

METRIC

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SUPERSEDING

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PERFORMANCE SPECIFICATION

HARBOR, APPROACH, COASTAL AND GENERAL NAUTICAL CHARTS

This specification is approved for use by all Departments and Agencies in the Department of Defense.

1. SCOPE

1.1 Scope. These specifications define requirements for the National Imagery and Mapping Agency's Harbor, Approach, Coastal and General nautical charts at all scales.

1.2 Purpose. This document provides the basic information necessary to standardize nautical charts in format, content and product design. Conformance to these specifications will assure uniformity of treatment among all Department of Defense elements engaged in a coordinated production program for these charts.

1.2.1 Authority. The statutory authority for the National Imagery and Mapping Agency (NIMA) to publish nautical charts is contained in Sections 2791, 2792, 2793 and 2794 of the U.S. Code, Title 10, Chapter 639.

1.3 Classification. Nautical Charts in this specification are classified by scale and intended use as either harbor charts, approach charts, coastal charts or general charts (see 3.5).

2. APPLICABLE DOCUMENTS

2.1 General: The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3 and 4 of this specification, whether or not they are listed.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Director, National Imagery and Mapping Agency, ATTN: Doctrine and Force Development Office/DF, Mail Stop P-37, 4600 Sangamore Road, Bethesda, MD 20816-5003, or by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

AREA MCGT

DISTRIBUTION STATEMENT A. Approved for public release, distribution unlimited. These specifications are unclassified.

MIL-PRF-89201B2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation (see 6.2).

DEPARTMENT OF DEFENSE

MIL-STD-2414 - Standard Practice Bar Coding for Mapping, Charting, and Geodesy Products

NATO STANDARDIZATION AGREEMENTS (STANAGS)

STANAG 1113 - General Specifications for Projections Required for Nautical Charts for Polar Regions and the Higher Latitudes.

STANAG 2211 - Geodetic Datums, Spheroids, Grids, and Grid References.

STANAG 3673 - Identification of Source Data on Nautical and Special Naval Charts.

STANAG 3678 - Method of Adding the Military Grid to Nautical Charts in the NATO Area.

(Copies of the above specifications, standards, and handbooks are available from the DoD Single Stock Point for Specifications and Standards (DODSSP), 700 Robbins Avenue, Building 4/D, Philadelphia, PA 19111-5094.)

2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those specified in the solicitation

NATIONAL IMAGERY AND MAPPING AGENCY PUBLICATIONS

DMA TM 8358.1 - Datums, Ellipsoids, Grids, and Grid Reference Systems

NIMA TM 8350.2 - Department of Defense World Geodetic System, 1984

NAVAL OCEANOGRAPHIC OFFICE

GDEM-V Generalized Digital Environmental Model - Variable (GDEM-V)

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(Copies of the above publications are available from Director, National Imagery and Mapping Agency, ATTN: ?????, 4600 Sangamore Road MS ???, Bethesda, MD 20816-5003.

- Chart No. 1 - Nautical Chart Symbols Abbreviations and Terms
- Pub. No. 9 - The American Practical Navigator

(Copies of the above NIMA publications are available for DoD users from the Director, National Imagery and Mapping Agency, ATTN: ?????, 4600 Sangamore Road MS ???, Bethesda, MD 20816-5003. Civil users can order them from the NOS Distribution Branch N/CG33 National Ocean Service, 6501 Lafayette Avenue, Riverdale, Md. 20737-1199

DMA Standard - U.S. Customary and International - Feet to
Conversion Table Meters, Meters to Feet, 2nd Ed., May 1979.
No. 1

DMA Standard - Meters to Feet to Fathoms & Feet (1463 meters
Conversion Table per second), 2nd Ed., May 1979.
No. 2

DMA Standard - Fathoms, Fathoms & Feet, Feet to Meters, Meters
Conversion Table & Decimeters (1500 meters per second), 2nd Ed.,
No. 3 May 1979.

DMA Standard - Fathoms & Feet to Feet to Meters & Decimeters,
Conversion Table 1st Ed., September 1982.
No. 4

Nautical Cartographer's Handbook

NIMA Standard Printing Catalog (SPC)

(Copies of the above publications are available from the National Imagery and Mapping Agency, ATTN: GIM, 4600 Sangamore Road, Bethesda, MD 20816-5003.

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the DoDISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS are the issues of the document cited in the solicitation (see 6.2).

INTERNATIONAL HYDROGRAPHIC ORGANIZATION

- IHO INT 1 - Symbols Abbreviations Terms Used On Charts
- IHO MP-004 - Chart Specifications of the IHO and Regulations of the IHO for International (INT) Charts
- IHO S-44 - IHO Standards for Hydrographic Surveys

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IHO S-46 - Correction of Echo Soundings

(Copies of the above publications are available from the International Hydrographic Bureau, Monaco.)

BRITISH ADMIRALTY HYDROGRAPHIC OFFICE

NP139 - Echo Sounding Correction Tables

(Copies of the above publication are available from the British Admiralty Hydrographic Office, Taunton, UK.)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First Article. When specified (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.2.

3.2 Accuracy.

3.2.1 Horizontal Accuracy. The absolute horizontal accuracy requirement for Harbor, Approach, Coastal and General Charts is 1.0 mm (at chart scale) circular error (CE) to the preferred datum, at a 90% confidence level. See 6.4.3 for definition of CE.

3.2.2 Vertical accuracy.

3.2.2.1 Topographic Accuracy. This section is not applicable to this specification.

3.2.2.2 Hydrographic Accuracy. The absolute vertical accuracy requirement for depth information shown on NIMA's Harbor, Approach, Coastal and General Charts is specified in the current edition of the IHO Special Publication No. 44 (S-44).

3.2.3 Hydrographic data accuracy. NIMA strives to compile nautical charts with the most accurate information available, but NIMA charts are compiled from a variety of sources, with varying accuracies. Often the metric accuracy (expressed as circular and linear error at a certain level of confidence) of the hydrographic and bathymetric data is unknown, or the information is not available to NIMA. In this case, a subjective determination of accuracy is made, based on the survey dates, scale, and originating agency of the source.

3.2.4 Tolerance for graticules. The intersections of the parallels and the meridians will be within 0.1 mm (0.005 in.) of their computed positions.

3.3 Datum.

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3.3.1 Horizontal Datum. For new production, as charts are revised or updated for periodic maintenance, the WGS 84 or NAD 83 datum shall be used. Where appropriate, a revised Military Grid System, also based on WGS 84 or NAD 83, shall be depicted as the primary grid (purple), and if required, the overlapping grid (blue). The old (local) datum and secondary grid will not be shown. Charts on the Mercator projection will show interior ticks in addition to border ticks, due to the curvature of grid lines on that projection.

3.3.2 Vertical datum. Features shown on nautical charts are referenced to one of three vertical datums. Topographic features are referenced to Mean Sea Level. Shorelines generally represent the land-water interface at Mean High Water. The hydrographic features are referenced to a vertical datum based on a low water tide level and is called the sounding datum or chart datum. The specific low water datum used depends on the type of tide in the area or on the number and magnitude of high and low tides in one tidal cycle.

3.4 Security. The security classification of Harbor, Approach, Coastal and General Charts shall be the lowest category practicable. When it becomes necessary to assign a security classification to the product, it shall be in accordance with established national procedures.

3.5 Chart classification by scale. There are four basic types of nautical charts based on scale and function. The scale categories are not rigid and may vary from area to area.

a. General charts are those charts with scales of 1:600,000 and smaller. They show major ocean basins, major seas and bays. They are used for oceanic route planning and deep-ocean navigation. They show minimal detail, with the understanding that the mariner will use larger scale charts for actual plotting of fixes and navigating near shore.

b. Coastal charts range in scale from 1:150,000 to 1:600,000. They show coastal areas, and are intended for navigation *along* the coast, but not close to or approaching it. For this reason, only major aids to navigation are portrayed, especially if larger scale charts show the same area. Inshore information may be greatly generalized. Offshore dangers are portrayed but are generalized if larger scale coverage exists.

c. Approach charts, with scales of 1:50,000 to 1:150,000, are used for inshore navigation and for approaching ports and harbors. They portray all aids to navigation usable by the mariner in the area, as well as dangers, but may generalize harbor information where a harbor chart exists. If there is no harbor chart for a given place, the approach chart may show all such information.

d. Harbor charts have scales of 1:50,000 and larger and are used for navigation within and around ports and harbors. All aids to navigation and dangers are shown, as well as information on the facilities and services of the port, and detailed information on depths, especially in channels and alongside berthing facilities.

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3.6 Chart design. Nautical charts rely upon a layered coverage at different scales to bring a navigator into port. This is because the same detail cannot be shown on a small scale chart as on a large scale chart.

3.7 Charts in a series. Some charts may be part of a coordinated series. Charts in a series have a common scale that is computed at the series midpoint. A coordinated series is identified by the common mid-latitude stated in the title.

3.8 Size and dimension. Size and dimension of a chart are dependent on scale and coverage requirements of a given area combined with the availability of chart compilation data. Chart dimensions are also subject to modification when attempting to locate a chart's neatlines on exact graduation subdivisions.

3.9 Projection.

3.9.1 Purpose of projection. A nautical chart represents part of the spherical earth on a plane surface. Because a sphere cannot be transferred to a flat surface without distortion, the sphere surface is "projected" onto a "developable surface". A developable surface is one that can be flattened to form a plane. This process is known as chart projection. Most NIMA Charts will be constructed on a Mercator or Transverse Mercator projection.

3.9.2 Projections for use at higher latitudes. As required by the NATO Standardization Agreement (STANAG) 1113MC (Edition No. 3), "General Specifications for Projections Required for Nautical Charts for the Polar Regions and the Higher Latitudes", the type of chart projections that would normally be used in polar regions and higher latitudes are shown in the following matrix:

<u>Latitude</u>	<u>1:50,000 or Larger</u>	<u>1:50,001 and smaller</u>
Lower than 80°(if chart extends above 80°, greater part is below 80°)	Mercator	Mercator
70° or higher, but does not cover pole	Mercator*, Transverse Mercator or Lambert Conformal	Polar Stereographic or Lambert Conformal
Higher than 70° and covers pole	Not Applicable	Polar Stereographic

* Harbor and Approach charts of scales 1:50,000 and larger may be compiled on a Transverse Mercator projection.

3.9.3 Graticule spacing. Graticule lines cannot be spaced a standard distance apart, because nautical charts are produced at various scales, and the length of a degree of longitude varies with latitude. The navigator must be able to reach from any point on the chart to a graticule line, using his dividers. Therefore, graticule lines on nautical charts are spaced from about 11.25 cm (4.5 inches) to about 25.0 cm (10 inches) apart. All parallels and

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meridians shown on the chart shall be labeled. Graticule lines should be matched to a standard increment of latitude and longitude along the border. For example, if the border is to be labeled every five minutes, the interior graticule lines should be shown at an increment that can be divided by five. If the border is to be labeled every thirty minutes, the graticule lines should be shown at an increment that can be divided by thirty minutes. Preference should be given to increments that include whole degrees.

3.9.4 Projection lineweights. Lineweights for the graticule are 0.13 mm (0.005 in.). See Section 3.11.36 and APPENDIX C for detailed information on border styles.

3.9.5 Graticules on insets. Graticules shall be shown on insets (small, medium, or large scale) based on the size of the inset. If the inset is larger than 11.25 cm (4.5") square then at least one set of latitude and longitude lines should be shown. The logic that is used for graticule lines on the main body of the chart also holds for insets, with the exception that if the inset is of a small size (less than 11.25 cm or 4.5" square) the graticule lines can be eliminated.

3.10 Grid reference systems

3.10.1 Portrayal requirements. All nautical charts at scales from 1:25,000 to 1:300,000 will carry a UTM or other appropriate grid. For further information on UTM and other grids, see DMA TM 8358.1.

3.10.2 Grid line spacing. Grid ticks, or if a special requirement dictates grid lines, shall be spaced according to TABLE 1. The grid, however, must not be so closely spaced as to detract from the chart information, or spaced so far apart as to be inconvenient when locating points.

<u>Scale</u>	<u>Interval</u>
Larger than 1:25,000	None
1:25,000 - 1:45,000	5,000 meters
1:45,001 - 1:95,000	10,000 meters
1:95,001 - 1:199,999	20,000 meters
1:200,000 - 1:300,000	50,000 meters
1:300,001 and smaller	None

Table 1. Spacing of grid lines/ticks.

The grid interval on the actual chart ranges from 5 to 15 centimeters (2 to 6 inches) using the above table. Ease of referencing is the main reason for the table; the second consideration is suitable spacing to reduce chart clutter.

3.10.3 Grids on insets and plans. Grids will be shown on insets (including plans) of charts with grids except when the inset is of a smaller scale than the main chart. Charts composed of several plans will show grids on each plan, regardless of the scale differences between plans. The grids will be portrayed as follows:

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On insets and plans the grid line interval should be selected so that at least two grid lines are shown horizontally and two vertically, even though the interval does not conform to FIGURE 1.

3.10.4 Border ticks and interior ticks. Portrayal of border ticks only, or border ticks and interior ticks is based on the following criteria:

a. All nautical charts on the Transverse Mercator Projection, requiring a UTM or other grid will contain border grid ticks. Full or continuous grid lines will be shown when a specific requirement is validated.

b. On Mercator and other projections where the grid will not be parallel lines, the grid will be shown by border ticks and where necessary, by interior grid intersections (+).

3.10.5 Overlapping grids. UTM grids normally consists of grid zones extending 3° west and 3° east of a central meridian, which is labeled with a easting of 500,000 meters. The grids from the adjacent grid zones are extended beyond the grid zone junction so that dual grids will be shown on charts containing a junction. The extent of the grids will be subject to the conditions in Section 3.10.6. However, extending the grid to the west more than 500,000 meters should be avoided to preclude showing negative grid values.

3.10.6 Extent of overlapping grid coverage. At scales of 1:75,000 and larger, both grids will be shown across the entire chart. The overlapping grid is omitted if there are no land bodies within the 40 km overlap area. At scales smaller than 1:75,000, both grids will extend one set of border ticks beyond the zone junction.

3.10.7 Grid color. Primary grid ticks are printed in purple, and overlapping grid ticks are printed in blue.

3.10.8 Grid labeling (exterior).

a. Border ticks will be labeled centered between the neatlines and border, with the labels centered on the ticks (or as near as possible).

b. Grid values shown on the side of the chart will be oriented parallel to the neatline with the tops of the characters toward the West. Grid values for eastings will be oriented with the tops toward the North.

c. Unless a special requirement exists for showing full grid values on all ticks, only the ticks nearest each corner will be labeled with full grid value indicating ^mN or ^mE as appropriate. Any tick designating a 100,000 meter square, that is not a corner tick, will show the full compliment of zeros but no letter designations.

d. Charts will show two principal figures representing 10,000 and 1,000 meters, preceded by one or two smaller figures. Example: ⁶87 ⁴¹55

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e. The principal digits and the direction will be in 10 point News Gothic Condensed all other digits will be 6 Point News Gothic Condensed.

3.10.9 Grid labeling (interior). Interior ticks at intersections of grid lines will not be labeled in any manner.

3.10.10 Notes (grid system). Explanation of the grid system and data pertaining to the major grid will be shown on all charts as follows:

3.10.10.1 Grid caution note. The following note referring to the convergence between grid north and true north will be shown on all charts that have military grid ticks. This note will apply equally to all grids shown as ticks regardless of the projection used. The following note will be shown in the same color as the primary grid:

<p>CAUTION</p> <p>Grid lines constructed by connecting border ticks are not true North and South. The resulting UTM grid is NOT to be used for navigation. It is designed to facilitate reporting of positions in accordance with the Military Grid Reference System (MGRS).</p>

Figure 1. Grid caution note.

If the grid is not a UTM grid, replace "UTM" in the above note with the proper name of the grid (i.e. BN, ITM).

3.10.10.2 Grid reference box. Each chart with a grid overprint will contain a grid reference box with instructions and pertinent data for composing standard grid references. Appropriate information as shown in the grid boxes illustrated on the style sheets (see APPENDICES A and B) will be used on all charts that have grid ticks. For charts with only border ticks the wording will be changed to read: "To form 10,000 meter squares, join the ticks on neatlines with straight line segments." No overlapping grid (blue) information will be shown inside the Grid Reference Box if the grid junction falls outside chart limits. See APPENDIX A for an example of a grid box with no overlapping grid, and APPENDIX B for an example of a grid box with an overlapping grid.

3.10.10.3 Sample point. A sample point is a point or object shown on the chart whose grid coordinates are given in the grid reference box to assist in the explanation of the Grid Reference System. Only one sample point and note will be used on each chart even though more than one plan or chart is printed inside a common border. The chart or plan on which the sample point falls will be indicated e.g. MAST (PLAN B) PG417590 in purple type. The sample point selected should be an easily identified, permanent point not subject to change by weekly Notice to Mariners.

3.10.11 Gisement. On gridded nautical charts, when necessary because of a special requirement, a gisement (grid declination) will be computed and placed on the chart according to the following:

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a. The gisement of those charts oriented north-south shall be determined for the mid-latitude of each of its bounding meridians.

b. On skewed charts the point of determination shall be the intersection of the parallel and meridian, to the nearest minute, approximately at the physical center of the chart.

3.10.11.1 Computation of gisement. The computation of the gisement shall be accurate to the nearest minute of arc, and shall be obtained by using the following formula:

$$\text{Grid Declination} = \text{DkSIN}(v)$$

Departure from grid zone central meridian expressed in minutes, multiplied by the sine of (latitude), gives the grid declination in minutes of arc. The grid declination is east or west depending on whether the point is to the east or west of the central meridian of the grid zone. When a zone junction occurs within the chart limits, grid declination will be computed at the zone junction, in addition to the grid declinations at the east and west edges of the chart.

Computation of example grid declination

TOP LATITUDE	31°41'00"
MINUS BOTTOM LAT	31°19'00"
DIFFERENCE	22'
DIFFERENCE/2	11'
DIFFERENCE/2 +	
BOTTOM LAT = LAT MIDPOINT	31°30'00"

DEPARTURE

	West Edge of Chart	East Edge of Chart
CENTRAL MERIDIAN	135°00'	135°00'
MINUS LON OF CHART EDGE	133°40'	134°20'
= DEPARTURE	1°20'	40'
DEPARTURE IN MINUTES	80'	40'

$\text{SIN}(\text{LAT.}) \text{ MIDPOINT} \times \text{DEPARTURE (IN MINUTES)} = \text{DECLINATION (MINUTES)}$

SIN of 31°30'00" (Midpoint Lat.)	0.522498	0.522498
MULTIPLIED BY DEPARTURE	80'	40'
EAST OR WEST OF TRUE NORTH	(41.79)	(20.89)
NORTH (CENTRAL MERIDIAN)	42'W of TRUE N.	21'W of TRUE N.

The computation data page for each chart will be reviewed and inserted as part of the chart record.

3.10.11.2 Gisement caution. The following caution will be shown in place of the note specified in 3.10.10.1)(content of the note is variable). The declination note is the same color as the grid.

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CAUTION
GRID LINES ARE NOT TRUE NORTH AND SOUTH

At West edge of chart Grid N is 0°40'E of True N
 At East edge of chart Grid N is 0°35'E of True N

Figure 2. Grid declination note.

3.11 Margin data.

3.11.1 General. Margin data and other notes consist of textual and graphic information used to identify the product and to enhance its usability. This section will provide information on use, content, applicability, position, type style and size, and color of required chart format items. The terms fixed, variable, and preferred, as defined below, will be used to identify content and position of marginal data.

3.11.1.1 Fixed. The item is always portrayed exactly as described in this section.

3.11.1.2 Variable. When used to describe content, the notes must be written to specifically apply to an individual chart. When used to describe position, variable means that the item is placed on the chart so that the least chart detail is obscured. Paragraphs a-d below list the preferred order for placing variable items.

a. On land areas, not to obscure navigational aids such as lights, radio navigational aids, or significant landmarks. If possible, the notes will be stacked in the following order, with at least 5 mm vertical spacing between each note:

1. Main Title Block
2. Sounding Velocity Note
3. Datum Conversion Note
4. Source Diagram
5. Source Listing
6. Copyright Note
7. Caution Note
8. General Note
9. Buoyage Note
10. Index to Next Larger Scale Charts
11. Tidal Information
12. Glossary
13. Military Grid Information

Not all of these notes will always apply to an individual chart. Also, the stacking may need to be separated due to space limitations.

b. In the upper margin, at least 5 mm above the heavy border line.

c. In the right margin, at least 5 mm from the heavy border line.

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d. On water areas, obscuring as little hydrography as possible, and not obscuring navigational aids. The same stacking preference as applies to land areas will be used for notes in water areas.

e. These placement rules will be adjusted to suit individual charts. For instance: the main title block may fit in the upper margin; source diagram, source listing, copyright note, and general note might fit in the right margin; and the rest of the notes would be stacked on land areas.

3.11.1.3 Preferred. This term will be used only for positioning. If possible, the margin data will be portrayed as described in this section. If the preferred position is not possible, then the position becomes variable, and placement rules for variable notes will apply as previously stated.

3.11.1.4 Requirements. APPENDIX A, the Plan Border Style Sheet, and APPENDIX B, the Scale Border Style Sheet, are intended for use as graphic illustrations of the positions described in this section. Fixed and preferred positions are portrayed the same way on the style sheets. Variable positions are shown on the style sheets without measurements. All example margin notes shown in section 3.11 of this specification are portrayed in a convenient font type and size for desktop publishing. The correct fonts (type size and style), color, justification, format, and placement for all margin notes and diagrams are provided in APPENDICES A and B.

3.11.2 Buoyage notes.

3.11.2.1 Use. The buoyage note tells the user which maritime buoyage system (Region A or Region B) is in effect for the area covered by the chart.

3.11.2.2 Applicability. The buoyage note is shown on charts at scales of 1:500,000 and larger, as authorized by the NIMA Marine Navigation Department.

3.11.2.3 Content. One of four buoyage notes may be shown on the chart.

BUOYAGE

IALA Buoyage System, Region A,
is in effect in the area covered
by this chart. See Chart No. 1.

Figure 3. Region A in effect.

BUOYAGE

IALA Buoyage System, Region B,
is in effect in the area covered
by this chart. See Chart No. 1.

Figure 4. Region B in effect.

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CHANGES IN BUOYAGE

Certain buoys, lights and beacons within the area of this chart will be affected by the implementation of the conversion to the IALA Maritime Buoyage System, Region A. For further explanation, see annual NM 1(6) and Chart No. 1.

Figure 5. Conversion to IALA Region A.

CHANGES IN BUOYAGE

Certain buoys, lights and beacons within the area of this chart will be affected by the implementation of the conversion to the IALA Maritime Buoyage System, Region B. For further explanation, see annual NM 1(6) and Chart No. 1.

Figure 6. Conversion to IALA Region B.

3.11.2.4 Position. The position of the buoyage note is variable.

3.11.2.5 Type. The headings - "BUOYAGE" and "CHANGES IN BUOYAGE" are shown in 10 point Techno Medium, upper case. The text of the note is shown in 8 point Techno Medium, upper and lower case.

3.11.2.6 Color. SPC 58600 Black - Solid.

3.11.3 Reserved.

3.11.4 Caution notes.

3.11.4.1 Use. Caution notes are shown on charts to warn the user of dangers to navigation.

3.11.4.2 Applicability. Caution notes are applied to charts on an individual basis.

3.11.4.3 Content. The content of caution notes is variable, although the wording may be standardized in some cases, as in 3.10.10.1. regarding cautions for use of UTM grids. There are two parts to a caution note: the note itself, and the caution referenced.

3.11.4.4 Caution box format. The type for caution notes is justified on both sides and enclosed in a box with a 0.38 mm line weight. The box should be no wider than 10 cm, but the height is variable.

a. A single caution is shown in the box beneath the heading "CAUTION". The heading is centered on the note (see FIGURE 7).

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b. Multiple cautions are numbered and shown in the box beneath the heading "CAUTIONS". The heading is centered on the note. Specific cautions (i.e., those applying to a specific part of the chart) shall be listed first, followed by the more general ones (i.e., those applicable to the entire chart), (see FIGURE 8).

<p>CAUTION</p> <p>Differences in latitude and longitude may exist between this and other charts in the area; therefore, the transfer of positions from one chart to another should be done by bearings and distances from common features.</p>

Figure 7. Single caution note

<p>CAUTIONS</p> <ol style="list-style-type: none"> 1. Mariners are cautioned against anchoring or fishing within the area indicated by a circle north of Erins Bank due to the existence of underwater obstructions. 2. Flag A, the International Code, when flown by ships in the vicinity of the Measured Distance Markers indicates that speed trials are being run. 3. Submarines exercise frequently in the area covered by this chart. 4. Differences in latitude and longitude may exist between this and other charts in the area; therefore, the transfer of positions from one chart to another should be done by bearings and distances from common features.

Figure 8. Multiple cautions note

3.11.4.5 Caution references. If cautions contained in the caution note concern only a certain area of the chart, a caution reference is placed in the body of the chart in the applicable area. Caution notes which apply to the entire chart do not require a caution reference.

a. If only a single caution is contained in the caution note, the caution reference is fixed, and reads "*SEE CAUTION*" (see FIGURE 9).

SEE CAUTION

Figure 9. Caution reference to a single caution.

b. If multiple cautions are shown in the caution note, the caution reference is variable to refer to the correct caution number (see FIGURE 10).

CAUTION NO 2

Figure 10. Caution reference to a numbered caution.

c. If more than one caution in a caution note applies to the same area, each applicable caution is referenced in the caution reference. Use dashes to

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separate consecutive cautions, "&" to separate nonconsecutive cautions. Periods and commas are not shown (see FIGURE 11).

CAUTION NOS 1-3 & 5

Figure 11. Caution reference to multiple cautions.

3.11.4.6 Position. The position of the caution note is variable.

3.11.4.7 Type. The heading of the caution note is shown in 10 point Techno Medium, upper case. The text of the caution note is shown in 8 point Techno Medium, upper and lower case. The caution reference is 10 or 12 point Techno Medium Italic, upper case.

3.11.4.8 Color. SPC 96532 Purple - Solid.

3.11.5 Chart number.

3.11.5.1 Use. Chart numbers are assigned to hydrographic charts in accordance with the scale range and geographical area of coverage of the chart. Five digit numbers are assigned to Harbor, Approach, and Coastal Charts of scales 1:2,000,000 and larger, which cover portions of the coastline rather than significant portions of ocean basins. These numbers are based on the regions of the nautical chart catalog. The first of the five digits indicates the region; the second digit indicates the subregion; the last three digits indicate the geographical sequence of the chart within the subregion. Four digit numbers are used for special purpose charts. Two and three digits numbers are assigned to those small scale charts 1:2,000,000 and smaller which depict a major portion of an ocean basin.

3.11.5.2 Applicability. Chart numbers appear on each chart.

3.11.5.3 Content. Each chart number is two to five digits long. The content is variable (see FIGURE 12).

62430

Figure 12. Sample chart number.

3.11.5.4 Position. The chart number is shown four times on each chart, as shown on APPENDICES A and B.

3.11.5.5 Type. 30 point News Gothic.

3.11.5.6 Color. SPC 58600 Black - Solid.

3.11.6 Classification notes.

3.11.6.1 Use. Classification notes clearly identify the security classification of the chart.

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3.11.6.2 Applicability. Classification notes are shown on all charts with classifications of Confidential or higher.

3.11.6.3 Content. The content of the classification note is one of three fixed classifications (see FIGURE 13). A declassification note is also shown describing the authority required for declassification. The declassification note is enclosed within a box with a 0.2 mm (.008") line weight (see FIGURE 14 for example). A warning notice is also placed 2.5 mm (0.1") below the declassification box and centered. No box encloses the warning notice. The content of these notes is fixed.

**CONFIDENTIAL
SECRET
TOP SECRET**

Figure 13. Classification notes.

DERIVED FROM: MULTIPLE SOURCES DECLASSIFY ON: SOURCES MARKED "OADR" DATE OF SOURCE: DECEMBER 1996

WARNING NOTICE - SECURITY CLASSIFICATION IS BASED ON THE FACT OF EXISTENCE AND AVAILABILITY OF THIS SHEET. TO ENABLE UNCLASSIFIED REQUISITIONING, THIS SHEET MUST BE ORDERED BY REFERENCE NUMBER.

Figure 14. Sample declassification note and warning notice.

3.11.6.4 Position. Three classification notes, one declassification note and one warning notice are shown on classified charts (see FIGURES 13 and 14, and APPENDIX A).

a. One classification note is shown in a preferred position in the lower right hand corner of the chart margin, the right side of the note is 17 mm (0.67") away from the NSN bar code and reference number, the top of the note is 18 mm (0.71") below the south heavy border line, and the note is readable from the bottom of the chart.

b. One classification note is shown in a fixed position in the upper left hand corner of the chart margin. The left side of the note is 60 mm (2.4") away from the extension of the north heavy border line, the top of the note is 3 mm (0.12") away from the west heavy border line, and the note is readable from the left side of the chart.

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c. One classification note is shown centered 2.5 mm (0.1") above the main title.

- If the main title is shown in its preferred position on land (See 3.11.25.4), a classification note is shown 2.5 mm above the NIMA seal centered on the main title and readable from the bottom of the chart.
- If the main title is shown in the upper margin of the chart a classification note is shown 2.5 mm (0.1") above the uppermost line of the main title, centered, and readable from the bottom of the chart.

d. The preferred position of the declassification note is in the lower right corner of the chart border, approximately halfway between the warning note (see 3.11.35) and the publication note (see 3.11.29). The top of the box is 2 mm (0.08") below the south heavy border line. The note is 60 mm (2.4") wide and is readable from the bottom of the chart. The warning notice is centered 2.5 mm (0.1") below the declassification box and is 87 mm (3.5") wide.

