Appendix D
FGDC Hydrographic Data Content Standard

National Hydrography Data Content Standard for Coastal and Inland Waterways – Public Review Draft

Bathymetric Subcommittee
Federal Geographic Data Committee

January 2000

Federal Geographic Data Committee

Established by Office of Management and Budget Circular A-16, the Federal Geographic Data Committee (FGDC) promotes the coordinated development, use, sharing, and dissemination of geographic data.

The FGDC is composed of representatives from the Departments of Agriculture, Commerce, Defense, Energy, Housing and Urban Development, the Interior, State, and Transportation; the Environmental Protection Agency; the Federal Emergency Management Agency; the Library of Congress; the National Aeronautics and Space Administration; the National Archives and Records Administration; and the Tennessee Valley Authority. Additional Federal agencies participate on FGDC subcommittees and working groups. The Department of the Interior chairs the committee.

FGDC subcommittees work on issues related to data categories coordinated under the circular. Subcommittees establish and implement standards for data content, quality, and transfer; encourage the exchange of information and the transfer of data; and organize the collection of geographic data to reduce duplication of effort. Working groups are established for issues that transcend data categories.

For more information about the committee, or to be added to the committee's newsletter mailing list, please contact:

Federal Geographic Data Committee Secretariat
c/o U.S. Geological Survey
590 National Center
Reston, Virginia 22092

Telephone: (703) 648-5514
Facsimile: (703) 648-5755
Internet (electronic mail): gdc@usgs.gov
Anonymous FTP: ftp://fgdc.er.usgs.gov/pub/gdc
World Wide Web: http://fgdc.er.usgs.gov/fgdc.html

1. INTRODUCTION

1.1 OBJECTIVE

Geospatial hydrography data for waterways, shorelines, coastlines, etc. that supports transportation applications has been specified as one of the key framework information layers for the National Spatial Data Infrastructure (NSDI). The objective of this NSDI Hydrography Data Content Standard for Coastal and Inland Waterways (hereafter called the Hydrography Standard) project is to develop a nationally focused hydrographic data content standard for spatial data that supports safety of navigation. When complete, this standard will provide a consistent catalog of terms and definitions (semantics) to ensure uniform interpretation of information across a variety of organizations that develop and use hydrographic feature data and applications. This standard is based upon a well known logical data model for geospatial data of features, attributes, and domain values that is consistent with the Spatial Data Transfer Standard/Federal Information Processing Standard (SDTS/FIPS 173 part 2).

1.2 SCOPE

The scope of this Hydrography Standard project first focused on developing a catalog of hydrographic feature terms and definitions pertaining to navigation of coastal and inland waterways. In that the guidance from the NSDI concentrated on transportation/navigation, the team limited the scope to information relating to charting and electronic chart display applications. This standard will not address data distribution formats, extraction criteria, or accuracy reporting methods beyond inland and coastal waterways. This standard does not currently address hydrographic symbology. However, in future versions/releases of this standard it is planned to add this standard symbology information.

1.3 APPLICABILITY

This Hydrography Standard is applicable to any U.S. organization that generates hydrographic feature information that supports coastal and inland waterways navigation. This standard is also applicable to any U.S. organization that uses hydrographic feature information generated by another organization and must translate its feature schema to a common feature schema based upon a standard hydrographic dictionary.

1.4 JUSTIFICATION/BENEFITS

There has never been a national data content standard for hydrographic data that support navigation applications; yet there has been interest from federal agencies, private industry, and the public for a uniform presentation of this type information for some time. A data content standard that supports navigation applications will ensure effective use and exchange of geospatial data across multiple agencies, organizations, and other users.

Specifically, this Hydrography Standard will facilitate semantic consistency when capturing geospatial hydrographic information for military and commercial navigation and electronic charting databases (in a GIS or CADD) and provide consistent data for applications that query, analyze this information, and interpreted this information for display of electronic charts. This standard will support cost savings associated with reducing the translating geospatial hydrographic information. This standard should also

reduce the costs of building navigation applications by eliminating the “multi-fuel” requirement of handling many different type of hydrographic feature information.

1.5 RELATED STANDARDS

This Hydrography Standard closely parallels the hydrographic information contained within the following standards:

International Hydrographic Organization's S57 (IHO S-57) Appendix A, Object Catalog for Digital Hydrographic Data. IHO is an intergovernmental consultative and technical organization working to support the safety of navigation and the protection of the marine environment.

North Atlantic Treaty Organization’s (NATO) Digital Geographic Information Exchange Standard (DIGEST) Part 4, Feature Attribute Coding Catalog (FACC), a comprehensive coding scheme for features, their attributes and attribute. This allows for joint naval operations between sovereign countries and requires naval personnel to have familiarity amongst traditional S-57 and FACC.

(Tri-Service) CADD/GIS Technology Center Spatial Data Standard (TSSDS Release 1.8), which is primarily used for civil and military installation mapping and facility management.

U.S. Army Corps of Engineers (USACE) Regional Engineering and Environmental Geographic Information System (REEGIS) project's data dictionary for inland waterways and primarily used by the USACE for engineering, navigation and flood control structures along the Mississippi River.

Also, this Hydrography Standard contains cross-references to the IHO- S57, NATA FACC, and TSSDS standards.

1.6 STANDARDS DEVELOPMENT PROCESS

This standard was developed under the guidance and procedures specified by the Federal Geographic Data Committee (FGDC) under the authority of the Bathymetric Subcommittee. The FGDC announced the initiation of this Hydrography Standard project in the Federal Register in 1998 and issued a call for any interested party to participate on the project development team. The project team that developed this standard was composed of experts from the National Oceanographic and Atmospheric Administration (NOAA) and National Imagery and Mapping Agency (NIMA), the U.S. Army Corps of Engineers and the U.S. Coast Guard, several pilot associations, and private industry representatives. (These agencies and organizations represented users of various existing Hydrography standards.) In addition to the expertise brought to this project team from the various organizations represented, key documents were used in the development of this standard. These standards are cited as references in the Related Standards section of this document.

The first step after the formation of a Hydrography Standard project team was to agree upon the scope of this Hydrography Standard. The project team then reviewed key documents that consisted of adopted standards and systems that had developed and used hydrographic feature data. The next step for the project team was to develop a master list of candidate features extracted from the related standards documents.

Next, the project team reviewed the master feature list and eliminated those clearly outside of the agreed to scope. A detailed comparison of feature terms and definitions extracted from the aforementioned standards was conducted. From this effort, the team was able to derive a standard feature term and definition for each feature. As a byproduct of this activity, a matrix was developed, which provides a mapping to related terms, or features, contained in each or the source standards. These matrices are included as appendices.

The project team has extracted all the attributes derived from the aforementioned standards and culled this list of attributes down to a subset of core attributes to include in the Hydrography standard. The project team created a domain list for each "category" of feature to facilitate the cross reference. Other attributes have been grouped into logical collections applicable to individual features to ease implementation. Finally, a draft Hydrography Standard document was generated to include the features, attributes, and domain terms and definitions lists, and additional descriptive documentation as specified by the FGDC directives on creating an NSDI standard.

1.7 TARGET AUTHORIZATION BODY

The Bathymetric Subcommittee originally proposed the development of this Hydrography Standard as an FGDC standard. The Bathymetric Subcommittee and the Standards Working Group of the FGDC may pursue a joint FGDC and American National Standards Institute (ANSI) adoption of this standard. To develop this Hydrography Standard through as an ANSI standard will require the development of an ANSI standard proposal and potentially an ANSI public review. The Bathymetric Subcommittee may consider (at a later date) promoting parts of this standard (e.g., inland waterways information) that are not currently part of the S-57 standard to International Hydrographic Organization for inclusion in their standard.

1.8 MAINTENANCE AUTHORITY

The National Oceanographic and Atmospheric Administration (NOAA) is the maintenance organization for the Hydrography Standard for the Federal Geographic Data Committee. All general questions and comments concerning this standard should be addressed to:

Anne Hale Miglarese, *Chair*,

NOAA Coastal Services Center
2234 South Hobson Ave.
Charleston, SC 29404-2413
phone 843-740-1238
fax 803-974-6315
amiglarese@csc.noaa.mil

1.9 PARTS OF THE STANDARD

This Hydrography Standard consists of a detailed main body and four appendices. The main body of the Hydrography Standard defines the purpose of this standard, the process followed during its development, the organization(s) involved in its development and maintenance, the actual Hydrography Standard Data Dictionary (sometimes called the Object Catalog), and its relationship to other standards. Appendices A

through D contain matrix cross-references between the respective source data standards and the Hydrography Data Content Standard. Appendices A through D are informative and therefore not mandatory.

2.0 DEFINITIONS

For the purpose of this Hydrography Data Content Standard, the following definitions apply.

2.1 **attribute –** a characteristic of an object (e.g., an attribute of hydrography surface course = degree of permanence of the surface course)

2.2 **attribute value** - a specific quality or quantity assigned to an attribute for a specific feature instance (e.g., electrical cable material = dry).

2.3 **data content standard** - provides the semantic definitions for a set of real world spatial phenomena of significance to a community. Data Content Standards may be organized and presented in a specified logical data model.

2.4 **domain** - a finite list (or range) of permissible values for a specified attribute. Included are tables of: units of measure, types, styles, status, names, methods, materials, dispositions, sources, dimensions, data, classes, etc. (e.g., degree of permanence = dry, intermittent, permanent, etc . . .)

2.5 **feature –** definition and description of a set (class of real world phenomena) into which similar feature instances are classified (e.g., shoreline and isohaline_zone_area).

2.6 **feature instance** - real-world spatial phenomenon about which data is collected, maintained, and disseminated. (e.g., the McMillan Water Reservoir). Feature instances are the geospatial objects that are graphically delineated in a spatial database.

2.7 **geospatial data** - data with implicit or explicit reference to a location relative to the surface of the earth.

2.8 **hydrography -** the science of the physical conditions, boundaries, flow, and related characteristics of earth's waters

2.9 **navigation –** to safely move on or through the water in a vessel.

2.10 **semantic content** – natural language information (e.g. names of features, attributes, and their phenomena on the earth’s surface).

3.0 LOGICAL DATA MODEL

Agreement on a common format is not sufficient to ensure that the geospatial information transferred is meaningful to both the sender and the receiver. In order to share spatial data (and as part of a SDTS data transfer process) a common data model must be defined and used. In addition, semantic content of a spatial database (i.e., the entities and associated attribute and attribute value information) must be well defined and agreed upon by an application community and specified in either an off-line document (i.e.

data content standard) and/or in the metadata for a given database. Part 2 of the SDTS is a formal attempt to develop a standardized list of entities. Additionally application communities that want to share geospatial information are developing data content standards modeled after the SDTS data model.

