



Sheetlines

The journal of
THE CHARLES CLOSE SOCIETY
for the Study of Ordnance Survey Maps

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topographic map?”

Richard Oliver

Sheetlines, 121 (August 2021), pp 2-12

Stable URL: <https://s3.eu-west-2.amazonaws.com/sheetlines-articles/Issue121page2.pdf>

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Published by
THE CHARLES CLOSE SOCIETY
for the Study of Ordnance Survey Maps
www.CharlesCloseSociety.org

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The Society publishes a wide range of books and booklets on historic OS map series and its journal, *Sheetlines*, is recognised internationally for its specialist articles on Ordnance Survey-related topics.

Is there ideal basic content for a topographic map?

Richard Oliver

In *Sheetlines* 109 I discussed a possible ideal sheet and paper size for topographic mapping, on the premise that for some users paper mapping continues to have greater functionality than do on-screen displays.¹ I concluded that the optimum size was B1 (100 × 71 centimetres), folded 8 × 4 to 12.5 × 17.75 cm. This entailed an integral cover, and a maximum legend area of 12.5 × 35.5 cm, though in practice this would be reduced by up to 1 cm on each side by a ‘handling edge’. I noted that ‘This ... would impose some constraint on the content of the legend, which in turn raises the question of whether there is optimum map content. This can be addressed on another occasion.’ Somewhat delayed, the present is that occasion.

The ideal sheet size was based on mathematical and ergonomic considerations, which were intended to be as ‘objective’ as seems attainable in a relativistic age. ‘Ideal content’ is much harder to define in ‘objective’ terms, and it would probably have been elusive even before the revolution in cartographic theory and study from the 1980s onwards associated with Brian Harley and his followers. ‘Ideal content’ implies ‘one size fits all’, and whilst it may have been the case in an earlier age that, as General Sir Redvers Buller observed in 1894, ‘the requirements of military purposes & of the practical traveller are identical’, the content of the 1:50,000 *Landranger* series, configured since the 1980s to be the ‘standard map of the country’ for both civilians and soldiers, perhaps calls this into question.² Up to then civil maps rarely carried grid figures on the map face – though they are certainly a convenience – and if ever the military needed ‘tourist information’ (a somewhat fluid category), their requests appear to have been ‘not selected for retention’ in the Ordnance Survey files preserved in The National Archives at Kew. As it is, the *Landranger* is a strange fusion of consumerism and militarism; paradoxically, the 1:25,000 *Explorer* series, though traceable to wholly military origins in the early twentieth century and with much of its style in common with the *Landranger*, is an entirely civil production.

Economies of scale and costs of renewing cartographic material seem to have made for an inertia in Ordnance Survey cartography that is an uneasy compromise between the two distinct groups of military and civil users, and of numerous constituencies within the latter. This results in a mixture of visible, ‘physical’, information, and that which is ‘invisible’ and is essentially administrative or ‘legal’. This is well demonstrated by the mapping of roads or ways: the higher categories are based on administration, the lower on physical characteristics, except that the lowest are either overlaid or replaced by the depictions of public rights of way, the status of which is not necessarily related to their physical characteristics. Or rather, this applies in England and Wales: in Scotland, as in both parts of Ireland, there is no officially recorded public rights of

¹ Richard Oliver, ‘Is there an optimum size for topographic maps?’, *Sheetlines* 109, 42-52.

² Buller to Harcourt, 11 May 1894, in group 10077/94 in The National Archives T1/8834C.

way network, and the specifications of both *Explorer* and *Landranger* have to accommodate two different legal, highway and tenurial systems. Economics of production and distribution have hitherto ensured the paper maps embody a one-size-fits-all approach; the alternative, of producing mapping in several versions, with the cartography and content adjusted to suit particular user groups, has not been pursued, but would seem ideal for basically digital production and distribution, with print-on-demand as necessary.