3.11.6.5 Type. The classification notes in the lower right and upper left chart margins are shown in 30 point News Gothic upper case. The classification note above the main title is shown in 20 point News Gothic upper case. The declassification note and warning notice are shown in 10 point News Gothic Condensed upper case.

3.11.6.6 Color. SPC 58600 Black - Solid.

3.11.7 Source Listing

3.11.7.1 Use. The source listing provides information on the origins, scales and dates of the hydrographic sources. The primary purpose of the source listing, used in conjunction with the source diagram, is to assist navigators and those involved in planning "navigational operations" (including the planning of new routes and routing measures) on the degree of confidence they should have in the adequacy and accuracy of charted depths and positions. As a secondary function, the source listing serves as a readily accessible, but not necessarily comprehensive, record of the sources that were used to compile the chart.

3.11.7.2 Applicability. A source listing is shown for each chart of coastal scale and larger. General charts do not require source listings.

3.11.7.3 Content. Source data consists of five parts; the source diagram (see 3.11.8), the source listing, the note "With additions from other sources," miscellaneous notes, and the foreign copyright note. In all cases, the specific hydrographic sources used in the compilation of the chart will be cited with an attempt to list the original survey date of chart sources in parenthesis.

3.11.7.3.1 Source listing. The source listing reveals the identity, scale, date and origin of each source in the source diagram. Each source is identified by a letter, which is keyed to a specific area in the source

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diagram. If only one source was used, the letter identifier is not shown on the source data list. See FIGURE 15. The single-source source listing requires the header "SOURCE LISTING" in 8 point Techno Medium type, upper case.

a. For hydrographic survey sources, the country of origin, date and scale shall be listed. Surveys of similar origin, type, date and scale may be grouped together to avoid too long a list or too complex a diagram, for example, French Surveys, 1978-1983, 1:20,000-1:30,000. Dates are grouped as follows: prior to 1940 (no sonar), 1940s (sonar but no electronic positioning), and 1950s and later (both sonar and electronic positioning). Lead line and echo-sounder surveys should not be grouped together.

b. For chart sources, the producing country, chart number, edition year, correction year (if different than the edition year), and scale shall be listed. If survey information is available from the source, the source of the survey and dates shall be shown, with surveys of similar origin and type grouped. If only a portion of a source chart is utilized, list only the survey information actually falling within the limits of utilization.

c. If known, the type of survey, such as "sketch survey" or "reconnaissance survey" shall be shown. These terms imply that there is a significant risk of undetected dangers, even if the survey is of a recent date. "Random track data" (i.e., IHO passage soundings) implies soundings acquired on an uncoordinated basis over a period of years. "Unsurveyed" indicates no data of any kind; it should be written in the appropriate area on the diagram, but not shown in the source listing. Qualifying terms such as "leadline" or "no sonar" may be added after the type of survey where the date does not give sufficient indication of the survey methods. Where a charted survey is supplemented by occasional soundings from older or later sources, only the main survey should normally be listed.

d. If unconventional or remotely collected bathymetry was used, it shall be identified in the source listing. An example is shown in FIGURE 16, I & J.

e. The sources used to compile the shoreline may be shown if considered useful (See FIGURE 16, example Z).

f. In listing sources, the only country name that shall be abbreviated is the U.S. All other country names shall be spelled out. "British Admiralty" shall be spelled out when citing chart sources, and "British" shall be used when citing surveys, originating from the Hydrographic Department, Ministry of Defence of the United Kingdom. Surveys made by non-government agencies, such as oil companies, shall be called "Commercial Surveys."

g. The sources should be listed with the most recent first, but surveys should precede references to charts. The importance of a major survey may require it to be placed first.

3.11.7.3.2 Other sources note. At the bottom of the source listing is the note "With additions from other sources" The content of this note is

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fixed. This part of the note allows minor sources to be used for enhancement, without listing them in the source data.

3.11.7.3.3 Miscellaneous notes. Notes are sometimes shown below the source list to provide the user with additional information about sources.

a. If soundings from a source cannot be corrected for sound velocity the source shall be identified in the source diagram. A note shall be added at the bottom of the list of hydrographic sources. It shall read: "* Uncorrected soundings" An asterisk shall be added to both the source reference line, as shown by sources A and B in FIGURE 16, and to the corresponding source identifier in the source diagram. When sounding correction information is noted in this manner, no sounding correction note is necessary because it is assumed that all other listed sources are corrected (see 3.14.2.5).

b. Miscellaneous notes are also used to identify sources with different units of soundings than what is shown on the majority of the chart, as shown by source H in FIGURE 16 (see 3.14.2.6.4.d).

SOURCE LISTING

Finnish Chart 909.....1:150,000
(Ed. 1955, from Finnish surveys in 1950)
With additions from other sources

This chart is based in whole or in part on information from other than official U.S. Government sources, as indicated above. Copyright restrictions of the country of origin continue to exist.

Figure 15. Example of a single-source source listing.

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*A - U.S. Navy Surveys, Archive No. 859424.....	1:30,000-1:50,000
(1976-1980)	
*B - U.S. Navy Survey, Archive No. 732560.....	1:25,000
(1946)	
C - British Survey, 1980 (Reconnaissance survey).....	1:75,000
D - Commercial Surveys, 1977-1986.....	1:18,000-1:24,000
E - Finnish Surveys, 1967-1972.....	1:20,000-1:40,000
F - Finnish Chart 909 (Plan).....	1:25,000
(Ed. 1955, from Finnish surveys in 1929)	
G - British Admiralty Chart 1234.....	1:40,000
(Ed. 1988, Corr. to 1992, from British surveys 1930 to 1935 and Passage soundings to 1987)	
+H - Swedish Chart 942.....	1:200,000
(Ed. 1958)	
I - Multispectral (LANDSAT), 1994	
J - Airborne Laser Sounder, 1993	
K - Random track data, 1987	
Z - Shoreline	
1 - Aerial Photography, 1994	
2 - Commercial Engineering Drawings, 1986	
3 - Finnish Chart 356, Ed. 1988.....	1:75,000
4 - Multispectral (LANDSAT), 1994	
With additions from other sources	
* Uncorrected soundings	
+ Meters and half meters	

This chart is based in whole or in part on information from other than official U. S. Government sources, as indicated above. Copyright restrictions of the country of origin continue to exist.

Figure 16. Example of a multi-source source listing.

<u>Source:</u>	<u>Example of:</u>
A.	Uncorrected soundings, scales, and dates (all after 1950) grouped together.
B.	Uncorrected soundings, date prior to 1950 shown as separate source. Also note the leader line in FIGURE 17.
C.	"British" survey, that is a also special type of survey.
D.	Commercial surveys, grouped into similar scales and ranges.
E.	Finnish surveys.
F.	Finnish source chart with plan survey information, only plan was used.
G.	"British Admiralty" chart, with edition and correction dates, no source data provided.
H.	Chart with date, and no source data provided. Depth units are meters and half meters.
I., J.	Examples of unconventional surveys.
K.	Random track data, which is listed after all other hydrographic sources.
Z.	Examples of shoreline sources. These are listed last, and identified as source "Z."

3.11.7.3.4 Foreign copyright note. When foreign charts or surveys are used as sources in the source listing, a copyright note is added beneath the source listing and miscellaneous notes, with a fixed content as shown in FIGURES 15 and 16. If only U.S. Government sources are used in the source listing, the copyright note is omitted. The foreign copyright note is in 8 point Techno Medium type, upper and lower case.

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3.11.7.4 Position. The position of the source data is variable but it must be shown adjacent to the source diagram (if applicable). The source data may be either 5 mm (0.20") below (preferred), or 5 mm (0.20") to either side of, the source diagram. The "other sources" note is shown directly below the source listing, followed by other miscellaneous notes (if applicable). The copyright note (if applicable) is positioned 5 mm (0.20") below the miscellaneous notes.

3.11.7.5 Type. 7 point Techno Medium, upper and lower case.

3.11.7.6 Color. SPC 58600 Black - Solid.

3.11.8 Source diagram.

3.11.8.1 Use. The source diagram is a miniature representation of the chart, that graphically illustrates the location of the various sources used in the compilation of the chart and is keyed to the source listing (see 3.11.7.3.1).

3.11.8.2 Applicability. Source diagrams are only shown on charts having more than one source.

3.11.8.3 Content. The content of the diagram is variable, except that the title - "SOURCE DIAGRAM" - is fixed. The linear dimensions of the graphic should normally be one-tenth those of the chart's neatline dimensions, with the longest side not to exceed 10 cm (4"); thus they may be reduced further if space is too limited to show the preferred size. The inner neatline is 0.13 mm (.005") lineweight, and the outer neatline is 0.38 mm (0.015") lineweight. The diagram is a miniature representation of the chart, and uses a generalized shoreline of 0.20 mm lineweight, with land tint as the only chart feature. Areas covered by chart or survey sources are outlined with a 0.13 mm (.005") lineweight. Letters, keyed to the list of sources in the source data list (see FIGURE 16), are shown in the appropriate area in 10 point Techno Medium type. Asterisks or plus signs are sometimes used preceding the letter to refer to notes in the source listing (see FIGURE 17). Points of change for shoreline sources are indicated by dotted lines (diameter: 0.1 mm (.004"), spacing: 0.75 mm (.03")) extending 3 mm (.12") inland.

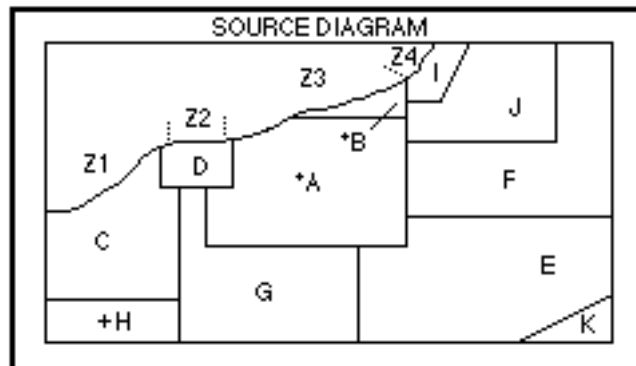


Figure 17. Example of a source diagram.

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3.11.8.4 Position. The position of the source diagram is variable. The preferred position is inside the neatline, on land, where it does not obscure any important chart detail. The positioning of the source diagram must also take into consideration the adjacent source listing. The source diagram and source listing may be placed outside the neatline on the top or right side of the chart when space is limited inside the neatline.

3.11.8.5 Type. The title "SOURCE DIAGRAM" is shown in 8 point Techno Medium, upper case. The preferred size of letters within the diagram is 10 point Techno Medium, upper case. Leader lines (0.1 mm (.004") linewidth) may be used to identify small areas.

3.11.8.6 Color.

a. Inner and outer neatlines, title, letters designating sources, shoreline, and source outlines are shown in solid black (SPC 58600).

b. Land tint is screened 12% black (SPC 58600) with a 45° screen angle.

3.11.9 Continuation notes.

3.11.9.1 Use. Continuation notes provide easy transition from one chart to another.

3.11.9.2 Applicability. Continuation notes are shown on all charts at or near the same scale, or charts intended for the same use, which are adjacent to one another.

3.11.9.3 Content. The first part of the continuation note is fixed, reading: "CONTINUED ON" The second part of the continuation note is variable.

a. If the adjacent coverage is another chart, the chart number is referred to in the continuation note (see FIGURE 18).

CONTINUED ON 62340

Figure 18. Continuation note for chart.

b. If the adjacent coverage is a panel or inset contained on the same chart (see 3.11.27), the second part of the continuation note refers to the specific panel or the inset, whichever is appropriate (see FIGURES 19 and 20).

CONTINUED ON INSET

Figure 19. Continuation note for insets.

CONTINUED ON PANEL A

Figure 20. Continuation note for panels.

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c. If the adjacent coverage on the panel or inset is at a different scale, type is added to the end of the continuation note (see FIGURE 21).

CONTINUED ON PANEL B AT SMALLER SCALE

CONTINUED ON INSET AT LARGER SCALE

Figure 21. Continuation note for panels and insets of different scales.

d. Labeling of adjacent coverage is mutual. For example a chart with two panels (A and B) would carry "CONTINUED ON PANEL A" on panel B and "CONTINUED ON PANEL B" on panel A. Insets refer to the main chart or to the panel which is extended by the inset. Changes of scale are also added to this note (see FIGURE 22).

CONTINUED ON MAIN CHART

Figure 22. Continuation note for inset referring to main chart.

3.11.9.4 Position. Continuation notes are shown in the area which is continued as other coverage and are aligned parallel with the inner neatline. The distance between the continuation notes and the inner neatline is 1 mm (.04"). The note is readable from the bottom of the chart when aligned parallel to the north or south inner neatlines, and from the right side of the chart when aligned with the west or east inner neatlines. The note should not be placed where it will obscure other chart detail.

3.11.9.5 Type. 8 point Techno Medium, upper case.

3.11.9.6 Color. SPC 58600 Black - Solid.

3.11.10 Corner coordinates.

3.11.10.1 Use. Corner coordinates give the user a quick reference to the geographical limits of the chart.

3.11.10.2 Applicability. Corner coordinates for the full extent of an area charted are to be shown on all charts. Inset plans carry corner coordinates only if they fall outside the area of the main chart. Charts consisting of several plans do not require corner coordinates to be shown on each plan.

3.11.10.3 Content. The content of corner coordinates is variable, and shows the longitude and latitude in degrees, minutes, and seconds value of the outermost neatlines on charts at scales 1:75,001 and smaller. On charts at scales of 1:75,000 and larger the coordinates are shown in degrees, minutes, seconds and tenths of seconds.

3.11.10.4 Position. The preferred position for corner coordinates (except those labeling curved graticules as in FIGURES 27 and 28) is parallel

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to and 1 mm (.04") inside the neatline the coordinate refers to, and 3 mm (.12") away from the perpendicular neatline. If displacement is necessary due to other significant chart features, the corner coordinate value may be moved outside the neatline. Latitude values are readable from the bottom of the chart and longitude values are readable from the right side of the chart.

a. Charts with neatlines extended in N-S or E-W directions (such as those constructed on Mercator projections) give a single value of latitude and longitude for the extent of each neatline. See FIGURE 23. Other charts, though oriented the same way, are nonrectangular in shape (such as those constructed on Transverse Mercator projections). These charts have parallel graticules of unequal length and meridional graticules which converge (see FIGURE 24). Both types show corner coordinates in the upper right and the lower left corners.

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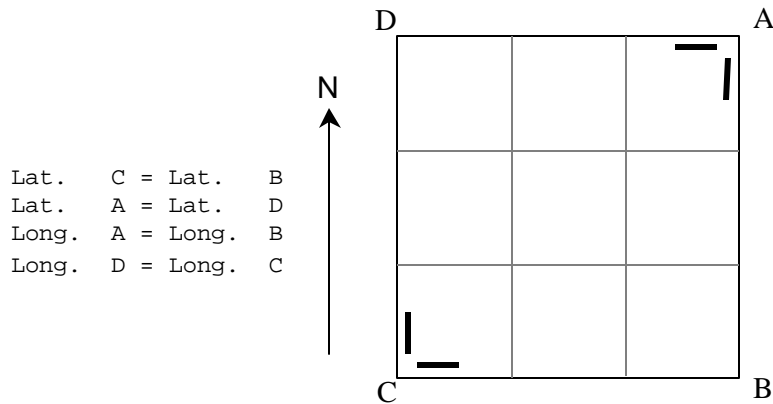


Figure 23. Rectangular graticule.

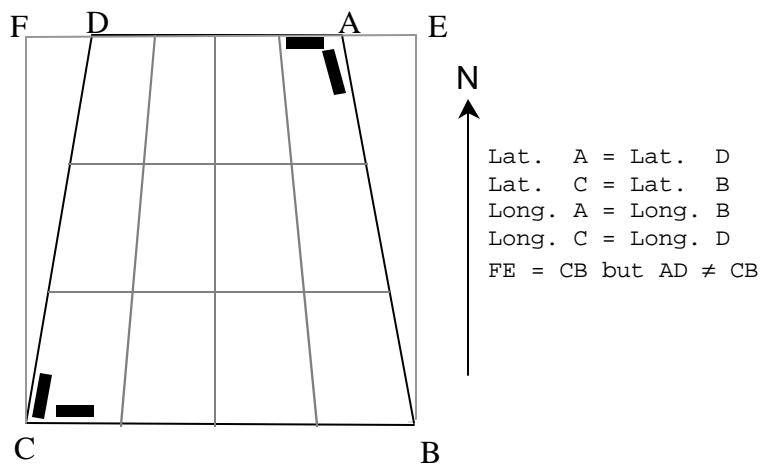


Figure 24. Converging graticule

b. On some N-S oriented charts, the neatlines do not represent constant values. These are charts whose meridians converge toward the poles, with the top and bottom neatlines having the same length due to the squaring off of the chart.

1. On these charts the limiting latitude is indicated at the lower left and upper right corners. The limiting longitude is indicated on the upper left and upper right corners for convergence to the North (see FIGURE 25), or at the lower left and lower right corners for convergence to the south (see FIGURE 26).

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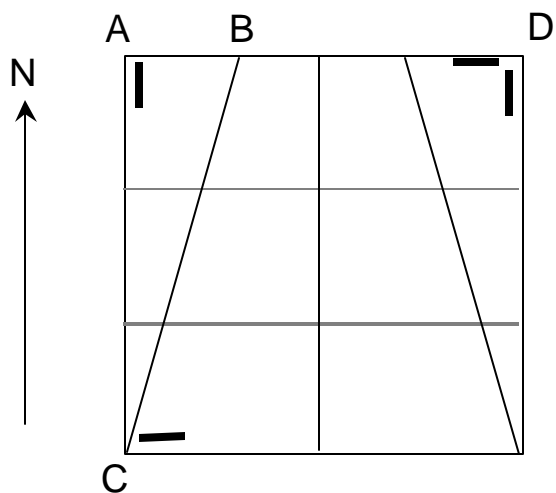


Figure 25. North Pole Convergence.

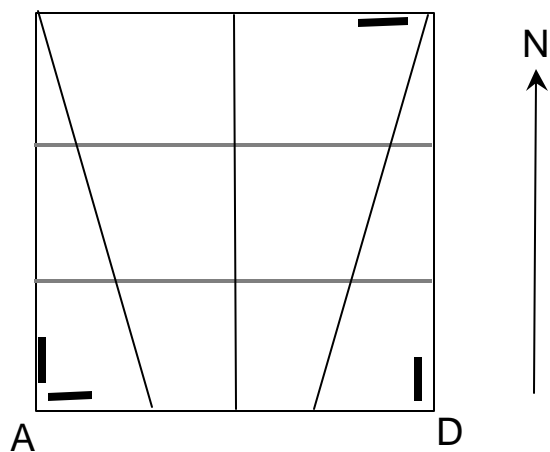


Figure 26. South Pole Convergence.

2. Some small scale charts have curved parallels of latitude. In these cases one of the latitude values will be shown at the point of greatest latitude extent, instead of at the corners (see Figure 27).

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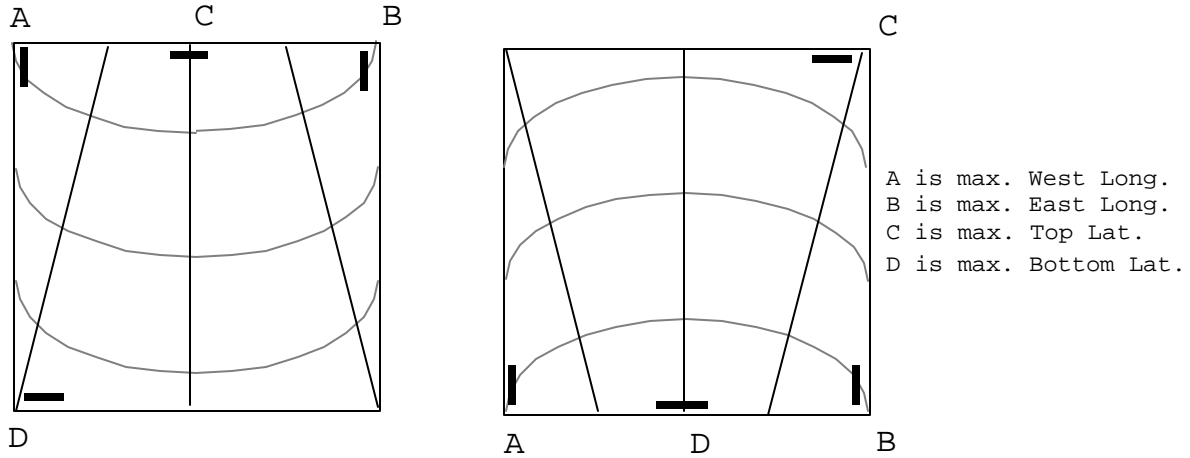


Figure 27. Curved graticules.

c. Charts which have skewed graticules carry labels in the farthest north, south, east, and west corners (see Figure 28).

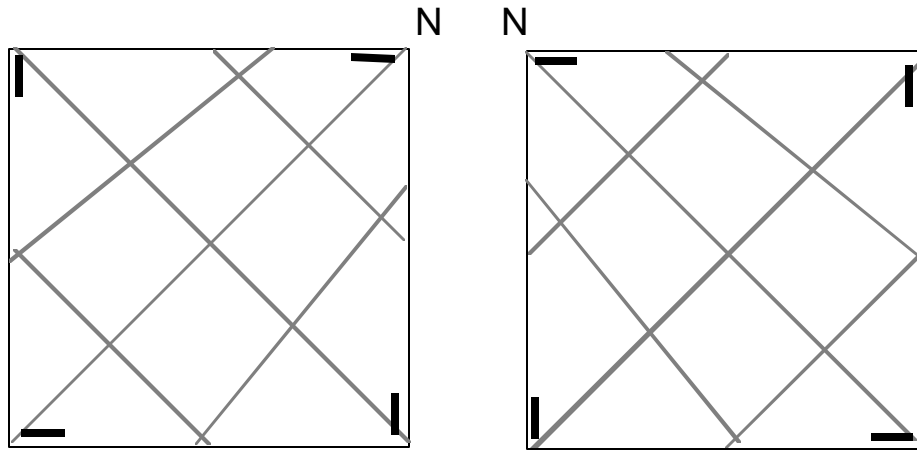


Figure 28. Skewed graticules.

d. Irregularly shaped charts or plans shall have their maximum extent indicated in the appropriate corner. The 2.5 mm clearance between the type and the corner may need to be changed in some cases (see Figure 29). Neatline extension (dog-ears) do not carry corner coordinates.

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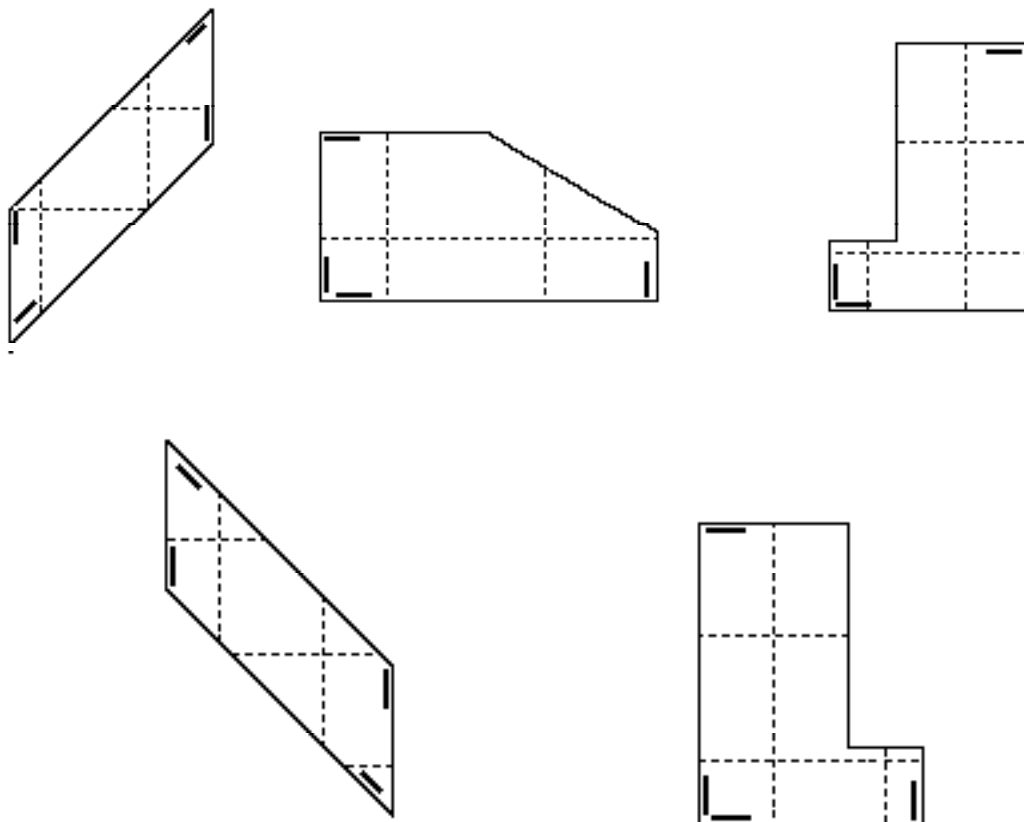


Figure 29. Irregularly shaped charts or plans.

3.11.10.5 Type. 6 point News Gothic, upper case.

3.11.10.6 Color. SPC 58600 Black - Solid.

3.11.11 Datum conversion notes

3.11.11.1 Use. Datum conversion notes inform the user of the compatibility of the chart with positions obtained from satellite navigation systems.

3.11.11.2 Applicability. Datum conversion notes are shown on charts at scales of 1:500,000 and larger not constructed on the World Geodetic System (WGS 84). No note is required if the chart is already on WGS-84.

3.11.11.3 Content. The content of the datum conversion note is variable, depending on the datum of the chart. The datum conversion note should not be more than 10 cm wide.

MIL-PRF-89201B**DATUM NOTE**

Positions obtained from satellite navigation systems referred to the World Geodetic System 1984 (WGS-84) * must be moved 0.77 minutes NORTHWARD and 0.77 minutes WESTWARD to agree with this chart.

Figure 30. Datum note for shift to WGS.

*Note: The datum "World Geodetic System 1984 (WGS-84)" is shown at scales of 1:50,000 and larger. The year is omitted from charts at scales 1:50,001 and smaller, i.e., "World Geodetic System (WGS)"

a. If the chart is not constructed on WGS, but a shift can be derived from the chart to WGS, the note is shown as in the example in FIGURE 30, filling in actual values to the nearest hundredth of a minute for shifts northward or southward and eastward or westward.

b. If the chart cannot be shifted to WGS because of the lack of a tie-in to the chart datum or if the chart is internally inconsistent; the datum note is fixed (see FIGURE 31).

DATUM NOTE

Adjustments for plotting positions obtained from satellite navigation systems based on the World Geodetic System (WGS) * cannot be determined for this chart.

Figure 31. Datum note used when chart cannot be shifted to WGS.

*Note: The datum "World Geodetic System 1984 (WGS-84)" is shown at scales of 1:50,000 and larger. The year is omitted from charts at scales 1:50,001 and smaller, i.e., "World Geodetic System (WGS)"

3.11.11.4 Position. The position of the datum note is variable, but should be placed close to the title block.

3.11.11.5 Type. The heading - "DATUM NOTE" - is shown in 10 point Techno Medium, upper case. The text is shown in 8 point Techno Medium, upper and lower case, except that the words "NORTHWARD" "SOUTHWARD" "EASTWARD" and "WESTWARD" are shown in upper case.

3.11.11.6 Color. SPC 58600 Black - Solid.

3.11.12 Depth conversion scale.

3.11.12.1 Use. A depth conversion scale allows the user to quickly convert depths from one unit to another, without calculation.

3.11.12.2 Applicability. The depth conversion scale is shown on each chart.

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3.11.12.3 Content. The content of the depth conversion scale is fixed. See APPENDICES A and B for an example of a depth conversion scale.

3.11.12.4 Position. The position of the depth conversion scale is fixed in the lower right side margin, readable from the bottom of the chart, 5.1 mm (0.20") away from the east heavy border line and 63.5 mm (2.5") above the south heavy border line.

3.11.12.5 Type. The label "DEPTH CONVERSION SCALE" is shown in 8 point News Gothic Condensed, upper case. The scale is shown in 5 and 7 point News Gothic Condensed, upper and lower case.

3.11.12.6 Color. SPC 58600 Black - Solid.

3.11.13 Limited distribution note.

3.11.13.1 Use. The "LIMITED DISTRIBUTION " note identifies charts that are intended for a special use and are published for limited distribution.

3.11.13.2 Applicability. Charts which are published for limited distribution are identified as such in the project special instructions, or other production management guidance.

3.11.13.3 Content

a. The content of the "LIMITED DISTRIBUTION" note is fixed (see FIGURE 32).

LIMITED DISTRIBUTION

Figure 32. Limited distribution note.

b. The content of the Distribution guidance note is fixed (see FIGURE 33).

Distribution authorized to DoD, IAW 10 U.S.C. Sect. 130 & 455. Release authorized to U.S. DoD contractors IAW 48 C.F.R. Sect. 252.245-7000. Refer other requests to Headquarters, NIMA, ATTN: Release Officer, Stop P-25. Destroy as "For Official Use Only". Removal of this caveat is prohibited.

Figure 33. Distribution guidance note.

3.11.13.4 Position. The "LIMITED DISTRIBUTION" note is shown in two places in the chart border and the distribution guidance note is shown in one location (see APPENDIX B).

a. One "LIMITED DISTRIBUTION" note is shown in a preferred position; in the lower chart margin, with the top of the note is 18 mm (0.71") below the south heavy border line, readable from the bottom of the chart. The distribution guidance note is shown 5 mm (0.20") below and centered on this

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LIMITED DISTRIBUTION note. The right side of the distribution guidance note is 17 mm (.67") from the left side of the NSN bar code and reference number.

b. One "LIMITED DISTRIBUTION" note is shown in a fixed position; in the upper left margin of the chart, 63.5 mm (2.5") from the extension of the north heavy border line, 2.5 mm (0.10") away from the west heavy border line, and readable from the left side of the chart.

3.11.13.5 Type. The note "LIMITED DISTRIBUTION" is shown in 18 point News Gothic, upper case. The distribution guidance note is shown in 8 point News Gothic, upper and lower case type. The width of this note is 11.5cm (4.5").

3.11.13.6 Color. SPC 58600 Black - Solid.

3.11.14 NIMA seal.

3.11.14.1 Use. The NIMA seal authenticates the chart as an official National Imagery and Mapping Agency product.

3.11.14.2 Applicability. A 19 mm (0.75 inch) diameter NIMA seal is shown on each chart except for NIMA International series charts. The International series charts require a 25.4 mm (1.0 inch) diameter NIMA seal.

3.11.14.3 Content. Content of the NIMA seal is fixed. See APPENDICES A and B for examples of the NIMA seal.

3.11.14.4 Position. The position of the NIMA seal is dependent upon the position of the main title.

a. If the main title is shown in its preferred position on land (see 3.11.25.4), the NIMA Seal is shown 2.5 mm (0.1") above the top line of the main title, centered on the main title, and readable from the bottom of the chart.

b. If the main title is shown in the upper margin of the chart, the NIMA seal is shown 2.5 mm (0.10") above the north heavy border line, aligned with the west neatline, and readable from the bottom of the chart.

3.11.14.5 Type. The NIMA seal is a standard symbol.

3.11.14.6 Color. SPC 58600 Black - Solid.

3.11.15 Bar codes and stock numbers.

3.11.15.1 Use. The National Stock Number (NSN), and edition number, in both bar code and human readable form, are shown on each chart, to uniquely identify the chart in the DoD Logistics Standard Systems (DLSS). The NIMA reference number, in human readable form only, is also shown, for internal NIMA use, and for users who wish to use it, rather than the NSN, for inventory control. Stock numbers and bar codes are shown in accordance with MIL-STD-2414.

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3.11.15.2 Applicability. A NSN bar code and stock number, and NIMA reference number are shown on each chart.

3.11.15.3 Content.

3.11.15.3.1 National stock number. The first four digits of the NSN indicate the Federal Supply Classification (FSC), which is 7642 for hydrographic products. The next two digits indicate the National Codification Bureau that assigned the item identification number to the item of supply. The remaining seven digits are a nonsignificant, serially assigned item identification number.

3.11.15.3.2 NIMA reference number. The first two numbers of the NIMA reference number are the region and sub-region, and are the same as the first two numbers of the chart. The next three digits are the chart portfolio and type (see Pub. No. 9, American Practical Navigator). The last five numbers of the reference number are the same as the chart number itself (see FIGURE 34).



Figure 34. NSN Bar code and NIMA reference number example.

3.11.15.4 Position. The position of the bar code is fixed, 25 mm (1.0") below the south heavy border on the right side, beneath the users' note, and aligned on the right side against the east heavy border (see APPENDICES A and B). The bottom line is 2 mm (0.08") below the top line.

3.11.15.5 Type. The dimensions of the identification numbers (HRI) shall be in accordance with MIL-STD-2414.

3.11.15.6 Color. SPC 58600 Black - Solid.

3.11.16 Edition number and date.

3.11.16.1 Use. The edition number and date tell the user how current the chart is. After this date, the user is responsible for applying changes to the chart made by Notice to Mariners (NM).

3.11.16.2 Applicability. The edition number and date are shown on each chart.

3.11.16.3 Content. The content of the edition number and date is variable. The word "edition" is abbreviated "Ed.", the month is abbreviated (except for May, June, and July), and "Notice to Mariners" is abbreviated "NM".

a. For new editions, the edition date agrees with the date of the latest Notice to Mariners the chart has been corrected through. The Notice to

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Mariners is represented by the notice number, a slash, and the last two digits of the year (see FIGURE 35).

5th Ed., Apr. 25, 1998 (Correct through NM 17/98)

Figure 35. Edition number and date for new editions.

b. For corrected reprints, the edition number and date do not change from the last printing. Notice to Mariners updates are cited by giving the notice number and the date - including month and day - of the notice (see FIGURE 36).

3rd Ed., Feb. 24, 1996; Correct through NM 17 of Apr. 25, 1998

Figure 36. Edition number and date for corrected reprints.

3.11.16.4 Position. The position of the edition number and date is fixed. The position is in the lower border of the chart, 2 mm (0.08") below the heavy border line, with the left side of the edition number aligned with the left outside corner of the heavy border line.

3.11.16.5 Type. 8 point Techno Medium, upper and lower case.

3.11.16.6 Color. SPC 58600 Black - Solid.

3.11.17 Reserved.

3.11.18 First edition date.

3.11.18.1 Use. The original date of issue shows how long the chart has been maintained.

3.11.18.2 Applicability. The first edition date is shown on each chart.

3.11.18.3 Content. The beginning of the note is fixed, and will always read: "1st Ed., ____". The date of the first edition is variable. Only the month and year are shown. Months are abbreviated except for May, June and July (see FIGURE 37).

1st Ed., Sept. 1985

Figure 37. First edition date.

3.11.18.4 Position. The position of the first edition date is fixed. It is shown in the upper margin 2 mm (.08") above the heavy border line, readable from the bottom of the chart, and centered on the center of the chart.

3.11.18.5 Type. 6 point Techno Medium, upper and lower case.

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3.11.18.6 Color. SPC 58600 Black - Solid.

3.11.19 General notes.

3.11.19.1 Use. Information specific to the chart and not concerning dangers to navigation is shown in the form of general notes. General notes may contain information on currents, harbor procedures, etc.

3.11.19.2 Applicability. General notes are applied to charts on an individual basis.

3.11.19.3 Content. The content of general notes is variable. There are two parts to general notes; the general note, and the note reference. Other notes described separately in this specification are not stacked with general notes.

3.11.19.4 General Notes format. General notes are left and right justified. The width of general notes shall be no wider than 10cm, but the height is variable.

a. Single notes are shown beneath the heading "NOTE". The heading is centered above the note (see FIGURE 38).

NOTE

During strong south winds the entrance to
Madiq Kamaran has very discolored water.

Figure 38. Single general note.

b. Multiple notes are numbered and shown beneath the heading "NOTES." The heading is centered above the notes. Specific notes (i.e., those applying to a specific part of the chart) should be listed first, followed by the more general ones (i.e., those applicable to the entire chart) (see FIGURE 39).

NOTES

1. Maintenance dredging is conducted frequently in Bishop Channel and the surrounding area. See Sailing Directions for details.
2. The height of the tide may vary depending on meteorological conditions. Winds between SE and SW cause a decrease in height; winds between NW and NE cause an increase. The deviation in height may, under exceptional conditions, amount to as much as a meter.

Figure 39. Multiple general notes.

3.11.19.5 Note reference. If notes contained in the general note concern only a certain area of the chart, a note reference is placed in the applicable area.

a. If only a single note is contained in the Note, the note reference is fixed, and reads: *SEE NOTE* (see FIGURE 40).

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SEE NOTE

Figure 40. Note reference to a single note.

b. If multiple notes are shown in the general note, the note reference on the chart must refer to the correct note number (see FIGURE 41).

NOTE NO 3

Figure 41. Note reference to numbered notes.

c. If more than one note in a general note applies to the same area, each applicable note is referenced in the note reference. Dashes are used to separate consecutive notes. Use an ampersand (&) to separate nonconsecutive notes. Periods and commas are not shown (see FIGURE 42).

NOTE NOS 1 - 3 & 5

Figure 42. Multiple note reference.

d. General notes which apply to the entire chart do not require a note reference.

3.11.19.6 Position. The position of general notes is variable.

3.11.19.7 Type. The heading of the general note is shown in 10 point Techno Medium, upper case. The text of the general note is shown in 8 point Techno Medium, upper and lower case. Note references are shown in 10 or 12 point Techno Medium Italic, upper case. However, when the note reference follows a legend on the chart the reference may match the point size and case of the legend it refers to.

3.11.19.8 Color. Notes will be placed in the color of the feature they refer to unless specified otherwise within this document.

3.11.20 Glossary.

3.11.20.1 Use. A glossary is provided on charts so that the user can translate (into English) foreign terms that are on the chart and are necessary for navigation.

3.11.20.2 Applicability. A glossary is shown on charts in areas where English is not the accepted language. Each chart has a unique glossary depending on the translations required.

3.11.20.3 Content. The content of the glossary is variable. The glossary shall only provide translations for physical and cultural features; it shall not be used to translate adjectives or descriptive terms. The glossary is shown with each foreign term listed in alphabetical order; the

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foreign term is shown on the left side and the English translation is shown on the right side. Both left and right sides are justified. The preferred glossary width is 3.8cm (1.5"). The height is variable. The heading - "GLOSSARY" - is centered above the list of terms (see FIGURE 43).

GLOSSARY

Ayer.....	stream
Batu	rock, stone, bank, reef, shoal
Darat.....	coast, land
Kepulauan.....	islands
Pulau	islet, island

Figure 43. Glossary.

3.11.20.4 Position. The position of the glossary is variable.

3.11.20.5 Type. The heading of the glossary is shown in 7 point Techno Medium, upper case. The rest of the glossary is shown in 7 point Techno Medium, upper and lower case.

3.11.20.6 Color. SPC 58600 Black - Solid.

3.11.21 Grid reference box.

3.11.21.1 Use. The grid reference box gives instructions and pertinent data for determining standard grid coordinates.

3.11.21.2 Applicability. A grid reference box is shown on all charts that show a Military Grid.

3.11.21.3 Content. See DMA TM 8358.1 for variable information used in the grid reference box. Refer to the examples shown in APPENDICES A and B.

3.11.21.4 Grid box heading. The heading of the grid reference box is composed of four lines with variable and fixed contents.

- a. The first line of the heading is variable and names the grid.
- b. The second line of the heading is variable. The Zone Number(s), the grid datum, and the grid ellipsoid are shown.
- c. The third line of the heading is fixed as shown in on the style sheets.
- d. The fourth line of the heading states the letter designators of the 100,000 meter squares shown and is variable.

3.11.21.5 Grid reference box. The grid reference box is composed of lines with 0.13 mm (.005") lineweight, and is variable. Zone junctions will be shown with a 0.2 mm (.008") lineweight line and labeled. The letter designators (matching those in the fourth line of the heading) are shown in the proper parts of the box in order to show the relationship of 100,000 meter

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squares used on the chart. Also, specific northing or easting meter values are shown to indicate where the separation of 100,000 meter squares occur.

3.11.21.6 Grid drawing instructions. The paragraph below the box gives instructions on forming squares to facilitate measurement of grid coordinates. The grid interval is determined when the grid is constructed. (See 3.10.2)

3.11.21.7 Sample coordinate point instructions. The last paragraph contains the grid coordinate instructions.

a. The grid datum, grid ellipsoid, and chart datum are restated in the first sentence. All are variable.

b. The next instructional sentence is fixed, except for the grid datum which is variable.

c. The last part of the grid coordinate instructions is variable and shows a sample point and its grid coordinates. The appropriate letter designator is shown next, followed by the six digit coordinate.

3.11.21.8 Position. For spacing between different parts of the grid reference box, see style sheets. The grid reference box should be no wider than 10 cm (4").

3.11.21.9 Type. Type used for the grid reference box is News Gothic and News Gothic Condensed, upper case.

a. The heading of the grid reference box is shown as follows: 10 point for the first line, 8 point for the second line, 10 point for the third line, and 6 point for the fourth line. The first three lines are shown in News Gothic Condensed, upper case. The fourth line is shown in News Gothic, upper case.

b. Inside the box, letter designators are shown in 8 point News Gothic Condensed; 100,000 and greater meter values are shown in 6 point News Gothic Condensed and 10,000 and 1,000 meter values are shown in 8 point News Gothic Condensed; the zone junction label is shown in 7 point News Gothic.

c. The grid interval instructions and grid coordinate instructions are shown in 6 point News Gothic, upper case, except the abbreviation "e.g.," which is lower case.

3.11.21.10 Color. The grid reference box is shown in purple, except for the zone junction and label (black), and the overlapping grid information (blue) (see 3.10.7).

3.11.22 Chart Parameters Block.

3.11.22.1 Use. The chart parameters block provides information concerning charting standards used for chart compilation. It also refers the user to Chart No. 1 for a description of symbols and abbreviations and, if necessary, disclaims the chart as an authority for boundaries.

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3.11.22.2 Applicability. A chart parameters block is shown on each chart.

3.11.22.3 Content.

a. The first line of the chart parameters block is variable and defines the type of projection the chart was constructed on.

b. The second line of the chart parameters block is variable and defines the horizontal datum the chart is based on.

*Note: The datum "World Geodetic System 1984 (WGS-84)" is shown at scales of 1:50,000 and larger. The year is omitted from charts at scales 1:50,001 and smaller, i.e., "World Geodetic System (WGS)".

c. The third line of the chart parameters block is variable and states the scale of the chart. Charts with scales 1:75,001 and smaller show the scale along with the mid-latitude for which the scale is based. Charts with scales of 1:75,000 and larger do not show the mid-latitude.

d. The line: "For Symbols and Abbreviations, see Chart No. 1" is fixed as the fourth line when the chart parameters block lies in the upper chart margin. It is positioned above the type of projection when the chart parameters block lies within the chart neatlines.

e. An additional line is shown if the chart contains lines separating areas of sovereignty or boundaries. The content is fixed and reads "Boundary representation is not necessarily authoritative".

FIGURES 44-46 show the various portrayals of the chart parameters block.

MERCATOR PROJECTION
WORLD GEODETIC SYSTEM 1984 (WGS-84)
SCALE 1:45,000
For Symbols and Abbreviations, see Chart No. 1

Figure 44. Chart parameters block (in upper margin) - 1:50,000 and larger with no boundaries.

MERCATOR PROJECTION
WORLD GEODETIC SYSTEM (WGS)
SCALE 1:55,000
For Symbols and Abbreviations, see Chart No. 1
Boundary representation is not necessarily authoritative

Figure 45. Chart parameters block (in upper margin) - 1:50,001 to 75,000 with boundary.

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For Symbols and Abbreviations, see Chart No. 1

Boundary representation is not necessarily authoritative

MERCATOR PROJECTION

WORLD GEODETIC SYSTEM (WGS)

SCALE 1:200,000 AT LAT. 23°10'

Figure 46. Chart parameters block (within neatlines) - smaller than 1:75,001 with boundary.

3.11.22.4 Position. The position of the chart parameters block is dependent upon the position of the main title.

a. If the main title is shown in its alternate position (the upper margin of the chart, see 3.11.25.4) the position of the chart parameters block is in the upper left chart margin, 5 mm (.20") above the north heavy border line, the right side of the fourth line is 60 mm (2.4") away from the left-most side of the main title. The vertical spacing between each line is 2.5 mm, with the note readable from the bottom of the chart, and each line of the note centered on the others.

b. If the main title is shown in its preferred position (within chart neatlines, see 3.11.25.4) the position of the chart parameters block is 5 mm below the vertical datum block (See 3.11.34), and centered under the main title. See APPENDICES A and B for vertical spacing between lines.

3.11.22.5 Type. The first three lines of the chart parameters block are shown in 8 point News Gothic, upper case. The reference to Chart No. 1 is shown in 10 point News Gothic, upper and lower case. The boundary disclaimer, if shown, is 8 point News Gothic, upper and lower case.

3.11.22.6 Color. SPC 58600 Black - Solid.

3.11.23 Index to next larger scale charts.

3.11.23.1 Use. Indexing to next larger scale charts is provided to the user to allow for quick transition to more detailed coverage.

3.11.23.2 Applicability. Next larger scale chart information is shown on charts of coastal scale and larger when next larger scale charts exist within the area charted.

3.11.23.3 Content. Areas covered by next larger scale charts are portrayed in three different ways: a purple outline and chart number, by the chart number alone if the area is less than 5cm (2") square, or by an index to next larger scale charts.

3.11.23.4 Outline and chart number. When the density of existing data on the purple plate is sparse, and where next larger scale outlines are not so numerous to detract from nautical chart detail, areas covered by the next larger scale charts can be depicted directly on the chart.

a. The limits of the next larger scale coverage will be outlined in purple with a 0.38 mm (.015") linewidth. The chart number of the larger

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scale chart is shown inside the outline in at least one corner (but not more than two corners) and is readable from the bottom of the chart. If a chart is a plan, panel, or inset, it should be referenced with the chart number. The preferred labeling is in opposing corners of the outline (upper left and lower right or lower left and upper right). The chart numbers will be placed so they will not obscure other information.

b. The following note is also added to the chart in purple. The content of the note is fixed as follows:

NOTE

Limits of next larger scale chart(s) are shown in purple.
Users should consult chart catalog which may contain
later information.

Figure 47. Next larger scale chart note.

3.11.23.5 Chart number only. Areas covered by next larger scale charts whose outline would measure less than 5cm (2") on the longest side are depicted by the larger scale chart number. The chart number reference shows no outlines. The chart number reference can be oriented in any way so long as it does not obscure other information and is readable from the bottom of the chart.

3.11.23.6 Index to next larger scale charts. If larger scale purple outlines are undesirable because of the density of purple data, a separate diagram is shown as the "Index to Next Larger Scale Charts". The base of the diagram is the same as the base of the source diagram in 3.11.8. The size of the diagram is variable, but should not exceed 10cm (4") on any side. The inner neatline of the index to next larger scale charts is a 0.13 mm (.005") linewidth, and the outer neatline is a 0.38 mm (.015") linewidth. The space between the neatlines is 3.3 mm (.13"). The heading of the index is fixed between the inner and outer neatlines at the top of the diagram and centered, reading: "INDEX TO NEXT LARGER SCALE CHARTS". The diagram is a miniature representation of the chart, and uses a generalized shoreline 0.20 mm (.008") with land tint as the only chart features. Outlines of next larger scale charts are shown in 0.13 mm (.005") linewidth. Chart numbers are shown in one corner inside each chart neatline. When a chart number will not fit inside the chart outline, the number can be set off to the side or, for better clarity, leader lines with a 0.13 mm (.005") linewidth can be used to point to the outline from the chart number. To maintain clarity, chart outlines will be deleted where overlapping occurs, limit preference will be given to the larger scale coverage. See APPENDIX B for an example of an Index to Next Larger Scale Charts.

3.11.23.7 Position. The positions of outline references, chart number references, next larger scale chart notes, and index to next larger scale charts, are variable. Positions of outlines are based on the actual coordinates of the next larger scale charts.

3.11.23.8 Type. The heading "NOTE" in the next larger scale chart note is shown in 10 point Techno Medium, upper case. The text of the note is shown

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in 8 point Techno Medium, upper and lower case. Chart numbers for the outline reference are shown in 12 point Techno Medium (10 point if space is limited). Chart number references are shown in 12 point Techno Medium (10 point if space is limited). The heading "INDEX TO NEXT LARGER SCALE CHARTS" is shown in 8 point Techno Medium, upper case. Chart numbers for the index to next larger scale charts are shown in 6 point Techno Medium.

3.11.23.9 Color. Chart number references, and next larger scale chart notes are shown in solid purple (SPC 96532). Outline references are normally shown in solid purple (SPC 96532) unless this would detract from other chart information,, in which case a purple 30%, 30°/60° bi-angle screen may be used. The index to next larger scale charts is shown in solid black, except that land tint inside the diagram is screened 12%, 45° angle black (SPC 58600).

3.11.24 Logarithmic speed scale.

3.11.24.1 Use. Measurement of speed becomes more critical the closer a ship is to shore. The logarithmic speed scale allows the user to quickly determine the speed of the vessel in knots when the distance and a time to go that distance are known.

3.11.24.2 Applicability. Logarithmic speed scales are applied to all charts that have a scale of 1:40,000 and larger. The application of the logarithmic speed scales on small scale charts having a plan with a scale of 1:40,000 and larger is left to the judgment of the cartographer.

3.11.24.3 Content. The content of the logarithmic speed scale is fixed. See APPENDIX A for an example of a logarithmic speed scale.

3.11.24.4 Position. When used, two logarithmic speed scales are shown. Their positions are fixed as follows:

a. One logarithmic speed scale is shown in the lower left side border, readable from inside the chart neatline, 5.1 mm (.20") away from the heavy border line, and with the left side of the note 63.5 mm (2.5") away from the bottom outside corner of the heavy border line (see APPENDIX A).

b. One logarithmic speed scale is shown in the upper right side border, readable from inside the chart neatline, 5.1 mm (.20") away from the heavy border line, and with the left side of the note 63.5 mm (2.5") away from the top outside corner of the heavy border line (see APPENDIX A).

3.11.24.5 Type. The label "LOGARITHMIC SPEED SCALE" is shown in 10 point Techno Medium, upper case. Numbers on the scale are shown in 7 point Techno Medium. Instructions for use are shown in 7 point Techno Medium, upper and lower case.

3.11.24.6 Color. SPC 58600 Black - Solid.

3.11.25 Main title.

3.11.25.1 Use. The main title provides convenient and specific information on what geographic area is covered by the chart, and general

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information on chart sources. The main title is used along with the chart number to enable the user to identify which charts are appropriate for navigation in the area.

3.11.25.2 Applicability. Main titles are shown on each chart.

3.11.25.3 Content. The main title is made up of two parts; the title and the sources, each of which is variable. The title is built in an "inverted pyramid" fashion; with a general geographic area at the top, narrowing to a more defined area (i.e., a country's coastline), and finally describing the specific locality of the chart. The geographic area used should be the same as that used on other charts in the same area, which allows easy transition from one chart to the next.

3.11.25.4 Titles for coastal charts. Coastal charts generally carry the names of two features in the specific locality which define the geographical limits of the chart. Names of bodies of water are preferred (i.e., from a harbor to another harbor), although names of topographic features and town names can be used. The order of listing names of features in the specific locality is counter-clockwise around the respective continent. For instance, a chart of the east coast of a continent would name the southernmost feature first and the northernmost feature last (see FIGURE 48).

BALTIC SEA
GULF OF BOTHNIA
TAUVO TO KAGNASET

Figure 48. Title of a coastal chart.

Some Coastal Charts are based on bodies of water and not on a certain continent. In these cases, the name of the body of water is shown in the specific locality (see FIGURE 49).

BALTIC SEA
WESTERN PART
GULF OF FINLAND

Figure 49. Title of a coastal chart when based on a body of water.

3.11.25.5 Titles for approach charts. Titles of approach charts may contain the word "Approach(es)" and the destination of the approach. If only the approaches are shown on the chart, and the destination is not shown or is in small scale, the specific locality will read "Approach(es) to ..." and the name of the destination (see FIGURE 50).

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BALTIC SEA
FINLAND - SOUTH COAST
APPROACHES TO HELSINKI

Figure 50. Title of approach chart.

Titles of approach charts which portray the destination of the approach in detail carry the name of the destination first, then " and Approach(es)" (see FIGURE 51).

CANADA
BRITISH COLUMBIA
VANCOUVER ISLAND
**ESQUIMALT HARBOR AND
APPROACHES**

Figure 51. Title of approach chart with destination shown.

3.11.25.6 Titles for harbor charts. Titles of charts depicting detailed information on harbors give the name of the harbor as the specific locality (see FIGURES 52 and 53).

BALTIC SEA
SWEDEN - EAST COAST
STOCKHOLMS HAMN

Figure 52. Title of harbor chart.

WEST INDIES
CUBA - SOUTH COAST
GUANTANAMO BAY

Figure 53. Title of harbor chart.

3.11.25.7 Chart source information. The second part of the main title briefly describes the sources for the chart. The country of origin or the nationality thereof, the medium (charts or surveys), and the dates are cited. The date of the latest chart is used as the date for all charts, and the date of the latest survey is used as the date for all surveys. Charts which would

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require more than three sources to be cited will show "From various sources to" and the date of the latest chart or survey (see FIGURES 54 through 56).

From French and U.S. charts to 1985

Figure 54. Main title sources (charts).

From British Admiralty charts to 1987 and a U.S. Navy survey of 1988

Figure 55. Main title sources (surveys).

From various sources to 1987

Figure 56. Main title sources (multiple sources).

3.11.25.8 Position. The preferred position of the main title is on land in an area where it will not obscure important information such as lights, radio beacons, or significant landmarks. The alternate position of the main title is in the upper margin of the chart, 5 mm above the first edition date, with all the lines of the main title centered on the center of the chart. See APPENDICES A and B for line spacing.

3.11.25.9 Type. The main title is shown in News Gothic. The title portion is all upper case, and the title sources are upper and lower case. The general geographic area at the top of the main title is shown in 12 point. The more defined area below it is in 16 point. The specific locality is shown in 30 point. The words, when contained in the specific locality, "TO", "AND", "FROM", and "INCLUDING" are shown in 20 point, upper case. In some cases an additional defined area is placed above the specific locality in 20 point. The sources (below the specific locality) are in 10 point.

3.11.25.10 Color. SPC 58600 Black - Solid.

3.11.26 Neatline dimensions.

3.11.26.1 Use. Neatline dimensions are provided so the user will know what size the chart was when it was originally constructed.

3.11.26.2 Applicability. Neatline dimensions are shown on all Mercator projection charts, except those consisting only of plans or panels.

3.11.26.3 Content. The first part of the note is the label - "Neatlines:", and is fixed. The dimensions are variable and are given in centimeters and tenths of centimeters from the north to the south and from the east to the west inner neatlines. The north - south measurement is always listed first (see FIGURE 57).

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Neatlines: 69.7cm N - S x 100.1cm E - W

Figure 57. Neatline Dimensions.

3.11.26.4 Position. The position of the neatline dimensions is fixed in the lower right hand corner inside the inner neatline, readable from the bottom of the chart, 1 mm (.04") above the south neatline and with the right side of the note 1 mm (.04") away from the east neatline (see APPENDICES A and B).

3.11.26.5 Type. 5 point News Gothic, upper and lower case.

3.11.26.6 Color. SPC 58600 Black - Solid.

3.11.27 Panel, plan and inset labels.

3.11.27.1 Use. Panels, plans and insets are identified so the user can distinguish separate parts of the chart, and separate parts of the chart can be referenced in other publications such as Notice to Mariners and the Chart Catalog.

3.11.27.2 Applicability. Identification labels are shown on each panel for paneled charts and on each plan or inset when more than one plan or inset is shown on a chart.

3.11.27.3 Content. Panels, plans, and insets are different ways to divide the area available on a chart to enhance the chart's coverage. The content of the identification label is variable. Letters are used, starting with "A", and are enclosed by a circle which is 8.38 mm (0.33") in diameter and 0.38 mm (0.015") lineweight (see FIGURE 58).

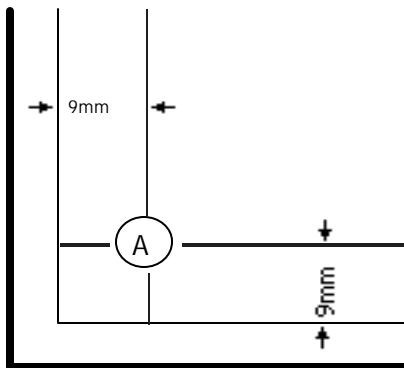


Figure 58. Identification label for panels, plans or insets.

3.11.27.4 Identification of panels. Panels are used as an aid in chart planning to allow odd shaped bodies of water to be covered on the same chart. For instance, river charts almost always have at least two panels. All panels carry an identification label. Panels usually overlap each other (which distinguishes panels from plans) and each panel treats the panel(s) next to it as a "continued on chart" (see 3.11.9).

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3.11.27.5 Identification of plans. Plans are detailed, large scale coverage of a specific locality. Plan limits are small enough to allow their placement within the neatlines of an existing smaller scale chart or they may be found grouped together on one sheet.

a. A plan reference is shown in the area covered by the plan. The plan reference is fixed and reads: "SEE PLAN". For a chart with more than one plan, the plan reference is variable and may read: *PLAN A, PLAN B, PLAN C* etc.

b. Charts which contain more than one plan show identification labels in each plan.

c. When the smaller scale coverage of a plan area is shown on a different chart, the plan is referenced on that chart as a next larger scale chart (see 3.11.23).

3.11.27.6 Identification of insets. Insets, like panels, are used to expand the area of coverage on the same chart within the chart limits. Insets are distinguished from plans in that their coverage is exclusive of that of the main chart, and they are not meant to cover an area of the main chart in greater detail. Insets cover a smaller area than panels, and can be used only for small extensions of the main chart coverage. Insets carry an identification label only when more than one inset is shown on the chart. Insets are treated as continuations of the main chart (see 3.11.9).

3.11.27.7 Positions. The preferred position of the identification label is in the lower left corner of the panel, plan, or inset; the center of the circle containing the letter is 9 mm (.35") from the south and west inner neatlines. If the detail in the lower left corner is too great, the panel identification can be shown in the lower right corner, 9 mm (.35") from the south and east inner neatlines.

3.11.27.8 Type. The identification label is shown in 16 point News Gothic, upper case. Plan References are shown in 10 point or 12 point Techno Medium Italic, upper case.

3.11.27.9 Color. The identification label is shown in solid black (SPC 58600). Plan references are shown in solid purple (SPC 96532).

3.11.28 Plan titles.

3.11.28.1 Use. The plan title provides convenient and specific information on what geographic area is covered by the plan, and general information on chart sources.

3.11.28.2 Applicability. Plan titles are shown on each plan.

3.11.28.3 Content. Plan titles are similar to main titles in their construction. Refer to 3.11.25 for instructions on titles. Plan titles will be shown in three or four lines; the top line of the plan title is the

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geographic area, then the specific locality, the title sources, and last the scale (see FIGURE 59).

KERKIRA
LIMENES ALIPA AND AYIOS SPIRIDHON

From a British survey of 1863
SCALE 1:18,000

Figure 59. Plan title with geographic area.

a. The geographic area is variable. No geographic area is shown if it is the same as that shown in the main title (see FIGURE 60).

TOKYO WAN

From Japanese surveys of 1985
SCALE 1:20,000

Figure 60. Plan title without geographic area.

b. The specific locality of the plan title is determined using the same guidelines as the Specific Locality in the main title, however, the plan title must be named for only the area covered by the plan. It must be different from the specific locality of the main title. For instance, if the main title were "Port 1 to Port 2", a plan title for a plan of Port 1 would read: "Port 1."

c. Title sources in the plan title are described in the same way as for title sources in the main title. Only those sources covering the area of the plan are cited.

d. The last line of the plan title shows the scale of the plan. The word "SCALE" is fixed, and the scale itself is variable.

3.11.28.4 Position. The lines of the plan title are stacked and centered, with 3 mm vertical separation between each line. The position of the plan title is variable, but must be shown inside the inner neatline of the plan it applies to.

3.11.28.5 Type. The geographic area is shown in 12 point News Gothic, upper case. The specific locality is shown in 20 point News Gothic, upper case, except "TO", "AND", "FROM" and "INCLUDING", which are shown in 16 point News Gothic, upper case. Title Sources are shown in 10 point News Gothic, upper and lower case. The scale of the plan is shown in 8 point News Gothic, upper case.

3.11.28.6 Color. SPC 58600 Black - Solid.

MIL-PRF-89201B3.11.29 Publication and copyright note.

3.11.29.1 The NIMA publishing and copyright note identifies the National Imagery and Mapping Agency as the publishing authority, and identifies the product as copyrighted material.

3.11.29.2 Applicability. The publication and copyright note appears on all charts.

3.11.29.3 Content. The content of the publication and copyright note is fixed, with the exception of the year of publication (see FIGURE 61).

Prepared and published by the
NATIONAL IMAGERY AND MAPPING AGENCY

© Copyright (year of publication) by the United States Government
No copyright claimed under Title 17 U. S. C.

Figure 61. Publication and copyright note.

3.11.29.4 Position. The position of the publication and copyright note is fixed. It appears in the lower chart margin, 2 mm (.08") below the south heavy border line. The center of the note is on the center of the chart as measured from the left and right edges of the heavy border line. The space between the publication and copyright note is approximately 4 mm (0.16").

3.11.29.5 Type. First line: 8 point, Techno Medium, upper and lower case. Second line: 8 point, Techno Medium, upper case. Third line: 7 point, News Gothic Condensed, upper and lower case. Fourth line: 5 point, News Gothic Condensed, upper and lower case.

3.11.29.6 Color. SPC 58600 Black - Solid.

3.11.30 Sounding note.

3.11.30.1 Use. The sounding note alerts the user to the unit of measure the soundings are based on.

3.11.30.2 Applicability. Sounding notes appear on each chart.

3.11.30.3 Content. The content is fixed (see FIGURE 62).

SOUNDINGS IN METERS

Figure 62. Sounding note.

3.11.30.4 Position. The sounding note appears twice on the chart. The preferred positions are as follows: one in the lower left border of the chart, 2 mm (0.08") below the south heavy border line and approximately halfway between the west border line and the center of the chart; and one in

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the upper right margin of the chart, 5 mm (0.20") above the north heavy border line, and approximately halfway between the center and the right edge of the chart. If it is necessary to vary from the preferred positions, the sounding note will not be placed inside the neatline.

3.11.30.5 Type. 30 point News Gothic, upper case.

3.11.30.6 Color. SPC 96532 Purple - Solid.

3.11.31 Subtitle.

3.11.31.1 Use. The subtitle is provided for easy reference to the title of the chart, the sounding units, and the scale. In the position it is placed (see 3.11.31.4) the user does not need to unfold the chart completely or remove it from a drawer just to see the title.

3.11.31.2 Applicability. A subtitle appears on each chart.

3.11.31.3 Content. The content of the subtitle is variable. The subtitle consists of two parts, described below:

a. The content of the upper part of the subtitle must match the specific locality in the main title exactly (see 3.11.25).

b. The lower part of the subtitle contains the unit of soundings and the scale. Only the scale of the main chart is mentioned in the subtitle (mid-latitudes are not noted in the subtitle, see FIGURE 63). A chart containing only a set of plans at various scales will omit reference to scale in the subtitle (see FIGURE 64).

Strait of Malacca - Central Part
SOUNDINGS IN METERS - SCALE 1:200,000

Ponta de Caio to Cap Verga
including Arquipelago dos Bijagos
SOUNDINGS IN METERS - SCALE 1:300,000

Figure 63. Samples of subtitles.

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Ports in Makassar Strait (Sulawesi)
SOUNDINGS IN METERS

Inokuchi Ko and Setoda Suido
SOUNDINGS IN METERS

Plans on the North Coast of New Guinea
SOUNDINGS IN METERS

Figure 64. Samples of subtitles for charts with plans only.

3.11.31.4 Position. The position of the subtitle is fixed in the lower right chart border, 2 mm (0.08") below the south heavy border line, with the right side of the note 25 mm (1") from the left side of the users' note (see 3.11.33). The subtitle is centered, with 2.5 mm (0.1") spacing between the upper and lower parts. When the Limited Distribution note or a classification note is required on the chart, an alternate position for the subtitle is used. This position aligns (right) the longest line of the subtitle with the Limited Distribution guidance note, or classification note and readily identifies the charts' handling requirements.

3.11.31.5 Type. The upper part of the subtitle is 12 point, Techno Medium, upper & lower case type. The lower part is 8 point, Techno Medium, upper case.

3.11.31.6 Color. SPC 58600 Black - Solid.

3.11.32 Tide box, tide stream tables, and tidal currents.

3.11.32.1 Use. The tide box is shown to give the user a quick reference to vertical tidal variation in relation to the chart sounding datum. Tide stream tables indicate the horizontal rate and direction of flow caused by astronomical conditions, i.e., the rise and fall of the tide, as opposed to flow caused by currents.

3.11.32.2 Applicability. The tide box is shown on charts with scales of 1:75,000 and larger. The information must be taken from either the largest scale foreign sources of the area or from U.S. Navy surveys. If this information is not available from these sources the tide box is not shown. Tide stream data is shown on charts when data is available from source charts up to chart scales of 1:750,000.

3.11.32.3 Content.

3.11.32.3.1 Tide boxes Tide box values are shown in meters from one of the sources described in 3.11.32.2 above. Tidal data from stations outside the chart area may be used if the station is located within five miles of the chart limits and if no appreciable difference in tidal height will result. Geographic coordinates are shown with the name of the station if it is outside

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the chart limits or if the station cannot be readily located on the chart; otherwise, geographic coordinates are not shown. Tide boxes are based on the three types of tides; semi-diurnal, diurnal, and mixed. The format of the tide box should be the same as that shown in the examples given in FIGURES 65 through 67 and on APPENDICES A and B. The tidal values, the stations, and the coordinates of stations shown will vary. Content is determined from sources as stated in 3.11.32.2 above. The box is shown with a 0.25 mm (.010") line weight and should be no wider than 10cm (4"). The height is variable.

a. Semi-diurnal tides, which have two highs and two lows daily, are shown in the same format as that given for the example in FIGURE 71. The height of MSL may be included in the tidal box when MSL was used as the plane of reference for charted heights.

TIDAL INFORMATION							
Place	Lat	Long	Height above datum of soundings				
			Mean High Water		Mean Sea	Mean Low Water	
			Springs	Neaps	Level	Springs	Neaps
			meters	meters	meters	meters	meters
Jutland	55°42'N	008°14'E	1.5	1.3	0.8	0.1	0.4
Helgoland	52°22'N	007°46'E	1.4	1.1	0.7	0.0	0.2

Figure 65. Tidal box for semi-diurnal tides.

b. Diurnal tides, which show a single high and a single low tide daily, are shown in the same format as that given for the example in FIGURE 66. The height of MSL may be included in the tidal box when MSL was used as the plane of reference for charted heights. For diurnal tides, a statement indicating the type of tide should be included.

TIDAL INFORMATION					
Place	Height above datum of soundings				
	Mean High Water		Mean Sea	Mean Low Water	
	Higher	Lower	Level	Lower	Higher
meters					
Abadan	1.3	--	0.7	0.1	--
Karg Island	1.1	--	0.5	0.0	--

Tide is usually diurnal

Figure 66. Tidal box for diurnal tides.

c. Mixed tides usually consist of two high and two low tides daily, but occasionally the tide may become diurnal with large differences in either the high or low water. These tides are shown in the same format as that given for the example in FIGURE 67. The height of MSL may be included in the tidal box when MSL was used as the plane of reference for charted heights.

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TIDAL INFORMATION					
Place	Height above datum of soundings				
	Mean High Water		Mean Sea Level	Mean Low Water	
	Higher	Lower		Lower	Higher
	meters	meters	meters	meters	meters
Tokyo Wan	1.3	0.8	0.5	0.1	0.4
Yokosuka	1.1	0.5	0.3	0.0	0.1

Figure 67. Tidal box for mixed tides.

3.11.32.3.2 Tidal stream table. Tidal streams or tidal currents are alternating horizontal movement of water associated with the rise and fall of the tide, caused by tide-producing forces. Tidal stream data points at which tidal streams have been observed and for which data are to be charted, shall be assigned reference letters A, B, C, etc. in some regular order. These letters, enclosed in a diamond outline, shall be inserted in the appropriate geographical positions on the chart and in a tide stream table with data relating to that position. The format of the tidal stream table in the margin is variable, and should be patterned after the box shown on the source chart. For currents not associated with tides, see 3.14.8.

3.11.32.3 Position. The positions of the tide box and tidal stream table are variable.

3.11.32.4 Type. The heading - "TIDAL INFORMATION" - is shown in 7 point News Gothic, upper case. All other type in the tidal box is shown in 7 point News Gothic, upper and lower case.

3.11.32.5 Color. SPC 58600 Black - Solid.

3.11.33 Users' note.

3.11.33.1 Use. The users' note is shown to give the user the mailing address of the National Imagery and Mapping Agency for communications concerning the product.

3.11.33.2 Applicability. The users' note appears on each chart.

3.11.33.3 Content. Content of the users' note is fixed and it is right and left justified 53.2 mm (2.1") width (see FIGURE 68 for content).

USERS SHOULD REFER CORRECTIONS, ADDITIONS,
AND COMMENTS TO THE NIMA CUSTOMER HELP
DESK: 1-800-455-0899, COMMERCIAL 1-314-260-1236,
DSN 490-1236, OR WRITE TO: ATTN: DF, MAIL STOP
P-37, NATIONAL IMAGERY AND MAPPING AGENCY,
4600 SANGAMORE ROAD, BETHESDA, MD 20816-5003.

Figure 68. Users' note.

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3.11.33.4 Position. Position of the users' note is fixed in the lower right chart margin, 2 mm (0.08") below the south heavy border line, right justified with the east heavy border line.

3.11.33.5 Type. 7 point, Techno Medium, upper case type.

3.11.33.6 Color. SPC 58600 Black - Solid.

3.11.3 Vertical datum note.

3.11.34.1 Use. The vertical datum note provides quick reference for the unit of soundings, the sounding datum, the unit of height measurements, the vertical datum for heights, and the contour interval.

3.11.34.2 Applicability. Vertical datum notes are shown on each chart, although some small scale charts may not have a known vertical datum.

3.11.34.3 Content. The unit of soundings is on the first line of the vertical datum note and is fixed, reading; "SOUNDINGS IN METERS." The next lines are variable, depending on sources (See 3.14.2.6), and indicate the depth unit(s) utilized for the greater portion of the chart. This may require two lines. The next line describes the sounding datum, and is variable. The next line indicates whether or not soundings have been corrected for sound velocity. The content is fixed, but its presence is variable (See 3.14.2.5.c). The next line contains the unit of heights and vertical datum for heights, and is variable. The next lines are variable and state the contour interval and any supplementary contours shown on the chart (see FIGURES 69 and 70).

SOUNDINGS IN METERS
(Under 21 in meters and decimeters)
(meters and half meters to 31)
reduced to the approximate level of Mean Lower Low Water
Soundings on this chart have been corrected for sound velocity
HEIGHTS IN METERS ABOVE MEAN SEA LEVEL
Contour interval 50 meters
with a supplementary contour at 25 meters

Figure 69. Vertical datum note stating several depth units, sounding velocity note, and supplementary contours.

SOUNDINGS IN METERS
(Under 30 in meters and half meters)
reduced to the approximate level of Mean Low Water
HEIGHTS IN METERS ABOVE MEAN SEA LEVEL
Contour interval 200 meters

Figure 70. Vertical datum note with less variety in vertical datum portrayal.

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3.11.34.4 Position. If the main title is shown in its preferred position (inside chart neatlines), then the position of the vertical datum note is 5 mm (0.20") below and centered under the main title. If the main title is shown in its alternate position in the upper chart margin, the preferred position of the vertical datum note is in the upper right margin of the chart, 5 mm (0.20") above the north heavy border line, with the lines of the note centered, and the left side of the note 60 mm (2.4") away from the right side of the main title.

3.11.34.5 Type. The vertical datum note is shown in News Gothic. The first line - "SOUNDINGS IN METERS" - is shown in 10 point, upper case. The lines describing the units for depths are shown in 10 point, upper and lower case. The sounding datum is shown in 8 point, lower case with the exception that the name of the sounding datum is in upper case and lower case. The sounding correction note is in 8 point upper and lower case. The line describing the unit and vertical datum for heights is shown in 8 point, upper case. The lines describing contours are shown in 8 point, upper and lower case.

3.11.34.6 Color. SPC 58600 Black - Solid.

3.11.35 Warning note.

3.11.35.1 Use. The warning note cautions the user not to depend entirely on any one navigational aid, especially floating aids (buoys). The note also refers the user to related publications, which discuss the reliability of buoys in detail.

3.11.35.2 Applicability. A warning note appears on each chart.

3.11.35.3 Content. The content of the warning note varies between three types. For charts in foreign waters, see FIGURE 71. For charts in U.S. waters, see FIGURE 72. For charts covering both U.S. and foreign waters, see FIGURE 73. The notes shall be left and right justified.

<p>WARNING</p> <p>The prudent mariner will not rely solely on any single aid to navigation, particularly on floating aids. See paragraph No. 1 of Notice to Mariners No. 1 or Sailing Directions Planning Guides for information relative to NIMA Charts.</p>
--

Figure 71. Warning note for charts of foreign waters.

<p>WARNING</p> <p>The prudent mariner will not rely solely on any single aid to navigation, particularly on floating aids. See U.S. Coast Guard Light List and U.S. Coast Pilot for details.</p>

Figure 72. Warning note for charts of U.S. waters.

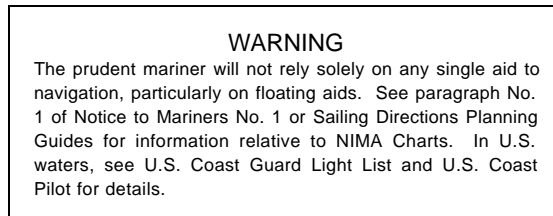
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Figure 73. Warning note for charts covering both U.S. and foreign waters.

3.11.35.4 Position. The preferred position for the warning note is in the lower right margin of the chart, 2 mm (0.08") below the south heavy border line, with the right side of the note 25 mm (1") away from the left side of the subtitle (see 3.11.31). On charts that show the LIMITED DISTRIBUTION or classification notes, the warning note is 25 mm (1") to the left of the distribution guidance note or classification note (see APPENDIX A or B). Alternate placement, if necessary, is in the upper left border of the chart, 2 mm (0.08") from the top heavy border and 60 mm (2.4") from the western neatline.

3.11.35.5 Type. The warning note is shown in 10 point, Techno Medium, upper case for the heading, and 8 point, Techno Medium, upper & lower case for the text. The box linewidth is 0.38 mm (0.015").

3.11.35.6 Color. SPC 96532 Purple - Solid.

3.11.36 Chart borders.

3.11.36.1 Types of chart borders. Borders shown on standard nautical charts are designated as either plan borders or scale borders. Plan borders are made from a single line conveniently subdivided by ticks; scale borders are more complex presenting minute subdivisions and suitable shading. The style of border to be used is determined by the scale of the chart. See 3.11.37 for specific plan border information and 3.11.38 for specific scale border information.

3.11.36.2 Graticule increment and labeling. The neatline of a plan border and the inner neatline of the scale border define the limits of the charted area. Depending on the scale of the chart, the chart area is divided by projection lines spaced for the convenience of the user. Projection (graticule) lines, therefore, are no closer than 11.25cm (4.5") or farther apart than 25.0cm (10") and extend outward from the neatline or scale border. All graticule lines on the chart should be labeled. Graticule lines should be matched to a labeling increment of latitude and longitude along the border. Preference should be given to increments that include whole degrees. Outside the neatline or scale border, separated by a 9 mm (.354") space for the projection values (figures), there is a heavy black border (outer border) which solid black.

3.11.36.3 Color. Border colors are SPC 58600 Black - Solid.

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3.11.37 Plan borders. Plan borders are used for all charts and plans with scales of 1:50,000 and larger. See plan border (Style D), which is portrayed and described in APPENDIX C.

3.11.37.1 Labeling of plan borders. One or more degree figures will be shown on each side of a plan border chart dependent on the size of the chart. Degree figures will be placed with minute figures when whole degrees do not fall within the chart. Even minutes are preferred, such as 2', 4', 6', etc.

a. One degree figure per side will be shown on charts whose longest neatline measures 66.03cm (25.9") or less.

b. Two degree figures per side, appropriately spaced, will be shown on charts whose longest neatline measures more than 66.03cm (25.9").

c. Regardless of chart size, each whole degree graticule shall be labeled.

3.11.37.2 Location of subdivided minutes. Plan border style D (1:50,000 and larger) does not portray a full compliment of graduation subdivisions. Minutes are subdivided into tenths around the chart. Six second subdivision locations are chosen for their accessibility to areas of the chart requiring heavy plotting, but should not be located in close proximity to one another. Locations of six second subdivisions are modified for smaller chart or plan sizes as described below:

a. Subdivide once (top or bottom) and once (left or right) when longest neatline dimension is 45.72cm (18") or less.

b. Subdivide once on each side of the chart when the longest neatline dimension is 45.73cm (18.1") to 63.5cm (25"). Choose diagonal locations for better coverage.

c. For charts of unusual shape, a combination of subdivision locations described above may be utilized to suit plotting requirements.

3.11.38 Scale borders. Scale borders are used for all charts at scales of 1:50,001 or smaller. See scale borders (Styles E through M), which are portrayed and described in APPENDIX C.

3.11.39 Graphic scales.

3.11.39.1 General. Graphic scales are applicable to charts 1:75,000 and larger. Graphic scales are designed to portray measurements in yards, meters, and nautical miles at individual chart scales. Charts 1:75,001 and smaller do not require graphic scales.

a. Graphic scales are inserted conveniently in the position of the heavy outer border when they are applicable to the entire chart.

b. Charts having a combination of panels and insets that would require more than one set of scales will not carry scales in the heavy outer border.

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Instead, each panel or inset will carry stacked scales prepared for the scale of each panel or inset (see 3.11.39.5).

c. For detailed information on the portrayal of graphic scales, see APPENDIX C. For placement information, see paragraphs below.

3.11.39.2 Yard scale. Graphic yard scales are placed on the right and left sides of the chart, centered.

3.11.39.3 Metric scale. Graphic metric scales are placed on the top of the chart, centered left of center.

3.11.39.4 Nautical mile scale. Graphic nautical mile scale is placed on the top of the chart, centered right of center.

3.11.39.5 Graphic scales on plans. Graphic scales on plans will be stacked and are referred to as bar scales. They are placed inside the neatlines of the plan; not in the heavy black border. Bar scales shall be placed clear of folds and important chart detail.

a. Bar scales will be stacked from top to bottom in the following order:

- Plans 1:10,000 and larger: yards, then meters
- Plans 1:10,001 to 1:75,000: nautical miles, yards, then meters

b. Portions of bar scales may be used when space is limited. Also, when space is a factor, bar scales may be placed side by side. Spacing between scales should always be equal.

c. For detailed information on the portrayal of bar scales, see APPENDIX C.

3.11.39.6 Type. 7 point News Gothic.

3.11.39.7 Color. SPC 58600 Black - Solid.

3.12 Chart features.

3.12.1 General. Nautical charts are designed for day-to-day use by the navigator, and may be used to quickly identify safe water and hazards in constantly changing conditions at sea. The navigator must be prepared for numerous exigencies such as finding his way into port, seeking safe harbor in a storm, or identifying safe landings. To this end, the nautical chart must be a clear, concise and easy-to-read document, showing all potential hazards, safe water, and aids to navigation as practicable. Therefore, the features on a nautical chart are not randomly selected, but are chosen for their usefulness to the mariner. Although commonly charted features have been listed in Chart No. 1, the occasion may arise where a feature that lacks standard symbology should be added for the mariner's benefit. In all cases the chart should be designed to support the mariner who uses the chart.

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3.12.2 Generalization of charted data. It is impractical to chart all available data. Owing to limitations of scale and readability, some information must be omitted. Moreover, certain information is useless, such as topographic detail behind the first ridgeline, which a mariner cannot see. However, data must not be omitted which may compromise the safety of vessels at sea. Data necessary for a given chart must be carefully selected in order to meet these requirements. The following guidelines provide basic direction for generalizing chart data.

3.12.2.1 Harbor charts. Harbor products are designed for use within ports and harbors. On these large scale charts, as much information as practicable should be portrayed. Hazards and aids to navigation must not be generalized. Special attention is paid to features that are used by the mariner, such as port facilities and landmarks.

3.12.2.2 Approach and coastal charts. Approach charts are designed to navigate the approaches to harbors, and for inshore navigation. Coastal charts are designed for offshore navigation. Since the mariner is not expected to travel close to shore with these products, some generalization of chart data is permitted. This makes the chart easier to read, and simplifies chart maintenance. For example, some lights and buoys can be omitted, as well as some harbor detail. Pertinent information should not be generalized where no larger scale products exist. It should be kept in mind that the chart may be used close to shore in an emergency.

3.12.2.3 General charts. General charts are intended for deep water navigation and route planning. Only the most basic features, such as offshore hydrography, significant ports and harbors, and major aids to navigation need to be shown. Inshore detail is not necessary, and may often be omitted. Certain data can be safely omitted, such as landmarks and most cultural features.

3.12.2.4 Dangers of omission. The possible dangers of omitting detail must be foreseen and avoided by the cartographer such as:

- a. Mariners are not always able to take their intended routes and may have to take an alternate passage or make for a harbor of refuge.
- b. Minor navigation aids outside a main channel may have to be charted in order to avoid confusion with the main channel aids.
- c. Eliminating too much detail could deprive the mariner of the overall picture of an area such as an indication of the routes used by local traffic.
- d) The probable use of smaller scale charts for route planning.

3.13 Topographic features.

3.13.1 General. Topographic features are those features which exist from the waterline and above, not including aids to navigation. Topography may be either natural or cultural, and is used to depict the configuration of the earth's surface, including mountains, peaks, waterways, cities, shoreline,

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islands and port facilities. Linear features not critical to the mariner, such as topographic contours and city limits, are smooth and simplified.

3.13.2 Natural features. Natural features include the shoreline, relief, rivers, lakes, glaciers, salt pans/salt evaporators and vegetation.

3.13.2.1 Shoreline. The shoreline is the interface between the land and the water, at the time of high water. Shoreline is never broken or moved for other data, except for aids to navigation such as beacons and lights, which cannot be displaced. In such cases, the shoreline is broken, and the delineation of the land tint will indicate the position of the shoreline. Surveyed shoreline is depicted as a solid .020 mm (.008") line at all scales. Unsurveyed shoreline is depicted as a dashed .020 mm (.008") line with dash length 2.54 mm (0.10"), spaced 0.64 mm (.025") apart at all scales.

a. Ancillary shoreline detail such as cliffs, stones/shingle and dunes (see Chart 1, C3-C8) should be shown on charts with scales 1:300,000 and larger.

b. Inland water features such as lakes and double line streams are treated as shoreline.

c. Apparent shoreline is the boundary between open water and offshore vegetation, such as mangrove, marsh, or swamp. Apparent shoreline is portrayed by a 0.13 mm (.005") solid black line. Land tint is extended to the seaward limit of the mangrove area even though it may be partly intertidal, as this represents the apparent coastline and the limit of navigation.

d. For marsh areas, if the actual shoreline is known it shall be portrayed by a 0.20 mm (.008") solid line. A 0.13 mm (.005") dashed line will be used to show the limit of marshy areas extending into the intertidal zones. Uncovers tint is used in the area between the actual shoreline and the dashed drying line. Blue tint is used if the area representing the seaward edge of marsh is not intertidal.

3.13.2.2 Relief. Relief refers to the elevation and overall shape of the land referred to a specified vertical datum. Relief is portrayed on a chart by means of elevation contours and spot elevations. The plane of reference for heights is stated in the chart title and reflects the lowest plane of reference stated on the sources.

3.13.2.2.1 Contours. A topographic contour is a line connecting equal points of elevation. Contours are of little value to the mariner other than providing a general visual bearing to his relative position.

a. Topographic contours and labels (7 point Techno medium type) are shown on a 67% black screen.

b. The contour interval should be uniformly portrayed throughout the chart and should not exceed 10 contour lines to show the full range of height. Index contours, if used, are shown at an even interval: for example, for a 25m interval, index contours are shown every 100m.

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c. The value of contours will be consistent with the source. If the contour interval is not metric, the contour interval will be indicated in the chart title with the metric conversion in parenthesis (see FIGURE 74).

CONTOURS IN FEET
Contour interval 25 feet (approx. 8 meters)

Figure 74. Non-metric contour interval (example).

d. Contours will be adequately labeled and oriented reading from the bottom of the featured hill, preferably legible from the bottom of the chart.

e. Contours are 0.13 mm (.005"); index contours are 0.20 mm (.008").

f. Contours are not charted on scales smaller than 1:300,000.

3.13.2.2.2 Spot Elevations. Spot elevations are used to identify heights of land. Spot elevations should be selected which indicate specific peaks. If the relief is mild, a random pattern of elevations may be chosen to indicate the nature of the relief. Spot elevations can be used by the mariner to obtain lines of approximate position.

a. Spot elevations less than 5 meters will be shown in meters and decimeters (in decimal form); all others will be shown in the nearest whole meter rounded to the next higher value at .5 meters.

b. Spot elevations for offshore islets or rocks shall be enclosed by parenthesis in vertical type i.e. (25).

c. Spot elevation dots are .5 mm (.020") in diameter. The elevation value is shown in 7 point Techno Medium type nearby.

d. Spot elevations are shown at all scales.

3.13.2.3 Drainage. Simplified drainage patterns should be shown on large scale charts. Detailed coverage of small unnavigable streams is not required however, streams in the coastal area that may be of interest to the mariner should be portrayed as follows:

a. Relative to the scale of the chart, large streams are double line; small streams are single line.

b. On charts smaller than 1:25,000 streams should only be shown to the first ridge line.

3.13.2.4 Vegetation and other naturally occurring features. Vegetation such as mangroves, marsh, swamps, and coastal wooded areas, and other naturally occurring features such as salt pans, glaciers, and lava flows are charted when such items are deemed useful as an indication of the character of the landscape or to define the apparent shoreline. Near the coast, wooded areas that alternate with areas without tree cover may assist the mariner in identifying headlands or other stretches of coastline. Grassland, cultivated

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fields, bushes and general woodland cover should not be shown even on the largest scale charts.

a. In small areas the above features should be portrayed by the appropriate area symbol. Small isolated patches may be portrayed by the appropriate point symbol.

b. In larger areas the above features are shown as 0.13 mm (.005") dashed line areas and labeled. Salt pans and lava flows are the exception as their area is more defined, the limiting linework will be solid.

3.13.2.5 Natural landmarks. Certain natural features may also be landmarks. The appropriate point symbol is used, whether a pictographic symbol or a position circle with legend, along with height information if available.

3.13.2.6 Radar-conspicuous features. Natural features which are known to give an unexpectedly strong radar response may be distinguished by a purple radar reflector symbol.

3.13.3 Cultural features. Cultural features are man-made alterations to the natural landscape. These features include cities, roads, buildings, canals, and airports. Only prominent and conspicuous cultural features, visible to the navigator from seaward and capable of positive identification will be shown on nautical charts. Prominence varies with the location of the observer and with lighting and atmospheric conditions. Conspicuous features distinguish themselves by being plainly visible over a large area, in varying conditions of light and by being easily identifiable. Conspicuous features should be labeled to stand out from other topographic detail using upper case type.

3.13.3.1 Buildings. A building is only useful to the mariner if the building can be seen from sea, is isolated, or is conspicuous among the surrounding structures. Where the source and scale of the chart permit, show large buildings in outline form. If a building is small then the pictorial symbol is used. Pictorial symbols shall be used as widely as possible to avoid the use of legends. See Chart No. 1 for various building symbolization.

3.13.3.1.1 General portrayal criteria for buildings by scale.

a. At scales of 1:25,000 and larger show all buildings along the waterfront and show conspicuous and prominent buildings back to the first parallel road or first ridge line. Public buildings are charted at these scales as points of reference. Harbor offices, post offices and hospitals are charted for their functions. Railway station buildings shall be shown.

b. Between scales 1:25,001 and 1:100,000 show only conspicuous and prominent buildings. Post offices and hospitals are charted for their functions. Railway station buildings shall be shown.

c. At scales between 1:100,001 and 1:300,000 only depict buildings that are conspicuous or are considered prominent. Places of worship when known to

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be prominent or conspicuous should be charted up to several miles inland with attention drawn to any significant features per Chart No. 1.

d. Buildings are not shown at scales smaller than 1:300,000.

3.13.3.2 Built-up areas. Built-up areas are populated places where congestion of buildings makes it impractical to show individual buildings. Built-up areas on nautical charts do not need to match the criteria of those shown on topographic products.

3.13.3.2.1 Method of portrayal. Built-up areas may be shown in either of two ways. They may be bound north and west by a 0.13 mm (.005") solid black line or by another linear feature; south and east by a 0.30 mm (.012") line, to make them stand out due to the shaded relief effect. Another method of depicting urban area is to tint the area with a 21% black screen not bound by limiting linework. Chart sources may direct which built-up area depiction is practical for a given chart. The two methods are not to be mixed within the same chart. All built-up areas should show a name label.

3.13.3.2.2 Cultural detail shown within build-up areas. Buildings, main roads and railroads may be shown within a built-up area using the criteria for charting these features found elsewhere within this section.

3.13.3.2.3 Portrayal criteria for build-up areas. Built-up areas may be shown on charts with scales of 1:1,000,000 and larger. City circles 1 mm (.04") in diameter are used for small areas and at small scales.

a. Charts at scales of 1:25,000 and larger show the complete urban extent outside the waterfront.

b. Charts at scales smaller than 1:25,001 will generalize the detail of the urban extent. On charts smaller than 1:75,000, a city symbol will be used in lieu of a 21% screen if the urban area is not at least 3 mm on its longest side.

c. On small scale charts only the most significant cities and towns need to be shown.

3.13.3.3 Airports. Airports should be charted on large and medium scale charts. They are significant for coastal navigation because of the many visual and aural features associated with them and the related air traffic.

a. On charts 1:100,000 and larger show the runway (solid), or airport outlines (solid) if the outline of the runways is not known (both 0.13 mm (.005")). Towers and aeronautical lights should be charted if they are prominent or conspicuous landmarks.

b. On charts from 1:100,001 to 1:300,000 portray airports and airfields with a point symbol.

c. Do not portray airport information on charts smaller than 1:300,000.

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3.13.3.4 Railroads. Active and "disused" railroads and tunnel entrances are portrayed according to the following criteria:

- a. At scales of 1:25,000 and larger show all railroads and associated cuttings if visible from seaward.
- b. From 1:25,001 to 1:100,000 show major railroads to the first ridge line, to include railways running down to the coast.
- c. From 1:100,001 to 1:300,000 show only major coastal railroads, to include railways running down to the coast.
- d. Do not show railroads on charts at scales smaller than 1:300,000.

3.13.3.5 Streets and roads. Streets and roads are portrayed according to the following criteria:

- a. At scales of 1:25,000 and larger show a generalized pattern of streets and roads along the waterfront. Show main roads and highways throughout the chart. Show associated cuttings if visible from seaward.
- b. From 1:25,001 to 1:100,000 show a generalized pattern of main roads and highways.
- c. From 1:100,001 to 1:300,000 show only major coastal highways.
- d. Do not show roads or highways on charts at scales smaller than 1:300,000.
- e. Roads on charts 1:100,000 and larger are symbolized by a 0.8 mm wide black 67% 30/60° bi-angle screened line. On the smaller scale charts, the symbol width is reduced to 0.5 mm to reduce congestion.

3.13.3.6 Bridges. Bridges and viaducts shall be charted on all charts of appropriate scale. When navigation is expected to pass beneath a bridge, all information to support safe passage will be charted.

- a. Large scale charts and, in some cases, the next smaller scale chart should distinguish between fixed bridges, and opening bridges. The method of opening (swing, bascule and draw), and special types of bridges such as pontoon or transporter, should be labeled.
- b. Where scale allows, bridge width should be portrayed to scale.
- c. Vertical clearance under fixed bridges and other fixed overhead obstructions should be charted on charts intended for navigation or passage planning. Vertical clearance is measured at a high water level (preferably mean high water springs however, it may be mean sea level if there is no appreciable tide). Vertical clearances shall be shown in whole meters, rounded down; vertical clearances less than 10 meters will be shown in decimal format in meters and decimeters.

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d. If a vessel may be able to pass under an opening bridge when closed, chart the vertical clearance for both the closed and open positions.

e. Chart the horizontal clearance between bridge supports as necessary and as source dictates.

3.13.3.7 Overhead obstructions. These features should be charted when they cross navigable waterways on charts suitable for use in navigation or passage planning. These obstructions include telephone/telegraph lines, overhead cables, power cables, and overhead pipes.

a. Vertical clearances for overhead obstructions should be charted as for bridges (see 3.13.3.6.c).

b. Towers and pylons associated with the above features should not be charted unless considered useful to the mariner as landmarks.

c. Power transmission lines should be charted with the clearance value sources dictate. This value could be the physical clearance (between high water and the lowest part of the cable) depicted in black or the "authorized safe clearance" (a clearance reduced by the margin of safety to avoid electrical discharge from high voltage lines) depicted in purple.

3.13.4 Landmarks. Landmarks are natural or cultural features which stand out due to a remarkable height or shape, are easily discernible from sea and are capable of being used by the mariner to determine position. A landmark is considered conspicuous if it is plainly visible over a large area of the sea, in varying conditions of light and should be easily identifiable. Landmarks have the highest priority of land features and their charting priority is only superseded by an aid to navigation. Heights of structures should be shown, if known, and are symbolized as above the normal plane of reference or above ground level as applicable. See Chart No. 1 for proper symbolization.

3.13.4.1 Method of depiction. Landmarks are depicted on nautical charts by either a pictographic symbol from Chart No. 1 or by a position circle and a legend. Pictographic symbols are preferred where space permits. Position circles are used when there is no room for the pictograph, or when the pictograph will break the shoreline. When position circles are used, the feature must be labeled with the abbreviation of the feature, such as "CHY", "Chy", "TR", "Tr", all upper case if conspicuous.

a. An accurate but non-conspicuous position circle is 1 mm in diameter with a center dot.

b. An approximate position circle is .635 mm in diameter with no center dot.

c. The conspicuous position circle is 2 mm in diameter with a center dot.

3.13.4.2 Labeling of landmarks. If the landmark is considered conspicuous, whether pictograph or position circle, it will be labeled in

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upper case letters (i.e. MON, CUP, DOME). If the landmark is not conspicuous it will be labeled with upper and lower case letters (i.e. Mon, Cup, Dome). Non-conspicuous pictograph symbols do not require labels. Descriptions of landmarks may be abbreviated according to Chart No. 1. Company names are not charted unless distinctive enough to be of use to the mariner. Well known landmarks may be identified in parenthesis following the name of the landmark, as DOME (STATE HOUSE).

3.13.4.3 Portrayal of tanks. To distinguish tanks from other open circular features, all sizable tanks are crosshatched. Small tanks less than 2 mm in diameter shall be shown as solid black.

3.13.4.4 Portrayal of "tall" features. Tall features such as towers, masts and chimneys are likely to be visible over long distances even when located well inland. Depending on height and topographic relief, these features should be charted up to several miles inland. Some of the taller structures may have air obstruction lights (see 3.19.8). Structures' color may be charted, to distinguish it from other similar landmarks, if thought to be visible at chart scale. Color abbreviations for structures are similar to daymark color designations for beacons.

3.13.4.5 Generalization of groups of landmarks. When only one feature of a group is to be charted, to eliminate clutter, its name should be followed by a descriptive legend in parenthesis, (TALLEST OF THREE) or (SOUTHERNMOST OF FOUR).

3.13.5 Ports and harbors. Detail concerning ports and harbors is primarily required on large scale charts. On smaller scales, the detail in these areas should be generalized or omitted. All available detail pertaining to the following features should be shown on charts designated for harbor navigation:

a. Cultural coastal features such as dikes, levees, seawalls, causeways, breakwaters and groins. Portions of some of these features may be intertidal or submerged, and are portrayed with intertidal tint and dashed/dotted symbolization in accordance with Chart No. 1.

b. All docks and basins which are enclosed or partly enclosed, and areas of water where ships are received for cargo handling, repairs or mooring. These features include tidal basins, dry (graving) docks, floating docks, slips and, if charted, should include any locks, caissons, gates and rails associated with the feature.

c. Location of dockside buildings such as harbor master, custom house, hospital, post office and quarantine building.

d. Berthing structures and their designations or names such as piers, wharfs, quays, moles, roll-on roll-off berths (RoRo), pontoons (floating structure), and jetties. Limit portrayal of cargo handling equipment (i.e. cranes, pipelines) unless the structure is considered very large or prominent. Numbered or lettered berths are shown in purple, 7 point Techno Medium type, inscribed in a circle. Names of piers, wharfs, etc. are shown in black. Non-

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berthing piers, built only as promenades, should be legended as such, i.e. "Promenade Pier".

e. Berthing installations such as dolphins, posts and piles. No land tint is shown on the small square symbol used for dolphins. The legend "Dn" or "Dns" should be inserted only if the nature of the feature is not self-evident. These features should be aligned in the same manner as source material. Alignment denotes the mooring position. Single dolphins having two sides horizontal denotes mooring may occur in any direction. Minor posts or piles should be represented by small circles filled in black. Submerged posts or piles should be charted as shown in Chart No. 1, K43.

f. Areas on water or land that are under construction or under reclamation. See 3.18.7 for portrayal.

3.14 Hydrographic features. Hydrographic features are those features which are under the water, or break the surface of the water, as well as installations and boundaries. They may be natural or man-made. Hydrographic features include soundings, dangers to navigation, areas and limits, and tracks and routes. These are the features which are of greatest interest to the mariner.

3.14.1 Hydrography. Hydrography is the science which deals with the measurement and description of the physical features of the oceans, seas, lakes, rivers, and their adjoining coastal areas with particular reference to their use for navigation. Hydrography on nautical charts is portrayed by soundings supplemented by depth curves, bottom characteristics and dangers to navigation.

3.14.2 Soundings. A sounding is a numerical figure on a chart representing the depth observed at a particular position and adjusted to a true (corrected) value relative to chart datum. The primary sources used for soundings are hydrographic surveys and foreign charts.

3.14.2.1 Reliability of soundings. The reliability of soundings is determined by the quality of the collection method employed, the care taken by the observer, the precision of the observer's position, and the accuracy of tidal correction or, the accuracy of the sound velocity correction.

a. Soundings may be considered less reliable if they have been enlarged more than two times from source thereby reducing their positional accuracy, the source portrays them as unreliable, or the source was exploratory or sketch.

b. Reliable soundings are shown in 7 point and 5 point Univers Light Italic type. Unreliable soundings are shown in vertical 8 point and 6 point News Gothic type. All soundings greater than 200 meters are shown in vertical type regardless of source. Also, on charts of scales smaller than 1:300,000 all soundings are shown in slant type. In rare cases where all soundings on a chart meet the criteria for vertical portrayal, all soundings will be shown in slant type. The following note (see FIGURE 75.), in 10 and 8 point Techno Medium type, appears on the chart when unreliable (upright) depths are charted.

MIL-PRF-89201B**NOTE**

Soundings in vertical figures are
from smaller scale sources.

Figure 75. Smaller scale source note.

3.14.2.2 Sounding position. On NIMA charts the position of a sounding is considered to be the center of the whole number sounding, excluding subscript (if any).

3.14.2.3 Out of position soundings. Soundings should normally be charted in their true positions, but if it is necessary to show least depth sounding out of position alongside a rock symbol or narrow channel, the figures shall be distinguished from normal sounding figures by enclosing them in parenthesis.

3.14.2.4 Chart datum. The chart datum, or sounding datum, is the tidal datum to which soundings and drying heights on charts are referred. A general statement of chart datum will be stated in the chart title.

a. Chart datums are generally established against a low water stage of the tide.

b. If utilizing sources referencing more than one chart datum, the higher tidal datum will be referenced in the chart title.

3.14.2.5 Correction of soundings for sound velocity. Soundings will be portrayed on nautical charts as corrected depth in meters whenever possible. Corrected depth in meters are meter depths adjusted for local variations in sound velocity.

a. Local variations in the speed of sound through water due to its temperature and salinity affect the sounding data collected by echo sounders. If soundings are received uncorrected, and sound velocity calibrations are available, a correction shall be applied prior to inclusion on the chart. If such calibrations are not available, soundings 200 meters and deeper shall be corrected using the Generalized Digital Environmental Model - Variable (GDEM-V). If directly observed sound velocity data are available, they should be used if considered to be more reliable than the correction values in GDEM-V.

b. See IHO Special Publication 46, Correction of Echo Soundings, for details on sounding correction policies of IHO members. Soundings on most newer foreign source charts have already been corrected for sound velocity. Soundings taken from surveys conducted prior to 1930 were not derived from sonar and need not be corrected for sound velocity.

c. If all soundings portrayed on the chart are corrected depths the following note (see FIGURE 76) will be placed in black type, 10pt/8pt Techno Medium, near the title block or in the title block 1.5 mm below the sounding datum in 8pt News Gothic (In the latter case the header "NOTE" is omitted).

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The entire note shall be omitted from charts that show any soundings that have not been corrected for sound velocity.

NOTE

Soundings on this chart are corrected for sound velocity.

Figure 76. Corrected sounding note.

d. If it is not possible to correct the soundings from a source, resulting in a mixture of corrected, uncorrected and/or unknown soundings, this will be indicated in the source diagram and listing. An asterisk "*" shall be placed to the left of the letter identifying the source, e.g. *B, both inside the source diagram and in the source listing. When soundings are known to be uncorrected, the note shall read: "* Uncorrected Soundings" below the Source Listing. If the sounding velocity correction is unknown, the note shall read: "*** Sounding velocity correction unknown". These items will be in 7 point Techno Medium type.

3.14.2.6 Depth unit. The preferred depth unit utilized for NIMA nautical charts is meters and decimeters to 21, meters and half meters to 31, and whole meters 31 and greater. However, the original degree of accuracy of the source material must be taken into account.

3.14.2.6.1 Source in meters and decimeters. When all source material for a new chart compilation consists of source charts or surveys depicting depths in meters and decimeters, the depth unit utilized will be in meters and decimeters to the depth shown on the sources. The depth unit shall be stated in the chart title as in FIGURE 77.

SOUNDINGS IN METERS

(Under * in meters and decimeters)

Figure 77. Depth unit note (meters/decimeters).

* The depth to which soundings are shown in meters and decimeters on the foreign sources.

3.14.2.6.2 Source in meters, half meters, and decimeters. When all source material consists of metric surveys, or metric sources that utilize both decimeters and half meters, the depth unit utilized for the chart will be the same as that used on the source material. The depth unit will be stated in the chart title as in FIGURE 78.

SOUNDINGS IN METERS

(Under * in meters and decimeters)

(meters and half meters to +)

Figure 78. Depth unit note (meters//half meters/decimeters).

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- * The depth to which soundings are shown in meters and decimeters on the surveys or source.
- + If meters and half meters are also shown, the depth to which soundings are shown in meters and half meters.

3.14.2.6.3 Source in fathoms, fathoms and fractions, or fathoms and feet. When source material for new chart compilation depicts depths in fathoms, fathoms and fractions, or fathoms and feet, soundings will be converted to meters and decimeters to the same degree of accuracy with which the depths were actually measured. For example, soundings originally reported in fathoms and feet to 11 fathoms will be converted as follows: Meters and decimeters less than 20 meters, meters and half meters from 20 to 30 meters, and whole meters 30 and greater. The depth unit will be stated in the title as shown in FIGURE 79.

SOUNDINGS IN METERS
(Under 20 in meters and decimeters)
(meters and half meters to 30)

Figure 79. Depth unit note (fathoms converted to meters).

3.14.2.6.4 Combination of source units. When the source material for a new chart compilation is a combination of sources, the depth units utilized will be:

- a. Meters and decimeters where the source is meters and decimeters.
- b. Meters and decimeters where the source is in feet or fathoms and feet.
- c. Meters and half meters where the source is in meters and half meters.
- d. The depth unit that is stated in the title will be the one that was used for a greater portion of the chart. A plus sign "+" shall be placed next to the sources utilizing the other depth unit in the source diagram and listing and a note shall be added to the bottom of the source diagram stating that the depth unit utilized in this area is different from that in the chart title. For example:

+ Meters and half meters

+ Meters and decimeters

Figure 80. Different depth unit note.

3.14.2.6.5 Rounding of decimeters. The rounding off of decimeters between 20 and 30 meters will be in the following manner: Decimeters between 3 and 7 will be shown as 5. Example: 21₃ and 21₇ soundings shall be shown as

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21₅. The decimeters 1,2,8, and 9 shall be rounded off to the nearest whole meter. Example: 21₂ shall be shown as 21 while 21₈ shall be shown as 22.

3.14.2.7 Sounding conversion. Sounding conversion includes the conversion of units of measure for depths from English to metric units, and the correction of the depth value by using the actual velocity of sound through seawater for a given depth and location, rather than an assumed value (for example 800 fathoms per second, or 1500 meters per second).

3.24.2.7.1 Determination of existing corrections. Corrections for sound velocity already applied to soundings from foreign charts can be found in IHO Publication No 46 (latest edition), or by inquiry to the producing agency.

Refer to section 3.14.2.6 for guidance in converting soundings to the same degree of accuracy with which the depths were actually measured.

3.14.2.7.2 Converting fathoms to meters. Use the guidance below to convert fathoms to meters:

a. Sources in fathoms and feet that have been corrected for sound velocity shall be converted to meters using Standard Conversion Table No. 4.

b. Sources in fathoms and feet that have not been corrected for sound velocity and have an assumed speed of sound in salt water of 1500 meters per second (820 fathoms per second) shall be converted to meters using Standard Conversion Table No. 4 before sound velocity corrections are applied using NP-139.

c. Sources in fathoms and feet that have not been corrected for sound velocity and have an assumed speed of sound in salt water of 1463 meters per second (800 fathoms per second) shall be converted to meters using Standard Conversion Table No. 3 before sound velocity corrections are applied using NP-139.

d. Standard Conversion Table No. 4 shall be used whenever the speed of sound is unknown. This applies to all uncorrected charts that do not supply this information.

3.14.2.8 Sounding selection. The objective of sounding portrayal is to provide the navigator with a distribution of sounding data that, when combined with depth curve information, accurately represents the true configuration and scope of the ocean floor while drawing attention to dangers and shoals. Sounding density is determined by the complexity of the bottom.

3.14.2.8.1 Categorization of soundings. Sounding data can be broken into three categories, based on the reason for which they are shown.

a. Critical soundings - The shallowest soundings in shoal areas and the least depths adjacent to or within shipping routes and destinations. These soundings are charted closely together.

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b. Support soundings - Soundings which complement critical soundings by defining the bottom areas adjacent to critical soundings and shoals, support curve development and define the bottom slope. The density of these soundings is determined by how many are necessary to show the slope of the bottom.

c. Fill soundings - Soundings used to fill in flat areas or show deeps that are not adequately defined by support soundings. These soundings are spaced to allow the mariner to interpolate the remainder of the ocean floor.

3.14.2.8.2 General guidelines to the selection of soundings.

a. Select the critical soundings which show the least depth in areas such as shoals, banks, tongues, ridges, the entrances to harbors and basins, in narrow passages, channels and fairways, alongside piers and wharves, along range lines and recommended tracks, in the fairway sector of lights, and in areas where vessels are likely to anchor.

b. Increase sounding density along tracks and routes.

c. Use soundings to delineate the width and depth of channels.

d. If generalizing, show critical shoal soundings and selected deep water soundings so that the full range of depths is shown.

e. Show fewer soundings, more evenly spaced, in flat or evenly sloping areas. Portray a denser, more irregular, pattern of depths in areas with irregular bottoms.

f. Depict deep water relief accurately to enable the mariner to relate echo sounder data to the chart.

g. Soundings selected should complement selected depth curves.

h. On small scale charts, soundings should be omitted within groups of rocks or coral heads when there is no well defined channel through them or where detail is generalized.

i. "No Bottom" soundings are only to be used when no other data is available.

j. Sea areas cut off from the main body of the water area by coastline or chart limits as well as inland water areas that can not be reached by sea-going vessels should not portray hydrographic information. A blue tint is applied to these areas.

k. As scale reduces, the ability of soundings to portray the bottom topography is impaired, however, depth curves can be reduced with much less loss of detail. Therefore, as scale decreases, the burden of depth representation should be transferred from soundings to curves, particularly in the depiction of narrow channels.

3.14.2.8.3 Areas of continual change. In areas indicated by source material or notices to mariners as being subject to continual and rapid

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change, such as at the mouths of river estuaries, inessential soundings may be eliminated and a cautionary note added to avoid excessive maintenance.

3.14.2.8.4 Mismatch between adjacent surveys. When surveys of different dates adjoin and do not correspond exactly, gaps in the contours may be left to indicate the disparity to the navigator. A purple dashed line with survey dates may be applied to the chart when curves are sparse or the surveys are not shown in the source diagram.

3.14.3 Depth representation by other than soundings. In certain circumstances, legends or symbols are used to describe the depth of water.

3.14.3.1 Dredged areas. Dredged areas have been dredged to a predetermined depth. The entire area is void of hydrography, except for the legend showing the dredged depth. The legend will show the dredged depth in meters and decimeters, separated by a decimal point, (always followed by m), and will include the date dredged if available, i.e. *Dredged to 9.2m (1995)*. No tint will be shown in the dredged area unless using the lighter of two water tints. Soundings (and tint if applicable) reported subsequent to dredging are added within dredged area limits; depth curves are shown if reported in the Notice to Mariners. Dredged areas are delimited by .13 mm weight black dashed lines, 1.3 mm long spaced .5 mm apart.

3.14.3.2 Maintained channels. Maintained channels, or areas, are constantly maintained at a certain depth. Portrayal of these areas is similar to dredged areas except no date is shown, i.e. *Maintained depth 9.2m*.

3.14.3.3 Swept areas. Swept (wire dragged) areas indicate the depth that ships can transit free of navigational dangers. The perimeter of the swept area is portrayed by .20 mm (.008") line weight dashed lines that are 2.5 mm (0.1") long spaced .64 mm (.025") apart. Area limits within the perimeter are shown by .20 mm (.008") line weight dashed lines that are 2.5 mm (0.1") long spaced .64 mm (.025") apart. The area limits and swept depth legends are shown in purple. If a chart already contains an abundant amount of purple data, swept area limits and type may be shown on a green plate. Swept depth legend type to include year is Techno Medium Italic and the size is dependent on the size of the area.

3.14.3.4 Controlling depths. A least depth sounding in a channel, or "controlling depth" is the shallowest sounding in the shallowest part of the channel, analogous to the highest point in a mountain pass in a valley on land. Every natural channel has at least one controlling sounding which identifies the minimum depth in the channel. The controlling depth of all natural channels shall be shown to let the mariner know the deepest draft vessel that can sail through the channel.

3.14.4 Drying heights. Drying heights are soundings attached to features in the intertidal zone (the area between the high and low water lines). These shoals are exposed during low tide and underwater at high tide. The height represents the height the feature or the exposed surface of the earth above the chart datum. This type of sounding is distinguished from ordinary soundings by underlining the whole number (not the fraction). The drying height will be enclosed by parenthesis if it cannot be shown within the

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feature. Drying heights use the same type style as sounding information, vertical 7 point and 5 point News Gothic type.

3.14.5 Depth curves. Depth curves are a navigational safety line indicating that no soundings of a lesser depth exist seaward of the line, but greater depths may occur on the shallow side of the line.

3.14.5.1 Accuracy of depth curves.

a. Accurate depth curves will be derived from intensively developed hydrographic sources such as closely spaced survey data or bathymetric collection sheets and shown as a continuous solid line, .13 mm (.005") wide, broken for labelling. When such sources are not available, curves may be taken from reliable nautical charts at an appropriate scale.

b. Approximate depth curves will be used when the reliability of the data used to develop the curve is suspect. These curves are depicted by a .13 mm (.005") width line, 4 mm (0.16") long and spaced 2 mm (0.08") apart and broken for labelling.

c. When compiling from foreign source charts, depict curves with the same level of accuracy shown on the source.

3.14.5.2 Interpolation of depth curves.

a. Depth curves are developed by interpolation between closely positioned depths. Soundings outside a given curve are greater than the value of the curve.

b. In delineating depth curves, the line will be positioned as near as possible to the deeper side of the sounding value without touching. The depth curve will not be broken for the sounding figure.

c. Isolated deep soundings within shoal areas will not show a depth curve unless channels, unusual configurations, or extensive areas are outlined.

d. In areas where depth curves converge on steep slopes, only the deepest and shoalest curves are shown. When space is limited in steep channels only show the deepest curve. Otherwise, the shoalest curve will be shown with the deep curve broken. In all cases, the curve delimiting the blue tint must be shown.

3.14.5.3 Labeling of depth curves. Depth curves are labeled in 7 point Techno medium italic type and are readable from the bottom of the chart. It is not necessary to label a curve that encloses a single sounding or small group of soundings where the value of the curve is apparent. However, small segments of depth contours not supported by soundings must always be labeled.

3.14.5.4 Depth curve interval.

a. The desired interval of depth curves taken from original surveys can be chosen from the following values: 2, 5, 10, 20, 30, 50, 100, 200, 1000,

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2000 meters etc. Curves may be omitted where they serve no useful purpose; and, it is not necessary for the complete sequence of curves to be shown in steep areas; however, every effort should be made to keep curves consistent within the chart and with surrounding charts.

b. If a metric foreign chart is used as a source, retain the depth curve interval utilized on the foreign source chart. In waters where irregular curves have been surveyed and charted (e.g. 3, 6, 15) they may be shown in lieu of standard curves.

c. If a foreign chart showing fathoms is used as a source, convert the soundings and depth curves to meters retaining the 1 fathom curve as a 2 meter curve and the 3 fathom curve as a 5 meter curve. This policy will be followed only when the soundings seaward of the curve are greater than the value of the curve. Refer to Section 3.14.5.2 for further details on depth curve development.

3.14.5.5 Depth curves delimiting water tint. Blue tint is generally applied to selected curves to emphasize areas of shallow water, thereby clarifying the navigable channels. The following criteria shall be used when selecting the significant depth curve:

a. Charts and plans 1:50,000 and larger may show blue screen to the 5 meter curve, occasionally to the 10 meters curve

b. Charts and plans 1:50,001 to 1:100,000 may show blue screen to the 10 meter curve

c. Charts 1:100,001 to 1:500,000 may show blue screen up to the 30 meter curve

d. On charts where deep draft routes exist, are planned, or on charts intended for the transit of deep draft vessels, blue tint will be extended to the 30 meter curve.

3.14.6 Bottom characteristics. The nature of the bottom is important to the mariner to determine good holding ground for anchoring, to assess the stability of shoals, to find a safe place to ground a vessel if necessary and, in deeper waters, to assist fishermen.

3.14.6.1 Selection and portrayal. The spacing of bottom information on a chart is dependent on the variations in the composition of the seabed. General guidance is a maximum of 5cm between abbreviations and show a sufficient number to show all major variations in the seabed. Bottom characteristics are derived from foreign source charts and, U.S. Navy, commercial or foreign surveys. Standard abbreviations for seabed characteristics can be found in Chart No. 1. Type is 6pt Univers Light Italic.

a. If available, full bottom characteristics should be placed at known or likely anchorages, against shoals, bars, banks, reefs, navigable channels, and fishing grounds.

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b. Priority should be given to qualities which indicate a rocky or foul bottom.

c. Bottom characteristics are not shown on charts smaller than 1:1,000,000.

d. Although the preferred position of bottom characteristics is below soundings, modern surveys often carry out bottom sampling independent of sounding. In these cases, bottom characteristics should be placed in their correct position.

e. Color of bottom material is insignificant to the mariner and should not be shown.

3.14.6.2 Multiple materials. The bottom may be composed of more than one material, either as a mixture, or as a distinct surface layer with a different layer underneath.

a. If material is mixed, separate the characteristics by spaces, for example: S M for "sand and mud".

b. If one material covers another material in a distinct layer, show order of layers separated by a slash with the top layer shown first, for example: S/M for "sand over mud". Layered characteristics are only shown on charts 1:75,000 and larger.

3.14.6.3 Special symbolization for bottom types. Certain bottom types require symbolization instead of abbreviation and at times may require notes.

a. Sandwaves build up during particular states of weather and tide and are an indication of seabed mobility. Charted depths may not portray the actual minimum depth. Sandwaves are charted by Chart No. 1 symbol J14.

b. Kelp is an indication of the presence of submerged rocks. Kelp is charted by Chart No. 1 symbol J13.2.

c. Underwater springs may cause false echo sounder readings. Underwater springs are charted by Chart No. 1 symbol J15.

d. Foul ground (see 3.15.5).

3.14.6.4 Uncovering areas and bottom description. An uncovering area, or intertidal zone, is an area that is covered at high water and exposed at low water. Offshore uncovering areas are generally hazardous reefs and shoals while inshore areas are usually coral reefs, rock ledges or tidal flats. Uncovering shoals and tidal flats are delineated by a drying line (zero meter curve) and contain a legend describing the bottom characteristic if known. Rock ledges and coral reefs are delineated by symbology. Both areas have dual 21% blue (shallow water) tint and 12% black (land) tint. If too small to be shown true-to-scale, they may be shown by an appropriate point symbol. When a point symbol outside of the first depth curve is used, it shall be encircled by danger dots and blue tint.