This Hydrography Standard data model (figure 1.) is based upon the SDTS geospatial data model as presented in Parts 1 and 2 of that standard as well as the specifications in ISO/IEC 8613-10:1995. The logical data model depicts the real world phenomena represented by features that are characterized by attributes that are assigned attribute values. This Hydrography Standard defines each of the features and their attributes and specifies a domain list for category attributes; e.g. those which further differentiate the individual features. In addition, this standard incorporates the use of a Feature Code, which identifies the feature in cryptic form for implementation of the standard. It also incorporates feature representation information that specifies the allowable graphic representations for each of the features.

Hydrography Data Model

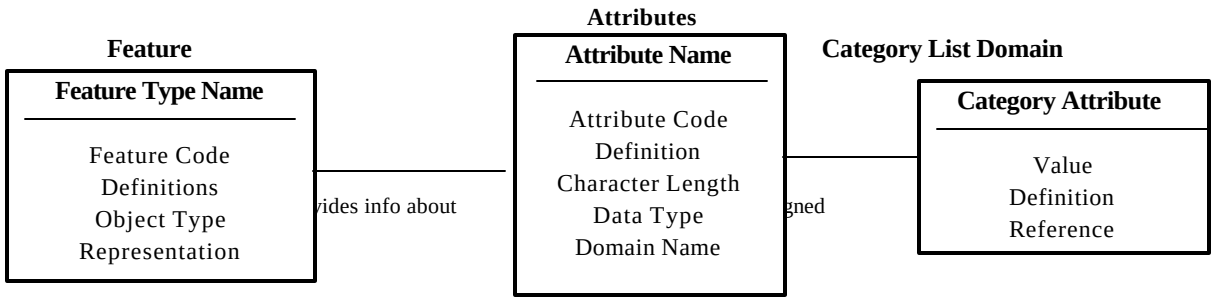

Figure 1

4.0 HYDROGRAPHY STANDARD DATA DICTIONARY/OBJECT CATALOG

CODE FEATURE NAME

HS001 ADMINISTRATION_AREA Land and water under the rights, powers, or authority of various local, state, and national governments.

CATEGORY COMMON_NAME COUNTRY DESCRIPTION FORMAL_NAME HORIZ_ACC
RECORD_DATE SOURCE_DATE

HS002 AIRPORT/AIRFIELD An area used for landing, take-off, and movement of aircraft, not including associated buildings, runways, and other facilities, either military or civilian.

COMMON_NAME CONDITION DESCRIPTION FORMAL_NAME RECORD_DATE SOURCE_DATE
STATUS

HS003 ANCHOR_BERTH A designated area of water where a single vessel, seaplane, etc. may anchor.

COMMON_NAME DATE_END DATE_START DESCRIPTION FORMAL_NAME RADIUS
RECORD_DATE SOURCE_DATE STATUS

HS004 ANCHORAGE_AREA A designated area in which vessels anchor or may anchor.

COMMON_NAME DATE_END DATE_START DESCRIPTION FORMAL_NAME PERMIT
RECORD_DATE RESTRICTION SOURCE_DATE STATUS

HS005 AQUATIC_VEGETATION_AREA A discrete area where submerged or partially submerged aquatic flora has been identified.

COMMON_NAME DESCRIPTION FORMAL_NAME RECORD_DATE SOURCE_DATE

HS006 BEACON A fixed object used for navigation, usually consisting of a single pile or lattice structure, which may or may not actually be in the water.

CARDINAL COLOR_PATTERN COMMON_NAME CONDITION CONSTRUCTION DATE_END
DATE_START DESCRIPTION ELEVATION FORMAL_NAME HEIGHT LATERAL
PRIMARY_COLOR RECORD_DATE SHAPE SOURCE_DATE SPECIAL_PURPOSE
STATUS VERT_ACC VERT_DATUM

HS007 BERTH A named or numbered mooring location, normally alongside a pier or wharf.

COMMON_NAME DATE_END DATE_START DEPTH_ACC DEPTH_DATUM DESCRIPTION
DESIGNATOR FORMAL_NAME QUALITY RECORD_DATE SOURCE_DATE STATUS

HS008 BOAT_LIFT A mechanical device for lifting vessels between two levels other than a lock.

COMMON_NAME DESCRIPTION FORMAL_NAME RECORD_DATE SOURCE_DATE

HS009 BOAT_RAMP A partially submerged hard surfaced area or fixed (not afloat) structure on a shoreline for launching and retrieving vessels or vehicles.

COLOR_PATTERN COMMON_NAME CONDITION CONSTRUCTION DATE_END DATE_START
DESCRIPTION FORMAL_NAME HEIGHT HORIZ_ACC HORIZ_CLEARANCE
LENGTH PRIMARY_COLOR RECORD_DATE SOURCE_DATE STATUS VERT_ACC
VERT_DATUM VERT_LENGTH WIDTH

HS010 BOTTOM_CHARACTERISTICS Designations used on surveys and charts to indicate the consistency, color and classification of the sea floor, as determined by sampling methods.

COMMON_NAME DESCRIPTION FORMAL_NAME MATERIAL NATURE_BOTTOM PRIMARY_COLOR
RECORD_DATE SOURCE_DATE

HS011 BREAKWATER A stone structure which is designed to reduce the action of waves and currents near the entrance to river and ports. Sometimes called a breakwater.

COLOR_PATTERN COMMON_NAME CONDITION CONSTRUCTION DATE_END DATE_START
DESCRIPTION FORMAL_NAME HEIGHT HORIZ_ACC HORIZ_CLEARANCE
LENGTH PRIMARY_COLOR RECORD_DATE SOURCE_DATE STATUS VERT_ACC
VERT_DATUM VERT_LENGTH WIDTH

HS012 BRIDGE A supporting structure used by pedestrians, vehicles, rail traffic, and utility services erected over obstacles such as a river, chasm, mountain, road or railroad. BRIDGE PIERS may support the structure at various locations along its length, or it may completely span the obstacle.

BRIDGE_TYPE	CLEARANCE	COLOR_PATTERN	COMMON_NAME	CONDITION	CONSTRUCTION
DATE_END	DATE_START	DESCRIPTION	DESIGNATOR	ELEVATION	FORMAL_NAME
HEIGHT	HORIZ_ACC	HORIZ_CLEARANCE		LENGTH	MATERIAL
NUM_SPANS	PRIMARY_COLOR	RECORD_DATE	SOURCE_DATE	STATUS	VERT_ACC
VERT_CLEARANCE		VERT_DATUM	WIDTH		

HS013 BRIDGE_PIER The support(s) below the span of a bridge in the form of pillar(s) or abutment(s) for the spans of a bridge. In general, BRIDGE PIERS are only separately coded if they emerge from the surface of the water such that they may be a hazard to navigation.

COLOR_PATTERN	COMMON_NAME	CONDITION	CONSTRUCTION	DATE_END	DATE_START
DESCRIPTION	FORMAL_NAME	HEIGHT	PRIMARY_COLOR	RECORD_DATE	SOURCE_DATE
VERT_ACC	VERT_DATUM	VERT_LENGTH	WIDTH		

HS014 BRIDGE_TOWER A tower or pylon extending above the surface of the bridge. In general, BRIDGE TOWERS are only separately coded if they may be conveniently used as an aide to navigation.

COLOR_PATTERN	COMMON_NAME	CONDITION	CONSTRUCTION	DATE_END	DATE_START
DESCRIPTION	DESIGNATOR	FORMAL_NAME	HEIGHT	HORIZ_ACC	PRIMARY_COLOR
RECORD_DATE	SOURCE_DATE	VERT_ACC	VERT_DATUM	VERT_LENGTH	WIDTH

HS015 BUILDING A relatively permanent structure, roofed and usually walled and designed for some particular use.

COLOR_PATTERN	COMMON_NAME	CONDITION	CONSTRUCTION	DESCRIPTION	DESIGNATOR
ELEVATION	FORMAL_NAME	FUNCTION	HEIGHT	HORIZ_ACC	LENGTH
NO_FLOORS	PRIMARY_COLOR	RECORD_DATE	SHAPE	SOURCE_DATE	STATUS
VERT_ACC	VERT_DATUM	WIDTH			

HS016 BUILT-UP_AREA An area containing a concentration of buildings and the supporting road or rail network.

COMMON_NAME	CONDITION	DESCRIPTION	FACC_CAT	FORMAL_NAME	HEIGHT
MATERIAL	RECORD_DATE	S_57_CAT	SOURCE_DATE	VERT_ACC	VERT_DATUM
WIDTH					

HS017 BUOY A floating object moored to the bottom in a particular place, as an aid to navigation or for other specific purposes.

CHARACTER	COLOR_PATTERN	COMMON_NAME	CONSTRUCTION	DATE_END	DATE_START
DESCRIPTION	FACC_CAT	FORMAL_NAME	HEIGHT	LATERAL	PERIOD
PRIMARY_COLOR	RADAR_REFLECTOR		RECORD_DATE	S_57_CAT	SHAPE
SOURCE_DATE	SPECIAL_PURPOSE		STATUS	TOP_MARK	VERT_ACC

HS018 CANAL An excavated shallow- or deep draft watercourse designed for navigation, usually artificially cut through land area to bypass rock outcrops and rapids, or through shallow intracoastal areas where an adequate depth cannot be maintained at low water periods. Canal edges or borders usually extend above the water surface with visible banks and important ship and bank interaction effects.

COMMON_NAME	CONDITION	DATE_END	DATE_START	DEPTH	DESCRIPTION
FORMAL_NAME	HORIZ_ACC	HORIZ_CLEARANCE		LENGTH	RECORD_DATE
RESTRICTION	S_57_CAT	SOURCE_DATE	STATUS	WATER_VELOCITY	WIDTH

HS019 CARGO_TRANSHIPMENT_AREA An area designated for the transfer of cargo from one vessel to another.

COMMON_NAME	DATE_END	DATE_START	DESCRIPTION	FORMAL_NAME	RECORD_DATE
SOURCE_DATE	STATUS	WIDTH			

HS020 CAUSEWAY A raised roadway of solid structure built primarily to provide a route across wet ground or intertidal area.(Alt)A raised area across low or wet ground used for transportation of pedestrians or vehicles.

CLEARANCE	COMMON_NAME	CONDITION	CONSTRUCTION	DESCRIPTION	FORMAL_NAME
HEIGHT	LENGTH	RECORD_DATE	SOURCE_DATE	STATUS	WIDTH

HS021 CAUTION_AREA Generally, an area where the mariner has to be made aware of circumstances influencing the safety of navigation.

