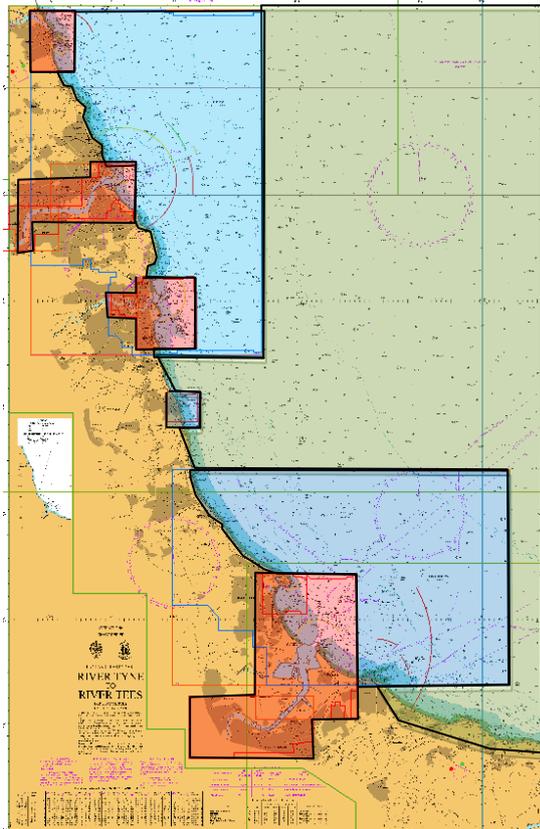


DISCUSSION PAPER: NEW GENERALISATION POLICY FOR SMALL SCALE ADMIRALTY CHARTS.

PREFACE.

Throughout this paper we will be making reference to largest scale, second scale, third scale coverage on an SNC (Standard Navigational Chart or paper chart). To remove any confusion, the diagram below explains what this means using the example of Admiralty chart 152,

CHART 152 – 1:75,000



Area where 152 is largest scale

Areas where 152 is second scale ie in areas covered by 1935 and 2567 (1:30,000) and 1624 -4 (1:12,500)

Area where 152 is third scale ie where larger scale charts and plans exist of Blyth, Tyne, Tees etc in the area of 1:30,000 coverage

1. THE PROBLEM.

The generalisation of detail (or lack of it) on medium and small scale SNCs in UK waters has long been a widely known and very significant problem. This problem is probably most pronounced in the North Sea.

The application of a generalisation policy in UK waters has generally been vague and inconsistent; this is partially the result of guidance that has never been rigorous or systematic enough. As a result, far too much detail is now shown on our smaller scale charts. The impact of this is heavy chart maintenance and long compilation times for new editions. Chart display is cluttered and there is a subsequent lack of clarity for chart users and chart maintainers. There is widespread agreement, both in UKHO and elsewhere that the problem needs to be resolved once and for all and 'this particular nettle needs to be grasped'. This proposal is designed to do that.

2. AIM OF THE NEW POLICY.

Any new generalisation policy needs to:

- a. Significantly reduce chart maintenance, remove clutter and provide clarity
- b. Be rules based ie simple and easy to understand.
- c. It must clarify, once and for all, at what coverage an SNC changes from being a navigation tool to a planning tool. This will eradicate the ambiguity that exists at the moment and is probably the root cause of the problem.

3. METHODOLOGY.

The methodology used in the process of defining a new generalisation policy was as follows :

- a. Define the overall purpose of largest scale, second scale, third scale coverage. These definitions to then act as benchmarks.
- b. Using these benchmarks, map all major charting features to them in the form of a matrix.
- c. Consider how the generalised 'areas' are to be displayed on the face of the SNC and decide the best option.
- d. Test the display and generalisation guidance on various charts and define any exceptions.
- e. Consider the impact this will have on the ENC.
- f. Define the final generalisation policy.

Briefly, taking each in turn .:

a. DEFINE THE PURPOSE OF EACH SNC SCALEBAND.

In order to define basic generalisation rules, the general purpose of each scale band had to be defined. After consultation, the final definitions are as follows :

Largest scale - enough detail to ensure safe navigation for various vessel types (this is a primary charting area) and meet navigation and stakeholder requirements subject to clarity of display at the scale of the chart ie if the largest scale is relatively small then full detail cannot be shown..

