Guidelines for BS 7666:2006

Section 1 – Introduction to BS 7666

Version 1

January 2007

This Section of the Guidelines provides a general introduction to all Sections of the Guidelines. It gives a general introduction to the subject of gazetteers and addressing. It also provides an introduction to standards, describes what BS 7666 is, identifies the main changes made in the 2006 edition and provides an overview of the other Sections of the Guidelines.

Contents

Preface

These Guidelines are intended for use with BS 7666: 2006 *Spatial datasets for geographical referencing*. They complement the Standard with more detailed explanation of the content and a general approach to creation of gazetteers. They are not specific to any particular implementation, for which it is expected that specific data specifications and capture and maintenance rules will be produced.

The Guidelines are aimed at:
- gazetteer owners – those with ultimate responsibility for the gazetteer;
- gazetteer custodians – those responsible for the creation, maintenance and quality of gazetteers;
- suppliers of gazetteer software;
- those developing and implementing gazetteer systems
- providers of gazetteer data;
- others who are responsible for aspects of the quality management of gazetteers.

The Guidelines are currently in four Sections:

1. Introduction to BS 7666;

2. How to create a gazetteer of a new type of geographic object;

3. Quality assessment and reporting;

4. How to create a national gazetteer.

Further Sections will cover specific implementation issues:

- How to create a street gazetteer;

- How to create a land and property gazetteer;

- How to create a delivery point gazetteer.

No guidelines for public rights of way which form an informative annex to Part 1 of the Standard are planned at present.

These Guidelines have been produced under the auspices of BSI IST/36 geographic information who are responsible for BS 7666. They were written by Rob Walker and Les Rackham working under the guidance of a Steering Group comprising representatives of major stakeholders in the Standard. The work is sponsored by the Department for Communities and Local Government (DCLG), Ordnance Survey, Office for National Statistics and Mayrise Ltd. Any comments on these Guidelines should be sent to standards@agi.org.uk

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1. General introduction to all parts of the Guidelines

This document is an introduction to a set of guidelines to accompany the British Standard BS 7666: 2006 *Spatial datasets for geographical referencing*. The 2006 edition is in four parts:

- Part 0: *General model for gazetteers and spatial referencing*;
- Part 1: *Specification for a street gazetteer*;
- Part 2: *Specification for a land and property gazetteer*;
- Part 5: *Specification for a delivery point gazetteer*.

Part 3 *Specification for addresses* and Part 4 *Specification for recording public rights of way* of the 2002 edition have been withdrawn, their content having been subsumed in the other parts.

BS 7666, particularly Parts 1 and 2 has been very widely used by the local authority community who are creating local street gazetteers and local land and property gazetteers. These in turn are being merged to form the National Street Gazetteer (NSG) and the National Land and Property Gazetteer (NLPG). Feedback from these activities has influenced the revision of the Standard and identified the need for further explanation and guidance.

Standards are not easy things to read or understand. Ideally, they express unambiguous requirements and do not include lengthy explanations. The emphasis is on precision in the use of language such as to minimise ambiguity. The intention is that standards should be used by those with knowledge of the subject area to build implementations that suit their specific applications.

This approach can work well where the objects in scope of the standardisation are susceptible to clear and close definition, or where there is a large and agreed body of theory and practice. Unfortunately, this is not the case with geographic information where the objects (e.g. buildings, paths, railways, rivers, woodlands) may be tangible but are not that well-defined or identified, and the theory and practice is still evolving.

Some form of additional guidance, which complements BS 7666, and which is written in a more accessible form is needed. It can be assumed that the audience will be familiar with the objects in question (e.g. streets or land and property) but not necessarily with the requirements set by the Standard or the economy of language.

To make the Standard more accessible and usable, the Guidelines aim to:

- provide an introduction to all parts of the Standard;
- interpret the requirement clauses in the Standard;
- provide general guidance in the implementation of the Standard;
- provide illustrations and examples.