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3.14.7 Tidal information. The tidal information shown on charts is not intended to be sufficient for all requirements of practical navigation. The tidal information shown should allow the mariner to assess the significance of the tide and tidal stream in an area and also to determine if it is feasible to take their vessel into a particular place. Tidal information and portrayal is discussed in Section 3.11.32.

3.14.8 Currents. Currents are water movements that are constant in direction. They occur as a result of seasonal changes, wind, and as the natural movement of water in rivers and other restricted waters. Only surface currents are charted, with the strength of the current given in knots. Current values will be shown as on the source (in decimal or fraction form). The decimal point portrayal of current figures is preferred. See Chart No. 1, H40-H43. For currents caused by tidal action, see 3.11.32.3.2.

3.15 Dangers. Dangers to navigation are defined depending on the largest draft vessels that will transit an area. The limiting depth used to define dangers to navigation is now considered to be 30 meters. Therefore, a danger to navigation can be defined as any feature that can obstruct the safe passage of a vessel to a depth of 30 meters. There are three basic categories of dangers: rocks, wrecks and obstructions.

3.15.1 Danger portrayal. Dangers in navigable waters are always portrayed regardless of scale.

3.15.1.1 Danger dots. A single line of dots on a chart indicates either a limiting danger line or is an obsolete symbol for a one fathom line.

a. In its use as a danger line, danger dots can be used to distinguish between dangerous and non-dangerous wrecks, dangerous rocks from rocks which may be of similar depth but are not individually dangerous, obstructions, submerged coral reefs, etc.

b. To further emphasize the danger, blue tint is added to all dangers 30 meters and less in depth.

c. Large areas of dangerous features may be generalized when surrounded by danger dots.

3.15.2 Rocks. The charting of rocks is important to the mariner because, apart from the obvious danger represented by rocks, their presence also indicates irregular depths and the possibility of undiscovered dangers.

a. For symbolization of rocks utilize Chart No. 1; for definitions of rocks consult the "Nautical Cartographer's Handbook" Chapter 11, Section 1106.

b. If available and scale permits, show the heights of islets, and depth over rocks. Depths over rocks are shown in most cases by soundings, in lieu of a rock symbol, accompanied by the bottom characteristic R. Danger dots encircle the depth if the value falls outside the corresponding depth area. See also 3.14.2.2 for soundings out of position and 3.13.2.2.2.b for spot elevations on islets.

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c. Small islets, or rocks which do not cover, should be represented as source material depicts; however, the minimum diameter of an islet dot should not be less than .2 mm and isolated offshore point symbol islets should be enclosed by danger dots.

d. Groups of rocks may be enclosed by a danger line.

3.15.3 Wrecks. A wreck is the ruined remains of a vessel. Wrecks may be totally submerged or extend above the surface of the water at some or all stages of the tide, or even appear on land.

3.15.3.1 Portrayal criteria. Wrecks shall be shown to whatever depth they are considered to be of interest, but not generally in water deeper than 2000 meters. Wrecks inside the 200 meter curve are charted according to sections 3.15.3.2-5.

3.15.3.2 Stranded wrecks. Stranded wrecks, or wrecks showing some portion of their superstructure or hull above chart datum, are more likely to be stranded on shore and therefore, less likely to be dangerous. They are generally conspicuous however, and may be used as visual aids for position fixing. A stranded wreck in an offshore position is considered dangerous. Show stranded wrecks:

- a. Always on largest scale charts
- b. On smaller scale charts if they constitute a danger
- c. If they are conspicuous in areas with few navigational aids

3.15.3.3 Exposed masts. Certain wrecks are submerged except for the masts, which are exposed above the water. They are shown as submerged wrecks but labeled "Mast". See Chart 1, K-25.

3.15.3.4 Dangerous submerged wrecks. Dangerous wrecks, covered 30 meters or less, should be shown at all scales, including the depth covered if available, with the following exceptions:

- a. When numerous wrecks exist in close proximity it may be necessary to delimit the area with danger dots, add a legend and retain the least depth shown;
- b. On parts of charts covered by larger scale coverage, the limitations of scale in inshore and congested areas may require the omission of wreck and navigation aid information. A note to this effect will be required;
- c. On charts with scales smaller than 1:250,000 do not portray submerged wrecks between the shoreline and the 10 meter curve;
- d. On the smallest scale charts, soundings and other submerged features are omitted within the blue tint curve and in unnavigable areas. This generalization typically occurs at scales 1:700,000 and smaller for ocean passage and planning charts.

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3.15.3.5 Non-dangerous submerged wrecks. Sunken wrecks not dangerous to surface navigation (covered more than 30 meters) shall be shown at all scales with the same exceptions noted above for dangerous wrecks. When scale and source permit, the least depth known over a wreck shall be charted up to the 200 meter curve.

3.14.3.6 Symbolization. Wreck information shall be portrayed as symbolized in Chart No. 1.

3.15.4 Obstructions. Obstructions are defined as unknown underwater dangers to navigation and shall be shown with a least depth if available. In many cases, known features will be referred to as obstructions. Obstructions shall be portrayed as specified in Chart No. 1.

3.15.5 Foul ground. Foul ground is an area over which it is safe to navigate, but which should be avoided for anchoring, grounding or trawling, due to the presence of wreckage or other obstructions on the bottom. Use the pound (#) symbol or, in large areas, a dashed line delimiting the foul ground area, labeled *Foul*. Since foul areas are considered safe for surface navigation, they do not automatically show a bluetint, unless they are inside the significant depth curve to which the general shallow water tint is shown.

3.15.6 Fish traps, fish havens, marine farms and shellfish beds. These areas are charted when they either obstruct navigation, restrict a vessel's ability to anchor or trawl, or a vessel could do damage to the area. Scale should be considered prior to placing these features.

3.15.6.1 Fish traps and fish stakes. Fish traps and fish stakes obstruct navigation and they are usually located in shallow water. These areas are symbolized if the precise location of the features is known. In extensive areas of fish traps or tunny nets the areas may be charted by black dashed lines with a legend. Legends are preferred if the positions of traps are likely to undergo considerable change.

3.15.6.2 Shellfish beds. Shellfish beds, located in fairly shallow water, may be damaged by vessels attempting to anchor, or grounding, on them. Shellfish beds are charted by purple dashed lines with a legend and may require a cautionary note.

3.15.6.3 Marine farms. Marine farms, designed for the cultivation of fish or shellfish, obstruct navigation and are not confined to inshore locations. These areas should be symbolized on small scale charts and delimited by black dashed lines on larger scale charts. See Chart 1, K48.

3.15.6.4 Fish havens. Fish havens are artificial underwater structures designed to attract fish and shellfish.

a. Fish havens on smaller scale charts with undefined limits will be shown by the fish symbol enclosed by danger dots. Fish havens with known limits on appropriate scales will be bound by danger dots with a fish symbol inside.

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b. If known, the minimum depth, or minimum authorized depth, over a fish haven will be charted either inside the area limits or next to the area in parenthesis.

c. Blue tint will be shown inside fish havens if the depth is not known or where the minimum depth makes tint appropriate.

3.15.7 Other dangers. Other dangers important to the mariner for a variety of reasons are the existence of coral, kelp, breakers, submerged posts or piles, tide rips and eddies.

3.15.8 Caveats. Caveats are applied to reported or doubtful dangers to indicate the reliability of a feature. They are as follows:

<i>ED</i>	-	Existence Doubtful	-	the existence of feature is doubtful
<i>PA</i>	-	Position Approximate	-	position of feature has not been accurately fixed
<i>PD</i>	-	Position Doubtful	-	the position of feature is not confirmed
<i>SD</i>	-	Doubtful sounding	-	the position is correct but the sounding value is in doubt
<i>Rep(year)</i>	-	Reported	-	Indicates the year of a reported feature

Parenthesis around caveats shall be omitted, except in cases where the abbreviation is used to qualify or supplement another abbreviation e.g., *Wk (PA)*.

3.16 Offshore installations. Culturally developed features found offshore can be considered a danger to navigation, anchoring and trawling; they are sometimes marked by navigational aids. The majority of offshore installations are related to the petroleum industry while others are linear features such as pipelines, outfalls and cables.

3.16.1 Platforms. Production platforms are permanent fixtures equipped to control the flow of gas or oil. Platforms, along with any associated safety zones, shall be charted on relevant large and medium scale charts.

a. Platforms are charted with the open-square platform symbol; light flares and characteristics should be shown if source and scale permit. Platforms may have to be generalized to allow a single platform to represent more than one platform.

b. Offshore terminals may burn off gas from separate production platforms known as flare stacks. Flare stacks should be portrayed per Chart No. 1.

c. If oil and gas field areas are too congested to show detailed platform or light legend information, the legend "*SEE NOTE*" will be placed adjacent to the area in black and the following note will be placed in black on the chart in 10pt/8pt Techno medium type. Figure 81 shows the note used

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for the Persian Gulf and Red Sea. Figure 82 shows the note used in other areas.

NOTE

OIL AND GAS FIELDS

The limits of development areas are charted around certain fields. Uncharted surface structures and submerged obstructions may exist in these areas. Platforms and tanker moorings are generally marked by some or all of the following: Mo(U) W or R lights, aircraft obstruction lights; and fog signals. Vessels, subsurface craft and divers engaged in construction and servicing of these installations may be encountered. Unauthorized navigation is prohibited within 500 meters of all structures and submerged wells marked by buoys. Caution should be exercised by all vessels navigating in the vicinity of oil or gas fields.

Figure 81. Oil and gas field notes (Persian Gulf/Red Sea area).

NOTE

OIL AND GAS FIELDS

The limits of development areas are charted around certain fields. Vessels, subsea craft and divers may be engaged in construction and servicing installations within these areas. Other vessels are strongly advised to keep outside the charted limits. Platforms and tanker moorings generally show all or some of the following lights: Mo(U) W 15s 10 or 15M, Mo(U) R 15s 2M, aircraft obstruction lights, and sound fog signals Mo(U) 30s. Unauthorized navigation is prohibited within 500 meters of structures and subsea production wells marked by buoys. Maneuvering tankers should be given a wide berth.

Figure 82. Oil and gas field notes (other areas).

d. The wording of these notes is modified as necessary to fit the circumstances.

- If the area is dedicated to oil, remove the reference to gas in the title and last sentence,

- If light descriptions differ from those in the standard note they shall be charted.

- Charts portraying the 500 meter safety zone are required to show the standard Oil and Gas Fields note.

3.16.2 Wellheads. A wellhead is a submerged structure which projects above the seabed and caps a temporarily abandoned or suspended oil or gas well.

a. Submerged wellheads should be charted with a danger circle, blue tint if necessary and the legend "Well". When scale and source permit, the least depth known over a well shall be charted up to the 200 meter curve.

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b. Wells projecting above the sea surface are charted by a small position circle and the legend "Pipe".

c. Submerged production wellheads may be in seabed installations only, which eliminate the need for permanent production platforms. At scales of 1:150,000 and smaller, they are charted the same as suspended wellheads, but at larger scale, the label "Prod Well" is used instead of "Well".

3.16.3 Mooring systems. A variety of mooring systems have been developed to facilitate the loading of vessels and mooring of storage vessels in deep water offshore installations and in the vicinity of certain ports. The moorings systems fall into either the Single Point Moorings (SPM) or Single Buoy Moorings (SBM) categories.

a. Large tanker loading moorings (SBM's) are symbolized using the basic symbol for a superbuoy with a rounded symbol on top. They are normally marked by lights and sound fog symbols. See Chart No. 1, L-16.

b. If the mooring is connected to bottom by a rigid, pivoted or articulated structure, the mooring is shown as a lighted platform and have the legend "SPM". See Chart 1, L-12.

3.16.4 Submarine pipelines. Submarine pipelines are laid on the seabed for transfer of water, oil, gas, chemicals and other materials. Pipelines are vulnerable to damage from vessels anchoring and trawling and, depending on the pipeline content, present a hazard to either a ship or the environment.

a. Pipelines are shown to the 1000 meter curve.

b. Pipelines are shown on charts at scales larger than 1:1,000,000.

c. Oil, gas, chemical and water pipelines are shown in purple; pipelines used for discharge or intake such as sewer, intake and outfall are shown in black. When the material associated with the pipeline is unknown, the pipeline is shown in purple.

d. Pipes discharging into the sea should show the dot at the seaward side of the pipe symbol.

e. In areas where pipelines are numerous, where showing them individually would affect the legibility of the chart, pipeline area limits are charted. The preferred portrayal of pipeline areas is composite lines alternating with pipeline symbology (see Chart 1, L-40.2 and L-41.2). Legends describing pipeline content should be shown in the area if space permits. Color of symbology is determined per para b. above.

f. Pipelines are labeled with content, and buried or elevation above seabed information, if known. Labels are 7 point Techno Medium, upper and lower case type.

g. Abandoned pipelines are charted as symbolized in Chart No. 1. L-44.

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- h. If deemed appropriate, a cautionary note may be charted as follows:

CAUTION

Mariners risk prosecution if they anchor or trawl near a pipeline and so damage it. Gas* from a damaged pipeline could cause fire or loss of a vessel's buoyancy.

Figure 83. Pipeline caution note.

* If the pipeline contains oil, replace the word "Gas" with "Oil".

3.16.5 Submarine cables. Submarine cables are laid on the seabed for either communication or power transmission purposes and are shown on charts to prevent damage from vessels anchoring and trawling.

a. Submarine cables will be shown in purple to the 1000 meter curve using appropriate symbology from Chart No. 1, L-30.1.

b. Power transmission cables should be symbolized or labeled if known (see Chart 1, L-31.1).

c. In areas where submarine cables are numerous, where showing them individually would affect the legibility of the chart, cable area limits are charted in purple. The preferred portrayal of cable areas is composite lines alternating with cable symbology (see Chart 1, L-30.2).

d. Abandoned cables are charted as symbolized in Chart No. 1, L-32.

e. Submarine cables are portrayed on NIMA charts as they are shown on the prime source charts chosen for construction. Cables are not to be added from larger scale or overlapping NIMA coverage unless the source of this information is more current than the prime sources.

3.16.6 Cable and pipeline areas. In areas where numerous submarine cables and pipelines exist, where showing all individually would affect the legibility of the chart, bound the area by purple composite lines alternating with pipeline and cable symbology.

3.17 Tracks and routes. Tracks are recommended features intended to assist the mariner in avoiding shoals, dangers, or obstructions. Routes are regulated features designed to control traffic in congested areas.

3.17.1 Recommended tracks. Recommended tracks are used to indicate safe courses through particular passages and are not generally subject to regulation. Recommended track lines may appear on charts as solid (based on fixed marks) or dashed lines, lines with bearings, lines marked by buoys, or as one-way or two-way tracks. On the largest scales, all important tracks will be shown. On smaller scales, tracks may be shown to assist in passage planning but buoys and other marks should not be charted. Tracklines are portrayed in black, with the exception of Deep Water (DW) and regulated tracks which require extra caution or attention. These specific tracks are shown in purple.

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a. Track lines based on fixed marks are represented by solid black .25 mm (.010 inch) lines.

b. The part of the track intended for navigating is portrayed as described in paragraphs a above; the remainder, up to the rear mark, is shown as a smaller dashed line (see 3.17.2.a).

c. Track lines not based on fixed features will be dashed black .25 mm (.010 inch) lines, 2.5 mm (.10 inch) long, spaced .64 mm (.025 inch) apart preferably with 45 degree arrows indicating traffic flow.

d. Tracks supporting local fishing or pleasure craft activity should only be shown on charts 1:300,000 and larger in Bermuda, the Bahama Islands and the areas of Nova Scotia and Newfoundland.

e. Tracks should have annotations including information such as bearings and minimum depths if available.

f. Tracks defining deep water routes should be indicated by the legend "DW" along the track. DW tracks are shown in purple.

3.17.2 Leading (range) lines. A leading line is a straight line passing through two or more clearly defined charted features which defines the track for a vessel to follow. The defining features may be natural or cultural in origin.

a. Leading lines are symbolized by solid black .13 mm (.005") weight lines upon the intended route and dashed lines for the remainder up to the rear mark. (Dash length 0.64mm, spaced 0.33 mm apart)

b. Leading lines shall quote bearings and, where space and range permit, the type of marks providing the line. Preferred placement of legend is above the line; type is vertical. Bearing degrees, with the exception of zero degrees, are shown by three figures.

c. Bearings attached to leading lines are read from seaward and provided in degrees and minutes. If a leading line has marks at both ends a reciprocal bearing should be shown. The charted line should always agree with the bearing.

d. If scale limits the ability to chart the leading marks separately use one symbol and/or a legend to describe the leading marks eg, 2F, 2Bns.

e. Although the term leading line refers to two or more marks in transit, a single mark may be used as a track. This line should be shown as solid black .13 mm (.005") with a legend and bearing.

3.17.3 Clearing lines. A clearing line marks the boundary between a safe and a dangerous area, or passes clear of a danger. A clearing line has all the same characteristics as a leading line and is portrayed as a .13 mm (.005") weight dashed line. (Dash length 0.64mm, spaced 0.33 mm apart)

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3.17.4 Regulated routeing. Regulated routeing exists to reduce the risk of collision, grounding and environmental hazard. Such routes are designed and established by national authorities and may be adopted by the International Maritime Organization (IMO). 'Ships' Routeing', an IMO publication, describes all the routeing measures which have been adopted internationally. Consideration should be given to the need for cautionary or explanatory notes regarding the features detailed in this section.

3.17.4.1 Traffic separation schemes. A Traffic Separation Scheme (TSS) is intended to reduce the event of collision or grounding by separating opposing streams of traffic. TSS's are shown in purple, on charts of navigable scales.

3.17.4.1.1 Outer boundary. The outer limits of traffic lanes, roundabouts and precautionary areas are shown as .64 mm (.025 inch) dashed purple lines, 3.8 mm (.15 inch) long, spaced .64 mm (.025 inch) apart with the following exceptions.

a. If the limit of a traffic lane or roundabout coincides with the limit of an inshore traffic zone, the dashed line is replaced by a 45° angle, 31% purple screen 3 mm (.12 inch) wide.

b. If the limit of a precautionary area coincides with the limit of an inshore traffic zone, the dashed line is replaced by a purple composite line. See Chart No. 1, M-24.

3.17.4.1.2 Separation zone. A separation zone is shown the full width of the zone by a 45° angle, 31% purple screen. The minimum width of a separation zone is 3 mm (.12 inch).

a. Separation zones in a roundabout may be any size or shape. If the separation zone is undefined, it is represented by an unscreened (i.e., solid) purple circle, .38 mm (.015 inch) linewidth, with a diameter of 3.6 mm (.14 inch).

b. If traffic lanes are separated by natural obstacles the separation zone may be omitted.

3.17.4.1.3 Direction of movement arrows. Unscreened purple outlined arrows, are used to indicate the 'established' direction of traffic flow in traffic lanes and roundabouts (counterclockwise). Dashed outlined arrows are used to represent the 'recommended' direction of traffic flow. Arrows are placed in a dispersed or staggered arrangement to encourage use of the full width of the traffic lane, and avoid the appearance of recommending a specific track to be followed. Arrows are not shown in junctions or crossings to avoid implying priority of one lane over another.

3.17.4.1.4 Inshore traffic zones. Inshore traffic zones are zones between the inshore limit of the TSS and the adjacent coast where special local rules may apply. A legend of "Inshore Traffic Zone" shall be shown in an appropriate Techno Medium Italic type size within the area.

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a. If the limits of the inshore zone have been defined, the zone will be bound by the separation zone described in paragraph 3.17.4.1.a, purple composite lines and the shore.

b. If the limits of the inshore zone have not been defined, the zone will only be shown by the separation zone described in paragraph 3.17.4.1.a and a legend.

3.17.4.1.5 Precautionary areas. Precautionary areas, designated for crossing or converging traffic, should contain the triangular danger symbol (preferred) or a legend reflecting the area's status.

3.17.4.1.6 Notes relating to traffic separation schemes. When a TSS is shown on a chart, a note is applied in purple 10pt/8pt Techno Medium type indicating whether the scheme is approved or not approved by the IMO.

1. If scheme is approved by the IMO, the note is as shown in FIGURE 84.

NOTE

The Traffic Separation Scheme(s) on this chart is approved by the International Maritime Organization (IMO).

Figure 84. Note for traffic separation scheme approved by IMO.

2. If scheme is not approved by the IMO, the note is as shown in FIGURE 85.

NOTE

The Traffic Separation Scheme(s) on this chart is not approved by the International Maritime Organization (IMO).

Figure 85. Note for traffic separation scheme not approved by IMO.

* In a case where a mixture of approved and non-approved TSS exist on a chart, a specific note naming the approved TSS will be applied.

3.17.4.2 Deep water routes. The limits of IMO designated deep water routes are generally shown by purple dashed lines as described in Section 3.17.4.1.1 and labelled with "DW" at intervals. The only exception is when the limit of a deep water route meets a separation zone; the separation zone is then used for the boundary. Arrows indicating the established or recommended direction of traffic flow are portrayed. In cases of smaller scale charts, deep water routes may be charted by the symbol for a recommended track, in purple, with the legend "DW" and arrows to indicate the traffic flow.

3.17.4.3 Recommended and two-way routes. These routes differ from those discussed in Section 3.17.1 because these routing measures are recommended by the IMO. A cautionary note may be applied to the chart to explain why the route was established.

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a. Recommended routes are of undefined width and are generally marked by safe water buoys on their centerline. The centerline of the route is shown as a purple dashed line and the recommended direction of traffic flow is indicated by dashed open outlined arrows.

b. Designated two-way routes are established within defined limits to provide safe passage through areas where navigation is difficult or dangerous. The limits of two-way routes are shown as purple dashed lines and the recommended traffic flow is indicated by dashed outlined arrows placed in a staggered formation. One-way sections may exist within two-way routes.

3.17.4.4 Areas to be avoided. An IMO designated area to be avoided is charted by a purple composite line, the legend "Area to be Avoided", and should be accompanied by a caution note.

3.17.5 Radio reporting (calling-in) points. These points are established in busy waterways and port approaches to assist in traffic control. On passing these points vessels are required to report to a Traffic Control Center.

a. These points are shown on charts by a purple circles 3.6 mm (.14") diameter with arrowheads; the arrowhead(s) indicates that a report is required only if heading in that direction.

b. Designations shall be placed in the purple circles if available.

3.18 Special areas. This Section covers areas of interest to the mariner which are portrayed on the chart.

3.18.1 Anchorage areas. Anchorage areas will be portrayed as follows:

a. Anchorage areas of small extent without defined limits will be represented by a black anchor symbol with double flukes. Mariners are responsible to determine the size of vessel which may safely use an anchorage therefore, the single fluke anchor symbol formerly used to depict anchorage for small vessels is considered obsolete. The plotted position is the center of the symbol.

b. General anchorage areas with defined limits are shown by purple .20 mm (.008") weight dashed lines (dash length 2.5mm, spaced .64 mm apart), interspaced with anchor symbols, and an anchor symbol centered within.

c. Special purpose anchorages with defined limits are shown by purple dashed lines, interspaced by anchor symbols, preferably with a legend describing the area centered within. If space is limited inside the anchorage limits use the point symbol. These anchorages are generally named for specific cargoes or ship type (*Quarantine, DW, Tanker, Explosives, Seaplane, Time Limited, Reserved, etc.*).

d. Anchor berths will be shown by an anchor symbol labeled with the berth number in a purple outline circle in the anchor stem. Alternatively, a rectangle in the anchor stem may be used if the berth name is long. Swing

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circles should be shown by purple dashed lines if available. Type is 7 point Techno Medium vertical in all cases. For berths alongside piers and wharfs, see 3.13.5.

3.18.2 Restricted and prohibited areas. These are areas in which certain classes of vessels are excluded or certain activities are discouraged or prohibited. If possible, the nature of the restriction and/or the exact nature of activity prohibited should be charted. In most cases only a particular class of vessel, or activity, is prohibited therefore, the general term "*Restricted Area*" would be more appropriate.

3.18.2.1 Anchoring prohibited area. Anchoring prohibited areas with defined limits are shown by purple composite lines, interspaced by a x-out anchor symbol. If space is limited use the x-out anchor symbol centered inside the area limits or as a point symbol in purple.

3.18.2.2 Fishing prohibited area. Fishing prohibited areas with defined limits are shown by purple composite lines, interspaced by a x-out fish symbol. If space is limited use the x-out fish symbol centered inside the area limits or as a point symbol.

3.18.2.3 Other restricted and prohibited areas. These areas will be shown by a purple composite line with a legend centered within describing the area. These include areas such as minefields, historic wrecks, areas to be avoided, areas restricted by local authorities etc. The general term "*Prohibited Area*" should be avoided if possible. These areas often requires a caution note describing the nature of the restriction. The term "*Entry Prohibited*" refers to areas where all entry is banned.

3.18.2.4 Dumping ground. Dumping ground areas containing hazardous material will be portrayed by purple composite lines with a legend, centered within, describing the material dumped, eg. "*Explosives Dumping Ground*". Disused dumping grounds may be considered dangerous for an indefinite period and must remain charted with "*(disused)*" inserted under the legend.

3.18.2.5 Degaussing range. Degaussing ranges are used to measure, and demagnetize, a ships magnetic field. These areas are prohibited to anchoring and trawling due to instruments and cables on the seafloor associated with them. The limits of degaussing ranges, and any associated cables are shown by purple composite lines alternating with cable symbology with the legend "*Degaussing range*" centered within.

3.18.3 Military exercise areas. Military firing and bombing exercise areas are not shown on nautical charts of foreign waters however, any navigation aid within such areas shall be shown.

a. Military firing and bombing exercise areas portrayed by NOS in US Territorial and adjacent waters will be charted by NIMA charts of the same scale to ensure consistency between the products.

b. Submarine exercise areas and transit lanes are not charted unless they occur in major shipping lanes or port approaches. These areas or lanes

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are delimited by purple dashed lines with a submarine symbol as shown in Chart No. 1, N33.

c. Minefields are charted by purple composite lines with the legend "*Minefield*" centered within. Mine laying practice and counter-measure areas which may contain unexploded ordnance are charted by a purple dashed line interspaced by a mine symbol.

d. Unexploded ordnance is added to a chart when an isolated ordnance (military explosive) is dropped in deep water. The location is marked by a dashed purple 0.50 mm weight line circle 3.6 mm in diameter and the legend "*Unexploded Ordnance*"

3.18.4 Spoil ground. Spoil grounds are areas set outside shipping channels and in deep water for the disposal of material (spoil) generally obtained from dredging. These areas will be shown as black 0.20 mm weight dashed lines (dash length 2.5mm, spaced .64 mm apart) with the legend "*Spoil Ground*" centered within.

3.18.5 Dredging area. Dredging areas are areas where a concentration of dredging vessels may be working, taking up sand or shingle to be brought ashore for construction purposes. Actual depths found in these areas may be greater than charted. These areas are different from the "dredged areas" discussed in Section 3.14.3.1. They are portrayed by a purple dashed boundary with the legend "*Dredging Area*" centered within.

3.18.6 Ferry routes. Ferry routes are charted on all harbor charts and when the routes cross fairly narrow channels to alert vessel traffic to their existence. Long distance ferries with routes which may vary will have their terminals charted in lieu of routes.

a. Ferry routes represent transitory physical hazards and shall be charted in purple.

b. Cable ferries represent an obstruction and shall be charted in black with the legend "Cable Ferry" in vertical type.

3.18.7 Works under construction. Works in progress are very dynamic and will likely change during the chart life. Brief legends, phrased specifically as possible with the year date of information such as:

Under construction (1997)

Works in progress (1997)

Figure 86. Example under construction/works in progress notes.

a. Works on land whose features are likely to be seen from seaward should be shown with a dashed line and legend on land e.g., "Dock under construction (1997)". Land tint should extend across works on land until completion.

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b. Works at sea which will extend the coastline seaward are charted by a dashed line with a legend. The existing coastline should remain until the new coastline can be charted by a solid line. The area being reclaimed should be shown without any tint or hydrography eg, "Area under reclamation (1997)".

c. Works at sea which will be completely or partly submerged when completed should be shown by the symbol for the completed feature with a legend such as "*Under construction (1997)*" in a color to match symbology.

d. Where detailed information is lacking a general legend "*Works in progress (1997)*", spaced out if necessary, should be shown on the chart. In this instance hydrography and tint remain.

3.18.8 Various limits. The limits of areas such as ice fronts (N-60.1), log ponds (N-61), cargo transshipment areas (N-64), seaplane landing areas (N-13), harbor limits (N-49), nature reserves (N-22), etc. will conform to Chart No. 1. US National Marine Sanctuaries shall be shown with the nature reserve symbol, and labeled "*National Marine Sanctuary*".

3.18.9 International boundaries and national limits. The word "boundary" refers to any delimitation between adjacent states or those which face each other across channels or seas. The term "limit" refers to a line marking the seaward extent of any coastal zone where no other state is concerned. The ultimate authority for the portrayal of international boundaries is the Department of State. This guidance may conflict with source portrayal.

a. International land boundaries should be shown on all charts in the vicinity of coastlines. If a boundary is charted, except on products depicting the U.S.-Canada or U.S.-Mexico boundaries, the following line is to be included in the chart parameters block:

Boundary representation is not necessarily authoritative

Figure 87. Boundary representation note.

b. NIMA does not portray maritime boundaries, territorial sea claims, contiguous zones, or limits of fishery zones on any charts without the approval of the U.S. Department of State.

c. An Exclusive Economic Zone (EEZ) is an area which extends to a distance of 200 miles from the territorial sea baseline. In this area the coastal state has the sovereign rights to explore, exploit, conserve and manage the natural resources. EEZ's are only charted in US waters and US trust territories because they generally extend outside NOS coverage areas.

d. Firing and bombing practice areas in US territorial and adjacent waters are shown on NOS charts. To ensure consistency, overlapping NIMA charts will show the same areas as NOS charts of similar scales. These areas will not be portrayed on NIMA charts of foreign waters.

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3.18.10 Safety fairways. Safety fairways or passages represent control or regulation of vessel movement and shall be charted in purple with .20 mm weight dashed lines. Dashes are 2.5 mm long spaced .64 mm apart.

3.19 Aids to navigation (general considerations). Navigation aids are features established by man to assist, advise or direct the mariner in the navigation or pilotage of his vessel. Aids to navigation are used to establish position, avoid dangers, follow tracks and channels, conform to maritime regulations and to enter and leave ports and harbors.

3.19.1 Classification of aids to navigation. Navigation aids may be fixed or floating and can be categorized as visual, audible, or electronic.

3.19.2 Reliability of different types of aids to navigation.

a. Fixed aids are securely attached to the seabed or are erected on land and have a high level of reliability. Legends associated with these aids will be shown in upright text.

b. Floating aids are less reliable because they can be damaged by storms, break away from their moorings or may even drag their moorings onto the shoal they were intended to mark. Legends associated with these aids will be shown in italic text.

3.19.3 Purposes of aids to navigation. Aids to navigation have varying purposes and should be selected according to both the scale and area of the chart.

a. General purpose aids of use to all kinds of shipping include major lights, prominent daymarks, major buoyage and light vessels.

b. General purpose aids of use to major shipping include buoyage marking deep water routes, traffic separation schemes, sophisticated radio aids and electronic aids.

c. Limited purpose aids of use to all shipping include special purpose buoys marking spoil grounds, prohibited areas, wrecks etc., various signals, and radio aids.

d. Limited purpose aids of use to small ships include minor lights and beacons, aids defining inshore channels and those approaching minor ports.

e. The time of day and visibility will limit the type of aids available to the mariner.

3.19.4 Chart maintenance considerations in portrayal of aids. Aids to navigation should be considered for exclusion from a particular chart with a view to reducing chart maintenance, when they fall into one of the categories below.

a. Portrayal of short range aids to navigation in areas of the chart where the use of larger scale charts is essential for all sizes of vessels will result in unnecessary chart maintenance.

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b. In unstable areas of frequent change, it may be sensible to omit aids in a channel and substitute a legend such as "*Channel marked by buoys and beacons*".

3.20 Lights. Lights are fixed navigation aids used for a variety of purposes. When identifying a light the mariner will look for the rhythm and color first.

3.20.1 Source. The authoritative source of information on lights, except positions, is the updated NIMA List of Lights (USCG Light List in U.S. waters and territories).

3.20.2 International Association of Lighthouse Authorities (IALA). The IALA System rules will apply to minor lights but not to leading lights, sectored lights, light vessels, LANBY's and landfall lights. The system is primarily concerned with buoyage and will be discussed in Section 3.21.8.

3.20.3 Light position. The position of a light is indicated by a five-pointed star in one of two sizes depending on the importance of the light. The larger star is considered the "normal" size for the majority of lights. The light star is not used for light vessels, LANBY's, minor obstruction lights or offshore platforms.

3.20.4 Light flares. Light flares are added to all charted lights except minor air obstruction lights. Light flares should be placed in a way that does not obscure other detail.

3.20.5 Radar reflectors. Radar reflectors are portrayed on landfall lights, in black, when this feature is stated in the List of Lights.

3.20.6 Light descriptions or light legends. The parts of a light description can be broken down into rhythm (character), color, period, height and visibility (range). The legends are abbreviated and are shown in vertical type.

3.20.6.1 Light rhythm (characteristic). The rhythm (F, Fl, Oc, Fl(3), Iso, Mo(K)), is the primary character of a light, although strictly speaking, fixed and alternating lights are not necessarily "rhythmic". For a full description of the various rhythms, consult Chart No. 1.

3.20.6.2 Light color. The colors of lights should be abbreviated as shown in Chart No. 1.

a. The omission of a color in a light legend signifies that the light is white. When more than one light is shown, as in sector lights and alternating lights, the abbreviation "W" must be included in the legend. When charting sector lights, the colors shall be given in the order listed in the List of Lights.

b. Orange or Amber lights shall be shown as yellow lights.

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3.20.6.3 Light period. The period of a light is the time taken to exhibit a full sequence of phases and is always expressed in seconds. Navigators time the period of an observed light when necessary to confirm an identification made from the rhythm and the color. When possible, the periods of all lights should be shown on at least the largest scale charts. A period of a light expressed in seconds and tenths shall be portrayed in decimal form.

3.20.6.4 Light height. The height or elevation of a light is the vertical distance between the light source and sea level measured in meters. The height of landfall lights should be shown up through the coastal series of charts. Heights of other lights where their elevation seems significant should be charted on the larger scales. The heights of minor lights are insignificant and should not be shown at any scale. The height of a light may be used by the mariner to:

- a. Estimate when a landfall light will be sighted.
- b. Identify particular lights, e.g. leading lights, where they may be confused with others.
- c. Calculate distance from a light by vertical sextant angle.

3.20.6.5 Light range. The range, or visibility, at which a light will be visible can be calculated by its candlepower (luminous) or by the effect of the earth's curvature (geographic). Nominal range, which is used for charting and obtained from the NIMA List of Lights, is calculated by using luminous range while assuming a meteorological visibility of 10 nautical miles. Ranges are rounded to the nearest whole mile (.5 mile rounded down).

- a. Ranges of landfall lights should be charted up to chart scales of 1:999,999. The range of all other lights useful to the mariner should be charted on the larger scales. The ranges of minor lights in restricted waters are insignificant and should be omitted.
- b. If more than one range is applicable to a light the range is shown as follows: two ranges are separated by a slash, eg 28/22M; for 3 or more ranges use a hyphen, eg 18-11M. The longest range is always shown first; the shortest range last.

3.20.7 Combining elements of a light description. A standardized method of combining light descriptions enables complex descriptions to be shown compactly, however, some spacing of the elements is needed for interpretation as follows:

- a. Spaces are inserted:
 - at the end of the character rhythm
 - at the end of the last color
 - after the abbreviation for alternating - "Al"
 - except where covered by rules of omission.
- b. Spaces are omitted:

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- after s (seconds)
- after m (height)
- after M (range)
- after parentheses.

3.20.8 Order of omission of detail. Details in a light description should be omitted as scale decreases in the following order:

a. Order of omission of legend items for major lights:

- Elevation (omit on charts smaller than coastal series)
- Period (omit on charts smaller than coastal series)
- Range (where space is limited and larger scale coverage exists)
- Omit legend altogether (on charts 1:1,000,000 and smaller)

b. Order of omission of legend items for minor lights within harbors and restricted channels where space is limited

- Range
- Elevation
- Period
- All detail except light star and flare*

* A note to describe unlegended lights may be added

3.20.9 Light selection. In general, the lights selected should be those within range of where navigation on that chart is possible. Below are some general guidelines on light selection.

a. Only portray lights with a range of 15 miles or more on charts smaller than 1:500,000 unless deemed necessary to mark off-lying islands, shoals, points or by a scarcity of other aids.

b. On charts 1:1,000,000 and smaller show only a selection of principal lights each showing a light star and flare but no legend.

c. Scale, overlapping coverage and intended use of a chart should be carefully considered prior to selecting lights for inclusion.

3.20.10 Leading lights. Lights marking a charted leading line (See Section 3.17.2. will be assumed to be of special purpose by the mariner and, in most cases, the sector arcs do not need to be shown. If deemed necessary to chart the sector arcs, the arc legends shall show as much of the light legend as necessary. When scale does not allow the portrayal of a leading line, the abbreviation "Ldg" shall precede the light description.

3.20.11 Direction lights. Direction lights have a very narrow sector intended to mark a route to be followed. The narrow sector may be flanked by (a) darkness or unintensified light, or (b) sectors of different color or character.

a. In case (a), the central line of the sector shall be charted similar to a leading line with the abbreviation "Dir" and the course to be followed on

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the line (Chart 1, P30.1/P30.2). The abbreviation "Dir" shall only be charted preceding the light legend if the course line is not charted.

b. In case (b), the sector limits and arcs shall be charted as described below for a sector light and the legend "Dir" may precede the light legend to inform the mariner that the fairway sector has a precise cut-off (P30.3).

3.20.12 Sector lights. An all-round, or omnidirectional, light is one that exhibits the same character over the whole horizon of interest to marine navigation. If a light is not visible on some bearings, or changes character as the bearing changes, it falls under the category of a sector light and the sector limits and arcs must be charted. A sector limit is a line, or bearing of a light, where the character changes or the light is blanked out. A sector arc is the curved line, between sector limits, which is labeled to indicate what the mariner should observe.

3.20.12.1 Sector light portrayal. Sector limits and sector arcs shall be charted as dashed .13 mm weight lines with a dash length of .64mm, spaced .33 mm apart except for fairway sector limits described in Section 3.20.12.2. Small arrowheads should be placed at the ends of the sector arcs.

a. No sector limit lines should extend beyond the nominal range of the light.

b. If a sector limit line crosses a sector arc, the sector limit line should be broken. If two sector arcs cross neither should be broken.

c. Legends on sector arcs will be abbreviated according to Chart No. 1 in upper and lower case vertical type placed on the outside of the arc.

d. Sector limit lines are given in degrees reading clockwise from seaward.

e. The obscured sector of a light will be shown for an all-round light not visible on certain bearings and labeled "Obscd". Where visibility is obviously obscured by landfall on smaller scale charts the obscured sector may be omitted to avoid unnecessary detail. When an arc of visibility is deliberately restricted (not an all-round light) this does not apply (see 3.20.10, 3.20.11, and 3.20.12.2).

f. A decrease in the apparent intensity of a light due to partial obstruction may result in a faint sector. At larger scales, the legend "Faint" is shown across the sector arc.

g. In some cases a red secondary light is used to mark a danger. The sector limit lines should extend to at least as far as the danger and the character of the red light should be shown on the sector arc, e.g., "FR". The light legends of both the main and secondary light should be charted at the light position. In other cases, the main light itself may have a red sector over the danger and a single light legend is used, e.g., "Fl WR".

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3.20.12.2 Fairway sector lights. When a narrow fairway sector leads between offlying dangers, the sector limits marking its edges should be long enough to show the channel. The lengths of the sector limit lines marking the channel shall be portrayed by 0.13 mm (.005") solid lines, the remainder of the line shall be shown as dashed.

a. Other sector limit lines may be omitted where they cross the fairway.

b. Where the sectors are differentiated by color only, the color abbreviations shall be shown on the sector arcs.

c. Where sectors are differentiated by different rhythms, the rhythms shall be shown on the sector arcs including the color if necessary.

d. In exceptional cases, where it is necessary to chart the sectors of a light which does not fall on the chart, full details of the light including the name may be charted on the sector arcs.

e. If a light is intensified in a sector, the ranges of all the sectors will be shown on the sector arcs but not in the light legend. If impracticable to show the ranges on the sector arcs, the legend "Intens" shall be placed on the affected sector arcs after the color.

3.20.13 Lights: time of exhibition. Lights are normally exhibited from sunset to sunrise however, some lights have limited times of exhibition and should be shown as described in Chart No. 1. These lights include occasional lights which are exhibited only when needed and fog lights which may be exhibited by day during periods of reduced visibility (Chart No. 1, P-50, P-51, P-52, P-53).

3.20.14 Aeronautical lights. "Aero" lights, established for aeronautical navigation, are generally higher power than marine lights and visible well offshore. When these lights can be seen from seaward, their characteristics should be charted (with a light star and flare) with the prefix "Aero".

3.20.15 Air obstruction lights. Air obstruction lights mark tall features such as radio towers and chimneys and, if considered visible from seaward, may be charted as follows:

a. If of high intensity, they should be charted similar to Aeronautical Lights and may include a legend describing the structure if considered conspicuous.

b. If of low intensity, they should be charted (without the light star or flare) by a descriptive legend, e.g., "(R Lts)" against the symbol of the structure.

3.20.16 Structures exhibiting more than one light. When two or more legends apply to a single light star they should be shown in the order given in the List of Lights. Preferably they will be charted on separate lines however, if they are on the same line they should be separated by a comma.

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a. Two fixed lights disposed horizontally or vertically shall be shown as either "2F(hor)" or "2F(vert)".

b. The exception to the above is a fixed light varied at intervals by a flash of greater intensity which should be shown as "FF1".

3.20.17 Light vessels. A light vessel is a major navigation aid, comparable to a landfall light. Light vessels will carry a light which may have any of the characteristics of a shore light, except light sectors. Light legends for light vessels will include both height and range on larger scale charts.

a. Major light floats and light vessels should be symbolized as superbuoys (without the mast or stick). This class of major floating light generally has a nominal range in excess of 10 miles and a hull length in excess of 10 meters. The light legends shall conform to the rules for shore lights except that all associated text will be italic. Colors of major light floats are not charted.

b. Smaller light floats are typically 9 meters or less in length. Minor light floats are used in areas of decreased tides and current. Minor light floats carry light characteristics similar to those of buoys and may conform to the IALA Buoyage System. In this case, structure color is significant. (See Chart No. 1, Q30 and Q31)

3.21 Buoys. Buoys are floating, man-made objects moored to the ocean floor to provide navigation aids, special purpose marks and moorings.

a. Buoy moorings consist of a weight attached to a chain that is generally about three times the depth of water where tides are significant. Buoys, particularly those in offshore exposed locations, are liable to drag their moorings out of position.

b. The position of a buoy is the "assigned position" quoted by the buoyage authority and is marked by the small circle at the base of the buoy symbol.

c. The body of a buoy is principally a float which may be designed as a distinctive shape, or may form the base of a superstructure.

3.21.1 Buoy categorization by size. Buoys differ greatly in size depending on their purpose and location but are generally charted as only two sizes:

a. Standard buoys, including high focal plane buoys.

b. Superbuoys. These very large buoys, often in excess of 5 meters diameter, are charted differently because their size renders them a hazard and/or their components are very expensive. Superbuoys will portray full light characteristics conforming to specifications for shore lights excepting that the legend type shall be italic. There are three principal types of superbuoys:

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3.21.2 Types of Superbuoys. Superbuoys are classified into the following types.

a. LANBY (Large Automatic Navigation Buoy) serves a function similar to light vessels (see 3.20.17).

b. Offshore tanker loading and discharge buoy (SBM) is described in Section 3.16.3.

c. ODAS (Oceanographic Data Acquisition System) buoy is generally moored in very deep water and is used for the remote collection of oceanographic and meteorological information. The purpose of an ODAS buoy shall be indicated on a chart by the legend "ODAS".

3.21.3 Shapes and symbols. The principal shapes are those recommended in the IALA (International Association of Lighthouse Authorities) System. They are: conical (including nun), can (including cylinder), spherical, pillar (including high focal plane) and spar. The majority of buoyage should be classified under the principal shapes.

a. Other buoys, e.g. barrel buoys, mooring buoys and light floats, will require their own symbols.

b. Buoys of no distinctive, or unknown, shape should be charted as open pillar.

c. Special buoys may have any shape providing they do not conflict with standard buoyage marks.

d. Buoy symbols, except lightfloats and superbuoys, are shown preferably slanting to the right.

3.21.4 Topmarks. These features are distinctively shaped and are a principal means, together with color, light character and certain shapes, of showing where safe water lies in relation to the buoy. They should always be charted when known to exist. See Chart No. 1 for symbolization of various topmarks.

3.21.5 Colors of buoys and topmarks. This Section refers to the color of buoy bodies and topmarks. Superbuoys and mooring buoys do not display color abbreviations.

3.21.5.1 Labels for buoy colors. Colors of buoys shall be abbreviated according to Chart No. 1 and centered below the buoy in 5 point black Techno medium italic type.

3.21.5.2 Color indications on multi-colored buoys. When buoys are more than one color the term 'stripes' refers to vertical or diagonal stripes and the term 'bands' refers to horizontal bands.

a. When the colors are stripes, the darker color is given first.

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b. When the colors are banded, the colors are given from top to bottom.

3.21.5.3 Color representation on buoy symbols.

a. A black (filled in) buoy symbol represents a black or green buoy or any color spar buoy.

b. An open buoy symbol is used for any other color of buoy or multi-colored buoy. The exceptions here are a safe water buoy which is an open symbol vertically dissected, and a preferred channel buoy which uses the first color to determine the symbol color, e.g. a green-red-green (GRG) banded buoy is shown by a solid black symbol in accordance with paragraph a above.

3.21.6 Designations of buoys. Identification names, numbers or letters will be shown in bold italic black type.

3.21.7 Lighted buoys. The symbol for a light buoy is the same as an unlit buoy with the addition of a light flare extending from the base of the buoy and a light legend in black italic type. Light legends will be charted as described for fixed lights except that height and range will only be shown on superbuoys and major lightfloats, not on standard buoys.

3.21.8 Buoyage systems. Systems of buoyage are described as lateral, cardinal or as a combination of both.

a. Lateral systems of buoyage depend on a direction of buoyage being defined. Normally the direction of buoyage is in accordance with the direction of the flood tide or an approach from seaward. The direction of buoyage should also follow a clockwise direction around continental land masses.

b. The cardinal system of buoyage depends on the main points of the compass and is generally confined to offshore isolated buoyage.

3.21.9 IALA Maritime Buoyage System. The IALA Maritime Buoyage System, Regions A and B, includes the lateral and cardinal systems. The buoy shapes are the same in both Regions, but in Region A the lateral marks are red to port, and in Region B they are red to starboard. See section 3.11.2 for information concerning buoyage notes.

3.21.10 Direction of buoyage indicator. A special symbol (see Chart No. 1, Q-130.2) showing the direction of buoyage is applied when:

a. The lateral system extends a long way offshore and at its outer end has a local direction opposed to the general direction

b. The "straight through" buoyage of a strait overrides the "approach from seaward", or where two opposing directions meet.

c. The lateral system is used in a one-way traffic system where the direction of buoyage is opposed to the traffic direction.

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3.21.11 Representation of buoys on charts. Buoys should be selected according to the intended purpose of the chart and should follow some basic guideline:

a. On large scale charts, all navigation and special purpose buoys, including their full characteristics, should be shown. Buoys marking minor channels may be omitted in favor of a legend, e.g., "*Channel marked by buoys*".

b. On approach charts, all buoys in the approaches are shown, and navigational buoys in the harbor are shown if the scale is adequate for navigation. Full characteristics of the harbor buoys may be reduced as appropriate if larger scale coverage exists.

c. On coastal charts, the buoys inside harbors charted at larger scales may be omitted with discretion and the periods of less significant buoys may be omitted.

d. On charts intended for offshore navigation, only buoys supporting offshore navigation and certain special purpose buoys such as those marking subsurface oilfield or ODAS buoys shall be charted.

e. Buoys fitted with Fog Signals and/or Radio Aids should be appropriately symbolized.

f. The characteristics, and light flares, of buoys marking channels should not be placed in the channel.

g. Radar reflector symbols shall not be shown on IALA buoys.

3.22 Beacons. The term beacon is used loosely to cover a wide range of "fixed" structures from simple poles to built up towers. There are many terms for particular types of beacon e.g., daymark, perch, stake, post, cairn. If their appearance is known they should be symbolized with topmarks as appropriate.

a. Shapes and colors of beacons, for the most part, are standardized in the IALA Maritime Buoyage System. The standardization however, applies principally to topmarks permitting wide variations in supporting structures. Beacons painted distinctive colors and those having distinctive topmarks should be shown on the largest scale charts with enough detail to be positively identified.

b. Beacons are shown as upright symbols to avoid confusion with spar buoys except in the special case of stakes or poles placed on submerged rocks where the symbol will be shown sloping to the right. Colors and designations of beacons shall be depicted as described for buoys, however the type shall be upright.

c. A beacon in general, as symbolized in Chart No. 1 (Q-80), is shown when it adequately represents the feature, when scale is too small to show additional detail, or when the actual shape of the beacon is unknown.

d. Radar reflectors are not shown on IALA beacons.

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3.22.1 Coastal beacons. Coastal cliffs and hills are sometimes marked by large daymarks. These daymarks do not generally conform to the IALA Buoyage System. Because of their size, major coastal beacons should be charted, along with elevation and color if available, on all scales where it is safe to navigate within visible range.

3.22.2 Channel and danger marking beacons. These beacons normally have topmarks that conform to the IALA Buoyage System but the chart symbol varies with the size of the beacon.

a. Beacon towers (Chart No. 1, Q-110) are found in exposed locations and are built of masonry on offshore drying rocks. Used in conjunction with small beacons and buoys, they act as the major aids in narrow channels through rock strewn areas. Lattice beacons (Chart No. 1, Q-111) are similar in function to tower beacons but have an open framework structure.

b. Perches, withies and stakes, sometimes with topmarks, are used to mark minor channels in intertidal areas. They should be charted as thin stemmed symbols with appropriate topmarks.

3.22.3 Special purpose beacons. Special purpose beacons include those used to mark cable and pipeline landings, outfall pipes, measured distances, spoil grounds, etc.

a. Most special purposes beacons will be painted yellow with "X" topmarks to conform to the IALA System, however, some of these features will remain marked by notice boards, which should be symbolized, at least on the largest scale charts.

b. When charting beacons marking cables, leading lines, outfalls, etc., where the function of the mark should be clear from the associated line symbols, there is no need to chart a legend describing the marks.

3.22.4 Lighted beacons. Some beacons, particularly those marking leading lines, exhibit lights. On large scale charts, important light beacons should be charted with color and shape information for use by day as well as full light characteristics.

a. Symbolize lighted beacons in accordance with Chart No. 1.

b. Charted light characters will follow the criteria for light legends.

c. On small scale charts where navigation within visual range of a beacon is unlikely, lighted beacons are charted as lights.

3.22.5 Buoyant Beacons (Articulated Lights). "Buoyant beacon" is the IALA approved term for resilient or elastic beacon, pivoted beacon, floating light beacon, Sarus tower and articulated light. These aids usually carry a light and topmark which conform to the rules of the IALA System.

a. Buoyant beacons, although 'floating', are considered to be fixed aids.

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- b. Buoyant beacons will be charted as fixed beacons.

3.23 Fog signals. Fog signals are relatively short range aids, used when visibility is reduced by fog, which are unreliable as indicators of position. Their importance in relation to other aids has declined however, they are still considered useful for the safe navigation of vessels with limited, or non-functional, electronic equipment.

3.23.1 Types of fog signals. Fog signals can be categorized into two types of signals.

a. Wave-actuated signals - bell, gong or whistle, which have no regular rhythm.

b. Power-operated signals - bell, horn, diaphone, or siren, which can give distinct rhythms.

3.23.2 Fog signal descriptions and abbreviations. Consult the NIMA List of Lights for descriptions of the various types of fog signals and Chart No. 1, R-10 through R-16 for fog signal abbreviations. When a description of the type of signal is not given, the fog signal symbol of three concentric purple arcs (Chart No. 1, R-1) is shown.

3.23.3 Fog signals not co-located with other aids. If the location of a fog signal is not on an aid, or close enough to an aid to be charted with it, the fog signal symbol will be placed against a small position circle.

3.23.4 Reserve fog signals and submarine fog signals. Reserve fog signals are shown only when wave-actuated. Submarine fog signals are no longer used.

3.23.5 Charting of fog signals. The 'usual' range, defined by IALA as the distance at which there is a 50% probability of hearing a fog signal from a ship's bridge with an ambient noise level, in relatively calm weather, is unchartable.

a. For the purpose of compilation, the following usual ranges shall be used:

Powerful diaphone	- 4 to 5 miles
Horn	- up to 3 miles
Wave actuated bell or whistle	- 1/2 mile or less

b. Fog signals should only be shown on larger scale charts where it is possible to navigate safely within audible range of the aid.

3.23.6 Rhythm and period of fog signals. The characteristic rhythm of the fog signal, other than those wave actuated, may be more important than the type to a mariner trying to identify them.

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a. Rhythm and period are generally shown if possible, but may have to be omitted to reduce chart clutter. The rhythm and period of a fog symbol are charted only the type of fog signal is charted.

b. Power operated signals should be charted by depicting the type of signal and number, or composite groups, of blasts, e.g., "Bell(1)", "Siren(2+3)", "Horn(2)", "Dia Mo(N)".

c. The period of a fog signal is the time taken for a complete sequence of emissions and should be charted in seconds, following the number of blasts, for major signals where space permits and for minor signals on the largest scale charts, e.g., "Dia(1)30s", "Siren Mo(N)60s", "Horn(2+3)120s".

3.24 Radio and radar aids to navigation. Radio and radar aids to navigation are symbolized by a 6.35 mm diameter purple circle centered over the position. If the station or beacon is not located at a charted aid or landmark, a 1 mm diameter circle with center dot shall denote its position. The abbreviated legend indicating the type of radio aid is printed in purple adjacent to the symbol.

3.24.1 Radio position fixing systems. The following systems enable a radio direction finder or radio equipment to determine the bearing of the transmitting device. International abbreviations for each type are shown in parentheses.

a. Marine radiobeacons. They may be circular (non-directional) (RC), directional (RD) or rotating (RW).

b. Aeronautical radiobeacons (Aero RC).

c. Radio direction-finding stations (RG).

d. Coast Radio Stations providing "QTG" service (R).

3.24.2 Portrayal of radio position fixing systems. The facilities listed above, or a selection of them, should be shown on charts of appropriate scale as determined by their range and likely use of the chart, with their names in black when it is not otherwise evident.

3.24.3 Systems omitted from charts. The Consol beacon system is almost obsolete, with coverage restricted to Norway and the Arctic coasts of Russia and should not be charted. Radio Calibration Stations shall not be charted.

3.24.4 Marine radiobeacons.

3.24.4.1 Types of marine radiobeacons.

a. Circular marine radiobeacons (RC) are sited to provide as uninterrupted a transmission path as possible. Their locations are chosen to provide good cross bearings.

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b. Rotating pattern radiobeacons (RW) enable a ship to find its true bearing in relation to the beacon without the use of direction finding (DF) equipment.

3.24.4.2 Portrayal of marine radiobeacons. All circular and rotating pattern marine radiobeacons shall be charted on medium and large scale charts except in the following circumstances:

a. On large scale charts, if radio position fixing would not be used within the area covered;

b. On medium scale charts, if an excessive number of radiobeacons exist forcing selection on criteria of position and range;

c. On charts 1:500,000 and smaller, radiobeacons shall be omitted if the chart does not permit navigation within range of them excepting charts used for approach planning.

d. Service details including frequency, Morse code signal, range, etc. will not be charted.

3.24.4.3 Directional radiobeacons. Directional radiobeacons (RD), generally of short range, are designed to assist vessels negotiating narrow channels or making a harbor entrance by giving an 'on-course' signal on a fixed bearing. The bearing line is charted in purple linework similar to a visual bearing line (See 3.17.2.a.).

3.24.5 Aeronautical radiobeacons. Aeronautical radiobeacons may be valuable for position fixing at sea in areas where marine radiobeacons are limited, or unreliable.

a. Aeronautical radiobeacons should be charted if they are located in low lying coastal areas, provide continuous service, operate between 285 kHz and 325 kHz and have a minimum 50 mile range.

b. An aeronautical radiobeacon should only be charted in the vicinity of a marine radiobeacon if the range of the Aero RC is significantly greater. On smaller scale charts, Aero RC's may be shown in preference to marine radiobeacons.

3.24.6 Radio direction finder (RG) stations. These stations are established on shore to provide a radiolocation service. They measure the bearing of a signal transmitted from a ship and relay the information to the ship, either directly or through a Coast Radio Station.

3.24.7 Coast radio stations providing "QTG" service (R). These Coast Radio Stations will transmit signals, on request, for use with ships' direction finding equipment to obtain a radio bearing. Only Coast Radio Stations providing this service are to be charted and only in areas where radiobeacons are not available.

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3.24.8 Radar services. Radar services available to the mariner for position fixing are listed below and should be selected for portrayal according to chart scale and with regard to their range.

a. Radar transponder beacons (Racon) emit a characteristic signal when activated by a ship's radar. They automatically return a distinctive signal which provides range, bearing and identification information on the radar display.

b. Radar beacons (Ramar) transmit a continuous signal appearing as a radial line on the radar display, indicating the direction of the beacon from the ship.

c. Coast radar stations (Ra) are shore-based stations the mariner can contact to obtain a position.

3.25 Marine services and signal stations. These are services, aside from aids to navigation, which assist the mariner.

3.25.1 Pilot stations.

a. Pilot station symbols, indicating the sea boarding location of harbor pilots, will be charted by a purple circle with a purple diamond inside; if the pilot will be transferred by helicopter, use the letter "H" in 7 point Techno Medium Italic purple type with the symbol. If there is a special name for the pilotage district or port served, the name may be added in 7 point Techno Medium Italic purple type alongside the symbol.

b. Pilot stations ashore require different symbolization. The pilot station building is charted on larger scale charts when the location is known. Legends indicating the type of pilot service such as "Pilot look-out" or "Pilots" will be indicated in 7 point Techno Medium black type next to the building symbol.

c. When the location of a pilot station (of any kind) is not known, the legend "(Pilots)" in 7 point Techno Medium Italic purple type is added under the name of the port to signify pilotage service.

3.25.2 Coast Guard/rescue stations. Coast Guard and/or rescue stations should be shown on at least the largest scale charts when source allows.

