# Ordnance Survey®

...linking you to the real world

# Strategi®
## User guide

# Preface

This user guide contains all the information you need to make effective use of Strategi®. It is designed to help you understand the information contained in the data, as well as providing detailed technical information and the data format specification.

This user guide has been checked and validated before issue and every endeavour made to ensure that the contents are accurate. If you find an error, omission, or otherwise wish to make a suggestion as to how this user guide can be improved, please contact us at the address shown under Contact details or use the *Product performance report form* at appendix B.

## Contact details

The Data Supply Team will be pleased to deal with your enquiries:

Data Supply Team
Phone: 023 80 792743
Fax:    023 80 792496
E-mail: datasupply@ordsvy.gov.uk

or write to:

Data Supply Team
Ordnance Survey
Romsey Road
SOUTHAMPTON
United Kingdom
SO16 4GU

Visit Ordnance Survey on our web site at: www.ordsvy.gov.uk

## Product performance

If you have any problems or identify any errors in the data, please complete the *Product performance report form* at appendix B.

## Liability

A full description of the terms and conditions of supply and use of Strategi is detailed in the signed *Customer contract* held by you or your organisation.

Ordnance Survey makes every effort to ensure that data supplied is free from errors and omissions. We will remedy, as soon as reasonably practicable, errors and omissions that the customer notifies to us in writing. It is the customer's responsibility to ensure that data ordered is suitable for the intended purpose. We will not be liable to the customer or any other party for any loss, damage, inconvenience or expense resulting from the use of, or reliance upon, the data.

# Delivery of Strategi

You are advised to copy the supplied data to a back-up medium.

Written notification of any deficiency in the data or damage to the goods must be given to us within 28 days of receipt of Strategi.

# Data copyright

All Ordnance Survey digital map data are Crown copyright. Full details of the conditions under which our digital map data may be processed and/or manipulated or copied by a customer – whether or not for use on PCs or workstations or for making hard copies – are contained in Ordnance Survey leaflet: *Copyright 1 – Business use of our digital and conventional mapping*. These are available from:

Copyright Licensing
Ordnance Survey
Romsey Road
SOUTHAMPTON
SO16 4GU

Phone: 023 80 792684 or 023 80 792703
Fax: 023 80 792535

You should check the terms and conditions with us before using the data. It is also the responsibility of the holder of the digital map data to ensure that any plotted or printed output contains the required copyright acknowledgement.

Ordnance Survey®

# User guide copyright

This user guide is © Crown copyright 1999. All rights reserved. It is supplied with Strategi to allow you to make effective use of the data. Any part of the guide may be copied for your own business use. Business use is defined as actions related to business decision-making or as part of day-to-day operations associated with the running of a business. No part of the guide may be copied or incorporated in products, services or publications you generate for onward sale or as free promotional or support material, without the prior written permission of Ordnance Survey.

# Trade marks

Ordnance Survey, the OS Symbol, Strategi, Landranger and Travelmaster are registered trade marks of Ordnance Survey, the national mapping agency of Great Britain.

MS-DOS is a registered trade mark of Microsoft Corporation.

UNIX is a registered trade mark of UNIX Systems Laboratories.

GEOPLAN is a registered trade mark of Geoplan (UK) Ltd.

AutoCAD and Autodesk are registered trade marks and DXF is a trade mark of Autodesk Inc.

Helvetica is a registered trade mark of Linotype AG and/or its subsidiaries.

Univers is a registered trade mark of Haas'sche Schrifigiesserei.

Gill Sans is a registered trade mark of The Monotype Corporation.

Zapf Chancery is a registered trade mark of International Typeface Corporation.

# Table of contents

# Chapter 1  Introduction

## Using this user guide

This chapter and chapter 2 provide an introduction to Strategi and illustrate potential uses. Chapter 3 contains details of the components of the data. These chapters are designed to enable users to make effective use of Strategi, and contains all the information you will need. Please refer to the glossary if you are unfamiliar with the terms used.

For information on the Strategi data format, please refer to chapters 6 to 9 of this user guide.

All aspects of Strategi discussed in this user guide relate to Strategi in both BS 7567 (NTF v2.0) and DXF™ (AutoCAD® release 12 compatible) formats. If the two format versions differ in their treatment of a particular aspect, the specific differences will be stated. Icons, as shown below, will be used to denote these differences.



For convenience BS 7567 (NTF v2.0 Level 3) is referred to as NTF in this user guide.



Drawing Exchange Format (DXF) is referred to as DXF in this user guide. Complies with *Layer Naming Convention for CAD in the Construction Industry Version 2,* which is based upon the guidelines laid down in BS 1192: Part 5 – *Guide for structuring of computer graphic information*.

# Strategi – an introduction

Strategi is detailed digital map data, ideal for applications requiring an overview of geographical information on England, Scotland and Wales. It supports a wide range of applications, including planning or environmental analysis. Users can geographically link their business information with Strategi to analyse national trends or to provide a planning overview, for example the provision of a framework for road scheme planning.

Full technical information on Strategi data transfer formats is contained in the chapters 6 to 9 of this user guide.

Complies with *Layer Naming Convention for CAD in the Construction Industry Version 2*, which is based upon the guidelines laid down in BS 1192: Part 5 – *Guide for structuring of computer graphic information.*

Complies with BS 1192: Part 5 – *Guide for structuring of computer graphic information*. Please see chapters 8 and 9 for a brief description of this standard.

The purpose of chapters 6 to 9 is to:

● Provide a brief description of the presentation of Strategi in the two transfer formats in which it is supplied:
  ● BS 7567 (NTF v2.0 Level 3).
  ● Drawing Exchange Format (DXF) (conforming to AutoCAD release 12 with extended entity data).

  As part of this description, data structure diagrams are used to give greater explanation where necessary.

● Provide Licensed Partners with as much detail as necessary to enable Strategi files in either NTF or DXF to be easily understood and processed by application software.

The term 'data structure' used in these chapters refers to the organisation and sequence of the records in the data file and **not** to the geographical topology of the data.

Because of the fundamental differences in the data format of Strategi supplied in NTF and DXF, this user guide devotes separate chapters to these transfer formats.

Chapters 6 to 9 should be read in conjunction with chapters 1 to 3 which describes the content of Strategi.

## Strategi features

● Coded features which give each feature a specific category, allowing users to group like features for search, display and output routines.

● Strategi is defined as a limited 'link and node' structure. It contains points, lines and nodes. Nodes have pointers to lines (links) that join at the node but there is no explicit topology within the data. Similarly, there are lines (links) that enclose an area containing a point (seed), and again there is no explicit topology between the lines (links) and point (seed). Some points (seeds) are not contained within areas enclosed by lines (links).

● Annual updating and Ordnance Survey's comprehensive intelligence gathering ensures that high standards of currency and integrity are maintained.

● Names are stored in attribute records and are applied to features, such as rivers and roads, as attributes of these features. Names applying to geographical names include the cartographic position for screen display. These may also be included in the attribute record of the appropriate point or line feature.

## Strategi benefits

The high specification of Strategi offers a number of benefits:

● National coverage.

● The definitive 1:250 000 scale dataset for Great Britain suited to multiple applications using a geographical information system (GIS), computer-aided design (CAD) and digital mapping systems.

● Structured vector format, offering maximum functionality and allowing you to build closed polygons.

● Annually updated from maintained data source.

# Strategi applications

Strategi provides a comprehensive national database of geographical (spatial) information designed to support a wide range of applications. Strategi is intended as a limited basis for an in-depth national resource for strategic planning and analytical processes.

The list of potential applications is by no means exhaustive; some examples are:

● Route planning and network analysis – such as shortest path computations.

● What if? – analysis.

● Statistical analysis for social, environmental or marketing decision-making.

● Linking and integrating user's own information with spatial data.

● Customised graphic output.

# What you need to use Strategi

## Hardware

Provided that sufficient memory and storage facilities are available, there are no constraints on the hardware platforms which can be used. The range of hardware which can typically be used varies from higher specification personal computers (PCs) to mainframe computers.

## Software

Strategi is inert data and does not include software for data manipulation. To fully exploit the potential of Strategi it is necessary to use appropriate application software. There are many proprietary systems available and Ordnance Survey publishes a list of Licensed Partners who have confirmed that their software can import Ordnance Survey NTF and/or DXF. Contact Ordnance Survey at the address at the beginning of this user guide for a copy of the list.

# Strategi supply

## Supply unit

Strategi is supplied in tiles. Each tile covers an area of 50 km by 50 km. There are 174 tiles in the series.

## Supply options

The options for data supply are as follows for both NTF and DFX formats:

● A complete database of Great Britain (174 tiles).

● Country datasets – all layers inclusive:

    ● England    (87 tiles).

    ● Scotland   (78 tiles).

    ● Wales      (21 tiles).

## Transfer formats

Strategi is available in:

● BS 7567 (NTF v2.0 Level 3).

● DXF conforming to AutoCAD release 12 with extended entity data.

## Media

Strategi is supplied on CD-ROM only.

## Update

Updates are provided for each operative year of your licence.

# Strategi version numbering (or specification)

The following gives details of the product specification identity and their relationship to Ordnance Survey data capture specifications. This user guide reflects the product specification current at the time of its production. Version details of these specifications are also stated.

| Product | Product specification |
| --- | --- |
| Strategi | Strategi_01.13 |

**Transfer format specifications:**

| Name | BS 7567 (NTF v2.0) | DXF (release 12) |
| --- | --- | --- |
| Level | 3 | |
| Version | 2 | 1 |
| Issue date | 15 May 1992 | 01 January 1997 |

## NTF release

The current release is NTF v2.0 and will be supplied until further notice. The NTF version is indicated by the {NTFVER} field of the Volume Header Record [VOLHDREC]. The effective date of the definition of NTF v2.0 in Strategi is 15 May 1992 and is indicated by the {DDATE} field of the Database Header Record.

# Strategi output options

Strategi is inert data. It requires software (not provided by Ordnance Survey) to display it on a screen or to plot it out as hard copy.

The parameters defining colours, line styles, text styles, symbols, and so on should be built into user software. Symbol definitions used by Ordnance Survey are given in chapter 6.

**BS 7567 NTF** | Strategi may be customised by viewing or plotting features in different colours, line styles and scales to suit different applications. Certain classes of features may be omitted from customised plans on the basis of selection by feature code.

**DXF** | The parameters defining colours, line styles, text styles, symbols, and so on are embedded within the DXF file, as is customary with this CAD format.

The resolution of Strategi will support plotted or displayed output at a range of scales around the nominal scale of the source mapping.

**User warning:**

Plotting at too small a scale will result in a map of cluttered appearance, with text too small to be legible.

A suggested output within 25% of a map's source scale should allow all data to be sensibly plotted or displayed.

# Chapter 2 Overview of Strategi

## Data overview

### Basic principles

Links represent all linear features, for example roads, railways, rivers, lakes, and so on.

Nodes represent all intersections of links within changes in attributes in links and link ends.

Each feature has associated geometry; this may be a single coordinate pair for a single point feature for a railway station or two or more coordinate pairs for a linear feature.

Each feature is classified by means of a feature code.

## Strategi data source

The data was captured from Ordnance Survey's 1:250 000 scale Routemaster map series, covering the whole of Great Britain, plus some additional data from other sources; this has been superseded by the Travelmaster® map series.

See chapter 4 for full information.

Strategi is revised annually.

# Strategi data structure

Strategi data is defined as a geometrically structured 'link and node' (see figure 2.1) database. Geographical features are represented as: **points** – these are fixed positionally by one coordinate pair, for example a roundabout feature; or **lines** – a series of connected coordinated points to represent, digitally, linear map features such as roads, rivers, settlement boundaries, and so on. Points and lines within the data model determine the **geometric** (positional) characteristics of the data.

Lines and points within the data model also have associated **attributes** – these give the point or line entities meaning, that is they represent the descriptive characteristic of an entity such as a feature code, a name or a numerical value.

**(DXF)** All features having the same feature code will be recorded on the same layer. DXF has a limited 'link and node' structure; within this structure, a feature may be a name, point or line. Each feature is free-standing, (its topological relationship to any other feature is not expressed in the data).

Other important data structural concepts include:

**Networks** are interconnecting linear features structurally related by means of an explicit point described as a **node**. Between the nodes are series of non-intersecting line segments described as **links**; hence, link and node – see figure 2.1. This is of special interest in GIS for network analysis processes such as shortest path computations. Proprietary GIS software is used to build and maintain networks for linear features such as roads, railways, and so on. However, not all data with the potential to be a network is structured into one.

**Figure 2.1:** Link and node
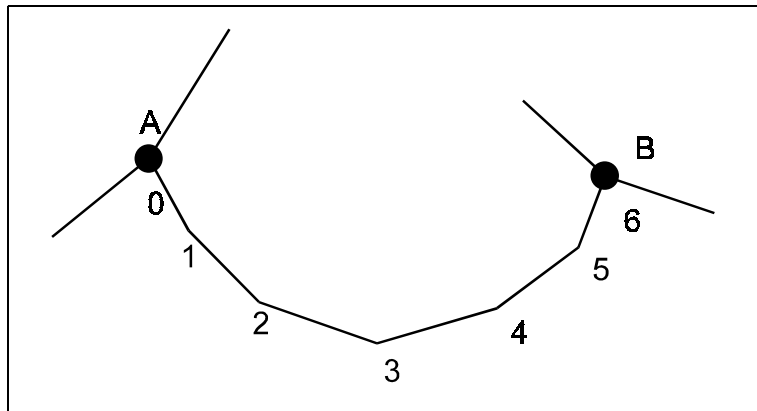


*Points A and B are nodes, as they intersect with other features. The line A–B is the link, and, in this example, is made up of 6 individual line segments.*

**Polygons** are continuous areas defined by sets of bounding closed lines. These are implicit within the data, but can be explicitly created with appropriate software. Stored within recognisable polygons are **seed points**, sometimes described as centroids, which hold information about that polygon, for example a town name. Unnamed polygons have a seed point which exists simply to represent the polygon feature, for example an unnamed woodland area.

**Figure 2.2:** Polygon
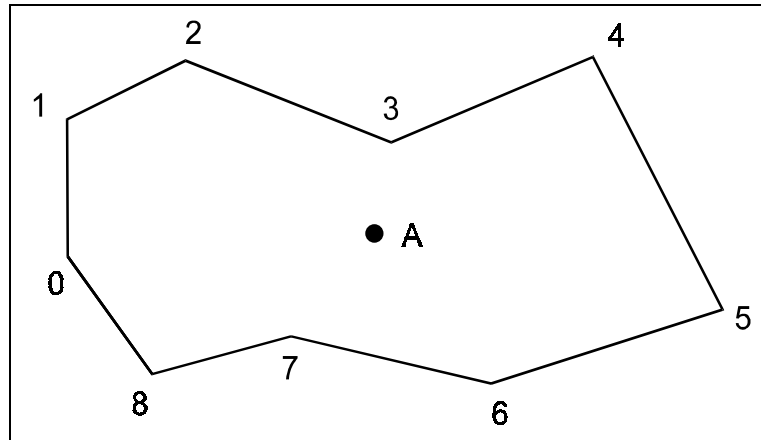


*Point A is the polygon seed point for the area; attached to this point will be attributes such as the feature code which defines it, and its definitive name – if it is named on the map. The polygon, in this example comprises 9 individual line segments.*

There are also free-standing seed points which are not associated with a defining polygon. An example of such free-standing seed points is a geographical seed such as the 'South Downs'.

GIS software provides the functionality to store, manage and manipulate this digital map data. The properties of Strategi make it suitable as the basis for users wishing to develop such applications.

# Strategi application overview

## Typical user scenarios

Strategi is a national database of Great Britain, and can form the geographical information base for use with a geographical information system. Here are two examples.

### 1 Site research for a large scale multiple retail outlet

Increasingly retail businesses are looking for competitive advantage; therefore, investment in retail outlets requires careful, efficient, objective and quantified approaches to planning. Where are the ideal locations to site these? What is the local infrastructure like? What is the demographic profile of the local population?

### Scenario:

A retailer is looking for a site in Hampshire. The company's criteria for selection are as follows:

● the site must be within a 3 km buffer of a motorway junction;

● the site must be within a catchment area of a large urban settlement; and

● the nearest competitor should not be within 5 km – information derived from the retailer's own competitor database.

Additionally, the researcher needs to know which postcodes are contained within this settlement area to enable the company to link to their own demographic database.

**Figure 2.3:** Site research
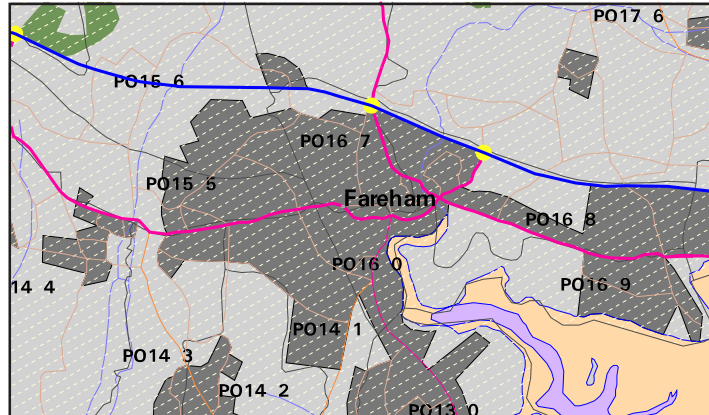


GEOPLAN® postcode data supplied courtesy of Geoplan (UK) Ltd.

*Note: Postcode data is **not** supplied with Strategi.*

### 2 Environmental analysis

**Scenario:**

Within the county of Hampshire, an environmental authority needs to know which woodland parcels (land areas) of 500 hectares or more are contained wholly within the county, to assist them in their woodland management programme.

**Figure 2.4:** Woodland parcels – light areas indicate woodlands of 500 hectares or more
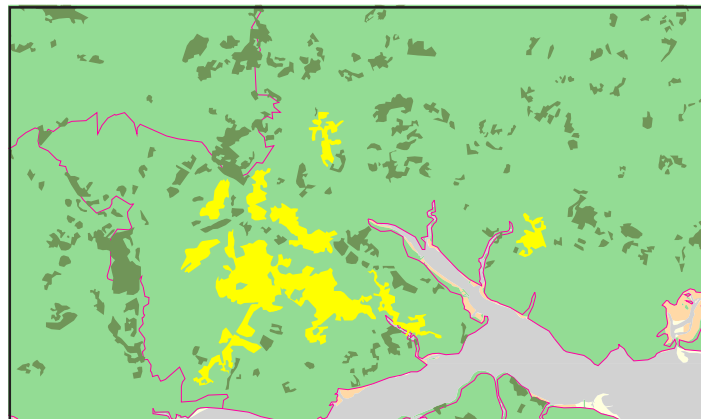
# Chapter 3 Strategi explained

## Features

Strategi has two feature classes:

● Point features

● Line features

These are arranged into recognisable map entities such as: roads, rivers, railways and lakes for line features; roundabouts, windmills, motorway junctions, and airports for point features. A full listing of individual features is given in chapters 6 and 8 for NTF and DXF respectively.

Each feature has two components:

● Feature position

● Attribute data

Also covered in this chapter:

● Feature layer descriptions

(DXF) Each feature recorded in Strategi should be considered as a DXF entity. Line features are recorded as DXF line(s) or polyline(s).

Point features will be recorded in the data as INSERT BLOCKS. Certain standard symbols are defined in the BLOCKS section of the data file. A list of these standard symbols is shown in chapter 8. Attributes are stored as extended entity data.

# Lines and points

Real-world geographical features are represented in the digital map data as geometric structures of lines and points. Each line or point has a geometric and attribute component.

The geometric component defines the positional characteristic of the feature, and implicit relationships exist between the lines and points based on relative position. The attribute component defines the descriptive characteristics of the feature.

Points may exist independently of lines.

An example of a geometric structure is shown in figure 3.1a.

**Figure 3.1a:** A geometric structure of lines and points
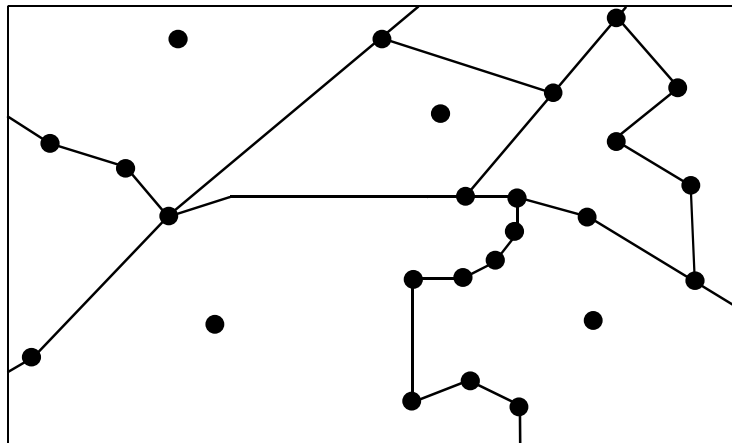
**Figure 3.1b:** The same geometric structure as map features
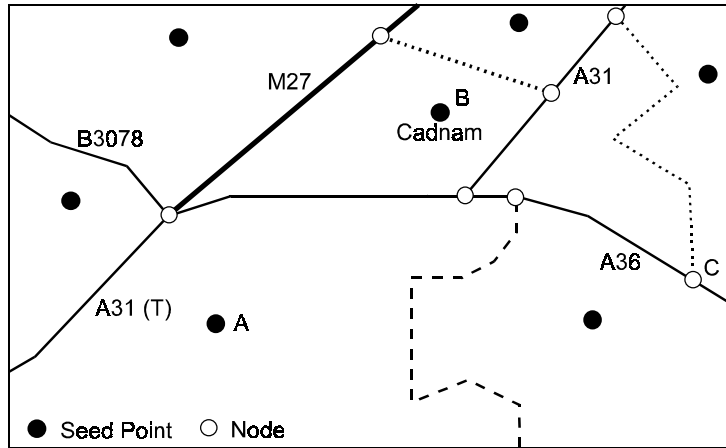


Lines and points from the geometric structure become features when a meaning, the feature code, has been added – for example, roads are created from lines, or settlements from points.

In figure 3.1b:

● Point A is a seed point which has attached to it a feature code identifying it – in this case, a woodland area.

● Point B is a seed point with a feature code that identifies it as an urban area, the seed will also carry its distinctive name attribute – 'Cadnam'.

● Point C is a special case of a point feature which shares a unique coordinate junction between intersecting features – in this case, where the A36 intersects with the urban area. This is an example of a node.

Some lines and points are common to more than one map feature as in figure 3.2a the area 'Cadnam' shares its boundaries with the M27, A31(T), A31 and A36.

**Figure 3.2a:** Overlapping features
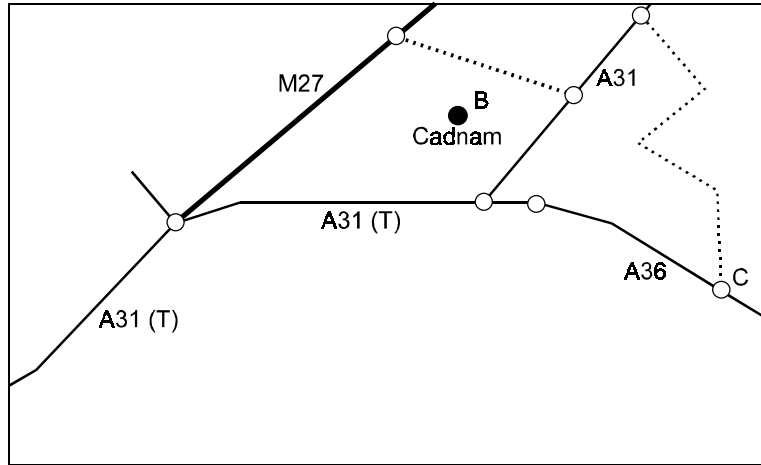


These overlapping features are stored separately within the data, as figures 3.2b and 3.2c.

**Figure 3.2b:** Separate storage of overlapping features
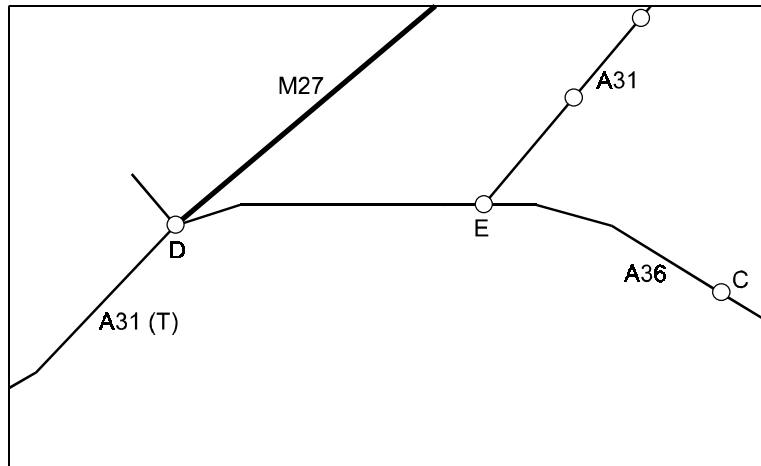
**Figure 3.2c:** Separate storage of overlapping features
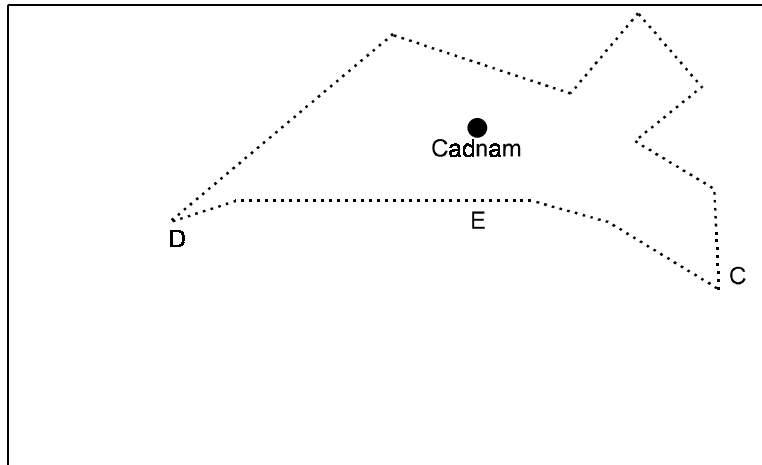


The common line (D–E) to the A31(T) and the settlement polygon, and the common line (EC) to the A36 and the settlement polygon, each represent two lines. The geometry of each feature is stored separately in the data.

**Note:** Within these examples, road numbers are attributes of the features.

# Feature  position

The geometry of map features is defined in terms of coordinates. All coordinates used in Strategi are based on the National Grid coordinate referencing system, and are quoted to a 1 m resolution. However, the data can be no more accurate than its source, (the Routemaster and/or Travelmaster map series).

The National Grid as it applies to Strategi is explained more fully in chapter 5.

# Feature attribute data

An attribute is the descriptive characteristic of a feature, that is a non-spatial element.

The geometry of the lines and points within the data would be meaningless unless they are assigned some distinguishing property. In Ordnance Survey map data terms, an attribute can be a feature code (in NTF these are numeric codes), or a distinctive name or number such as 'Birmingham' or 'M40'.

Attribute codes relevant to NTF and DXF are described more fully within chapters 6 to 9.

## Feature codes

Each feature is classified by means of a feature code (FC). These feature codes are allocated when each feature is initially interpreted and captured from the map base. Thus an A road dual carriageway is distinguished by the feature code allocated to it from a B road single carriageway and other kinds of line feature.

---

**(DXF)** Each feature is classified as belonging to a specific feature layer. These layers range in value from G8060570 to G8065845, using the *Layer Naming Convention for CAD in the Construction Industry Version 2,* which is based upon the guidelines laid down in BS 1192: Part 5 – *Guide for structuring of computer graphic information.* These feature layers are listed in chapter 8.

A further four text feature codes for layout of footnotes are included. These feature codes are listed in chapter 8.

---

**DXF**

In order to display the attributes stored as extended entity data, the following two scripts are required. These two files, 'Showeed.lsp' and 'Showeed.dcl', are contained in the 'EXE' directory on the Ordnance Survey supplied CD-ROM and should be placed in a directory in the AutoCAD preferences search string. This should include the directory containing the map data files in DXF.

To utilise the scripts, type the following at the AutoCAD command line prompt within a drawing session:

```
AutoCAD:    (load "showeed")
AutoCAD:    eedd
```

Selecting a map feature will now display the allied attributes of that feature in a dialogue box. To interrogate other features, the 'Re-Select' option on the user dialogue box should be chosen. The 'Cancel' option will return the user to a normal AutoCAD session.

If the 'eedd' command is repeated at the command prompt, the facility will again be available to the user.

The visibility of extended entity data to software other than AutoCAD release 12 will be constrained by the functionality of those individual software applications.

**NTF** BS 7567

Each feature is classified as belonging to a specific feature code. These feature codes are listed in chapter 6.

These differences in the data are inferred during translation from Ordnance Survey's internal data format to the required customer transfer format.

## Names as attributes

The 1:250 000 scale TOPO database, which is the source for the data, contains names. Some of the names appear in Strategi.

The criteria for names attribute attachment are as follows:

**Rivers and roads –**   each portion of the line, where named in the data.

**Place names –**   a chosen seed point in the urban area.

**Other names –**   freestanding seed points.

Not all stored data is named.

It is possible, with appropriate software, for users to add other names or values of their own choice as attributes of features.

## Over codes

The 'over' code has been introduced in order to allow you to give priority to features that go over other features. This code can apply to roads, water features and railways. In NTF this information is explicitly transferred in the node record, and relative levels of the links on the ground are assigned '1' for a level feature or '2' for a feature that crosses over the level feature. However, in Strategi the node record identifies all links as at level '1', and the 'over' information is contained within the feature code for that feature.

## Settlement nodes

Where a polygon falls across a tile edge, the primary node is shown on the tile, central to the area, with satellite nodes placed within the parts of the polygon falling on other tiles.

# Feature layer description

The feature codes which appear in Strategi within each layer are detailed in chapter 6. The individual layers are described in the following pages.

**Note:** Names, where recorded as attributes, appear in all layers.

## Layer 1 – roads, railways, airports and ferries

All roads classified by the Department of the Environment, Transport and Regions (DETR) are represented in the data, and identified as dual carriageway, single carriageway or narrow roads with passing places. Please note however, that for clarity, a selection of classified roads have been omitted. Vehicular ferries are included within the data and form part of the road network via links.

Roads are broken at junctions with other roads, at road classification changes and at tile edges.

Railway information includes all standard gauge railways and their associated infrastructure such as stations and tunnels. However, again please note that, for clarity a selection of railway stations have been omitted.

Narrow gauge railways are included where space permits.

Airports and heliports are included.

The inclusion of long-distance footpaths completes this comprehensive layer.

## Layer 2 – water features

Included in this layer are rivers and canals. These are broken at intersections and do not pass through lakes and reservoirs.

All rivers are stored as single lines from the source to high water mark. A point is identified where a river enters an estuary. From the estuary point to the sea, the banks are coded as coastline, with the river name as an attribute of a geographical area seed point.

Lake and reservoir shorelines are broken where a river or canal enters or exits. A dam or barrage is not distinguished from the shore.

Coastal foreshore detail identifies differences between natural and man-made coastline. Foreshore detail is identified as sand or other, which makes sand areas easily identifiable.

Information on lighthouses and lightships is also included and is represented by a point feature.

Sea areas are identified with an unbounded sea seed point, its precise position is not important. Examples of sea seed points include those which denote the Bristol Channel and Falmouth Bay.

## Layer 3 – cities, towns and other settlements

Settlements show outer limits and open spaces within polygons.

Settlements which are primary route destinations, as designated by the DETR, are given a different feature code to those which are not. They always lie on a primary route.

Minor settlements on non-primary route destinations may contain information relating to a number of features that are not 'true' settlements, such as power stations, industrial estates, railway stations or hotels.

# Layer 4 – ceremonial boundaries

The information contained in this layer includes boundary and ceremonial information for national and county boundaries, as they existed at March 1995. Hierarchical feature coding is applied to national and county boundaries. Therefore, a national boundary is also a county boundary.

**Figure 3.3:** Hierarchical relationship of boundaries



Line A is a national and county boundary

Line B is a county boundary
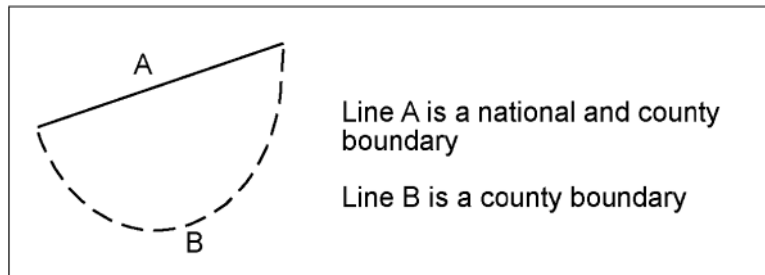
The data associated with ceremonial area seed points contains the name of the ceremonial area. This is the means by which separated areas of the same ceremonial unit are linked together.

Seed points have associated boundary codes. In the case of national seed points they are coastline and boundary. In the case of county seed points they are coastline, national and county boundaries. Any number of separated areas of the same ceremonial unit may carry the seed point code.

Offshore islands will carry county seed points but not the national seed point. Small islands and rocks, coded as point features, do not have area seed points. There is no logical connection in the data between them and ceremonial units.

In addition to ceremonial boundaries, this layer includes National Park boundaries and National Park seeds making these important recreational areas identifiable.

## Layer 5 – woods and land use

This layer includes woodland margins and clearings, and woodland area seeds.

Geographical areas are identified as well as linear antiquities and Roman roads.

The inclusion of hill-forts and battlefields, radio masts, wind generators and windmills complete the information contained in this layer.

## Layer 6 – geographic names

This layer includes all cartographically positioned names from the Travelmaster map series. They have been transferred in their stored map positions.

The font and point size of the text is transferred which enables the user to define the appearance of the text.

Ordnance Survey convention for the digitising of names is as follows: all names are digitised as point features, given as X and Y National Grid coordinates. The point has been digitised relative to the map feature it describes, and the actual point will represent one of the standard positions as illustrated in figure 3.4 on the next page.

**Figure 3.4:** Standard Ordnance Survey text positions
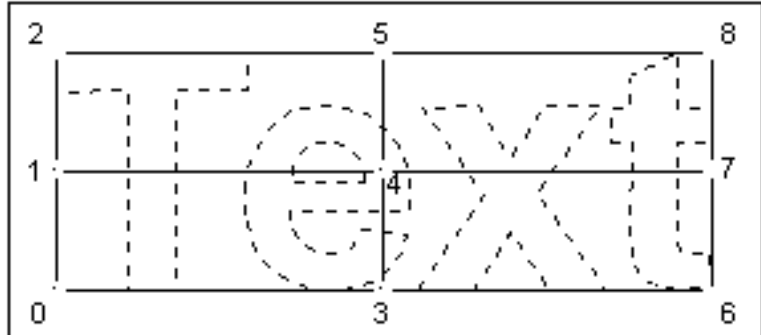


Names are normally placed on the printed map parallel to the horizontal grid. However, names of linear features are orientated to appear parallel to them, for example rivers.

| | |
|---|---|
| **DXF** | Position 0 is supplied. |

| | |
|---|---|
| BS 7567 **NTF** | The text string may start, end or be centred on this coordinate pair; the relationship of the text to its coordinate pair is expressed as an 'original digitised position'. When the position of text features are recorded, one of these positions is digitised. |

# Chapter 4 Quality statement

## Source of Strategi

Strategi data has been digitised from Ordnance Survey's published mapping at 1:250 000 scale. Originally the data was derived from the Routemaster series of mapping; Routemaster was subsequently superseded by Travelmaster, Ordnance Survey's current 1:250 000 scale printed map series. There has also been some reference, where necessary, to Ordnance Survey's Landranger® (1:50 000 scale) map series.

## Currency

Strategi updates are released annually. Each update is a replacement dataset for all Strategi tiles. The updates represent Strategi features as at a date that falls, typically, during the preceding February, with roads information advanced to the end of that year.

A replacement dataset for all Strategi tiles held under your contract will be supplied annually.

## Accuracy and resolution

The resolution of the coordinate system is 1 m. However, it is not possible to calculate meaningful accuracy limits for this data, due to both the graphic nature and scale of the source 1:250 000 scale mapping.

Such mapping is subject to map 'generalisation' – information is cartographically represented in areas where accurate positional representation would cause confusing clutter on the map.

Nevertheless, the original data was digitised to an accuracy of 0.1 mm, at scale, of the line centre of the original document. The shape of any feature is not altered within this tolerance. When the original centreline is regenerated from the original data by joining coordinates with straight lines, no point on the line should deviate from the original centre by more than 0.2 mm.

All updates of the data are carried out by an experienced cartographer using intelligence documents maintained by Ordnance Survey. New data is input using 'best fit' techniques and is subject to map generalisation as with the original data.

## Completeness

Completeness is a measure of the correspondence between the real world and the specified data content.

During digitising, all source data is checked against source documents to ensure that no features have been omitted or misaligned.

Strategi data is validated by software before release. The completeness of the geometry can be checked by either visual display or plotted output. Feature coding can be checked by visual display.

# Chapter 5  Strategi tile numbering and the National Grid

Strategi tiles are identified by the National Grid reference of the south-west corner of the area they cover. The National Grid divides Great Britain into squares 100 km by 100 km. Each of these squares has a unique two-letter reference, for example TQ in the diagram below.
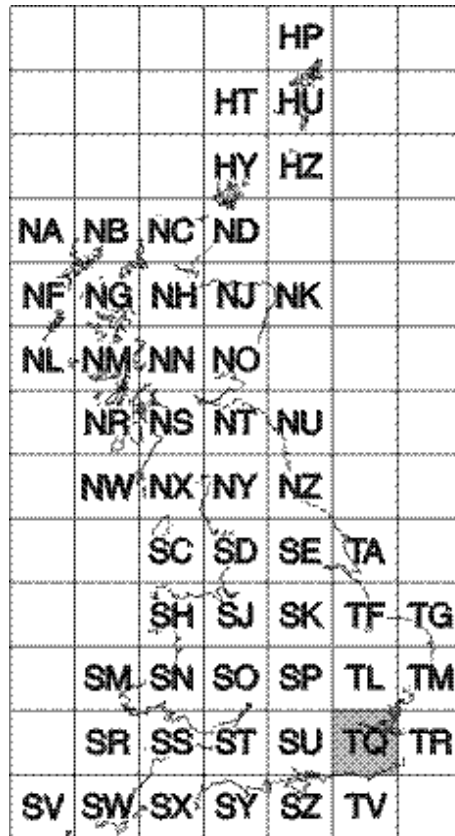


Each 50 km by 50 km tile in Strategi is identified by adding an appropriate suffix to the 100 km by 100 km square reference, for example TQ NW.
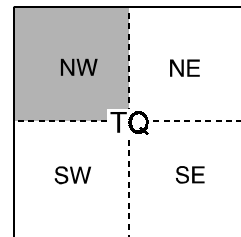
# Chapter 6  NTF explained

For convenience, BS 7567 (NTF v2.0 Level 3) is referred to as NTF.

## An overview of Strategi in NTF

Strategi data is supplied in the British Standard national format common to most of Ordnance Survey's digital map data products; namely NTF, and is transferred in Level 3 as variable length records. An overview of the data structure of a Strategi data file is shown in diagrammatic form on pages 6.4 and 6.5. The convention used for the diagrams is in the industry standard adopted for Jackson Structured Programming (JSP).

The British Standard for NTF stipulates the following for Level 3.

'This level supports a variety of data models that may include network data, polygons, semantic relationships and complex features – for example, a school consisting of its buildings, boundaries, playing fields'.

This level is designed for:

● Transferring basic geometry and simple features through the use of geometry and feature records.

● Relating basic geometrical and topological elements to one or more features through the use of chain, polygon and complex line records.

● Combining features to form complex features through the use of collection and complex polygon records.

● Using text records both to relate text strings to features and cartographic output.

● Referencing and positioning external features, for example, raster data.

The record structure at this level may also be defined to be compatible with data in Levels 1 and 2.

Chapters 6 and 7 should be read in conjunction with chapters 1, 2 and 3 which describes the content of Strategi.

The governing body for the industry standard NTF is the Association for Geographic Information (AGI).

Their address is as follows:

The Association for Geographic Information
12 Great George Street
Parliament Square
LONDON
SW1P 3AD

Phone: 020 7334 3746
Fax: 020 7334 3791
E-mail: agi@geo.ed.ac.uk

Any queries relating to the Strategi product should be referred to the Data Supply Team at the address given in Contact details at the beginning of this user guide.

The following section gives a detailed breakdown of the data structure of Strategi in NTF. This is a two stage procedure which consists of:

1.  Outline description of the data structure.

2.  Record breakdown.

# Conventions used in this user guide

Certain conventions are adopted as an aid to interpretation. In some cases the convention is dropped where the context is self-evident.

[ ]    Square brackets are placed around record names, for example [VOLHDREC].

{ }    A pair of braces denote field names, for example {REC_DESC} is the Record Descriptor Field.

[ ] 90   A two-digit number following square brackets denotes the Record Descriptor which uniquely identifies the record name between the brackets.

\<S\>    This is the space character (ASCII code 32).

\<3S\>   This denotes three successive space characters.

%     The percentage character (ASCII code 37).

## Jackson structure

Data supplied in this format has variable length records. An overview of the data format of a Strategi file in NTF is shown below. The convention used for diagramming data files is the industry standard adopted for Jackson Structured Programming (JSP).

The following diagrams are examples of Strategi files and no fixed record sequence or relationship is implied.

Key:
∗ One or more
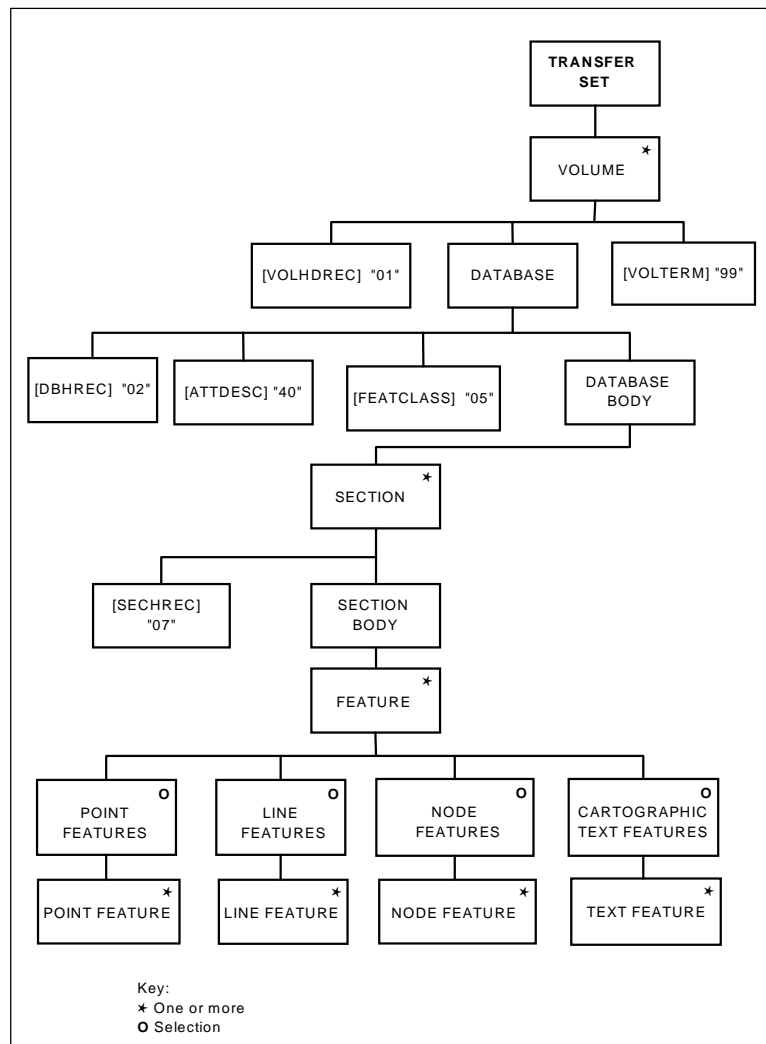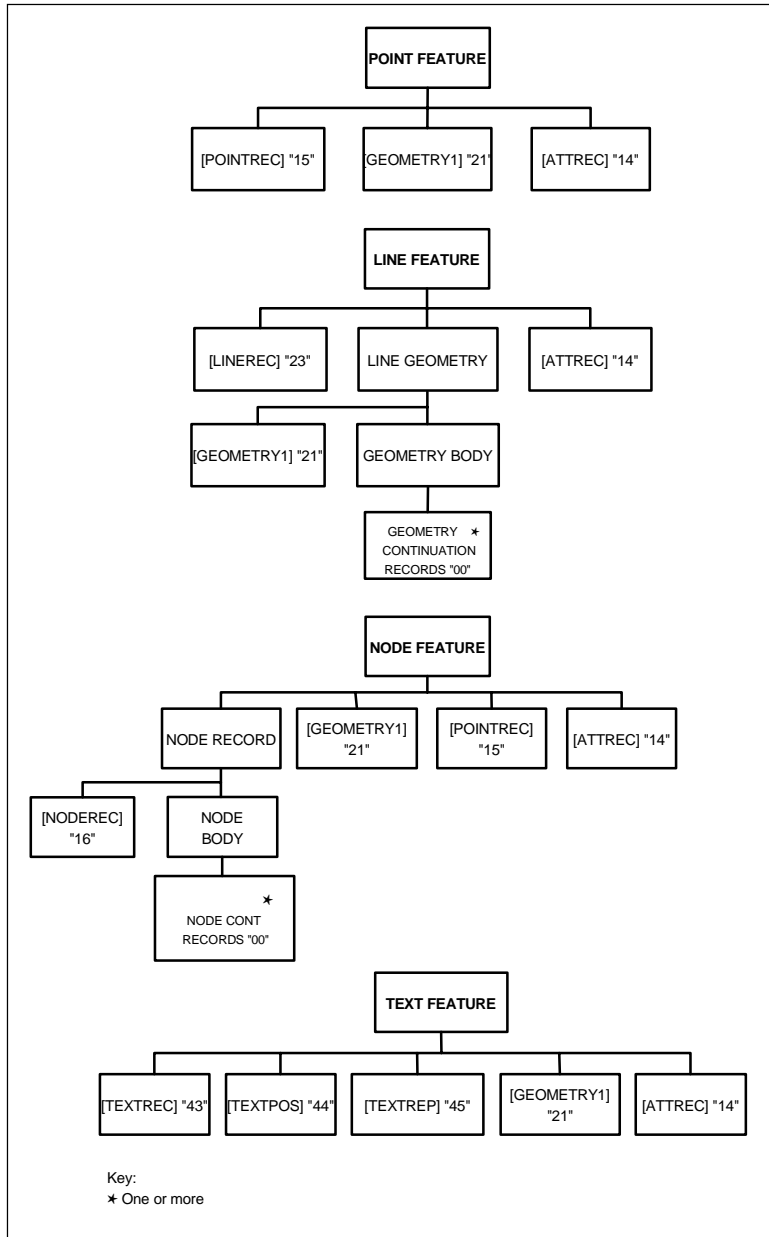
# Version management

The product version number and the release number are specified in the Database Header Record [DBHREC], as supplied in NTF.

## Product version

Each version of all Strategi products are defined by a unique **product version number** and relates to the specification of the data being supplied. The product version number takes the form **xx.yy**, where xx is the major product number, and yy is the minor change number. Thus version 02.04 would indicate that this is the major product version 02, and that this is the fourth minor amendment to the product specification.

The product specification can be found in Strategi data in the {FCNAME} field of the Database Header Record [DBHREC]. This user guide reflects the product specification current at the time of its production, that is Strategi_01.13. The effective date of this product specification is 1 August 1999 and is indicated by the {FCDATE} field of the Database Header Record [DBHREC].

## Product release

The **release number** takes the form **xx.yy**, where xx is the sequential release within a year, and yy is the year of the release. Thus release 02.99 would indicate that this is the second data release in 1999 and is indicated by the {DBNAME} field of the Database Header Record [DBHREC].

Product releases do not necessarily include a change of product version (specification).

## NTF  version

The current version is NTF v2.0 Level 3 and will be supplied until further notice. The NTF version is indicated by the {NTFVER} field of the Volume Header Record [VOLHDREC]. The effective date of the definition of NTF v2.0 in Strategi is 15 May 1992 and is indicated by the {DDATE} field of the Database Header Record [DBHREC].

# Feature information relevant to NTF

## Point  features

Point features can exist independently and at the junction or ends of lines.

There are two types of point feature which require special mention:

● **Representative point bounded (Attribute RB),** which is a point within a polygon that can be used to carry the attributes of the whole polygon.

● **Representative point unbounded (Attribute RU),** which is a point used to carry name information only.

## Line features

The first and last coordinate pairs in a line correspond exactly with the end coordinates of the adjoining line(s).

A line cannot cross from one tile to the next – it is split on the tile edge.

## Coordinates

Coordinate values and the number of coordinate pairs in a feature are transferred in the [GEOMETRY1] NTF record.

All coordinates within the data are expressed as strings of five numeric characters. Leading zeros are present to complete the five characters.

All coordinates are measured from the local origin, which is the south-west corner of the tile.

To convert coordinate data to full National Grid coordinates, add the coordinates of the feature to those of the south-west corner of the tile. The south-west corner coordinates are contained within the {X_ORIG} and {Y_ORIG} fields of the Section Header Record [SECREC] '07'.

## Bearings

Bearings are transferred in the {ORIENT} field of the Node Record [NODEREC] '16'.

Bearings are National Grid bearings, in degrees, measured clockwise from grid north.

The start of line bearing, indicated by a value of '1' in the {DIR} field of [NODEREC], is the bearing of the first segment of the line. The direction is from the start of the line to the next pair of coordinates or, if there are only two coordinate pairs, from the start to the end of the line.

The end of line bearing, indicated by a '2' in the {DIR} field, is the bearing of the last segment of the line. The direction is from the end of the feature to the last-minus-one pair of coordinates.

## Attribute codes

Attribute codes provide supplementary information on a feature, providing such qualifying information as feature code, feature name, orientation, and so on.

In NTF, the structure of user defined attributes is described in record '40' – [ATTDESC].

The actual attribute detail of a record is written in record '14' – [ATTREC].

Attributes which are used in the supply of Strategi data are:

● **FC feature code.** Contains the feature code of the feature, for example 5330 – A road, dual carriageway.

● **OR orientation.** Used to describe the orientation of a point feature from grid east, anticlockwise. If absent the feature is not deemed to have an orientation.

● **RU representative point *not bounded*** by line features, for example South Downs.

● **RB representative point *bounded*** by line features, for example a lake.

● **NU numbered feature,** for example M27 or junction number.

● **PN proper name,** for example Southampton, River Test.

● **TX independent text.** Contains the text associated with a cartographically positioned name.

● **AN airport – International.** Airports with scheduled flights to Europe and USA, for example Heathrow.

● **AO airport – other**. Airports with non-scheduled flights to Europe and USA, for example Goodwood.

● **CM county name.** For which features are located, for example Hampshire.

● **UN unitary name.** For which features are located, for example City of Southampton.

● **FF ferry from.** