S-131

Annex A

Data Classification and Encoding Guide

Edition 1.0.0 – March 2023

IHO

International Hydrographic Organization

Published by the
International Hydrographic Organization
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Document History

Changes to this Specification are coordinated by the Nautical Information Provision Working Group, an IHO working group under HSSC. New editions will be made available via the IHO web site. Maintenance of the Specification shall conform to IHO Resolution 2/2007 (as amended).

Version Number	Date	Approved By	Purpose
1.0.0	2022-08-18		Draft 1
1.0.0	2022-08-22		Revised Draft 1
1.0.0	2022-11-25	RM	Draft 2. Applied feedback from NIPWG after NIPWG9; additional encoding guidance and figures in various places in clause 2; value types for simple attributes added in clause 17; revised description of feature table format; enhanced encoding guidance and figures for various features in clauses 4-13; added associations not generated by IHO S-100 toolkit in clauses 5-13.
1.0.0	2023-01-10	RM	Clarified encoding remarks for dock areas respecting S-101 guidance; additional encoding instructions or general remarks (HarbourAreaAdministrative, HarbourAreaSection, Terminal, OuterLimit, HarbourBasin); added Location Hours association to HarbourFacility; document date updated to synchronize with other S-131 artefacts; ToC regenerated.
1.0.0	2023-03-15	RM	Applied NIPWG feedback on January 10 draft; added “General” clauses in Spatial Quality, Available Port Services, Non-Standard Working Day.
1.0.0	2023-04-09	RM	Rearranged template table in clause 3 to conform to actual structure of feature tables; split associations section of feature tables into separate tables to reduce table formatting problems; updated dates.

Contents

1 Overview

1.1 Preface

The “Data Classification and Encoding Guide” has been developed to provide consistent, standardized instructions for encoding S-100 compliant Marine Harbour Infrastructure (S-131) data.

The purpose of the Data Classification and Encoding Guide is to facilitate S-131 encoding to meet IHO standards for the proper display of Marine Harbour Infrastructure information in an ECDIS and other electronic charting displays. This document describes how to encode information that the modeller considers relevant to a Harbour Infrastructure data product. The content of a dataset is at the discretion of the producing authority provided that the conventions described within this document are followed. A “producing authority” is a Hydrographic Office (HO) or other organization authorized by a government, to produce definitive nautical information.

The entire S-100 Universal Hydrographic Data Model, including the S-131 Product Specification, is available at the following web site, http://www.iho.int.

1.2 S-131 Annex A - Data Classification and Encoding Guide – Metadata

NOTE: This information uniquely identifies this Data Classification and Encoding Guide to the Product Specification and provides information about its creation and maintenance.

Table 1.1 - Marine Harbour Infrastructure product specification metadata

Metadata	Content
Title:	The International Hydrographic Organization Marine Harbour Infrastructure Product Specification, Data Classification and Encoding Guide
Version:	1.0.0
Date:	15 March 2023
Language:	English
Classification:	Unclassified
Contact:	International Hydrographic Organization 4 Quai Antoine 1er B.P. 445 MC 98011 MONACO CEDEX Telephone: +377 93 10 81 00 Fax: +377 93 10 81 40 URL: www.iho.int
Identifier:	S-131 Annex A Data Classification and Encoding Guide
Maintenance:	Changes to S-131 Annex A; Data Classification and Encoding Guide are coordinated by the IHO Nautical Information Provision Working Group (NIPWG) and must be made available via the IHO web site.

1.3 Terms and definitions

For terms and definitions, see the Marine Harbour Infrastructure Product Specification, Clause 1.4.2.

1.4 Abbreviations

For a list of abbreviations, see the Marine Harbour Infrastructure Product Specification, Clause 1.4.3.

1.5 Use of language

Within this document:

> “Must” indicates a mandatory requirement;
>
> “Should” indicates an optional requirement, that is the recommended process to be followed, but is not mandatory;
>
> “May” means “allowed to” or “could possibly”, and is not mandatory, or recommended.

1.6 Maintenance

Changes to the Data Classification and Encoding Guide must occur in accordance with the S-131 Product Specification clause 1.7.

2 General

2.1 Introduction

This S-131 Data Classification and Encoding Guide (DCEG) contains rules and guidance for converting data describing the real world into data products that conform to the S-131 specification.

The S-131 specification contains an application schema (UML model) describing the conceptual domain model in terms of classes and relationships, and a Feature Catalogue (see S-131 Annex C) that specifies the data model, i.e., specifies the data model types and associations corresponding to the various classes and relationships in the application schema.

To simplify the DCEG text, the various data model types will be provided without the suffixes “class”, “type” or “instance”; e.g. the term “feature” should be understood as “feature class” or “feature type” or “feature instance” as best fits the immediate context in which it is used (and where there might be confusion, it is written out in full as feature class/type/instance).The model defines real world entities as a combination of descriptive and spatial characteristics (S-131 Product Specification clause 6).

This clause of the DCEG contains general information needed to understand the encoding rules and describes fundamental common rules and constraints. It also describes datasets and metadata. The data model object types used within S-131 and their encoding rules and guidelines are defined in detail in subsequent clauses of this document.

Within this document the features, information types, associations, and attributes appear in **bold text** or *italic text*, to distinguish them from surrounding words.

2.2 Descriptive characteristics

2.2.1 Feature

A feature contains descriptive attributes that characterize real world entities.

The word ‘feature’ as used in the ISO 191xx series and in S-100 based product specifications has two distinct but related senses – ‘feature type’ and ‘feature instance’. A feature instance is a single occurrence of the feature and is represented as an object in a dataset.

The location of a feature instance on the Earth’s surface is indicated by a relationship to one or more spatial primitive instances. A feature instance may exist without referencing a spatial primitive instance.

2.2.1.1 Geographic feature class

Geographic (Geo) feature types carry the descriptive characteristics of a real world entity which is provided by a spatial primitive instance.

2.2.1.2 Meta feature class

Meta feature type contains information about other features.

2.2.1.3 Charted background feature

The data product would mostly be visualized as an overlay of an ENC or other GIS applications. Consequently, all necessary descriptive and spatial characteristics to provide a charted background should be provided by the underlying application.

2.2.2 Information type

An information type has no geometry and therefore is not associated to any spatial primitives to indicate its location.

An information type may have attributes and can be associated with features or other information types in order to carry information particular to these associated features or information types.

2.3 Spatial characteristics

2.3.1 Spatial primitives

The allowable spatial primitive for each feature is defined in the Feature Catalogue. Allowable spatial primitives are point, curve, and surface.

Within this document, allowable spatial primitives are included in the description of each feature. For easy reference, Table 2.1 below summarises the allowable spatial primitives for each feature. In the table, abbreviations are as follows: point (P), curve (C), surface (S), and none (N). Abstract features are excluded from this table since they cannot have feature instances in datasets.

Table 2.1 - Features and their spatial primitives

Feature	P	C	S	N
Geographic Features				
AnchorBerth	P		S	
AnchorageArea	P		S	
Berth	P	C	S	
BerthPosition	P			
DockArea			S	
DryDock	P		S	
DumpingGround	P		S	
FloatingDock	P		S	
Gridiron	P		S	
HarbourAreaAdministrative	P		S	
HarbourAreaSection	P		S	
HarbourBasin			S	
HarbourFacility	P		S	
MooringWarpingFacility	P			
OuterLimit		C	S	
PilotBoardingPlace	P		S	
SeaplaneLandingArea	P		S	
Terminal	P		S	
TurningBasin			S	
WaterwayArea			S	
Meta and Cartographic Features				
DataCoverage			S	
QualityOfNonBathymetricData			S	
SoundingDatum			S	
VerticalDatumOfData			S	

Feature	P	C	S	N
TextPlacement	P			

2.3.2 Capture density guideline

Coordinate density can have a significant impact on file size and system performance. A rule of thumb is to limit the coordinate density to 0.3 mm at maximum permitted display scale. For a scaleless product, the producer should keep in mind the expected scale range for typical use and the density of coordinates needed to suit the needs of the product.

The capture density will follow the recommendation of the S-101 (ENC) DCEG, which states curves and surface boundaries should not be encoded at a point density greater than 0.3 mm at permitted display scale.

A curve consists of one or more curve segments. Each curve segment is defined as a loxodromic line on WGS84, or as an arc or circle. Long lines may need to have additional coordinates inserted to cater for the effects of projection change.

The presentation of line styles may be affected by curve length. Therefore, the encoder must be aware that splitting a curve into numerous small curves may result in poor symbolization.

2.4 Attributes

Attributes may be simple type or complex type. Complex (C) attributes are aggregates of other attributes that can be simple type or complex type attributes. Simple (S) attributes are assigned to one of the types collected at clause 2.4.1.

The binding of attributes to a feature, the binding of attributes to attributes to construct complex attributes, and attribute multiplicity are all defined in the Feature Catalogue.

Within this document, the allowable attributes are included in the description of each feature, as well as the allowable values for enumeration type attributes.

2.4.1 Simple attribute types

Each simple attribute (S) is assigned to one of attribute types in Table 2.2 (in alphabetic order):

Table 2.2 - Simple attribute types

Abbreviation	Attribute type	Description
BO	Boolean	A value representing binary logic. The value can be either True or False. The default state for Boolean type attributes (i.e. where the attribute is not populated for the feature) is False.
CL	Code List	A type of flexible enumeration (see “EN” below). A code list type is a list of literals which may be extended only in conformance with specified rules. Attributes of a code list type may take values from the list or other values which are defined according to the rules. The rules should be part of the specification of the individual codelist type. A code list could either be closed (fixed) or open (extensible). A code list type has the following properties: 1. A description of the code list type, 2. The URI where the list could be found, and 3. An encoding instruction.

DA	Date	A date provides values for year, month and day according to the Gregorian Calendar. Example (XML/GML): 1998-09-18 (YYYY-MM-DD) S-131 uses only XML-based formats (including GML) and therefore the ISO "basic" format described in S-100 is not used.
DT	Date and Time	A DateTime is a combination of a date and a time type. Example (XML/GML): 1985-04-12T10:15:30 (YYYY-MM-DDThh:mm:ss) S-131 uses only XML-based formats (including GML) and therefore the ISO "basic" format described in S-100 is not used.
EN	Enumer-ation	A fixed list of valid identifiers of named literal values. Attributes of an enumerated type may only take values from this list.
IN	Integer	A signed integer number. The representation of an integer is encapsulation and usage dependent. Integer attribute values must not be padded by non-significant zeroes. For example, for a number of 19, the value populated for the attribute must be 19 and not 019. Examples: 29, -65547
RE	Real	A signed real (floating point) number consisting of a mantissa and an exponent. The representation of a real is encapsulation and usage dependent. Real attribute values must not be padded by non-significant zeroes. For example, for a signal period of 2.5 seconds, the value populated for the attribute signal period must be 2.5 and not 02.50. Examples: 23.501, -0.0001234, -23.0, 3.141296
TD	Truncate d Date	One or more significant components of the modelling date are omitted. Example: A GML dataset would use a GML built-in type and encode it as <gMonth>--02<gMonth> S-131 uses only XML-based formats (including GML) and therefore the ISO "basic" format described in S-100 is not used.
TE	Free text	An arbitrary-length sequence of characters including accents and special characters from a repertoire of one of the adopted character sets.
TI	Time	A time is given by an hour, minute, and second. Time zone according to UTC is optional. Character encoding of a time is a string that follows the local time. Examples (XML/GML): 18:30:59Z; 18:30:59+01:00; 18:30:59
UL	URL	A uniform resource locator (URL) is a URI that provides a means of locating the resource by describing its primary access mechanism (RFC 3986). EXAMPLE http://registry.iho.int
UN	URN	A persistent, location-independent, resource identifier that follows the syntax and semantics for URNs specified in RFC 2141. EXAMPLE urn:mrn:iho:s127:1:0:0:RouteingMeasure

2.4.2 Mandatory attributes

Some attributes are mandatory and must be populated for a given feature. There are some reasons why attribute values may be considered mandatory:

- They are fundamental to the definition of a feature;
- They are required to support the correct portrayal of a feature instance;
- Certain features make no logical sense without specific attributes;

- Some attributes are required for safety of navigation.

Within this document, mandatory attributes are those with a multiplicity of 1,1 or 1,n (n>1) or 1,*. The attribute multiplicity is identified in the description of each feature class.

2.4.3 Conditional attributes

The feature classes or information types do not contain conditional attributes.

Complex attributes which are assigned to feature classes or information types have at least one sub-attribute which is mandatory (or conditionally mandatory). Where the sub-attribute of a complex attribute is conditional, this is indicated in the Remarks sub-clause for the relevant feature class entries.

2.4.4 Missing attribute values

Where a value of a mandatory attribute is not known, the attribute must be populated with an empty (null) value.

Where the value of a non-mandatory attribute is not known, the attribute must not be included in the dataset.

2.4.5 Multiplicity

In order to control the number of allowed attribute values or sub-attribute instances within a complex attribute, S-100 uses the concept of multiplicity. This defines lower and upper limits for the number of values, whether the order of the instances is significant, and if an attribute is mandatory. Common examples are shown in Table 2.3:

Format: MinOccurs, MaxOccurs (a * indicates that infinite instances are possible, the term (ordered) indicates that the order of the provided instances is significant)

Table 2.3 - Multiplicity of attributes

Multiplicity	Explanation
0,1	An instance is not required; if provided there must only be one instance.
1,1	An instance is required and there must only be one instance.
0,*	An instance is not required and there can be an infinite number of instances.
1,*	An instance is required and there can be an infinite number of instances.
1,* (ordered)	An instance is required and there can be an infinite number of instances, the order of which is significant.
2,2	Two instances are required and there must be no more than two.

2.4.6 Spatial attribute types

Spatial attribute types must contain a referenced geometry and may be associated with spatial quality attributes. Each spatial attribute instance must be referenced by a feature instance or another spatial attribute instance.

2.4.6.1 Quality of spatial attributes

The quality of spatial attributes in S-131 is described in a **Quality of Non-Bathymetric Data** meta-feature. This meta-feature defines areas within which uniform assessment exists for the quality. It is described in detail later in this document.

If the spatial quality attributes for an individual instance of a spatial primitive differ from the quality indicated in the overlying **Quality of Non-Bathymetric Data** meta-feature, the quality attributes for that instance are carried in an information class called **spatial quality**. Only points and curves can be associated with **spatial quality**. S-131 does not use multi-points. Currently, no use case for associating surfaces with spatial quality attributes is known, therefore this is prohibited. Vertical uncertainty is prohibited for curves as this dimension is not supported by curves.

NOTE: S-131 does not make use of the S-101 **Quality of Bathymetric Data** meta- feature since depth range uncertainties are not needed. The **Quality of Non-Bathymetric Data** meta-feature has all the quality attributes needed by S-131.

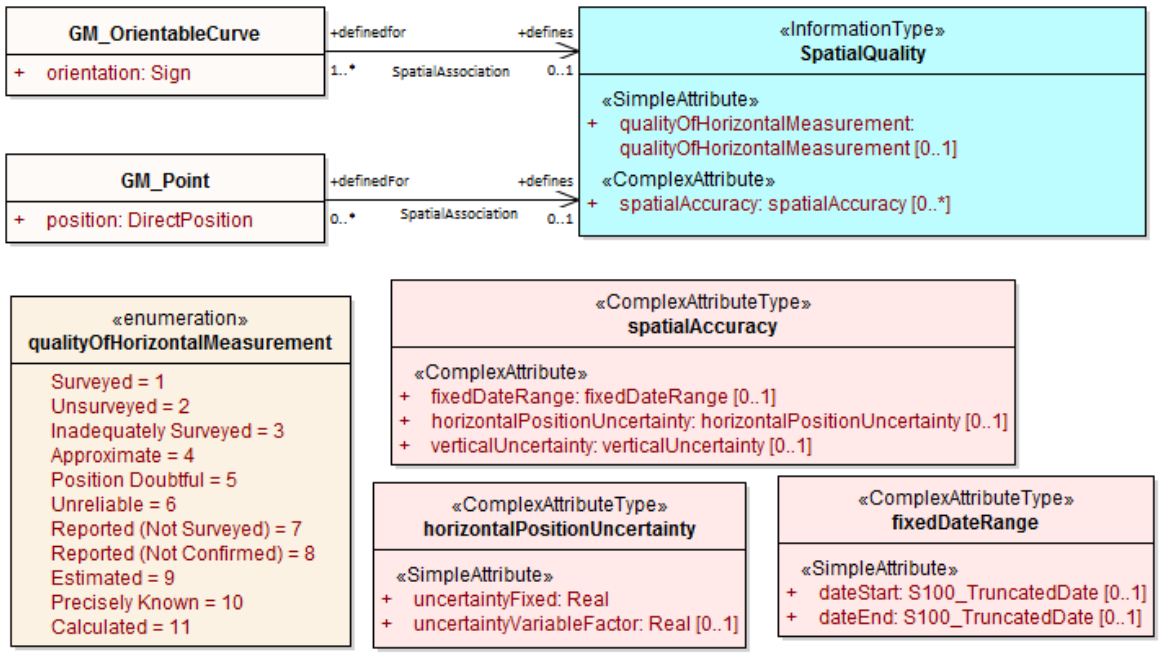

Figure 2.1 - Spatial quality information

2.4.7 Portrayal feature attributes

Marine Harbour Infrastructure data products will be used within ECDIS where ENC data is displayed based on the rules defined within the S-101 Portrayal Catalogue. While most ECDIS portrayal is based on attributes describing the instance of a particular feature in the real world, certain feature attributes are used in portrayal rules to provide additional functionality in the ECDIS. Table 2.4 provides a list of attributes which have specific influence on portrayal.

Table 2.4 - Attributes which have effects on portrayal

Attribute	Effects on portrayal
displayName	This Boolean attribute determines if the text for a name should be displayed. If not populated the default rules provided in the portrayal catalogue will be used.
information	Population of this complex attribute will result in the display of the magenta information symbol to highlight additional information to the user.
pictorialRepresentation	The population of this Text attribute will result in the display of the magenta information symbol to highlight additional information to the user.

textContent	The population of this complex attribute will result in the display of the magenta information symbol to highlight additional information to the user.

2.4.8 Textual information

Textual information may provide additional information essential to understand the presence of the Marine Harbour Infrastructure and other features of an S-131 product. This information may also provide legal information pertaining to the S-131 product features.

The methods to provide textual information vary from the simple provision of short text, to the more structured provision of extensive text. The length of the text determines the method and the attribute selection, see clause 2.4.8.2.

2.4.8.1 Specialized information types for common kinds of textual information

The information types **Restrictions, Recommendations, Regulations,** or **NauticalInformation** must be used to encode text information when the DCEG allows them to be associated to the feature or information type and the information is of the appropriate kind (a restriction, regulation, etc.).

In exceptional circumstances and only if the use of the information types **Restrictions, Recommendations,** or **Regulations** is not sufficient, **NauticalInformation** can be used to encode additional textual information associated to a feature or a group of features.

In some cases, there may be a specialized attribute that is specifically intended for the data in question. If an appropriate specialized attribute is available, it must be used in preference to **information** or **textContent**. For example, feature names will generally be encoded in the **name** sub-attribute of complex attribute **featureName**, instead of **information**->**text**.

2.4.8.2 Textual information attributes

Textual information which is not appropriate for any of the Text-type attribute (or sub-attribute) allowed for the feature/information type should be encoded using either **information** or **textContent** complex attributes. Generally, either **information** or **textContent** is allowed, but not both.

2.4.8.3 Languages

Both **information** and **textContent** define a **language** sub-attribute for specifying the language in which the text is encoded.

The exchange language for textual information should be English; therefore it is not required to populate the sub-attribute **language** for an English version of textual information.

Languages other than English may be used as a supplementary option, for which **language** must be populated with an appropriate value to indicate the language.

When a national language is used in the textual attributes, the English translation must also exist.

The specification of the *language* attribute in the IHO GI registry states “The language is encoded by a 3 character code following ISO 639-2/T.” These codes and the corresponding language names may be obtained from the codelist *S100_MD_LanguageCode* in the S-100 codelists file, which is part of the S-100 Edition 5.0.0 schemas distribution, at the URLs below:

- XML file:

  https://schemas.s100dev.net/schemas/S100/5.0.0/resources/Codelists/cat/codelists.xml

- Web list:

  https://schemas.s100dev.net/schemas/S100/5.0.0/resources/Codelists/cat/codelists.html

2.4.8.4 Minimal use of generalized text attributes

The complex attributes **information** and **textContent** must not be used when it is possible to encode the information by means of any other attribute. The population of these attributes provides symbols on an ECDIS screen. Therefore producers should carefully consider use of these attributes as the symbol may contribute significantly to ECDIS screen clutter and text attributes should be populated only when the content conveys useful information.

2.4.8.5 Short textual information

The **text** sub-attribute of complex attribute **information** should generally be used for short notes or to transfer information which cannot be encoded by other attributes, or to give brief information about a feature. The use of the complex attribute **information** as a stand-alone complex attribute is intentionally limited to the information types **ContactDetails, Applicability, NonStandardWorkingDay,** and **ServiceHours,** which do not need the additional attributes defined in **textContent**. The reason for the limited use of **information** as a stand-alone complex attribute is to provide a structured and harmonised approach to textual information within the S-131 product data sets.

The text populated in **text** must not exceed 300 characters. Character strings contained in **text** sub-attribute must be UTF-8 character encoding.

If the **text** sub-attribute of **information** is populated, the **headline**, **fileReference**, and **fileLocator** sub-attributes must not be populated.

2.4.8.6 Complex or lengthy textual information

More complex encodings of text may use either **information** or **textContent**. The feature catalogue and the feature/information type definitions in this DCEG indicate whether **information** or **textContent** is allowed.

The complex attribute **textContent** also has **information** as a complex sub-attribute. If a short note must be encoded in a feature or information type which has only **textContent** as an attribute, it should be encoded as **textContent**->**information**->**text**.

Complex text information, such as text longer than 300 characters, formatted text, or HTML extracts from shipping regulations, must be encoded in a file named in either **information**->**fileReference** or **textContent**->**information**->**fileReference**. The construction **textContent**->**information**->**fileReference** should be used if the feature/information type provides **textContent** as complex attribute.

The complex attribute **information** defines an optional sub-attribute **headline** which may be used for a short title not exceeding 60 characters. The content should be short but informative – if the textual information is divided into sections, the most relevant section header from the referenced content may be a good choice for **headline**.

The complex attribute **textContent** defines an optional sub-attribute **categoryOfText** for indicating whether the text is the full text from the source, an extract from the source, or a summary prepared by the encoder. Populating **categoryOfText** is recommended whenever the textual information is taken or summarised from a law or regulation.

If it is considered necessary to include a description of the source of the textual information, the sub-attribute **sourceIndication** of **textContent** must be used. Encoding a description of the source is strongly recommended for textual information whose source is considered as information the end-user must have, e.g., because the date of issue must be conveyed or because it cites official regulations which are frequently updated.

NOTE: Some government documents are frequently updated, e.g., the U.S. Electronic Code of Federal Regulations, which is currently updated every working day even though a particular section may be stable for years.

2.4.9 Attributes referencing external files

2.4.9.1 Predefined derived types

Table 2.5 presents the following predefined derived types which are described in S-100 (§ 1-4.6):

Table 2.5 - Predefined derived types

Name	Description	Derived from
URI	A uniform resource identifier which character encoding shall follow the syntax rules as defined in RFC 3986. EXAMPLE http://registry.iho.int	CharacterString
URL	A uniform resource locator (URL) is a URI that provides a means of locating the resource by describing its primary access mechanism (RFC 3986). EXAMPLE http://registry.iho.int	URI
URN	A persistent, location-independent, resource identifier that follows the syntax and semantics for URNs specified in RFC 2141. EXAMPLE urn:iho:s101:1:0:0:AnchorageArea	URI

2.4.9.2 Reference to textual files

The files referenced by complex attribute **information** and its sub-attribute **fileReference** must be *.TXT, *.HTM or *.XML files, and may contain formatted text. It is up to the Producing Authority to determine the most suitable means of encoding a particular piece of text (as text, HTML, or XML). The format of the reference to the file should be a “file URI” (S-100 1-4.6).

Besides being bound to certain types, the complex attribute **information** is also a sub-attribute of the complex attribute **textContent**. This means that any type that binds **textContent** as an attribute can also contain a reference to a textual file via an **information** sub-attribute. In S-131, there are several features, information types, and complex attributes that bind either **textContent** or **information**.

The exchange language for textual information should be English. The sub-attribute **language** must be populated with an appropriate value to indicate the language used. Languages other than English may be used as a supplementary option. Generally this means, when a national language is used in the textual attributes, the English translation must also exist.

Files must only use UTF-8 character encoding even when the sub-attribute **language** is populated with a language other than English.

If it is necessary to indicate a specific section within a large text file, this may be done by encoding the location in the **fileLocator** sub-attribute of **information**, as described in Table 2.6.

Producers and application developers should note that the use of the **fileLocator** attribute enables a single support file to contain separate chunks of text referenced from different features, information types, or complex attribute. Adopting this practice enables producers to reduce the number of external files needed with a dataset.

Table 2.6 - Locators for external files

Format	File extension	Content of fileLocator

Text	TXT	The offset of the start of the section relative to the beginning of the file (the first character in the file has offset 0). (While allowed, locators to text files are not recommended; an HTML or XML file should be used instead.)
HTML	HTM	The HTML fragment identifier, i.e., the value of the HTML *name* or *id* attribute of the target (as defined in the relevant HTML specification).
XML	XML	The XML fragment identifier as defined in the relevant specification, e.g., the value of an *xml:id* attribute.

2.4.9.3 Reference to external sources

References to Internet sources should be encoded using the **onlineResource** sub-attribute of **textContent**. Encoders should be aware that systems may not be able to access the Internet, so **onlineResource** should be used only for non-essential information.

Only sources that can be certified as secure and free from malicious downloads should be provided.

2.4.9.4 Reference to graphics

If it is required to indicate a graphic, the complex attribute **graphic** must be used. The sub-attribute **pictorialRepresentation** must be used to indicate the file name (without the path) of the external graphical file. Graphic files that form part of the data product must be content with the characteristics collected in Table 2.7.

Table 2.7 - Graphics characteristics

Characteristics	Values
Recommended Resolution:	96 DPI
Minimum Size x,y:	200,200 pixels
Maximum Size x,y:	800,800 pixels
Bit Depth:	8 Bit Indexed Colour
Compression:	LZW
Format:	Tiff 6.0
File size	Minimum, consider that 10 Mb is the maximum allowable size of a dataset

Additional information about the graphic file may be encoded in other sub-attributes of attribute **graphic**, as described in clause 2.4.12.

2.4.10 Dates

Dates may be need to be encoded as complete or truncated values, depending on available information and allowed format for the particular attribute. The definition of the attribute will indicate if it must take a complete value (type *Date* or *DA*) or is allowed to take a truncated value (type *S100_TruncatedDate* or *TD*). Complete and truncated dates are different value types (see S-100 § 1-4.5.2 Table 1-2).

For attributes that use the complete date type (type *Date* or *DA*), all their components (year, month, and day) must be specified.

For attributes that use the truncated date type (type *S100_TruncatedDate* or *TD*), zero, one, or two of the year/month/day components may be omitted. If the year component is included, it must be specified using exactly 4 digits.

2.4.10.1 Complete dates

Dates (except truncated dates, see the following clause) must be encoded in conformance with the Date format as specified in S-100 Ed. 5.0.0 (§ 1-4.5.2) which is the same as the DA format in Table 2.2 in this document. The data values have to be provided in accordance with the Gregorian Calendar starting with four digits for the year, two digits for the month and two digits for the day.

Example: The date 18 September 2010 is encoded as follows:

In the GML format: <date>2010-09-18</date>

Note that since both discovery metadata and GML datasets are XML files, both will use the “GML format” above.

2.4.10.2 Truncated dates

In Truncated Dates one or more components (year, month, or day) of the date is not specified. Truncated date values must be encoded in conformance with the S100_TruncatedDate format or equivalent as specified in S-100 (§§ 1-4.5.2 and 3-9) which is the same as the *TD* format in Table 2-2 in this document. If encoding attributes which can take truncated date values (e.g., **fixedDateRange**, **periodicDateRange**, **reportedDate)** and no specific year, month, or day is required, the values must be encoded in conformance with the truncated date format as specified in S-100 (§§ 1-4.5.2 and 3-9), using the format-specific type for XML/GML.

To encode partial dates in the XML/GML data format:

Table 2.8 - Date encoding format in XML and GML

Description	ISO 8211	GML
• No specific year, same day each year	• – – – – MMDD	• <gMonthDay>--MM-DD</gMonthDay>
• No specific year, same month each year	• – – – – MM– –	• <gMonth>--MM</gMonth>
• No specific day	• YYYYMM– –	• <gYearMonth>YYYY-MM</gYearMonth>
• No specific month and no specific day	• YYYY– – – –	• <gYear>YYYY</gYear>

NOTE: YYYY = calendar year; MM = month; DD = day.

The dashes (–) indicating that the year, month, or date which is not specified must be included in the encoding (with no space between the dashes).

2.4.10.3 Start and end of ranges

In accordance with S-100 § 3-8, the start and end instants of a range or period are included in the range or period.

EXAMPLE 1: If the beginning of a date range is encoded as the complete date 01 January 2016, the period begins at 00:00:00 on 1 January 2016, and the whole of New Year's Day is included in the period. If the end of the date range is encoded as 01 January 2016, the period ends at 24:00:00 on 1 January 2016, i.e., again the whole of New Year's Day is included in the period.

EXAMPLE 2: If the beginning of a period is encoded in truncated date format as – – – –01– – (i.e., year and day not specified), the period begins at 00:00:00 on 1 January each year. If the end of the period is encoded as – – – –01– –, the period ends at 24:00:00 on 31 January each year.

NOTE (1): Particular care should be taken if the start or end date is 28 or 29 February. S-100 § 3-8.3 explains the implications for end of February. For example, the truncated date – – – –02– – will be interpreted as 29 February in leap years and 28 February in non-leap years, while – – – –0228 will be interpreted as 28 February in every year.

NOTE (2): In accordance with ISO practice[1], 00:00:00 means midnight at the start of a day and 24:00:00 means midnight at the end of a day.

2.4.10.4 Schedules

Weekly service schedules of a feature can be comprehensively described by using the information types **ServiceHours** and **NonStandardWorkingDay**.

EXAMPLE: A feature service is available under normal operation status 24 hours/day on Monday and Wednesday and from 08:00 to 16:00 LT from Thursday to Saturday. The service is available by pre-arrangement on public holidays and the 5 of August of each year when they fall on days which would otherwise be normal working days.

ServiceHours
- **scheduleByDayOfWeek**
  - **categoryOfSchedule** =1 (normal operation)
  - **timeIntervalsByDayofWeek**
    - **dayOfWeek** =2(Monday), 4(Wednesday)
    - **dayOfWeekIsRange** =0 (false)
  - **timeIntervalsByDayofWeek**
    - **dayOfWeek** =5(Thursday), 7(Saturday)
    - **dayOfWeekIsRange** =1 (true)
    - **timeOfDayStart** = 08:00:00
    - **timeOfDayEnd** = 16:00:00

NonStandardWorkingDay
- **dateFixed** = – – – 08 – 05 (5 August)
- **dateVariable** = public holidays
- **information.text =** "By pre-arrangement"

The above example can be encoded as follows:

```
<S131:ServiceHours gml:id="(GML ID of ServiceHours)">
  <scheduleByDayOfWeek>
    <categoryOfSchedule code="1">Normal Operation</categoryOfSchedule>
    <timeIntervalsByDayOfWeek>
      <dayOfWeek code="2">Monday</dayOfWeek>
      <dayOfWeek code="4">Wednesday</dayOfWeek>
```

[1] S-100 and by extension S-131 have not adopted ISO 8601-1/2 (2019).

```
            <dayOfWeekIsRange>0</dayOfWeekIsRange>
            <timeOfDayStart>00:00:00</timeOfDayStart>
            <timeOfDayEnd>24:00:00</timeOfDayEnd>
         </timeIntervalsByDayOfWeek>
         <timeIntervalsByDayOfWeek>
            <dayOfWeek code="5">Thursday</dayOfWeek>
            <dayOfWeek code="7">Saturday</dayOfWeek>
            <dayOfWeekIsRange>0</dayOfWeekIsRange>
            <timeOfDayStart>08:00:00</timeOfDayStart>
            <timeOfDayEnd>16:00:00</timeOfDayEnd>
         </timeIntervalsByDayOfWeek>
      </scheduleByDayOfWeek>
      <partialWorkingDay xlink:href="(reference to NonStandardWorkingDay)"/>
   </S131:ServiceHours>

   <S131:NonStandardWorkingDay gml:id="(GML ID of NonStandardWorkingDay)">
      <dateFixed><gMonthDay>--08-05</gMonthDay></dateFixed>
      <dateVariable>public holidays</dateVariable>
      <information><text>By pre-arrangement</text></information>
      <theServiceHours_nsdy xlink:href="(reference to ServiceHours)"/>
   </S131:NonStandardWorkingDay>
```

If the days of week are known but the hours of availability are unknown, there is no time attribute. Twenty-four availability is indicated by encoding the availability period as 000000-240000. Special cases such as unknown can be explained in the **textContent** or **information** attribute of **ServiceHours**.

To encode two or more periods within the same day, repeat the **timeOfDayStart** and **timeOfDayEnd** attributes. If one of the times is not known, it may be nilled as described in clause 2.4.4.

For example, to encode open hours of 8 a.m. to 12 noon and 1 p.m. to 5 p.m. on Thursdays and Saturdays:

timeIntervalsByDayofWeek
- **dayOfWeek** =5(Thursday), 7(Saturday)
- **dayOfWeekIsRange** =1 (true)
- **timeOfDayStart** = 08:00:00
- **timeOfDayStart** = 13:00:00
- **timeOfDayEnd** = 12:00:00
- **timeOfDayEnd** = 17:00:00

The order of repeated **timeOfDayStart** and **timeOfDayEnd** attributes is significant, since intervals are specified by matching them pairwise in order.

UTC is indicated by the Z suffix. The absence of the Z suffix indicates local time.

The absence of any additional information other than date (fixed or variable) in **NonStandardWorkingDay** should be interpreted as closure on the specified days. Non-standard working days do not need to be associated with **ServiceHours** instances categorized as "closure" (*categoryOfSchedule=Closure*) because the closure is already indicated in the **ServiceHours** instance.

2.4.10.5 Times

If it is required to provide information of the start time and end time of an active period of a feature, it must be encoded using the attributes **timeOfDayStart** and **timeOfDayEnd**. The order has significance.

2.4.11 Combination of date schedules and times

Schedule information can also include time of day. The complex attribute **timeIntervalsByDayofWeek** also includes **timeOfDayStart** and **timeOfDayEnd** attributes to encode the daily start and end times of service. Complete instructions on how to encode schedules are described in clause 2.4.10.4.

2.4.12 Graphic information

A graphic file should be appropriate for the purpose and should supplement the information in terms of navigational relevance. Preferably, the graphic should provide perspective relevant to the view of the mariner. Graphics should be such that all the information in the graphic is legible in the application display.

Graphic information must be encoded using the complex attribute **graphic**. The simple sub-attribute **pictureInformation** should be used to provide credits to the picture creator, copyright owner etc.

Assuming that graphic information provides a coastal view, mariners are interested in knowing from which point on sea that graphic has been taken. The complex attribute **bearingInformation** (see clause 2.4.12.1) provides all necessary information.

2.4.12.1 Bearing information

The most accurate information should be provided if it is necessary to indicate a position from where a picture has been taken. **information** is a sub-complex attribute of **bearingInformation** and should be used to specify that no bearing information can be provided whenever such is the case. The sub-attributes **sectorBearing** and **orientation** can be used to describe a certain level of inaccuracy in the position determination.

2.5 Associations

2.5.1 Introduction

An association expresses a relationship between two classes - features, information types, or a feature and an information type. Objects in the dataset (instances of feature/information types) are related only if the link between them is encoded in the dataset. An association end may have a multiplicity which describes how many instances the feature or information type instance at the other end is allowed to link to.

2.5.2 Association names

The association name is normally provided by the UML diagram at the middle of the connection line/arrow between the two involved classes and can be obtained from the feature and information type tables provided in this document).

Association names may be omitted in the UML diagrams for the following reasons:

a) the association is defined by an association class, see 2.5.4 (the name of the association class is used);

b) to avoid cluttering the diagram – however, the name is always documented in the feature/information type tables.

2.5.3 Association roles

Either or both association ends can have a name (role). Roles may be also omitted from the diagram to reduce clutter – again, the role name is documented in the feature/information type tables.

NOTE: Instead of documenting every single role, Product Specifications may describe rules for defining default roles.

2.5.4 Association classes

Association classes allow relationships to be characterized by one or more attributes. The attributes of the association class belong to the association itself, not to any of the features or information types it connects. An association class is both an association and a class. Within an S-131 product the association classes **Permission Type** and **Inclusion Type** may be used for relating vessel classes to feature and information types.

2.5.4.1 Permission Type

This association class specifies the relationship of the vessel class to a feature, e.g., whether access to a feature (or use of a facility) is prohibited or permitted for a specified class of vessel. The class of vessel is described by the simple and complex attributes of the information type **Applicability** such as length, cargo, etc. The attributes of the association class describe the nature of the relationship, i.e., whether access to an area is permitted or prohibited, or whether use of a service is required or recommended.

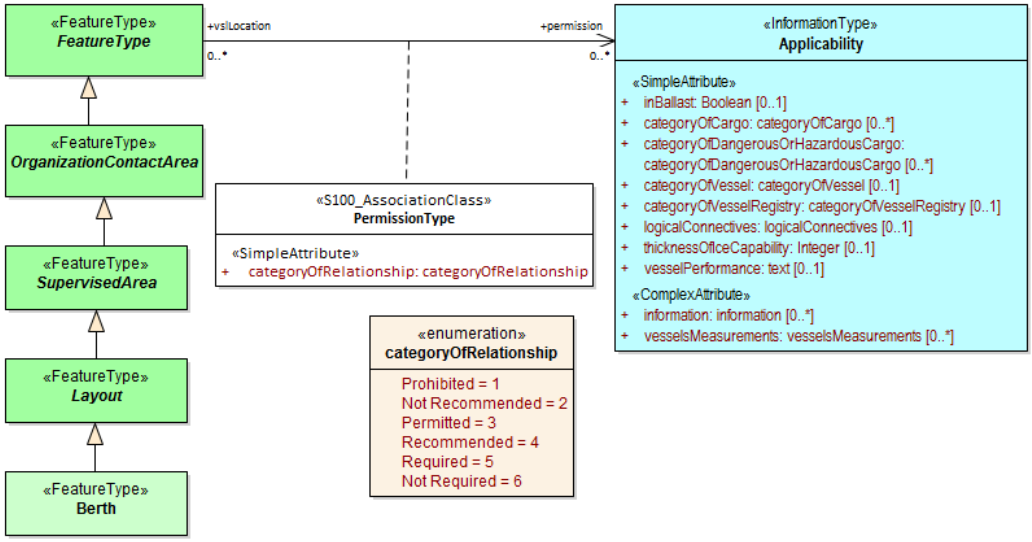

Figure 2.2 - Association class for hypothetical requirement for non-use of a berth by a vessel carrying hazardous cargo

EXAMPLE: An association between an **Applicability** instance with attribute **categoryOfDangerousOrHazardousCargo** = IMDG Code Class 3 and an instance of feature **Berth**, with **Permission Type**'s attribute **categoryOfRelationship** = Prohibited, means that vessels carrying flammable liquids (hazardous cargo type class 3 in the IMDG Code) cannot use the **Berth** instance. Note that in this case the relationship is inherited by the **Berth** instance from the abstract class **FeatureType**.

2.5.4.2 Inclusion Type

This association class defines whether a specified customer (class of vessels, as described by **Applicability**) is excluded or included from a particular regulation, recommendation, etc. Again, the attributes of the association class describe the nature of the relationship; in this case whether the vessel is included or excluded from the regulation, etc.