COMMON_NAME	DATE_END	DATE_START	DESCRIPTION	RECORD_DATE	SOURCE_DATE
STATUS	WIDTH				

HS022 CHANNEL_RIVER_SYSTEM(SHALLOW) An inland waterway system used by shallow-draft (15 feet or less) commercial towing and recreational vessels. Includes open river navigation systems (Mississippi River below St. Louis, Missouri River, Columbia River below Bonneville Dam) and canalized streams with locks and dams (e.g. Ohio River, Mississippi River above St. Louis, MO

COMMON_NAME	DATE_END	DATE_START	DEPTH_ACC	DESCRIPTION	FORMAL_NAME
RECORD_DATE	SOURCE_DATE	STATUS	VERT_DATUM		

HS023 CHANNEL_MAINTAINED(DEEP_DRAFT) Type of navigation channel provided for the movement of vessels with drafts of 15 feet or more designed for open-water navigation including seagoing and intracoastal vessels operating in the Great Lakes. Deep-draft channels are usually marked and designated on the appropriate navigation charts with known/fixed depth and width parameters. May be formed and maintained totally, or in part, through excavation,

COMMON_NAME	DATE_END	DATE_START	DEPTH_ACC	DESCRIPTION	FORMAL_NAME
RECORD_DATE	SOURCE_DATE	STATUS	VERT_DATUM		

HS024 CHECKPOINT An official place to register, declare or check goods and people.

COMMON_NAME	DEPTH

HS025 COAST_GUARD_STATION Watch keeping station at which a watch is kept either continuously, or at certain times.

COMMON_NAME	DATE_END	DATE_START	DESCRIPTION	FORMAL_NAME	RECORD_DATE
S_57_CAT	SOURCE_DATE	STATUS			

HS026 CONTIGUOUS_ZONE A zone contiguous to a coastal State's territorial sea, which may not extend beyond 24 nautical miles from the baselines from which the breadth of the territorial sea is measured. The coastal state may exercise certain control in this zone subject to the provisions of Internationa Law. (IHO Dictionary, S-32, 5th Edition, 993)

COMMON_NAME	COUNTRY	DATE_END	DATE_START	DESCRIPTION	RECORD_DATE
SOURCE_DATE	STATUS				

HS027 CONTINENTAL_SHELF_AREA The seabed and subsoil of the submarine areas that extend beyond its territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin.

COMMON_NAME	COUNTRY	DESCRIPTION	FORMAL_NAME	RECORD_DATE	SOURCE_DATE

HS028 CONTROL_POINT A permanently monumented survey control point constructed with an original purpose of establishing spatial location in one or more dimensions from a known reference or datum.

COMMON_NAME	DATE_END	DATE_START	DESCRIPTION	ELEVATION	FORMAL_NAME
RECORD_DATE	SOURCE_DATE	VERT_ACC	VERT_DATUM		

HS029 CONVEYOR A mechanical apparatus for moving bulk material or people from place to place (as by a moving belt or chain of receptacles).

COLOR_PATTERN	COMMON_NAME	CONDITION	DATE_END	DATE_START	DESCRIPTION
DESIGNATOR	FORMAL_NAME	HEIGHT	HORIZ_ACC	LENGTH	PRIMARY_COLOR
RECORD_DATE	SOURCE_DATE	STATUS	VERT_ACC	VERT_CLEARANCE	
VERT_DATUM	WIDTH				

HS030 CRANE A machine for lifting, shifting and lowering objects or materials by means of a swinging boom or with a lifting apparatus supported on an overhead track.

COLOR_PATTERN	COMMON_NAME	CONDITION	DESCRIPTION	FORMAL_NAME	HEIGHT
HORIZ_ACC	LENGTH	MATERIAL	PRIMARY_COLOR	RECORD_DATE	SHAPE
SOURCE_DATE	STATUS	ERT_ACC	VERT_CLEARANCE	VERT_DATUM	WIDTH

HS031 CURRENT Currents (non-gravitational) include either singly or in combination: ocean currents, inter-oceanic equalizing currents, currents of navigable rivers, river outflow effects offshore and other non-tidal flows.

COMMON_NAME	DATE_END	DATE_START	FORMAL_NAME	ORIENTATION	RECORD_DATE
SOURCE_DATE	VELOCITY				

HS032 CUSTOM_ZONE The area within which national customs regulations are in force.

COUNTRY DESCRIPTION RECORD_DATE SOURCE_DATE STATUS WIDTH

HS033 DAM A barrier constructed to hold back water and raise its level to form a reservoir or to prevent flooding.

COLOR_PATTERN COMMON_NAME CONDITION CONSTRUCTION DATE_END DATE_START
DESCRIPTION FORMAL_NAME HEIGHT LENGTH PRIMARY_COLOR RECORD_DATE SOURCE_DATE
VERT_ACC VERT_DATUM WIDTH

HS034 DAY_MARK The daytime identifier of an aid to navigation. The daymark conveys to the mariner, during daylight hours, the same significance as does the aid to naviation's light at night.

COLOR_PATTERN COMMON_NAME CONSTRUCTION DATE_END DATE_START DESCRIPTION
ELEVATION FORMAL_NAME HEIGHT PRIMARY_COLOR RECORD_DATE S_57_CAT
SHAPE SOURCE_DATE STATUS VERT_ACC VERT_DATUM

HS035 DEEP_WATER_ROUTE A deep water route in a designated area, within defined limits, which has been accurately surveyed for clearance of sea bottom and submerged obstacles to a minimum indicated depth of water.

COMMON_NAME DATE_END DATE_START DEPTH_ACC DESCRIPTION FORMAL_NAME
RECORD_DATE SOURCE_DATE STATUS VERT_DATUM

HS036 DEPTH_AREA A depth area is a water area whose depth is within a defined range of values.

DESCRIPTION RECORD_DATE SOURCE_DATE VERT_DATUM

HS037 DEPTH_CONTOUR A line connecting points of equal water depth which is sometimes significantly displaced outside of soundings, symbols and other chart detail for clarity as well as generalization.

DEPTH DESCRIPTION RECORD_DATE SOURCE_DATE VERT_DATUM

HS038 DISTANCE_MARK A distance mark indicates the distance measured from an origin and consists of either a solid visible structure or a distinct location without special installation.

COMMON_NAME DATE_END DATE_START DESCRIPTION FORMAL_NAME RECORD_DATE
RIVER_MILE SOURCE_DATE

HS039 DOLPHIN A post or group of posts, which may suport a deck, used for mooring or warping a vessel.

COLOR_PATTERN COMMON_NAME CONDITION CONSTRUCTION DATE_END DATE_START
DESCRIPTION FORMAL_NAME HEIGHT PRIMARY_COLOR RECORD_DATE SHAPE
SOURCE_DATE STATUS VERT_ACC VERT_DATUM

HS040 DREDGED_AREA An area of the bottom of a body of water which has been deepened by dredging.

COMMON_NAME DESCRIPTION FORMAL_NAME LENGTH PERMIT RECORD_DATE
RESTRICTION SOURCE_DATE VERT_DATUM

HS041 DRYDOCK A structure, providing support for a vessel, which has a means of removing water so that the bottom of the vessel can be exposed.

COMMON_NAME CONDITION DESCRIPTION FORMAL_NAME HORIZ_ACC
HORIZ_CLEARANCE LENGTH RECORD_DATE SOURCE_DATE STATUS VERT_DATUM
WIDTH

HS042 DUMPING_GROUND An area where dredged material or potentially harmful material e.g. explosives chemical waste is deliberately deposited.

COMMON_NAME DESCRIPTION FORMAL_NAME RECORD_DATE S_57_CAT SOURCE_DATE
STATUS WIDTH

HS043 DYKE A linear stone structure with a peaked or trapezoidal section located in pointway, secondary and main channel area and typically extending channelward from the convex bank to improve channel for navigational and flood control purposes.

COMMON_NAME DESCRIPTION ELEVATION LENGTH RECORD_DATE SOURCE_DATE

HS044 ELEVATION An elevation is the vertical distance of a point or a level, on, or affixed to, the surface of the earth, measured from a specified Geodetic vertical datum.

COMMON_NAME	DESCRIPTION	DESIGNATOR	ELEVATION	FORMAL_NAME	HORIZ_ACC
MATERIAL	RECORD_DATE	SOURCE_DATE	VERT_ACC	VERT_DATUM	

HS045 FAIRWAY A navigable pathway in an open and unobstructed waterway, such as a bay, lake, sound, or straight, or open coast, usually leading into a harbor from the open sea outside a buoyed channel, ordinarily used by vessel traffic, and so designated by appropriate authority.

COMMON_NAME	CONDITION	CONSTRUCTION	DESCRIPTION	ELEVATION	FORMAL_NAME
RECORD_DATE	SOURCE_DATE	STATUS	VERT_ACC	VERT_DATUM	WIDTH

FENCE/WALL A natural or man-made barrier used as an enclosure or boundary or for protection.

COLOR_PATTERN	COMMON_NAME	CONDITION	CONSTRUCTION	DESCRIPTION	ELEVATION
FORMAL_NAME	HEIGHT	PRIMARY_COLOR	RECORD_DATE	S_57_CAT	SOURCE_DATE
STATUS	VERT_ACC	VERT_DATUM	WIDTH		

HS047 FENDER A protective structure designed to cushion the impact of a vessel and prevent

COLOR_PATTERN	COMMON_NAME	CONDITION	CONSTRUCTION	DATE_END	DATE_START
DESCRIPTION	FORMAL_NAME	HEIGHT	HORIZ_ACC	HORIZ_CLEARANCE	
LENGTH	PRIMARY_COLOR	RECORD_DATE	S_57_CAT	SOURCE_DATE	STATUS
VERT_ACC	VERT_DATUM	WIDTH			

HS048 FERRY_ROUTE A route in a body of water where a ferry crosses from one shoreline to another.

COMMON_NAME	DATE_END	DATE_START	DESCRIPTION	FORMAL_NAME	RECORD_DATE
S_57_CAT	SOURCE_DATE	STATUS	TRIP_LENGTH		

HS049 FISHERY_ZONE The offshore zone in which exclusive fishing rights and management are held by the coastal nation.

COMMON_NAME	COUNTRY	DESCRIPTION	FORMAL_NAME	RECORD_DATE	SOURCE_DATE
STATUS					

HS050 FISHING_FACILITY A structure in shallow water for fishing purposes which can be an obstruction to ships in general. The position of these structures may vary frequently over time.

COMMON_NAME	DESCRIPTION	FORMAL_NAME	HEIGHT	RECORD_DATE	S_57_CAT
SOURCE_DATE	STATUS	VERT_ACC			

HS051 FISHING_GROUND A water area in which fishing is frequently carried on.

COMMON_NAME	DESCRIPTION	FORMAL_NAME	RECORD_DATE	SOURCE_DATE	STATUS

HS052 FISHING_HARBOR A harbour with facilities for fishing boats.

COMMON_NAME	CONDITION	CONSTRUCTION	DATE_END	DATE_START	DESCRIPTION
FORMAL_NAME	RECORD_DATE	S_57_CAT	SOURCE_DATE	STATUS	

HS053 FLEETING_AREA Area where barges and tows are assembled into a fleet.

