A.   Features & Attributes: Mandatory, Conditional, Optional

Each feature class and attribute class in the harmonization guide has been classified for encoding purposes as mandatory, conditional or optional.

- Mandatory (M) features or attributes must be encoded. For attributes, if the value is not known, it must be coded as UNKNOWN.

- Conditional (C) features or attributes are mandatory (must be encoded) if defined conditions are met (e.g. if a feature has multiple colours, a colour pattern must be encoded). If the defined conditions are not met, the features or attributes are Optional (O).

- Optional (O) features or attributes should be encoded if the value is known.

B.   Attribute Classes Associated With All Geo Object Classes

The following attribute classes can be associated with all geo object classes in an IENC:

SORIND
US: The source indicator is a <u>mandatory</u> attribute and must be coded for all objects in the IENC. All objects in the Encoding Guide state that SORIND is Conditional (C); the condition that must be met is that it is a US produced chart.

The format is: 2 character country code, 2 character authority code, 5 character source code, identifier (no restriction on number of characters).
- Examples:
   - For navigation features reference an authority such as the USCG Mississippi River System Light List, Volume 5: (US,U3,MS_LL,2004_Edition_No.808)
   - For hydrographic features reference appropriate survey: (US,U3,SURVY,2001_Hydro_Survey)
   - For other features reference appropriate survey data: (US,U3,SURVY,1999_Aerial_Survey)

EU: The source indicator must only be coded for an object in an IENC when the source is different from the producer of the IENC and the producer wants to exclude liability.

The format is: 2 character country code, other codes (no restriction on number of characters). All other coding is at the decision of the local authority.

BR: SORIND is an optional attribute which may be used for an object in an IENC when the source is different from the producer of the IENC.

The format is: 2 character country code, description of the responsible authority (no restriction on number of characters).

SORDAT
The production date of the source of the data (e.g. the date of measurement). The source date should be coded for those objects in an IENC, which are changing regularly, for example depth information.

The format is yearmonthday (YYYYMMDD).
- Example:
   - SORDAT coding for a feature with of source date of September 30, 2004 is 20040930

US: SORDAT is a <u>mandatory</u> attribute and must be coded for all objects in the IENC. SORDAT should be set to the release date of the chart if the actual source dates of the data unavailable.

EU: SORDAT for other objects it might be set to "unknown".

BR: SORDAT is optional.

OBJNAM
Use to code feature's name (do not include information on characteristics of feature). Name must be in Title Case. Use abbreviations where possible. Use short names only to avoid clutter in the display. OBJNAM shall be entered in local language using Basic Latin Unicode characters, e.g. Baarlerbruecke, Volkeraksluis or Wien.

NOBJNM
Whenever OBJNAM is used, it is also possible to use NOBJNM. NOBJNM may be used for names in the National Language, for example, Cyrillic characters.

INFORM
Use to code navigationally significant information about the feature that cannot be coded by attributes. INFORM should always be in English.

NINFOM
Whenever INFORM is used, it is also possible to use NINFOM. INFORM should always be in English, whereas NINFOM may be used for the National Language, for example, Cyrillic characters.

TXTDSC
Use to link textual descriptions or feature information in an ASCII file. For object names within the TXTDSC file, the same rules as for the attribute OBJNAM are applicable. Free text within the TXTDSC file should be provided in English language.

Note that filename must be in UPPER CASE.
US: Format is AARRMMMXNN.EXT where:
    AA = 2-character Producer Code
    RR = 2-character river code
    MMM = 3-digit river mile or river km, 000-999
    X = tenth of river mile/km; preceding decimal point implied; use zero if river mile/km known only to the nearest mile.
    NN = 01-99; unique identifier for text file at the particular river mile/km.
    For example, if three TXTDSC files exist at the same river mile/km, 01, 02, and 03 would be used.
    EXT = 3-character file extension for Hypertext Metafile (HTM), ASCII text (TXT), or Standardized External XML file with communication information.

EU: The ISRS code can be used for the file name, e.g. DEXXX039000000005023.XML.

PICREP
Use to link imagery related to feature. Note that the filename must be in UPPER CASE. Image should be 640 x 480 pixels in resolution.
Format is AARRMMMXNN.EXT, where:
    AA = 2-character Producer Code
    RR = 2-character river code
    MMM = 3-digit river mile or river km, 000-999
    X = tenth of river mile/km; preceding decimal point implied; use zero if river mile/km known only to the nearest mile.
    NN = 01-99; unique identifier for image file at the particular river mile/km.
    For example, if three PICREP files exist at the same river mile/km, 01, 02, and 03 would be used.
    EXT = 3-character file extension for the image file format; most commonly TIFF (TIF) or JPEG (JPG) formats.