In terms of scope, the Guidelines cover:

- the underlying concepts, the purpose of the Standard and the applicability;

- the approach to creating a gazetteer of any type of geographic object in conformance to the general model in Part 0 of the Standard;

- the general approach to the creation of gazetteers of streets, land and property and delivery points;

- quality assessment and reporting;

- the creation of national gazetteers.

It is intended that the Guidelines should be for general use and independent of any particular application. Specifications for these applications will need to be developed by the bodies responsible for their implementation but within, it is hoped, the framework provided by these Guidelines. For example documentation is being developed to support the National Street Gazetteer (NSG), National Land and Property Gazetteer (NLPG) and DNA-Scotland (Definitive National Addressing – Scotland) implementations of the 2006 edition of the Standard.

It is expected that such implementations will have their own specific data specifications and capture and maintenance rules based upon user requirements.
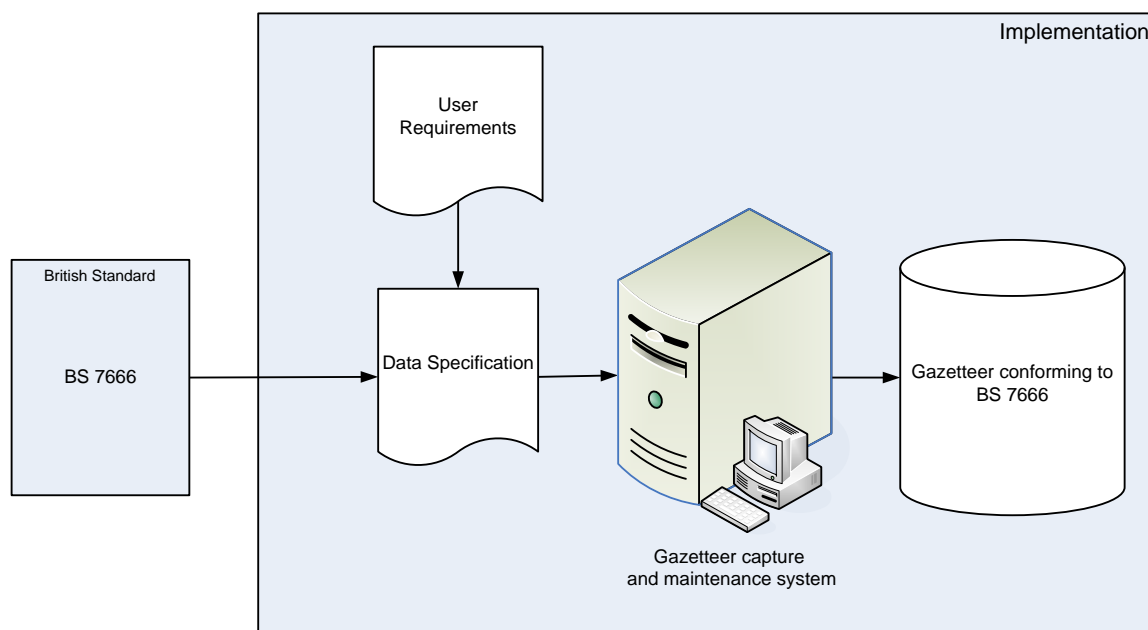
Figure 1: The relationship between the Standard and a gazetteer implementation

These Guidelines should be read in conjunction with the Standard. The Standard provides the authoritative statement of what is required, and the Guidelines are recommendations on how to fulfil those requirements. Throughout this document, the term 'the Standard' refers to all parts of BS 7666.

Examples or explanations of certain terms and more detailed concepts are enclosed in boxes. This is to aid those readers who are less familiar with the Standard and the concepts while enabling others to pass over them.

2. Standards

2.1 What is a standard?

The term 'standard' is often associated with a perceived quality level e.g. some product or service is said to reach "a high standard".

In the context of information and communications technologies (ICT) and specifically BS 7666, 'standard' has a rather different meaning. The 'standard' provides a norm, model or specification which should be conformed to when implementing systems or structuring information. By so doing, interoperability and information exchange are enabled. Actual quality levels are not specified in the standard, these are left to the implementation so that levels can be established taking into account user requirements.