COMMON_NAME	DESCRIPTION	PERMIT

HS054 FLOATING_DOCK A facility which can be raised or lowered into the water which can serve as a launching place for vessels or as a floating drydock.

COLOR_PATTERN	COMMON_NAME	CONDITION	DATE_END	DATE_START	DESCRIPTION
FORMAL_NAME	HEIGHT	HORIZ_ACC	HORIZ_CLEARANCE		LENGTH
PRIMARY_COLOR	RECORD_DATE	SOURCE_DATE	STATUS	VERT_ACC	VERT_DATUM
WIDTH					

HS055 FLOOD_DIVERSION_AREA An area specifically intended to be covered with water to permit reduction in river/waterbody water levels protecting more critical areas from inundation.

COMMON_NAME	DESCRIPTION

HS056 FLOODWALL A structure erected to protect an area from high river stages.

COLOR_PATTERN	COMMON_NAME	CONDITION	CONSTRUCTION	DATE_END	DATE_START
DESCRIPTION	ELEVATION	FORMAL_NAME	HEIGHT	HORIZ_ACC	
HORIZ_CLEARANCE		LENGTH	PRIMARY_COLOR	RECORD_DATE	S_57_CAT
SOURCE_DATE	STATUS	VERT_ACC	VERT_DATUM	WIDTH	

HS057 FOG_SIGNAL A warning signal transmitted by a vessel, or aid to navigation, during periods of low visibility. Also, the device producing such a signal.

COMMON_NAME	DATE_END	DATE_START	DESCRIPTION	FORMAL_NAME	FREQUENCY
PERIOD	RECORD_DATE	S_57_CAT	SOURCE_DATE	STATUS	

HS058 FORTIFIED_STRUCTURE A structure for the military defence of a site.

COMMON_NAME	CONDITION	CONSTRUCTION	DESCRIPTION	FORMAL_NAME	HEIGHT
HORIZ_ACC	RECORD_DATE	S_57_CAT	SOURCE_DATE	VERT_ACC	VERT_DATUM
WIDTH					

HS059 FOUL_GROUND An area of numerous unidentified dangers to navigation. The area serves as a warning to the mariner that all dangers are not identified individually and that navigation through the area may be hazardous. Commonly used to encode areas behind danger lines on navigation charts. (adapted from IHO Dictionary, S-32, 5th Edition)

COMMON_NAME	CONDITION	CONSTRUCTION	DEPTH	DESCRIPTION	FORMAL_NAME
HEIGHT	RECORD_DATE	S_57_CAT	SOURCE_DATE	STATUS	VERT_ACC
VERT_DATUM					

HS060 FREEPORT_AREA A port where certain import and export duties are waived to facilitate reshipment to other countries.

COMMON_NAME	DESCRIPTION	FORMAL_NAME	RECORD_DATE	SOURCE_DATE	STATUS	WIDTH

HS061 GATE A structure that may be swung, drawn, or lowered to block an entrance or passageway. (United States Geological Survey, Jan.89)

COMMON_NAME	CONDITION	CONSTRUCTION	DESCRIPTION	FORMAL_NAME	HORIZ_ACC
HORIZ_CLEARANCE		RECORD_DATE	S_57_CAT	SOURCE_DATE	STATUS
VERT_ACC	VERT_CLEARANCE		VERT_DATUM	WIDTH	

HS062 GAUGING_STATION A device which monitors stream flow and water elevation.

COMM_CHANNEL	COMMON_NAME	DATE_END	DATE_START	DESCRIPTION	FORMAL_NAME
RECORD_DATE	S_57_CAT	SOURCE_DATE	STATUS		

HS063 GRAIN_ELEVATOR/ELEVATOR A tall structure used to store and distribute grain whose location accuracy is not sufficient for naviation purposes.

COLOR_PATTERN	COMMON_NAME	CONDITION	CONSTRUCTION	DESCRIPTION	ELEVATION
FORMAL_NAME	HEIGHT	HORIZ_ACC	PRIMARY_COLOR	RECORD_DATE	S_57_CAT
SHAPE	SOURCE_DATE	STATUS	VERT_ACC	VERT_DATUM	WIDTH

HS064 GRIDIRON A flat frame, usually of parallel timber baulks, erected on the foreshore so that a vessel may dry out on it for painting or repair at low water.

COMMON_NAME	CONSTRUCTION	DESCRIPTION	FORMAL_NAME	HEIGHT	HORIZ_ACC	LENGTH
RECORD_DATE	SOURCE_DATE	STATUS	VERT_ACC	WIDTH		

HS065 GUIDE_WALL The structure used to guide boats or ships into a lock chamber.

COLOR_PATTERN	COMMON_NAME	CONDITION	CONSTRUCTION	DATE_END	DATE_START
DESCRIPTION	FORMAL_NAME	HEIGHT	HORIZ_ACC	HORIZ_CLEARANCE	
LENGTH	PRIMARY_COLOR	RECORD_DATE	S_57_CAT	SOURCE_DATE	STATUS
VERT_ACC	VERT_DATUM	WIDTH			

HS066 HARBOR A natural or artificial improved body of water providing protection for vessels and anchorage and docking facilities.

COMMON_NAME	DEPTH	DESCRIPTION	FORMAL_NAME	RECORD_DATE	SOURCE_DATE
STATUS					

HS067 HARBOR_FACILITY A harbor installation with a service or commercial operation of public interest.

COMMON_NAME	CONDITION	CONSTRUCTION	DATE_END	DATE_START	DESCRIPTION
FORMAL_NAME	RECORD_DATE	S_57_CAT	SOURCE_DATE	STATUS	

HS068 ICE_AREA An area which is covered by ice for the entire year.

COMMON_NAME	DESCRIPTION	ELEVATION	FORMAL_NAME	HEIGHT	RECORD_DATE
S_57_CAT	SOURCE_DATE	STATUS	VERT_ACC	VERT_DATUM	WIDTH

HS069 ICE_BOOM Floating barriers, anchored to the bottom, used to deflect the path of floating ice in order to prevent the obstruction of locks, intakes etc., and to prevent damage to bridge piers and other structures.

COMMON_NAME	CONDITION	CONSTRUCTION	DEPTH	DESCRIPTION	FORMAL_NAME
HEIGHT	RECORD_DATE	S_57_CAT	SOURCE_DATE	STATUS	VERT_ACC
VERT_DATUM					

HS070 INCINERATION_AREA An offshore area officially designated as suitable for the burning of chemical waste by specially equipped ships.

COMMON_NAME	DEPTH	DESCRIPTION	FORMAL_NAME	RECORD_DATE	RESTRICTION
SOURCE_DATE	STATUS	WIDTH			

HS071 INSHORE_TRAFFIC_ZONE A routeing measure comprising a designated area between the landward boundary of a traffic separation scheme and the adjacent coast, to be used in accordance with the provisions of the International Regulations for Preventing Collisions at Sea.

COMMON_NAME	DATE_END	DATE_START	DEPTH	DESCRIPTION	FACC_CAT
RECORD_DATE	RESTRICTION	S_57_CAT	SOURCE_DATE	STATUS	WIDTH

HS072 ISLAND An area of land completely surrounded by the waters of an ocean, sea, lake, or stream.

COMMON_NAME	CONDITION	DESCRIPTION	ELEVATION	FORMAL_NAME	HEIGHT
RECORD_DATE	SOURCE_DATE	STATUS	WIDTH		

HS073 ISOGONIC_LINE Lines connecting point of equal magnetic variation.

MAG_VARIATION

HS074 LAKE Any body of water surrounded by land.

COMMON_NAME	DESCRIPTION	ELEVATION	FACC_CAT	FORMAL_NAME	RECORD_DATE
SOURCE_DATE	VERT_ACC				
VERT_DATUM	WIDTH				

HS075 LANDING_PLACE A named place, normally outside a harbor facility, where boats can transfer passengers or cargo. A ferry terminal may be called a landing area.

WIDTH

HS076 LANDMARK Tall structures or objects which are precisely located to serve as an aid to navigation.

COLOR_PATTERN	COMMON_NAME	CONDITION	CONSTRUCTION	DESCRIPTION	DESIGNATOR
Directivity	ELEVATION	FORMAL_NAME	FUNCTION	HEIGHT	HORIZ_ACC
HORIZ_DATUM	PRIMARY_COLOR	RECORD_DATE	S_57_CAT	SHAPE	SOURCE_DATE
STATUS V	ERT_ACC	VERT_DATUM	WIDTH		

HS077 LEADING_LINE A track line which passes through one or more (usually two) clearly defined objects, along which a vessel can safely travel.

DATE_END	DATE_START	DESCRIPTION	ORIENTATION	RECORD_DATE	S_57_CAT
SOURCE_DATE	STATUS				

HS078 LEVEE An embankment for controlling the waters of the sea, river or other water bodies.

COMMON_NAME	DESCRIPTION	RECORD_DATE	SOURCE_DATE

HS079 LIGHT_VESSEL/LIGHTSHIP A distinctively marked manned vessel anchored or moored at a defined point to serve as an aid to navigation.

CHARACTER	COLOR_PATTERN	COMMON_NAME	CONSTRUCTION	DATE_END	DATE_START
DESCRIPTION	FORMAL_NAME	HEIGHT	HORIZ_ACC	HORIZ_DATUM	LENGTH
PERIOD	PRIMARY_COLOR	RANGE	RECORD_DATE	SOURCE_DATE	STATUS
VERT_ACC	VERT_DATUM	WIDTH			

HS080 LOCK A wet dock in a waterway, permitting a ship to pass from one level to another.

COMMON_NAME	DATE_END	DATE_START	DESCRIPTION	DIRECTIVITY	ELEVATION
FORMAL_NAME	HEIGHT	HORIZ_ACC	HORIZ_CLEARANCE		LENGTH
MATERIAL	RECORD_DATE	SOURCE_DATE	STATUS WIDTH		

HS081 LOCK_BASIN/LOCK_CHAMBER A wet dock in a waterway, permitting a ship to pass from one level to another.

COMMON_NAME	DATE_END	DATE_START	DESCRIPTION	FORMAL_NAME	HORIZ_ACC
HORIZ_CLEARANCE		LENGTH	RECORD_DATE	SOURCE_DATE	STATUS WIDTH

HS082 LOG_POND A maritime area enclosed with connected floating timbers used as a staging area for sawn logs.

COMMON_NAME	DESCRIPTION	FORMAL_NAME	LENGTH	RECORD_DATE	SOURCE_DATE
STATUS	WIDTH				

HS083 MAGNETIC_DISTURBANCE_AREA A localized anomaly in the earth's magnetic field.

COMMON_NAME	DESCRIPTION	FORMAL_NAME	MAG_ANOMALY	RECORD_DATE	SOURCE_DATE

HS084 MAGNETIC_VARIATION Lines connecting point of equal magnetic variation.