C.   Scale Minimum

The values for the scale minimum mentioned in the encoding guide are recommendations for European and N. American waterways. The chart producer might deviate from these values in order to improve the chart display in special situations, for example on very small or very large waterways. The value of SCAMIN has to be set to a scale value smaller than or equal to the compilation scale of the data for the area.

D.   Numeric Precision

Numeric attributes indicating meters (e.g., depth contours and structure heights) should reflect the accuracy of the number. For example, a bridge height of thirty-five meters, accurate to one meter, would be 35, not 35.0. No more than two decimal places should be used. Real values without safety margins should be used.
The S-57 standard only supports depth contour resolutions to 0.1 meter.

E. Feature Naming and Text Display

US: Any important navigation notes that should always be shown on the IENC should be encoded as LNDRGN (P) on land or SEAARE (P) objects in the water.

EU: Use the appropriate object to display information (e.g. comare).

F. Assigning Approximate Positions

To assign an approximate position ('PA') for charted features, the attribute Quality of Position [QUAPOS = 4 (approximate)] is assigned to the appropriate spatial object (point or line). It is not assigned to the feature object (e.g. WRECKS object), but to the spatial reference for the feature object. When correctly coded, the electronic chart system will display 'PA' adjacent to the feature object.

G. Navigational Purpose

The following types of Navigational Purpose ("usage") are available:

Subfield	Navigational purpose	Definition for intended use
1	Overview:	For route planning and oceanic crossing.
2	General:	For navigating oceans, approaching coasts and route planning.
3	Coastal:	For navigating along the coastline, either inshore or offshore.
4	Approach:	Navigating the approaches to ports or mayor channels or through intricate or congested waters.
5	Harbour:	Navigating within ports, harbours, bays, rivers and canals, for anchorages.
6	Berthing:	Detailed data to aid berthing.
7	**River:**	**Navigating the inland waterways (skin cell).**
8	**River harbour:**	**Navigating within ports and harbours on inland waterways (skin cell).**
9	**River berthing:**	**Detailed data to aid berthing maneuvering in inland navigation (skin cell).**
A	**Overlay:**	**Overlay cell to be displayed in conjunction with skin cells**

The Navigational Purposes 1 to 8 may be used by authorities as well as private bodies. Navigational Purpose 9 may only be used by private bodies. Overlay cells may be used by authorities as well as private bodies.

Within overlapping cells with the same navigational purpose skin-of-the-earth objects of the same object class must not overlap.

The letter "A" at the third position of the file name indicates that the cell is displayed as overlay over other cells within a range of usages. Overlay cells may not contain skin-of-the-earth objects. The range of usages of overlay cells is indicated in the Data Set Identification Field of the header of the overlay cell (see S57, Part 3, Data Structure, ch. 7.3.1.1). The 8th bit of the intended usage subfield (INTU) has to be set, if a range is used and the other seven bits describe the range (e.g. 25 means a range from usage 2 to usage 5).

H. UN Location Code

The attribute 'unlocd' should be used to encode the UN Location Code (http://www.unece.org/cefact/locode/service/main.htm) or, in Europe, the Inland Ship Reporting Standard (ISRS) Code; which is used to establish a standardized relation to other River Information Services.

UN country code (2 digits),

UN Location code (3 digits, "XXX" if not available),

Fairway section number (5 alphanumerical digits, to be determined by the national authority; a side branch should have its 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 center of the area or "00000" if not available).

If the ISRS code is not available, the code of the Noordersoft RIS-Index may be used.

I.   Legal ECDIS (refers to Section U)

Category attributes for ship types, ship formations and cargo type are available. These categories are used to describe for which type of ship, convoy, or cargo the particular regulation is valid. There are two ways of describing which categories are affected by the rule:

1. explicit selection
2. implicit selection

The attributes for explicit type selection are used to explicitly select the types from the given list. The attributes for implicit type selection are is used to select those types that are not affected.

It is up to the encoder if the explicit attribute or its implicit version is used. However, it is **not allowed** to use both attributes when defining the category of a law content object.

One would make use of implicit type selection if for example the respective regulation states which types are excluded from the regulation rather than explicitly listing those types that are affected.
Example: "recreational crafts are excluded from a speed limit."

J.   DATSTA, DATEND, PERSTA and PEREND

For objects, which are installed for a specific time, the date start and date end should be encoded using the DATSTA and DATEND attributes. In case of periodic installation (for example in the summer time each year) the attributes periodic start PERSTA and periodic end PEREND should be used.

The attributes should be encoded using 4 digits for the calendar year (CCYY), 2 digits for the month (MM) (e.g. April = 04) and 2 digits for the day (DD), according to ISO 8601: 1988.

Format is: CCYYMMDD (mandatory), for example: 19960822 for 22 August 1996.

These attributes may not be used for Group I feature classes.