Characteristic of these sorts of ICT standards, including BS 7666, is a specification that:

- provides rules, guidelines or characteristics for activities or their results – i.e. it expresses a requirement in a formal manner;

- is aimed at the achievement of the optimum degree of order in a given context - i.e. it must have some practical application;

- is established by consensus – it is not ordained from on high;

- is approved by a recognised body, such as BSI, the International Standards Organisation (ISO), or the Open Geospatial Consortium (OGC);

- is for common and repeated use – standards have no value unless widely applied.

2.2 How requirements are expressed in standards

When requirements are expressed in a standard, particular language is used to indicate whether this is mandatory or optional. In the case of British Standards, if the requirement is mandatory then the verb 'shall' is used but if it is optional then 'may' is used. For example, "the gazetteer *shall* have the following metadata elements" means that these must be present to conform to the standard but "the location instance *may* be related to other location instances" means that the location instance can be related to another instance but it does not have to be to conform. The term 'should' is used where making a recommendation.

2.3 Conformance to Standards

Standards by themselves only become enforceable when mandated, for example by government regulation. Adoption is usually voluntary and brought about because it is commercially beneficial or in the public good. Organisations often claim conformance or compliance as an indication of following best practice. However, this is often a statement of intent rather than a verifiable fact. Many standards, including BS 7666, now contain a "conformance clause" or "statement of conformity", which states what

the implementer must do to demonstrate conformance with the standard. This will often take the form of a set of tests that should be passed or can be verified to have been passed.

2.4 The value of standards for geographic data

The benefits of standards vary with the area of application, but generally include the following:

- increased user confidence that their needs are being met;

- compatibility between similar implementations, enabling data sharing between users, interoperability between applications and creation of national datasets;

- increased data integrity;

- greater understanding of products;

- reduced production costs and reduction of data duplication.

3. Gazetteers and addressing

3.1 Geographic objects

BS 7666 is concerned with gazetteers, lists of geographic objects of a given type with their locations which provide information identifying and describing where they are in the real world. Any type of object that is fixed in position and can be consistently identified, recognised and described as occupying a specific place in the real world can be regarded as a **geographic object**. It can range in size from a lamp post to an administrative area or even a complete country depending on the application.

Examples of geographic objects
Commonly used examples of geographic objects are streets and occupied properties. Other examples are countries, towns, localities and postcode areas.

These geographic objects are used to define a location which is turn is used to reference other data. The purpose of gazetteers is to allow the consistent linking of information to locations and by so doing enable the cross-referencing of all information relating to those locations.

Example of geographic objects used as locations to reference other data
Residential properties, referenced by their address, are used to reference demographic data.

3.2 Spatial references

A location is given a **spatial reference**. In the context of BS 7666, this spatial reference takes the form of a description of a real-world place which can then be used to reference other information. Each location needs to be uniquely identified, by a name (e.g. for a town) or a code (e.g. a postcode). The name may not in itself be unique (e.g. there are several occurrences of 'Newport' around the world), and where this occurs, further information is need to distinguish between them (e.g. 'Newport, Isle of Wight').

In building up a unique spatial reference, other locations such as locality, town, county have to be used which are themselves geographic objects. These other locations used in referencing the location in the gazetteer are termed **spatial units**. Spatial units can reference other spatial units (e.g. 'Ashford, Kent') and typically form part of a hierarchy of spatial units. The way that spatial references are applied to locations is specified in the **spatial referencing system** which details the types of spatial units and their relationships.

The most common example of a spatial reference is an **address.** This locates and identifies the object using a standard set of spatial units. Instances of these units are identifiable in the real world by their name. A geographic object that is capable of referencing in this way is termed an '**addressable object**'. A common form of an address is the postal address. This is defined by Royal Mail for the purpose of delivery of mail. It applies only to buildings that receive mail deliveries, and uses a set of spatial units, such as post town, that represent the organisational structure of the delivery organisation. However, a geographic address can be produced for other types of addressable object that do not have a postal address. This latter approach is used in BS 7666.


Geographic addresses
Defined in BS 7666, these are designed to be applicable to a range of geographic objects such as land and property, not just properties that receive mail. They are based upon the following:

- object name – the number, name, description or occupant of the property;

- street reference – the name or number of the street;

- locality name – an established name for the local area;

- town name – the nearest town;

- administrative area name – this is the highest level local authority, usually a county or unitary authority.

An example of a geographic address is 'The Cenotaph, Whitehall, London'.

In addition to the descriptive spatial references described above, a geographic object also has a **position** defined by coordinates such as those derived from the National Grid of Great Britain. Recording the position of a geographic object in a gazetteer is mandatory in the Standard but is never the sole means of locating it.

The concepts of spatial referencing and gazetteers are illustrated in Figure 2.
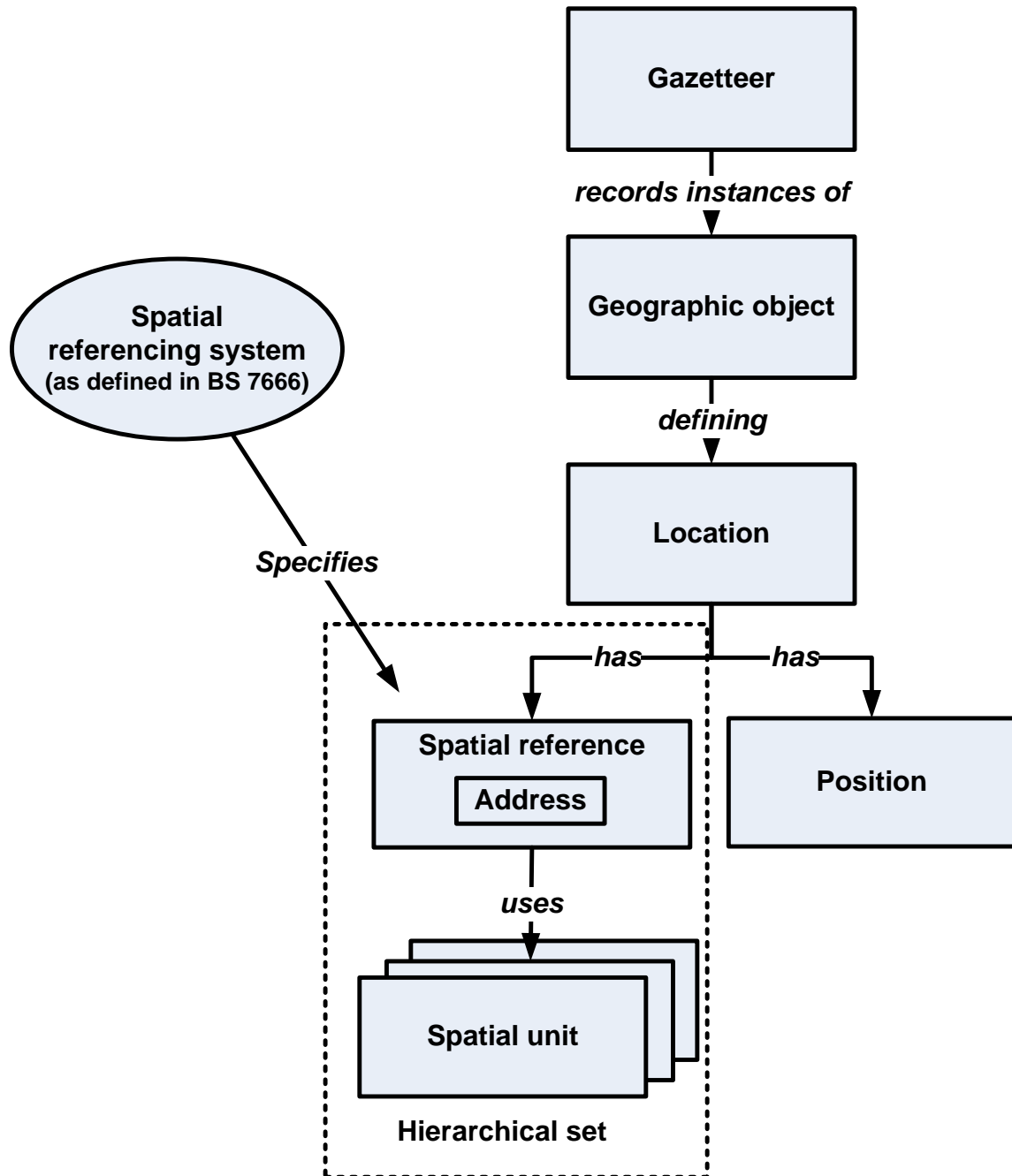
Figure 2: Concepts of spatial referencing

To make each geographic object uniquely identifiable within a gazetteer, a **unique identifier** is needed for each geographic object. This is usually in the form of a unique number which is retained by the object throughout its life-cycle from creation in the gazetteer to its demise.

4. What is BS 7666?

4.1 First edition

BS 7666 was first published over the period 1994 to 1996 in four parts. Part 1 was originally produced to support street works activities. Its main application was the production of street gazetteers in local authorities, which were then combined to form the National Street Gazetteer.

Part 2 followed to support land and property gazetteer production in local authorities. This required a mechanism for creating addresses for a range of objects, not only those that have postal addresses (i.e. receive mail deliveries), including unoccupied land, industrial premises and some public buildings, and Part 3 was produced to provide a general address structure for any such geographical objects. Part 2 was used extensively in local authorities in the creation of local land and property gazetteers, and underpins the National Land and Property Gazetteer (NLPG).

Part 4, first produced in 1996, was somewhat different from the other Parts, being not a gazetteer specification, but a specification of additional information to be recorded about Public Rights of Way (PROW), which were themselves linked to streets.

4.2 2000-2002 edition

All four parts were revised separately over the period 2000-2002. During 2003, a strategic review of the standard was carried out. This concluded that:

- there was a strong and continuing business case for the Standard;

- it had been successful in the context of the National Street Gazetteer (NSG) and the National Land and Property Gazetteer (NLPG);

- the context within which the Standard operated was changing, other related national datasets were being developed including OS MasterMap® (with its address and transport layers), new technology was allowing greater interoperability between systems and datasets, new International Standards were emerging;

- a general model of spatial referencing and gazetteers was required, for use in particular by those outside the local authority community.

It resulted in the current revision of all parts of the Standard together, and the consideration of a wider scope for the Standard.

4.3 Purpose of the Standard

The general purpose of BS 7666 is to define standard referencing systems for a range of types of geographic objects. These include not only streets and land and property, but also other classes of reference objects such as localities, towns and countries. It provides a standard way for identifying and defining these geographic objects, and of sharing and accessing information about them. Specifically, it assists the creation of local datasets or gazetteers which will in turn enable the creation of national datasets or gazetteers.

4.4 Benefits of adoption

The general benefits of adopting BS7666 are that data created by different users is produced to a common specification, so that data can be readily interchanged, and amalgamated to create 'national' gazetteers. This has been the basis of implementations such as the National Street Gazetteer (NSG), National Land and Property Gazetteer (NLPG) and Definitive National Addressing – Scotland. Adoption of the standard also means that common processes can be applied, making implementation more straightforward.

4.5 Perspectives on the Standard

There are different perspectives that need to be considered in any implementation of the standard:

- **Gazetteer users**: who need to know what they will find in the gazetteer, and get some idea of its quality, as well as being able to access the data;

- **Gazetteer custodians**: those responsible for creating and maintaining the gazetteer;

- **Gazetteer owners**: those who retain the intellectual property rights (IPR) to the gazetteer (but not necessarily to the IPR of every item of data in it);

- **Data suppliers**: those who supply the data, in whole or in part;

- **System suppliers**: who provide software for gazetteers and related applications.

4.6 Object names

BS 7666 standardises only the structure and form of the gazetteers. It does not standardise the content itself. Gazetteers are essentially records of geographic place names. These place names are created and controlled elsewhere, sometimes by a statutory body. Of particular importance to the Standard is street naming and numbering. This is a statutory function carried out in local authorities. This process is outside the remit of BS 7666. Many of the problems encountered in addressing relate to street naming and (property) numbering, and need to be resolved in that context. Complex gazetteer structures and records are not a sensible way of solving real-world addressing problems. There is no substitute for rational street naming and property numbering, and data standards cannot solve problems resulting from institutional failure.

4.7 International Standards

BS 7666: 2006 is based upon an International Standard ISO 19112 *Spatial referencing by geographic identifiers* that deals with gazetteers. The principles and concepts employed are the same but there are some differences in terminology. The International Standard is described in Annex C, which also explains the differences between it and BS 7666.

5. Changes to the Standard

5.1 What are the changes introduced in the 2006 revision?

The main changes are as follows.

- Introduction of a new Part 0 to provide a common structure for gazetteers of any class of geographic object.

- Harmonisation of structure, content and terminology across all parts to provide consistency with Part 0.

- Use of UML (Unified Modelling Language) for presenting data models (see Annex D);

- Addition of a requirement to provide metadata for all gazetteers.

- Addition of a facility for recording descriptive identifiers in multiple languages.

- Addition of a facility for classification of objects recorded in the gazetteer.

- Extension of facilities for cross-referencing to other datasets in all Parts of the Standard.

- Addition of a requirement for a data quality report for all gazetteers.

- BS 7666 Part 3, *Specification for addresses* is withdrawn, and its contents incorporated in Part 0 as an informative annex.

- BS 7666 Part 4, Specification for recording Public Rights of Way is withdrawn, and its contents incorporated in Part 1 as an informative annex.

- Introduction of a new Part 5 *Specification for a delivery point gazetteer*. This is applicable to a range of delivery services.

- Field lengths are no longer prescribed.

- Minor changes in the light of experience.

The main changes to Part 1 are:

- Removal of the tolerance attribute and the replacement of the spatial locator by a pair of extremity points;

- Removal of the requirement for the identifier of an elementary street unit to be the coordinates of a reference point, and replacement with a general identifier;

- Addition of an informative annex on Public Rights of Way.

The main changes to Part 2 are:

- The structure and content are made consistent with the revised Part 1;

- Addition of an identifier for a Land and Property Identifier (LPI);

- Changes to the role of provenance.

Further details of these changes can be found in the relevant sections of these Guidelines dealing with Parts 1, 2 and 5 of the Standard.

5.2 What are the general implications of the changes?

Most of the changes concern presentation and clarification. However, there are some additional requirements introduced (for example the requirement to produce metadata and quality reports[1]), and some additional enabling facilities (for example classifications and cross-referencing). Changes to the detail are small, are based upon current best practice, and are highlighted in the relevant sections of these guidelines.

6. Overview of other sections of the Guidelines

The Guidelines are currently in four Sections.

Section 2 of these Guidelines covers how to create a gazetteer of a new class of geographic object. Part 0 of BS 7666 defines a generic gazetteer model that can be used for any class of geographic object, and this section describes how to implement this. It describes the planning and initiation of such an implementation and general principles of gazetteer construction. Finally the process of creating a new part of BS 7666 is outlined.

Section 3 covers quality assessment and reporting. It introduces the principles and concepts of data quality in the context of gazetteer creation, maintenance and utilisation and provides general guidance on how to test and report on gazetteer quality in conformance with BS 7666: 2006. This includes a description of some basic data quality measures and quality evaluation procedures, some quality test methods, the outline of a data quality report and an overall process for controlling quality of a gazetteer. It is at a generic level. It will be expanded in later sections in the context of particular types of gazetteer.

Section 4 deals with how to create a 'national' gazetteer. It describes how to amalgamate 'local' gazetteers into a 'national' one. It identifies quality issues between the two types of gazetteer and in particular issues relating to how a national gazetteer should be maintained.

Further Sections will cover specific implementation issues relating to the specific parts of BS 7666:

- How to create a street gazetteer;
- How to create a land and property gazetteer;
- How to create a delivery point gazetteer.

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[1] Quality reports were previously a requirement for Part 1 only