DATE_END	DATE_START	DESCRIPTION	RECORD_DATE	SOURCE_DATE	VARIATION

HS085 MAJOR_INFLOW/OUTFLOW_STRUCTUR Major inflow and outflow structures, i.e., the intake structure of an electric generating stations, located in the river that are potential hazards to navigation.

COMMON_NAME	CONDITION	DATE_END	DATE_START	DEPTH	DESCRIPTION
FORMAL_NAME	HEIGHT	RECORD_DATE	RESTRICTION	S_57_CAT	SOURCE_DATE
STATUS	VERT_ACC	VERT_DATUM			

HS086 MARINE_FARM An assemblage of cages, nets, rafts and floats or posts where fish, including shellfish are artificially cultivated.

COMMON_NAME	DATE_END	DATE_START	DEPTH	DESCRIPTION	FORMAL_NAME
HEIGHT	RECORD_DATE	RESTRICTION	S_57_CAT	SOURCE_DATE	STATUS
VERT_ACC	VERT_DATUM	WIDTH			

HS087 MAT_CASTING_FIELD A site where concrete blocks are cast for ACM revetment.

COMMON_NAME	DATE_END	DATE_START	DESCRIPTION	FORMAL_NAME	RECORD_DATE
SOURCE_DATE	STATUS				

HS088 MEASURED_DISTANCE_LINE A course whose length has been accurately measured and is used in conjunction with ranges ashore. It is used by vessels to calibrate logs, engine revolution counters, etc., and determine speed.

COMMON_NAME	DATE_END	DATE_START	DESCRIPTION	FORMAL_NAME	LENGTH
ORIENTATION	RECORD_DATE	S_57_CAT	SOURCE_DATE	STATUS	VERT_DATUM

HS089 MILITARY_PRACTICE_AREA An area within which naval, military or aerial exercises are carried out. Also called an exercise area.

COMMON_NAME	DATE_END	DATE_START	DESCRIPTION	FORMAL_NAME	RECORD_DATE
RESTRICTION	S_57_CAT	SOURCE_DATE	STATUS	WIDTH	

HS090 MINE-NAVAL An explosive device used in naval warfare located on or below the sea.

DEPTH	DESIGNATOR	HORIZ_ACC	IDENTIFIER	STATUS

HS091 MOORED_VESSEL A semi-permanently moored ship.

COLOR_PATTERN	COMMON_NAME	CONDITION	DESCRIPTION	FORMAL_NAME	HEIGHT
HORIZ_ACC	LENGTH PERMIT	PRIMARY_COLOR	RECORD_DATE	S_57_CAT	SOURCE_DATE
VERT_ACC	WIDTH				

HS092 MOORING_FACILITY A structure used for mooring/warping a ship or as a protection for harbor

COLOR_PATTERN	COMMON_NAME	CONDITION	CONSTRUCTION	DATE_END	DATE_START
DESCRIPTION	FORMAL_NAME	HEIGHT	PRIMARY_COLOR	RECORD_DATE	S_57_CAT
SHAPE	SOURCE_DATE	STATUS	VERT_ACC	VERT_DATUM	

HS093 NAMED_WATER_AREA An area within a water body which is commonly referenced by a name.

COMMON_NAME	DESCRIPTION	FORMAL_NAME	RECORD_DATE	SEA_TYPE	SOURCE_DATE

HS094 NAVIGATION_LIGHT A luminous or lighted aid to navigation.

CATEGORY	COLOR_PATTERN	COMMON_NAME	DATE_END	DATE_START	DESCRIPTION
ELEVATION	FORMAL_NAME	HEIGHT	HORIZ_ACC	HORIZ_DATUM	MATERIAL
ORIENTATION	PRIMARY_COLOR	RANGE	RECORD_DATE	SIG_GROUP	SIG_PERIOD
SIQ_SEQUENCE	SOURCE_DATE	STATUS	VERT_ACC	VERT_DATUM	

HS095 NAVIGATION_LINE A navigation line is a straight line extending towards and area of navigational interest and generally generated by two navigational aids or one navigational aid and a bearing.

DATE_END	DATE_START	DESCRIPTION	ORIENTATION	RECORD_DATE	S_57_CAT
SOURCE_DATE	STATUS				

HS096 OBSTRUCTION In marine navigation, anything that hinders or prevents movement, particularly anything that endangers or prevents passage of a vessel. The term is usually used to refer to an isolated danger to navigation…(IHO Dictionary, S-32, 5th Edition, 3503)

COMMON_NAME	CONDITION	CONSTRUCTION	DEPTH	DESCRIPTION	FORMAL_NAME
HEIGHT	RECORD_DATE	S_57_CAT	SOURCE_DATE	STATUS	VERT_ACC
VERT_DATUM					

HS097 OFFSHORE_LOADING_FACILITY A facility located offshore for loading and unloading cargo.

COLOR_PATTERN	COMMON_NAME	CONSTRUCTION	DATE_END	DATE_START	DESCRIPTION
ELEVATION	FORMAL_NAME	HEIGHT	PRIMARY_COLOR	RECORD_DATE	S_57_CAT
SHAPE	SOURCE_DATE	STATUS	VERT_ACC	VERT_LENGTH	WIDTH

HS098 OFFSHORE_PLATFORM A permanent offshore structure, either fixed or floating, used in the production of oil or natural gas.

COLOR_PATTERN	COMMON_NAME	CONDITION	CONSTRUCTION	DATE_END	DATE_START
DESCRIPTION	ELEVATION	FORMAL_NAME	HEIGHT	HORIZ_ACC	PRIMARY_COLOR
RECORD_DATE	S_57_CAT	SOURCE_DATE	STATUS	VERT_ACC	VERT_DATUM
WIDTH					

HS099 OFFSHORE_PRODUCTION_AREA An area at sea within which there are production facilities.

COMMON_NAME	CONDITION	DATE_END	DATE_START	DEPTH	DESCRIPTION
FORMAL_NAME	HEIGHT	RECORD_DATE	RESTRICTION	S_57_CAT	SOURCE_DATE
STATUS	VERT_ACC	VERT_LENGTH	WIDTH		

HS100 OIL_BARRIER A construction to dam oil flow on water.

COMMON_NAME	CONDITION	DATE_END	DATE_START	DESCRIPTION	FORMAL_NAME
RECORD_DATE	S_57_CAT	SOURCE_DATE	STATUS		

HS101 OVERHEAD_PIPELINE/CABLE A collection of wires, cables, or pipe either supported or suspended above the waterway.

COMMON_NAME	CONDITION	DATE_END	DATE_START	DESCRIPTION	DESIGNATOR
ELEVATION	FORMAL_NAME	HEIGHT	HORIZ_ACC	LENGTH	MATERIAL
RECORD_DATE	S_57_CAT	SOURCE_DATE	STATUS	VERT_ACC	VERT_CLEARANCE
VERT_DATUM	WIDTH				

HS102 PARK An area set aside and designated for several types of leisure or recreational activities.

COMMON_NAME

HS103 PARKING_AREA An area used for parking vehicles not including residential streets and driveways.

COMMON_NAME	DESCRIPTION	FORMAL_NAME	LENGTH	RECORD_DATE	S_57_CAT
SOURCE_DATE	SPACES	STATUS	WIDTH		

HS104 PIER/WHARF/QUAY A structure primarily used as berthing places for vessels.

COLOR_PATTERN	COMMON_NAME	CONDITION	CONSTRUCTION	DATE_END	DATE_START
DESCRIPTION	ELEVATION	FORMAL_NAME	HEIGHT	HORIZ_ACC	
HORIZ_CLEARANCE		LENGTH	PRIMARY_COLOR	RECORD_DATE	S_57_CAT
SOURCE_DATE	STATUS	VERT_ACC	VERT_DATUM	WIDTH	

HS105 PILE/POST A long heavy timber or section of steel, wood, concrete, etc.. forced into the earth which may serve as a support, as for a pier, or a free standing pole within a marine environment.

COLOR_PATTERN	COMMON_NAME	CONDITION	DATE_END	DATE_START	DESCRIPTION
ELEVATION	FORMAL_NAME	HEIGHT	PRIMARY_COLOR	RECORD_DATE	S_57_CAT
SOURCE_DATE	VERT_ACC	VERT_DATUM	WIDTH		

HS106 PILOT_BOARDING_PLACE The meeting place to which a pilot comes out.

COMM_CHANNEL	COMMON_NAME	DATE_END	DATE_START	DEPTH	DESCRIPTION
FORMAL_NAME	RECORD_DATE	S_57_CAT	SOURCE_DATE	STATUS	WIDTH

HS107 PONTOON A permanently floating structure used as a bridge support or as the head of a pier, dock, or landing.

COMMON_NAME	CONDITION	CONSTRUCTION	DATE_END	DATE_START	DESCRIPTION
FORMAL_NAME	HEIGHT	RECORD_DATE	SOURCE_DATE	STATUS	VERT_ACC

HS108 PORT_AUTHORITY An area over which a harbour authorty has jurisdiction.

COMMON_NAME	CONDITION	CONSTRUCTION	DATE_END	DATE_START	DESCRIPTION
FORMAL_NAME	RECORD_DATE	S_57_CAT	SOURCE_DATE	STATUS	

HS109 PRECAUTIONARY_AREA A routing measure comprising an area within defined limits where ships must navigate with particular caution and within which the direction of traffic flow may be recommended.

DATE_END	DATE_START	DEPTH	DESCRIPTION	FORMAL_NAME	RECORD_DATE
RESTRICTION	SOURCE_DATE	STATUS	WIDTH		

HS110 PRODUCTION_AREA An existing structure that was created, by man, for occupation, storage, or to facilitate an activity.

COMMON_NAME	CONDITION	DATE_END	DATE_START	DESCRIPTION	DESIGNATOR
ELEVATION	FORMAL_NAME	FUNCTION	HEIGHT	HORIZ_ACC	HORIZ_DATUM
MATERIAL	PRODUCT	RECORD_DATE	S_57_CAT	SOURCE_DATE	STATUS
VERT_ACC	VERT_DATUM	WIDTH			

HS111 PROMENADE_PIER A pier used only for recreational purposes. These structures are sometimes the remnants of the approaches to bridges.

COLOR_PATTERN	COMMON_NAME	CONDITION	CONSTRUCTION	DATE_END	DATE_START
DESCRIPTION	ELEVATION	FORMAL_NAME	HEIGHT	HORIZ_ACC	HORIZ_CLEARANCE
LENGTH	PRIMARY_COLOR	RECORD_DATE	S_57_CAT	SOURCE_DATE	STATUS
VERT_ACC	VERT_DATUM	WIDTH			

HS112 PYLON A pylon or pole used to support a telephone or telegraph line.