3.25.3 Signal stations. Signal stations communicating visually have diminished in importance but still have some significance as a landmark. When both day and night signals are exhibited from a station, the station should be represented by a position circle and the legend "SS". If the type of signal station is known, it should be charted after the legend "SS" in parenthesis, e.g. SS (Storm).

3.26 Names and labeling

3.26.1 Geographic names requirements. Geographic names on nautical charts are used by the mariner to coordinate between overlapping charts and as a reference in locating information in various publications such as Sailing

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Directions, List of Lights, Radio Aids, Tide Tables, etc. Names mentioned in the above publications should appear on the largest scale charts when source and NIMA standard name guidance approves.

3.26.2 Abbreviations. Abbreviations should be avoided in geographic names whenever possible. If abbreviations are deemed necessary, do not show periods.

3.26.3 Name placement. If possible, type for land names should be placed on land; and water names, on water areas. Point names, however, should be placed on water areas, but names should not obscure hydrography in critical areas. When it is impossible to place a name where it does not obstruct hydrographic features, it may be placed on adjacent land area. If avoidable, names should not be placed along the axis of the deepest water or across a channel. Names of features that cover a considerable area should be placed as near the center of the area as possible and should be curved to follow the general configuration of the area. If a feature covers a considerable length, do not spread the name over a long distance. Repeat the name, if necessary, although this technique should be used sparingly.

3.26.4 Type, weights and styles. Geographic names referring to land features shall be shown in upright Century Expanded type; those relating to water features in Century Expanded italic type. Type size shall be selected according to the relative importance of the names to be shown. Sizes vary from 7 point to 24 point.

3.27 Magnetic variations.

3.27.1 Definitions. See 6.4 for definitions of magnetic variation, annual change, isogonic line and compass rose.

3.27.2 Compass rose portrayal.

3.27.2.1 Size and style. The various styles of compass roses shown on NIMA standard nautical charts are displayed on APPENDICES A and B. Use of a particular style is scale dependent on the chart scale and whether or not isogonic lines are shown on the chart (see 3.27.2.4). The size or diameter of the true rose varies from 7.6cm (3") to 12.7cm (5") depending on the size and configuration of the chart. The compass rose will be shown on the purple plate, SPC-96532.

3.27.2.2 Compass rose placement.

a. Whenever practical, a point shall be selected for compass rose placement in every quadrant of a nautical chart subject to double folding. Chart size, shape of land areas, and density of detail on a given chart will affect the number of points selected. Sufficient points shall be selected to ensure that all navigable waters are within 18 inches of a compass rose.

b. In the selection of a point for compass portrayal, a cartographer must retain the awareness of the accompanying chart detail. Thus, a selected point shall not be less than one inch from any projection line, to keep the compass rose from obscuring the projection. On charts constructed on the

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Transverse Mercator Projection, compass roses will be placed in the vicinity of the meridians which are central to the areas where compass roses will most likely be used. Such positioning minimizes the course and bearing errors which may be introduced by using the Transverse Mercator projection. Compass roses must not obscure dangers, shoal soundings, or aids to navigation, nor overprint shoreline, notes, anchorages, or approaches to a harbor. A minimum of other chart detail can be overprinted. All compass roses shall be clear of a chart fold. Compass roses shall be located in a position convenient to the most important navigational features of the chart for ease in plotting bearings and courses. For example, a compass rose placed offshore (or on land) should be positioned in a locality where direct bearings between ships and navigational aids in the vicinity can be readily determined.

c. Whenever a chart or plan is too small to accommodate a compass rose without unduly obscuring the detail of the chart, a compass rose will not be shown. Instead, the magnetic variation will be computed and given for the geographic center of the plan or chart. The variation note will be identical in type size as general notes and will be shown on the purple plate. It will be placed in a convenient area on the chart, preferably under the title.

3.27.2.3 Construction of compass roses. The true compass rose (outer ring) will always be oriented so that 0° is aligned with the geographic (or true) North Pole. The small cross at the center of the rose will be placed so that the lines forming the cross are aligned to N-S and E-W, and their intersection coincides with the point of computations. The magnetic compass rose will be placed inside the true compass rose, centered and aligned to the magnetic variation. The small cross at the center of the magnetic compass rose will be aligned to the magnetic variation. When used, the half arrow shaft is also aligned to the magnetic variation. The half arrow is shown on the west or east side of the shaft corresponding to the variation.

a. Variation Value - Variation and annual change values for each selected point of computations will be indicated by a note in 7 point News Gothic type, upper case. The lines of type are spaced 4 mm (.16") apart. This note will give the computed variation in degrees and minutes, E or W bearing, current year for which computed, and annual change. It will be centered on the small cross marking the center of the true rose (outer ring) as shown below and aligned to the magnetic rose. Leading zeros are required in magnetic variation legends for minute values less than 10'.

VAR 2° 45'W (1998)	VAR 2° 45'W (1998)
+	+
ANNUAL CHANGE 3'W	NO ANNUAL CHANGE

Figure 88. Variation portrayal.

b. All variation values in the inner rose will be rounded to the nearest five minute. The annual rate of change values shall be rounded off to the nearest minute using the following rationale. Annual change values do not require leading zeros.

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Example: 4'30"E will be shown as 5'E
 4'29"E will be shown as 4'E

3.27.2.4 Components of a compass rose. The compass roses on a Harbor, Approach, Coastal and General Charts consist of four parts: the outer or true rose (oriented to true north), the inner or magnetic rose (oriented to magnetic north), the points of the compass (also oriented to magnetic north), and a cross at the center (also oriented to magnetic north). Charts larger than 1:300,000 show all 4 parts. Charts 1:300,000 and smaller, that do not show isogonic lines, show a half arrow, aligned with magnetic north, in lieu of the magnetic rose and points of the compass. Charts at scales 1:300,000 and smaller that show isogonic lines show only the true rose and the cross.

3.27.3 Isogonic lines.

3.27.3.1 Requirements. If the range of the magnetic variation over the limits of the chart is three or more degrees, isogonic lines will be portrayed on the chart. Only 5-year epoch values will be drawn. A true compass rose (outer ring), aligned to true north, will be located in at least two places on charts displaying isogonic lines.

3.27.3.2 Isogonic line portrayal.

3.27.3.2.1 General. Magnetic variation (isogonic) lines will be shown on the purple plate by unbroken lines connecting points of equal variation, e.g., at 1-degree, 2-degree, or 5-degree intervals so that spacing does not generally exceed 15 cm. These lines shall be labeled with appropriate values of variation and annual change. Line weights shall be 0.13 mm (0.005 inches) wide. Isogonic lines do not cross land masses larger than 25 mm (1 inch).

a. The magnetic variation shall be shown in degrees followed by the letter E or W as appropriate. The annual change (placed in parentheses), expressed in minutes, followed by E or W as appropriate, shall immediately follow the variation.

b. Where the isogonic line of 0-degrees must be charted, it shall be so labeled, followed in parentheses by the annual change. The line shall be unbroken and 0.56 mm (0.022 inches) wide.

3.27.3.2.2 Labeling. Isogonic lines will be labeled at each end, with the variation expressed in degrees and minutes E or W. Annual change will be indicated in parentheses following the variation, e.g., "12°E(5'E)." Type will be 10 point News Gothic Condensed, upper case, placed above but clear of the line, and avoiding overprints or conflicts with other chart data.

3.27.3.2.3 Spacing. Isogonic lines shall not be less than 8.38 mm (0.33 inch) apart. Whenever closer, as may occur on polar charts, the interval will be reduced to each even degree, every five degrees, or every 10-degrees, according to line spacing. If two or less isogonic lines are to be shown, only compass roses shall be used.

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3.27.3.2.4 Note. On all charts with isogonic lines, a note, 7.9cm (3.1") wide, indicating the 5 year epoch date of the curves and the rules for applying annual change to magnetic variation shall be shown below or near the title block of the chart on the purple plate in 9 and 8 point Techno Medium type as follows:

Magnetic variation curves are for (epoch).
Figures in parentheses indicate annual change.

RULES FOR APPLYING ANNUAL CHANGE TO MAGNETIC VARIATION

The following procedures are to be followed when applying annual change to the magnetic variation. If annual change is of the same direction (West or East) as variation, it is to be added and variation is increasing. If annual change is opposite in direction to variation, it is to be subtracted and the variation is decreasing.

Figure 89. Isogonic lines note.

3.26.3.3 Alternate portrayal of isogonic lines.

a. When a need for clarity within the working area of a chart is desirable the following practice will be followed: The standard inset showing the next larger scale will be used and overprinted in purple with lines of magnetic variation and annual change.

b. The purple overlay will contain solid lines 0.13 mm (0.005") line weight for magnetic variation, labeled with whole degrees and the suffix E or W. Annual change is shown by dashed lines 0.13 mm (0.005") line weight, dashes 2 mm (0.080"), spaces 0.50 mm (0.020") and the suffix E or W and enclosed in parentheses.

c. A solid line 0.25 mm (0.01") line weight will be used for 0 degree variation and (0') annual change.

d. All type for line labels will be 6 Point Techno Medium, upper case. The title for the magnetic data will be centered below the inset box and will read:

(EPOCH) MAGNETIC VARIATION CURVES IN PURPLE
Dashed lines and figures in parentheses indicate annual change

Figure 90. Alternative isogonic lines note.

The first line of the note is 8 point Techno Medium, upper case, and the second line is 7 point Techno Medium upper and lower case.

3.27.4 Magnetic anomalies. A magnetic anomaly is a departure in magnetic variation from the general pattern at any given point or area in the world over relatively small areas.

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a. Where the magnitude and extent of the local magnetic anomalies have been established they should each be shown by a black limiting undulating line with the value of the anomalous variation as shown in Chart No. 1, B-82.1.

b. Where local magnetic anomalies have not been investigated, an appropriate legend and note should be added to the chart in 7 point News Gothic type, black.

3.28 Symbology.

Symbology for the Harbor, Approach, Coastal, and General Charts shall be in accordance with IHO INT 1. Unless otherwise specified, the center of a symbol shall correspond to the true location of the feature being represented, and the orientation of the feature shall be in accordance with its relation to surrounding features. All linear features shall be plotted in their true position and whenever the scale permits, they shall reflect the alignment that actually exists; that is, the alignment of straight segments, curves, and angles, shall be retained as nearly as practicable.

3.29 Reproduction.

Standard nautical charts are printed by lithography, on high wet strength chart paper. Symbols and tints are separated onto various color plates prior to the printing processes. The prescribed colors utilized by NIMA are black, blue, purple and green.

3.29.1 Black plate. - SPC No. 58600.

3.29.1.1 Base data. This includes the projection, border, degrees, minutes, and chart scales.

3.29.1.2 Format notes. This includes the NIMA seal, title entries, chart number, edition number and date, publisher note, users' note, revision date, neatline dimensions, corner coordinates, chart classification if any, depth conversion scale, logarithmic speed scale, first edition date, source diagram and listing, copyright note, index to larger scale charts, NIMA reference number and barcodes, glossary, tidal information, bar scales and general notes.

3.29.1.3 Hydrography. This includes soundings, bottom characteristics, sewers, doubtful danger data, wrecks, currents, platforms, names, descriptive data, buoy and light legends, buoys, beacons, radar reflectors on aids to navigation, stakes, dangers, obstructions, depth curves, danger curve (dotted lines), reef outlines, breakers, tide rips, eddies, kelp, light sectors (dashed lines), submerged jetties, submerged ruins, cable ferries, dredged areas, light stars, and hydrographic limits associated with permanent physical obstructions.

3.29.1.4 Topography. This includes land names, elevations, descriptive type for land forms, town symbols, conspicuous object symbols, landmark symbols, shoreline, drainage, lake shoreline, built-up area outlines, piers, buildings, vegetation outlines, roads, canals, airports, lava flows, and elevation dots.

MIL-PRF-89201B**3.29.2 Black screen - land and uncovering areas, built-up areas.**

3.29.2.1 Land tint. Land screen plate is made by an open-window mask. All land and uncovering areas are left open. A 45 degree angle - 12% screen is used to delineate these areas. This requires only one land screen negative mask. Built-up area requires a separate 75 degree - 21% screen. Land tint is not printed over glaciers which have a white background. (Land tint is not featured on the black plate for charts belonging to the International Series. Instead a buff colored (SPC No. 57437) plate is used)

3.29.2.2 Uncovers tint. Uncovering areas are made by two methods of open-window masks.

a. Combination of 45 degree angle - 12% screen black, and 75 degree angle - 21% screen blue, when only one blue is used on the chart. This requires one negative mask for land and uncovering areas and one negative mask for water and uncovering areas.

b. Or a combination of 45 degree angle - 12% screen black, and when trapping, use 15 degree angle - 12% screen and 75 degree angle - 21% blue screens. This combination requires one negative mask for the land and uncovering areas, two negative masks for the water and uncovering areas; as follows, one negative mask from shoreline to a predetermined meter curve, and one negative mask from the shoreline to the second predetermined meter curve. All of the aforementioned negative masks will include the uncovering areas.

3.29.2.3 Land contours. Land Contours and labels will be portrayed by a screened black line. Screening will be accomplished by using a 67% bi-angle screen. In cases where contours were formerly shown in solid black and combined with the base plate, the contours will not be separated for purposes of screening.

3.29.3 Purple plate and screens. The purple plate (SPC No. 96532) contains: unit of sounding notes, light flares, pilot symbols, berths, tide stream reference letters, ferries, radio beacon circles and their legends, compass roses, isogonics, roundabouts, hydrographic limits not associated with permanent physical obstructions, offshore pipelines, submarine cables, larger scale chart outlines, references to larger scale charts, notes referring to larger scale charts, caution notes, warning notes, traffic separation note, and traffic separation scheme limits, restricted areas, nature reserves, swept areas, deep water routes and regulated tracks. Purple screens for Traffic Separation Zones, roundabouts with defined limits, and Inshore Traffic Zones may be made by using an AP-130 area pattern, to avoid creating a moiré pattern when overprinted with blue tints (A 31% - 45 degree screen is also used).

3.29.4 Blue screen plates. A blue screen (SPC No. 48253) is shown from the shoreline to the depth curve considered to be the most significant. At times a second, lighter, blue screen is shown from the significant depth curve to a secondary depth curve. Factors such as chart scale, supertanker ship routes, and dangers will determine the extent of the blue screen.

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a. Depths less than the significant curve value, seaward of the curve, will show a blue screen. This blue screen will be shown for lakes, double line drainage and uncovers. Dangers with a known depth 30 meters and less will show the darker blue screen regardless of the significant curve. Areas tinted blue will require one open window negative delineating these areas and a second negative with a 21% - 75 degree screen.

b. Major portions of the water area will not be screened, unless it is clearly evident that such extensive screening is essential. On some charts with areas of irregular bottom configuration, it may be desirable to show blue screens to two significant depths, e.g., a darker screen from shoreline to the 5-meter curve, and a lighter screen from the 5-meter curve to the 10-meter curve, requiring two open window negatives. One negative is from shoreline to 5-meter curve, with 21% - 75 degrees screen, and one negative is from the shoreline to 10-meter curve, with a 12% - 15 degree screen. Ribbon tints will not be used.

3.29.5 Green (alternate swept area plate). (SPC No. 49733) If a chart contains a large amount of data in purple, swept area limits and their associated type and legends may be shown on a green plate. No screens are used.

3.29.6 Trim size. Harbor, Approach and Coastal charts shall be trimmed after printing, to leave a 25 mm (1") margin on each side of the chart. The margin is measured from the maximum extent of the image area on each side, to the edge of the paper.

4. VERIFICATION

4.1 Classification of inspection. The inspection requirements specified herein are classified as follows:

- a. Visual examination (see 4.3)
- b. Review of construction records (see 4.4)

4.2 First article inspection. When a first article inspection is required (see 3.1 and 6.2), it shall be examined for defects as specified in 4.3, and the construction record reviewed for compliance with 4.4.

4.3 Visual examination. The chart shall be examined for defects and errors as specified by the contract or Government. Required corrections shall be made to manuscripts, drafting positives, and reproducible material before the chart is sent to the next production stage. Defects detected during the inspection of the printed "catch copy" shall be evaluated by NIMA for criticality, and suitable corrective action.

4.4 Review of construction records. Records about the construction of the chart shall be maintained. The records shall document sources, decisions regarding reconciliation of conflicting data, etc. Chart records/construction histories shall be reviewed concurrently with visual examinations (see 4.3) to ensure that proper cartographic procedures have been followed.

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4.5 Government furnished materials. The contractor shall not duplicate, copy or otherwise reproduce the MC&G materials for purposes other than those necessary for performance of the contract.

4.6 Government property surplus. At the completion of performance of the contract, the contractor, as directed by the contracting officer, shall either destroy or return to the Government all Government-furnished MC&G property not consumed in the performance of the contract.

5. PACKAGING.

5.1 Packaging. For acquisitions purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of material is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's Systems Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory).

6.1 Intended use. Harbor, Approach Coastal and General Charts are various scale charts used for plotting ship courses in ocean waters. Nautical charts are not a military unique item, but charts are produced by NIMA for DoD and the general maritime community under statutory authority contained in Sections 2791, 2792, 2793, and 2794 of the U.S. Code, Title 10, Chapter 639.

6.2 Acquisition Requirements. Acquisition documents must specify the following:

- a. Title, number and date of this specification.
- b. Issue of the DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.2.1 and 2.3).
- c. When a first article is required (see 3.1 and 4.2).
- d. Packaging requirements (see 5.1).

6.3 Supersession. These specifications supersede General Military Specifications for Harbor, Approach, and Coastal Charts (HAC), MIL-H-89201A, 29 April 1995, associated specifications MIL-H-89201/1-9, and PS/2AA/010, PS/2AB/020, DMA Product Specifications for Harbor, Approach, and Coastal Charts, Third Edition, September 1982.

6.4 Definitions.

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6.4.1 Aids to navigation. Any man-made object or objects of visible, audible, or of an electronically receivable nature established specifically for aiding the mariner in determining position, heading, and/or speed.

6.4.2 Annual change. - The increasing or decreasing value of the variation on a yearly basis, usually expressed in minutes.

6.4.3 Circular error (CE). - An accuracy figure representing the stated percentage of probability that any point expressed as a function of two linear components (e.g., horizontal position) will be within the given figure.

6.4.4 Compass rose.

6.4.4.1 True compass rose. A true compass rose is a circle graduated in degrees, clockwise from 0 to 360. The compass rose is portrayed to afford the mariner an easy method of plotting compass headings or bearings. It is oriented with respect to true north.

6.4.4.2 Magnetic compass rose. A magnetic compass rose is a circle graduated in degrees from 0° to 360°, placed inside the true compass and oriented to magnetic north.

6.4.4.3 Points of the compass. The points of the compass is a traditional method of giving compass directions in fractions of a circle rather than in degrees, i.e., north, north northeast, northeast, etc. Points of the compass are shown by ticks pointing inward placed inside the magnetic compass rose. The circle making up the points of the compass is divided into 128 equal parts.

6.4.5 Isogonic line. A line connecting points on the earth's surface having equal magnetic variation (not to be confused with magnetic meridian). The zero variation line is called the "agonic line."

6.4.6 Linear error (LE). - A one dimensional error (such as an error in elevation) defined by the normal distribution function.

6.4.7 Magnetic variation. - The angle between magnetic and geographic meridian expressed in degrees and minutes east or west to indicate the direction of magnetic north from true north.

6.5 Subject term (key word) listing.

Bathymetry
 Charting
 National Imagery and Mapping Agency (NIMA)
 Hydrography
 Marine
 Maritime
 MC&G (Mapping, Charting and Geodesy)
 Nautical
 Navigation

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6.6 Standardization agreements. Certain provisions of this specification may be subject to international standardization agreements. When amendment, revision, or cancellation of this specification is proposed that will modify the international agreement concerned, the preparing activity will take appropriate action through international standardization channels, including departmental standardization offices, to change the agreement or make other appropriate accommodations.

6.6.1 NATO Standardization Agreements (STANAGs)

STANAG 1113, General Specifications for Projections Required for Nautical Charts for Polar Regions and the Higher Latitudes.

STANAG 2211, Geodetic Datums, Spheroids, Grids, and Grid References.

STANAG 3673, Identification of Source Data on Nautical and Special Naval Charts.

STANAG 3678, Method of Adding the Military Grid to Nautical Charts in the NATO Area.

6.6.2 International MC&G Agreements.

This specification is generally based on, and attempts to implement the Chart Specifications of the International Hydrographic Organization (IHO) and Regulations of the IHO for International (INT) Charts. The Chart Specifications of the IHO are intended to provide a framework for the standardization by member countries of all nautical charts, both in their national series, and in the international (INT) series of the IHO. Standardization among NIMA products has also influenced this specification, resulting in some minor differences between this specification and the Chart Specifications of the IHO.

6.7 USIGS Conceptual Data Model. The data content of this product is reflected in the United States Imagery and Geospatial Information System (USIGS) Conceptual Data Model. When amendment, revision, or cancellation of this specification is proposed which will result in additions, changes or deletions to the USIGS Conceptual Data Model, the preparing activity will take appropriate action through data standardization channels to change the USIGS Conceptual Data Model.

6.8 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

6.9 NIMA customer help desk. For questions concerning is or other NIMA products, services, or specifications, please telephone the NIMA Customer Help Desk at 1-800-455-0899, Commercial 314-260-1236, or DSN 490-1236.

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APPENDIX A

HAC STYLE SHEET (PLAN BORDER-22223)

A.1 SCOPE

A.1.1 Scope. This Appendix is a graphic illustration of the design, composition, and location of the margin data of charts at scales 1:50,000 and larger. This Appendix is a mandatory part of the specification. The information contained herein is intended for compliance.

A.2 APPLICABLE DOCUMENTS

This section is not applicable to this Appendix.

A.3 HAC STYLE SHEET

A.3.1 Style sheet. See next page for style sheet information.

A.3.2 Order of precedence. In the event of a conflict between type styles/sizes illustrated on this style sheet and the type styles/sizes specifications shown in green, the specifications in green shall take precedence.

A.3.3 Folding. This style sheet is folded to the size of this document. Folding of printed charts shall be as specified in the contract (see 6.2).

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INSERT PLAN BORDER STYLE SHEET HERE

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APPENDIX B

HAC STYLE SHEET (SCALE BORDER-44290)

B.1 SCOPE

B.1.1 Scope. This Appendix is a graphic illustration of the design, composition, and location of the margin data of charts at scales 1:50,001 and smaller. This Appendix is a mandatory part of the specification. The information contained herein is intended for compliance.

B.2 APPLICABLE DOCUMENTS

This section is not applicable to this Appendix.

B.3 HAC CHART STYLE SHEET

B.3.1 Style sheet. See next page for style sheet information.

B.3.2 Order of precedence. In the event of a conflict between type styles/sizes illustrated on this style sheet and the type styles/sizes specifications shown in green, the specifications in green shall take precedence.

B.3.3 Folding. This style sheet is folded to the size of this document. Folding of printed charts shall be as specified in the contract (see 6.2).

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INSERT SCALE BORDER STYLE SHEET HERE

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APPENDIX C

PLAN AND SCALE BORDERS AND RELATED MEASUREMENTS

C.1 SCOPE

C.1.1 Scope. This Appendix is a graphic illustration of various border styles for all scales. This Appendix is a mandatory part of the specification. The information contained herein is intended for compliance.

C.2 APPLICABLE DOCUMENTS

This section is not applicable to this Appendix.

C.3 PLAN AND SCALE BORDERS

C.3.1 Plan and scale borders and related measurements. See next page for border information.

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APPENDIX C

INSERT PLAN AND SCALE BORDER GUIDE HERE

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APPENDIX D

TYPE AND LINE WEIGHT STANDARDS

D.1 SCOPE

D.1.1 Scope. This Appendix is a graphic illustration of various type sizes/styles, and line weight used on standard nautical charts. This Appendix is a mandatory part of the specification. The information contained herein is intended for compliance.

D.2 APPLICABLE DOCUMENTS

D.2.1 Applicable documents.

U.S. Chart No. 1, Nautical Chart Symbols, Abbreviations, and Terms

Chart Specifications of the IHO and Regulations of the IHO for International (INT) Charts (MP-004)

D.3 TYPE STANDARDS

D.3.1 Source of symbols. Comparable line weights in this Appendix are in agreement with IHO symbols found in Chart No. 1 and the Chart Specifications of the IHO.

D.3.2 Specification of type sizes and styles. Type sizes and styles in this specification are indicated using traditional typographic font names, and their appropriate type size. Actual size of type of the same font size may vary from one typesetting system to another. Type on charts shall be visually equivalent to the samples provided below. To provide consistency with digital production systems, an acceptable equivalent digital type font, Zurich®(formerly Swiss 742) is also provided.

D.3.3 Type standards. The following list provides examples of type found on nautical charts, along with the size and style.

a. News Gothic	206J		Zurich
Upright soundings	8 and 6 pt	23 _s 9 145	7 and 5 pt
b. Univers Light Italic	124A		Zurich Light Italic
Slant soundings	7 and 5pt	23 _s 9 145	6 and 5 pt
Bottom characteristics	6 pt C/lc	R IS cS	5 pt C/lc
* c. Techno Bold Condensed	604J	20	Zurich
Fixed aids (Bns, Lts)	8pt C/lc	FI 9.3s 11m 8M	7 pt C/lc
designations, legends		Bell SS(Storm)	
Radar, radio aids	(purple)	RC	

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d. News Gothic Condensed	204J		Zurich
Light sector legends	7pt C/lc	Red W Obscd	6 pt C/lc
Bearing line legends	7pt C/lc	Ldg Lts 225 18'	6 pt C/lc
Markers	7pt C/lc	Measured distance	6 pt C/lc
Corner coordinates	6pt CAPS	34 53'00"S	5 pt CAPS
Military grid border figures	6 and 10pt C/lc (purple, blue)	3800 ⁰⁰⁰ mN	5 and 9 pt C/lc
* e. Techno Bold Italic	603K	2A	Zurich Bold Italic
Floating aids (buoys)	7pt C/lc	<i>FI R</i>	6 pt C/lc
designations, legends		<i>Whis</i>	
Radio, radio aids	(purple)	<i>Racon</i>	
f. Techno Medium Italic	605K		Zurich Italic
Hydrographic labels	7pt C/lc	---- 10 ----	6 pt C/lc
	(purple)	1.5kn 3kn	
	(purple)	<i>Oil Water</i>	
Submerged dangers	7pt C/lc	<i>Harbor limit</i>	
		<i>Obstn Rep(1973)</i>	6 pt C/lc
		<i>Wk(PA) PA</i>	
		<i>Fish stakes Ruins</i>	
		<i>Breakers Br</i>	
Small area description	7pt, 9pt, 10pt C/lc	<i>Works in progress</i>	6, 8, 9 pt C/lc
		<i>Spoil Ground</i>	
		<i>Dredged to 3,5m</i>	
(space type)	(black, purple)	<i>Unsurveyed</i>	
Regulated areas	10pt, 12pt C/lc (purple)	<i>Entry Prohibited</i>	10, 12 pt C/lc
		<i>Western Anchorage</i>	
		<i>Nature Reserve</i>	
		<i>Inshore Traffic Zone</i>	
Directions to user	10pt, 12pt CAPS (black, purple)	<i>SEE PLAN</i>	8, 10 pt CAPS
		<i>SEE NOTE</i>	
Large area description	12pt, 14pt CAPS (purple)	<i>SUBMARINE</i>	10, 12 pt CAPS
		<i>EXERCISE AREA</i>	
g. Century Expanded	459A		Zurich
Topographic names			
Larger areas (space type)	24pt, 18pt, 16pt CAPS	ENGLAND	22, 16, 14 pt CAPS
Important feature names	14pt, 12pt, 10pt CAPS	PENINSULA	12, 10, 8 pt CAPS
Points, peaks, small cities	9pt, 8pt, 7pt C/lc	San Pedro	8, 7, 6 pt CAPS
h. Century Expanded Italic	459K		Zurich Italic
Hydrographic names			
Large bodies of water (space type)	24pt, 18pt, 16pt CAPS	BAY OF BISCAY	22, 16, 14 pt CAPS
Important feature names	14pt, 12pt, 10pt CAPS	TATHONG CHANNEL	12, 10, 8 pt CAPS
Shoals, reefs, small rivers	9pt, 8pt, 7pt C/lc	Boar Bank	8, 7, 6 pt CAPS

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i. Techno Medium	605J		Zurich
Topographic contours	7pt	---- 200 ----	6 pt
Topographic features	7 C/lc	Under constr Mast PA	6 pt C/lc
		Ru km46	
Conspicuous features	7 CAPS	WATER TR	6 pt CAPS
Small area description (may be spaced)	7pt, 8pt, 9pt, 10pt C/lc	Salt pans	6, 7, 8, 10 pt C/lc
Elevations	7pt	Mangrove	
Number designations	7pt CAPS	86 RTr(28)	6 pt
Shed(black)		2	6 pt CAPS
Berths - land or water(purple)		4B	
Radio calling-in point(purple)	7pt, 8pt CAPS	A	6, 7 pt CAPS
Boundary labels on land	7pt CAPS	POLAND	7 pt CAPS
Larger scale chart numbers	10pt, 12pt	51663	9, 10 pt
Man-made features above sea level	7pt C/lc	Breakwater	6 pt C/lc
		Cable Ferry Dns	
		Area under reclamation(1991)	
* j. Techno Bold	603J		Zurich Bold
Island elevation in water (round at 5)	7pt	(4.9) (5)	6 pt

* Indicates type style has been updated to conform to MIL-PRF-89201B, the new specification for standard nautical charts.

D.4 LINE WEIGHT STANDARDS

D.4.1 Line weight standards. See following pages for line weight information.

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INSERT LINEWEIGHT GUIDE (Pages 110-113) HERE

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