Second scale – sufficient detail to navigate on, in all but the most complicated areas. Non critical features generalised. *This caters for leisure craft and the situation where the second scale Admiralty chart is the first scale INT chart.*

Third Scale – Planning and situational awareness only. Not enough detail to navigate on. Larger scales to be used for safe navigation.

Fourth Scale (plus) – Planning purposes only.

b. FEATURE MAPPING/ GENERALISATION MATRIX

With these definitions agreed, it was then a relatively straightforward task to map all the major charting features against each scale band and describe how they should be ideally depicted. The results of this work are given in Annex A as a Generalisation Matrix.. The adoption of this generalisation matrix will lead to a much more objective and 'rules based' approach to the generalisation process and greatly simplify it.

c. DISPLAY

The next major task was to consider how our new recommended policy should be displayed on the face of the SNC. The goal here was clarity and simplicity ie making it immediately obvious to chart users (and maintainers) where generalisation has occurred on any SNC and which features have been removed. .

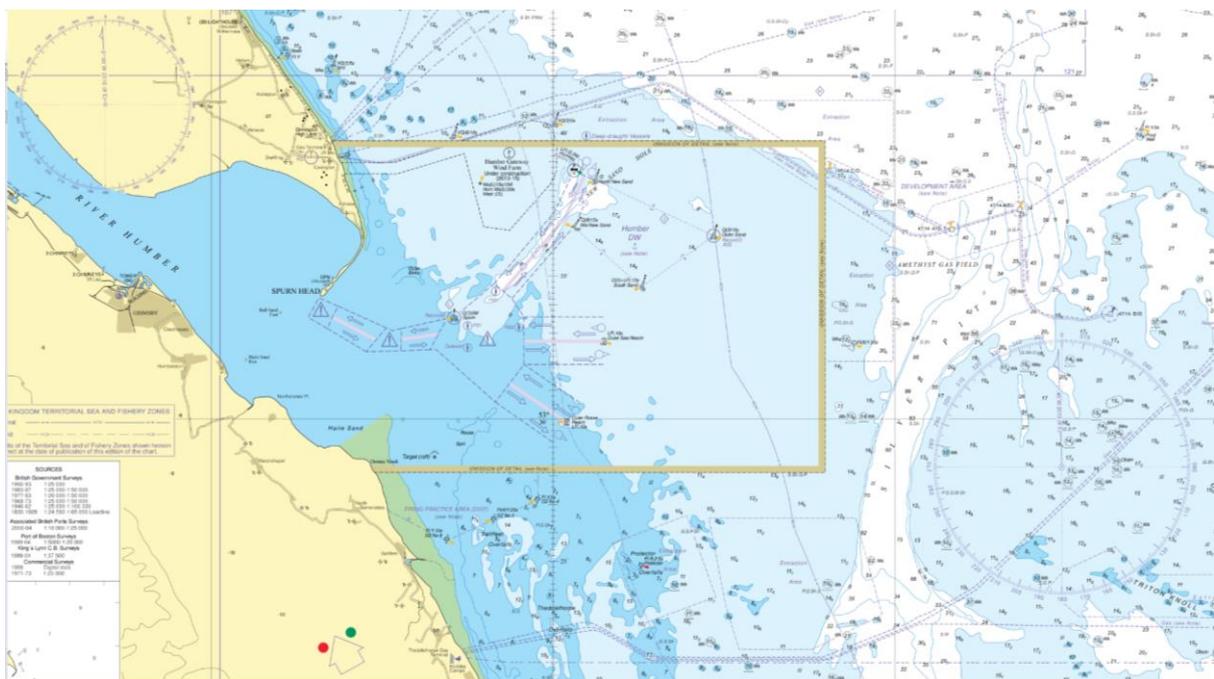
After due consideration, it was felt that the dividing line between second and third scale *ie where an SNC switches from being a navigational tool to a planning tool* is the critical line of concern. Again after further consideration, it was decided the most effective way to show this was to simply draw an Omission of detail (OOD) line along this border accompanied by a note explaining what detail has been removed. A precedent for this has actually already been set on Admiralty charts in the Gulf of Mexico.

The proposed wording of the note is as follows:

OMISSION OF DETAIL

In the area between the limit marked  and the coastline, this chart should only be used for planning purposes as features such as depths, platforms, wrecks, pipelines, minor Aids to Navigation and cables have been omitted. Larger scale Admiralty charts are available for mariners intending to navigate in this area.

Chart 1190 with the proposed generalisation policy applied would look as follows



Please note that the OOD line is to be grey in colour (town stipple) to distinguish it from other features. This depiction already exists on Admiralty charts in the Gulf of Mexico.

d. TESTING AND IDENTIFICATION OF EXCEPTIONS.

The above policy was then tested on numerous charts in the North Sea to see whether it met its objectives and to identify any issues.

The guidance in Annex A did not raise any particular concerns but it became apparent that strictly limiting the OOD line to the extent of third scale coverage was too simplistic to adopt as a uniform policy as various issues were raised. To counteract these issues several exceptions were identified which are to be considered when defining the extent of the OOD line. These exceptions are as follows :

- 1 The OOD line will only be drawn around 'larger' areas of third scale coverage. Small areas around bays, estuaries will be generalised but are not to have an OOD line to avoid cluttering the chart unnecessarily.
2. Offshore 'Through' Traffic – the OOD line should avoid crossing any known offshore coastal routes for large vessels. This is to avoid such vessels having to continually switch scale paper charts as they follow the coast. Note: It is recommended that historical AIS data is used to ensure this.
3. Buffer Zone - the OOD may need to be shrunk slightly to allow for a narrow 'band' of detail (at least 1cm at chart scale) within third scale coverage. This allows for the safe transition from first to third scale when the second scale is not available eg where it is not an INT chart.
4. Complexity – where the resultant OOD line shows a complicated display of second/ third scale 'pockets' it is to be simplified to create a clear and unambiguous picture.
5. Clash with area Features – clashes with major area features such as oilfields/ Traffic Separation Schemes are to be avoided as two displays of the same feature will result. Whether the OOD line is brought landward or seaward of the feature depends on the type of feature and its importance.
6. Chart integrity – where the placement of the OOD line creates issues with the integrity of subsequent smaller scale charts ie multiple smaller scales showing exactly the same generalised detail , a review of those charts may be needed. If deemed to be still required in the chart series, the position of the OOD line may then require amendment on a chart ie moving it landward to avoid duplication of display.
7. Chart value – similar to 6. A balance, between the percentage of a chart that shows navigable (useful ?) detail and that which shows generalised planning information is required. Too much of the latter and the 'value' of a chart will start to be questioned. For a small number of very small scale charts, which are at least third scale across most of their area, there may be a need to retain a sparse coverage of depths and contours eg Admiralty chart 2.
8. INT Chart scheme – the impact on the INT chart scheme of the area needs to be carefully considered when positioning the OOD line. Research in UK waters suggests there will be no major impact as the main ports and routes are adequately covered by INT charts. Issues will occur where the INT scheme for a main port is at an insufficiently small scale compared to

the national scheme eg Plymouth. In these instances the OOD line may need to be amended or the INT scheme may need amendment.

9. Local Safety factors – if a safety risk is created by the omission of a feature when applying the new policy, the rules are to be over ridden and the feature included eg an isolated platform lying out to sea but just inside the corner of the OOD line

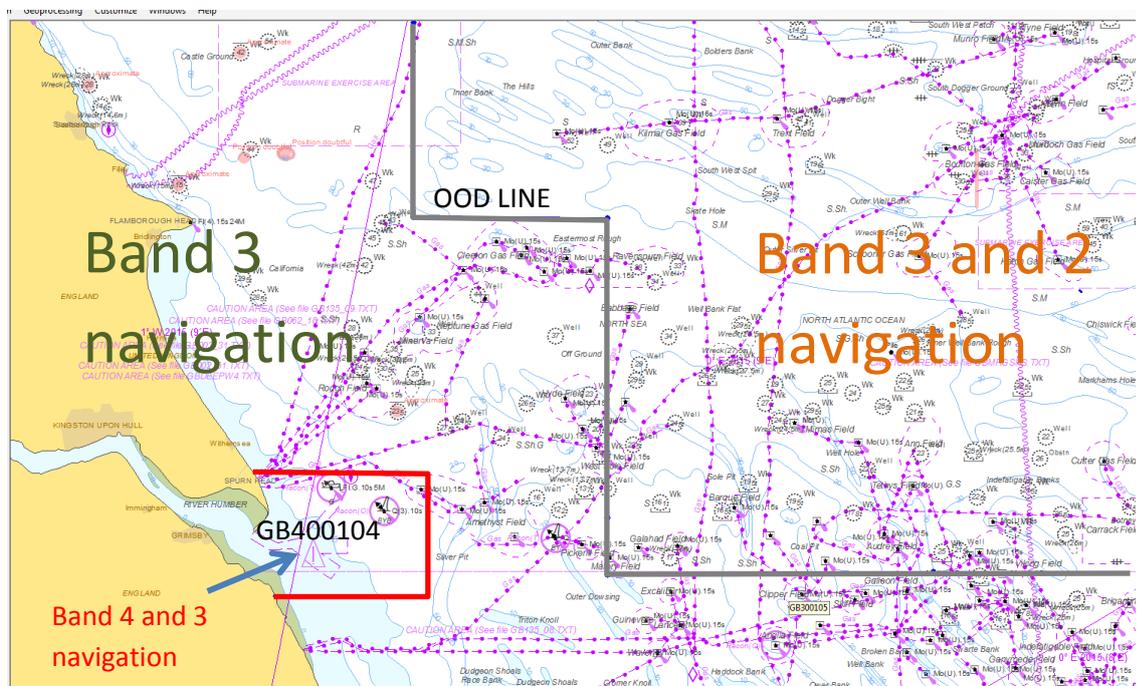
e. IMPACT ON ENC COVERAGE.

There will only be an impact on the ECDIS user in inshore waters when zoomed out to an inappropriately small scale ENC Band.

The example below is in the approaches to the Humber and shows the Band 2 cell which is based on chart 2182A at 1:750,000. Band 3 coverage is across the whole area. A Band 4 cell exists in the final approaches to the river.

The only change for the ECDIS users (from the current situation) will be in the area between the OOD line (shown) and the Band 4 cell. When zoomed out here, the ECDIS display will revert to the filtered planning detail behind the OOD line on the Band 2 cell.

This is not seen as an issue as the ECDIS user should be on Band 3 coverage for navigation anyway, If the Band 2 display is ‘filtered’, it will be even more apparent to any ECDIS user that they are zoomed out to an inappropriately small scale for navigation. In fact, if a CTNARE (area of Simplified or Minimal depiction) is also inserted on the Band 2 cell, alarms will be triggered and the system will state that the depiction shown is for planning purposes only and a larger scale ENC cell should be used for navigation.



In reality it can be seen in the above that the Band 2 cell is already heavily generalised in the area behind the OOD line and therefore there will be very little difference on the ECDIS display.

f. FINAL RECOMMENDED POLICY FOR ADMIRALTY CHARTS.

Generalisation of detail on smaller scale Admiralty charts will be conducted wherever possible through use of an Omission of Detail line. This cartographic line will generally encompass the areas where the chart becomes third scale, however numerous exceptions will need to be considered and applied. It is recommended that a cartographic specialist defines the position of the OOD line taking into account a whole series of factors as described. Once defined, detail behind the line will then be omitted or generalised in accordance with the guidance as given in Annex A.

Andrew Hinton.
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6th June 2016

ANNEX A: GENERALISATION MATRIX.

FEATURE TYPE.	LARGEST SCALE <i>ALL DATA SHOWN FOR NAVIGATION (DEPENDENT ON SCALE) AND TO MEET STAKEHOLDERS' REQUIREMENTS eg platform designations</i>	SECOND SCALE <i>SUFFICIENT DETAIL TO NAVIGATE AND ANCHOR IN ALL BUT THE MOST COMPLICATED AREAS. NON CRITICAL FEATURES GENERALISED.</i>	THIRD SCALE <i>PLANNING AND SITUATIONAL AWARENESS, LARGER SCALES TO BE USED FOR NAVIGATION.</i>	FOURTH SCALE AND SMALLER <i>PLANNING PURPOSES ONLY</i>
DEPTHS/ CONTOURS	Full hydrography to allow for safe navigation apart from areas where scale of chart will not allow ie too small a scale or where highly changeable areas where local guidelines may apply.	Sufficient hydrography to navigate in open water, main channels and anchorages Contours generalised - small offlying shoals encompassed. More open sounding density over shoals.	Purposely not enough depths to navigate on. Contours and colour tints used to describe underlying hydrography, no qualifying depths needed. Blued out completely in enclosed waters. Generally no depths shown apart from offshore anchorage areas or, in rare cases, critical or controlling depths in main channels. Latter subject to local factors. Note: Contours to be shown as displayed on the associated HDB NAV band ie no further generalisation required.	Same model as third scale display across but greater use of Blued out areas behind certain contours along coast as well as enclosed waters. Where issues of chart integrity and value are present a generally sparse scattering of depths is to be considered but not of sufficient density to allow for navigation.
WRECKS/ OBSTRUCTIONS/ FOULS	All shown dependent on INT 1	Wherever possible Foul/ Obstruction Areas and Wreck areas shown with least depth. NDW with no depth over not shown ? Remove foulds wherever possible	None shown unless of critical importance.	None shown
OIL AND GAS/ WINDFARM	All shown, designations of platforms	All - but grouped together wherever possible - ie platforms grouped, even oilfields grouped where small scale - no designations of platforms	Shown as Maritime limit and Oilfield/ Windfarm name . Where oilfields are small and numerous cover by general maritime limit. Note: where Fields extend into second scale depict the feature as if it were second scale.	Maritime limit and Oilfield/ Windfarm name . Grouped together wherever necessary with legend 'Oilfields'
PIPELINES/ CABLES	All shown as per IHO-S4.	All - but consider inserting cable/ pipeline areas. Disused cables and disused pipelines not to be shown ?	None - pipelines and cables to be cut off on the OOD line.	None

LIGHTS/ BUOYS	All - names, all details, full light descriptions	Most buoys and lights shown and named dependent on scale. Certain minor buoys away from main shipping channels not shown eg mooring buoys, special buoys, 2xFR. Abbreviated wherever possible.	Only major lights (>10M) or lights whose range extends beyond OOD area and are significant shown. All lights included are to be named and abbreviated light description given. Only major buoys eg cardinal marks close to shipping lanes. On the SD insert legend 'Refer to larger scales'	Certain major aids to navigation shown with names and abbreviated descriptions.
Source Diagram/ M_SREL	Show graphical extents of surveys - combining where possible.	Show graphical extents of surveys - combining where possible.		Dependent on scale - if larger than 1:500,000 insert legend Refer to larger scales.
NAMES	All appropriate names shown dependent on scale of the chart as per IHO S-4	All appropriate names shown dependent on scale of chart as per IHO S_4	All appropriate names shown for planning purposes eg Major banks, headlands, bays, channels, ports oil and gas fields, lights, buoys, anchorages etc	Names limited to geographical features eg Headlands, channels, banks, ports and major features such as TSS schemes, anchorages etc.
OTHER FEATURE TYPES				
AIS	Shown	Shown	Shown	Consider showing if significant
Pilot pick up point	Shown and named	Shown and named	Shown and named if significant	Consider showing if significant
Radio Reporting	Shown and named	Shown and named	Shown and named if significant	Consider showing if significant
Anchorage Area (No anchorage areas)	Shown and named	Shown and named	Shown and named if significant	Consider showing if significant
Port Limits/ Pilotage area	Shown	Shown	Shown if significant	Consider showing if significant
TSS/ ATBAs/ Rec Routes	Shown	Shown	Shown	Consider showing if significant
Precautionary Areas	Shown	Shown	Shown	Consider showing if significant
EXTRACTION AREAS	Shown	Not shown ?	Not shown	Not shown
Firing Practice Areas	Shown and named	Shown	Shown if significant	Not shown
Tidal Diamonds/ Tidal stream	Shown	Shown	Limited number shown	Limited number shown