COLOR_PATTERN	COMMON_NAME	CONDITION	CONSTRUCTION	DATE_END	DATE_START
DESCRIPTION	ELEVATION	FORMAL_NAME	HEIGHT	HORIZ_ACC	HORIZ_DATUM
PRIMARY_COLOR	RECORD_DATE	S_57_CAT	SOURCE_DATE	VERT_ACC	VERT_DATUM
WIDTH					

HS113 RADAR_LINE A track along which ships may be guided by coastal radar stations in the even of bad visibility.

COMMON_NAME	DESCRIPTION	FORMAL_NAME	ORIENTATION	RECORD_DATE	SOURCE_DATE
STATUS					

HS114 RADAR_RANGE Indicates the coverage of a sea area by a radar surveillance station. Inside this area a vessel may request shore based radar assistance, particularly in poor visibility.

COMM_CHANNEL	COMMON_NAME	DATE_END	DATE_START	DESCRIPTION	FORMAL_NAME
RECORD_DATE	SOURCE_DATE	STATUS			

HS115 RADAR_REFLECTOR A device capable of, or intended for, reflecting radar signals.

DESCRIPTION	HEIGHT	RECORD_DATE	SOURCE_DATE	STATUS	VERT_ACC
VERT_DATUM					

HS116 RADAR_STATION A station with a transmitter emitting pulses of ultra-high frequency radio waves which are reflected by solid objects and are detected upon their return to the sending station.

COMM_CHANNEL	COMMON_NAME	DATE_END	DATE_START	DESCRIPTION	FORMAL_NAME
HEIGHT	LENGTH	MAX_RANGE	RECORD_DATE	S_57_CAT	SOURCE_DATE
STATUS	VERT_ACC	VERT_DATUM	WIDTH		

HS117 RADAR_TRANSPONDER_BEACON A transponder beacon transmitting a coded signal on radar frequency, permitting an interrogating craft to determine the bearing and range of the transponder. Also called recon.

COMMON_NAME	DATE_END	DATE_START	DESCRIPTION	ELEVATION	FORMAL_NAME
HORIZ_ACC	MAX_RANGE	PRIMARY_COLOR	RECORD_DATE	S_57_CAT	SOURCE_DATE
STATUS					

HS118 RADIO_CALLING_IN_POINT A specified point some distance from the harbor at which a vessel's navigator notifies the harbor authority of his ship's position to assist traffic control.

COMM_CHANNEL	COMMON_NAME	DATE_END	DATE_START	DESCRIPTION	FORMAL_NAME
RECORD_DATE	SOURCE_DATE	STATUS			

HS119 RADIO_STATION A place equipped to transmit radio waves. Such a station may be either stationary or mobile, and may also be provided with a radio receiver.

CALL_SIGN	COMM_CHANNEL	COMMON_NAME	DATE_END	DATE_START	DESCRIPTION
DESIGNATOR	ELEVATION	EST_RANGE	FORMAL_NAME	FREQUENCY	HORIZ_ACC
HORIZ_DATUM	LENGTH	MATERIAL	ORIENTATION	RECORD_DATE	S_57_CAT
SOURCE_DATE	STATUS	VERT_ACC	WIDTH		

HS120 RAILROAD A rail or set of parallel rails on which a train or tram runs.

COMMON_NAME	CONDITION	DESCRIPTION	FORMAL_NAME	HEIGHT	RECORD_DATE
SOURCE_DATE	STATUS	VERT_ACC			

HS121 RAILROAD_YARD A system of tracks within defined limits, and associated features, provided for loading/unloading and assembling trains.

COMMON_NAME	TRACK_LENGTH	WIDTH

HS122 RAPIDS Portions of a stream with accelerated current where it descends rapidly but without a break in the slope of the bed sufficient to form a waterfall. Usually used in the plural.

COMMON_NAME	DESCRIPTION	FORMAL_NAME	HEIGHT	RECORD_DATE	SOURCE_DATE
VERT_ACC	WIDTH				

HS123 RECOMMENDED_TRACK A track recommended to all or only certain vessels.

COMMON_NAME	DATE_END	DATE_START	DEPTH	DESCRIPTION	FORMAL_NAME
RECORD_DATE	S_57_CAT	SOURCE_DATE	STATUS	VERT_DATUM	

HS124 REEF A rocky or coral elevation at or near enough to the surface of the sea to be a danger to surface navigation.

COMMON_NAME	DEPTH	DESCRIPTION	FORMAL_NAME	HORIZ_ACC	LENGTH
MATERIAL	RECORD_DATE	S_57_CAT	SOURCE_DATE	WIDTH	

HS125 RESCUE_STATION A place at which life saving equipment is held.

COMMON_NAME	DATE_END	DATE_START	DESCRIPTION	DESIGNATOR	ELEVATION
FORMAL_NAME	FUNCTION	HEIGHT	HORIZ_ACC	IDENTIFIER	LENGTH
MATERIAL	RECORD_DATE	S_57_CAT	SOURCE_DATE	STATUS	VERT_ACC
WIDTH					

HS126 RESTRICTED_AREA A specified area designated by an appropriate authority within which navigation is restricted in accordance with certain specified conditions.

COMMON_NAME	DATE_END	DATE_START	DESCRIPTION	FORMAL_NAME	RECORD_DATE
RESTRICTION	S_57_CAT	SOURCE_DATE	STATUS		

HS127 RETRO_REFLECTOR A means of distinguishing unlighted marks at night. Retro-reflective material is secured to the mark in a particular pattern to reflect back light.

COLOR_PATTERN	DESCRIPTION	HEIGHT	PRIMARY_COLOR	RECORD_DATE	SOURCE_DATE
STATUS	VERT_ACC	VERT_DATUM			

HS128 RIVER A natural flowing watercourse.

COMMON_NAME	DEPTH	DESCRIPTION	FORMAL_NAME	LENGTH	RECORD_DATE
SOURCE_DATE	STATUS	WIDTH			

HS129 RIVER_BANK River edge delineated during general planimetric mapping from aerial photography.

COMMON_NAME	CONDITION	DESCRIPTION	FORMAL_NAME	RECORD_DATE	SOURCE_DATE

HS130 RIVER_ENGINEERING_STRUCTURE Any man-made object designed to check, control, or direct flow placed in the waterway which may pose a hazard to navigation.

COLOR_PATTERN	COMMON_NAME	CONDITION	CONSTRUCTION	DATE_END	DATE_START
DESCRIPTION	FORMAL_NAME	HEIGHT	HORIZ_ACC	HORIZ_CLEARANCE	
LENGTH	PRIMARY_COLOR	RECORD_DATE	S_57_CAT	SOURCE_DATE	STATUS
VERT_ACC	VERT_DATUM	WIDTH			

HS131 ROAD A road is an open way for the passage of vehicles.

COMMON_NAME	CONDITION	CONSTRUCTION	DESCRIPTION	DESIGNATOR	FORMAL_NAME
HORIZ_ACC	MATERIAL	RECORD_DATE	S_57_CAT	SOURCE_DATE	STATUS
SURFACE	WIDTH				

HS132 RUNWAY A defined area, usually rectangular, used for the conventional landing and take-off of aircraft.

COMMON_NAME	CONDITION	CONSTRUCTION	DESCRIPTION	DESIGNATOR	ELEVATION
FORMAL_NAME	HORIZ_ACC	LENGTH	RECORD_DATE	S_57_CAT	SOURCE_DATE
STATUS	SURFACE	WIDTH			

HS133 SAFETY_FAIRWAY An area defined by the code of regulations where construction of temporary or permanent structures is prohibited.

COMMON_NAME	DATE_END	DATE_START	DEPTH	DESCRIPTION	FORMAL_NAME
RECORD_DATE	RESTRICTION	SOURCE_DATE	STATUS	VERT_DATUM	

HS134 SAND_WAVES A large mobile wave-like sediment feature in shallow water and composed of sand. The wavelength may reach 1000 meters, the amplitude may be up to 20 meters.

DESCRIPTION	HEIGHT	RECORD_DATE	SOURCE_DATE	VERT_ACC

HS135 SANDBAR The boundary or outline of an area where the bottom protrudes above the surface of the water subject to water levels and currents.

DESCRIPTION	FORMAL_NAME	RECORD_DATE	SOURCE_DATE	VERT_DATUM

HS136 SEA-PLANE_LANDING_AREA A designated portion of water for the landing and take-off of sea planes.

COMMON_NAME	DESCRIPTION	ELEVATION	FORMAL_NAME	LENGTH	RECORD_DATE
RESTRICTION	SOURCE_DATE	STATUS	WIDTH		

HS137 SEAWALL A structure built to protect the shore from erosion.

COLOR_PATTERN	COMMON_NAME	CONDITION	CONSTRUCTION	DATE_END	DATE_START
DESCRIPTION	FORMAL_NAME	HEIGHT	HORIZ_ACC	HORIZ_CLEARANCE	LENGTH
PRIMARY_COLOR	RECORD_DATE	S_57_CAT	SOURCE_DATE	STATUS	VERT_ACC
VERT_DATUM	WIDTH				

HS138 SHORELINE The line where a land mass is in contact with a body of water.

COMMON_NAME	DESCRIPTION	ELEVATION	FACC_CAT	FORMAL_NAME	PRIMARY_COLOR
RECORD_DATE	S_57_CAT	SOURCE_DATE	VERT_ACC	VERT_DATUM	

HS139 SHORELINE_CONSTRUCTION Any man-made structure immediately adjacent to the water way designed to assist in the management of flow and the deposit of sediment.

COLOR_PATTERN	COMMON_NAME	CONDITION	CONSTRUCTION	DATE_END	DATE_START
DESCRIPTION	ELEVATION	FORMAL_NAME	HEIGHT	HORIZ_ACC	
HORIZ_CLEARANCE		LENGTH	PRIMARY_COLOR	RECORD_DATE	S_57_CAT
SOURCE_DATE	STATUS	VERT_ACC	VERT_DATUM	WIDTH	

HS140 SILO/TANK A container used for the storage of liquids or gases.

COLOR_PATTERN	COMMON_NAME	CONDITION	CONSTRUCTION	DESCRIPTION	DESIGNATOR
ELEVATION	FORMAL_NAME	HEIGHT	HORIZ_ACC	HORIZ_DATUM	LENGTH
PRIMARY_COLOR	PRODUCT	RECORD_DATE	S_57_CAT	SHAPE	OURCE_DATE
STATUS	VERT_ACC	VERT_DATUM	WIDTH		

HS141 SLIPWAY A prepared slope for launching and recovering vessels.

COLOR_PATTERN	COMMON_NAME	CONDITION	CONSTRUCTION	DATE_END	DATE_START
DESCRIPTION	FORMAL_NAME	HEIGHT	HORIZ_ACC	HORIZ_CLEARANCE	LENGTH
PRIMARY_COLOR	RECORD_DATE	S_57_CAT	SOURCE_DATE	STATUS	VERT_ACC
VERT_DATUM	WIDTH				

HS142 SLOPE_TOPLINE The upper marking of a slope, e.g. the ridge line or the separation line between two different gradients.

COMMON_NAME	CONSTRUCTION	DESCRIPTION	ELEVATION	FORMAL_NAME	PRIMARY_COLOR
RECORD_DATE	S_57_CAT	SOURCE_DATE	VERT_ACC	VERT_DATUM	

HS143 SMALL_CRAFT_FACILITY A place at which a service generally of interest for small crafts or pleasure boats is available.

COMMON_NAME	DESCRIPTION	FORMAL_NAME	RECORD_DATE	S_57_CAT	SOURCE_DATE
STATUS					

HS144 SOUNDING A measured water depth or spot depth which has been reduced to chart datum and includes drying heights.

COMMON_NAME	DEPTH	DESCRIPTION	FORMAL_NAME	HORIZ_ACC	RECORD_DATE
SOURCE_DATE	STATUS	VERT_DATUM			

HS145 SPRING A natural issue of water or other substances from the earth. One on the bottom of the sea is called a submarine spring.

COMMON_NAME	DESCRIPTION	FORMAL_NAME	RECORD_DATE	SOURCE_DATE

HS146 STRAIGHT_TERRITORIAL_BASELINE A baseline is the line from which the outer limits of the territorial sea and certain other outer limits are measured.

COMMON_NAME	COUNTRY	DESCRIPTION	RECORD_DATE	SOURCE_DATE

HS147 SUBMARINE_TRANSIT_LANE An area where submarines may navigate under water or at the surface.

COMMON_NAME	DESCRIPTION	FORMAL_NAME	RECORD_DATE	RESTRICTION	SOURCE_DATE

HS148 SUBMERGED_PIPELINE/CABLE Any pipeline or cable which lying on or under the bottom.

COMMON_NAME	CONDITION	DATE_END	DATE_START	DEPTH	DESCRIPTION
DESIGNATOR	DIAMETER	ELEVATION	FORMAL_NAME	HEIGHT	HORIZ_ACC
HORIZ_DATUM	MATERIAL	PRODUCT	RECORD_DATE	RESTRICTION	S_57_CAT
SOURCE_DATE	STATUS	VERT_ACC	VERT_DATUM	WIDTH	

HS149 SWAMP/MARSH Those areas that are inundated or saturated by surface or ground water.

COMMON_NAME	DESCRIPTION	FORMAL_NAME	RECORD_DATE	S_57_CAT	SOURCE_DATE

HS150 SWEPT_AREA An area that has been determined to be clear of navigational dangers to a specified depth.

DEPTH DESCRIPTION RECORD_DATE SOURCE_DATE VERT_DATUM

HS151 TERRITORIAL_SEA_AREA The territorial sea is a belt of water of a defined breadth but not exceeding 12 nautical miles measured seaward from the territorial sea baseline.

COMMON_NAME COUNTRY DESCRIPTION RECORD_DATE RESTRICTION SOURCE_DATE
STATUS WIDTH

HS152 TIDAL_STREAM A tidal stream (or tidal current) is a horizontal movement of water associated with the rise and fall of the tide caused by tide-producing forces.

COMMON_NAME DATE_END DATE_START DESCRIPTION FORMAL_NAME MAX_RATE
MIN_RATE RECORD_DATE S_57_CAT SOURCE_DATE STATUS VELOCITY

HS153 TIDE_DATA_POINT Tidal heights over time may be approximated by a series of height values given at regular intervals, starting from a specific moment in time.

COMMON_NAME DESCRIPTION FORMAL_NAME RECORD_DATE SOURCE_DATE STATUS
TIME_START TIME_END

HS154 TIDEWAY A natural watercourse in intertidal areas where water flows during the ebb or flow.

COMMON_NAME DESCRIPTION FORMAL_NAME RECORD_DATE SOURCE_DATE

HS155 TOP_MARK One of more relatively small objects of characteric shape and color placed on an aid to identify it purpose.

COLOR_PATTERN DESCRIPTION HEIGHT PRIMARY_COLOR RECORD_DATE SHAPE
SOURCE_DATE STATUS V ERT_ACC VERT_DATUM

HS156 TRAFFIC_SEPARATION_SCHEME A traffic separation scheme is a scheme which aims to reduce the risk of collision in congested and/or converging areas by separating traffic moving in opposite, or nearly opposite, directions.

DATE_END DATE_START DESCRIPTION FORMAL_NAME RECORD_DATE RESTRICTION
S_57_CAT SOURCE_DATE STATUS

HS157 TUNNEL A passage that is open at both ends, buried under the sea bed or laid over the sea floor or bored under the ground or through mountains. (based on ISO S-57)

COMMON_NAME CONDITION DESCRIPTION FORMAL_NAME HORIZ_ACC
HORIZ_CLEARANCE LENGTH RECORD_DATE SOURCE_DATE STATUS
VERT_ACC VERT_CLEARANCE WIDTH

HS158 TURNING_BASIN A maintained area for vessels to turn.

COMMON_NAME DESCRIPTION FORMAL_NAME LENGTH RECORD_DATE RESTRICTION
SOURCE_DATE VERT_DATUM WIDTH

HS159 TWO_WAY_ROUTE A two-way route is a route within defined limits inside which two-way traffic is established, aimed at providing safe passage of ships through waters where navigation is difficult or dangerous.(IHO Dictionary, S-32, 5th Edition, 5712)

COMMON_NAME DATE_END DATE_START DEPTH DESCRIPTION RECORD_DATE
S_57_CAT SOURCE_DATE STATUS VERT_DATUM

HS160 UNDERWATER_ROCK A concrete mass of stony material or coral which dries, is awash, or is below the water surface.

COMMON_NAME DEPTH DESCRIPTION FORMAL_NAME RECORD_DATE SOURCE_DATE
STATUS VERT_DATUM

HS161 UNSURVEYED_AREA An area for which no bathymetric survey information is available.

COMMON_NAME DESCRIPTION RECORD_DATE SOURCE_DATE WIDTH

HS162 VEGETATION Collections or individual plants.

COMMON_NAME DESCRIPTION ELEVATION FORMAL_NAME HEIGHT
RECORD_DATE S_57_CAT SOURCE_DATE VERT_ACC

HS163 VISUAL_SIGNAL_STATION A place on shore from which signals are made to ships at sea.

COMM_CHANNEL	COMMON_NAME	DATE_END	DATE_START	DESCRIPTION	FORMAL_NAME
RECORD_DATE	S_57_CAT	SOURCE_DATE	STATUS		

HS164 WAITING_AREA/LOCK_ARRIVAL_POINT A designated location where boats or tows wait to receive clearance to enter a lock chamber or basin.

HS165 WATER_TOWER An elevated container and its supporting structure used to hold water.

COLOR_PATTERN	COMMON_NAME	CONDITION	CONSTRUCTION	DESCRIPTION	DESIGNATOR
ELEVATION	FORMAL_NAME	HEIGHT	HORIZ_ACC	HORIZ_DATUM	LENGTH
PRIMARY_COLOR	PRODUCT	RECORD_DATE	S_57_CAT	SHAPE	SOURCE_DATE
STATUS	VERT_ACC	VERT_DATUM	WIDTH		

HS166 WATER_TURBULENCE The disturbance of water caused by the interaction of any combination of waves, currents, tidal streams, wind, shoal patches and obstructions.

COMMON_NAME	DESCRIPTION	FORMAL_NAME	RECORD_DATE	S_57_CAT	SOURCE_DATE

HS167 WATERFALL A sudden descent of water over a step in the bed of a river or the sea bottom caused by tidal flows. In place names commonly shortened to fall or falls, e.g. Niagara Falls.

COMMON_NAME	DESCRIPTION	ELEVATION	FORMAL_NAME	HEIGHT	LENGTH
RECORD_DATE	SOURCE_DATE	VERT_ACC	WIDTH		

HS168 WILDLIFE_MANAGEMENT_AREA An area set aside for the investigation, maintenance, or management of plants and/or animals.

COMMON_NAME	DATE_END	DATE_START	DEPTH	DESCRIPTION	FORMAL_NAME
RECORD_DATE	RESTRICTION	S_57_CAT	SOURCE_DATE	STATUS	WIDTH

HS169 WRECK The ruined remains of a stranded or sunken vessel which has been rendered useless.

COMMON_NAME	DATE_START	DEPTH	DESCRIPTION	ELEVATION	FORMAL_NAME
HEIGHT	HORIZ_ACC	LENGTH	RECORD_DATE	S_57_CAT	SOURCE_DATE
STATUS	TONNAGE	VERT_ACC	VERT_DATUM	WIDTH	

5.0 HYDROGRAPHY STANDARD ATTRIBUTE DEFINITIONS

Attribute Name	Attribute Definition	Data Type
BRIDGE_TYPE	The various types of bridges.	Text (30)
CALL_SIGN	The designated call-sign of a radio station.	Text (30)
CARDINAL	The four quadrants (north, east, south and west) are bounded by the true bearings NW-NE, NE-SE, SE-SW, and SW-NW taken from the point of interest. A cardinal mark is named after the quadrant in which it is placed.	Text (35)
CATEGORY	The attribute which differentiates the "types" or "kinds" of like features which may be separately identified in the standard. The specific values (or domain) associated with the standard is a function of the individual feature type.	Text (35)
CHARACTER	Any identifier comprised of the class, number and color(s) of flashes or occultations, of a light or lights at one geographic position [i.e. Q(6)+LF1, VQ G, L F1 (3+2)WR].	Text (30)
CLEARANCE	The vertical clearance of an object in closed condition (e.g. a closed lifting bridge) measured from the plane towards the object overhead.	Text (30)
COLOR_PATTERN	The various colour patterns of a navigational mark.	Text (30)
COMM_CHANNEL	A channel number assigned to a specific radio frequency, frequencies or frequency band.	Text (30)
COMMON_NAME	A unofficial, slang, or other common or textual designation of the feature.	Text (55)
CONDITION	A domain value indicating the physical situation or condition of the feature.	Text (35)
CONSTRUCTION	A domain indicating the technique or primary method used in building or constructing the feature.	Text (35)
COUNTRY	The attribute indicates the nationality of the specific object or feature.	Text (30)
DATE_END	The date the feature will, or is expected to, cease to exist, if known. May also indicate the latest date on which the feature may reasonably be expected to be present in this location. This date will almost always be in the future.	Numeric
DATE_START	The date the existence of the feature began, if known. May also indicate the earliest date on which the feature may reasonably be expected to be present in this location.	Numeric
DEPTH	The numeric distance from the surface of the earth to the deepest point of the feature.	Numeric
DEPTH_ACC	The best estimate of the accuracy of the sounding data	Text (30)
DEPTH_DATUM	The name of the datum which determines the reference for the numeric attribute Depth.	Text (30)
DESCRIPTION	A user defined description of the feature.	Text (255)
DESIGNATOR	Any identifying number which differentiates the feature from any other similar features.	Numeric