There are four basic scale-groups for topographic mapping suitable for countries such as Britain and Ireland: 1:25,000, 1:50,000, 1:100,000 and 1:250,000. Variations of scale of about 25 per cent larger or smaller (e.g. 1:63,360 *versus* 1:50,000) do not greatly affect the basic type of detail appropriate to the scale; some detail cannot be shown conveniently at much smaller than 1:25,000, whereas other is suitable for, indeed expected by users on, all four. On the basis of an average pace for walking of 4-5 km/h, for cycling of 15-20 km/h and for motoring of 50 km/h or more, an approximate equation of purpose of 1:25,000, 1:100,000 and 1:250,000 to these three modes of movement may be suggested, but in practice in Britain the 'one-inch habit' seems so ingrained that the 1:50,000 needs to be added, as a scale that seems a compromise between 1:25,000 and 1:100,000, but has neither the detail of the former nor the compactness of the latter. Indeed, there is at present no national 1:100,000 in either Britain or either part of Ireland; the apparent dominance of the half-inch scale in the latter for much of the twentieth century appears to have been an episode, not an indication of a change of direction.

'Ideal content' and 'softening up'

A characteristic of the development of Ordnance Survey and other mass-market mapping in Britain from the early 1960s was the increased prominence of 'soft' information: that is, information that, often, describes and enhances that which is already shown and which can come or go without significant effect on the built environment. Another way of defining it is that the absence of this information would produce a basic content generally very similar to that of an Ordnance Survey topographic map – in practice the one-inch – of the middle quarters of the nineteenth century, or indeed of six-inch or larger scale mapping produced at any time over the past two centuries.³ The first signs of the rise of 'soft' content came on one-inch mapping published from the early 1880s, mainly in the form of noting some inns, smithies and post offices; this was adding descriptions to buildings that had hitherto been mapped anyway. This was followed a decade later by implementing the recommendations of a War Office committee, which led to the rapid and comprehensive appearance of post and telegraph offices, letter boxes, inns, smithies, light houses and beacons, coastguard stations, windmills and mile markers, the last indicated selectively by road mileages. The military did not have it all their own way; they would have preferred to do without parish boundaries, which had a civil administrative function. Such

³ A substantial difference would be in road classification; administrative road classification tends to be reflected in physical characteristics, although the correlation is certainly not absolute.

boundaries are 'soft' and, particularly in Britain, have been subject to considerable change since the later nineteenth century. The inclusion of parliamentary constituency boundaries on the 1:25,000 *Explorer* series seems far more indicative of production economics than it does of utility to the great majority of users, added to which it tends to 'clutter'.

The windmills and lighthouses were shown by symbol, as landmarks; other types of tower were much more discreetly mapped. This basic approach lasted through various generations of one-inch map into the 1960s; after 1914 smithies and letter boxes disappeared, but in due course symbols were introduced for communications masts – those not omitted on security grounds, anyway – and public and motoring organisation telephones.

Whilst the designation 'Tourist Map' developed around 1919-20, such maps were initially standard one-inch mapping with enhanced relief treatment. From 1964 they started to carry a limited range of 'tourist information' not to be found on the parent mapping, mostly shown by symbols that needed explaining in the legend. Market research in 1970 indicated that 'tourist information' would be a worthwhile addition to the 1:50,000 series then being developed; the extra cost of collection would be more than offset by increased sales. A design that had its roots in the age of the horse and the bicycle would be revolutionised for that of mass motoring, prosperity and consumerism. The example set in Britain was quickly emulated in Ireland, and by commercial mapmakers.

Collection of the information lagged a little behind the publication of the first group of 1:50,000 maps, in 1974. These sheets were unusual for an Ordnance Survey small-scale series in having a national sheet-index in the legend, thus duplicating information on the back cover of the folded copies that represented the majority of sales. This might be thought to aid the transition from the layout of the one-inch predecessor, but in fact seems to have been to 'fill in' the space to be occupied by the tourist symbols, which were added to these sheets at the first convenient reprint.⁴ As on the one-inch 'tourist maps', some of the information was conveyed by symbol and some by a form of highlighting.

'Tourist information' appeared on the restyled 1:250,000 mapping of Britain that appeared in 1978-9, relying heavily on symbol, and then on the redrawn 1:250,000 of Ireland of 1981-2. On the 1:25,000 the information was at first confined to what in concept was a parallel series of 'Outdoor Leisure Maps', but which developed in the mid 1990s into a national series of 'Explorer' maps. The *Explorers* mimicked the 1:50,000 and 1:250,000 in including 'tourist information', but resembled the smaller scale rather than the larger in relying heavily on symbols, despite the apparently greater room for text. Whilst the 1:250,000 had always been oriented to the motorist, the addition of the tourist information to the 1:50,000 and 1:25,000 seemed to tilt these scales towards a motorised, consumer market. This development coincided with – indeed, was in counterpoint to – the

⁴ This applies to the 99 First Series sheets issued in March 1974; the three Second Series sheets issued at the same time incorporated the tourist symbols from the start, and had a differently arranged legend.

growth of 'environmental awareness' and a questioning of the ubiquity and net benefit of consumerism generally and the motor-car in particular. In that respect the *Landranger* and the *Explorer* seem to embody a view of things that is under challenge.

The rise of the tourist information was accompanied by other specification changes, some of which added information – including a distinction of lighthouses in use and disused – and others of which reduced it, including omitting the distinction of uncultivated land from the 1:50,000 and a simplification of classification for public roads without sealed surface, so that the 'white roads' now varied from private drives with a surface superior to many publicly-maintained highways that were colour-infilled, to those that were traversable only by four-wheel-drive or farm vehicles. The derivation of the 1:25,000 Second Series from drawings also used for the 1:10,560/10,000 series resulted in the former gaining some detail, particularly administrative boundaries and boundary markers, hitherto only shown on the latter.

In both Britain and both parts of Ireland the various topographic scales have been initiated at different times and have developed independently, so that there tends to be a lack of the evident 'family relationship' and sense of conscious relationship between scales that is characteristic of, for example, the French and Swiss equivalents. Design has apparently taken place in a vacuum, with inconsistent symbolisation, and historical anomalies persisting: in Britain and Northern Ireland the explicit distinction of 'Park or ornamental ground' on the 1:50,000 but not on the 1:25,000 is a striking example.

Basic content

The assumption made here is that whatever symbols and conventions appear on the map should be explained on the map, rather than in a separate document.

The fundamental consideration is: what is of use for planning travel, and for finding one's way on the ground? The following is based on a combination of what is visible with what is 'accessible', and includes some detail more appropriate to larger rather than smaller scales. To avoid a sense of hierarchy, classes of information are given in alphabetical order.

'Access' land, including danger areas

Administrative boundaries

Bridges and level crossings

Buildings: those of wide interest (*e.g.* schools, hospitals) being emphasised

Electricity lines

Ferries

Field boundaries, including hedges, fences and walls

Heighting (contours and spot heights)

High and low water mark

'Landmarks', defined as (1) structures with a vertical emphasis (church steeples, communication masts, etc), and (2) visible 'antiquities'

Railways, including stations

Roads and ways: to include road numbers and indications of public rights of way
 Surface cover, including woodland and uncultivated ground
 Water, including foreshore

Table 1 indicates what would be shown at each scale: numbers indicate categories, and a blank indicates that a feature is omitted at that scale: for example, field boundaries would not be shown at smaller than 1:25,000. Also, some generalisation would be necessary: for example, only major road bridges could be shown at 1:250,000. Note that certain features frequently repeated in legends, *e.g.* bridges, are listed only once.

Table 1 – Basic content: numbers of categories at different scales

| Feature | 1:25,000 | 1:50,000 | 1:100,000 | 1:250,000 |
|---|-----------|-----------|-----------|-----------|
| 'Access land' | 3 | 2 | 1 | |
| Administrative boundaries | 4 | 3 | 2 | 1 |
| Airports | | | | 1 |
| Bridges, level crossings, earthworks | 5 | 5 | 3 | 3 |
| Buildings | 4 | 4 | 1 | 1 |
| Electricity supply | 2 | 2 | 1 | |
| Ferries | 2 | 2 | 1 | 1 |
| Field and road boundaries | 2 | 1 | | |
| Heighting (contour interval in metres) | 2 (5) | 2 (10) | 2 (20) | 2 (50) |
| High/low water mark | 2 | 2 | 2 | 2 |
| Landmarks | 8 | 8 | 6 | 4 |
| Railways | 4 | 3 | 3 | 3 |
| Roads & public rights of way: classifications | 7 + 8 | 7 + 8 | 6 + 6 | 7 |
| Roads & ways: physical characteristics | 4 | 4 | 3 | 2 |
| Surface cover | 9 | 8 | 5 | 5 |
| Water | 6 | 6 | 3 | 2 |
| <i>Total number of symbols</i> | <i>70</i> | <i>67</i> | <i>45</i> | <i>34</i> |

This gives a maximum of 70 symbols to be explained in a legend, compared with over 150 on the current *Landranger*. This is achieved partly by a reduction in features shown, but also by rationalising symbols used in multiple contents, such as bridges.

Table 2 expands on features to be included, in order of elimination as the scale of the map reduces.

Table 2 – Details of features to be included within categories

| | | |
|--|--|--|
| 'Access land' | Public parks, cemeteries and sports grounds; 'Access land' designated under CRoW Act 2000; 'Danger areas' | 'Access land' inapplicable in Scotland |
| Administrative boundaries | Parish; district; county; nation | |
| Airfields and airports | Military and private airfields (to be shown by name) Airports (to be shown by symbol at 1:250,000, otherwise by name) | Only airports at 1:250,000 |
| Bridges, etc | Foot bridges; road, railway and other earthworks; road bridges; level crossings; tunnels | Viaducts and aqueducts treated as 'bridges' |
| Buildings | Buildings of public interest, e.g. schools, hospitals, places of worship without 'steeples'; ruins; glasshouses; buildings generally | Retain 'landmark' ruins, e.g. abbeys, at smaller scales |
| Electricity supply | Solar farms; electricity lines | |
| Ferries | Foot; vehicular | |
| Field and road boundaries | Field boundaries (hedges, fences, walls); indication of fenced/unfenced roads and woodland | |
| Landmarks | Beacons; trig pillars; windmills; obelisks and towers; lighthouses; church steeples; wind farms; communication masts | |
| Railways | Single/multiple track distinction; sidings; narrow gauge; stations | |
| Roads and ways: [A] roads; [B] public rights of way | [A] Untarred and other 'white' or minor roads; tarred rural roads; B-road; A-road; Motorway; [primary routes] [B] Footpath (ordinary/permissive); Bridleway (ordinary/permissive); off-road cycle route; Restricted Byway; Byway Open to All Traffic; 'Other route with public access'; | Primary routes on 1:250,000 only Public rights of way at present inapplicable in Scotland |
| Roads & public rights of way: physical characteristics | Fenced/unfenced; dual carriageway; car parks (rural); over/under two-way width | Two-way width threshold to be 5 metres |
| Surface cover | Uncultivated ground; rocky surface; mud; orchard; coniferous/non-coniferous woodland; quarries, pits and tips; marsh; sand; woodland | Distinction of coniferous and non-coniferous woodland only at 1:25,000 and 1:50,000 |
| Water | Springs; weirs; locks; ponds; canals; streams/rivers | Larger waterbodies will appear by default |

Names, when ‘given’ or descriptive, have not been discussed, as these usually do not feature in legends, and their gradual exclusion as the scale of mapping diminishes is in inverse ratio to the assumed importance of the feature or place. Criteria for inclusion or exclusion at particular scales need a more thorough discussion than is possible here, and in any case does not affect the content of legends, except if there are abbreviations to be explained, which are themselves a form of symbol. However, a useful improvement would be to have ‘cultural names’ in upright or ‘Roman’ and ‘physical’ names in italics, and ‘given’ names with an initial capital and descriptive names entirely in lower case.

Whilst detail redesign is not for discussion here, *Figure 1* (page 12) shows some suggested symbols. For some, alternatives are suggested. The fundamental approach has been to make these ‘planimetric’ rather than ‘pictorial’ in style.

Comments, including exclusions

Certain features are either excluded entirely from the ideal, seem questionable, or need further discussion. Discussion is not exhaustive, and more detailed studies might follow on certain aspects, for example the classification of roads and ways, and landmarks.

Administrative boundaries and markers

Administrative boundaries are ‘invisible’; roadside signs indicating a change of local authority are often placed some distance from the actual boundary; boundary stones, posts and other markers are frequently inconspicuous and hard to find. The occasional showing of tree types along boundaries, taken over from the 1:10,000, is selective and of doubtful wayfinding use. Such detailed ‘mereing’ is surely the function of larger-scale and more specialised mapping, and seems quite inappropriate to topographic mapping.

Aerodromes, airfields and airports

These are best shown by name at the three larger scales; only airports would be shown at 1:250,000, by symbol.

‘Antiquities’ and ‘heritage’

Sites of antiquities of which there are no obvious remains on the ground, which include battlefields not commemorated by obelisks, etc, are of limited wayfinding use.⁵ Discoveries by remote sensing methods over the past century mean that any

⁵ The showing of battlefields in Britain seems to be an interesting consequence of the adoption of ‘civil-oriented’ six-inch survey after 1840, and perhaps reflects practices developed in the ‘encyclopaedic’ and ‘antiquarian’ elements of the 1:10,560 survey of Ireland of 1825-42: one notes that one-inch Old Series sheet 93, compiled from six-inch survey of c.1844-50, shows the battlefield at Towton, but not at Marston Moor. Earlier one-inch Old Series sheets, despite their ‘military’ origins, seem to ignore battlefields completely, with the exception of the French landing at Carregwastad Point in Pembrokeshire in 1797, which has never been shown by the ‘battlefield’ symbol. There is a certain logic to this as, even assuming that the site of the battle is accurately known, battles would take place over a much wider area than the symbol and date on topographic maps immediately suggest.

Otherwise the latest battle shown is that of Culloden, of 1746. The writer has seen tourist mapping of Czechoslovakia of the late 1950s which includes the sites of ‘workers’ uprisings’, with dates, but no such indications of ‘left’-‘right’, ‘worker’-‘capitalist’ confrontation have ever

comprehensive attempt to show the ‘invisible’ archaeological record is properly the function of thematic rather than of general mapping. The depiction of Roman roads, whilst long-standing, in practice excludes a large number of known or inferred routes, and entails the showing of often invisible courses across land that is not publicly accessible. Similar considerations apply to the treatment of former railways, the courses of which are far more certain than those of many Roman roads. The threshold for treating a building as an ‘antiquity’ has been progressively brought forward well into the nineteenth century; it seems anomalous that twentieth century military remains, for example, continue to be shown in ‘ordinary’ lettering. Or does ‘living memory’ have something to do with it?

Any ‘antiquities’ would seem better treated like other features, as roofed buildings that continue in use, ‘ruins’ or ‘earthworks’, and left at that. Possibly the largest class of ‘historic’ or ‘heritage’ building is parish churches, which are only treated as antiquities if in ruins.

Bridges, viaducts and aqueducts

An aqueduct or viaduct is simply a long bridge, and it seems strange that a distinctive symbol has continued to be used for these by Ordnance Survey, all the more so because the symbol used on the 1:50,000 *Landranger* has ‘cutwaters’, which is at odds with the reality of elevated sections of motorway and other major road and railway viaducts and aqueducts.

Landmarks

Those listed are useful for wayfinding and for locating oneself in the landscape. Church steeples are useful for locating road junctions in villages. It is difficult to see what practical use is served by the distinction of lighthouses in use and disused, or of showing chimneys in large industrial complexes. A purist might argue that windmills, obelisks lighthouses and towers, and possibly church steeples, should all be categorised as ‘tower-like structures’, and beacons, windfarms and telecommunications masts as ‘mast-like structures’. This is certainly worth further study.

The usual Ordnance Survey practice (some chimneys and towers excepted) has been to show these by either a geometrical or a pictorial symbol that, though the significance of the feature in the landscape is vertical, have nonetheless been horizontal and ‘flat on the ground’. Churches with steeples are effectively shown oriented north and thus at right angles to the prevailing eastwards orientation, and parallel with the ground rather than perpendicular to it.⁶

appeared on British maps, which no doubt indicates that, though ‘history in cartography’ is ‘inscribed by the victors’, the conflict actually commemorated is of a limited nature; there is no indication of the blitz of 1940-1, for example, to say nothing of numerous aircraft crash sites. The showing of mediaeval and early modern battlefields therefore perhaps says as much about a habit of mind as it does about ‘history’ or the landscape. In summary: the showing of battle sites seems inconsistent and anomalous.

⁶ Fortunately for the various Ordnance Surveys, none of them have to map the Leaning Tower of Pisa.

Post and telecommunications

There has been a considerable reduction in both post offices and in telephone boxes in recent years, and these must now be regarded as ‘soft’ data, and hence impermanent.⁷ An ‘ideal’ specification needs to recognise the rise of the cellphone.

Railways

The distinction of Light Rapid Transit (LRT) systems and stations seems an unnecessary elaboration; most of these systems run over, or even sometimes share, former ‘heavy’ rail routes and stations, and there is no substantial difference in physical appearance, as there is with narrow gauge lines. The distinction of sidings as a separate category seems unnecessary.

Roads and ‘ways’

The use of superimposed symbols for public rights of way and for cycle routes obscures underlying detail and sometimes the physical characteristics of the route: the most clearly depicted rights of way can be those which follow no obvious feature on the ground.⁸ The current threshold for indicating a ‘wider’ and a ‘narrower’ ‘unclassified’ public road is 4 metres, or 13 feet. The War Office committee of 1892 recommended 14 feet (4.3 metres), evidently as the minimum width suitable for two-way horse-drawn military convoy traffic. Metrication and a simplification in lower road classification in the early 1970s led to the adoption of the 4-metre standard, perhaps because it was easy to effect without extensive fieldwork or redrawing of road casings on published mapping, but in practice this now seems too low, and a threshold of 5 metres, or 16 feet, seems more appropriate at present.

‘Roadside furniture’ and ‘minor obstructions’

This includes cattle grids, gates, gradient arrows, and mile stones and posts. Cattle grids are not mapped completely at present; gates across roads are highly unusual; gradient arrows – a souvenir of a War Office committee of 1912, and of the limitations of early mechanised military transport – do not indicate the length of steep gradient, and in any case difficult gradients of any significance should be apparent from the contours; mile stones and posts are often hard to find, are illegible when found, and survive fragmentarily, added to which the mapping of them is at present incomplete, and not subject to maintenance.

⁷ There were 28 post offices within the Exeter city boundary in 1999-2000 and 13 in April 2021: *AZ Street Plan Exeter*, Borough Green: Geographers’ A-Z, edition 6A, 2000, and survey of city postal facilities by writer, April 2021. In 3 of 4 villages included in the 1999-2000 map, but outside the city boundary, the post office continued open in 2021.

⁸ The showing of bridleways, which are legally usable by cyclists, was discussed in Richard Oliver, ‘The later Ordnance Survey half-inch maps: some points of detail’, *Sheetlines* 92 (2011), 23-8, pp25-7; their inclusion on 1:100,000 or similar scale mapping, for which a significant constituency would be cyclists, presents problems.

Surface cover

The persistence of pictorial rather than abstract depictions seems to complicate map production and design, and has the disadvantage that, as with landmarks, symbols are often shown at right angles to how what they appear in actuality, save briefly when tree-felling is in progress. Pictorial depictions of slopes and associated features, for example rocks, derive from a time when topographic mapping relied wholly on pictorial relief – hachures in OS practice – before the advent of contours. It follows that steep slopes should be depicted by continuous contouring, even if it ‘fuses’, rather than pictorially. A single symbol seems appropriate for rock, sand and shingle that affect ‘going’ and can appear both above and below high water mark.⁹ Ordnance Survey practice in distinguishing, or not distinguishing, coniferous and non-coniferous woodland has varied from time to time, and this would seem worth further study.

‘Tourist information’

Most of this is ‘soft’ information, which can change without significant structural change on the ground, and is essentially enhancement of information already provided, for example indications of ‘viewpoints’ and highlighting of names that the scale of mapping would favour the inclusion of anyway.

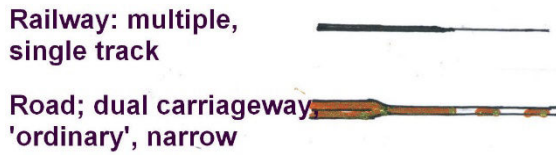
Conclusion: less is better – and greener

The outline of map content given here provides the basis, duly adapted according to scale, for four types of topographic mapping. It seeks to balance what can be fitted into a legend of a certain size on the one hand with information considered to be of practical use for journey planning and wayfinding on the ground on the other, and minimises the showing of ‘soft’ information that is liable to change, and therefore affect map maintenance costs. Mapping produced to this specification should be rather clearer than that at present on offer from Ordnance Survey.

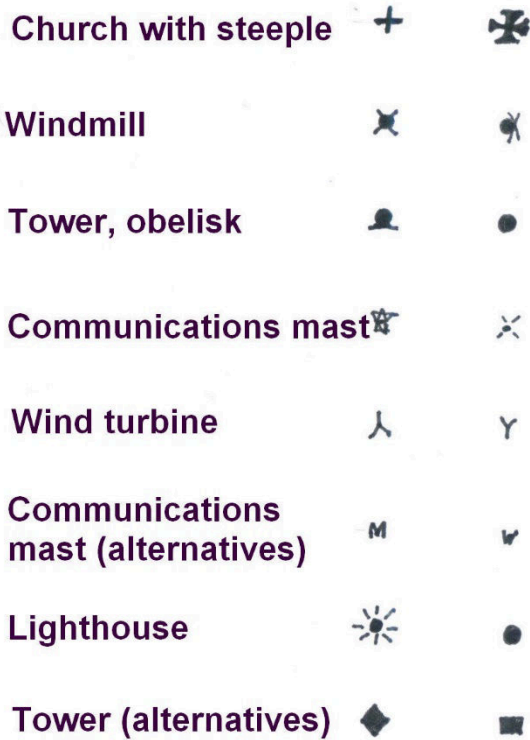
See figure 1, p12.

⁹ It follows that the writer would prefer a ‘physical’ depiction of high water, based on spring tides, rather than the ‘administrative’ one, of ‘mean tides’, that is used in England, Wales and Ireland: see Richard Oliver, ‘The Ordnance Survey Act, tidelines and the growth of a myth’, *Sheetlines* 90 (2011), 36-51, esp. p.49.

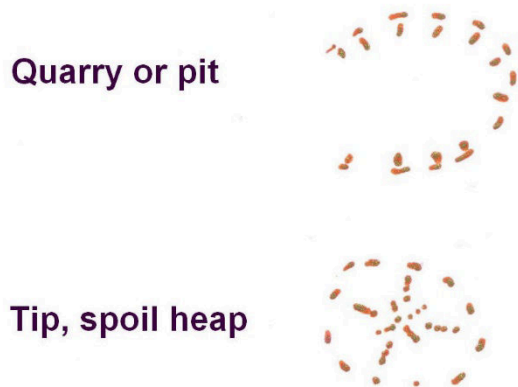
Communications



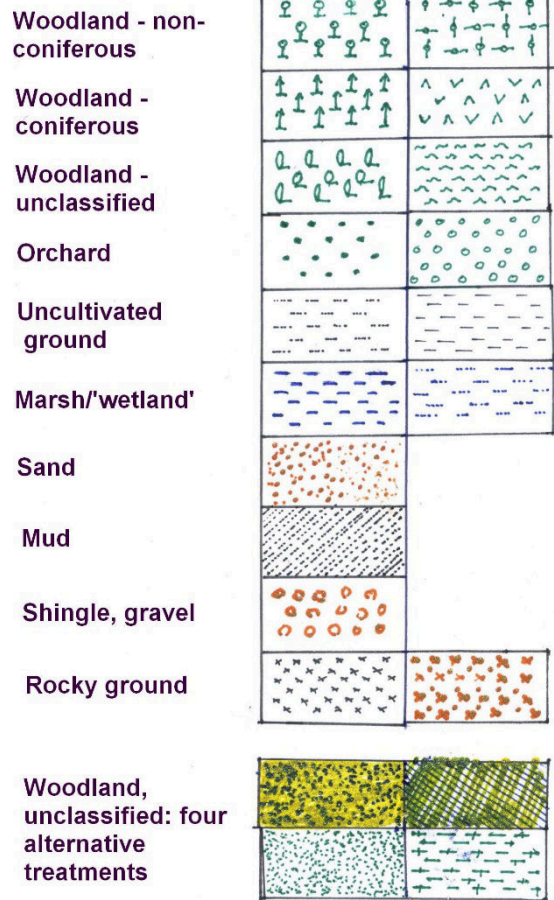
Landmarks



Quarries and tips



Surface Cover



Lettering

TOWNS

Villages, Settlements

Physical Names

sluice, memorial

fp mm bm ph

Figure 1. Some suggested non-pictorial signs for topographic maps, with some alternatives. Note: these are basic designs, and are not necessarily at the size at which any of them would appear on a printed map.