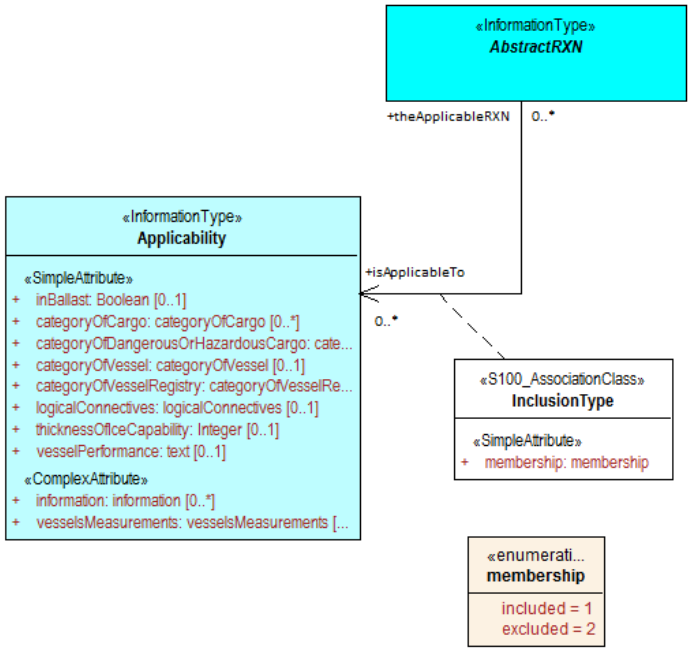

Figure 2.3 - Association class for inclusion of vessel types in regulations

EXAMPLE: An association between an **Applicability** instance with attribute **categoryOfDangerousOrHazardousCargo** = IMDG Code Class 3, with **Inclusion Type**'s attribute **membership** = included, and an association of a **Regulation** instance to the same Inclusion Type, means that the information provided by the **Regulation** (a sub-type of **AbstractRXN)** applies to vessels carrying flammable liquids (hazardous cargo type class 3 in the IMDG Code).

NOTE (1): Since **AbstractRXN** is an abstract type, it cannot have direct instances in the dataset. Only instances of its (non-abstract) sub-types can be used.

NOTE (2): Specific tools may use different presentations in their user interfaces, e.g., as two associations (as described in the text of the example), or one association with an association class also shown (as shown in Figure 2.3).

2.5.5 Use of various associations

2.5.5.1 General

In general, associations must be encoded whenever the relationship is useful for navigation, monitoring, voyage or route planning, or reporting purposes, or any other purpose for which the dataset is intended. The multiplicity lower bound of "0" at an association end means only that the absence of a link to the relevant instance does not invalidate the dataset. The encoding instructions for individual feature and information types describe what associations are allowed and whether they are required or optional.

2.5.5.2 Generic association for uncategorized additional information

Unless other associations are specified, information types are associated to the relevant features using the association name **AdditionalInformation** and the role names **providesInformation** and **informationProvidedFor**.

2.5.5.3 Associations to Restrictions, Recommendation, Regulations, and Nautical Information

The **Restrictions, Recommendation, Regulations, Nautical Information** are associated to the relevant features using the association named **AssociatedRxN** (inherited from their common abstract

super-type). The roles at the ends of this association are **appliesInLocation** and **theRxN** (the Restriction, Regulation etc.).

If the regulation applies only to a specific class, or if it mentions an exempt class, an additional association to an **Applicability** object is encoded using the **InclusionType** association class.

2.5.5.4 Conventional Association

Certain features and information types may be permitted or required to have associations to other feature or information types. The allowed or mandatory associations for a feature/information type are shown in the application schema (clause 4 of the Product Specification) and listed in the documentation for individual types in this Annex (clauses 5–13). Definitions of the associations and roles are also given in the DCEG.

2.5.5.5 Where to Encode Associations

The presentation and management of associations will be determined by the user interface of the encoding software tools. Since S-100 permits feature-information associations to be encoded only from the geographic feature to the information type and not vice versa, the information-to-feature link might be unavailable or treated differently from the feature-to-information link.

2.6 Datasets

2.6.1 Types of Datasets

A dataset is a grouping of features, attributes, geometry and metadata which comprises a specific coverage.

Table 2.9 shows the types of datasets which may be produced and contained within an exchange set:

Table 2.9 - Dataset types

Dataset	Explanations
New dataset:	Data for an area different (in coverage and/or extent) to existing datasets.
New Edition of a dataset:	A re-issue plus new information which has not been previously distributed by Updates. Each New Edition of a dataset must have the same name as the dataset that it replaces and should have the same spatial extents.
Update dataset	Updated or new information. Contains information about objects being added, modified, or deleted.

2.6.2 Overlay data sets

S-131 datasets are intended to be used together with S-101 ENC (or similar data products) which will act as a base layer. The base layer is expected to provide navigational and visual context. Generally, an overlay dataset like S-131 does not provide “skin of the earth” coverage and there will be large areas with no data coverage because the S-131 application schema does not include any feature for designating a region as “other”, or “not an MHI area” (i.e., there is no S-131 feature equivalent to the S-101 Unsurveyed Area). Further, an overlay dataset does not include features that provide auxiliary information such as bathymetry within a routeing measure area.

2.6.3 Data coverage

A Marine Harbour Infrastructure dataset can contain one or more **DataCoverage** features (see clause 4.4). The data boundary is defined by the extent of the **DataCoverage** meta features. Data must only be present within **DataCoverage** meta features.

When a feature extends across datasets of overlapping scale ranges, its geometry must be split at the boundaries of the **DataCoverage** features and its complete attribute description must be repeated in each dataset.

An Update dataset must not extend the data coverage for the base dataset to which it applies. Where the extent of the data coverage for a base dataset is to be changed, this must be done by issuing a New Edition of the dataset.

2.6.4 Discovery metadata

Discovery metadata is intended to allow applications to find out important information about datasets and accompanying support files to be examined without accessing the data itself (or without reading the support file). Discovery metadata includes, but is not limited to:

- information identifying the product specification and encoding format;
- edition and version numbers, production/release date, and other details of data creation and updating;
- data coverage of the dataset;
- summary descriptions of content, purpose, use, and limitations;
- identification and contact information for the producer and distributor of the dataset.

Discovery metadata is encoded in the exchange catalogue. S-131 uses the same classes and attributes for discovery metadata as S-100, but adds certain product-specific restrictions. The classes and attributes for generic discovery metadata are defined in S-100 Part 17. Constraints and restrictions specific to S-131 are defined in the S-131 Product Specification.

The schema for the exchange catalogue file (CATALOG.XML) for S-131 is the same as the S-100 generic schemas and is available from the schema server (https://schemas.s100dev.net).

2.6.5 Dataset header metadata

Dataset header metadata contains structural and discovery metadata that apply to the whole dataset and are encoded in the dataset file. The elements are described in S-100 Part 10b.

2.6.6 Dataset units

The depth, height and positional uncertainty units in a dataset must be metres.

2.6.7 Dataset Coverage

Marine Harbour Infrastructure datasets are spatially limited.

In areas which include neighbouring producer nations, producing agencies should co-operate to agree on dataset boundaries and ensure no data overlap. Where possible, adjoining nations should agree on common data boundaries within a technical arrangement based on cartographic convenience and benefit to the mariner.

If an MHI feature extends outside the product coverage and the adjoining object does not exist, e.g. due to delay in the production of the neighbouring HO product, an indication should be placed at the outer edge of the product.

2.6.8 Overlaps

The **DataCoverage** features within a dataset must not overlap, however **DataCoverage** features from different datasets may overlap if they have differing maximum display scales or the datasets are for different ports.

MHI does not envisage multiple datasets for the same port, and does not anticipate overlapping datasets for a single port.

Overlapping datasets are possible in the case where there are two or more ports in close proximity (which may, for example, have overlapping approaches). In the latter case, consideration should be given to creating a single dataset that covers all the ports in the region in question, but overlapping datasets may be created as necessary. In case of overlapping datasets, the ECDIS should display an indicator and allow the user to select one dataset for display.

2.6.9 Feature Object Identifiers

Each feature and information instance within a dataset must have a unique universal Feature Object Identifier [FOID]. This is mapped to the *gml:id* attribute of the feature in the dataset (FOID and *gml:id* may not be identical due to XML restrictions on the format of *gml:id* attributes). Where a real-world feature has multiple geometric elements within a single dataset due to the dataset scheme, the same FOID may be used to identify multiple instances of the same feature. Since *gml:id* attributes in the same file must be unique, the mapping between FOID and *gml:id* must allow for a one-to-many mapping if needed. Features within a dataset may carry multiple geometries.

Features split across multiple datasets may be identified by the same FOID. Features repeated in different scale ranges may be identified by the same FOID.

FOID must not be reused, even when a feature has been deleted. However, the same feature can be deleted and added again later using the same FOID.

NOTE (1) (informative): The current format of FOID is defined in S-101 as a concatenation of subfields Producing Agency, Feature Identification Number and Feature Identification Subdivision. The identifier is currently formatted as a string value. The identifier may eventually be replaced with an identifier adhering to the scheme for Maritime Resource Names (MRN) which is based on the format of URNs.

NOTE (2): S-131 uses *gml:id* as a proxy representing FOID. S-131 does not define a rule for the structure or generation of *gml:id* values or their relation to identifiers in S-57, S-101 or other sources. Producers may generate *gml:id* values according to any desired scheme or schemes

2.6.10 180° Meridian of Longitude

Datasets must not cross the 180° meridian of longitude.

2.7 Geographic names

2.7.1 Feature names

If it is required to encode an international or national geographic name, it must be done using complex attribute **featureName**.

If it is required to encode a geographic name for which there is no existing feature, an appropriate area feature must be created. In order to minimise the data volume, these features should, where possible, use the geometry of existing features.

Geographic names should be encoded with the complex attribute **featureName.** The complex attribute **featureName** consists of the simple sub-attributes **language**, **name** and a Boolean type to indicate whether that particular name is the **displayName** or not**.**

National geographic names can be left in their original national language in a non-English iteration of the complex attribute **featureName** (but only if the national language can be expressed using lexical level 0 or 1), or transliterated or transcribed and used in an English iteration of the complex attribute **featureName**, in which case the national name should be populated in an additional iteration of the **featureName** with sub-attribute **language** populated with the relevant national language value in accordance with ISO 639-2/T**.**

All area and point features within a Marine Harbour Infrastructure product should be encoded using **featureName** if a name is available.

A group of features, associated with a particular geographic name, should have the name encoded using **featureName** on an aggregation feature (of type surface or point, or no geometry, as appropriate). The name should not be encoded on the individual hydrographic features.

A group of service or forecast areas with the same attribute values associated with the same name should be encoded as spatial attributes of the same feature (so there would be only one feature with multiple spatial attributes for location).

Named features listed in Hydrographic Office's Sailing Directions or other documents that may assist in locating service information should be encoded using feature name on the relevant feature (e.g. **WaterwayArea**).

In all instances, if the exact extent of the feature to be named is known, a feature must be created. If the exact extent is not known, or the area is too small, an existing or specifically encoded point feature should be used to encode the geographic name.

2.7.2 Text placement

The cartographic feature **TextPlacement** is used specifically to place text cartographically. The properties of the **TextPlacement** feature are described as follows:

- Geometry (point) – the spatial point location of the text string.
- text type – the attribute (or class) which is to be placed.
- orientation value and text offset mm – the bearing and distance (in millimetres in the ECDIS
- display) used to position the text relative to the feature.

The **TextPlacement** feature is associated to the feature which carries the text being placed. The attribute **textType** determines which text string is to be displayed if more than one is present. The **TextPlacement** feature ensures that as the screen rotates from "north up" (e.g. if display is set to "course up") text can remain readable, or clear other important charted information.

2.8 Scale policy

2.8.1 General policy

Marine Harbour Infrastructure data must be compiled in the best applicable scale.

2.8.2 Usage of scale attributes in displays (informative)

The attributes *scaleMinimum* and *scaleMaximum* define the range of display scales within which features will be portrayed on the display if these scale minimum/maximum functions are enabled in the

ECDIS or another GIS device. A geo feature with one or more spatial attributes can utilize the *scaleMinimum* and *scaleMaximum* attributes on the link to the spatial object (see the S-100 General Feature Model, S-100 Part 3, Figure 3-1 and § 3-5.3.5). There are essentially two ways in which these attributes may be used.

1) A producer may decide to use only a *scaleMinimum* value. This option is employed when the data producer wishes to turn off the display of a feature above certain scales. This is particularly useful in areas with high data density, and when it is expected that the data will be used a larger scale where data clutter might become an issue. Features are therefore encoded with an applicable value, which represents the scale at which the producer wishes to turn off the feature.

2) A producer may decide to provide several pairs of *scaleMinimum* and *scaleMaximum* values. This decision may be based on the fact that for one particular feature different spatial instances in different scale ranges should be provided to supply this particular feature with more detailed geographic representation at larger scales.

An example can be a building which has two spatial objects associated, first one with only scale minimum value encoded at 21999, and the second spatial object encoded with *scaleMaximum* at 22000 and *scaleMinimum* encoded with 999999. These values would enable the use of a highly-detailed geometry at larger scales than 22000, and a less detailed geometry at scales of 22000 and less, while the building would be turned off at scales of 999999 and less.

A similar strategy can be followed to enable boundaries to conform to a scale-dependent geometry such as a coastline. Conformance at different scales can achieved by using minimum/maximum scales on spatial attributes to indicate which particular geometry should be used at a given scale.

The meta feature **DataCoverage** (clause 4.4) is used to provide ECDIS with the scale information needed for the determination of dataset loading and unloading in relation to the user-selected viewing scale of the ECDIS. The mandatory attribute *maximumDisplayScale* is used to indicate the largest intended viewing scale for the data. The mandatory attribute *minimumDisplayScale* is used to indicate the smallest intended viewing scale for the data.

S-131 does not prescribe specific values for *maximumDisplayScale* and *minimumDisplayScale*. Instead, producers should refer to the S-101 DCEG for values, and use values appropriate to the S-101 ENCs underlying the S-131 dataset.

2.8.3 Scale minimum values

Scale minimum values must be chosen from the list below. These values are the same as in S-101 to ensure visual compatibility between comparable underlying S-101 ENCs and S-131 data products. The scale minimum values used in the actual comparable underlying ENCs should be used, and in case of differences with the list below, the values in the actual ENCs prevail.

“Comparable” ENCs for the purpose of this requirement means ENCs of scales large enough to distinguish berths, terminals, and other features that are part of a port. These will generally have *navigationPurpose=port* in discovery metadata (see S-100 Part 17) and have maximum and minimum display scales values in the lower end of the scale ranges (i.e., be the larger scale ENCs).

Table 2.10 - Scale minimum values (from the S-101 DCEG)

Scale
19999999
9999999
4999999
3499999

1499999
999999
699999
499999
349999
259999
179999
119999
89999
59999
44999
29999
21999
17999
11999
7999
3999
2999
1999
999

All data within a dataset must have the same minimum display scale, but portions of a dataset can have a different maximum display scale, depending on the best scale required in an area for the operational purpose of the data.

2.8.4 Scale policy for feature types

Unlike S-101, S-131 does not define scale minimum values or steps for individual feature types.

2.9 Masking

Since a MHI dataset will cover the entire extent of a port, masking at cell boundaries is not required.

2.10 “Linear” surface features

If it is required to encode a linear feature when the only allowable primitive for the relevant feature type is surface (e.g. a service area along a track, or channel), a “very narrow surface” should be encoded. The suggested extent is 0.3mm wide at viewing scales (keeping in mind that S-100 permits different spatial attributes at different scales.) An edge of this surface should correspond to the position of the line. All other edges should be masked.

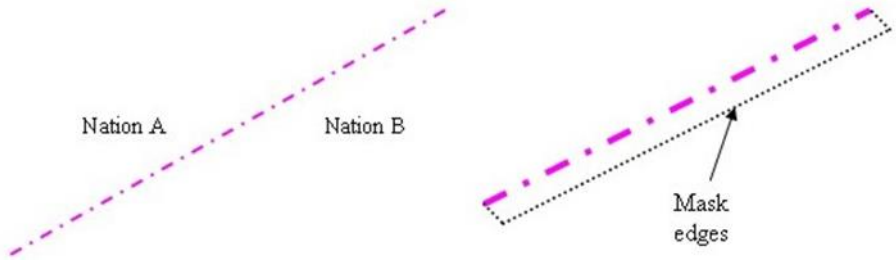

Figure 2.4 - "Linear" features

3 Description of table format for feature and information types

The tables describing feature and information types are based on the template below.

X.X Clause heading

<table>
<tr><td colspan="5">IHO Definition: FEATURE: Definition. (Authority for definition).</td></tr>
<tr><td colspan="5">S-131[Geo Feature/Information Type]: Feature (S-57 Acronym) S-131 feature and corresponding S-57 acronym (if applicable)</td></tr>
<tr><td colspan="5">Super-Type: super-type (clause reference, should be hyperlink when published)</td></tr>
<tr><td colspan="5">Sub-Types: sub-types (clause references, should be hyperlinks when published)</td></tr>
<tr><td colspan="5">Primitives: Allowable geometric primitive(s) [Point, Curve, Surface]</td></tr>
<tr><td>Real World
(Reserved)</td><td colspan="2">Paper Chart Symbol
(Reserved)</td><td colspan="2">ECDIS Symbol
(Reserved)</td></tr>
<tr><td>S-10x Attribute</td><td>S-57 Acronym</td><td>Allowable Encoding Value</td><td>Type</td><td>Multiplicity</td></tr>
<tr><td>This section lists the allowable local attributes for the S-131 feature or information type.</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="5">INT 1 Reference: The INT 1 location(s) of the Feature – by INT1 Section and Section Number (if applicable).
X.X.X Sub-clause heading(s) (see S-4 – B-YYY.Y)
Introductory remarks. Includes information regarding the real world entity/situation requiring the encoding of the Feature in the ENC, and where required nautical cartographic principles relevant to the Feature to aid the compiler in determining encoding requirements.
Specific instructions to encode the feature.
Remarks:
• Additional encoding guidance relevant to the feature.
X.X.X.X Sub-sub-clause heading(s) (see S-4 – B-CCC.C)
Clauses related to specific encoding scenarios for the Feature (if required).
Remarks:
• Additional encoding guidance relevant to the scenario (if required).
Distinction: List of features in the Product Specification distinct from the Feature.</td></tr>
</table>

<table>
<tr><td colspan="8">Feature/information associations (allowable local associations)</td></tr>
<tr><td>Type</td><td>Association Name</td><td>Class</td><td>Role</td><td>Mult.</td><td>Class</td><td>Role</td><td>Mult.</td></tr>
</table>

association, aggregation, or composition	Name	The name of the feature class (same as at the head of this table).	Role of this class.		Name of the other class to which this class is linked.	Role of the other class.	
If the class, role, and multiplicity for one end are missing, it means the association is unidirectional, that is, the binding for the association is only in one of the participating features or information types. This is sometimes the case for information associations that link a feature to an information type - the feature type has a binding to the information type, but not vice versa.							

Remarks:

The clause references in the super-type and sub-types fields should be hyperlinks when this DCEG is published, allowing navigation back and forth between a feature type and its super-type. This can be used to access guidance encoded in the feature table for a feature's super-types.

S-131 Attribute: Indentation of attributes indicates sub-attributes of complex attributes. Complex attributes may also be sub-attributes of complex attributes, which is indicated by further indentation of the attribute name in the tables. Inherited attributes are not shown in the table, only locally defined attributes.

S-131 Attribute: Attributes shown in grey text are ECDIS "system" attributes which are not visible to the encoder, but are populated by the ENC production system in order to assist with portrayal of ENC data in ECDIS. (NOTE: Retained for compatibility with S-101. S-131 Edition 1.0 does not use system attributes.)

S-57 Acronym: S-57 attribute acronyms shown in italic style text have been re-modelled in S-101 from S-57.

Allowable Encoding Value: For (EN) type attributes, the enumerates listed are only those allowable for the particular occurrence of the attribute relevant to the feature. Allowable values may vary for the attribute depending on the feature to which the attribute is bound. Such bindings are defined in the S-131 Feature Catalogue. The full list of enumerates that may be assigned to an attribute in S-131 can be found in the Simple Attributes section of the printed feature catalogue document.

Type: The prefix (C) indicates that the attribute is a complex attribute. Complex attributes are aggregates of other attributes that can be simple type or complex type (see Product Specification main document clause 7.3). The prefix (S) indicates that the attribute is a sub-attribute of a complex attribute. Complex attributes that are sub-attributes of a complex attribute, and their sub-attributes, are indicated by indentation of the attribute name in the S-131 Attribute column.

Introductory clauses may depict associations using a UML diagram showing the relationships that apply to the class and its super-classes (generalizations). Relationships which are inherited from super-classes are shown by including the super-classes and their associations in the diagram.

The usual UML conventions apply. For explanations of standard UML notations, see S-100 Part 1. For explanations of the conventions used for associations, see clause 2.5 in this DCEG.

Association ends and multiplicities: A lower bound of 0 in the multiplicity at any end of an association indicates only that the association is not mandatory for any particular instance of the feature at the other end (i.e., it is not mandatory for an instance of "that" feature type to have an association to a feature of "this" type). A lower bound of "1" means that if an instance of "that" type exists, it must be associated to an instance of "this" type. If the association is actually encoded then it amounts to saying that "this relationship exists between these two instances" and there must be an appropriate feature instance at both ends. Associations that are not mandatory should be encoded if and only if they convey useful information.

4 Metadata Features

4.1 Introduction

Meta-features are used to reduce the need to code quality and datum attributes in individual features, as well as to delimit the extent of data in the dataset. In a base dataset, some meta-features are mandatory (clause 4.2).

Horizontal and vertical uncertainties that apply to the majority of features are encoded as attributes of one or more **QualityOfNonBathymetricData** features together covering the same extent as the spatial union of the **DataCoverage** features in the dataset. (Typically, there would be one **DataCoverage** feature and one **QualityOfNonBathymetricData** feature, having the same spatial extent.) Exceptional horizontal and vertical uncertainties are encoded in a **SpatialAccuracy** information type associated to particular spatial primitives.

4.2 Mandatory meta features

The mandatory meta features are:

- DataCoverage
- QualityOfNonBathymetricData
- SoundingDatum
- VerticalDatumOfData

4.3 Maximum and minimum display scales

Maximum and minimum values for the display scale attributes are specified in Table 4.1. These are the same as in S-101 except that the empty (null) value is not used in S-131 (and therefore struck through in the table).

Table 4.1 - Maximum and minimum display scale values (from S-101 DCEG)

maximum display scale	minimum display scale
10,000,000	~~empty (null)~~
3,500,000	10,000,000
1,500,000	3,500,000
700,000	1,500,000
350,000	700,000
180,000	350,000
90,000	180,000
45,000	90,000
22,000	45,000
12,000	22,000
8,000	12,000
4,000	8,000
3,000	4,000
2,000	3,000
1,000	2,000

4.4 Data coverage meta feature

DataCoverage: In order to assist in data discovery, the meta feature **DataCoverage** must be used to provide the area of coverage of the S-131 dataset. This means that **DataCoverage** expresses where the presence or absence of S-131 geographic features is asserted. Unlike S-101 datasets, there is no 'skin of the earth' principle in S-131 and there may be regions covered by a **DataCoverage** but where no geographic S-131 feature is present.

IHO Definition: A geographical area that describes the coverage and extent of spatial objects.

S-10x Metadata Feature: DataCoverage (M_COVR)

Super Type:

Primitives: surface

Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-10x Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
Maximum Display Scale		(see Table 4.1)	IN	1, 1
Minimum Display Scale		(see Table 4.1)	IN	1, 1

INT 1 Reference: --

4.4.1 General

The meta feature **DataCoverage** encodes the area covered by the dataset. In S-131, this feature is also used to harmonize dataset loading and unloading in relation to the underlying ENC(s).

There must be a minimum of one **DataCoverage** feature in a dataset. **DataCoverage** features must cover at least the total extent of all geographic features in the dataset, and must not overlap.

The mandatory attribute *maximumDisplayScale* is used to indicate the largest intended viewing scale for the data.

The mandatory attribute *minimumDisplayScale* is used to indicate the smallest intended viewing scale for the data.

The values of maximum and minimum display scales should be harmonized with comparable base layer S-101 datasets. (See clause 2.8.3 for the definition of "comparable".) This serves to harmonize the loading strategy of S-131 port information with that for the underlying ENCs. However, use of the same values as S-101 datasets is not mandatory in S-131.

Given that S-131 data will overlay ENC and possibly other datasets, the conditions described in the S-101 DCEG "Data Coverage" clause for displaying overscale warnings and setting the viewing scale may be overridden by interoperability constraints or the presence of higher-priority datasets. The specification of such behaviour is out of scope for this document (the S-100 interoperability specification should address it for ECDIS).

Typically, only a single **DataCoverage** feature should be used in a dataset. However, if the maximum display scale is different for discrete areas within a single MHI dataset, this must be indicated by

encoding separate, non-overlapping **DataCoverage** features, each having a different value populated for *maximumDisplayScale*. Producing Authorities are to note, however, that excessive use of multiple **DataCoverage** features having different values of *maximumDisplayScale* within a single dataset should be avoided. Where different values of *maximumDisplayScale* are used, this should be restricted only to data compiled in order to achieve the intended navigational purpose of the entire dataset. Datasets must have the same value for *minimumDisplayScale* for all **DataCoverage** features in the dataset.

Remarks:

- This meta feature is intended to support an indication of coverage.
- Where a dataset consists of only one **DataCoverage** feature, the value for the maximum display scale populated in the dataset discovery metadata must be the same as the value populated for maximum display scale on the **DataCoverage**.
- For any **DataCoverage** feature, maximum display scale < minimum display scale.
- S-131 does not use the NULL value, which is permitted in S-101 for *minimumDisplayScale* when *maximumDisplayScale*=10,000,000. An appropriate greater value may be used instead.

Distinction: None

4.5 Quality of Non-Bathymetric Data

IHO Definition: An area within which a uniform assessment of the quality of the non-bathymetric data exists.				
S-10x Metadata Feature: QualityOfNonBathymetricData (M_ACCY)				
Super Type:				
Primitives: surface				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-10x Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Category of Temporal Variation		1 : Extreme Event 2 : Likely to Change and Significant Shoaling Expected 3 : Likely to Change But Significant Shoaling Not Expected 4 : Likely to Change 5 : Unlikely to Change 6 : Unassessed	EN	0, 1
Horizontal Distance Uncertainty	(HORACC)		RE	0, 1
Horizontal Position Uncertainty	(POSACC)		C	1, 1
Uncertainty Fixed	(POSACC) (SOUACC) (VERACC)		(S) RE	1, 1
Uncertainty Variable Factor			(S) RE	0, 1
Orientation Uncertainty			RE	0, 1
Survey Date Range			C	0, 1
Date Start	(DATSTA)		(S) TD	0, 1
Date End	(DATEND)		(S) TD	1, 1
Vertical Uncertainty	(VERACC)		C	0, 1
Uncertainty Fixed	(POSACC)		(S) RE	1, 1

	(SOUACC) (VERACC)			
Uncertainty Variable Factor			(S) RE	0, 1
Information			C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1

INT 1 Reference: --

4.5.1 Quality of positions

The meta feature **QualityOfNonBathymetricData** may be used to provide an indication of the overall uncertainty of position for all non-bathymetric features. It must not be used to provide the uncertainty of bathymetric information.

The attribute *horizontalPositionUncertainty* may be applied to any spatial type, in order to qualify the location of a feature.

The attributes *horizontalDistanceUncertainty* and *horizontalPositionUncertainty* must not be applied to the spatial type of any geo feature if they are identical to the *horizontalDistanceUncertainty* and *horizontalPositionUncertainty* values of the underlying meta feature.

Position uncertainty on the **QualityOfNonBathymetricData** applies to non-bathymetric data situated within the area, while position uncertainty on the associated spatial types qualifies the location of the **QualityOfNonBathymetricData** feature itself.

Remarks:

Distinction:

4.6 Sounding Datum

IHO Definition: The horizontal plane or tidal datum to which soundings have been reduced. Also called datum for sounding reduction.
S-10x Metadata Feature: SoundingDatum (M_SDAT)
Super Type:
Primitives: surface

Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-10x Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
Vertical Datum	(VERDAT) (Datum Level) (Reference Plane) (Levelling Datum) (Datum for Sounding Reduction) (Datum for Heights)	1 : Mean Low Water Springs 2 : Mean Lower Low Water Springs 3 : Mean Sea Level 4 : Lowest Low Water 5 : Mean Low Water 6 : Lowest Low Water Springs 7 : Approximate Mean Low Water Springs 8 : Indian Spring Low Water 9 : Low Water Springs 10 : Approximate Lowest Astronomical Tide 11 : Nearly Lowest Low Water 12 : Mean Lower Low Water 13 : Low Water 14 : Approximate Mean Low Water 15 : Approximate Mean Lower Low Water 19 : Approximate Mean Sea Level 22 : Equinoctial Spring Low Water 23 : Lowest Astronomical Tide 24 : Local Datum	EN	1, 1

		25 : International Great Lakes Datum 1985 26 : Mean Water Level 27 : Lower Low Water Large Tide 44 : Baltic Sea Chart Datum 2000		
Information			C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1

INT 1 Reference: --

4.6.1 General

There must be only one **SoundingDatum** feature in an S-131 dataset, providing the datum for all depth values encoded in any feature. Given the relatively small extent of S-131 datasets and the importance of uniform datums in the same port, it is not anticipated that depths in different features will be referred to different datums; however, if this is the case in the sources, values must be converted to the same datum before encoding in the dataset.

Remarks:

Distinction: **VerticalDatumOfData**

4.7 Vertical Datum of Data

IHO Definition: Any level surface (for example Mean Sea Level) taken as a surface of reference to which the elevations within a data set are reduced. Also called datum level, reference level, reference plane, levelling datum, datum for heights.				
S-10x Metadata Feature: VerticalDatumOfData (M_VDAT)				
Super Type:				
Primitives: surface				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-10x Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Vertical Datum	(VERDAT) (Datum Level) (Reference Plane) (Levelling Datum) (Datum for Sounding Reduction) (Datum for Heights)	3 : Mean Sea Level 16 : Mean High Water 17 : Mean High Water Springs 18 : High Water 19 : Approximate Mean Sea Level 20 : High Water Springs 21 : Mean Higher High Water 24 : Local Datum 25 : International Great Lakes Datum 1985 26 : Mean Water Level 28 : Higher High Water Large Tide 29 : Nearly Highest High Water 30 : Highest Astronomical Tide 44 : Baltic Sea Chart Datum 2000	EN	1, 1
Information			C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1

Text	(INFORM) (NINFOM)		(S) TE	0, 1

INT 1 Reference: --

4.7.1 General

There must be only one **VerticalDatumOfData** feature in an S-131 dataset, providing the datum for all elevation values encoded in any feature. Given the relatively small extent of S-131 datasets and the importance of uniform datums in the same port, it is not anticipated that elevations in different features will be referred to different datums; however, if this is the case in the sources, values must be converted to the same datum before encoding in the dataset.

Remarks:

Distinction: **SoundingDatum**

5 Abstract Geo Features

5.1 Introduction

This clause describes abstract feature types. The abstract types cannot be used directly, but define attributes and associations inherited by their sub-types. The encoding remarks in the description of each abstract feature apply to its sub-types but may be overridden by remarks in the sub-type.

The abstract feature types are depicted in Figure 5.1. At the root is the type named **FeatureType**, from which all feature types except cartographic and meta-features inherit several attributes. This means that any Geo feature in S-131 can have any of the several attributes in the **FeatureType** box. This type also has information associations to three information types, and a feature association to **TextPlacement** which, as for attributes, allows any S-131 Geo feature to have the same associations. The feature types **OrganizationContactArea** and **SupervisedArea** define no local attributes but inherit the attributes of **FeatureType**, however each adds an additional information association which is inherited by all Geo features in S-131.

The abstract feature hierarchy in S-131 is intentionally harmonised with the abstract hierarchy in other nautical publications Product Specifications, specifically S-127 (Marine Traffic Management), which has a more complex structure than S-131 necessitating the use of the abstract types **OrganizationContactArea** and **SupervisedArea** (in S-131, unlike S-127, these classes do not have separate sub-hierarchies). The abstract types **Layout** and **HarbourPhysicalInfrastructure** distinguish S-131 features describing harbour layout from those describing infrastructure.

This top-level hierarchy of types in S-131 means than any S-131 Geo feature can have any or all of the five information associations in Figure 5.1, and also an associated **TextPlacement** cartographic feature to position text. Cartographic and meta-features are not derived from this abstract hierarchy and do not inherit these attributes and associations.

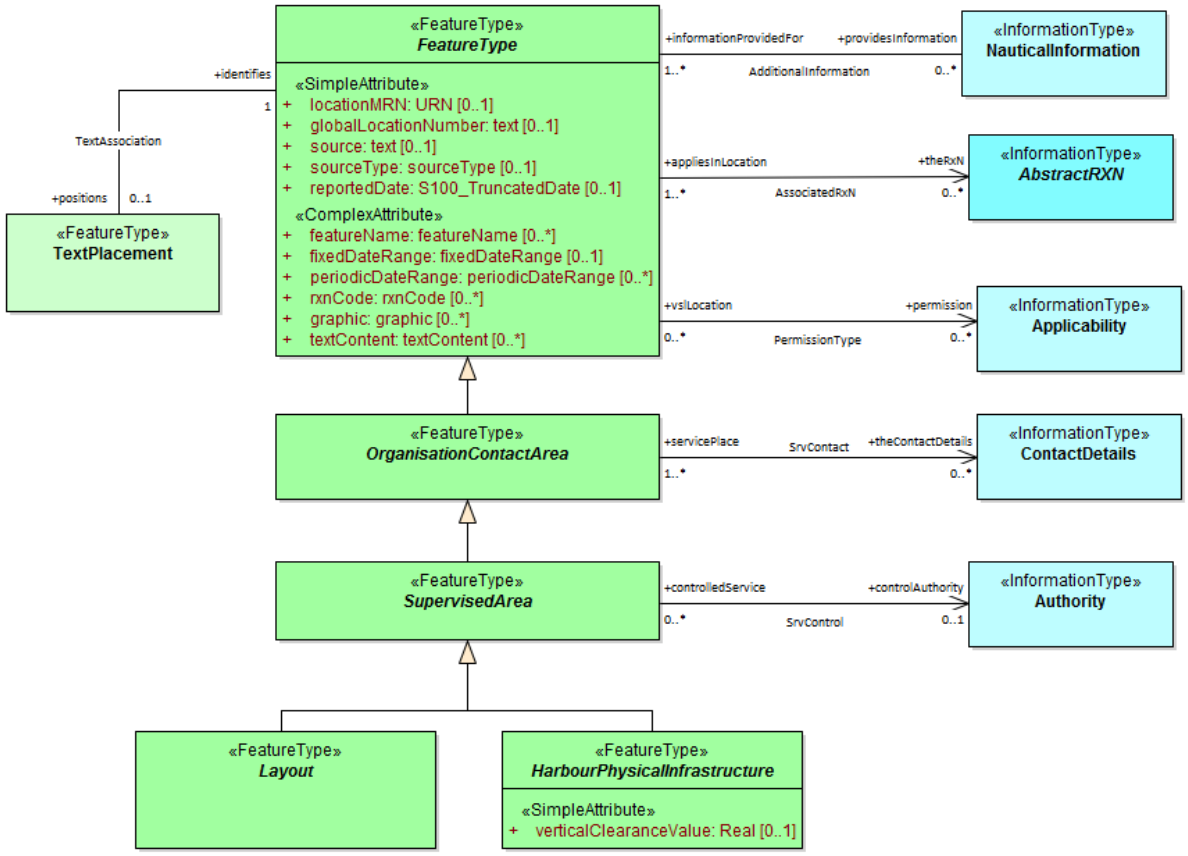

Figure 5.1 - Abstract feature types and their relationships

5.2 Feature Type

IHO Definition: Generalized feature type which carries all the common attributes.				
S-10x Geo Feature: FeatureType				
Super Type:				
Sub-Types: OrganizationContactArea (5.3)				
Primitives: noGeometry				
Real World	*Paper Chart Symbol*		*ECDIS Symbol*	
S-10x Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Location Maritime Resource Name			UN	0, 1
Global Location Number			TE	0, 1

Feature Name			C	0, *
Display Name			(S) BO	0, 1
Language			(S) TE	0, 1
Name	(OBJNAM)		(S) TE	1, 1
Fixed date range			C	0, 1
Date Start	(DATSTA)		(S) TD	0, 1
Date End	(DATEND)		(S) TD	0, 1
Periodic Date Range			C	0, *
Date Start	(DATSTA)		(S) TD	1, 1
Date End	(DATEND)		(S) TD	1, 1
RxN Code			C	0, *
Category of RxN		1 : Navigation 2 : Communication 3 : Environmental Protection 4 : Wildlife Protection 5 : Security 6 : Customs 7 : Cargo Operation 8 : Refuge 9 : Health 10 : Natural Resources or Exploitation 11 : Port 12 : Finance 13 : Agriculture	(S) CL	0, 1
Action or Activity		1 : Navigating With a Pilot 2 : Entering Port 3 : Leaving Port 4 : Berthing 5 : Slipping 6 : Anchoring 7 : Weighing Anchor 8 : Transiting 9 : Overtaking 10 : Reporting 11 : Working Cargo	(S) CL	0, 1

		12 : Landing 13 : Diving 14 : Fishing 15 : Discharging Overboard 16 : Passing		
Headline			(S) TE	0, * (ordered)
Graphic			C	0, *
Pictorial Representation	(PICREP)		(S) TE	1, *
Picture Caption			(S) TE	0, 1
Source Date	(SORDAT)		(S) DA	0, 1
Picture Information			(S) TE	0, 1
Bearing Information			(S) C	0, 1
Cardinal Direction		1 : North 2 : North Northeast 3 : Northeast 4 : East Northeast 5 : East 6 : East Southeast 7 : Southeast 8 : South Southeast 9 : South 10 : South Southwest 11 : Southwest 12 : West Southwest 13 : West 14 : West Northwest 15 : Northwest 16 : North Northwest	(S) EN	0, 1
Distance			(S) RE	0, 1
Sector Bearing	(SECTR1) (SECTR2)		(S) RE	0, 2 (ordered)
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1

Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Orientation			(S) C	0, 1
Orientation Uncertainty			(S) RE	0, 1
Orientation Value	(ORIENT)		(S) RE	1, 1
Source			TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data	EN	0, 1
Reported Date	(SORDAT)		TD	0, 1
Text Content			C	0, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM)		(S) TE	0, 1

	(NINFOM)			
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data	(S) EN	0, 1
Reported Date	(SORDAT)		(S) TD	0, 1
INT 1 Reference: --				

5.2.1 General

Where a complex attribute has all its sub-attributes optional (e.g., multiplicity 0..1 or 0..*), at least one of the sub-attributes must be populated.

The *AdditionalInformation* association to a **NauticalInfomation** object can be used to attach an additional chunk of information to a feature, and there is no applicable specific information type or association. This should be used sparingly if at all.

The *PermissionType* association is used to encode permission information (e.g., whether use or entry is prohibited, etc) for vessels with different characteristics, if such permissions or requirements exist for a feature.

The *AssociatedRxN* association allows (mostly) textual information pertaining to regulations, etc., to be associated to features.

Remarks:

- The complex attribute *rxNCode* when bound to a feature allows features to be tagged with keywords that make it easier for software queries to search for features relevant to particular subjects or to particular kinds of vessel operations. See clause 9.1 for guidance on encoding values of *rxNCode* sub-attributes.
- Regulations, recommendations, restrictions, or general nautical information must be encoded in the appropriate associated information type (see clauses 9.3 and 10). The ability to encode *rxNCode* and *textContent* as attributes of features must not be used to avoid encoding instances of **Regulations**, **Restrictions**, **Recommendations**, or **NauticalInformation,** because encoding the same type of information using different methods or different structures in the same dataset or data product makes it more difficult for the mariner to find information.
- When encoding text information in the complex attribute *textContent*, it is not necessary to encode the entire content in a single instance of the *information* sub-attribute. Instead, the information should be organized so that each instance of *information* deals with a distinct topic or sub-topic, each with an appropriate heading in the *headline* attribute. This will make it easier for readers to find a topic. Part, chapter, section and sub-section headings in the source material may be used in either verbatim or condensed form, ordered according to the hierarchy in the source.
- Multiple instances of *textContent* should be used when the encoded material bears different relationships to the source (abstract/extract vs. summary vs. full text).
- Multiple instances of *textContent* may be used to distinguish information available purely as an external reference (in the *onlineResource* sub-attribute) from information encoded within the dataset (in the *information.text* sub-attribute or in a support file).
- In general, encoders may use the multiplicities of *textContent* and its sub-attributes to organize textual information so as to facilitate structuring text by topic, avoid flooding end-user screens with large blocks of unorganized text, and improve its accessibility to the mariner.

Distinction:

Feature/Information associations		
Type	**Association Name**	**Association Ends**

		Class	Role	Mult	Class	Role	Mult
association	Permission Type				**Applicability**	permission	0,*
association	Associated RxN				**AbstractRxN**	theRxN	0,*
association	Additional Information				**NauticalInformation**	providesInformation	0,*
association	Text Association	**FeatureType**	identifies	0,*	**TextPlacement**	positions	0,1

5.3 Organization Contact Area

IHO Definition: A feature often associated with contact information for an organization that exercises a management role or offers a service in the location.
S-10x Geo Feature: OrganizationContactArea
Super Type: FeatureType (5.2)
Sub-Types: SupervisedArea (5.4)
Primitives: noGeometry

Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-10x Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity

INT 1 Reference: --

5.3.1 General

If it is necessary to encode contact information related to a particular feature, without encoding information about a supervising or controlling authority, it should be done using an associated **ContactDetails** information type. This can be used when

- information about the supervising authority is unavailable, or,
- when the contact information pertains to a particular feature, but not to all features supervised by the authority. For example, if contact details for different terminals are different though they are operated by the same operator, the *ServiceContact* association can be used to link particular contact information to particular terminal features.

Remarks:

- Adds the *ServiceContact* association to **ContactDetails** for any sub-feature class.

Distinction:

Feature/Information associations

Type	Association Name	Association Ends					
		Class	Role	Mult	Class	Role	Mult
association	Service Contact				**ContactDetails**	theContactDetails	0,*

5.4 Supervised Area

IHO Definition: A location which may be supervised by a responsible or controlling authority.
S-10x Geo Feature: Supervised Area
Super Type: OrganizationContactArea (5.3)
Sub-Types: HarbourPhysicalInfrastructure (5.5), Layout (5.6)
Primitives: noGeometry

Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-10x Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity

INT 1 Reference: --

5.4.1 General

If it is necessary to encode information a controlling authority or organization for a particular location, it should be done using an associated **Authority** information type. Contact details for the organization should be encoded in a **ContactDetails** associated to the **Authority**.

For example, information about terminal operators may be encoded in an **Authority** information type associated to the feature via a *ServiceControl* association. The Harbourmaster's office should be encoded as an **Authority** associated to the whole port area, represented by a **HarbourAreaAdministrative** feature

Remarks:

- Adds the *ServiceControl* association to **Authority** for any sub feature class.

Distinction:

Feature/Information associations

Type	Association Name	Association Ends					
		Class	Role	Mult	Class	Role	Mult
association	Service Control				**Authority**	controlAuthority	0,1

5.5 Harbour Physical Infrastructure

IHO Definition: The physical installations and facilities that support operations in a port or harbour.
S-10x Geo Feature: Harbour Physical Infrastructure
Super Type: SupervisedArea (5.4)
Sub-Types: DryDock (7.2), FloatingDock (7.3), Gridiron (7.4), HarbourFacility (7.5)
Primitives: point, surface

Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-10x Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
Vertical Clearance Value	(VERCLR) (VERCCL) (VERCOP) (VERCSA)		RE	0, 1

INT 1 Reference: --

5.5.1 General

This feature type is the immediate supertype for all physical infrastructure features and defines a single optional attribute for the clearance value.

The *Infrastructure* association to the Terminal feature type is intended for encoding the infrastructure (represented by the sub-types of **HarbourPhysicalInfrastructure**) available in a **Terminal**. For example, if it is necessary to indicate that a particular terminal has dry dock facilities, it should be done by encoding a **DryDock** feature and associating it to the **Terminal** feature by the *Infrastructure* association.

Remarks:

Distinction:

Feature/Information associations

Type	Association Name	Association Ends					
		Class	Role	Mult	Class	Role	Mult
association	Infrastructure	**HarbourPhysicalInfrastructure**	hasInfrastructure	0, *	**Terminal**	infrastructure Location	0,1

5.6 Layout

IHO Definition: The spatial arrangement of areas and other types of locations that are designated for specified purposes or otherwise distinguished from other areas and locations.

S-10x Geo Feature: Layout

Super Type: SupervisedArea (5.4)

Sub-Types: AnchorageArea (6.3), AnchorBerth (6.2), Berth (6.4), BerthPosition (6.5), DockArea (6.6), DumpingGround (6.7), HarbourAreaAdministrative (6.8), HarbourAreaSection (6.9), HarbourBasin (6.10), MooringWarpingFacility (6.11), OuterLimit (6.12), PilotBoardingPlace (6.13), SeaplaneLandingArea (6.14), Terminal (6.15), TurningBasin (6.16), WaterwayArea (6.17)

Primitives: noGeometry

Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-10x Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity

INT 1 Reference: --

5.6.1 General

Layout features describe the layout of the harbour area. The **Layout** abstract type serves as the supertype for all the layout features in S-131.

Remarks:

Distinction:

6 Harbour Layout

6.1 Introduction

Layout features describe the layout of the harbour area. They include terminals, mooring facilities, special areas within the harbour, berths, designation of the positioning of specific berths along a wharf or quay, dock areas, and a **HarbourAreaSection** feature for subdividing harbour areas into sub-sections.

Note that the current model includes some features which would ideally be merged into "categoryOfPortSection" attributes of other features, due to GI Registry conceptual limitations on re-use of concepts.

Port sections in S-131 include both water and land sections.

The most common water sections in ports are:

- Anchorage: An area in which vessels anchor or may anchor (NP100)
- Fairway: The main navigable channel in the approaches to, or within, a river or harbour. Sometimes called the Ship Channel (NP100)
- Turning basin: An area of water or enlargement of a channel in a port, where vessels are enabled to turn, and which is kept clear of obstructions such as buoys for that purpose (NP100)
- Basin: A sheltered body of water available for port operations connecting either with the sea, with an outer port or with another basin. Generally an almost land locked area leading off an in inlet, firth or sound. Also, an area of water limited in extent and nearly enclosed by structures alongside which vessels can lie (IHO S-32)
- Berth Pocket: Body of water at the berth or anchor berth with sufficient footprint to allow the vessel to make fast to the shore or mooring buoys or to anchor (NP100).

Land or mixed land/water sections include:

- Terminals: A number of berths grouped together and provided with facilities for handling cargo (IHO S-32)
- Berths, quays, wharfs, and mooring facilities: Places where vessels may make fast for the purpose of loading or unloading cargo, embarking or disembarking passengers, etc.
- Service locations: Dock areas, locations for removal of pollutants, fueling, repairs, etc.

Different sections may be under the immediate control of different organizations or served by different operators. Terminal facilities are often owned and/or operated by private companies. The overall harbour area is therefore generally divisible into different sections, each of which may be further divided into sub-sections or contain specific types or areas or facilities.

Figure 6.1 depicts the logical hierarchy of layout feature types in S-131, showing what attributes are bound to each type along with their supertypes, from which they inherit attributes and associations.

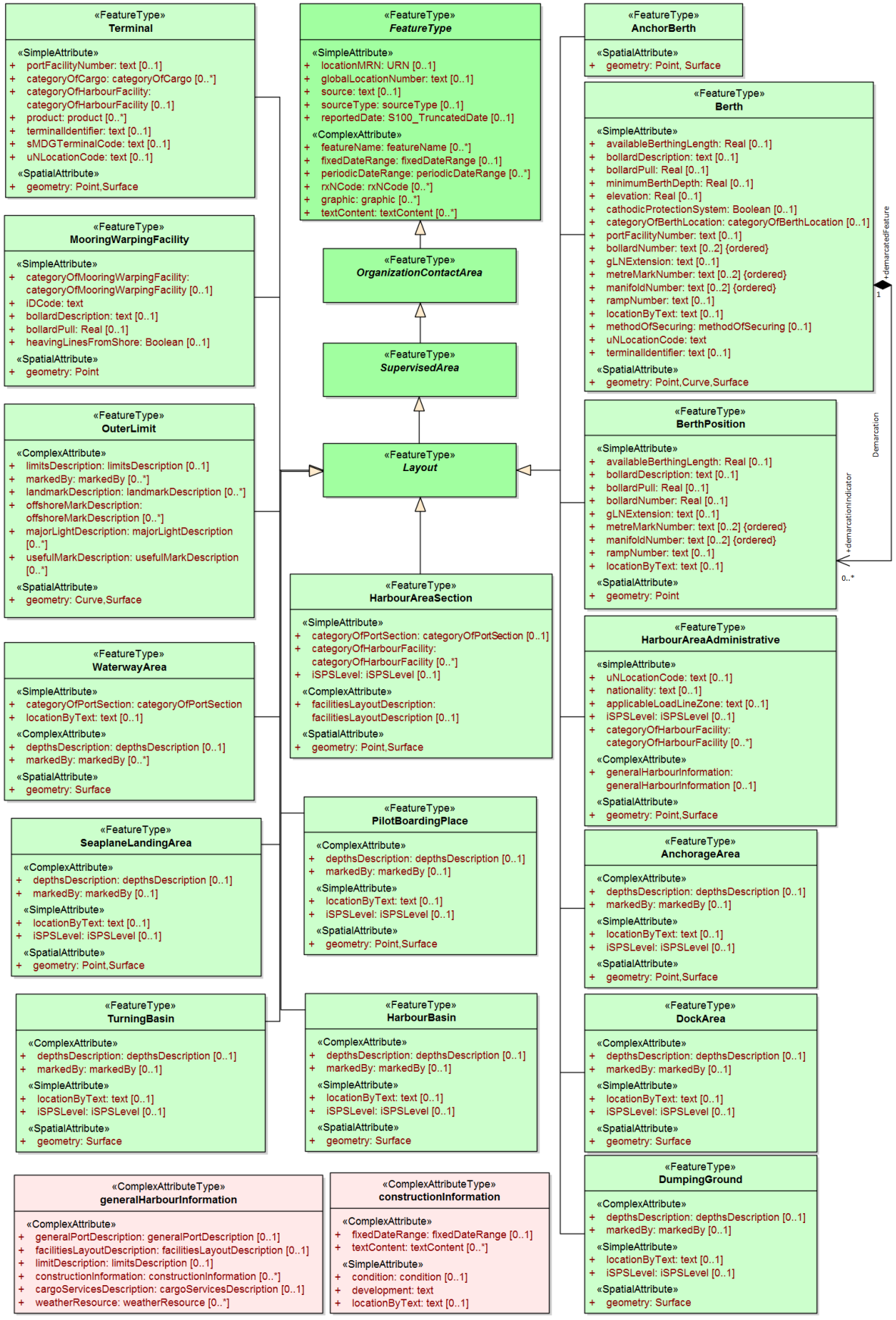

Figure 6.1 - Layout features and attributes

6.1.1 Layout container associations

Figure 6.2 depicts the containment (spatial) hierarchy, with containment relationships between layout feature types indicating which features are spatially contained within and part of a larger feature.

HarbourAreaAdministrative is the main feature that covers the whole port area. It is subdivided into zero or more sections modelled by **HarbourAreaSection** features (the **LayoutDivision**) aggregation. **HarbourAreaSection** can be further subdivided into **WaterwayArea**, **Terminal**, **Berth**, **AnchorageArea**, **DockArea**, etc. The **Terminal** feature can also be subdivided into **Berth** features using the same association.

HarbourAreaSection can also be subdivided into further features of the same class (the **SubUnit** self-association role).

Note that **HarbourAreaSection** features can contain other **HarbourAreaSection** features. Note also that a **Terminal** can contain any number of **Berth** features.

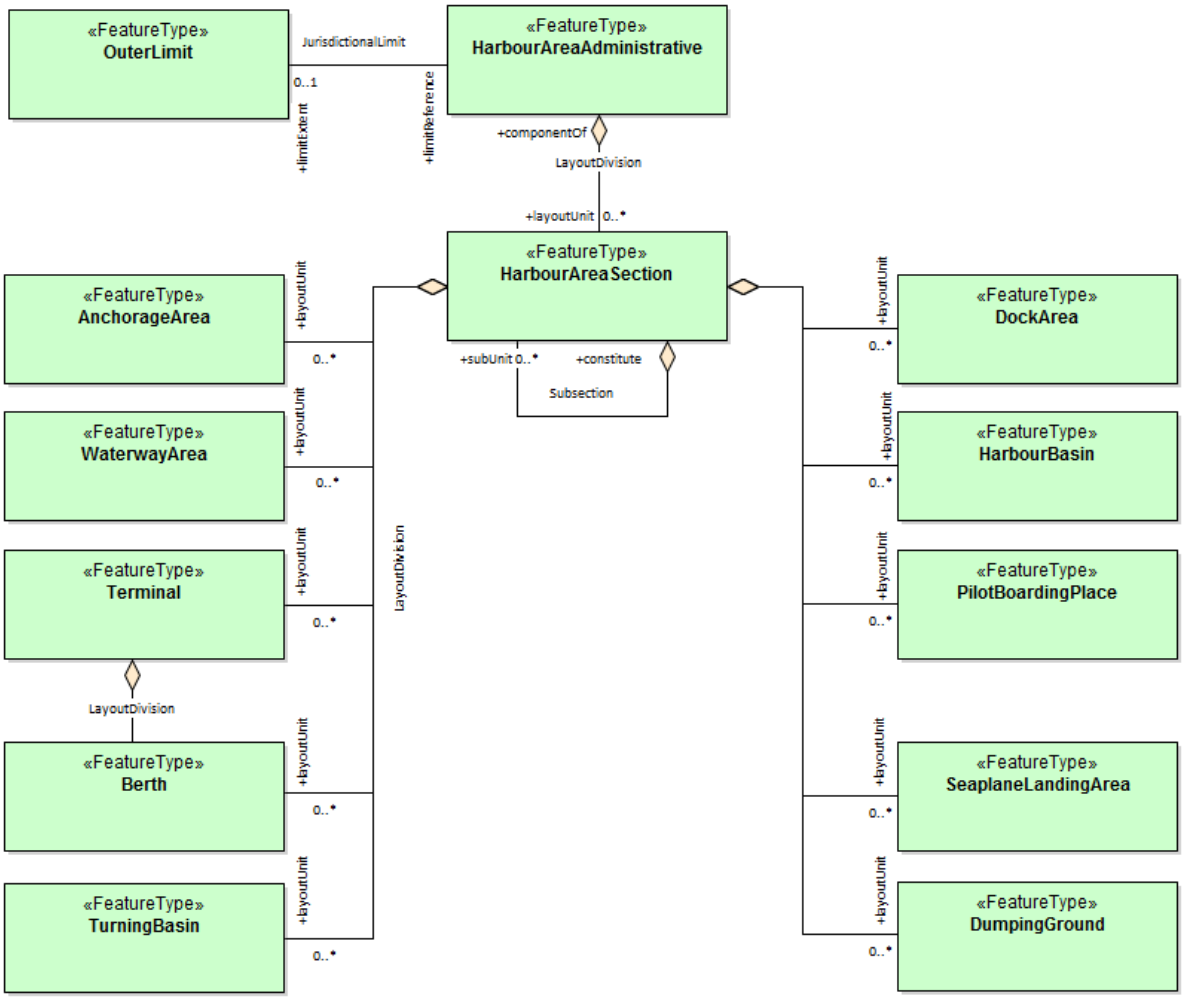

Figure 6.2 - Containment hierarchy of layout features

6.1.2 Positioning in berths

Positions in a berth can be indicated by means of the **BerthPosition** feature. Mooring facilities for anchor berths or at particular positions can be linked with either **AnchorBerth** or **BerthPosition** features with the *PrimaryAuxiliaryFacility* association. These relationships are depicted in Figure 6.3.

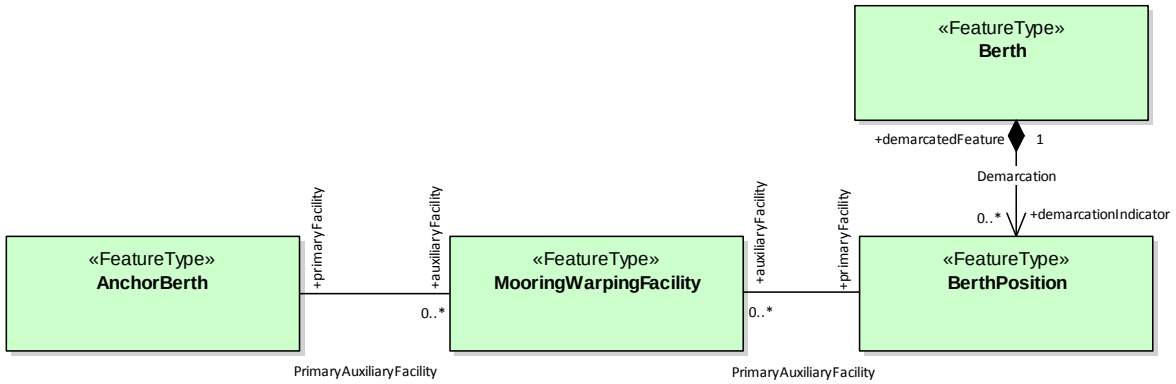

Figure 6.3 - Positions within berths and mooring facilities

6.1.3 Associations for layout features

Figure 6.4 depicts all associations between layout features.

Nominal positions of berths can be indicated by associating a **BerthPosition** feature to **Berth** using the **Demarcation** association.

Berth positions and Anchor berths can be linked to a mooring facility using the **PrimaryAuxiliaryFacility** association.

The outer limit of the whole harbour area can be associated to **HarbourAreaAdministrative** feature using a **JurisdictionalLimit** association.

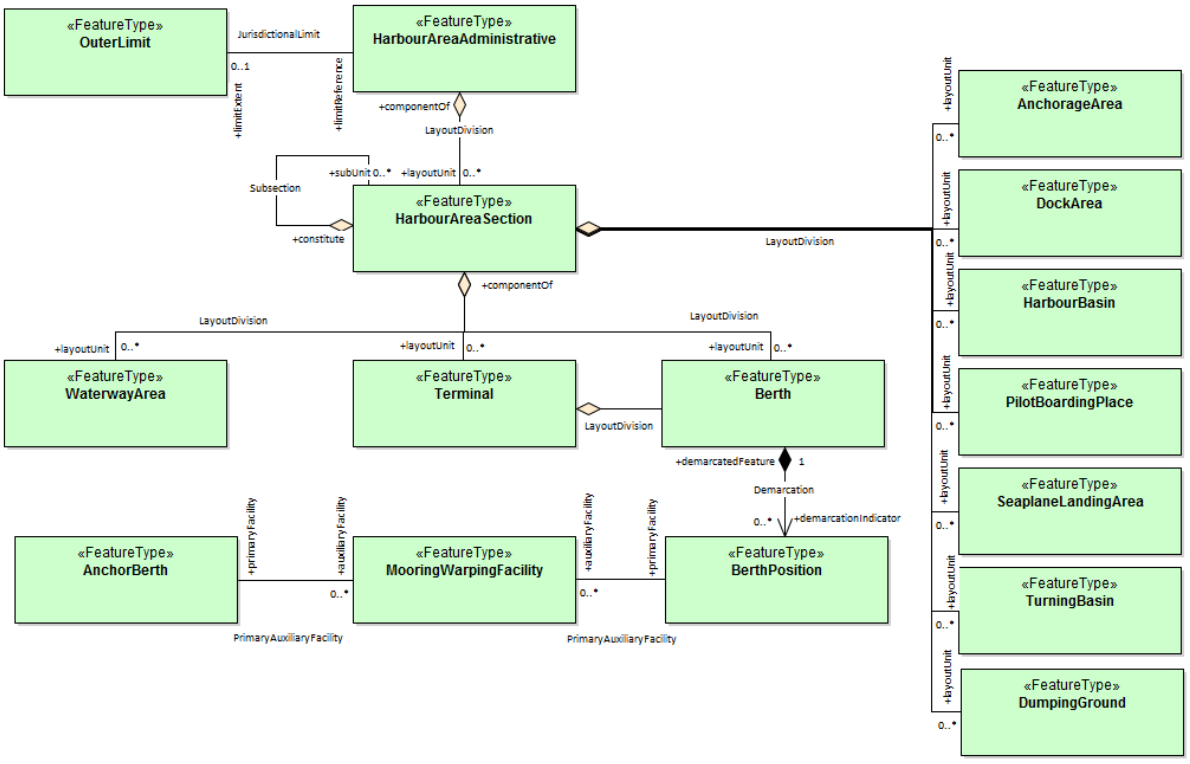

Figure 6.4 - Feature associations for non-abstract layout features

6.1.4 Associations between layout and physical infrastructure features

Physical infrastructure features in a Terminal or **HarbourAreaSection** feature should be linked to a containing **Terminal** or **HarbourAreaSection** by an **Infrastructure** association (Figure 6.5). If there is an hierarchy of features containing the infrastructure only the feature at the lowest level of the hierarchy should be linked to the infrastructure feature.

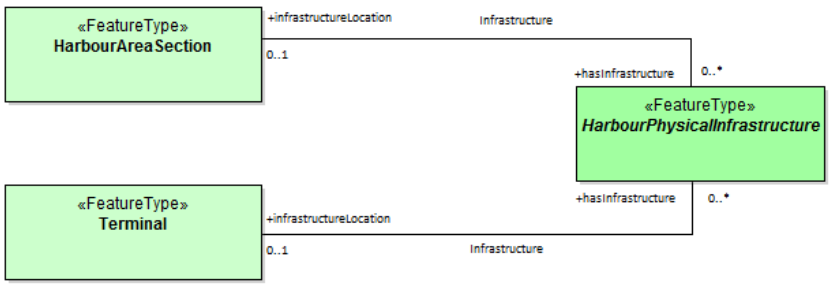

Figure 6.5 - Feature association for infrastructure

6.1.5 Inheritance of *TextAssociation* by all layout and physical infrastructure features

In addition, all layout and physical infrastructure features inherit a *TextAssociation* to the cartographic feature **TextPlacement** (Figure 6.6).

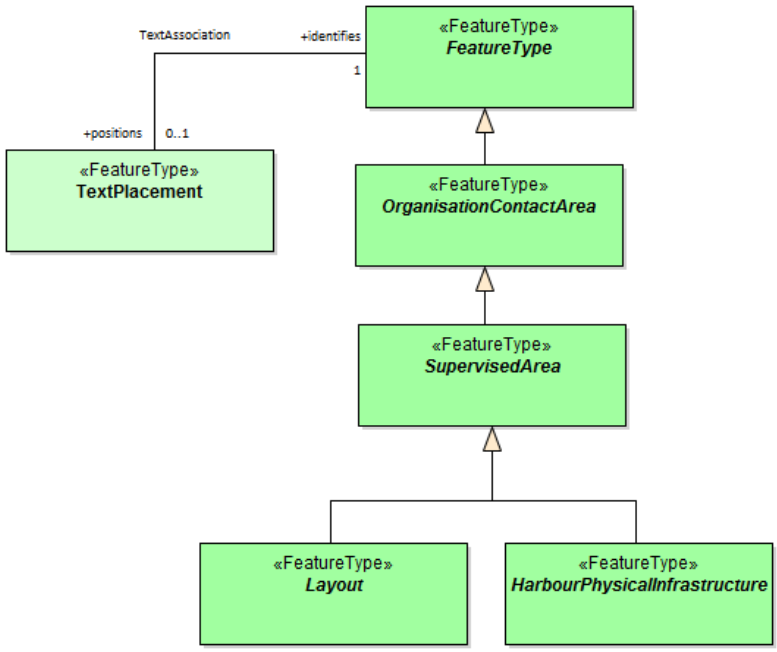

Figure 6.6 - Inherited TextAssociation

6.2 Anchor Berth

IHO Definition: A designated area of water where a vessel, sea plane, etc., may anchor.
S-10x Geo Feature: Anchor Berth (ACHBRT)
Super Type: Layout (5.6)

Primitives: point, surface				
Real World	*Paper Chart Symbol*		*ECDIS Symbol*	
S-10x Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**

INT 1 Reference: --

6.2.1 General

The **AnchorBerth** feature in S-131 omits several of the attributes of the S-101 equivalent.

The positions or limits of anchor berths may be defined by a regulatory authority (for example harbour authority).

6.2.2 Anchor berths with limitations or restrictions on their use

If it is required to encode an anchorage with conditions on its use related to the characteristics of a vessel or its cargo, it must be done using an associated **Applicability** information type.

If it is required to encode an anchorage with other types of limitations on its use (not pertaining to vessel or cargo characteristics), for example an anchorage which may be used for a limited period of time, it must be done using an associated **Restrictions** information type. The specific limitation must be encoded in one or more attributes of the Restrictions object.

Remarks:

- The inherited complex attribute *featureName*, sub-attribute *name* is used to encode the name and/or number of the anchor berth.
- Unlike S-101, S-131 does not include Sea Area/Named Water Area feature types, so the name of a group of anchor berths known by a single common name, must be encoded in each **AnchorBerth**.
- If an anchor berth is defined by a centre point and a swinging circle, it should be encoded as a point in S-131 since the radius attribute of S-101 is not included in S-131. The radius must be encoded in the *textContent* complex attribute with the headline “Swinging Circle”

Distinction: AnchorageArea; Berth; MooringWarpingFacility

Feature/Information associations

Type	**Association Name**	**Association Ends**					
		Class	**Role**	**Mult**	**Class**	**Role**	**Mult**
association	Service Availability				**AvailablePortServices**	serviceDescriptionReference	0,1
association	Location Hours				**ServiceHours**	location_srvHrs	0,1

association	Primary/Auxiliary Facility	**AnchorBerth**	primaryFacility	0,1	**MooringWarpingFacility**	auxiliaryFacility	0,*

6.3 Anchorage Area

IHO Definition: An area in which vessels or seaplanes anchor or may anchor.		
S-10x Geo Feature: Anchorage Area (ACHARE)		
Super Type: Layout (5.6)		
Primitives: point, surface		
Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-10x Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
Depths Description			C	0, 1
Category of Depths Description		1 : Shoal 2 : General Depth 3 : Controlling Depth	(S) EN	1, 1
Text Content			(S) C	1, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1

Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data	(S) EN	0, 1
Reported Date	(SORDAT)		(S) TD	0, 1
Location by Text			TE	0, 1
Marked By			C	0, 1
Text Content			(S) C	1, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *

File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports	(S) EN	0, 1

		10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data		
Reported Date	(SORDAT)		(S) TD	0, 1
ISPS Level		1 : ISPS Level 1 2 : ISPS Level 2 3 : ISPS Level 3	EN	0, 1

INT 1 Reference: (see S-4 – B-431.1; B-431.3 and B-431.7)

6.3.1 General

The **AnchorageArea** feature in S-131 omits several of the attributes of the S-101 equivalent.

The complex attribute *featureName*, sub-attribute *name* is used to encode the name and/or number of the Anchorage Area.

The complex attribute *textContent* may be used to provide information about the category of anchorage, where required.

Individual recommended anchorages without defined limits should be encoded as **AnchorageArea** features with *point* spatial primitives.

Areas with numerous small craft moorings may be encoded as **AnchorageArea** features of type surface.

6.3.2 Regulations, depth information, and general textual information

General port regulations about anchorage areas in the port area may be encoded in an associated **Regulations** information type.

The complex attribute *depthsDescription* must be used for encoding information about the depth of the anchorage, including for example the nature of the seabed, shoaling, etc.

Other general textual information may be encoded in an associated **NauticalInformation** information type, if pertaining to more than one feature, or in the *textContent* attribute, if pertinent to a particular anchorage.

6.3.3 Anchorages with limitations or restrictions on their use

If it is required to encode an anchorage with conditions on its use related to the characteristics of a vessel or its cargo, it must be done using an associated **Applicability** information type.

If it is required to encode an anchorage with other types of limitations on its use (not pertaining to vessel or cargo characteristics), for example an anchorage which may be used for a limited period of time, it must be done using an associated **Restrictions** information type. The specific limitation must be encoded in one or more attributes of the Restrictions object.

Remarks:

- The attribute *markedBy* should be used to describe aids to navigation used to demarcate the location, for example, by marking a limit line, or one of the boundaries of an area.

Distinction:

Feature/Information associations							
Type	**Association Name**	**Association Ends**					
		Class	**Role**	**Mult**	**Class**	**Role**	**Mult**
association	Location Hours				**ServiceHours**	location_srvHrs	0,1
aggregation	Layout Division	**AnchorageArea**	layoutUnit	0,*	**HarbourAreaSection**	componentOf	1,1

6.4 Berth

IHO Definition: Place in which a ship is moored at wharf.		
S-10x Geo Feature: Berth (BERTHS)		
Super Type: Layout (5.6)		
Primitives: point, curve, surface		
Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-10x Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
Available Berthing Length			RE	0, 1
Bollard Description			TE	0, 1
Bollard Pull			RE	0, 1
Minimum Berth Depth			RE	0, 1
Elevation	(ELEVAT)		RE	0, 1
Cathodic Protection System			BO	0, 1
Category of Berth Location		1 : Wharf Reference Metre Mark 2 : Wharf Reference Position 3 : Pier (Jetty) 4 : Conventional Mooring	EN	0, 1
Port Facility Number			TE	0, 1
Bollard Number			TE	0, 2 (ordered)
GLN Extension			TE	0, 1
Metre Mark Number			TE	0, 2 (ordered)
Manifold Number			TE	0, 2 (ordered)
Ramp Number			TE	0, 1
Location by Text			TE	0, 1
Method of Securing		1 : Bow to Seaward 2 : Stern to Seaward 3 : Mediterranean Mooring 4 : Baltic Mooring 5 : Running Mooring	EN	0, 1

		6 : Standing Mooring 7 : Single Point Mooring 8 : Conventional Mooring 9 : Ship-to-Ship Mooring 10 : Spider Buoy Mooring		
UN Location Code			TE	1, 1
Terminal Identifier			TE	0, 1

INT 1 Reference: --

6.4.1 General

The berth encodes the named place where a vessel can be moored adjacent to a shoreline construction.

Remarks:

The complex attribute *featureName* is used to encode the name or number of the berth.

Population of more than one of the attributes bollard number, metre mark number, manifold number, and ramp number is allowed but should be reviewed to ensure that it reflects the reality of what is used at the berth.

Distinction: AnchorBerth; DockArea; MooringWarpingFacility

Feature/Information associations

Type	**Association Name**	**Association Ends**					
		Class	**Role**	**Mult**	**Class**	**Role**	**Mult**
association	Service Availability				**AvailablePortServices**	serviceDescriptionReference	0,1
association	Location Hours				**ServiceHours**	location_srvHrs	0,1
association	Demarcation	**Berth**	demarcatedFeature	1,1	**BerthPosition**	demarcationIndicator	0,*
association	Layout Division	**Berth**	layoutUnit	0,*	**HarbourAreaSection, Terminal**	componentOf	1,1

6.5 Berth Position

IHO Definition: A specific position within a berth where a vessel may be moored or anchored.

S-10x Geo Feature: Berth Position

Super Type: Layout (5.6)

Primitives: point

Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-10x Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
Available Berthing Length			RE	0, 1
Bollard Description			TE	0, 1
Bollard Pull			RE	0, 1
Bollard Number			TE	0, 2 (ordered)
GLN Extension			TE	0, 1
Metre Mark Number			TE	0, 2 (ordered)
Manifold Number			TE	0, 2 (ordered)
Ramp Number			TE	0, 1
Location by Text			TE	0, 1

INT 1 Reference: --

6.5.1 General

The **BerthPosition** feature is used to designate a position along a line of a **Berth**.

Remarks:

Population of more than one of the attributes bollard number, metre mark number, manifold number, and ramp number is allowed but should be reviewed to ensure that it reflects the reality of what is used at the berth position.

Distinction:

Feature/Information associations

Type		Association Ends

	Association Name	**Class**	**Role**	**Mult**	**Class**	**Role**	**Mult**
composition	Demarcation	**BerthPosition**	demarcationIndicator	0,*	**Berth**	demarcatedFeature	1,1
association	Primary/Auxiliary Facility	**BerthPosition**	primaryFacility	0,1	**MooringWarpingFacility**	auxiliaryFacility	0,*

6.6 Dock Area

IHO Definition: An artificially enclosed area within which ships may moor and which may have gates to regulate water level.				
S-10x Geo Feature: Dock Area (DOCARE)				
Super Type: Layout (5.6)				
Primitives: surface				
Real World	*Paper Chart Symbol*		*ECDIS Symbol*	
S-10x Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Depths Description			C	0, 1
Category of Depths Description		1 : Shoal 2 : General Depth 3 : Controlling Depth	(S) EN	1, 1
Text Content			(S) C	1, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1

Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data	(S) EN	0, 1
Reported Date	(SORDAT)		(S) TD	0, 1
Location by Text			TE	0, 1
Marked By			C	0, 1
Text Content			(S) C	1, *
Category of text		1 : Abstract or Summary	(S) EN	0, 1

		2 : Extract 3 : Full Text		
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed	(S) EN	0, 1

		8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data		
Reported Date	(SORDAT)		(S) TD	0, 1
ISPS Level		1 : ISPS Level 1 2 : ISPS Level 2 3 : ISPS Level 3	EN	0, 1

INT 1 Reference: --

6.6.1 General

Dock areas in S-101 ENCs that are not navigable at the maximum display scale of the ENC data, are encoded in S-101 ENCs using the S-101 feature Dock Area. Except for Gate, the boundaries of the dock are not encoded as separate features.

Dock areas in S-101 ENCs that are navigable may be encoded as the S-101 features Depth Area, Dredged Area or Unsurveyed Area (see the S-101 DCEG), with the geo features making up the dock limits encoded using appropriate features such as Coastline, Shoreline Construction or Gate.

S-131 datasets may encode both types of S-101 ENC dock features according to their primary use as a dock areas, using the S-131 feature type **DockArea**. The *depthsDescription* attribute must be used for textual descriptions of the depths in the area.

If an encoded Dock Area has a date dependency, this should be indicated using the complex attributes *fixedDateRange* or *periodicDateRange*.

• The complex attribute horizontal clearance fixed is used to encode the size of the entrance to the dock area, where required. This attribute is not included in S-131 Edition 1.0, but should be in the underlying ENC. If not, it may be encoded as text information in a *textContent* attribute.

• The attributes horizontal clearance length and horizontal clearance width are used to encode the regulatory length and width of the navigable part of the dock area as declared by a competent authority, where known. This attribute is not included in S-131 Edition 1.0, but should be in the underlying ENC. If not, it may be encoded as text information in a *textContent* attribute.

• S-101 guidance is that “[in] a non-tidal basin (wet dock), depths may refer to a sounding datum different from that in open waters. If this area is navigable at the maximum display scale of the ENC data, the value of this datum must be encoded using the meta feature Sounding Datum, with attribute vertical datum = 24 (local datum), co- incident with the area covered by the dock.” For S-131, depths must be converted to the single sounding datum meta-feature and a note regarding the conversion must be included in the *depthsDescription* complex attribute.

Remarks:

- The attribute *markedBy* should be used to describe aids to navigation used to demarcate the location, for example, by marking a limit line, or one of the boundaries of an area.

Distinction:

Feature/Information associations

Type	Association Name	Association Ends					
		Class	Role	Mult	Class	Role	Mult
association	Service Availability				**AvailablePortServices**	serviceDescriptionReference	0,1
association	Location Hours				**ServiceHours**	location_srvHrs	0,1
aggregation	Layout Division	**DockArea**	layoutUnit	0,*	**HarbourAreaSection**	componentOf	1,1

6.7 Dumping Ground

IHO Definition: A sea area where dredged material or other potentially more harmful material, for example explosives, chemical waste, is deliberately deposited.				
S-10x Geo Feature: Dumping Ground (DMPGRD)				
Super Type: Layout (5.6)				
Primitives: surface, point				
Real World	*Paper Chart Symbol*		*ECDIS Symbol*	
S-10x Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Depths Description			C	0, 1
Category of Depths Description		1 : Shoal 2 : General Depth 3 : Controlling Depth	(S) EN	1, 1
Text Content			(S) C	1, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1

Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data	(S) EN	0, 1
Reported Date	(SORDAT)		(S) TD	0, 1
Location by Text			TE	0, 1
Marked By			C	0, 1
Text Content			(S) C	1, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *
File Locator			(S) TE	0, 1

File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs	(S) EN	0, 1

		12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data		
Reported Date	(SORDAT)		(S) TD	0, 1
ISPS Level		1 : ISPS Level 1 2 : ISPS Level 2 3 : ISPS Level 3	EN	0, 1

INT 1 Reference: --

6.7.1 General

(Reserved)

Remarks:

- The attribute *markedBy* should be used to describe aids to navigation used to demarcate the location, for example, by marking a limit line, or one of the boundaries of an area.

Distinction:

Feature/Information associations

Type	Association Name	Association Ends					
		Class	Role	Mult	Class	Role	Mult
association	Location Hours				**ServiceHours**	location_srvHrs	0,1
aggregation	Layout Division	**DumpingGround**	layoutUnit	0,*	**HarbourBasin**	componentOf	1,1

6.8 Harbour Area (Administrative)

IHO Definition: The area over which a harbour authority has jurisdiction.				
S-10x Geo Feature: Harbour Area (Administrative) (HRBARE)				
Super Type: Layout (5.6)				
Primitives: point, surface				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-10x Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
UN Location Code			TE	0, 1
Nationality	(NATION)		TE	0, 1
Applicable Load Line Zone			TE	0, 1
ISPS Level		1 : ISPS Level 1 2 : ISPS Level 2 3 : ISPS Level 3	EN	0, 1
Category of Harbour Facility	(CATHAF)	1 : RoRo Terminal 3 : Ferry Terminal 4 : Fishing Harbour 5 : Yacht Harbour/Marina 6 : Naval Base 7 : Tanker Terminal 8 : Passenger Terminal 9 : Shipyard 10 : Container Terminal 11 : Bulk Terminal 12 : Ship Lift 13 : Straddle Carrier 14 : Service Harbour 15 : Pilotage Service	EN	0, *
General Harbour Information			C	0, 1
General Port Description			(S) C	0, 1
Text Content			(S) C	1, *

Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication	(S) EN	0, 1

		7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data		
Reported Date	(SORDAT)		(S) TD	0, 1
Facilities Layout Description			(S) C	0, 1
Text Content			(S) C	1, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download	(S) EN	0, 1

		3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access		
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data	(S) EN	0, 1
Reported Date	(SORDAT)		(S) TD	0, 1
Limits Description			(S) C	0, 1
Text Content			(S) C	1, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)

Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media	(S) EN	0, 1

		14 : Traffic Data		
Reported Date	(SORDAT)		(S) TD	0, 1
Construction Information			(S) C	0, 1
Fixed date range			(S) C	0, 1
Date Start	(DATSTA)		(S) TD	0, 1
Date End	(DATEND)		(S) TD	0, 1
Condition	(CONDTN)	1 : Under Construction 2 : Ruined 3 : Under Reclamation 5 : Planned Construction	(S) EN	0, 1
Development			(S) TE	1, 1
Location by Text			(S) TE	0, 1
Text Content			(S) C	0, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1

Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data	(S) EN	0, 1
Reported Date	(SORDAT)		(S) TD	0, 1
Cargo Services Description			(S) C	0, 1
Text Content			(S) C	1, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1

Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs	(S) EN	0, 1

		12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data		
Reported Date	(SORDAT)		(S) TD	0, 1
Weather Resource			(S) C	0, *
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Dynamic Resource		1 : Static 2 : Mandatory External Dynamic 3 : Optional External Dynamic 4 : Onboard Dynamic	(S) EN	0, 1
Text Content			(S) C	0, 1
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *

File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports	(S) EN	0, 1

		10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data		
Reported Date	(SORDAT)		(S) TD	0, 1

INT 1 Reference: --

6.8.1 General

The **HarbourAreaAdministrative** feature is used for encoding the location and extent of individual ports or harbours.

A **HarbourAreaAdministrative** feature may be subdivided into **HarbourAreaSection** features to represent subdivisions of the harbour or port area (see clause 6.9.1), but should be so subdivided only if the source material includes such subdivisions, or if it is necessary to distinguish portions of the harbour or port area (for example, if different sections have different names or designations for administrative jurisdiction purposes).

If other layout features (such as **Terminal**, **Berth**, etc., but excepting **OuterLimit** - see Figure 6.2) are to be encoded, at least one **HarbourAreaSection** feature must be added to contain these features.

Remarks:

- Services for import and export cargoes should be described in separate instances of *cargoServicesDescription.textContent*. When this is done, the *headline* sub-attribute of *textContent* should indicate whether the *textContent* instance pertains to import or export cargoes.
- In the complex attribute *constructionInformation*, the *textContent* sub-atttribute is used for encoding a textual and/or graphical description of the development. The mandatory *development* sub-attribute is used for encoding a brief description of the type of development.
- In the complex attribute *weatherResource*, at least one of *onlineResource* or *textContent* must be populated. If *onlineResource* is populated *dynamicResource* must be populated. If the information is to be obtained from an external source, the external source must be indicated in *onlineResource*,
- Links to online resources for weather information should be provided in complex attribute *weatherResource* and not in a linked **ContactDetails** information type.
- Note also that *weatherResource* binds the generic textual attribute *textContent* and therefore information about accessing the online weather resource which cannot be encoded in other sub-attributes of *weatherResource* should be provided in that *textContent* attribute instead of creating a separate **ContactDetails** object.
- The attributes *categoryOfHarbourFacility* and *generalHarbourInformation* should be populated so that together they provide a complete overview of port/harbour type and function. For example, if a large commercial harbour area includes a marina in its jurisdiction, *categoryOfHarbourFacility* should include the listed value 5 (Yacht Harbour/Marina). However, it is not necessary to mention every single port service or facility in these attributes.
- There is no requirement for a dataset to contain only one **HarbourAreaAdministrative** feature, even if the dataset covers only one port.

Distinction:

Feature/Information associations							
Type	**Association Name**	**Association Ends**					
		Class	**Role**	**Mult**	**Class**	**Role**	**Mult**
association	Service Availability				**AvailablePortServices**	serviceDescriptionReference	0,1
association	Location Hours				**ServiceHours**	location_srvHrs	0,1
association	Jurisdictional Limit	**HarbourAreaAdministrative**	limitReference	1,1	**OuterLimit**	limitExtent	0,1
association	Layout Division	**HarbourAreaAdministrative**	componentOf	0,1	**HarbourAreaSection**	layoutUnit	0,*

6.9 Harbour Area Section

IHO Definition: A distinguishable portion of the area over which a harbour authority has jurisdiction.		
S-10x Geo Feature: Harbour Area Section		
Super Type: Layout (5.6)		
Primitives: point, surface		
Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-10x Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
Category of Port Section		1 : Port Fairway 3 : Berth Pocket 8 : Seaplane Anchorage 9 : Dredged Basin 11 : Port Safety Zone 12 : Lay-by Berth	EN	0, 1
Category of Harbour Facility	(CATHAF)	4 : Fishing Harbour 5 : Yacht Harbour/Marina 6 : Naval Base 9 : Shipyard 14 : Service Harbour 15 : Pilotage Service 16 : Service and Repair 17 : Quarantine Station	EN	0, *
ISPS Level		1 : ISPS Level 1 2 : ISPS Level 2 3 : ISPS Level 3	EN	0, 1
Facilities Layout Description			C	0, 1
Text Content			(S) C	1, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *
File Locator			(S) TE	0, 1

File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs	(S) EN	0, 1

		12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data		
Reported Date	(SORDAT)		(S) TD	0, 1

INT 1 Reference: --

6.9.1 General

HarbourAreaSection features must be used when it is necessary to represent subdivisions of a port or harbour area, or group harbour facilities under a common designation. A **HarbourAreaSection** feature may contain specialized features such as **Terminal**s, **Berth**s, etc., and/or smaller **HarbourAreaSection** features.

Since most specialized layout features such as **Terminal**s, **Berth**s, etc. are mandatorily associated to a **HarbourAreaSection** feature (see Figure 6.2), a **HarbourAreaSection** feature must be created to contain these features.

Remarks:

- If a **HarbourAreaSection** feature contains other **HarbourAreaSection** features (i.e., is associated to other **HarbourAreaSection** features via *subUnit* roles), the *categoryOfPortSection* and *categoryOfHarbourFacility* attributes on the containing feature must be either (a) the union or superset of the values of those attributes on its subdivisions, or (b) not encoded in the containing feature.
- A **HarbourAreaSection** feature may have both *subUnit* and *layoutUnit* roles, i.e., it may contain other **HarbourAreaSection** feature as well as specialized features such as **Terminal**, **Berth**, etc. Generally, a **HarbourAreaSection** will have both types of roles only when it contains subdivision **HarbourAreaSection**s that do not cover the whole spatial extent of the container.
- If there is a subdivision hierarchy of **HarbourAreaSection** features, specialized features (**Terminal**, **Berth**, etc.) or infrastructure features should be associated to the **HarbourAreaSection** feature at the lowest level possible (i.e., the lowest level that contains the entire specialized or infrastructure feature).
- There is no requirement for **HarbourAreaSection** features to cover the entire extent of a **HarbourAreaAdministrative** feature. For example, larger ports may have areas which are spatially within the harbour area (or adjacent to its navigable waters as legally defined) but which are not controlled by the port authority, for example naval bases or civic waterfronts.

Distinction:

Feature/Information associations

Type	Association Name	Association Ends					
		Class	Role	Mult	Class	Role	Mult

association	Service Availability				**AvailablePortServices**	serviceDescriptionReference	0,1
association	Location Hours				**ServiceHours**	location_srvHrs	0,1
aggregation	Layout Division	**HarbourAreaSection**	layoutUnit	0,*	**HarbourAreaAdministrative**	componentOf	0,1
aggregation	Subsection	**HarbourAreaSection**	subUnit	0,*	**HarbourAreaSection**	constitute	0,1
association	Subsection	**HarbourAreaSection**	constitute	0,1	**HarbourAreaSection**	subUnit	0,*
association	Layout Division	**HarbourAreaSection**	componentOf	1,1	**AnchorageArea, Berth, DockArea, DumpingGround, HarbourBasin, PilotBoardingPlace, SeaplaneLandingArea, Terminal, TurningBasin, WaterwayArea**	layoutUnit	0,*
association	Infrastructure	**HarbourAreaSection**	infratructureLocation	0,1	**HarbourPhysicalInfrastructure**	hasinfrastructure	0,*

6.10 Harbour Basin

IHO Definition: An enclosed area of water surrounded by quay walls constructed to provide means for the transfer of cargos from and to ships.		
S-10x Geo Feature: Harbour Basin		
Super Type: Layout (5.6)		
Primitives: surface		
Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-10x Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
Depths Description			C	0, 1
Category of Depths Description		1 : Shoal 2 : General Depth 3 : Controlling Depth	(S) EN	1, 1
Text Content			(S) C	1, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1

Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data	(S) EN	0, 1
Reported Date	(SORDAT)		(S) TD	0, 1
Location by Text			TE	0, 1
Marked By			C	0, 1
Text Content			(S) C	1, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *

File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs	(S) EN	0, 1

		12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data		
Reported Date	(SORDAT)		(S) TD	0, 1
ISPS Level		1 : ISPS Level 1 2 : ISPS Level 2 3 : ISPS Level 3	EN	0, 1

INT 1 Reference: --

6.10.1 General

This feature may be used in S-131 to encode basins not marked by quay walls or specifically designated for cargo transfer.

Remarks:

- The attribute *markedBy* should be used to describe aids to navigation used to demarcate the location, for example, by marking a limit line, or one of the boundaries of an area.

Distinction:

Feature/Information associations

Type	Association Name	Association Ends					
		Class	Role	Mult	Class	Role	Mult
association	Location Hours				**ServiceHours**	location_srvHrs	0,1
aggregation	Layout Division	**HarbourBasin**	layoutUnit	0,*	**HarbourAreaSection**	componentOf	1,1

6.11 Mooring/Warping Facility

IHO Definition: The equipment or structure used to secure a vessel.

S-10x Geo Feature: Mooring/Warping Facility (MORFAC)

Super Type: Layout (5.6)

Primitives: point

Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-10x Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
Category of Mooring/Warping Facility	(CATMOR)	1 : Dolphin 2 : Deviation Dolphin 3 : Bollard 4 : Tie-Up Wall 5 : Post or Pile 6 : Mooring Cable 7 : Mooring Buoy	EN	1, 1
ID Code			TE	1, 1
Bollard Description			TE	0, 1
Bollard Pull			RE	0, 1
Heaving Lines From Shore			BO	0, 1

INT 1 Reference: --

6.11.1 General

In S-131, only mooring/warping facilities that are in use are encoded as features.

The identifying number of the mooring/warping facility, if any, must be encoded in the *iDCode* attribute.

Remarks:

Distinction:

Feature/Information associations

Type		Association Ends

	Association Name	**Class**	**Role**	**Mult**	**Class**	**Role**	**Mult**
association	Service Availability				**AvailablePortServices**	serviceDescriptionReference	0,1
association	Location Hours				**ServiceHours**	location_srvHrs	0,1
association	Primary/Auxiliary Facility	**MooringWarpingFacility**	auxiliaryFacility	0,*	**BerthPosition**	primaryFacility	0,1

6.12 Outer Limit

IHO Definition: The extent to which a coastal State claims or may claim a specific jurisdiction in accordance with the provisions of International Law.				
S-10x Geo Feature: Outer Limit				
Super Type: Layout (5.6)				
Primitives: curve, surface				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-10x Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Limits Description			C	0, 1
Text Content			(S) C	1, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1

Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data	(S) EN	0, 1
Reported Date	(SORDAT)		(S) TD	0, 1
Marked By			C	0, *
Text Content			(S) C	1, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *
File Locator			(S) TE	0, 1

File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports	(S) EN	0, 1

		10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data		
Reported Date	(SORDAT)		(S) TD	0, 1
Landmark Description			C	0, *
Text Content			(S) C	1, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search	(S) EN	0, 1

		6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access		
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data	(S) EN	0, 1
Reported Date	(SORDAT)		(S) TD	0, 1
Offshore Mark Description			C	0, *
Text Content			(S) C	1, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1

Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media	(S) EN	0, 1

		14 : Traffic Data		
Reported Date	(SORDAT)		(S) TD	0, 1
Major Light Description			C	0, *
Text Content			(S) C	1, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1

Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data	(S) EN	0, 1
Reported Date	(SORDAT)		(S) TD	0, 1
Useful Mark Description			C	0, *
Text Content			(S) C	1, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1

Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data	(S) EN	0, 1
Reported Date	(SORDAT)		(S) TD	0, 1

INT 1 Reference: --

6.12.1 General

This feature may be used to the legally or officially designated limits of the harbour area for purposes of navigation. Land-side boundaries of jurisdiction need not be encoded as **OuterLimit** features.

Remarks:

- Aids to navigation should not be encoded in the attribute *landmarkDescription*. Instead, they should be encoded in the appropriate attribute for describing marks (*offshoreMarkDescription*, *majorLightDescription*, or *usefulMarkDescription*).
- The attribute *markedBy* should be used to describe aids to navigation used to demarcate the location, for example, by marking a limit line, or one of the boundaries of an area.

Distinction:

Feature/Information associations

Type	**Association Name**	**Association Ends**					
		Class	**Role**	**Mult**	**Class**	**Role**	**Mult**
association	Limit Entrance				**Entrance**	entranceReference	0,1
association	Jurisdictional Limit	**OuterLimit**	limitExtent	0,1	**HarbourAreaAdministrative**	limitReference	1,1

6.13 Pilot Boarding Place

IHO Definition: A location offshore where a pilot may board a vessel in preparation to piloting it through local waters.
S-10x Geo Feature: Pilot Boarding Place (PILBOP)
Super Type: Layout (5.6)
Primitives: surface, point

Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-10x Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
Depths Description			C	0, 1
Category of Depths Description		1 : Shoal 2 : General Depth 3 : Controlling Depth	(S) EN	1, 1
Text Content			(S) C	1, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1

Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data	(S) EN	0, 1
Reported Date	(SORDAT)		(S) TD	0, 1
Location by Text			TE	0, 1
Marked By			C	0, 1
Text Content			(S) C	1, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *

File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports	(S) EN	0, 1

		10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data		
Reported Date	(SORDAT)		(S) TD	0, 1
ISPS Level		1 : ISPS Level 1 2 : ISPS Level 2 3 : ISPS Level 3	EN	0, 1

INT 1 Reference: T 1.1-4

6.13.1 General

For a pilot boarding place, the pilot vessel may either cruise in the area or come out on request. Off some large ports pilots on outgoing ships may be disembarked at a different location. Pilots may board from a helicopter; it is then less important for a ship to reach the exact position of the boarding place but an approximate position should still be encoded. Some pilot stations are used solely for long-distance (deep-sea) pilots. Pilots may be in constant attendance, in regular attendance at certain limited times, or available by previous arrangement only. The primary purpose of encoded pilotage information is to show the position of the facility. Because of the many variations in the service provided, the main source of information on pilotage must be in an associated publication or product.

If it is required to encode a pilot boarding place, it must be done using the feature **Pilot Boarding Place**.

For general information about the representation of pilot boarding places on charts, see S-4 – B-491 and S-101 DCEG.

Remarks:

- If it is required to encode the ship to shore or shore to ship contact information, it must be done using the information class **Contact Details** (see clause 11.3). The **Contact Details** must be associated to the **Pilot Boarding Place** feature using the association *AdditionalInformation*.

- The attribute *markedBy* should be used to describe aids to navigation used to demarcate the location, for example, by marking a limit line, or one of the boundaries of an area.

Distinction:

Feature/Information associations

Type	Association Name	Association Ends					
		Class	Role	Mult	Class	Role	Mult

association	Location Hours				**ServiceHours**	location_srvHrs	0,1
aggregation	Layout Division	**PilotBoarding Place**	layoutUnit	0,*	**HarbourAreaSection**	componentOf	1,1

6.14 Seaplane Landing Area

IHO Definition: A designated portion of water for the landing and take-off of seaplanes.		
S-10x Geo Feature: Seaplane Landing Area (SPLARE)		
Super Type: Layout (5.6)		
Primitives: surface, point		
Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-10x Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
Depths Description			C	0, 1
Category of Depths Description		1 : Shoal 2 : General Depth 3 : Controlling Depth	(S) EN	1, 1
Text Content			(S) C	1, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1

Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data	(S) EN	0, 1
Reported Date	(SORDAT)		(S) TD	0, 1
Location by Text			TE	0, 1
Marked By			C	0, 1
Text Content			(S) C	1, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *

File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports	(S) EN	0, 1

		10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data		
Reported Date	(SORDAT)		(S) TD	0, 1
ISPS Level		1 : ISPS Level 1 2 : ISPS Level 2 3 : ISPS Level 3	EN	0, 1

INT 1 Reference: --

6.14.1 General

(Reserved)

Remarks:

- The attribute *markedBy* should be used to describe aids to navigation used to demarcate the location, for example, by marking a limit line, or one of the boundaries of an area.

Distinction: WaterwayArea

Feature/Information associations

Type	Association Name	Association Ends					
		Class	Role	Mult	Class	Role	Mult
association	Location Hours				**ServiceHours**	location_srvHrs	0,1
aggregation	Layout Division	**SeaplaneLandingArea**	layoutUnit	0,*	**HarbourAreaSection**	componentOf	1,1

6.15 Terminal

IHO Definition: A terminal covers that area on shore which provides buildings and constructions for the transfer of cargo or passengers from and to ships.
S-10x Geo Feature: Terminal
Super Type: Layout (5.6)
Primitives: point, surface

Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-10x Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
Port Facility Number			TE	0, 1
Category of Harbour Facility	(CATHAF)	1 : RoRo Terminal 3 : Ferry Terminal 5 : Yacht Harbour/Marina 7 : Tanker Terminal 8 : Passenger Terminal 10 : Container Terminal 11 : Bulk Terminal	EN	0, 1
Category of Cargo		2 : Container 5 : Passenger 6 : Livestock 7 : Dangerous or Hazardous 8 : Heavy Lift 10 : Dry Bulk Cargo 11 : Liquid Bulk Cargo 12 : Reefer Container Cargo 13 : Ro-Ro Cargo 14 : Project Cargo 15 : Break Bulk Cargo	EN	0, *
Product	(PRODCT)	1 : Oil 2 : Gas 4 : Stone 5 : Coal 6 : Ore 7 : Chemicals	EN	0, *

		9 : Milk 10 : Bauxite 11 : Coke 12 : Iron Ingots 13 : Salt 14 : Sand 15 : Timber 16 : Sawdust/Wood Chips 17 : Scrap Metal 18 : Liquefied Natural Gas 19 : Liquefied Petroleum Gas 20 : Wine 21 : Cement 22 : Grain		
Terminal Identifier			TE	0, 1
SMDG Terminal Code			TE	0, 1
UN Location Code			TE	0, 1

INT 1 Reference: --

6.15.1 General

A terminal in S-131 may include water areas immediately adjacent to the shore installation.

Remarks:

Since port authorities sometimes designate terminals by their nominal point locations instead of providing precise coordinates, point terminal features may be located in water areas.

Distinction:

Feature/Information associations

Type	Association Name	Association Ends					
		Class	Role	Mult	Class	Role	Mult
association	Service Availability				**AvailablePortServices**	serviceDescriptionReference	0,1
association	Location Hours				**ServiceHours**	location_srvHrs	0,1
association	Layout Division	**Terminal**	componentOf	1,1	**Berth**	layoutUnit	0,*

aggregation	Layout Division	**Terminal**	layoutUnit	0,*	**HarbourAreaSection**	componentOf	1,1
association	Infrastructure	**Terminal**	infrastructureLocation	0,1	**HarbourPhysicalInfrastructure**	hasInfrastructure	0, *

6.16 Turning Basin

IHO Definition: An area of water or enlargement of a channel used for turning vessels.		
S-10x Geo Feature: Turning Basin		
Super Type: Layout (5.6)		
Primitives: surface		
Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-10x Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
Depths Description			C	0, 1
Category of Depths Description		1 : Shoal 2 : General Depth 3 : Controlling Depth	(S) EN	1, 1
Text Content			(S) C	1, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1

Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data	(S) EN	0, 1
Reported Date	(SORDAT)		(S) TD	0, 1
Location by Text			TE	0, 1
Marked By			C	0, 1
Text Content			(S) C	1, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *

File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports	(S) EN	0, 1

		10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data		
Reported Date	(SORDAT)		(S) TD	0, 1
ISPS Level		1 : ISPS Level 1 2 : ISPS Level 2 3 : ISPS Level 3	EN	0, 1

INT 1 Reference: --

6.16.1 General

(Reserved)

Remarks:

- The attribute *markedBy* should be used to describe aids to navigation used to demarcate the location, for example, by marking a limit line, or one of the boundaries of an area.

Distinction: WaterwayArea; HarbourBasin

Feature/Information associations

Type	Association Name	Association Ends					
		Class	Role	Mult	Class	Role	Mult
association	Location Hours				**ServiceHours**	location_srvHrs	0,1
aggregation	Layout Division	**TurningBasin**	layoutUnit	0,*	**HarbourAreaSection**	componentOf	1,1

6.17 Waterway Area

IHO Definition: An area in which uniform general information of the waterway exists.		
S-10x Geo Feature: Waterway Area		
Super Type: Layout (5.6)		
Primitives: surface		
Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-10x Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
Category of Port Section		1 : Port Fairway 3 : Berth Pocket 8 : Seaplane Anchorage 9 : Dredged Basin 11 : Port Safety Zone 12 : Lay-by Berth	EN	1, 1
Depths Description			C	0, 1
Category of Depths Description		1 : Shoal 2 : General Depth 3 : Controlling Depth	(S) EN	1, 1
Text Content			(S) C	1, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1

Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data	(S) EN	0, 1
Reported Date	(SORDAT)		(S) TD	0, 1
Location by Text			TE	0, 1
Marked By			C	0, 1
Text Content			(S) C	1, *
Category of text		1 : Abstract or Summary	(S) EN	0, 1

		2 : Extract 3 : Full Text		
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed	(S) EN	0, 1

		9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data		
Reported Date	(SORDAT)		(S) TD	0, 1

INT 1 Reference: --

6.17.1 General

Waterways can be encoded to indicate how specific sections of water have been divided for various administrative purposes such as for organising traffic and managing the available water column. When it is required to encode a section of water as one of the types mentioned in the *categoryOfPortSection* attribute, this must be done using the feature **WaterwayArea** with *categoryOfPortSection* set to the appropriate value.

Remarks:

- The attribute *markedBy* should be used to describe aids to navigation used to demarcate the location, for example, by marking a limit line, or one of the boundaries of an area.

Distinction: DumpingGround; HarbourBasin; PilotBoardingPlace; SeaplaneLandingArea; TurningBasin.

Feature/Information associations

Type	**Association Name**	**Association Ends**					
		Class	**Role**	**Mult**	**Class**	**Role**	**Mult**
association	Location Hours				**ServiceHours**	location_srvHrs	0,1
aggregation	Layout Division	**WaterwayArea**	layoutUnit	0,*	**HarbourAreaSection**	componentOf	1,1

7 Physical Infrastructure

7.1 Introduction

Physical infrastructure features describe the infrastructural facilities of the harbour area. They include floating and dry docks, gridirons, ship lifts, and straddle carriers.

Note that the current model models ship lifts and straddle carriers using the feature **HarbourFacility**, due to GI Registry conceptual limitations on re-use of concepts.

All infrastructure features in S-131 carry a vertical clearance attribute, inherited from the abstract type **HarbourPhysicalInfrastructure**. The features are depicted in Figure 7.1 below. In addition, they inherit the attributes and associations of higher-level supertypes **FeatureType**, **OrganizationContactArea**, and **SupervisedArea**.

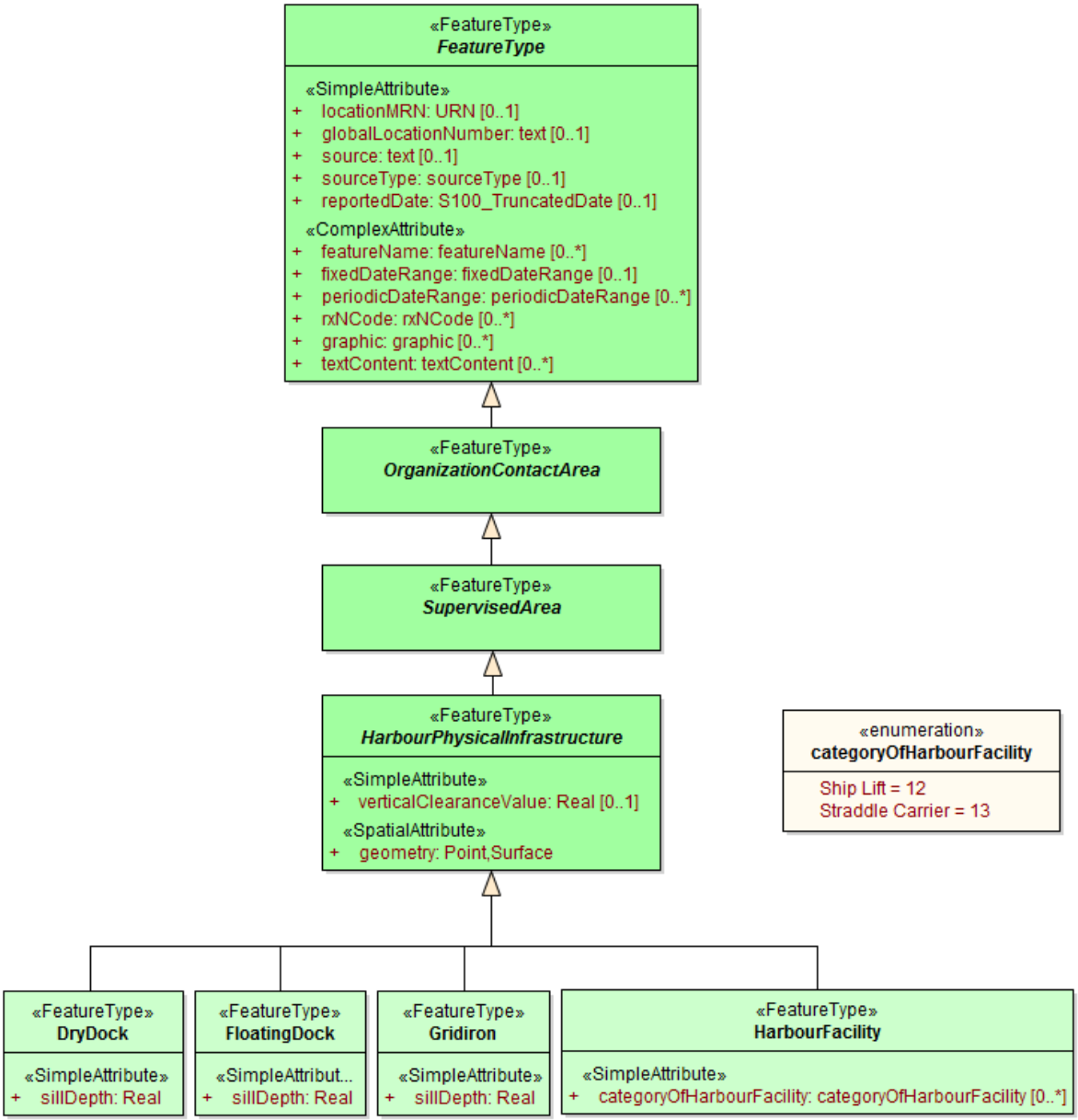

Figure 7.1 - Physical infrastructure features

7.2 Dry Dock

IHO Definition: An artificial basin fitted with a gate or caisson, into which vessels can be floated and the water pumped out to expose the vessel's bottom. Also called graving dock.

S-10x Geo Feature: Dry Dock (DRYDOC, Graving Dock)

Super Type: HarbourPhysicalInfrastructure (5.5)

Primitives: point, surface

Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-10x Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
Sill Depth			RE	0, 1

INT 1 Reference: --

7.2.1 General

A dry dock (or graving dock) is an artificial basin into which a ship can be floated for cleaning and repairs. The entrance can be closed by gate or caisson and the water pumped out to expose the vessel's bottom.

In S-101, a dry dock must also be covered by the S-101 LandArea feature. The boundary of a dry dock is not encoded as a separate Coastline or Shoreline Construction feature, except for the gate feature (Gate), which may be encoded.

S-131 dry docks may therefore be superimposed on ENC LandArea features. The Gate boundary in the underlying S-101 ENC should be included in the surface spatial primitive of the S-131 **DockArea**.

Remarks:

Distinction: DockArea; FloatingDock

Feature/Information associations

Type	Association Name	Association Ends					
		Class	Role	Mult	Class	Role	Mult
association	Location Hours				**ServiceHours**	location_srvHrs	0,1

7.3 Floating Dock

IHO Definition: A form of dry dock consisting of a floating structure of one or more sections which can be partly submerged by controlled flooding to receive a vessel, then raised by pumping out the water so that the vessel's bottom can be exposed.

S-10x Geo Feature: Floating Dock (FLODOC)

Super Type: HarbourPhysicalInfrastructure (5.5)

Primitives: point, surface

Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-10x Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
Sill Depth			RE	0, 1

INT 1 Reference: --

7.3.1 General

In S-101, a Floating Dock feature must also be covered by Depth Area, Dredged Area or Unsurveyed Area features. The boundary of a Floating Dock feature of type surface is not be encoded as a separate feature (Coastline or Shoreline Construction). S-131 encoders should therefore verify that an S-131 **FloatingDock** is covered by an S-101 feature of the appropriate type in an underlying S-101 ENC. If a discrepancy is detected an attempt should be made to reconcile it.

The S-131 **FloatingDock** feature allows encoding of the sill depth for the dock as a real attribute.

Remarks:

Distinction:

Feature/Information associations

Type	Association Name	Association Ends					
		Class	Role	Mult	Class	Role	Mult
association	Location Hours				**ServiceHours**	location_srvHrs	0,1

7.4 Gridiron

IHO Definition: A structure in the intertidal zone serving as a support for vessels at low stages of the tide to permit work on the exposed portion of the vessel's hull.		
S-10x Geo Feature: Gridiron (GRIDRN, Careening Grid)		
Super Type: HarbourPhysicalInfrastructure (5.5)		
Primitives: point, surface		
Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-10x Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
Sill Depth			RE	0, 1

INT 1 Reference: --

7.4.1 General

(Reserved)

Remarks:

Distinction: DryDock; FloatingDock

Feature/Information associations

Type	Association Name	Association Ends					
		Class	Role	Mult	Class	Role	Mult
association	Location Hours				**ServiceHours**	location_srvHrs	0,1

7.5 Harbour Facility

IHO Definition: A harbour installation with a service or commercial operation of public interest.				
S-10x Geo Feature: Harbour Facility (HRBFAC)				
Super Type: HarbourPhysicalInfrastructure (5.5)				
Primitives: point, surface				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-10x Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Category of Harbour Facility	(CATHAF)	12 : Ship Lift 13 : Straddle Carrier	EN	1, *

INT 1 Reference: --

7.5.1 General

In S-131 the **HarbourFacility** feature is used only for encoding the locations of ship lifts and straddle carriers.

Remarks:

Distinction:

Feature/Information associations							
Type	**Association Name**	**Association Ends**					
		Class	**Role**	**Mult**	**Class**	**Role**	**Mult**
association	Location Hours				**ServiceHours**	location_srvHrs	0,1

8 Cartographic Features

This product specification uses the **Text Placement** cartographic features derived from S-101 (version 1.0). The structure of the feature and its usage are the same as in S-101 but the feature specification in S-131 omits elements which are not relevant to marine protected areas, for example, 'light characteristic' is omitted as a listed value for the attribute **text type**.

8.1 Text Placement

IHO Definition: The Text Placement feature is used in association with the Feature Name attribute or a light description to optimize text positioning in ECDIS.

S-10x Cartographic Feature: Text Placement

Super Type:

Primitives: point

Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-10x Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
Orientation Value	(ORIENT)		RE	1, 1
Text	(INFORM) (NINFOM)		TE	0, 1
Text Offset Mm			IN	1, 1
Text Type		1 : Name	EN	0, 1
Scale Minimum	(SCAMIN)		IN	0, 1

INT 1 Reference: --

8.1.1 General

If it is required to place text to improve clarity of display, it must be done using the cartographic feature **TextPlacement**. The **TextPlacement** feature must be associated with the relevant geo feature using the composition TextAssociation.

S-131 differs from S-101 in prohibiting **TextPlacement** features not associated to a geographic feature; further, S-101 does not use the "light characteristic" value of *textType*, since S-131 does not include light geographic features.

Remarks:

- The **Text Placement** cartographic feature is used by the ECDIS to optionally position text in ECDIS, which has been populated using an attribute for the related feature. This attribute is identified by populating the attribute *text type*. Alternatively, the text to be displayed may be encoded using the attribute *text*.
- Only one of the attributes text or text type must be populated for each instance of **Text Placement**.

- The attributes *orientationValue* and *textOffsetMm* define the bearing (related to true north) and distance of the anchor point of the text, in millimetres on the ECDIS display, relative to the associated geographic feature. The values populated for these attributes must be determined based on the desired position of the text at the maximum display scale of the data.
- **Text Placement** should only be associated with features of type point, and used in areas where it is important that text clear navigationally relevant areas, for example shipping channels and dredged areas.
- The attribute *scaleMinimum* may be used to determine a scale at which the text string is no longer visible in the ECDIS when scale minimum functionality is enabled. Where populated, the value for scale minimum on **TextPlacement** must not be set to a smaller scale value than the value (if any) populated for the associated feature.

Distinction:

Feature/Information associations

Type	Association Name	Association Ends					
		Class	Role	Mult	Class	Role	Mult
association	Text Association	**TextPlacement**	positions	0,1	**FeatureType**	identifies	1,1

9 Abstract Information types

9.1 Introduction

The abstract feature types are depicted in Figure 9.1. At the root is the type named **InformationType**, from which all information types except **SpatialQuality** inherit several attributes. This means that any information type in S-131 except **SpatialQuality** can have any of the several attributes in the **InformationType** box. The information types **AbstractRxN** adds attributes and associations inherited by the four types **Regulations**, **Restrictions**, **Recommendations**, and **NauticalInformation**.

The abstract information type hierarchy in S-131 is intentionally harmonised with the abstract hierarchy in other nautical publications Product Specifications.

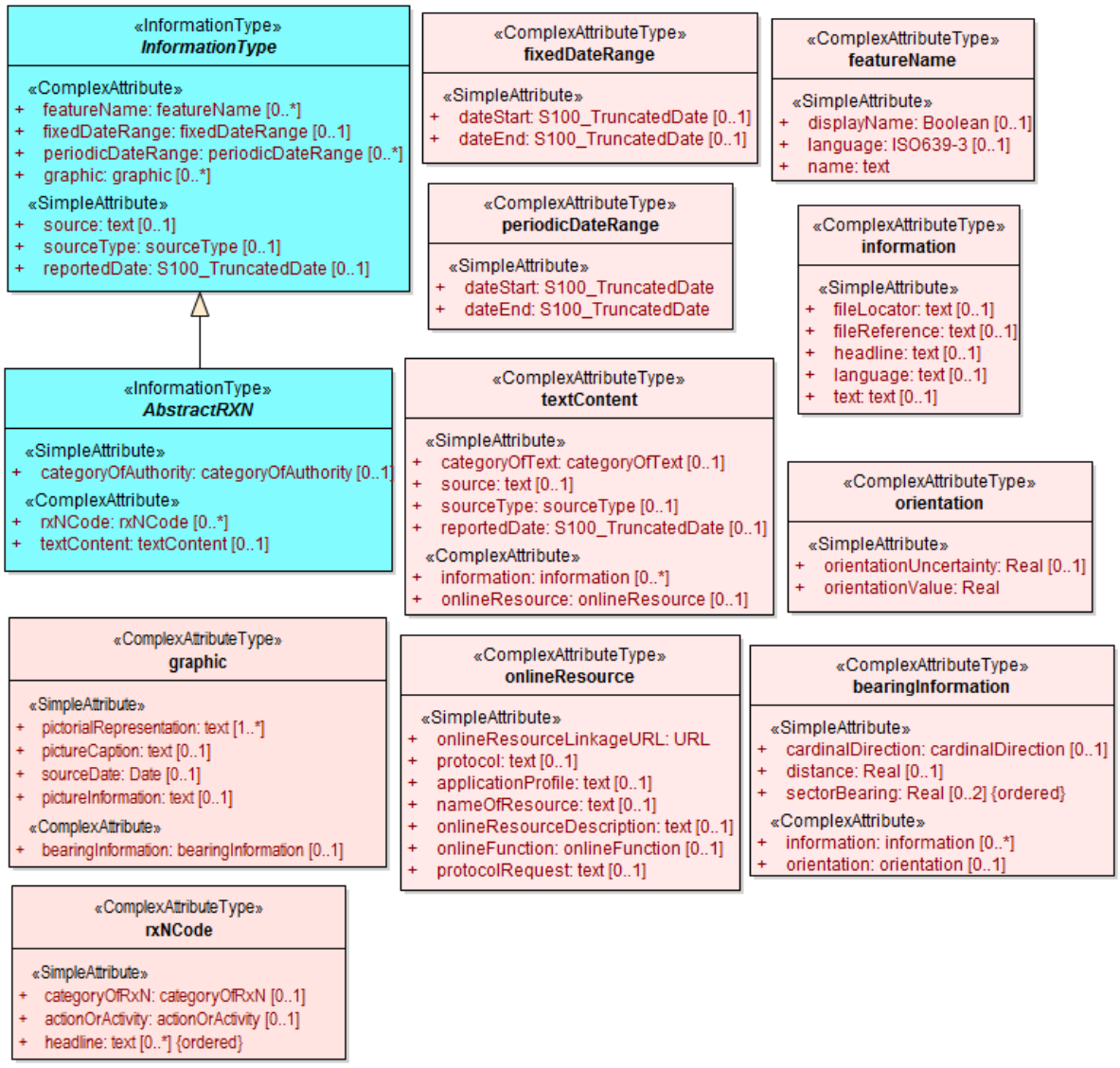

Figure 9.1 - Abstract information types

9.2 Information Type

IHO Definition: Generalized information type which carries all the common attributes.
S-10x Information Type: Information Type

Super Type:				
Sub-Types: AbstractRxN (9.3), Authority (11.2), ContactDetails (11.3), ServiceHours (11.4), NonstandardWorkingDay (11.5), AvailablePortServices (11.6), Applicability (12.4), Entrance (13.1)				
Primitives: None				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-10x Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Feature Name			C	0, *
Display Name			(S) BO	0, 1
Language			(S) TE	0, 1
Name	(OBJNAM)		(S) TE	1, 1
Fixed date range			C	0, 1
Date Start	(DATSTA)		(S) TD	0, 1
Date End	(DATEND)		(S) TD	0, 1
Periodic Date Range			C	0, *
Date Start	(DATSTA)		(S) TD	1, 1
Date End	(DATEND)		(S) TD	1, 1
Graphic			C	0, *
Pictorial Representation	(PICREP)		(S) TE	1, *
Picture Caption			(S) TE	0, 1
Source Date	(SORDAT)		(S) DA	0, 1
Picture Information			(S) TE	0, 1
Bearing Information			(S) C	0, 1
Cardinal Direction		1 : North 2 : North Northeast 3 : Northeast 4 : East Northeast 5 : East 6 : East Southeast	(S) EN	0, 1

		7 : Southeast 8 : South Southeast 9 : South 10 : South Southwest 11 : Southwest 12 : West Southwest 13 : West 14 : West Northwest 15 : Northwest 16 : North Northwest		
Distance			(S) RE	0, 1
Sector Bearing	(SECTR1) (SECTR2)		(S) RE	0, 2 (ordered)
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Orientation			(S) C	0, 1
Orientation Uncertainty			(S) RE	0, 1
Orientation Value	(ORIENT)		(S) RE	1, 1
Source			TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed	EN	0, 1

		9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data		
Reported Date	(SORDAT)		TD	0, 1

INT 1 Reference: --

9.2.1 General

Where a complex attribute has all its sub-attributes optional (e.g., multiplicity 0..1 or 0..*), at least one of the sub-attributes must be populated.

The **featureName** attribute of an instance of an information type can be used for a short title that is either a proper name (if such is relevant) or which describes the instance. For example, the **featureName** attribute of an **Authority** information type can be the name of a government agency.

featureName attributes of information types should not duplicate the geographic feature name of an associated feature, but should pertain to the information instance itself.

The **featureName** attribute should be populated only if the value conveys useful information to the end user. Some examples of such situations are:

- providing the name of an organisation, such as the name of an Authority.
- distinguishing between instances – if multiple instances of the same information type are associated to the same feature type (or another information type), the different instances may be given descriptive names to make it easier for the mariner to distinguish their content.

Some information instances are associated to multiple features, in which case its name should be general enough to be relevant to all the features.

For example, if naming **Regulations** instances describing regulations, consider whether (for example) there is a general regulation applicable to all areas in a jurisdiction and an exceptional regulations object associated to a single area or a subset of areas in the jurisdiction. In this situation, the general regulations may be encoded with the name “General regulations for (feature type) Areas” and associated to several features, while a specific feature can also have a specific regulation whose name is “Special regulations for (named area)”.

The **AdditionalInformation** association to a **NauticalInfomation** object can be used to attach an additional chunk of information to an information type, when there is no applicable specific information type or association. This should be used sparingly if at all.

Remarks:

Distinction:

Feature/Information associations							
Type	**Association Name**	**Association Ends**					
		Class	**Role**	**Mult**	**Class**	**Role**	**Mult**
association	AdditionalInformation	**InformationType**	informationProvidedFor	0,*	**NauticalInformation**	providesInformation	0,*

9.3 AbstractRxN

IHO Definition: An abstract superclass for information types that encode rules, recommendations, and general information in text or graphic form.				
S-10x Information Type: AbstractRxN				
Super Type: InformationType (9.2)				
Sub-Types: Regulations (10.2), Restrictions (10.3), Recommendations (10.4), NauticalInformation (10.5)				
Primitives: None				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-10x Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Category of Authority		2 : Border Control 3 : Police 4 : Port 5 : Immigration 6 : Health 7 : Coast Guard 8 : Agricultural 9 : Military 10 : Private Company 11 : Maritime Police 12 : Environmental 13 : Fishery 14 : Finance 15 : Maritime 16 : Customs	EN	0, 1
RxN Code			C	0, *
Category of RxN		1 : Navigation 2 : Communication 3 : Environmental Protection 4 : Wildlife Protection 5 : Security 6 : Customs 7 : Cargo Operation	(S) CL	0, 1

		8 : Refuge 9 : Health 10 : Natural Resources or Exploitation 11 : Port 12 : Finance 13 : Agriculture		
Action or Activity		1 : Navigating With a Pilot 2 : Entering Port 3 : Leaving Port 4 : Berthing 5 : Slipping 6 : Anchoring 7 : Weighing Anchor 8 : Transiting 9 : Overtaking 10 : Reporting 11 : Working Cargo 12 : Landing 13 : Diving 14 : Fishing 15 : Discharging Overboard 16 : Passing	(S) CL	0, 1
Headline			(S) TE	0, * (ordered)
Text Content			C	0, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1

Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data	(S) EN	0, 1
Reported Date	(SORDAT)		(S) TD	0, 1
INT 1 Reference: --				

9.3.1 Abstract supertype for information from textual sources

AbstractRxN is the supertype of the four types intended primarily for encoding information from regulatory or other text sources. The attributes **categoryOfRxN** and **actionOrActivity** should be encoded wherever possible in order to allow software to classify the content according to the type of regulation (**categoryOfRxN**) and its effects on common maritime activities by both commercial and recreational vessels.

At least one of the attributes **textContent** and **graphic** must be populated.

Subtypes of **AbstractRxN** must not be associated to **Nautical Information**, since this leads to chains of information types which have little or no meaning in reality.

Remarks:

The complex attribute *rxNCode* can be used to classify regulations (or recommendations, etc.) according to their principal subject (sub-attribute *categoryOfRxN*) and the type of vessel activity affected (sub-attribute *actionOrActivity*), as well as provide a sequence of brief topic headings (sub-attribute headline). The *rxNCode* attribute is intended to be used to allow mariners to obtain information relevant to particular subjects or to particular kinds of vessel operations.

Distinction:

Feature/Information associations

Type	Association Name	Association Ends					
		Class	Role	Mult	Class	Role	Mult
association	Inclusion Type	**AbstractRxN**	theApplicableRxN	0,*	**Applicability**	isApplicableTo	0,*
association	Related organisation	**AbstractRxN**	theInformation	0,*	**Authority**	theOrganisation	0,*

10 Textual Regulations and Notes

10.1 Introduction

The information types **Regulations**, **Restrictions**, **Recommendations**, and **NauticalInformation** all inherit the attributes of their immediate abstract superclass **AbstractRxN**, which provides attributes *textContent* and *graphic* for textual and pictorial material respectively. The sub-attributes of its complex attribute *rxnCode* allow optional classification of the material encoded in *textContent* or *graphic* according to the type of material and the kind of nautical activity affected by it. The classifications in *rxNCode* sub-attributes *categoryOfRxN* and *actionOrActivity* are intended to facilitate software queries for information, while the sub-attribute headline provides additional topic headings for subject matter.

These four information types also inherit the attributes of abstract superclass **InformationType**, which allows encoding of the effective and expiry dates, if any, and the source of information[2], if it is necessary to encode that data.

The content of the regulation (recommendation, etc.) should be encoded in the *textContent* attribute, which is also inherited from the abstract superclass **InformationType**. It may be encoded inline (*textContent.information.text*) or in an external file (*textContent.information.fileReference*) depending on its length, on whether it is unique to the feature instance, and on whether the producer decides to include a support file containing multiple sections referenced from different places in the dataset. (See also clauses 2.4.8 and 2.4.9 for general guidance on encoding textual information.)

These four information types are intended primarily for encoding textual information, such as that which derives from textual source material such as port handbooks, national or local laws or official publications.

[2] Source information is currently broken out into three attributes: source, sourceType, and reportedDate, due to GI Registry issues with the complex attribute sourceIndication.

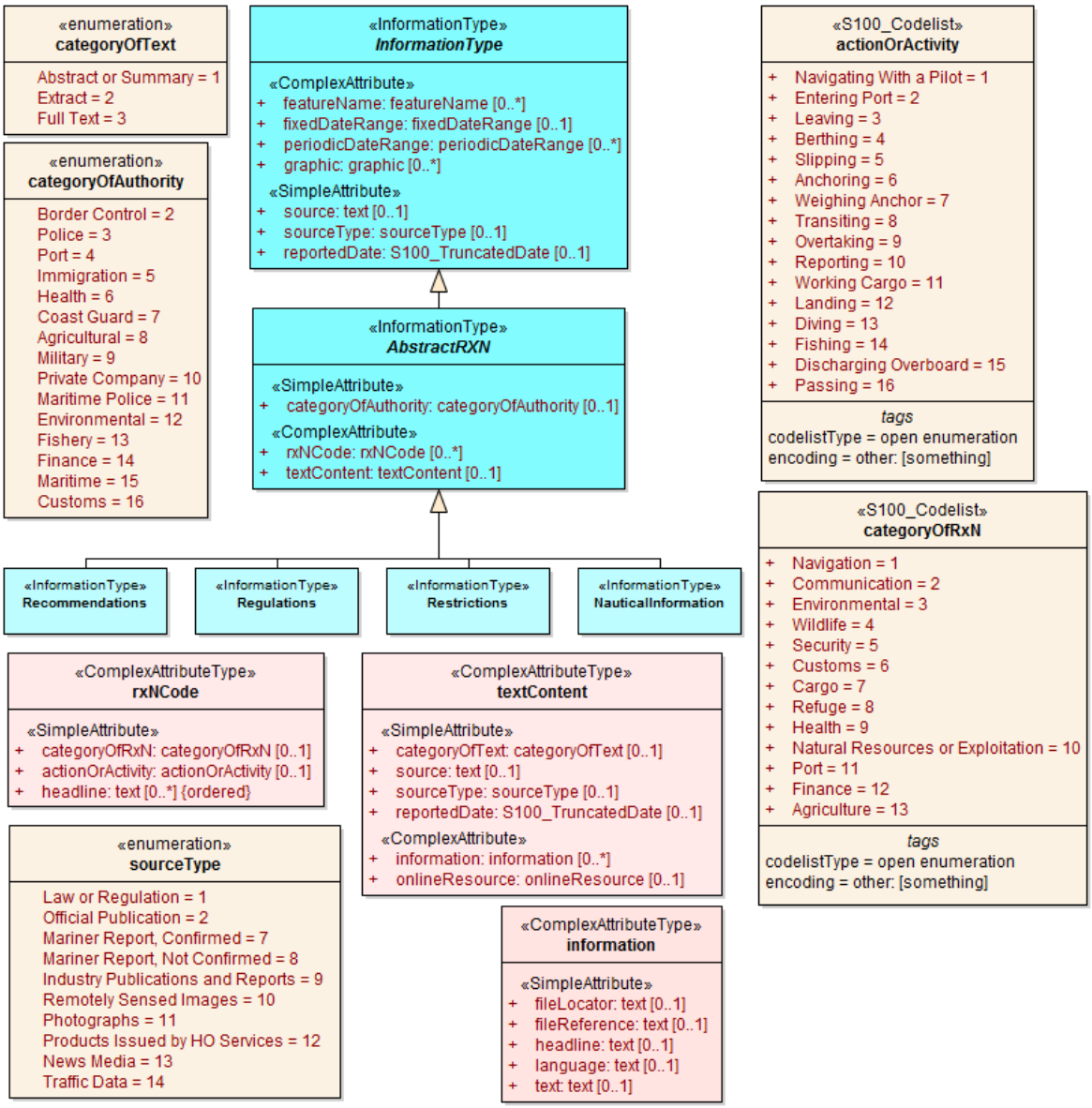

Figure 10.1 - Types for textual information concerning regulations, etc.

Where possible, these types should be classified using the *categoryOfRxN* and *actionOrActivity* codelists in the *rxnCode* complex attribute. Being open enumeration codelists, they allow for additional categories not listed among their standard values. For example, an “under repair” activity might be encoded in the *actionOrActivity* attribute (as “other: underRepair”, following the syntax rule for encoding “extra” values in open enumerations[3]).

Producers should note that such extra values will merely be displayed and not processed (for example, the user interface will not use extra values to choose symbols or filter instances of **Regulations**[4], whereas it may apply filters to the standard values and/or them in portrayal).

[3] S-100 3-6.7 specifies the format as “The word ‘other’ followed by a colon and a single space character (that is ‘other: ’ without quotes), followed by one or more alphanumeric strings separated by single spaces.”

[4] In the interest of brevity, “Regulations” in this sub-clause stands for any one of the four types described by this section.

The *headline* attribute of *rxNCode* should be used to encode brief topic headings describing the textual content of the **Regulations** object. Topic headings in the source material may be suitable either as-is or being adapted for use in the intended application context (for example, being shortened for readability on an ECDIS screen or auxiliary display). The *headline* attribute of the *textContent/information* attribute may also be used to provide sub-heads but must not duplicate the content of *rxNCode/headline*.

Where multiple headline attributes are encoded in the same instance of *rxNCode* complex attribute, they must be ordered as follows:

1) If the *headline* values are derived from a source material (such as the published legal text of a government regulation), the ordering must conform to the hierarchy in the source, for example, section headings must precede sub-section headings. It is not necessary to include the entire hierarchy of headings for the portion that is actually encoded in the *textContent* co-attribute.

2) If the *headline* values are not derived from a source text, the ordering should be from general to specific.

10.1.1 Regulations, etc., for specific locations

All geo features may have an association to any of Regulations or its sibling information types. This association is *AssociatedRxN* and it is inherited from the root feature type **FeatureType**.

If it is necessary to identify an authority or organization related to a particular regulation (restriction, etc.) object, this may be done using the *RelatedOrganisation* association between **Regulations**, etc., and an **Authority** object.

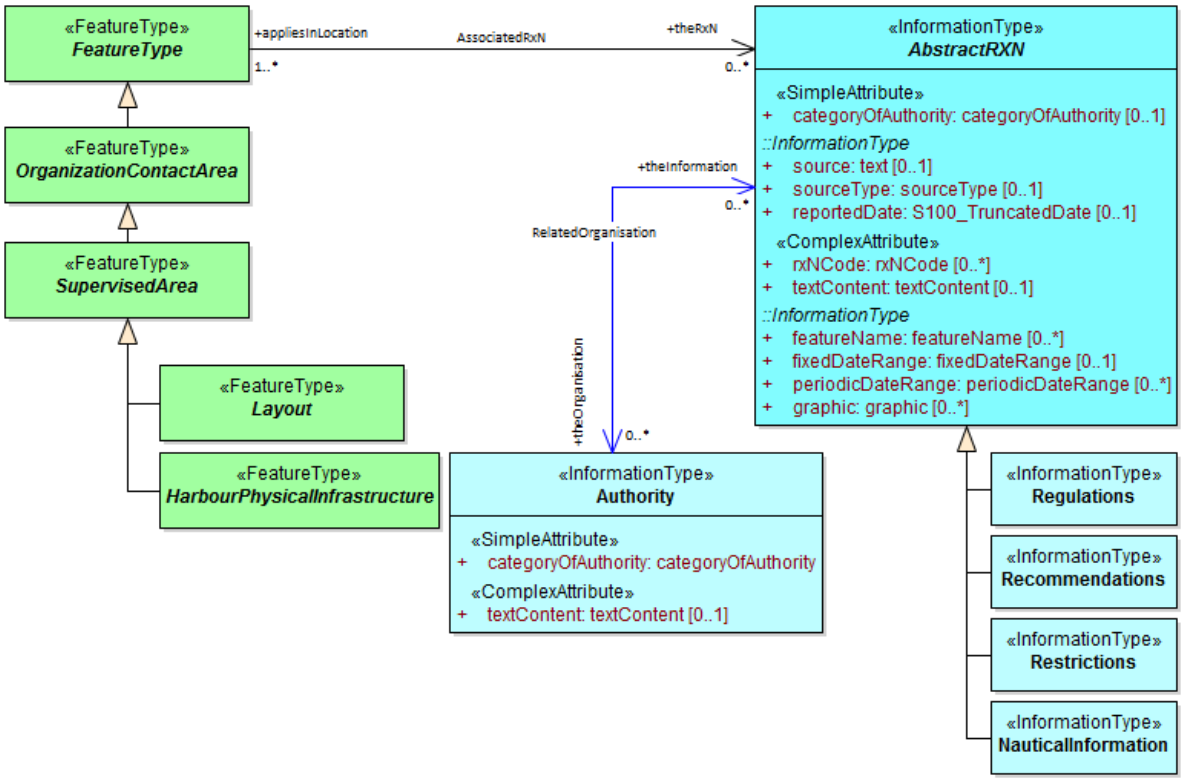

Figure 10.2 - Regulations, etc., for geo features

10.1.2 Regulations applying only to vessels with specific characteristics or cargoes

Regulations applying only to vessels of specified types, exceeding specified dimensions, or carrying specified cargoes (or other limitations which apply only to subsets of vessels) are encoded by defining the subset of vessels using an **Applicability** instance and associating the **Regulations** object to that **Applicability**.

For information on the use of Applicability to define subsets of vessels, see clause 12 in this DCEG and clause 4.2.1.9 in the main PS.

10.2 Regulations

IHO Definition: Regulations for a related area or facility.

S-10x Information Type: Regulations

Super Type: AbstractRxN (9.3)

Primitives: None

Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-10x Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity

INT 1 Reference: --

10.2.1 General

Regulations is intended to be used for official rules, laws, and similar source material, i.e., sources that have the force of law or are mandated by a controlling authority. They will generally originate from some kind of administration or authority, including port authorities.

Remarks:

- Association *AssociatedRxN* is with a geographic feature. While an association from geographic feature to information type can be encoded in the geographic feature instance, the reverse association from the information type to the geographic feature may be omitted from the information type instance.

Distinction: Restrictions, Recommendations, NauticalInformation

10.3 Restrictions

IHO Definition: Restrictions for a related area or facility.

S-10x Information Type: Restrictions

Super Type: AbstractRxN (9.3)

Primitives: None

Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-10x Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity

INT 1 Reference: --

10.3.1 General

Restrictions is intended for restrictions that constrain the activities of vessels temporarily with or without the legal force, or for longer terms without the force of law; they may be issued by a local authority such as a port captain or US Coast Guard district.

Remarks:

- Association *AssociatedRxN* is with a geographic feature. While an association from geographic feature to information type can be encoded in the geographic feature instance, the reverse association from the information type to the geographic feature may be omitted from the information type instance.

Distinction: Regulations, Recommendations, NauticalInformation

10.4 Recommendations

IHO Definition: Recommendations for a related area or facility.

S-10x Information Type: Recommendations

Super Type: AbstractRxN (9.3)

Primitives: None

Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-10x Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity

INT 1 Reference: --

10.4.1 General

Recommendations is intended for encoding suggestions, limitations, or preferred procedures that are not mandatory.

For example, a recommendation for approaching a particular berth at a given orientation may be encoded in a **Recommendations** object associated to the **Berth** feature with an *AssociatedRxN* association from the **Berth** to the **Recommendations** object. If it is a port rule rather than a recommendation, it should be encoded as a **Restrictions** or **Regulations** object instead, with the same association from the **Berth** feature.

Remarks:

- Association *AssociatedRxN* is with a geographic feature. While an association from geographic feature to information type can be encoded in the geographic feature instance, the reverse association from the information type to the geographic feature may be omitted from the information type instance.

Distinction: Regulations, Restrictions, NauticalInformation

10.5 Nautical Information

IHO Definition: Nautical information about a related area or facility.				
S-10x Information Type: Nautical Information				
Super Type: AbstractRxN (9.3)				
Primitives: None				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-10x Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**

INT 1 Reference: --

NauticalInformation is intended for material that is largely informative in nature, of which does not fit into the category of regulation, recommendation, or restriction.

Remarks:

- Association *AdditionalInformation* may be with a geographic feature or an information type. Association *AssociatedRxN* is with a geographic feature. While an association from geographic feature to information type can be encoded in the geographic feature instance, the reverse association from the information type to the geographic feature may be omitted from the information type instance.
- In theory, **Nautical Information** can be associated with any geographic feature through either an *AdditionalInformation* or *AssociatedRxN* association. *AdditionalInformation* should be used only when the information encoded in **Nautical Information** is general in nature and does not supplement information encoded in a **Regulations**, **Restrictions**, or **Recommendations** object associated to the same feature.
- According to a purely theoretical reading of the model, **Nautical Information** can be associated to another **Nautical Information**, **Regulations**, **Restrictions**, or **Recommendations** instance using the *AdditionalInformation* association inherited from **Information Type**. This is not permitted due to the undefined semantics of chaining RxN types (i.e., such chaining has little or no significant meaning and has not been given any special meaning in the model).

Distinction: Regulations, Restrictions, Recommendations

Feature/Information associations

Type	Association Name	Association Ends					
		Class	Role	Mult	Class	Role	Mult
association	Additional Information	**NauticalInformation**	providesInformation	0,*	**InformationType**	informationProvidedFor	0,*

11 Services, Organisations, and Work Schedules

11.1 Introduction

Information about the services available in specific areas is modelled by means of an information association from the feature to the **AvailablePortServices** information type. This relationship is depicted Figure 11.1. This type contains attributes for encoding various types of services, in the form of enumeration attributes, details of which are provided in clause 11.6.

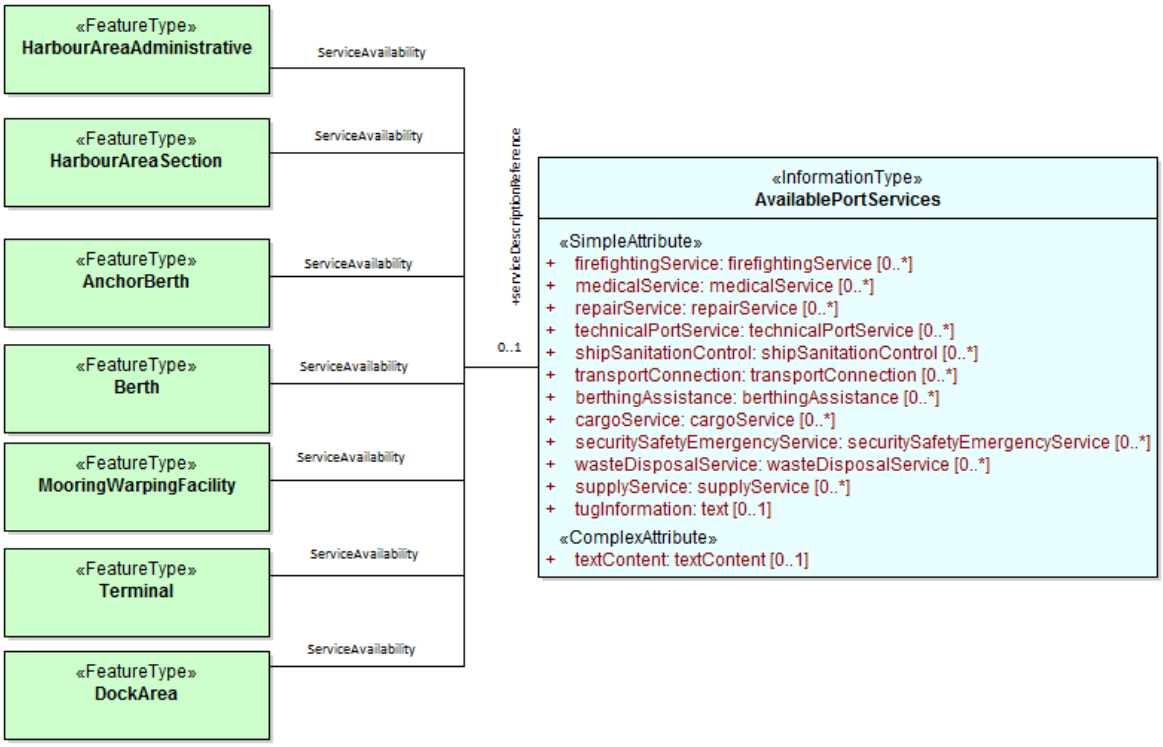

Figure 11.1 - Port services

11.1.1 Work schedules and holidays

Operating schedules and business hours of organizations are encoded by associating a **ServiceHours** instance to an **Authority**. Partial work schedules on holidays or other special days are encoded by associating a **NonstandardWorkingDay** instance to the **ServiceHours** instance.

Similarly, operating schedules for a facility are encoded by associating a **ServiceHours** to the geo feature representing the facility, and associating a **NonstandardWorkingDay** to the **ServiceHours** to encode partial working days.

For further guidance and examples, see clause 2.4.10.4.

11.1.2 Contact information

Contact information for service operators, controllers or facilities should be encoded in instances of the **ContactDetails** information type, which may be linked from multiple instances of geographic features or information types. Any S-131 geographic feature except meta and cartographic features can be associated to an instance of **ContactDetails**. S-131 geographic feature inherit the association to ContactDetails from the abstract feature type **OrganizationContactArea**, as shown in Figure 11.2.

Contact information must not be encoded directly in the feature or information type instance using a *textContent* or *information* complex attribute bound directly to the feature or information type. An instance of **ContactDetails** must be created instead. The exception to this rule is when contact-related attributes such as *communicationChannel* are bound to the feature or information type, in which case a **ContactDetails** instance should be created only if it is necessary to provide contact information which cannot be coded in the contact-specific attributes bound to the feature.

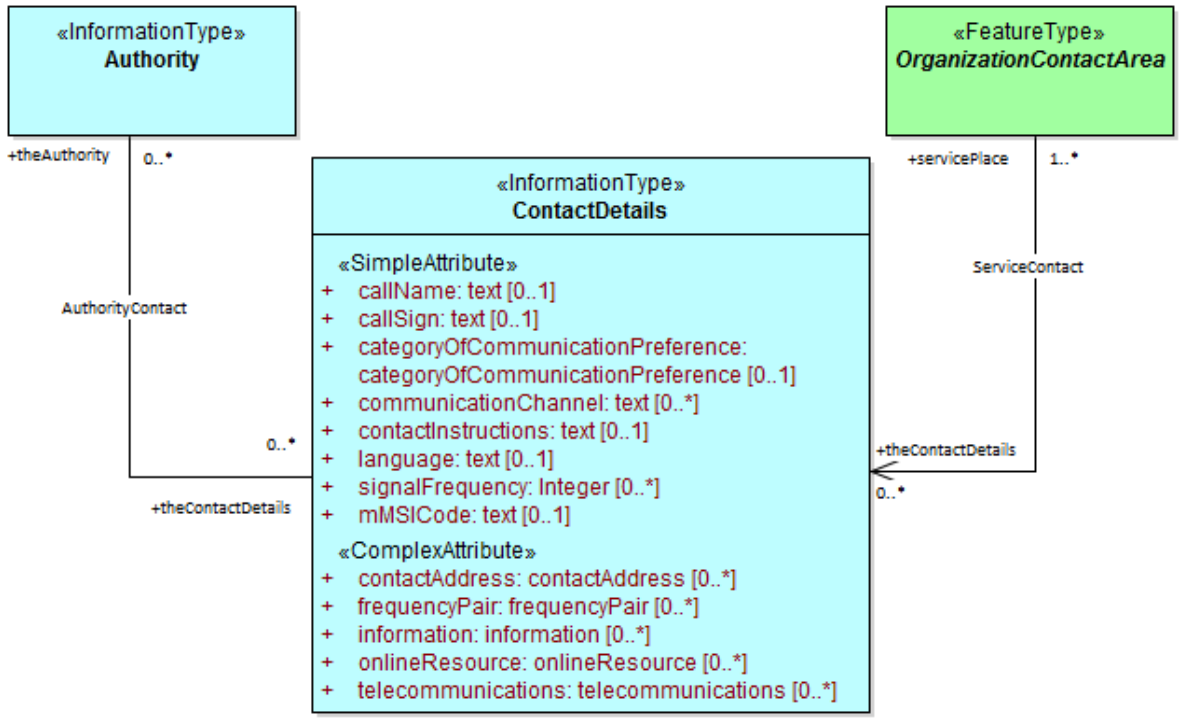

Figure 11.2 - Associations to contact information

11.2 Authority

IHO Definition: A person or organisation having political or administrative power and control.				
S-10x Information Type: Authority				
Super Type: InformationType (9.2)				
Primitives: None				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-10x Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Category of Authority		2 : Border Control 3 : Police 4 : Port	EN	1, 1

		5 : Immigration 6 : Health 7 : Coast Guard 8 : Agricultural 9 : Military 10 : Private Company 11 : Maritime Police 12 : Environmental 13 : Fishery 14 : Finance 15 : Maritime 16 : Customs		
Text Content			C	0, 1
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search	(S) EN	0, 1

		6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access		
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data	(S) EN	0, 1
Reported Date	(SORDAT)		(S) TD	0, 1

INT 1 Reference: --

11.2.1 General

The Authority information type is used for encoding information about organizations, including official authorities (port and other) as well as private organizations which control or operate port facilities.

For encoding the contact details for an organization, use an associated **ContactDetails** information type (see the information associations table below).

For encoding the general operating hours of an organization, use an associated **ServiceHours** information type (see clause 4.2.1.7 in the main Product Specification).

For encoding the supervisory or operating organization for a facility or area, such as a Terminal, use an information association from the geo feature to Authority (see 5.4 Supervised Area and clause 4.2.1.7 in the main Product Specification).

Remarks:

Distinction:

Feature/Information associations							
Type	**Association Name**	**Association Ends**					
		Class	**Role**	**Mult**	**Class**	**Role**	**Mult**
association	Authority Contact	**Authority**	theAuthority	0,*	**ContactDetails**	theContactDetails	0,*
association	Authority Hours	**Authority**	theAuthority_srvHrs	0,*	**ServiceHours**	theServiceHours	0,*
association	Related Organisation	**Authority**	theOrganisation	0,*	**AbstractRxN**	theInformation	0,*

11.3 Contact details

IHO Definition: information on how to reach a person or organisation by postal, internet, telephone, telex and radio systems.				
S-10x Information Type: Contact details				
Super Type: InformationType (9.2)				
Primitives: None				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-10x Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Call Name			TE	0, 1
Call Sign	(CALSGN)		TE	0, 1
Category of Communication Preference		1 : Preferred Calling 2 : Alternate Calling 3 : Preferred Working 4 : Alternate Working	EN	0, 1
Communication Channel	(COMCHA)		TE	0, *
Contact address			C	0, *
Delivery Point			(S) TE	0, * (ordered)
City Name			(S) TE	0, 1
Administrative Division			(S) TE	0, 1
Country Name			(S) TE	0, 1
Postal code			(S) TE	0, 1
Contact Instructions			TE	0, 1
Signal Frequency	(SIGFRQ)		IN	0, *
Frequency pair			C	0, *
Frequency Shore Station Transmits			(S) IN	0, * (ordered)
Frequency Shore Station Receives			(S) IN	0, * (ordered)

Contact Instructions			(S) TE	0, * (ordered)
Information			C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
MMSI Code			TE	0, 1
Online Resource			C	0, *
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Telecommunications			C	0, *
Category of Communication Preference		1 : Preferred Calling 2 : Alternate Calling 3 : Preferred Working	(S) EN	0, 1

		4 : Alternate Working		
Telecommunication Identifier			(S) TE	1, 1
Telecommunication Carrier			(S) TE	0, 1
Contact Instructions			(S) TE	0, 1
Telecommunication Service		1 : Voice 2 : Facsimile 3 : SMS 4 : Data 5 : Streamed Data 6 : Telex 7 : Telegraph 8 : Email	(S) EN	0, *
Schedule by Day of Week			(S) C	0, 1
Category of Schedule		1 : Normal Operation 2 : Closure 3 : Unmanned Operation	(S) EN	0, 1
Time Intervals by Day of Week			(S) C	1, *
Day of Week		1 : Sunday 2 : Monday 3 : Tuesday 4 : Wednesday 5 : Thursday 6 : Friday 7 : Saturday	(S) EN	0, 7 (ordered)
Day of Week is Range			(S) BO	0, 1
Time of Day Start			(S) TI	0, * (ordered)
Time of Day End			(S) TI	0, * (ordered)

INT 1 Reference: --

11.3.1 General

The **ContactDetails** information type provides several attributes for encoding different types of contact details.

ContactDetails may be associated to:

- An Authority information type via an information association (*AuthorityContact*), in which case it encodes the contact information for the organization in general.

- A geo feature via a feature association *ServiceContact*, inherited by geo features from **OrganizationContactArea** (5.3), in which case it encodes contact information particular to the specific feature, either because further information about the controlling authority is not available or because the contact is specific to the feature.

Remarks:

- If it is required to encode call name in different languages, this must be done by associating an instance of **ContactDetails** per language, with the originating instance. The **Language** attribute must be used to designate the language of the instance.
- The name of the contact (for example, the name of the agency, pilot service, office, etc.) should be encoded in the *featureName* attribute, which is inherited from **InformationType**.

Distinction:

Feature/Information associations

Type	Association Name	Association Ends					
		Class	Role	Mult	Class	Role	Mult
association	Authority Contact	**ContactDetails**	theContactDetails	0,*	**Authority**	theAuthority	0,*

11.4 Service Hours

IHO Definition: The time when a service is available and known exceptions.				
S-10x Information Type: Service Hours				
Super Type: InformationType (9.2)				
Primitives: None				
Real World	*Paper Chart Symbol*		*ECDIS Symbol*	
S-10x Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Schedule by Day of Week			C	1, *
Category of Schedule		1 : Normal Operation 2 : Closure 3 : Unmanned Operation	(S) EN	0, 1
Time Intervals by Day of Week			(S) C	1, *
Day of Week		1 : Sunday 2 : Monday 3 : Tuesday 4 : Wednesday 5 : Thursday 6 : Friday 7 : Saturday	(S) EN	0, 7 (ordered)
Day of Week is Range			(S) BO	0, 1
Time of Day Start			(S) TI	0, * (ordered)
Time of Day End			(S) TI	0, * (ordered)
Information			C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1

INT 1 Reference: --

11.4.1 General

Seasonal variations in service hours can be encoded using multiple **Service Hours** instances with appropriate **periodicDateRange** values.

Remarks:

Distinction:

Feature/Information associations

Type	Association Name	Association Ends					
		Class	Role	Mult	Class	Role	Mult
association	Authority Hours	**ServiceHours**	theServiceHours	0,*	**Authority**	theAuthority_srvHrs	0,*
association	Exceptional Workday	**ServiceHours**			**Non-standard Working Day**	partialWorkingDay	0,*

11.5 Non-Standard Working Day

IHO Definition: Days when many services are not available. Often days of festivity or recreation or public holidays when normal working hours are limited, especially a national or religious festival, etc.

S-10x Information Type: Non-Standard Working Day

Super Type: InformationType (9.2)

Primitives: None

Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-10x Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
Date Fixed			TD	0, *
Date Variable			TE	0, *
Information			C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1

INT 1 Reference: --

11.5.1 General

This information type is used for encoding information about holidays other than recurrent weekly closures, which may or may not occur during the traditional weekend. Regular weekly closures must be encoded in **ServiceHours** instead of **NonStandardWorkingDay**.

Remarks:

- Non-standard workdays which cannot be represented using fixed or variable dates should be encoded using the **information** complex attribute, preferably as a short description in the **text** sub-attribute of **information**. The information attribute can also be used for encoding any additional explanatory information if the explanation is essential knowledge for specifying the day.
- The two date range attributes (fixed and periodic date range) should be used if the non-standard day applies only in specific years or periods (e.g., seasonally).

Distinction:

11.6 Available Port Services

IHO Definition: Services that are available for a given port.
S-10x Information Type: Available Port Services
Super Type: InformationType (9.2)
Primitives: None

Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-10x Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
Firefighting Service		1 : Shore-Based Firefighting 2 : Onboard Firefighting 3 : Firefighting Boat	EN	0, *
Medical Service		1 : Ambulance 2 : Fumigation 3 : Doctor 4 : Quarantine 5 : Vaccination Centre	EN	0, *
Repair Service		1 : Compensation of Magnetic Compass 2 : Diver Service 3 : Bridge Equipment Repair 4 : Engine Repair 5 : Electronic Equipment Repair 6 : Hull Repair 7 : Navigational Equipment Repair 8 : Propeller Repair 9 : Salvage Gear Repair 10 : Shaft Repair	EN	0, *
Technical Port Service		1 : Compensation of Magnetic Compass 2 : Degaussing 3 : Cargo Surveying 4 : Vetting	EN	0, *

Ship Sanitation Control		1 : Sanitation Measures Only 2 : Issue SSCC 3 : Issue SSCEC	EN	0, *
Transport Connection		2 : Heliport 3 : Helipad 4 : Hired Boat 5 : Bus Station 6 : Ferry 8 : Motorway 9 : Launch 11 : Inland Waterway Transport 12 : Short Sea Transportation 13 : Marine Highway	CL	0, *
Berthing Assistance		1 : Berthing Information 2 : Line Personnel 3 : Mooring Boat 4 : Mule 5 : Tugboat	EN	0, *
Cargo Service		1 : Stevedoring 2 : Cargo Surveying 3 : Cargo Lashing 4 : Draught Survey	EN	0, *
Security-Safety-Emergency Service		1 : Coast Guard 2 : Customs 3 : Environmental Emergency Information Centre 4 : Emergency Coordination Centre 5 : Guard and/or Security Service 6 : Immigration 7 : Police 8 : Sea Rescue Control	CL	0, *
Waste Disposal Service		1 : MARPOL Annex I Oily Bilge Water 2 : MARPOL Annex I Oily Residues 3 : MARPOL Annex I Oily Tank Washings	EN	0, *

		4 : MARPOL Annex I Dirty Ballast Water 5 : MARPOL Annex I Scale and Sludge from Tank Cleaning 6 : MARPOL Annex I Other Oily Waste 7 : MARPOL Annex II Category X 8 : MARPOL Annex II Category Y 9 : MARPOL Annex II Category Z 10 : MARPOL Annex II Category OS 11 : MARPOL Annex IV Sewage 12 : MARPOL Annex V Plastics 13 : MARPOL Annex V Food Wastes 14 : MARPOL Annex V Domestic Wastes 15 : MARPOL Annex V Cooking Oil 16 : MARPOL Annex V Incinerator Ashes 17 : MARPOL Annex V Operational Wastes 18 : MARPOL Annex V Animal Carcasses 19 : MARPOL Annex V Fishing Gear 20 : MARPOL Annex V E-Waste 21 : MARPOL Annex V Cargo Residues - non-HME 22 : MARPOL Annex V Cargo Residues - HME 23 : MARPOL Annex VI Ozone-Depleting Substances 24 : MARPOL Annex VI Exhaust Gas-Cleaning Residues		
Supply Service		1 : Shore Power 2 : Fuel Oil Bunkering 3 : LNG Bunkering 4 : Lubricants	EN	0, *

		5 : Steam 6 : Potable Water 7 : International Shore Connection 8 : Provisions 9 : Chandler 10 : Mechanics Workshop		
Tug Information			TE	0, 1
Text Content			C	0, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing	(S) EN	0, 1

		11 : File Access		
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data	(S) EN	0, 1
Reported Date	(SORDAT)		(S) TD	0, 1

INT 1 Reference: --

11.6.1 General

This information type is used for describing services available in a port, a section of a port, or a port facility. Instances of this information type are referenced from the appropriate geographic feature using a ServiceAvailability information association (see Figure 11.1).

Remarks:

Distinction:

12 Limitation by Vessels Characteristics and Cargo

12.1 Introduction

Certain regulations, recommendations, etc., apply only to vessels of specified dimensions, types, or carrying specified cargo, etc. Similarly, certain features have specific significance for vessels of specified dimensions (e.g., different speed limits for vessels carrying specified cargoes or exceeding specified dimensions, or entry prohibitions for certain vessel types).

12.2 Defining subsets of vessels by dimensions, cargo, and other characteristics

This is modelled by first defining the relevant subset of vessels according to the dimension, type, cargo, etc., and then associating that subset to the appropriate feature or information type. The subset of vessels is modelled using the **Applicability** class, which contains attributes for the most common vessel characteristics used in nautical publications. These include measurements (length, beam, draught), type of cargo, displacement, etc. Constraints which cannot be modelled using the attributes of **Applicability** can be described in plain text in its *information* attribute.

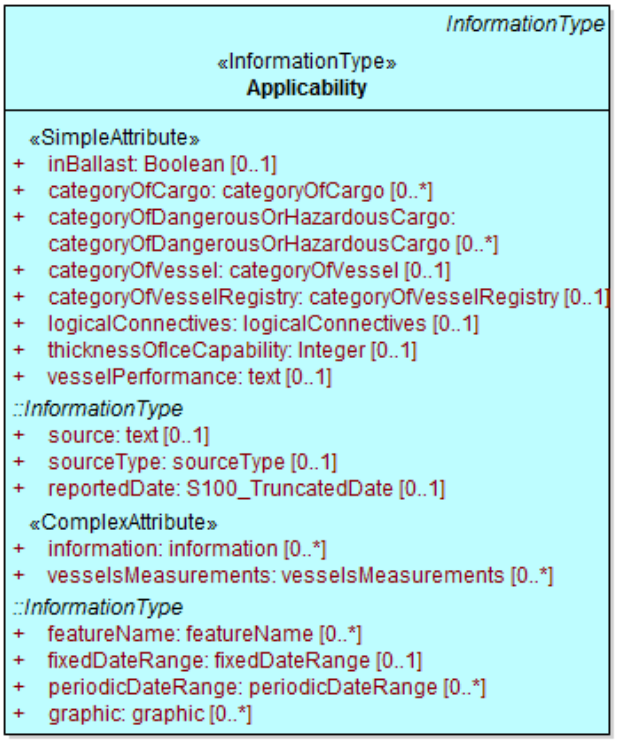

Figure 12.1 - Characteristics and dimensions defining sets of vessels

Conditions relating to vessel dimensions are modelled by the complex attribute vesselsMeasurements, which has sub-attributes for naming the dimension and indicating the limit (whether the condition applies to a vessel which exceeds or falls below the limit).

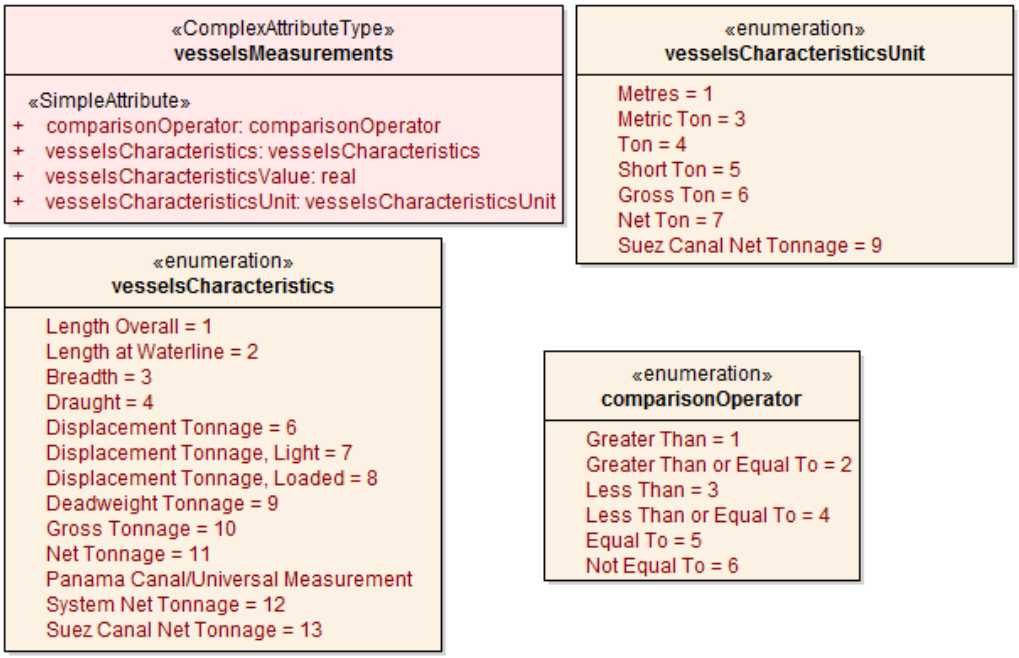

Figure 12.2 - Attributes for specifying vessel dimensions

For example, the combinations in Table 12.1 below describe the conditions “length overall > 50 m” (Condition 1); “length overall < 90 m” (Condition 2); and “breadth > 20 m” (Condition 3).

Table 12.1 - Examples of conditions based on vessel dimensions

Attribute	Condition 1	Condition 2	Condition 3
vesselsCharacteristics	length overall	length overall	breadth
comparisonOperator	greater than	less than	greater than
vesselsCharacteristicsValue	50	90	20
vesselsCharacteristicsUnit	metre	metre	metre

The *logicalConnectives* attribute of **Applicability** is used to indicate how multiple conditions are combined. Combinations may be cumulative (conjunctive, AND) or alternatives (disjunctive, OR).

EXAMPLE 1: Encoding *logicalConnectives*=AND combined with Conditions 1 and 2 above describes a vessel of length between 50 and 90 metres.

EXAMPLE 2: Encoding *logicalConnectives*=OR combined with Conditions 1 and 3 describes a vessel of length greater than 50 metres or beam greater than 20 metres.

This modelling cannot represent subsets defined by both AND and OR combinations, but it is always possible to convert such complex conditions into multiple combinations each using only AND (‘conjunctive normal form’) or OR (‘disjunctive normal form’), and model the subset using more than one **Applicability** object.

12.3 Characterizing the relationship between the vessel set and the feature or regulation

The relationship between a set of vessels and a **geographic feature** may be one of several different mandate levels ranging from prohibition on use of entry into a geographic location to mandatory use of

a feature (such as vessels exceeding certain dimensions being required to board pilots at an outer boarding place).

The relationship between a set of vessels and a **regulation information type** (or recommendation, restriction, or special note) may be one of *inclusion* or *specific exclusion* - either the regulation (recommendation, etc.) *specifically applies* to the specified set of vessels, or the specified set of vessels is *explicitly excluded* from the regulation. (If a regulation does not apply to a set of vessels but there is no explicit exemption stated in the source material, there is no relationship that needs to be encoded.)

The association classes **PermissionType** and **InclusionType** (Figures 12.3 and 12.4) characterize these relationships using values of their attributes *categoryOfRelationship* and *membership* respectively.

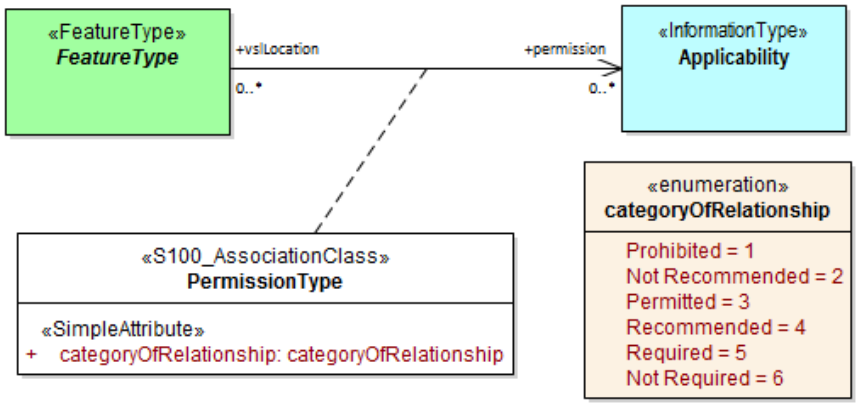

Figure 12.3 - Permission relationship

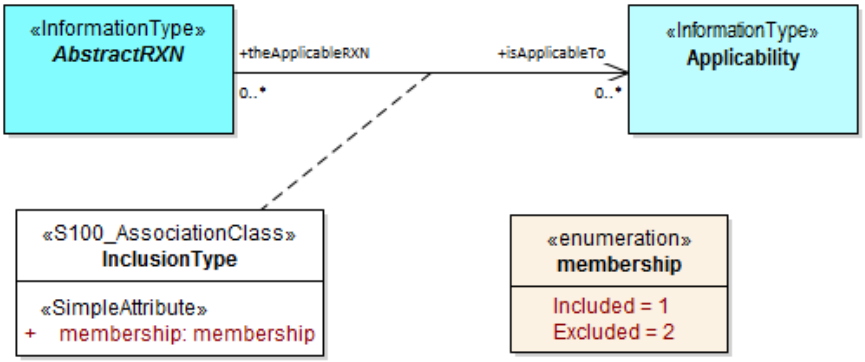

Figure 12.4 - Inclusion/exclusion relationship

EXAMPLE 1: A specified set of vessels is COVERED by a regulation and another set of vessels is EXEMPT from the regulation - described by the *membership* attribute values “included” and “excluded” respectively.

EXAMPLE 2: Vessels with specified cargo and dimensions MUST use a specified berth, vessels of smaller dimensions are RECOMMENDED to use the berth, and naval transports are EXEMPT from using the berth - described by the *categoryOfRelationship* attribute values “required”, “recommended” and “recommended” respectively.

12.4 Production hints and recommended practices (informative)

12.4.1 Capturing the application of a regulation, recommendation, etc. to specified kinds of vessels

Encoders may find it easiest to capture the application of a regulation (recommendation , etc.) to a class or set of vessels in three phases:

(1) Encode the operative part of the regulation (the part that describes what the vessels subject to the regulation must or must not do), creating an instance of **Regulation** (or **Recommendation**, etc., as appropriate). Descriptions of what kinds of vessels are subject to the regulation must be excluded from the content of the **Regulation** instance.

(2) Create an **Applicability** information type and encode the description of what kinds of vessels are subject to (or exempted from) the regulation.

(3) Link the two using an **InclusionType** with *membership=included* if the vessels described by **Applicability** are subject to the regulation, or *membership=excluded* if they are explicitly exempted from the regulation.

It is not necessary to create separate instances of the regulation for inclusion and exclusion.

12.4.2 Capturing the permissibility or otherwise of a geographic feature for specified kinds of vessels

Encoders may find it easiest to capture the permissibility of a feature to specified kinds of vessels in three phases.

(1) Create the geographic feature if it does not already exist.

(2) Create an **Applicability** information type and encode the description of what kinds of vessels are required to use the geographic feature.

(3) Link the two using a **PemissionType** with *categoryOfRelationship* = *required*.

For the other relationships (prohibited, not recommended, etc.) steps 2 and 3 should be modified accordingly (i.e., if use by certain kinds of vessels is “not recommended” encode the description of that kind of vessels in an **Applicability** and create a linking **PermissionType** with *categoryOfRelationship* = *not recommended*).

It is not necessary to create a separate instance of the geographic feature for each type of relationship.

12.4.3 Constructing the Applicability information type

Where the source material describes complex conditions, encoders may find it useful to write out the conditions in structured language with grouping parentheses, for example, as *“(condition A) AND (condition B) AND (condition C)*”, or draw diagrams, before encoding **Applicability** and its associations.

Note that the model limitation on mixing logical connectives means some forms of conditions which use “nesting” cannot be encoded in a single **Applicability** instance and multiple instances must be created.

EXAMPLE: The complex condition “(condition A) AND ((condition B) OR (condition C))” must be encoded as two **Applicability** instances, one with “(condition A) AND (condition B)” and the other with “(condition A) AND (condition C)”.

Table 12.2 - Example of conversion of complex condition to multiple simple conditions

Complex condition	Encode as
(condition A) AND ((condition B) OR (condition C))	Applicability 1: (condition A) AND (condition B) Applicability 2: (condition A) AND (condition C)

Data producers may contact NIPWG with questions about encoding complex conditions.

As a last resort, conditions may be written as phrases in natural language and encoded in the *information* attribute. It is acceptable for an **Applicability** to have only the *information* attribute populated.

12.5 Applicability

IHO Definition: Describes the relationship between vessel characteristics and: (i) the applicability of an associated information object or feature to the vessel; or, (ii) the use of a facility, place, or service by the vessel; or, (iii) passage of the vessel through an area.				
S-10x Information Type: Applicability				
Super Type: InformationType (9.2)				
Primitives: None				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-10x Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
In Ballast			BO	0, 1
Category of Cargo		2 : Container 5 : Passenger 6 : Livestock 7 : Dangerous or Hazardous 8 : Heavy Lift 10 : Dry Bulk Cargo 11 : Liquid Bulk Cargo 12 : Reefer Container Cargo 13 : Ro-Ro Cargo 14 : Project Cargo 15 : Break Bulk Cargo	EN	0, *

Category Of Dangerous Or Hazardous Cargo		1 : IMDG Code Class 1 Div. 1.1 2 : IMDG Code Class 1 Div. 1.2 3 : IMDG Code Class 1 Div. 1.3 4 : IMDG Code Class 1 Div. 1.4 5 : IMDG Code Class 1 Div. 1.5 6 : IMDG Code Class 1 Div. 1.6 7 : IMDG Code Class 2 Div. 2.1 8 : IMDG Code Class 2 Div. 2.2 9 : IMDG Code Class 2 Div. 2.3 10 : IMDG Code Class 3 11 : IMDG Code Class 4 Div. 4.1 12 : IMDG Code Class 4 Div. 4.2 13 : IMDG Code Class 4 Div. 4.3 14 : IMDG Code Class 5 Div. 5.1 15 : IMDG Code Class 5 Div. 5.2 16 : IMDG Code Class 6 Div. 6.1 17 : IMDG Code Class 6 Div. 6.2 18 : IMDG Code Class 7 19 : IMDG Code Class 8 20 : IMDG Code Class 9 21 : Harmful Substances in Packaged Form	EN	0, *
Category of Vessel		1 : General Cargo Vessel 2 : Container Carrier 3 : Tanker 4 : Bulk Carrier 5 : Passenger Vessel	CL	0, 1

		6 : Roll-On Roll-Off 7 : Refrigerated Cargo Vessel 8 : Fishing Vessel 9 : Service 10 : Warship 11 : Towed or Pushed Composite Unit 12 : Tug and Tow 13 : Light Recreational 14 : Semi-Submersible Offshore Installation 15 : Jack-Up Exploration or Project Installation 16 : Livestock Carrier 17 : Sport Fishing		
Category of Vessel Registry		1 : Domestic 2 : Foreign	EN	0, 1
Logical Connectives		1 : Logical Conjunction 2 : Logical Disjunction	EN	0, 1
Thickness of Ice Capability			IN	0, 1
Vessel Performance			TE	0, 1
Information			C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Vessels Measurements			C	0, *
Comparison Operator		1 : Greater Than 2 : Greater Than or Equal To 3 : Less Than 4 : Less Than or Equal To 5 : Equal To 6 : Not Equal To	(S) EN	1, 1

Vessels Characteristics		1 : Length Overall 2 : Length at Waterline 3 : Breadth 4 : Draught 6 : Displacement Tonnage 7 : Displacement Tonnage, Light 8 : Displacement Tonnage, Loaded 9 : Deadweight Tonnage 10 : Gross Tonnage 11 : Net Tonnage 12 : Panama Canal/Universal Measurement System Net Tonnage 13 : Suez Canal Net Tonnage	(S) EN	1, 1
Vessels Characteristics Value			(S) RE	1, 1
Vessels Characteristics Unit		3 : Metric Ton 4 : Ton 5 : Short Ton 6 : Gross Ton 7 : Net Ton 9 : Suez Canal Net Tonnage	(S) EN	1, 1

INT 1 Reference: --

12.5.1 General

The **Applicability** information type is intended for defining sets of vessels according to their dimensions, capabilities, and cargo. Its attributes are intended for defining different limitation conditions, as described by their definitions in clauses 17 and 17.131.

Multiple instances of **Applicability** associated to the same feature or regulation are treated as “inclusive OR”, that is, each **Applicability** defines an independent set of vessels to which the regulation, permission or requirement applies (or which is specifically exempted, depending on the attribute encoded in the association class).

Clause 12.1 contains a comprehensive discussion of the use of **Applicability** to describe subsets of vessels according to dimensions, types, cargo, and other characteristics. The remarks below provide additional guidance.

Remarks:

- Multiple values of *Category of Cargo* and of *Category of Dangerous Or Hazardous Cargo* should be treated as “inclusive OR” (i.e., if *Category of Cargo*=1 and 2, then it means vessels with either bulk or container cargo or both).

- Limitations which cannot be expressed using more specific attributes should be encoded in text form in the *information* attribute.
- It is acceptable for an **Applicability** to have only the *information* attribute populated.
- Vessel types which do not conform to any of the listed *categoryOfVessel* values should be encoded as “other: <text>” where <text> is a producer-supplied type name.
- The attribute *logicalConnectives* has multiplicity lower bound 0 for the case where there is only a single limiting condition (for example, if the only condition is “length overall > 100m”) and must be omitted in such a situation. If there is more than one condition, *logicalConnectives* must be encoded. If *logicalConnectives* is omitted and there is more than one condition, the default value assumed is logical conjunction.
- Mutually inconsistent measurements (e.g., draught > 10m and draught < 5m) are an error.
- The inherited attributes *featureName* and *graphic* may be used to provide supplementary information in the form of a title for the defined set of vessels and sketch or other graphic pertaining to the set, but there being no widely acknowledged use cases for them, their use in **Applicability** is discouraged.
- Encoding the inherited *fixedDateRange* and *periodicDateRange* attributes for **Applicability** is discouraged. The *fixedDateRange* and *periodicDateRange* attributes may theoretically be used to qualify the set defined by the **Applicability** instance, but must not be used to define the commencement, termination, season, etc., of the regulation or feature to which **Applicability** is associated (fixed and periodic date ranges should be encoded in the regulation or feature instance instead).

Distinction:

Feature/Information associations

Type	**Association Name**	**Association Ends**					
		Class	**Role**	**Mult**	**Class**	**Role**	**Mult**
association	Inclusion Type	**Applicability**	isApplicableTo	0,*	**AbstractRxN**	theApplicableRxN	0,*

13 Harbour Entrance

13.1 Entrance

IHO Definition: The seaward end of a channel, harbour, dock, etc.		
S-10x Information Type: Entrance		
Super Type: InformationType (9.2)		
Primitives: None		
Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-10x Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
Entrance Description			TE	0, 1
Associated Feature Name			TE	0, *
Local Knowledge Description			TE	0, 1
Approach Description			TE	0, 1
Marked By			C	0, *
Text Content			(S) C	1, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1

Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data	(S) EN	0, 1
Reported Date	(SORDAT)		(S) TD	0, 1
Landmark Description			C	0, *
Text Content			(S) C	1, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1

Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports	(S) EN	0, 1

		10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data		
Reported Date	(SORDAT)		(S) TD	0, 1
Offshore Mark Description			C	0, *
Text Content			(S) C	1, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic	(S) EN	0, 1

		8 : Upload 9 : Email Service 10 : Browsing 11 : File Access		
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data	(S) EN	0, 1
Reported Date	(SORDAT)		(S) TD	0, 1
Major Light Description			C	0, *
Text Content			(S) C	1, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1

Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data	(S) EN	0, 1
Reported Date	(SORDAT)		(S) TD	0, 1
Useful Mark Description			C	0, *
Text Content			(S) C	1, *

Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata 7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access	(S) EN	0, 1
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed	(S) EN	0, 1

		8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data		
Reported Date	(SORDAT)		(S) TD	0, 1
Text Content			C	0, *
Category of text		1 : Abstract or Summary 2 : Extract 3 : Full Text	(S) EN	0, 1
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference	(TXTDSC)		(S) TE	0, 1
Headline			(S) TE	0, * (ordered)
Language			(S) TE	0, 1
Text	(INFORM) (NINFOM)		(S) TE	0, 1
Online Resource			(S) C	0, 1
Online Resource Linkage URL			(S) UL	1, 1
Protocol			(S) TE	0, 1
Application Profile			(S) TE	0, 1
Name of Resource			(S) TE	0, 1
Online Resource Description			(S) TE	0, 1
Online Function		1 : Download 3 : Offline Access 4 : Order 5 : Search 6 : Complete Metadata	(S) EN	0, 1

		7 : Browse Graphic 8 : Upload 9 : Email Service 10 : Browsing 11 : File Access		
Protocol request			(S) TE	0, 1
Source			(S) TE	0, 1
Source Type		1 : Law or Regulation 2 : Official Publication 7 : Mariner Report, Confirmed 8 : Mariner Report, Not Confirmed 9 : Industry Publications and Reports 10 : Remotely Sensed Images 11 : Photographs 12 : Products Issued by HO Services 13 : News Media 14 : Traffic Data	(S) EN	0, 1
Reported Date	(SORDAT)		(S) TD	0, 1

INT 1 Reference: --

13.1.1 General

(Reserved)

Remarks:

- Aids to navigation should not be encoded in the attribute *landmarkDescription*. Instead, they should be encoded in the appropriate attribute for describing marks (*offshoreMarkDescription*, *majorLightsDescription*, or *usefulMarksDescription*).
- The attribute *markedBy* should be used to describe aids to navigation used to demarcate the location, for example, by marking a limit line, or one of the boundaries of an area.

Distinction:

14 Spatial Quality

14.1 Spatial Quality

IHO Definition: The indication of the quality of the locational information for features in a dataset.				
S-10x Information Type: Spatial Quality				
Super Type:				
Primitives: None				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-10x Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Quality of Horizontal Measurement	(QUAPOS)	1 : Surveyed 2 : Unsurveyed 3 : Inadequately Surveyed 4 : Approximate 5 : Position Doubtful 6 : Unreliable 7 : Reported (Not Surveyed) 8 : Reported (Not Confirmed) 9 : Estimated 10 : Precisely Known 11 : Calculated	EN	0, 1
Spatial Accuracy			C	0, *
Fixed date range			(S) C	0, 1
Date Start	(DATSTA)		(S) TD	0, 1
Date End	(DATEND)		(S) TD	0, 1
Horizontal Position Uncertainty	(POSACC)		(S) C	0, 1
Uncertainty Fixed	(POSACC) (SOUACC) (VERACC)		(S) RE	1, 1
Uncertainty Variable Factor			(S) RE	0, 1

Vertical Uncertainty	(VERACC)		(S) C	0, 1
Uncertainty Fixed	(POSACC) (SOUACC) (VERACC)		(S) RE	1, 1
Uncertainty Variable Factor			(S) RE	0, 1

INT 1 Reference: --

14.1.1 General

This information type is used for specifying the accuracy of individual point or curve spatial primitives.

Remarks:

- SpatialQuality is not to be associated with Surface spatial objects.
- SpatialQuality associated to Curve or Composite Curve spatial objects cannot have vertical uncertainty attributes.

Distinction:

15 Association Names

15.1 Additional Information

IHO Definition: A feature association for the binding between at least one instance of a geo feature and an instance of an information type.

Remarks:

Role informationProvidedFor encodable only as a generic inverse association in feature objects in 3.0.0 datasets

Role Type	Role	Associated With	Multiplicity
Association	Information provided for	**Information Type, Feature Type**	0, *
	Provides information	**Nautical Information**	0, *

15.2 Authority Contact

IHO Definition: Contact information for an authority

Remarks:

• No remarks.

Role Type	Role	Associated With	Multiplicity
Association	Contact details (reference)	**Contact details**	0, *
	Authority (reference)	**Authority**	0, *

15.3 Authority Hours

IHO Definition: Service hours for an authority

Remarks:

• No remarks.

Role Type	Role	Associated With	Multiplicity
Association	Service Hours (reference)	**Service Hours**	0, *

	Authority service hours	**Authority**	0, *

15.4 Associated RxN

IHO Definition: Association between a geographic location and a regulation, restriction, recommendation, or nautical information

Remarks:

Role appliesInLocation encodable only as a generic inverse association in 3.0.0 datasets as it is an information->feature link

Role Type	Role	Associated With	Multiplicity
Association	The RxN	**AbstractRxN**	0, *
	Applies in location	**Feature Type**	

15.5 Exceptional Workday

IHO Definition: Exception to the usual working day

Remarks:

• No remarks.

Role Type	Role	Associated With	Multiplicity
Association	Partial working day	**Non-Standard Working Day**	0, *
	The service hours for a non-standard workday	**Service Hours**	

15.6 Inclusion Type

IHO Definition: Association class specifying the relationship between the subset of vessels described by an APPLIC data object and a regulation (restriction, recommendation, or nautical information).

Remarks:

• No remarks.

Role Type	Role	Associated With	Multiplicity

Association	Is applicable to	**Applicability**	0, *
	The applicable RxN	**AbstractRxN**	0, *

15.7 Limit Entrance

IHO Definition: Association between a limit feature and the entrance for the limit.

Remarks:

• No remarks.

Role Type	Role	Associated With	Multiplicity
Association	Entrance Reference		0, 1
	Entrance To	**Outer Limit**	

15.8 Permission Type

IHO Definition: Association class for associations describing whether the subsets of vessels determined by the ship characteristics specified in APPLIC may (or must, etc.) transit, enter, or use a feature.

Remarks:

• No remarks.

Role Type	Role	Associated With	Multiplicity
Association	Permission	**Applicability**	0, *
	Vessel location	**Feature Type**	0, *

15.9 Related organisation

IHO Definition: Related Organisation

Remarks:

• No remarks.

Role Type	Role	Associated With	Multiplicity

Association	The organisation	**Authority**	0, *
	The information	**AbstractRxN**	0, *

15.10 Service Contact

IHO Definition: Contact details for a service or facility

Remarks:

• No remarks.

Role Type	Role	Associated With	Multiplicity
Association	Contact details (reference)	**Contact Details**	0, *
	Service place	**Organization Contact Area**	

15.11 Service Control

IHO Definition: Association between a geographically located service and the organisation that controls it

Remarks:

This is an information association linking a location where a service is provided with an information type describing the provider. Contrast to serviceProvisionArea, which is a feature association linking the area served with another feature describing the provider. Role controlledService encodable only as a generic inverse association in 3.0.0 datasets as it is an information->feature link

Role Type	Role	Associated With	Multiplicity
Association	Control authority	**Authority**	0, 1
	Controlled service	**Supervised Area**	

15.12 Spatial Association

IHO Definition: Association for linking spatial quality to spatial objects.

Remarks:

• No remarks.

Role Type	Role	Associated With	Multiplicity
	Defined for	**(spatial primitive)**	0, *
	Defines	**Spatial Quality**	0, 1

15.13 Location Hours

IHO Definition: Working hours for a service or facility described by a geographic location.

Remarks:

This association links a geo feature to a Service Hours object. Distinction: authyHours, which links an information type (Authority) to a Service Hours object.

Role Type	Role	Associated With	Multiplicity
Association	Facility Operating Hours	**Anchor Berth, Anchorage Area, Berth, Dock Area, Dry Dock, Dumping Ground, Floating Dock, Gridiron, Harbour Area (Administrative), Harbour Area Section, Harbour Basin, Harbour Facility, Mooring/Warping Facility, Pilot Boarding Place, Seaplane Landing Area, Terminal, Turning Basin, Waterway Area**	
	Location service hours	**Service Hours**	0, 1

15.14 Service Availability

IHO Definition: The services available within a location.

Remarks:

• No remarks.

Role Type	Role	Associated With	Multiplicity
Association	Service Description Reference	**Available Port Services**	0, 1
	Location Served	**Anchor Berth, Berth, Dock Area, Harbour Area (Administrative), Harbour Area Section, Mooring/Warping Facility, Terminal**	

15.15 Subsection

IHO Definition: A division of a feature into parts of the same type as the whole.

Remarks:

• No remarks.

Role Type	Role	Associated With	Multiplicity
Aggregation	Constitute	**Harbour Area Section**	0, 1
	Sub-Unit	**Harbour Area Section**	0, *

15.16 Infrastructure

IHO Definition: The infrastructure facilities in an area.

Remarks:

• No remarks.

Role Type	Role	Associated With	Multiplicity
Association	Has Infrastructure	**Harbour Physical Infrastructure**	0, *
	Infrastructure Location	**Harbour Area Section, Terminal**	0, 1

15.17 Primary/Auxiliary Facility

IHO Definition: Describes the relationship between a primary feature and a feature that plays a supporting role in the use of the primary facility by a vessel.

Remarks:

• No remarks.

Role Type	Role	Associated With	Multiplicity
Association	Auxiliary Facility	**Mooring/Warping Facility**	0, *
	Primary Facility	**Anchor Berth, Berth Position**	0, 1

15.18 Demarcation

IHO Definition: Demarcation of location(s) within a feature by relation to another feature or features

Remarks:

• No remarks.

Role Type	Role	Associated With	Multiplicity
Composition	Demarcated Feature	**Berth**	1, 1
	Demarcation Indicator	**Berth Position**	0, *

15.19 Jurisdictional Limit

IHO Definition: The limit(s) of a jurisdiction claimed by a coastal State.

Remarks:

• No remarks.

Role Type	Role	Associated With	Multiplicity
Association	Limit Extent	**Outer Limit**	0, 1
	Limit Reference	**Harbour Area (Administrative)**	1, 1

15.20 Layout Division

IHO Definition: A division of a feature into parts of type(s) different from the type of the whole.

Remarks:

• No remarks.

Role Type	Role	Associated With	Multiplicity
Aggregation	Component of	**Harbour Area (Administrative)**	1, 1
	Layout Unit	**Anchorage Area, Berth, Dock Area, Dumping Ground, Harbour Area Section, Harbour Basin, Pilot Boarding Place, Seaplane Landing Area, Terminal, Turning Basin, Waterway Area**	0, *

15.21 Text Association

IHO Definition: A feature association for the binding between a geo feature and the cartographically positioned location for text.

Remarks:

• No remarks.

Role Type	Role	Associated With	Multiplicity
Association	Positions	**Text Placement**	0, 1
	Identifies	**Feature Type**	0, *

16 Association Roles

16.1 Component of

IHO Definition: A pointer to the aggregate in a whole-part relationship.

16.2 Constitute

IHO Definition: Reference to a whole of the same type as the part feature in the relationship.

16.3 The applicable RxN

IHO Definition: The applicable regulation, restriction, recommendation or nautical information

16.4 Applies in location

IHO Definition: The location in which the information item applies

16.5 Authority (reference)

IHO Definition: A pointer to an Authority object

16.6 Authority service hours

IHO Definition: The authority for which service hours are given

16.7 Contact details (reference)

IHO Definition: A pointer to an Contact Details object

16.8 Auxiliary Facility

IHO Definition: A refernce to a feature that supplements or supports the use of the primary feature in an AuxiliaryFacility relationship.

16.9 Control authority

IHO Definition: The controlling organization or authority for a geographically located service

16.10 Controlled service

IHO Definition: The service controlled by an organisation or authority

16.11 Defined for

IHO Definition: A pointer to a specific spatial type(s).

16.12 Defines

IHO Definition: A pointer to an information type providing spatial quality information.

16.13 Demarcated Feature

IHO Definition: Reference to the feature within which locations are demarcated.

16.14 Demarcation Indicator

IHO Definition: Reference to a feature demarcating a location within another feature.

16.15 Entrance Reference

IHO Definition: Reference to an information type describing the entrance to a limit area.

16.16 Entrance To

IHO Definition: A reference to the feature to which entrance information pertains.

16.17 Has Infrastructure

IHO Definition: Reference to the feature describing a particular instance of physical infrastructure.

16.18 Identifies

IHO Definition: A pointer to a specific feature(s).

16.19 Infrastructure Location

IHO Definition: Reference to the feature within which the infrastructure is located.

16.20 Information provided for

IHO Definition: A pointer to a specific feature(s) for which further information is required.

16.21 Is applicable to

IHO Definition: The object or class of objects to which the regulation, restriction, recommendation, or nautical information applies

16.22 Limit Extent

IHO Definition: Reference to a feature demarcating the extent to which a coastal State claims or may claim a specific jurisdiction.

16.23 Limit Reference

IHO Definition: Reference to the feature for which a coastal State claims a specific jurisdiction different from the feature's geographic boundary.

16.24 Location service hours

IHO Definition: Reference to the location for which service hours are given.

16.25 Layout Unit

IHO Definition: A reference to the diverse units comprising a feature of a different type.

16.26 Location Served

IHO Definition: Reference to the location (feature) where specified services are available.

16.27 Facility Operating Hours

IHO Definition: Reference to information about the days and times during which a facility operates or may be used.

16.28 Partial working day

IHO Definition: The work hours for a non-standard workday

16.29 Permission

IHO Definition: The permissions for a location

16.30 Positions

IHO Definition: A pointer to a specific cartographically positioned location for text.

16.31 Primary Facility

IHO Definition: A reference to the primary feature in an Auxiliaryfacility relationship.

16.32 Provides information

IHO Definition: A pointer to an object that provides more information about the referencing feature or information type.

16.33 Service Description Reference

IHO Definition: Reference to an information object describing services.

16.34 The information

IHO Definition: Information related to an organisation

16.35 The organisation

IHO Definition: The organisation to which information relates

16.36 The RxN

IHO Definition: The regulation, restriction, recommendation, or nautical information

16.37 Service Hours (reference)

IHO Definition: Service hours for an authority or service provider

16.38 The service hours for a non-standard workday

IHO Definition: The usual service hours to which an exception applies

16.39 Service place

IHO Definition: Pointer to service or facility

16.40 Sub-Unit

IHO Definition: Reference to a part of the same type as the whole feature in the relationship.

16.41 Vessel location

IHO Definition: The location to which the permission statement applies

17 Attribute and Enumerate Descriptions

[This section was generated automatically using S-100 tools and does not contain attribute types or constraints. See the review print of the feature catalogue for that information. Also, encoding instructions are provided for only a few attributes in this edition.]

17.1 Administrative Division

IHO Definition: A generic term for an administrative region within a country at a level below that of the sovereign state.

Value Type: text

Remarks:

• No remarks.

17.2 Applicable Load Line Zone

IHO Definition: The load line zone in which the port is located. Defined by the International Convention on Load Lines.

Value Type: text

Remarks:

• No remarks.

17.3 Application Profile

IHO Definition: Name of an application profile that can be used with the online resource.

Value Type: text

Remarks:

• No remarks.

17.4 Approach Description

IHO Definition: Description of the approach to a location.

Value Type: text

Remarks:

• No remarks.

17.5 Associated Feature Name

IHO Definition: The name of an associated feature.

Value Type: text

Remarks:

• No remarks.

17.6 Available Berthing Length

IHO Definition: The length of a berth or dock which is available for use.

Value Type: real

Remarks:

• No remarks.

17.7 Berthing Assistance

IHO Definition: Classification of assistance for mooring or anchoring operations.

1) **Berthing Information**

IHO Definition: Information about assistance or arrangements for a service related to berthing operations.

2) **Line Personnel**

IHO Definition: Personnel specializing in the mooring and unmooring of vessels.

3) **Mooring Boat**

IHO Definition: A boat which assists the securement of a vessel to a berth or mooring with ropes or anchor.

4) **Mule**

IHO Definition: A locomotive for moving vessels.

5) **Tugboat**

IHO Definition: A powerful small boat designed to pull or push larger ships or powerless barges.

Remarks:

• No remarks.

17.8 Bollard Description

IHO Definition: A textual description of the type of bollard at a berth or mooring facility.

Value Type: text

Remarks:

• No remarks.

17.9 Bollard Number

IHO Definition: An identifier used to locate a specific bollard.

Value Type: text

Remarks:

• No remarks.

17.10 Bollard Pull

IHO Definition: The rated pull force for a bollard or other structure used to secure a vessel's lines at a berth, a mooring facility or to a tug.

Value Type: real

Remarks:

• No remarks.

17.11 Call Name

IHO Definition: The designated call name of a station; for example, radio station, radar station, pilot.

Value Type: text

Remarks:

This is the name used when calling a radio station by radio; for example, "Singapore Pilots".

17.12 Call Sign

IHO Definition: The designated call-sign of a station (radio station, radar station, pilot, ...).

Value Type: text

Remarks:

• No remarks.

17.13 Cardinal Direction

IHO Definition: Principal and intermediate compass points.

1) **North**

IHO Definition: 348.75-011.25 degrees (true north).

2) **North Northeast**

IHO Definition: 011.25 - 033.75 degrees.

3) Northeast

IHO Definition: 033.75 - 056.25 degrees.

4) **East Northeast**

IHO Definition: 056.25-078.75 degrees.

5) East

IHO Definition: 078.75-101.25 degrees

6) **East Southeast**

IHO Definition: 101.25-123.75 degrees.

7) Southeast

IHO Definition: 123.75-146.25 degrees.

8) **South Southeast**

IHO Definition: 146.25-168.75 degrees.

9) South

IHO Definition: 168.75-191.25 degrees

10) **South Southwest**

IHO Definition: 191.25-213.75 degrees.

11) Southwest

IHO Definition: 213.75-236.25 degrees.

12) **West Southwest**

IHO Definition: 236.25-258.75 degrees.

13) West

IHO Definition: 258.75-281.25 degrees.

14) **West Northwest**

IHO Definition: 281.25-303.75 degrees.

15) Northwest

IHO Definition: 303.75 - 326.25 degrees.

16) **North Northwest**

IHO Definition: 326.25 - 348.75 degrees.

Remarks:

• No remarks.

17.14 Cargo Service

IHO Definition: Classification of services related to the goods or items carried by vessels.

1) **Stevedoring**

IHO Definition: The loading, unloading, moving or handling of cargo, ship's stores, gear, or other materials, into, in, on, or out of any vessel.

2) **Cargo Surveying**

IHO Definition: Inspection, evaluation or monitoring of the quantity, stowage, loading and unloading, and condition of cargo, and the effects of cargoes on vessel stability and safety.

3) **Cargo Lashing**

IHO Definition: The securement of cargo to the ship's structure and/or other cargo.

4) **Draught Survey**

IHO Definition: Determination of the quantity of certain types of bulk cargo by assessment of its effect on displacement when loaded in a vessel.

Remarks:

• No remarks.

17.15 Category of Authority

IHO Definition: The type of person, government agency or organisation granted powers of managing or controlling access to and/or activity in an area.

2) **Border Control**

IHO Definition: The administration to prevent or detect and prosecute violations of rules and regulations at international boundaries.

3) **Police**

IHO Definition: The department of government, or civil force, charged with maintaining public order.

4) **Port**

IHO Definition: Person or corporation, owners of, or entrusted with or invested with the power of managing a port. May be called a Harbour Board, Port Trust, Port Commission, Harbour Commission, Marine Department.

5) **Immigration**

IHO Definition: The authority controlling people entering a country.

6) **Health**

IHO Definition: The authority with responsibility for checking the validity of the health declaration of a vessel and for declaring free pratique.

7) **Coast Guard**

IHO Definition: Organization keeping watch on shipping and coastal waters according to governmental law; normally the authority with responsibility for search and rescue.

8) **Agricultural**

IHO Definition: The authority with responsibility for preventing infection of the agriculture of a country and for the protection of the agricultural interests of a country.

9) **Military**

IHO Definition: A military authority which provides control of access to or approval for transit through designated areas or airspace.

10) **Private Company**

IHO Definition: A private or publicly owned company or commercial enterprise which exercises control of facilities, for example a calibration area.

11) **Maritime Police**

IHO Definition: A governmental or military force with jurisdiction in territorial waters. Examples could include Gendarmerie Maritime, Carabinierie, and Guardia Civil.

12) **Environmental**

IHO Definition: An authority with responsibility for the protection of the environment.

13) **Fishery**

IHO Definition: An authority with responsibility for the control of fisheries.

14) **Finance**

IHO Definition: An authority with responsibility for the control and movement of money.

15) **Maritime**

IHO Definition: A national or regional authority charged with administration of maritime affairs.

16) **Customs**

IHO Definition: The agency or establishment for collecting duties, tolls.

Remarks:

• No remarks.

17.16 Category of Berth Location

IHO Definition: Classification of a berth according to the method of describing its location or extent.

1) **Wharf Reference Metre Mark**

IHO Definition: A wharf or quay with reference position(s) given by one or more metre marks.

2) **Wharf Reference Position**

IHO Definition: A wharf or quay with reference position(s) given by one or more point or points in geographic coordinates.

3) **Pier (Jetty)**

IHO Definition: A long, narrow structure extending into the water to afford a berthing place for vessels, to serve as a promenade, etc.

4) **Conventional Mooring**

IHO Definition: Mooring using the vessel's anchors and buoys to secure the vessel at multiple points.

Remarks:

• No remarks.

17.17 Category of Cargo

IHO Definition: Classification of the different types of cargo that a ship may be carrying.

2) **Container**

IHO Definition: One of a number of standard sized cargo carrying units, secured using standard corner attachments and bar.

5) **Passenger**

IHO Definition: A fee paying traveller.

6) **Livestock**

IHO Definition: Live animals carried in bulk.

7) **Dangerous or Hazardous**

IHO Definition: Dangerous or hazardous cargo as described by the IMO International Maritime Dangerous Goods code.

8) **Heavy Lift**

IHO Definition: Indivisible heavy items of weight generally over 100 tons, and width or height greater than 100 metres.

10) **Dry Bulk Cargo**

IHO Definition: Commodity cargo that is transported unpackaged in large quantities. These types of goods usually need to be kept dry during the whole transportation period.

11) **Liquid Bulk Cargo**

IHO Definition: Liquids or gases that are transported in bulk and carried unpackaged.

12) **Reefer Container Cargo**

IHO Definition: Cargo transported in refrigerated containers, generally perishable commodities which require temperature-controlled transportation, such as fruit, meat, fish, vegetables, dairy products and other foods.

13) **Ro-Ro Cargo**

IHO Definition: Wheeled cargo, such as cars, busses, trucks, agricultural vehicles and cranes, that are driven on and off the ship on their own wheels or using a platform vehicle, such as a self-propelled modular transporter.

14) **Project Cargo**

IHO Definition: Project cargo is a term used to broadly describe the national or international transportation of large, heavy, high value, or critical (to the project they are intended for) pieces of equipment. Also commonly referred to as heavy lift, this includes shipments made of various components which need disassembly for shipment and reassembly after delivery.

15) **Break Bulk Cargo**

IHO Definition: Goods that are stowed on board ship in individually counted units, and not in intermodal containers nor in bulk as with oil or grain.

Remarks:

If item 7 is used, the nature of dangerous or hazardous cargoes can be amplified with category of dangerous or hazardous cargo.

17.18 Category of Communication Preference

IHO Definition: Classification of frequencies, VHF channels, telephone numbers, or other means of communication based on preference.

1) **Preferred Calling**

IHO Definition: The first choice channel or frequency to be used when calling a radio station.

2) **Alternate Calling**

IHO Definition: A channel or frequency to be used for calling a radio station when the preferred channel or frequency is busy or is suffering from interference.

3) **Preferred Working**

IHO Definition: The first choice channel or frequency to be used when working with a radio station.

4) **Alternate Working**

IHO Definition: A channel or frequency to be used for working with a radio station when the preferred working channel or frequency is busy or is suffering from interference.

Remarks:

• No remarks.

17.19 Category Of Dangerous Or Hazardous Cargo

IHO Definition: Classification of dangerous goods or hazardous materials based on the International Maritime Dangerous Goods Code (IMDG Code).

1) **IMDG Code Class 1 Div. 1.1**

IHO Definition: Explosives, Division 1: Substances and articles which have a mass explosion hazard.

2) **IMDG Code Class 1 Div. 1.2**

IHO Definition: Explosives, Division 2: substances and articles which have a projection hazard but not a mass explosion hazard

3) **IMDG Code Class 1 Div. 1.3**

IHO Definition: Explosives, Division 3: substances and articles which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard

4) **IMDG Code Class 1 Div. 1.4**

IHO Definition: Explosives, Division 4: substances and articles which present no significant hazard

5) **IMDG Code Class 1 Div. 1.5**

IHO Definition: Explosives, Division 5: very insensitive substances which have a mass explosion hazard

6) **IMDG Code Class 1 Div. 1.6**

IHO Definition: Explosives, Division 6: extremely insensitive articles which do not have a mass explosion hazard

7) **IMDG Code Class 2 Div. 2.1**

IHO Definition: Gases, flammable gases

8) **IMDG Code Class 2 Div. 2.2**

IHO Definition: Gases, non-flammable, non-toxic gases

9) **IMDG Code Class 2 Div. 2.3**

IHO Definition: Gases, toxic gases

10) **IMDG Code Class 3**

IHO Definition: flammable liquids

11) **IMDG Code Class 4 Div. 4.1**

IHO Definition: flammable solids, self-reactive substances and desensitized explosives

12) **IMDG Code Class 4 Div. 4.2**

IHO Definition: substances liable to spontaneous combustion

13) **IMDG Code Class 4 Div. 4.3**

IHO Definition: substances which, in contact with water, emit flammable gases

14) **IMDG Code Class 5 Div. 5.1**

IHO Definition: oxidizing substances

15) **IMDG Code Class 5 Div. 5.2**

IHO Definition: organic peroxides

16) **IMDG Code Class 6 Div. 6.1**

IHO Definition: toxic substances

17) **IMDG Code Class 6 Div. 6.2**

IHO Definition: infectious substances

18) **IMDG Code Class 7**

IHO Definition: Radioactive material

19) **IMDG Code Class 8**

IHO Definition: Corrosive substances

20) **IMDG Code Class 9**

IHO Definition: Miscellaneous dangerous substances and articles

21) **Harmful Substances in Packaged Form**

IHO Definition: Harmful substances are those substances which are identified as marine pollutants in the International Maritime Dangerous Goods Code (IMDG Code). Packaged form is defined as the forms of containment specified for harmful substances in the IMDG Code.

Remarks:

• No remarks.

17.20 Category of Depths Description

IHO Definition: Classification of significant aspects of depths about which information is provided.

1) **Shoal**

IHO Definition: A shallow elevation composed of unconsolidated material that may constitute a hazard to surface navigation.

2) **General Depth**

IHO Definition: General information about the vertical distance from the water surface to the bottom.

3) **Controlling Depth**

IHO Definition: The least depth in the approach or channel to an area, such as a port or anchorage, governing the maximum draft of vessels that can enter.

Remarks:

• No remarks.

17.21 Category of Harbour Facility

IHO Definition: Classification of harbour use.

1) **RoRo Terminal**

IHO Definition: A terminal for roll-on roll-off ferries.

3) **Ferry Terminal**

IHO Definition: A terminal for passenger and vehicle ferries.

4) **Fishing Harbour**

IHO Definition: A harbour with facilities for fishing boats.

5) **Yacht Harbour/Marina**

IHO Definition: A harbour facility for small boats, yachts, etc., where supplies, repairs, and various services are available.

6) **Naval Base**

IHO Definition: A centre of operations for naval vessels.

7) **Tanker Terminal**

IHO Definition: A terminal for the bulk handling of liquid cargoes.

8) **Passenger Terminal**

IHO Definition: A terminal for the loading and unloading of passengers.

9) **Shipyard**

IHO Definition: A place where ships are built or repaired.

10) **Container Terminal**

IHO Definition: A terminal with facilities to load/unload or store shipping containers.

11) **Bulk Terminal**

IHO Definition: A terminal for the handling of bulk materials such as iron ore, coal, etc.

12) **Ship Lift**

IHO Definition: A platform powered by synchronous electric motors (for example syncrolift) used to lift vessels (larger than boats) in and out of the water.

13) **Straddle Carrier**

IHO Definition: A wheeled vehicle designed to lift and carry containers or vessels within its own framework. It is used for moving, and sometimes stacking, shipping containers and vessels.

14) **Service Harbour**

IHO Definition: A harbour within which the floating equipment (dredges, tugs ...) of harbour services are stationed.

15) **Pilotage Service**

IHO Definition: The services of a person who directs the movements of a vessel through pilot waters, usually a person who has demonstrated extensive knowledge of channels, aids to navigation, dangers to navigation, etc., in a particular area and is licensed for that area, are available.

16) **Service and Repair**

IHO Definition: A place where mechanical services or repairs can be undertaken to engines or other vessel equipment.

17) **Quarantine Station**

IHO Definition: A medical control center located in an isolated spot ashore where patients with contagious diseases from vessel in quarantine are taken.

Remarks:

• No remarks.

17.22 Category of Mooring/Warping Facility

IHO Definition: A place or structure to which a vessel can be secured.

1) **Dolphin**

IHO Definition: A post or group of posts, used for mooring or warping a vessel, or as an aid to navigation. The dolphin may be in the water, on a wharf or on the beach.

2) **Deviation Dolphin**

IHO Definition: A post or group of posts, which a vessel may swing around for compass adjustment.

3) **Bollard**

IHO Definition: Small shaped post, mounted on a wharf or dolphin used to secure ship's lines.

4) **Tie-Up Wall**

IHO Definition: A section of wall designated for tying-up vessels awaiting transit. Bollards and mooring devices are available for both large and small ships.

5) **Post or Pile**

IHO Definition: A long heavy timber or section of steel, wood, concrete, etc., forced into the seabed to serve as a mooring facility.

6) **Mooring Cable**

IHO Definition: A chain or very strong fibre or wire rope used to anchor or moor vessels or buoys.

7) **Mooring Buoy**

IHO Definition: A buoy secured to the bottom by permanent moorings with means for mooring a vessel by use of its anchor chain or mooring lines.

Remarks:

• No remarks.

17.23 Category of Port Section

IHO Definition: Classification of subdivisions of a port or harbour area by usage.

1) **Port Fairway**

IHO Definition: The main navigable channel in a harbour or its approaches, for vessels of larger size.

3) **Berth Pocket**

IHO Definition: A body of water at a berth or anchor berth, of adequate dimensions to allow a vessel to make fast to the shore, mooring buoys, berthing dolphins or to anchor.

8) **Seaplane Anchorage**

IHO Definition: An area in which sea-planes anchor or may anchor.

9) **Dredged Basin**

IHO Definition: An area of water or channel enlargement of increased depth compared to adjacent areas, where the depth is maintained by dredging operations.

11) **Port Safety Zone**

IHO Definition: The area around a port facility or harbour installation within which vessels are prohibited from entering without permission.

12) **Lay-by Berth**

IHO Definition: A general berth for use by vessels for short term waiting until a loading or discharging berth is available.

Remarks:

• No remarks.

17.24 Category of Relationship

IHO Definition: Expresses constraints or requirements on vessel actions or activities in relation to a geographic feature, facility, or service.

1) **Prohibited**

IHO Definition: Use of facility, waterway or service is forbidden.

2) **Not Recommended**

IHO Definition: Use of facility, waterway or service is not recommended.

3) **Permitted**

IHO Definition: Use of facility, waterway, or service is permitted but **not required**.

4) Recommended

IHO Definition: Use of facility, waterway, or service is recommended.

5) Required

IHO Definition: Use of facility, waterway, or service is required.

6) Not Required

IHO Definition: Use of facility, waterway, or service is not required.

Remarks:

• No remarks.

17.25 Category of Schedule

IHO Definition: The type of schedule, for instance opening, **closure**, etc.

1) **Normal Operation**

IHO Definition: The service, office, is open, fully manned, and operating normally, or the area is accessible as usual.

2) Closure

IHO Definition: The service, office, or area is closed.

3) **Unmanned Operation**

IHO Definition: The service is available but not manned.

Remarks:

• No remarks.

17.26 Category of Temporal Variation

IHO Definition: An assessment of the likelihood of change over time.

1) **Extreme Event**

IHO Definition: Indication of the possible impact of a significant event (for example hurricane, earthquake, volcanic eruption, landslide, etc), which is considered likely to have changed the seafloor or landscape significantly.

2) **Likely to Change and Significant Shoaling Expected**

IHO Definition: Continuous or frequent change (for example river siltation, sand waves, seasonal storms, ice bergs, etc) that is likely to result in new significant shoaling.

3) **Likely to Change But Significant Shoaling Not Expected**

IHO Definition: Continuous or frequent change (for example sand wave shift, seasonal storms, ice bergs, etc) that is not likely to result in new significant shoaling.

4) Likely to Change

IHO Definition: Continuous or frequent change to non-bathymetric features (for example river siltation, glacier creep/recession, sand dunes, buoys, marine farms, etc).

5) **Unlikely to Change**

IHO Definition: Significant change to the seafloor is not expected.

6) **Unassessed**

IHO Definition: Not having been assessed.

Remarks:

• No remarks.

17.27 Category of text

IHO Definition: Classification of completeness of textual information in relation to the source.

1) **Abstract or Summary**

IHO Definition: A statement summarizing the important points of a text.

2) **Extract**

IHO Definition: An excerpt or excerpts from a text.

3) **Full Text**

IHO Definition: The whole text.

Remarks:

• No remarks.

17.28 Category of Vessel Registry

IHO Definition: The locality of vessel registration or enrolment relative to the nationality of a port, territorial sea, administrative area, exclusive zone or other location.

1) **Domestic**

IHO Definition: The vessel is registered or enrolled under the same national flag as the port, harbour, territorial sea, exclusive economic zone, or administrative area in which the object that possesses this attribute applies or is located.

2) **Foreign**

IHO Definition: The vessel is registered or enrolled under a national flag different from the port, harbour, territorial sea, exclusive economic zone, or other administrative area in which the object that possesses this attribute applies or is located.

Remarks:

• No remarks.

17.29 Cathodic Protection System

IHO Definition: A system used to protect metal structures against corrosion by supplying direct current to the immersed external surface of the structure.

Value Type: boolean

Remarks:

• No remarks.

17.30 City Name

IHO Definition: The name of a town or city.

Value Type: text

Remarks:

• No remarks.

17.31 Communication Channel

IHO Definition: A channel number assigned to a specific radio frequency, frequencies or frequency band.

Value Type: text

Remarks:

The expected input is the specific VHF-Channel. The attribute 'communication channel' encodes the various VHF-channels used for communication.

17.32 Condition

IHO Definition: The various conditions of buildings and other constructions.

1) **Under Construction**

IHO Definition: Being built but not yet capable of function.

2) **Ruined**

IHO Definition: A structure in a decayed or deteriorated condition resulting from neglect or disuse, or a damaged structure in need of repair.

3) **Under Reclamation**

IHO Definition: An area of the sea, a lake or the navigable part of a river that is being reclaimed as land, usually by the dumping of earth and other material.

5) **Planned Construction**

IHO Definition: Detailed planning has been completed but construction has not been initiated.

Remarks:

The default 'condition' should be considered to be completed, undamaged and working normally.

17.33 Comparison Operator

IHO Definition: Numerical comparison.

1) **Greater Than**

IHO Definition: The value of the left value is greater than that of the right.

2) **Greater Than or Equal To**

IHO Definition: The value of the left expression is greater than or equal to that of the right.

3) **Less Than**

IHO Definition: The value of the left expression is less than that of the right.

4) **Less Than or Equal To**

IHO Definition: The value of the left expression is less than or equal to that of the right.

5) Equal To

IHO Definition: The two values are equivalent.

6) **Not Equal To**

IHO Definition: The two values are not equivalent.

Remarks:

Provides the relation between the value given in the model and the real ship's value.

17.34 Contact Instructions

IHO Definition: Instructions provided on how to contact a particular person, organisation or service.

Value Type: text

Remarks:

• No remarks.

17.35 Country Name

IHO Definition: The name of a nation.

Value Type: text

Remarks:

• No remarks.

17.36 Date End

IHO Definition: The latest date on which an object (for example a buoy) will be present.

Indication: Dates should be encoded using 4 digits for the calendar year (YYYY), 2 digits for the month (MM) (for example April = 04) and 2 digits for the day (DD). When no specific year, month and/or day is required/known, indication of the year, month and/or day is omitted.

Value Type: S100_TruncatedDate

Remarks:

Date End indicates the latest date of an event or the end of a date range. It is used to indicate the end of a fixed date range, the end of a periodic date range, or the removal or cancellation of a feature at a specific date in the future.

17.37 Date Fixed

IHO Definition: The date of an event.

Value Type: S100_TruncatedDate

Remarks:

• No remarks.

17.38 Date Start

IHO Definition: The earliest date on which an object (for example a buoy) will be present.

Value Type: S100_TruncatedDate

Remarks:

Date Start indicates the earliest date of an event or the start of a date range. It is used to indicate the start of a fixed date range, the start of a periodic date range, or the deployment or implementation of a feature at a specific date in the future.

17.39 Date Variable

IHO Definition: A day which is not fixed in the Gregorian calendar.

Value Type: text

Remarks:

Examples: The fourth Thursday in November; new moon day of Kartika (Diwali); Easter Sunday.

17.40 Day of Week

IHO Definition: Any one of seven days in a week.

1) **Sunday**

IHO Definition: The first day of the week.

2) **Monday**

IHO Definition: The second day of the week.

3) **Tuesday**

IHO Definition: The third day of the week.

4) **Wednesday**

IHO Definition: The fourth day of the week.

5) **Thursday**

IHO Definition: The fifth day of the week.

6) **Friday**

IHO Definition: The sixth day of the week.

7) **Saturday**

IHO Definition: The seventh day of the week.

Remarks:

• No remarks.

17.41 Day of Week is Range

IHO Definition: A statement expressing if the days of the week identified define a range or not.

Value Type: boolean

Remarks:

A True value is an indication that the identified days of the week define a range between and inclusive of those days.

17.42 Delivery Point

IHO Definition: Details of where post can be delivered such as the apartment, name and/or number of a street, building or PO Box.

Value Type: text

Remarks:

• No remarks.

17.43 Development

IHO Definition: Describes a feature that is in development.

Value Type: text

Remarks:

• No remarks.

17.44 Display Name

IHO Definition: A statement expressing if a feature name is to be displayed in certain system display settings or not.

Indication: A True value is an indication that the name is intended to be displayed.

Value Type: boolean

Remarks:

Where it is allowable to encode multiple instances of feature name for a single feature instance, only one feature name instance can indicate that the name is to be displayed (display name set to True).

17.45 Distance

IHO Definition: A numeric measure of the spatial separation between two locations.

Value Type: real

Remarks:

• No remarks.

17.46 Dynamic Resource

IHO Definition: Whether a vessel must use a shore-based or other resource to obtain up-to-date information.

1) **Static**

IHO Definition: The information is static, or a source of up-to-date information is unavailable or unknown.

2) **Mandatory External Dynamic**

IHO Definition: An external source of up-to-date information is available and interaction with it to obtain up-to-date information is required.

3) **Optional External Dynamic**

IHO Definition: An external source of up-to-date information is available but interaction with it to obtain up-to-date information is not required.

4) **Onboard Dynamic**

IHO Definition: Up-to-date information may be computed using only onboard resources.

Remarks:

• No remarks.

17.47 Elevation

IHO Definition: The altitude of the ground level of an object, measured from a specified vertical datum.

Value Type: real

Remarks:

• No remarks.

17.48 Entrance Description

IHO Definition: Description of the seaward end of a channel, harbour, dock, etc.

Value Type: text

Remarks:

• No remarks.

17.49 File Locator

IHO Definition: The location of a fragment of text or other information in a support file.

Value Type: text

Indication: The string encodes the location of a single fragment of text or other information contained in a support file.

Example: **p-224.105(a)(1)** (when used as the ID of a element in an XML support file)

Remarks:

- The attribute **file locator** indicates the location of a section of text within the file referenced by the attribute **file reference** that is relevant for a particular feature.
- The value populated for **file locator** depends on the type of file:
  - Plain-text (S-100 support file format = "ASCII"): The offset of the start of the section relative to the beginning of the file (the first character in the file has offset 0).
  - HTML: A HTML fragment identifier; this is the value of the *name* or *id* attribute of a HTML element in the file.
  - XML: XML fragment identifier; that is, the value of an *xml:id* attribute of an element in the file.
- The type of file is provided in the support file discovery metadata block (see S-100 Part 17 S100_SupportFileFormat).

17.50 File Reference

IHO Definition: The file name of an externally referenced text file.

Value Type: text

Remarks:

• No remarks.

17.51 Firefighting Service

IHO Definition: Services for combating fires, provided by different methods.

1) **Shore-Based Firefighting**

IHO Definition: Personnel and equipment that are capable of combating a fire from ashore.

2) **Onboard Firefighting**

IHO Definition: Trained firefighting personnel with the capability of boarding and combating a fire on a vessel.

3) **Firefighting Boat**

IHO Definition: Specialised watercraft with firefighting apparatus designed for fighting shoreline and shipboard fires

Remarks:

• No remarks.

17.52 Frequency Shore Station Receives

IHO Definition: The shore station receiver frequency.

Value Type: integer

Remarks:

• No remarks.

17.53 Frequency Shore Station Transmits

IHO Definition: The shore station transmitter frequency.

Value Type: integer

Remarks:

• No remarks.

17.54 GLN Extension

IHO Definition: The GLN extension component is used to identify internal physical locations within a location which is identified with a GLN. Must conform to the rules for GLN extension. (GS1 specification).

Value Type: text

Remarks:

• The GLN extension component is used to identify internal physical locations within a location which is identified with a GLN. Must conform to the rules for GLN extension. (GS1 specification.

17.55 Global Location Number

IHO Definition: A globally unique, standardised identifier for parties and locations in business processes or supply chains.

Value Type: text

Remarks:

•Global Location Numbers may be used to identify physical or digital locations, legal entities, organisational subdivisions or departments. A Global Location Number must conform to the GLN format specified in GS1 General Specifications.

17.56 Headline

IHO Definition: Words set at the head of a passage or page to introduce or categorize.

Value Type: text

Example: **Weather and Tidal Information**

Remarks:

• The length of a *headline* value should be no more than 60 characters.

17.57 Heaving Lines From Shore

IHO Definition: Ships must take heaving lines thrown from the shore.

Value Type: boolean

Remarks:

No remarks

17.58 Horizontal Distance Uncertainty

IHO Definition: The best estimate of the horizontal accuracy of horizontal clearances and distances.

Attribute Type: Real

Unit: Defined as an attribute in the ENC dataset metadata: metre (m)

Resolution: 0·1m

Format: xx.x

Example: **0.5** for an error of 0·5 metres.

Remarks:

- The expected input is the radius of the two-dimensional error.
- The error is assumed to be positive and negative. The plus/minus character must not be encoded.

17.59 ID Code

IHO Definition: Identification code as specified in predefined system. Also called identification number.

Value Type: text

Remarks:

• No remarks.

17.60 In Ballast

IHO Definition: Whether the vessel is in ballast.

Value Type: boolean

Remarks:

• No remarks.

17.61 ISPS Level

IHO Definition: Classification of ISPS security levels according to the ISPS Code.

1) **ISPS Level 1**

IHO Definition: The level for which minimum appropriate protective security measures shall be maintained at all times.

2) **ISPS Level 2**

IHO Definition: The level for which appropriate additional protective security measures shall be maintained for a period of time as a result of heightened risk of a security incident.

3) **ISPS Level 3**

IHO Definition: The level for which further specific protective security measures shall be maintained for a limited period of time when a security incident is probable or imminent, although it may not be possible to identify the specific target.

Remarks:

• No remarks.

17.62 Language

IHO Definition: The method of human communication, either spoken or written, consisting of the use of words in a structured and conventional way.

Attribute Type: text
Indication: The language is encoded by a character code following

ISO 639-2/T.

Format: c3 **(mandatory)**

Example: **eng** for English

Remarks:

The language is encoded by a 3 character code following ISO 639-2/T.

17.63 Local Knowledge Description

IHO Definition: Description of local knowledge that may be needed, for example to traverse a location.

Value Type: text

Remarks:

• No remarks.

17.64 Location by Text

IHO Definition: A textual rendering of a geographic location.

Value Type: text

Remarks:

• No remarks.

17.65 Location Maritime Resource Name

IHO Definition: Location identifier, based on MRN. This can be either a specific identifier for an identified physical location or a type-only identifier for a logical location, such as BERTH.

Value Type: URN

Remarks:

• No remarks.

17.66 Logical Connectives

IHO Definition: Expresses whether all the constraints described by its co-attributes must be satisfied, or only one such constraint need be satisfied.

1) **Logical Conjunction**

IHO Definition: All the conditions described by the other attributes of the object, or sub-attributes of the same complex attribute, are true.

2) **Logical Disjunction**

IHO Definition: At least one of the conditions described by the other attributes of the object, or sub-attributes of the same complex attributes, is true.

Remarks:

This attribute is intended to be used with co-attributes that encode limits on vessel dimensions, type of cargo, and other characteristics.

The combination of constraints described by **logicalConnective** and its co-attributes defines a subset of vessels to which information described by a feature or information type instance applies (or does not apply, is required, recommended, etc.).

The relationship between the vessel subset and the information is indicated by an association - see PermissionType and InclusionType).

The two listed values of logicalConnective are two of the basic operations of Boolean logic. The third basic operation (not) is not used.

17.67 Manifold Number

IHO Definition: An identifier for a specific location on a manifold (a pipe or chamber with several openings).

Value Type: text

Remarks:

• No remarks.

17.68 Maximum Display Scale

IHO Definition: The largest intended viewing scale for the data.

Type: Integer

Indication: The modulus of the scale is indicated, that is 1:22 000 is encoded as 22000.

Unit: none

Resolution: 1

Minimum value: 1

Format: xxxxxxxx

Example: **12000** for a maximum display scale of scale of 1:12000

Remarks:
Maximum display scale provides a reference for the user-selected viewing scale in the ECDIS at which the overscale warning will be displayed if there is no larger maximum display scale ENC dataset available, as well as the ECDIS viewing scale when the cell is loaded.
This attribute is only used in conjunction with the meta feature **Data Coverage** which is used to define polygons of equal largest intended viewing scale. **Maximum display scale** should therefore not be confused with the attribute **scale maximum**.

17.69 Medical Service

IHO Definition: Services for the prevention or treatment of, or response to injury or illness.

1) **Ambulance**

IHO Definition: A vehicle for conveying the sick or injured to or from a hospital.

2) **Fumigation**

IHO Definition: Disinfection or purification with fumes.

3) **Doctor**

IHO Definition: A place where a doctor is available to provide medical attention.

4) **Quarantine**

IHO Definition: The isolation of patients with contagious diseases.

5) **Vaccination Centre**

IHO Definition: A place where substances intended to procure immunity against one or several diseases are administered.

Remarks:

• No remarks.

17.70 Membership

IHO Definition: Indicates whether a vessel is **included** or **excluded** from the regulation/restriction/recommendation/nautical information.

1) **Included**

IHO Definition: Vessels with these characteristics are included in the regulation/restriction/recommendation/nautical information.

2) **Excluded**

IHO Definition: Vessels with these characteristics are excluded from the regulation/restriction/recommendation/nautical information.

Remarks:

• No remarks.

17.71 Method of Securing

IHO Definition: The process, arrangement or scheme of attachment used to secure a vessel to a berth.

1) **Bow to Seaward**

IHO Definition: Vessel is secured perpendicular to the wharf with bow to seaward.

2) **Stern to Seaward**

IHO Definition: Vessel is secured perpendicular to the wharf with stern to the seaward.

3) **Mediterranean Mooring**

IHO Definition: The vessel is secured perpendicular to the wharf.

4) **Baltic Mooring**

IHO Definition: Mooring method/procedure used during onshore wind conditions without a tug.

5) **Running Mooring**

IHO Definition: Mooring by maneuvering ahead and astern while dropping anchors to secure the vessel with reduced swinging room.

6) **Standing Mooring**

IHO Definition: Mooring by using mainly wind and tide to position the vessel while dropping anchors to secure the vessel with reduced swinging room. Makes limited use of the engine to position the vessel.

7) **Single Point Mooring**

IHO Definition: A mooring structure used by tankers to load and unload in port approaches or in offshore oil and gas fields. The size of the structure can vary between a large mooring buoy and a manned floating structure.

8) **Conventional Mooring**

IHO Definition: Mooring using the vessel's anchors and buoys to secure the vessel at multiple points.

9) **Ship-to-Ship Mooring**

IHO Definition: Mooring alongside another vessel.

10) **Spider Buoy Mooring**

IHO Definition: Mooring system supported by a spider buoy.

Remarks:

• No remarks.

17.72 Metre Mark Number

IHO Definition: An identifier for a specific position along a linear or curvilinear extent of a wharf, quay, or jetty. Numbering may be continued over multiple segments.

Value Type: text

Remarks:

• No remarks.

17.73 Minimum Berth Depth

IHO Definition: The least depth of the body of water at the berth or in a berth pocket adjacent to the berth.

Value Type: real

Remarks:

• No remarks.

17.74 Minimum Display Scale

IHO Definition: The smallest intended viewing scale for the data.

Type: Integer

Indication: The modulus of the scale is indicated, that is 1:700 000 is encoded as 700000.

Unit: none

Resolution: 1

Minimum value: 1

Format: xxxxxxxx

Example: **700000** for a minimum display scale of scale of 1:700000

Remarks:

- **Minimum display scale** is intended to be used in a series of ENC cells covering a geographic area to determine the dataset loading strategy as the user selected viewing scale becomes larger.
- This attribute is only used in conjunction with the meta feature **Data Coverage** which is used to define polygons of equal smallest intended viewing scale. **minimum display scale** should therefore not be confused with the attribute **scale minimum**.

17.75 MMSI Code

IHO Definition: The Maritime Mobile Service Identity (MMSI) Code is formed of a series of nine digits which are transmitted over the radio path in order to uniquely identify ship stations, ship earth stations,coast stations, coast earth stations, and group calls. These identities are formed in such a way that the identity or part thereof can be used by telephone and telex subscribers connected to the general telecommunications network principally to call ships automatically.

Value Type: text

Remarks:

• No remarks.

17.76 Name

IHO Definition: The individual name of a feature.

Value Type: text

Remarks:

• No remarks.

17.77 Name of Resource

IHO Definition: Name of the online resource.

Value Type: text

Remarks:

• No remarks.

17.78 Nationality

IHO Definition: Identifier of membership of a particular nation.

Type: text

Indication: The nationality is encoded by a 2 character code following ISO 3166

Format:

Example: **AU** for Australia
US for the United States of America

Remarks:

- The attribute “nationality” indicates the nationality of the specific feature.

- Where it is required to encode multiple nationalities relevant to a single feature (for example, for a maritime jurisdiction area that is in dispute between two Coastal States), this must be done by populating multiple instances of **nationality**.

17.79 Online Function

IHO Definition: Code for function performed by the online resource.

1) **Download**

IHO Definition: online instructions for transferring data from one storage device or system to another.

3) **Offline Access**

IHO Definition: Online instructions for requesting the resource from the provider.

4) **Order**

IHO Definition: Online order process for obtaining the resource.

5) **Search**

IHO Definition: To make painstaking investigation or examination.

6) **Complete Metadata**

IHO Definition: Complete metadata provided.

7) **Browse Graphic**

IHO Definition: Browse graphic provided.

8) **Upload**

IHO Definition: Online resource upload capability provided.

9) **Email Service**

IHO Definition: Online email service provided.

10) **Browsing**

IHO Definition: Online browsing provided.

11) **File Access**

IHO Definition: Online file access provided (ISO 19115:2014)

Remarks:

• No remarks.

17.80 Online Resource Description

IHO Definition: Detailed text description of what the online resource is/does.

Value Type: text

Remarks:

• No remarks.

17.81 Online Resource Linkage URL

IHO Definition: Universal Resource Locator of the online resource.

Attribute Type: URL

Indication:

Format: URL address

Example: https://www.iho.int

Remarks:

• No remarks.

17.82 Orientation Uncertainty

IHO Definition: The best estimate of the accuracy of a bearing.

Value Type: real

Remarks:

• No remarks.

17.83 Orientation Value

IHO Definition: The angular distance measured from true north to the major axis of the feature.

Value Type: real

Remarks:

• No remarks.

17.84 Pictorial Representation

IHO Definition: Indicates whether a pictorial representation of the feature is available.

Value Type: text

Remarks:

The 'pictorial representation' could be a drawing or a photo. The string encodes the file name of an external graphic file (pixel/vector).

17.85 Picture Caption

IHO Definition: Short description of the purpose of the image

Value Type: text

Remarks:

• No remarks.

17.86 Picture Information

IHO Definition: A set of information to provide credits to picture creator, copyright owner etc.

Value Type: text

Remarks:

• No remarks.

17.87 Port Facility Number

IHO Definition: Number assigned to the port facility in the IMO port facility database.

Value Type: text

Remarks:

• The IMO port facility number consists of a UN LOCODE with a 4-digit sufffix, seperated by a hyphen, for example USLAX-0001.

17.88 Postal Code

IHO Definition: Known in various countries as a postcode, or ZIP code, the postal code is a series of letters and/or digits that identifies each postal delivery area.

Value Type: text

Remarks:

• No remarks.

17.89 Product

IHO Definition: The various substances which are transported, st**ore**d or exploited.

1) **Oil**

IHO Definition: A thick, slippery liquid that will not dissolve in water, usually petroleum based in the context of storage tanks.

2) **Gas**

IHO Definition: A substance with particles that can move freely, usually a fuel substance in the context of storage tanks.

4) **Stone**

IHO Definition: A general term for rock and rock fragments ranging in size from pebbles and gravel to boulders or large rock masses.

5) **Coal**

IHO Definition: A hard black mineral that is burned as fuel.

6) Ore

IHO Definition: A solid rock or mineral from which metal is obtained.

7) **Chemicals**

IHO Definition: Any substance obtained by or used in a chemical process.

9) **Milk**

IHO Definition: A white fluid secreted by female mammals as food for their young.

10) **Bauxite**

IHO Definition: A mineral from which aluminum is obtained.

11) **Coke**

IHO Definition: A solid substance obtained after gas and tar have been extracted from coal, used as a fuel.

12) **Iron Ingots**

IHO Definition: An oblong lump of cast iron metal.

13) **Salt**

IHO Definition: Sodium chloride obtained from mines or by the evaporation of sea water.

14) **Sand**

IHO Definition: Loose material consisting of small but easily distinguishable, separate **grain**s, between 0.0625 and 2.000 millimetres in diameter.

15) **Timber**

IHO Definition: Wood prepared for use in building or carpentry.

16) **Sawdust/Wood Chips**

IHO Definition: Powdery fragments of wood made in sawing timber or coarse chips produced for use in manufacturing pressed board.

17) **Scrap Metal**

IHO Definition: Discarded metal suitable for being reprocessed.

18) **Liquefied Natural Gas**

IHO Definition: Natural gas that has been liquefied for ease of transport by cooling the gas to -162 Celsius.

19) **Liquefied Petroleum Gas**

IHO Definition: A compressed gas consisting of flammable light hydrocarbons and derived from petroleum.

20) **Wine**

IHO Definition: The fermented juice of grapes.

21) **Cement**

IHO Definition: A substance made of powdered lime and clay, mixed with water.

22) Grain

IHO Definition: A small hard seed, especially that of any cereal plant such as wheat, rice, corn, rye etc.

Remarks:

• No remarks.

17.90 Protocol

IHO Definition: connection protocol to be used. Example: ftp, http get KVP, http POST, etc.

Value Type: text

Remarks:

• No remarks.

17.91 Protocol Request

IHO Definition: Request used to access the resource. Structure and content depend on the protocol and standard used by the online resource, such as Web Feature Service standard.

Value Type: text

Remarks:

• No remarks.

17.92 Quality of Horizontal Measurement

IHO Definition: The degree of reliability attributed to a position.

1) **Surveyed**

IHO Definition: The position(s) was(were) determined by the operation of making measurements for determining the relative position of points on, above or beneath the earth's surface. Survey implies a regular, controlled survey of any date.

2) **Unsurveyed**

IHO Definition: Survey data is does not exist or is very poor.

3) **Inadequately Surveyed**

IHO Definition: Not surveyed to modern standards; or due to its age, scale, or positional or vertical uncertainties is not suitable to the type of navigation expected in the area.

4) **Approximate**

IHO Definition: A position that is considered to be less than third-order accuracy, but is generally considered to be within 30.5 metres of its correct geographic location. Also may apply to an object whose position does not remain fixed.

5) **Position Doubtful**

IHO Definition: Of uncertain position. The expression is used principally on charts to indicate that a wreck, shoal, etc., has been reported in various positions and not definitely determined in any.

6) **Unreliable**

IHO Definition: A feature's position has been obtained from questionable or unreliable data.

7) **Reported (Not Surveyed)**

IHO Definition: An object whose position has been reported and its position confirmed by some means other than a formal survey such as an independent report of the same object.

8) **Reported (Not Confirmed)**

IHO Definition: An object whose position has been reported and its position has not been confirmed.

9) **Estimated**

IHO Definition: The most probable position of an object determined from incomplete data or data of questionable accuracy.

10) **Precisely Known**

IHO Definition: A position that is of a known value, such as the position of an anchor berth or other defined object.

11) **Calculated**

IHO Definition: A position that is computed from data.

Remarks:

• No remarks.

17.93 Ramp Number

IHO Definition: An identifier for a specific ramp (a sloping structure that can be used as a landing place for small vessels, landing ships, or a ferry boat, or for hauling a cradle carrying a vessel, or for the transfer of rolling cargo).

Value Type: text

Remarks:

• No remarks.

17.94 Repair Service

IHO Definition: Work or maintenance activities whereby vessels or equipment are restored to working order, renovated, or improved in condition.

1) **Compensation of Magnetic Compass**

IHO Definition: The process of neutralizing or reducing to a minimum the magnetic effects the vessel itself exerts on a magnetic compass. It is based on the principle that the magnetic effect of the iron and steel of the vessel can be counterbalanced by means of magnets and soft iron placed near the compass. Also called compass adjustment, compass compensation, or magnetic compensation.

2) **Diver Service**

IHO Definition: Underwater inspection and repair performed by divers.

3) **Bridge Equipment Repair**

IHO Definition: Repairs to eqipment installed on the ship's bridge.

4) **Engine Repair**

IHO Definition: Repair of an engine or machine parts.

5) **Electronic Equipment Repair**

IHO Definition: Repair of marine electronic instruments.

6) **Hull Repair**

IHO Definition: Repairs to the ship's body, frame, or superstructure.

7) **Navigational Equipment Repair**

IHO Definition: Repairs to equipment used in the act of navigating a ship.

8) **Propeller Repair**

IHO Definition: Repairs to propeller hub and blades.

9) **Salvage Gear Repair**

IHO Definition: Repairs to equipment used in salvage operations.

10) **Shaft Repair**

IHO Definition: Repairs to drive shafts used for transmitting mechanical power and torque to a propeller.

Remarks:

• No remarks.

17.95 Reported Date

IHO Definition: The date that the item was observed, done, or investigated.

Value Type: S100_TruncatedDate

Remarks:

• No remarks.

17.96 SMDG Terminal Code

IHO Definition: A code from the SMDG (Ship Message Design Group) Terminal Code List.

Value Type: text

Remarks:

• No remarks.

17.97 Scale Minimum

IHO Definition: The minimum scale at which the feature may be used for example for ECDIS presentation.

Value Type: integer

Indication: The modulus of the scale is indicated, that is 1:89 999 is encoded as 89999

Example: If a particular minimum scale is specified as 1:89 999 (encoded as **89999**), and an example of a smaller scale would be 1:179 999 (encoded as **179999**).

The **scale minimum** value of a feature determines the display scale below which the feature is no longer displayed. Its purpose is to reduce clutter, to prioritise the display of features and to improve display speed. In encoding its value, the producing authority should consider these factors, as well as the scale at which the feature is no longer likely to be required for navigation.

In order to optimise the performance and clarity of the ENC, it is a mandatory requirement on ENCs that **scale minimum** is used.

Remarks:

- **scale minimum** only affects the display of a feature on an ECDIS, not its presence in the SD.
- If **scale minimum** is not encoded, the feature is displayed at all scales.
- Where **scale minimum** is used, it must always be set to a scale less (that is, to a smaller scale) than or equal to the maximum display scale of the data. Failure to follow this rule will mean that features will not be displayed on the ECDIS until the overscale warning is activated.
- If the same feature exists in datasets of different maximum display scales, the same **scale minimum** value must be assigned to each occurrence of the feature.

17.98 Sector Bearing

IHO Definition: A sector is the part of a circle between two straight lines drawn from the centre to the circumference. Sector bearing specifies the limit of the sector.

Value Type: real

Remarks:

The values given to the common limits of adjacent sectors should be identical. The orientation of bearing is from seaward to the central object. This conforms with the method used in 'List of Lights' publications. A generic term such as 'to shore' cannot be used; a specific bearing must be encoded. Where a light sector limit is defined as 'to the shore', it should be encoded using a value that ensures that, when the limit is drawn, it will fall entirely on land.

17.99 Ship Sanitation Control

IHO Definition: Application of measures to ensure that a vessel is free of disease and disease risks, or issue of completion or exemption certificates for such measures.

1) **Sanitation Measures Only**

IHO Definition: Capable of applying measures to ensure that a vessel is free of disease and disease risks, but cannot issue a certificate.

2) **Issue SSCC**

IHO Definition: The competent authority can issue a Ship Sanitation Control Certificate after satisfactorily completing or supervising the completion of ship sanitation control measures.

3) **Issue SSCEC**

IHO Definition: The competent authority may issue a Ship Sanitation Control Exemption Certificate if it is satisfied that the ship is free of infection and contamination, including vectors and reservoirs

Remarks:

• No remarks.

17.100 Signal Frequency

IHO Definition: The frequency of a signal.

Value Type: integer

Remarks:

• No remarks.

17.101 Sill Depth

IHO Definition: The greatest depth over a sill.

Value Type: real

Remarks:

• No remarks.

17.102 Source

IHO Definition: The publication, document, or reference work from which information comes or is acquired.

Value Type: text

Remarks:

May be populated with the corresponding paper chart Notice to Mariners numbers, although other references are permitted.

17.103 Source Date

IHO Definition: The production date of the source; for example the date of measurement.

Value Type: date

Remarks:

• No remarks.

17.104 Source Type

IHO Definition: Type of the source.

1) **Law or Regulation**

IHO Definition: Treaty, convention, or international agreement; law or regulation issued by a national or other authority.

2) **Official Publication**

IHO Definition: Publication not having the force of law, issued by an international organisation or a national or local administration.

7) **Mariner Report, Confirmed**

IHO Definition: Reported by mariner(s) and confirmed by another source.

8) **Mariner Report, Not Confirmed**

IHO Definition: Reported by mariner(s) but not confirmed.

9) **Industry Publications and Reports**

IHO Definition: Shipping and other industry publications, including graphics, charts and web sites.

10) **Remotely Sensed Images**

IHO Definition: Information obtained from satellite images.

11) **Photographs**

IHO Definition: Information obtained from photographs.

12) **Products Issued by HO Services**

IHO Definition: Information obtained from products issued by Hydrographic Offices.

13) **News Media**

IHO Definition: Information obtained from news media.

14) **Traffic Data**

IHO Definition: Information obtained from the analysis of traffic data.

Remarks:

• No remarks.

17.105 Supply Service

IHO Definition: Classification of services for the provision of materials, goods, utilities, or personal services to vessels, passengers, or crew.

1) **Shore Power**

IHO Definition: The provision of shoreside electrical power to a ship at berth while its main and auxiliary engines are shut down.

2) **Fuel Oil Bunkering**

IHO Definition: Transfer of fuel oil to the fuel compartments of a ship.

3) **LNG Bunkering**

IHO Definition: Transfer of liquefied natural gas to the fuel compartments of a ship.

4) **Lubricants**

IHO Definition: Substances capable of reducing friction, heat, and wear when introduced as a film between solid surfaces.

5) **Steam**

IHO Definition: The gas into which water is changed by boiling.

6) **Potable Water**

IHO Definition: Water which can be used for drinking and food preparation.

7) **International Shore Connection**

IHO Definition: A universal hose connection for the supply of water for fighting fires.

8) **Provisions**

IHO Definition: A place where food and other such supplies are available.

9) **Chandler**

IHO Definition: A dealer in ships' supplies.

10) **Mechanics Workshop**

IHO Definition: A place where mechanical repairs can be undertaken to engines or other vessel equipment.

Remarks:

• No remarks.

17.106 Technical Port Service

IHO Definition: Services for the adjustment of vessel equipment or for assessments pertaining to cargo, compliance with regulations, safety, or security.

1) **Compensation of Magnetic Compass**

IHO Definition: The process of neutralizing or reducing to a minimum the magnetic effects the vessel itself exerts on a magnetic compass. It is based on the principle that the magnetic effect of the iron and steel of the vessel can be counterbalanced by means of magnets and soft iron placed near the compass. Also called compass adjustment, compass compensation, or magnetic compensation.

2) **Degaussing**

IHO Definition: Neutralization of the strength of the magnetic field of a vessel, by means of suitably arranged electric coils permanently installed in the vessel. See also Degaussing Cable.

3) **Cargo Surveying**

IHO Definition: Inspection, evaluation or monitoring of the quantity, stowage, loading and unloading, and condition of cargo, and the effects of cargoes on vessel stability and safety.

4) **Vetting**

IHO Definition: Assessment of quality and compliance with applicable law, regulations, and safety standards.

Remarks:

• No remarks.

17.107 Telecommunication Carrier

IHO Definition: The name of a provider or type of carrier for a telecommunication service. This service may include land line based, shore based or satellite based radio connections.

Value Type: text

Remarks:

• No remarks.

17.108 Telecommunication Identifier

IHO Definition: An identifier, such as words, numbers, letters, symbols, or any combination of those used to establish a contact to a particular person, organisation or service.

Value Type: text

Remarks:

• No remarks.

17.109 Telecommunication Service

IHO Definition: Classification of methods of communication over a distance by electrical, electronic, or electromagnetic means.

1) **Voice**

IHO Definition: The transfer or exchange of information by using sounds that are being made by mouth and throat when speaking.

2) **Facsimile**

IHO Definition: A system of transmitting and reproducing graphic matter (as printing or still pictures) by means of signals sent over telephone lines.

3) **SMS**

IHO Definition: Short Message Service is a form of text messaging communication on phones and mobile phones.

4) **Data**

IHO Definition: A representation of facts, concepts or instructions in a formalised manner suitable for communication, interpretation or processing.

5) **Streamed Data**

IHO Definition: Data that is constantly received by and presented to an end-user while being delivered by a provider.

6) **Telex**

IHO Definition: A system of communication in which messages are sent over long distances by using a telephone system and are printed by using a special machine (called a teletypewriter).

7) **Telegraph**

IHO Definition: An apparatus, system or process for communication at a distance by electric transmission over wire.

8) **Email**

IHO Definition: Messages and other data exchanged between individuals using computers in a network.

Remarks:

• No remarks.

17.110 Terminal Identifier

IHO Definition: The unique identifier for a given terminal.

Value Type: text

Remarks:

• No remarks.

17.111 Text

IHO Definition: A non-formatted digital text string.

Value Type: text

Remarks:

- This attribute should be used, for example, to hold the information that is shown on paper charts by short cautionary or explanatory notes. Therefore, text populated in *text* must not exceed 300 characters.
- Text may be in English, or in a national language defined by the attribute *language*.
- No formatting of text is possible within text. If formatted text, or text strings exceeding 300 characters, is required, then the sub-attribute *fileReference* must be used.

17.112 Text Offset Mm

IHO Definition: The distance in millimetres that text associated with a feature is positioned from the feature in an end-user system.

Type: Integer

Example: **45** for a text offset of 45 mm

Remarks:

• No remarks.

17.113 Text Type

IHO Definition: The attribute from which a text string is derived.

1) **Name**

IHO Definition: The individual name of a feature.

Remarks:

• No remarks.

17.114 Thickness of Ice Capability

IHO Definition: The thickness of ice that the ship can safely transit.

Value Type: integer

Remarks:

• No remarks.

17.115 Time of Day End

IHO Definition: The time corresponding to the end of an active period.

Format: XML built-in time format

Example: 12:30:00, 12:30:00Z, 12:30:00-0700

Remarks:

The time of day end must be encoded using 2 digits for the hour (hh), 2 digits for the minutes(mm) and 2 digits for the seconds (ss). This conforms to ISO 8601:2004.

Local time expressed without a specified offset to UTC is used where the same time of day applies locally, regardless of any local seasonal time adjustments (for example daylight saving (or Summer) time).

17.116 Time of Day Start

IHO Definition: The time corresponding to the start of an active period.

Format: XML built-in time format

Example: 12:30:00, 12:30:00Z, 12:30:00-0700

Remarks:

The time of day start must be encoded using 2 digits for the hour (hh), 2 digits for the minutes(mm) and 2 digits for the seconds (ss). This conforms to ISO 8601:2004.

Local time expressed without a specified offset to UTC is used where the same time of day applies locally, regardless of any local seasonal time adjustments (for example daylight saving (or Summer) time).

17.117 Tug Information

IHO Definition: Textual description of the types and capacities of available tugs.

Value Type: text

Remarks:

• No remarks.

17.118 Uncertainty Fixed

IHO Definition: The best estimate of the fixed horizontal or vertical accuracy component for positions, depths, heights, vertical distances and vertical clearances.

Type: Real

Unit: Defined as an attribute in the ENC dataset metadata: metre (m).

Resolution: 0·1m

Format: xx.x

Example: **1.2** for a fixed uncertainty of 1·2 metres

Remarks:

- The maximum of the one-dimensional error (for vertical) or two-dimensional error (for horizontal).
- The error is assumed to be positive and negative. The plus/minus character must not be encoded.

17.119 Uncertainty Variable Factor

IHO Definition: The factor to be applied to the variable component of an uncertainty equation so as to provide the best estimate of the variable horizontal or vertical accuracy component for positions, depths, heights, vertical distances and vertical clearances.

Attribute Type: Real

Indication: The fraction that equates to the factor (or percentage) contributing to the variable uncertainty component is indicated, that is a factor of 5% is encoded as 0.05.

Resolution: 0·01

Format: 0.xx

Example: The positional accuracy for the highest accuracy for hydrographic data is quoted as “±5 metres + 10% depth”. The variable component in this example is depth, and the factor to be applied to the depth at a location in order to provide the variable uncertainty is **0.1**.

In this example, at a depth of 25 metres, the variable uncertainty would be 2.5 metres, and the overall best estimate of the positional accuracy would be ±7.5 metres.

Remarks:

• No remarks.

17.120 UN Location Code

IHO Definition: Used to encode the UN Location Code (http://www.unece.org/cefact/locode/service/location.html) or - in Europe - the Inland Ship Reporting Standard (ISRS) Code.

Value Type: text

Remarks:

•The ISRS Code exists of: - UN country code (2 digits), - UN Location code (3 digits, "XXX" if not available), - Fairway section number (5 numerical digits, to be determined by the national authority; a side branch should have an own section number, when there are special restrictions, e.g. bridges), - terminal code or passage point code (5 alphanumerical digits, "00000" if not available), - fairway section hectometre (5 numerical digits, hectometre at the centre of the area, "00000" if not available). If the ISRS code is not available, the code of the Nordersoft RIS-Index may be used.

17.121 Vertical Clearance Value

IHO Definition: The vertical clearance measured from the horizontal plane towards the feature overhead.

Value Type: real

Remarks:

• No remarks.

17.122 Vertical Datum

IHO Definition: The reference level used for expressing the vertical measurements of points on the earth's surface. Also called datum level, reference plane, levelling datum, datum for sounding reduction, datum for heights.

1) **Mean Low Water Springs**

IHO Definition: The average height of the low waters of spring tides. This level is used as a tidal datum in some areas. Also called spring low water.

2) **Mean Lower Low Water Springs**

IHO Definition: The average height of lower low water springs at a place.

3) **Mean Sea Level**

IHO Definition: The average height of the surface of the sea at a tide station for all stages of the tide over a 19-year period, usually determined from hourly height readings measured from a fixed predetermined reference level.

4) **Lowest Low Water**

IHO Definition: An arbitrary level conforming to the lowest tide observed at a place, or some what lower.

5) Mean Low Water

IHO Definition: The average height of all low waters at a place over a 19-year period.

6) **Lowest Low Water Springs**

IHO Definition: An arbitrary level conforming to the lowest water level observed at a place at spring tides during a period of time shorter than 19 years.

7) **Approximate Mean Low Water Springs**

IHO Definition: An arbitrary level, usually within 0.3m from that of Mean Low Water Springs (MLWS).

8) **Indian Spring Low Water**

IHO Definition: An arbitrary tidal datum approximating the level of the mean of the lower low water at spring tides. It was first used in waters surrounding India.

9) Low Water Springs

IHO Definition: An arbitrary level, approximating that of mean low water springs (MLWS).

10) **Approximate Lowest Astronomical Tide**

IHO Definition: An arbitrary level, usually within 0.3m from that of Lowest Astronomical Tide (LAT).

11) **Nearly Lowest Low Water**

IHO Definition: An arbitrary level approximating the lowest water level observed at a place, usually equivalent to the Indian Spring Low Water (ISLW).

12) Mean Lower Low Water

IHO Definition: The average height of the lower low waters at a place over a 19-year period.

13) Low Water

IHO Definition: The lowest level reached at a place by the water surface in one oscillation. Also called low tide.

14) Approximate Mean Low Water

IHO Definition: An arbitrary level, usually within 0.3m from that of Mean Low Water (MLW).

15) **Approximate Mean Lower Low Water**

IHO Definition: An arbitrary level, usually within 0.3m from that of Mean Lower Low Water (MLLW).

16) **Mean High Water**

IHO Definition: The average height of all high waters at a place over a 19-year period.

17) **Mean High Water Springs**

IHO Definition: The average height of the high waters of spring tides. Also called spring high water.

18) High Water

IHO Definition: The highest level reached at a place by the water surface in one oscillation.

19) **Approximate Mean Sea Level**

IHO Definition: An arbitrary level, usually within 0.3m from that of Mean Sea Level (MSL).

20) High Water Springs

IHO Definition: An arbitrary level, approximating that of mean high water springs (MHWS).

21) **Mean Higher High Water**

IHO Definition: The average height of higher high waters at a place over a 19-year period.

22) **Equinoctial Spring Low Water**

IHO Definition: The level of low water springs near the time of an equinox.

23) Lowest Astronomical Tide

IHO Definition: The lowest tide level which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions.

24) **Local Datum**

IHO Definition: An arbitrary datum defined by a local harbour authority, from which levels and tidal heights are measured by this authority.

25) **International Great Lakes Datum 1985**

IHO Definition: A vertical reference system with its zero based on the **mean water level** at Rimouski/Pointe-au-Pere, Quebec, over the period 1970 to 1988.

26) Mean Water Level

IHO Definition: The average of all hourly water levels over the available period of record.

27) **Lower Low Water Large Tide**

IHO Definition: The average of the lowest low waters, one from each of 19 years of observations.

28) **Higher High Water Large Tide**

IHO Definition: The average of the highest high waters, one from each of 19 years of observations.

29) **Nearly Highest High Water**

IHO Definition: An arbitrary level approximating the highest water level observed at a place, usually equivalent to the high water springs.

30) **Highest Astronomical Tide**

IHO Definition: The highest tidal level which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions.

44) **Baltic Sea Chart Datum 2000**

IHO Definition: The datum refers to each Baltic country's realization of the European Vertical Reference System (EVRS) with land-uplift epoch 2000, which is connected to the Normaal Amsterdams Peil (NAP).

Remarks:

• No remarks.

17.123 Vessels Characteristics

IHO Definition: Characteristics of vessels

1) **Length Overall**

IHO Definition: The maximum length of the ship (L.O.A.). (http://en.wikipedia.org/wiki/Ship_measurements; 24 July 2010)

2) **Length at Waterline**

IHO Definition: The ship's length measured at the waterline.

3) **Breadth**

IHO Definition: The width or beam of the vessel.

4) **Draught**

IHO Definition: The depth of water necessary to float a vessel fully loaded.

6) **Displacement Tonnage**

IHO Definition: A measurement of the weight of the vessel, usually used for warships. (Merchant ships are usually measured based on the volume of cargo space; see tonnage). Displacement is expressed either in long tons of 2,240 pounds or metric tonnes of 1,000 kg. Since the two units are very close in size (2,240 pounds = 1,016 kg and 1,000 kg = 2,205 pounds), it is common not to distinguish between them. To preserve secrecy, nations sometimes misstate a warship's displacement.

7) **Displacement Tonnage, Light**

IHO Definition: The weight of the ship excluding cargo, fuel, ballast, stores, passengers, and crew, but with water in the boilers to steaming level.

8) **Displacement Tonnage, Loaded**

IHO Definition: The weight of the ship including cargo, passengers, fuel, water, stores, dunnage and such other items necessary for use on a voyage, which brings the vessel down to her load draft.

9) **Deadweight Tonnage**

IHO Definition: The difference between displacement, light and displacement, loaded. A measure of the ship's total carrying capacity.

10) **Gross Tonnage**

IHO Definition: The entire internal cubic capacity of the ship expressed in tons of 100 cubic feet to the ton, except certain spaces with are exempted such as: peak and other tanks for water ballast, open forecastle bridge and poop, access of hatchways, certain light and air spaces, domes of skylights, condenser, anchor gear, steering gear, wheel house, galley and cabin for passengers.

11) **Net Tonnage**

IHO Definition: Obtained from the gross tonnage by deducting crew and navigating spaces and allowances for propulsion machinery.

12) **Panama Canal/Universal Measurement System Net Tonnage**

IHO Definition: The Panama Canal/Universal Measurement System (PC/UMS) is based on net tonnage, modified for Panama Canal purposes. PC/UMS is based on a mathematical formula to calculate a vessel's total volume; a PC/UMS net ton is equivalent to 100 cubic feet of capacity.

13) **Suez Canal Net Tonnage**

IHO Definition: The Suez Canal Net Tonnage (SCNT) is derived with a number of modifications from the former net register tonnage of the Moorsom System and was established by the International Commission of Constantinople in its Protocol of 18 December 1873. It is still in use, as amended by the Rules of Navigation of the Suez Canal Authority, and is registered in the Suez Canal Tonnage Certificate.

Remarks:

• No remarks.

17.124 Vessels Characteristics Unit

IHO Definition: The unit used for vessel characteristics attribute.

3) **Metric Ton**

IHO Definition: The tonne or metric ton (U.S.), often redundantly referred to as a metric tonne, is a unit of mass equal to 1,000 kg (2,205 lb) or approximately the mass of one cubic metre of water at four degrees Celsius. It is sometimes abbreviated as mt in the United States, but this conflicts with other SI symbols. The tonne is not a unit in the International System of Units (SI), but is accepted for use with the SI. In SI units and prefixes, the tonne is a megagram (Mg). The Imperial and US customary units comparable to the tonne are both spelled ton in English, though they differ in mass. Pronunciation of tonne (the word used in the UK) and ton is usually identical, but is not too confusing unless accuracy is important as the tonne and UK long ton differ by only 1.6.

4) **Ton**

IHO Definition: Long ton (weight ton or imperial ton) is the name for the unit called the "ton" in the avoirdupois or Imperial system of measurements, as used in the United Kingdom and several other Commonwealth countries. It has been mostly replaced by the tonne, and in the United States by the **short ton**. One long ton is equal to 2,240 pounds (1,016 kg) or 35 cubic feet (0.9911 m) of salt water with a density of 64 lb/ft (1.025 g/ml). It has some limited use in the United States, most commonly in measuring the displacement of ships, and was the unit prescribed for warships by the Washington Naval Treaty for example battleships were limited to a mass of 35,000 long tons (36,000 t; 39,000 ST).

5) **Short Ton**

IHO Definition: A unit of weight equal to 2,000 pounds (907.18474 kg). In the United States it is often called simply ton without distinguishing it from the metric ton (tonne, 1,000 kilograms) or the long ton (2,240 pounds / 1,016.0469088 kilograms); rather, the other two are specifically noted. There are, however, some US applications for which unspecified tons normally means long tons (for example, Navy ships) or metric tons (world grain production figures). Both the long and short ton are defined as 20 hundredweights, but a hundredweight is 100 pounds (45.359237 kg) in the US system (short or net hundredweight) and 112 pounds (50.80234544 kg) in the Imperial system (long or gross hundredweight).

6) **Gross Ton**

IHO Definition: Gross tonnage (GT) is a function of the volume of all ship's enclosed spaces (from keel to funnel) measured to the outside of the hull framing. There is a sliding scale factor. So GT is a kind of capacity-derived index that is used to rank a ship for purposes of determining manning, safety and other statutory requirements and is expressed simply as GT, which is a unitless entity, even though its derivation is tied to the cubic meter unit of volumetric capacity.Tonnage measurements are now governed by an IMO Convention (International Convention on Tonnage Measurement of Ships, 1969 (London-Rules)), which applies to all ships built after July 1982. In accordance with the Convention, the correct term to use now is GT, which is a function of the moulded volume of all enclosed spaces of the ship.

7) **Net Ton**

IHO Definition: Net tonnage (NT) is based on a calculation of the volume of all cargo spaces of the ship. It indicates a vessels earning space and is a function of the moulded volume of all cargo spaces of the ship.

9) **Suez Canal Net Tonnage**

IHO Definition: The Suez Canal Net Tonnage (SCNT) is derived with a number of modifications from the former net register tonnage of the Moorsom System and was established by the International Commission of Constantinople in its Protocol of 18 December 1873. It is still in use, as amended by the Rules of Navigation of the Suez Canal Authority, and is registered in the Suez Canal Tonnage Certificate.

Remarks:

• No remarks.

17.125 Vessels Characteristics Value

IHO Definition: The value of a particular characteristic such as a dimension or tonnage of a vessel.

Value Type: real

Remarks:

• Indicates range limits in expressions characterizing vessels by dimensions and tonnages. The unit of measure, characteristic, and comparison operator (greater, less, etc.) are encoded separately.

17.126 Vessel Performance

IHO Definition: A description of the required handling characteristics of a vessel including hull design, main and auxiliary machinery, cargo handling equipment, navigation equipment and manoeuvring behaviour.

Value Type: text

Remarks:

• No remarks.

17.127 Waste Disposal Service

IHO Definition: Service for the reception of residues, polluting substances, refuse, oily wastes, and by-products from ships.

1) **MARPOL Annex I Oily Bilge Water**

IHO Definition: The service with facility to receive oil related waste/residue of the type "Oily bilge water" as specified in MARPOL Annex I.

2) **MARPOL Annex I Oily Residues**

IHO Definition: The service with facility to receive oil related waste/residue of the type "Oily Residues (sludge)" as specified in MARPOL Annex I.

3) **MARPOL Annex I Oily Tank Washings**

IHO Definition: The service with facility to receive oil related waste/residue of the type "Oily tank washings (slops)" as specified in MARPOL Annex I.

4) **MARPOL Annex I Dirty Ballast Water**

IHO Definition: The service with facility to receive oil related waste/residue of the type "Dirty ballast water" as specified in MARPOL Annex I.

5) **MARPOL Annex I Scale and Sludge from Tank Cleaning**

IHO Definition: The service with facility to receive oil related waste/residue of the type "Scale and sludge from tank cleaning" as specified in MARPOL Annex I.

6) **MARPOL Annex I Other Oily Waste**

IHO Definition: The service with facility to receive oil related waste/residue of the type "Other" as specified in MARPOL Annex I.

7) **MARPOL Annex II Category X**

IHO Definition: The service with facility to receive chemical/Noxious liquid substances related waste/residue of the type "Category X" as specified in MARPOL Annex II.

8) **MARPOL Annex II Category Y**

IHO Definition: The service with facility to receive chemical/Noxious liquid substances related waste/residue of the type "Category Y" as specified in MARPOL Annex II.

9) **MARPOL Annex II Category Z**

IHO Definition: The service with facility to receive chemical/Noxious liquid substances related waste/residue of the type "Category Z" as specified in MARPOL Annex II.

10) **MARPOL Annex II Category OS**

IHO Definition: The service with facility to receive chemical/Noxious liquid substances related waste/residue of the type "Other substance" as specified in MARPOL Annex II.

11) **MARPOL Annex IV Sewage**

IHO Definition: The service with facility to receive waste/residue of the type "Sewage" as specified in MARPOL Annex IV.

12) **MARPOL Annex V Plastics**

IHO Definition: The service with facility to receive garbage related waste/residue of the type "Plastics", as specified in MARPOL Annex V

13) **MARPOL Annex V Food Wastes**

IHO Definition: The service with facility to receive garbage related waste/residue of the type "Food wastes", as specified in MARPOL Annex V

14) **MARPOL Annex V Domestic Wastes**

IHO Definition: The service with facility to receive garbage related waste/residue of the type "Domestic wastes", as specified in MARPOL Annex V

15) **MARPOL Annex V Cooking Oil**

IHO Definition: The service with facility to receive garbage related waste/residue of the type "Cooking oil", as specified in MARPOL Annex V

16) **MARPOL Annex V Incinerator Ashes**

IHO Definition: The service with facility to receive garbage related waste/residue of the type "Incinerator ashes", as specified in MARPOL Annex V

17) **MARPOL Annex V Operational Wastes**

IHO Definition: The service with facility to receive garbage related waste/residue of the type "Operational wastes", as specified in MARPOL Annex V

18) **MARPOL Annex V Animal Carcasses**

IHO Definition: The service with facility to receive garbage related waste/residue of the type "Animal carcasses", as specified in MARPOL Annex V

19) **MARPOL Annex V Fishing Gear**

IHO Definition: The service with facility to receive garbage related waste/residue of the type "Fishing gear", as specified in MARPOL Annex V

20) **MARPOL Annex V E-Waste**

IHO Definition: The service with facility to receive garbage related waste/residue of the type "E-waste", as specified in MARPOL Annex V

21) **MARPOL Annex V Cargo Residues - non-HME**

IHO Definition: The service with facility to receive garbage related waste/residue of the type "Cargo residues not determined to be harmful to the marine environment", as specified in MARPOL Annex V

22) **MARPOL Annex V Cargo Residues - HME**

IHO Definition: The service with facility to receive garbage related waste/residue of the type "Cargo residues harmful to the marine environment", as specified in MARPOL Annex V

23) **MARPOL Annex VI Ozone-Depleting Substances**

IHO Definition: The service with facility to receive air pollution related waste/residue of the type "Ozone-depleting substances" as specified in MARPOL Annex VI.

24) **MARPOL Annex VI Exhaust Gas-Cleaning Residues**

IHO Definition: The service with facility to receive air pollution related waste/residue of the type "Exhaust gas-cleaning residues" as specified in MARPOL Annex VI.

Remarks:

• No remarks.

17.128 Action or Activity

IHO Definition: The action or activity of a vessel.

1) **Navigating With a Pilot**

IHO Definition: Carrying a qualified pilot as part of the vessel navigation team.

2) **Entering Port**

IHO Definition: Navigating a vessel into a port.

3) **Leaving Port**

IHO Definition: Navigating a vessel out of a port.

4) **Berthing**

IHO Definition: Attaching a vessel to a wharf or jetty.

5) **Slipping**

IHO Definition: Detaching a vessel from a wharf or jetty.

6) **Anchoring**

IHO Definition: Attaching a vessel to the seabed by means of an anchor and cable.

7) **Weighing Anchor**

IHO Definition: Detaching a vessel from the seabed by recovering an anchor and cable.

8) **Transiting**

IHO Definition: Navigating a vessel along a route or through a narrow gap, such as under a bridge or through a lock.

9) **Overtaking**

IHO Definition: Navigating a vessel past another traveling broadly in the same direction.

10) **Reporting**

IHO Definition: Providing details such as the name, location or intentions of a vessel.

11) **Working Cargo**

IHO Definition: Loading or unloading cargo.

12) **Landing**

IHO Definition: Placing crew or passengers on shore.

13) **Diving**

IHO Definition: A signal or message warning of diving activity.

14) **Fishing**

IHO Definition: Hunting or catching fish.

15) **Discharging Overboard**

IHO Definition: Releasing anything into the sea; often ballast water; or spoil from dredging elsewhere.

16) **Passing**

IHO Definition: Navigating a vessel past another travelling broadly in the opposite direction.

Remarks:

codeListType=open enumeration; encoding=other: [something]

17.129 Category of RxN

IHO Definition: The principal subject matter of regulations, restrictions, recommendations or nautical information.

1) **Navigation**

IHO Definition: The process of directing the movement of a craft from one point to another.

2) **Communication**

IHO Definition: Transmitting and/or receiving electronic communication signals.

3) **Environmental Protection**

IHO Definition: Pertaining to environmental protection.

4) **Wildlife Protection**

IHO Definition: Pertaining to wildlife protection.

5) **Security**

IHO Definition: Pertaining to security.

6) **Customs**

IHO Definition: The agency or establishment for collecting duties, tolls.

7) **Cargo Operation**

IHO Definition: Pertaining to cargo operations.

8) **Refuge**

IHO Definition: Pertaining to a place of safety or refuge.

9) **Health**

IHO Definition: The authority with responsibility for checking the validity of the health declaration of a vessel and for declaring free pratique.

10) **Natural Resources or Exploitation**

IHO Definition: Pertaining to natural resources or exploitation.

11) **Port**

IHO Definition: Person or corporation, owners of, or entrusted with or invested with the power of managing a port. May be called a Harbour Board, Port Trust, Port Commission, Harbour Commission, Marine Department.

12) **Finance**

IHO Definition: An authority with responsibility for the control and movement of money.

13) **Agriculture**

IHO Definition: The science, art, or practice of cultivating the soil, producing crops, and raising livestock and in varying degrees the preparation and marketing of the resulting products.

Remarks:

codeListType=open enumeration; encoding=other: [something]

17.130 Category of Vessel

IHO Definition: Classification of vessels by function or use.

1) **General Cargo Vessel**

IHO Definition: A vessel which is designed for carrying general cargo, e.g. boxes, sacks.

2) **Container Carrier**

IHO Definition: a vessel designed to carry ISO containers.

3) **Tanker**

IHO Definition: A vessel which is designed for carrying liquid goods, for example oil or water.

4) **Bulk Carrier**

IHO Definition: A vessel which is designed for carrying bulk goods, e.g. coal, ore or grain.

5) **Passenger Vessel**

IHO Definition: A day trip or cabin vessel constructed and equipped to carry more than 12 passengers.

6) **Roll-On Roll-Off**

IHO Definition: A vessel designed to allow road vehicles to be driven on and off; often a ferry.

7) **Refrigerated Cargo Vessel**

IHO Definition: A vessel designed to carry refrigerated cargo.

8) **Fishing Vessel**

IHO Definition: A vessel that is used and equipped for the fishing of living aquatic resources.

9) **Service**

IHO Definition: A vessel which provides a service such as a tug, anchor handler, survey or supply vessel.

10) **Warship**

IHO Definition: A vessel designed for the conduct of military operations.

11) **Towed or Pushed Composite Unit**

IHO Definition: Either a **tug and tow**, or any combination of a tug providing propulsion to barges or vessels secured ahead or alongside.

12) Tug and Tow

IHO Definition: A combination of tug(s) and non-powered tow(s).

13) **Light Recreational**

IHO Definition: A pleasure boat or watercraft, or an excursion vessel used for short cruises such as whale watching.

14) **Semi-Submersible Offshore Installation**

IHO Definition: An installation which is designed to float at all times and which is normally anchored in position when deployed in the offshore gas and oil industry.

15) **Jack-Up Exploration or Project Installation**

IHO Definition: An exploration or project installation with legs which can be raised and lowered. The legs are raised when the installation is re-positioned. When stationary the legs are lowered to the sea floor and the working platform is raised clear of the sea surface.

16) **Livestock Carrier**

IHO Definition: A vessel designed to carry large quantities of live animals.

17) **Sport Fishing**

IHO Definition: A vessel used in fishing for pleasure or competition.

Remarks:

codeListType=open enumeration; encoding=other: [something]

17.131 Security-Safety-Emergency Service

IHO Definition: Protective services, law enforcement, or services for responding to sudden danger.

1) **Coast Guard**

IHO Definition: Organization keeping watch on shipping and coastal waters according to governmental law; normally the authority with responsibility for search and rescue.

2) **Customs**

IHO Definition: The agency or establishment for collecting duties, tolls.

3) **Environmental Emergency Information Centre**

IHO Definition: Office for reporting or obtaining information about sudden dangers to the environment such as spillage of polluting or hazardous substances.

4) **Emergency Coordination Centre**

IHO Definition: An office or organisation for reporting or coordinating response to emergencies.

5) **Guard and/or Security Service**

IHO Definition: A place where a vessel is patrolled by a security service or stored in a secure lockup.

6) **Immigration**

IHO Definition: The authority controlling people entering a country.

7) **Police**

IHO Definition: The department of government, or civil force, charged with maintaining public order.

8) **Sea Rescue Control**

IHO Definition: A unit responsible for promoting efficient organization of search and rescue services and for coordinating the conduct of search and rescue operations within a search and rescue region.

Remarks:

codelistType=openEnumeration

17.132 Transport Connection

IHO Definition: Classification of services for the conveyance of persons and/or goods, according to means of transport, nature of path, or representative installation.

2) **Heliport**

IHO Definition: A small airport for the use of helicopters and some other vertical lift aircraft. Heliports typically contain one or more touchdown and liftoff areas and also have facilities such as fuel or hangars. In some larger towns and cities, customs facilities may also be available.

3) **Helipad**

IHO Definition: A small landing surface for helicopters, with minimal or no supporting installations or facilities.

4) **Hired Boat**

IHO Definition: Small boat with crew that may be hired for single journeys.

5) **Bus Station**

IHO Definition: A building where buses and coaches regularly stop to take on and/or let off passengers, especially for long-distance travel.

6) **Ferry**

IHO Definition: A vessel for transporting passengers, vehicles, and/or goods across a stretch of water, especially as a regular service.

8) **Motorway**

IHO Definition: A limited access dual carriageway road specially designed for fast long-distance traffic and subject to special regulations concerning its use. It may have more than two lanes.

9) **Launch**

IHO Definition: Large open or half decked boat.

11) **Inland Waterway Transport**

IHO Definition: The carriage of goods or passengers using navigable waterways such as canals, rivers, lakes, or other stretch of water that is not part of the sea.

12) **Short Sea Transportation**

IHO Definition: The carriage of specified types of cargo between qualifying ports. The types of cargo and/or qualifying ports are generally specified by law or government regulation.

13) **Marine Highway**

IHO Definition: Specially designated commercially navigable routes in coastal, inland, and intracoastal waters, frequently as waterborne relievers to congested landside routes.

Remarks:

codelistType=openEnumeration

18 Complex Attributes

18.1 Bearing Information

IHO Definition: A bearing is the direction one object is from another object.

Sub-attributes:

Cardinal Direction (see clause 17.13)

Distance (see clause 17.45)

Sector Bearing (see clause 17.98)

Information (see clause 18.14)

Orientation (see clause 18.21)

Remarks:

• No remarks.

18.2 Cargo Services Description

IHO Definition: Description of services related to the goods or items carried by vessels.

Sub-attributes:

Text Content (see clause 18.28)

Remarks:

- Services for import and export cargoes should be described in separate instances of *textContent*. When this is done, the *headline* sub-attribute of *textContent* should indicate whether the *textContent* instance pertains to import or export cargoes.

18.3 Construction Information

IHO Definition: A description of construction or other development in a location where the work will affect vessel operations such as navigation, maneuvering or docking/berthing.

Sub-attributes:

Fixed date range (see clause 18.8)

Condition (see clause 17.32)

Development (see clause 17.43)

Location by Text (see clause 17.133)

Text Content (see clause 18.28)

Remarks:

- The *development* sub-attribute should be used to provide a brief textual summary of the type of harbour development.
- The *locationByText* sub-attribute should be used to provide a textual description of the extent of construction operations.
- The *textContent* sub-attribute should be used to provide information about the construction that is not covered by the other sub-attributes, such as the effects on vessel operations.

18.4 Contact Address

IHO Definition: Direction or superscription of a letter, package, etc., specifying the name of the place to which it is directed, and optionally a contact person or organisation who should receive it.

Sub-attributes:

Delivery Point (see clause 17.42)

City Name (see clause 17.30)

Administrative Division (see clause 17.1)

Country Name (see clause 17.35)

Postal code (see clause 17.87)

Remarks:

- Where specific delivery data is generally split over multiple lines of the address (such as adding an “Attention: …” line, or when office and street are on separate lines), multiple instances of the sub-attribute *deliveryPoint* should be used to encode separate lines. The order of *deliveryPoint* instances must be the same as that in which the lines appear in the address, as given in the source material.
- The name of the agency or person need not be encoded in *deliveryPoint*, because it is expected to be provided in the data object (information type or feature) to which this *contactAddress* belongs. For example **ContactDetails** is expected to encode the name in its *featureName* attribute.

18.5 Depths Description

IHO Definition: Textual description of the characteristics and notable matters pertaining to depths in an area.

Sub-attributes:

Category of Depths Description (see clause 17.20)

Text Content (see clause 18.28)

Remarks:

• No remarks.

18.6 Facilities Layout Description

IHO Definition: Textual description of the layout of port facilities.

Sub-attributes:

Text Content (see clause 18.28)

Remarks:

- This complex attribute is used to provide a general description of the arrangement of port facilities within the boundaries of the feature to which the attribute instance belongs.

18.7 Feature Name

IHO Definition: Provides the name of an entity, defines the national language of the name, and provides the option to display the name at various system display settings.

Sub-attributes:

Display Name (see clause 17.44)

Language (see clause 17.62)

Name (see clause 17.77)

Remarks:

• No remarks.

18.8 Fixed Date Range

IHO Definition: The complex attribute describes single fixed period, as the date range between its sub-attributes.

Sub-attributes:

Date Start (see clause 17.38)

Date End (see clause 17.36)

Remarks:

Dates must be encoded in the format YYYYMMDD; using 4 digits for the calendar year (YYYY) and, optionally, 2 digits for the month (MM) (for example April = 04) and 2 digits for the day (DD). When no specific month and/or day is required/known, the values are replaced with dashes (-). The date range of a recurring event or occurrence must be encoded using periodicDateRange.

Encoding instructions

- At least one of the sub-attributes must be populated.

18.9 Frequency Pair

IHO Definition: A pair of frequencies for transmitting and receiving radio signals. The shore station transmits and receives on the frequencies indicated.

Sub-attributes:

Frequency Shore Station Transmits (see clause 17.53)

Frequency Shore Station Receives (see clause 17.52)

Contact Instructions (see clause 17.34)

Remarks:

• No remarks.

Encoding instructions:

- If this attribute is present, at least one of the frequency attributes must be populated.

18.10 General Harbour Information

IHO Definition: General information about the port or harbour area.

Sub-attributes:

General Port Description (see clause 18.11)

Facilities Layout Description (see clause 18.6)

Limits Description (see clause 18.16)

Construction Information (see clause 18.3)

Cargo Services Description (see clause 18.2)

Weather Resource (see clause 18.32)

Remarks:

• No remarks.

Encoding instructions:

- Information encoded in this complex attribute should be confined to information not contained in any other attributes, features, or information types.
- Services for import and export cargoes should be described in separate instances of *cargoServicesDescription*.
- The sub-attribute *facilitiesLayoutDescription* may be used to provide a general description of the arrangement of port facilities within the boundaries of the feature to which the particular instance of *generalHarbourInformation* belongs.
- In the complex attribute *weatherResource*, at least one of *onlineResource* or *textContent* must be populated. If *onlineResource* is populated *dynamicResource* must be populated.

18.11 General Port Description

IHO Definition: General, introductory information about the port.

Sub-attributes:

Text Content (see clause 18.28)

Remarks:

• No remarks.

18.12 Graphic

IHO Definition: Pictorial information such as a photograph, sketch or other graphic, optionally accompanied by descriptive information about the graphic and the location relative to its subject from which it was made.

Sub-attributes:

Pictorial Representation (see clause 17.83)

Picture Caption (see clause 17.84)

Source Date (see clause 17.103)

Picture Information (see clause 17.85)

Bearing Information (see clause 18.1)

Remarks:

• No remarks.

18.13 Horizontal Position Uncertainty

IHO Definition: The best estimate of the accuracy of a position.

Sub-attributes:

Uncertainty Fixed (see clause 17.120)

Uncertainty Variable Factor (see clause 17.121)

Remarks:

The expected input is the maximum of the two-dimensional error. The error is assumed to be positive and negative.

18.14 Information

IHO Definition: Textual information about the feature. The information may be provided as a string of text or as a file name of a single external text file that contains the text.

Sub-attributes:

File Locator (see clause 17.49)

File Reference (see clause 17.50)

Headline (see clause 17.55)

Language (see clause 17.62)

Text (see clause 17.111)

Remarks:

- At least one of the sub-attributes **file reference** or **text** must be populated.
- The files referenced by the sub-attribute **file reference** generally contain long text strings or those that require formatting; there is no restriction on the type of text (except for lexical level) that can be held in files referenced by sub-attribute **file reference**.
- The sub-attribute **file locator** cannot be populated unless the attribute **file reference** is populated.

18.15 Landmark Description

IHO Definition: Textual description of selected landmarks that have significance in an area.

Sub-attributes:

Text Content (see clause 18.28)

Remarks:

• No remarks.

Distinction: majorLightDescription, markedBy, usefulMarkDescription, offshoreMarkDescription

18.16 Limits Description

IHO Definition: Description of the area covered by the information specified.

Sub-attributes:

Text Content (see clause 18.28)

Remarks:

• No remarks.

18.17 Major Light Description

IHO Definition: A description of navigationally significant lights essential for marking landfalls, offshore dangers, shipping routes, port access channels or protection of the marine environment.

Sub-attributes:

Text Content (see clause 18.28)

Remarks:

• No remarks.

18.18 Marked By

IHO Definition: Description of the aids to navigation used to mark an area or object.

Sub-attributes:

Text Content (see clause 18.28)

Remarks:

• No remarks.

18.19 Online Resource

IHO Definition: Information about online sources from which a resource or data can be obtained.

Sub-attributes:

Online Resource Linkage URL (see clause 17.67)

Protocol (see clause 17.89)

Application Profile (see clause 17.3)

Name of Resource (see clause 17.78)

Online Resource Description (see clause 17.80)

Online Function (see clause 17.66)

Protocol request (see clause 17.90)

Remarks:

• No remarks.

18.20 Offshore Mark Description

IHO Definition: Description of aids to navigation or prominent marks located away from the shore.

Sub-attributes:

Text Content (see clause 18.28)

Remarks:

• No remarks.

18.21 Orientation

IHO Definition: (1) The angular distance measured from true north to the major axis of the feature. (2) In ECDIS, the mode in which information on the ECDIS is being presented. Typical modes include: north-up - as shown on a nautical chart, north is at the top of the display; Ships head-up - based on the actual heading of the ship, (e.g. Ships gyrocompass); course-up display - based on the course or route being taken.

Sub-attributes:

Orientation Uncertainty (see clause 17.81)

Orientation Value (see clause 17.82)

Remarks:

• No remarks.

18.22 Schedule by Day of Week

IHO Definition: The nature and timings of a daily schedule by days of the week.

Sub-attributes:

Category of Schedule (see clause 17.25)

Time Intervals by Day of Week (see clause 18.29)

Remarks:

• No remarks.

18.23 Periodic Date Range

IHO Definition: The active period of a recurring event or occurrence.

Sub-attributes:

Date Start (see clause 17.38)

Date End (see clause 17.36)

Remarks:

The sub-attributes date start and date end should be encoded using 4 digits for the calendar year (YYYY), 2 digits for the month (MM) (for example April = 04) and 2 digits for the day (DD). When no specific year is required (that is, the feature is removed at the same time each year) the following two cases may be considered: - same day each year: ----MMDD - same month each year: ----MM-- This conforms to ISO 8601:2004.

18.24 RxN Code

IHO Definition: A summary of the impact of the most common types of regulation, restriction, recommendation and nautical information on a vessel.

Sub-attributes:

Category of RxN (see clause 17.131)

Action or Activity (see clause 17.130)

Headline (see clause 17.55)

Remarks:

• No remarks.

18.25 Spatial Accuracy

IHO Definition: Provides an indication of the vertical and horizontal positional uncertainty of bathymetric data, optionally within a specified date range.

Sub-attributes:

Fixed date range (see clause 18.8)

Horizontal Position Uncertainty (see clause 18.13)

Vertical Uncertainty (see clause 18.33)

Remarks:

• No remarks.

18.26 Survey Date Range

IHO Definition: The complex attribute describes the period of the hydrographic survey, as the time between its sub-attributes.

Sub-attributes:

Date Start (see clause 17.38)

Date End (see clause 17.36)

Remarks:

• No remarks.

18.27 Telecommunications

IHO Definition: A means or channel of communicating at a distance by electrical or electromagnetic means such as telegraphy, telephony, or broadcasting.

Sub-attributes:

Category of Communication Preference (see clause 17.18)

Telecommunication Identifier (see clause 17.107)

Telecommunication Carrier (see clause 17.108)

Contact Instructions (see clause 17.34)

Telecommunication Service (see clause 17.109)

Schedule by Day of Week (see clause 18.22)

Remarks:

• No remarks.

18.28 Text Content

IHO Definition: Textual material, or a pointer to a resource providing textual material. May be accompanied by basic information about its source and relationship to the source.

Sub-attributes:

Category of text (see clause 17.27)

Information (see clause 18.14)

Online Resource (see clause 18.19)

Source (see clause 17.102)

Source Type (see clause 17.104)

Reported Date (see clause 17.94)

Remarks:

Exactly one of sub-attributes onlineResource or information must be completed in one instance of textContent. Product specifications may restrict the use or content of onlineResource for security. For example, a product specification may forbid populating onlineResource. Product specification authors must consider whether applications using the data product may be prevented from accessing off-system resources by security policies.

18.29 Time Intervals by Day of Week

IHO Definition: The regular weekly operation times of a service or schedule.

Sub-attributes:

Day of Week (see clause 17.40)

Day of Week is Range (see clause 17.41)

Time of Day Start (see clause 17.117)

Time of Day End (see clause 17.116)

Remarks:

- At least one of the sub-attributes **day of week**, **time of day start** or **time of day end** must be encoded. Where populated, the number of instances of **time of day start** must be the same as the number of instances of **time of day end**.
- The sub-attribute **day of week is range** indicates whether an instance of **time intervals by day of week** encodes a range of days or discrete days. The day(s) or day range(s) are encoded using sub-attribute **day of week**. Where **day of week is range** is populated as *True*, there must be exactly two instances of the attribute **day of week**. If **day of week** is not populated, this indicates that the same schedule applies every day (Monday through Sunday). Multiple ranges or mixing range with discrete days(s) is not allowed (if this is required another instance of **time intervals by day of week** must be encoded).
- An indeterminate range may be indicated with a null value at the appropriate position in the sequence.

18.30 Useful Mark Description

IHO Definition: Description of Aids to Navigation or prominent marks which are usually clearly visible and identifiable enough to be used in determining location or direction.

Sub-attributes:

Text Content (see clause 18.28)

Remarks:

• No remarks.

18.31 Vessels Measurements

IHO Definition: Values, discovered by measuring, that correspond to vessels characteristics.

Sub-attributes:

Comparison Operator (see clause 17.33)

Vessels Characteristics (see clause 17.125)

Vessels Characteristics Value (see clause 17.127)

Vessels Characteristics Unit (see clause 17.126)

Remarks:

•Combines (i) specifications of vessels' measurable characteristics (length, beam, tonnages, etc.), (ii) limit values for the specified characteristics (with units), (iii) arithmetical comparison operators (greater than, etc.), and (iv) logical operators (AND/OR) to define a subset of vessels characterized by the specified ranges. For example, the combination (draught, 10.5, metres, greaterThan) describes "vessels with draught greater than 10.5 metres.

18.32 Weather Resource

IHO Definition: Links for relevant weather related information.

Sub-attributes:

Online Resource (see clause 18.19)

Dynamic Resource (see clause 17.46)

Text Content (see clause 18.28)

Remarks:

• No remarks.

18.33 Vertical Uncertainty

IHO Definition: The best estimate of the vertical accuracy of depths, heights, vertical distances and vertical clearances.

Sub-attributes:

Uncertainty Fixed (see clause 17.120)

Uncertainty Variable Factor (see clause 17.121)

Remarks:

Encodes the vertical uncertainty associated with any vertical measurement.