DIAMETER	Pipe diameter in inches	Numeric
DIRECTIVITY	The side or sides of a feature which produces the greatest reflectivity potential.	Text (30)
ELEVATION	The altitude of the ground level of an object, measured from a specified vertical datum.	Text (30)
EST_RANGE	The estimated range of a non-optical electromagnetic transmission.	Text (30)
FACC_CAT	The differentiation attribute which exists within the Feature and Attribute Coding Catalog Standard.	Text (30)
FORMAL_NAME	A official name or textual designation of the feature.	Text (55)
FREQUENCY	The frequency of a signal.	Text (30)
FUNCTION	The function, or purpose of various buildings.	Text (30)
HEIGHT	The numeric height of the feature as measured from the lowest point to the highest point.	Numeric
HORIZ_ACC	The best estimate of the horizontal accuracy of horizontal clearance and distances.	Numeric
HORIZ_CLEARANCE	The numeric horizontal distance through an opening in the feature.	Numeric
HORIZ_DATUM	Horizontal datum. The name of the reference used for measurements in the horizontal direction.	Text (30)
IDENTIFIER	A unique number which identifies the feature as opposed to all other features of the same type.	Text (30)
LATERAL	There are two international buoyage regions, A and B, between which lateral marks differ. The buoyage region is encoded using the separate attribute MARSYS. When top-marks, retro reflectors and/or lights are fitted to these marks, they are encoded as separate objects.	Text (30)
LENGTH	A measurement of the longer of two linear axis.	Numeric
MAG_ANOMALY	The value of the deviation from the normal magnetic variation.	Numeric
MAG_VARIATION	Horizontal angle between true north and magnetic north measured East (positive value) or West (negative value) according to whether magnetic north lies east or west of true north.	Numeric
MATERIAL	A domain specifying the primary material used on the construction of the feature.	Text (35)
MAX_RANGE	The extreme distance at which an object can be seen or a signal detected in nautical miles	Numeric
MAX_RATE	Maximum speed of current.	Numeric
MIN_RATE	Minimum speed of current.	Numeric
NATURE_BOTTOM	The attribute ‘nature of surface’ encodes the general nature of the material of which the land surface or the sea bed is composed.	Text (30)
NO_FLOORS	The number of floors or levels within a structure.	Numeric
NUM_SPANS	Number of spans in a bridge or aqueduct.	Numeric
ORIENTATION	The angular distance measured from true north to the major axis of the object.	Numeric

PERIOD	The time occupied by an entire cycle of intervals of light and eclipse.	Text (30)
PERMIT	Any permit required for the vessel.	Text (30)
PRIMARY_COLOR	The Primary or most frequently occurring color of the feature.	Text (12)
PRODUCT	The various substances which are transported, stored or exploited.	Text (30)
QUALITY	The reliability of the value of sounding.	Text (30)
RADAR_REFLECTOR	Indicates whether or not a radar reflector is attached to, or connected with, a feature.	Text (30)
RADIUS	The vector extending from the centre to the periphery of a circular or spherical object.	Text (30)
RANGE	The nominal range at which an object can be seen or a signal detected in nautical miles.	Numeric
RECORD_DATE	The date when the specific feature was captured, edited, or deleted.	Numeric
RESTRICTION	A domain value indicating any limitations or other conditions imposed on the use or function of the feature.	Text (35)
RIVER_MILE	The most currently used river mile designation for a given river system.	Text (30)
S_57_CAT	The differentiation attribute which exists within the IHO S-57 Standard.	Text (30)
SEA_TYPE	The various types of sea areas.	Text (30)
SHAPE	The various types or shapes of the daymarkers used on beacons or buoys.	Text (30)
SIG_GROUP	The number of signals, the combination of signals or the morse character(s) within one period of full sequence.	Numeric
SIG_PERIOD	The time occupied by an entire cycle of intervals of light and eclipse.	Text (30)
SIQ_SEQUENCE	The sequence of times occupied by intervals of light and eclipse for all ‘light characteristics’ except for occulting where the sequence of times is occupied by intervals of eclipse and light.	Text (30)
SOURCE_DATE	The production date of the source; e.g. the date of measurement.	Numeric
SPACES	The total parking spaces available in the area including handicapped or reserved spaces.	Numeric
SPECIAL_PURPOSE	A mark may be a beacon, a buoy, a signpost or may take another form.	Text (30)
STATUS	A domain value indicating the current status of the feature.	Text (35)
SURFACE	The physical surface composition of a road.	Text (30)
TIME_END	The end of a active period.	Numeric
TIME_START	The start of an active period.	Numeric
TONNAGE	Tonnage of a sunken or stranded wreck.	Numeric
TOP_MARK	The characteristic shape secured at the top of a buoy or beacon to aid identification.	Text (30)

TRACK_LENGTH	Total cumulative length of track contained within confines of the feature, exclusive of the branch or main trunk lines running into and/or out of the feature.	Numeric
TRIP_LENGTH	Length of crossing between shore points.	Numeric
VARIATION	A positive value, i.e. unsigned indicates variation in an Easterly direction while a negative value indicates variation in a westerly direction.	Numeric
VELOCITY	The speed of the current in knots. The rate of travel of a current.	Numeric
VERT_ACC	The best estimate of the vertical accuracy of heights, vertical distances, and vertical clearances, excluding sounding measurements.	Numeric
VERT_CLEARANCE	The numeric distance from the surface of the earth to the lowest point associated with the feature.	Numeric
VERT_DATUM	This attribute is used to specify the datum to which both heights and soundings are referred.	Text (30)
VERT_LENGTH	The total vertical length of an object.	Numeric
WATER_VELOCITY	Range of water velocity, estimated in meters/second within delineation of feature exclusive of high water due to runoff or low water due to drought.	Numeric
WIDTH	The numeric width of the feature as measured across its widest dimension.	Numeric

6.0 IMPLEMENTATION

This Hydrography Standard has not yet been implemented in any significant way. Its organization, however, is designed to permit easy implementation on a number of existing GIS and/or A-E-C/CADD platforms. The conversion of the Hydrography Standard Logical Model to a physical implementation is accomplished by specifying several naming conventions associated with the standard. These conventions and the physical implementation, while compatible with most major database management systems, are provided for information only and are not intended to mandate or recommend any vendors software. In addition, the implementation strategy provided is only one of several acceptable strategies and is included for information only. The revised organization of the Hydrography Standard and its naming conventions are represented in Figure 2.

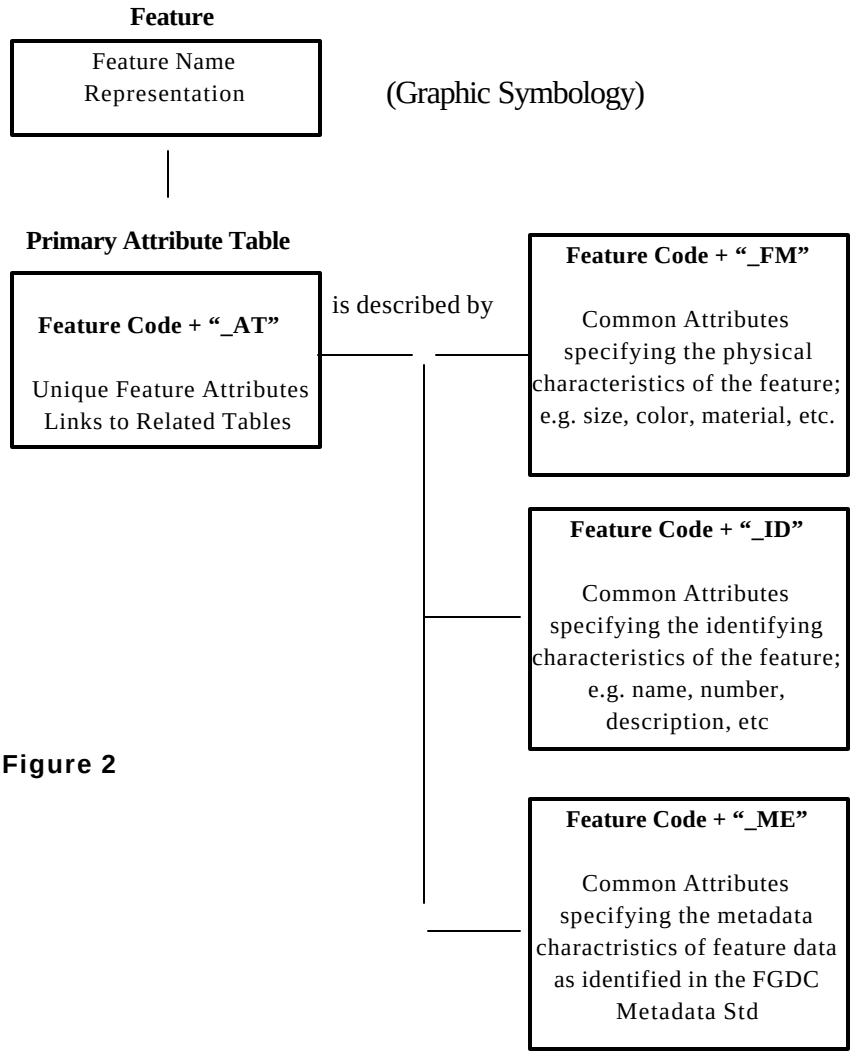

Figure 2

The codes of the features and the names of the attributes are designed to meet the naming restrictions associated with the major Relational Data Base Management Systems in use in the GIS field. And, by defining standard "groupings" of attributes which apply to the features, it is possible to identify separate "tables" of these attributes associated with each of the features, further simplifying implementation. The attribute groupings defined include **IDENTIFICATION** – which specifies numbers,

names, and descriptions of the feature, **FORM** – which specifies physical characteristics of the features, and **METADATA**.

7.0 REFERENCES

International Hydrographic Organization, S57 Appendix A, Object Catalog for Digital Hydrographic Data, 1997.

National Institute of Standards and Technology, Federal Information Processing Standard Publication 173 (Spatial Data Transfer Standards), U. S. Department of Commerce, 1992.

North Atlantic Treaty Organization (NATO), Digital Geographic Information Exchange Standard (DIGEST) Part 4, Feature Attribute Coding Catalog (FACC), 1998.

(Tri-Service) CADD/GIS Technology Center, (Tri-Service) Spatial Data Standard (TSSDS), version 1.8, 1998.

U.S. Army Corps of Engineers (USACE), Regional Engineering and Environmental Geographic Information System (REEGIS), Project's Data Dictionary For Inland Waterways Information, 1997.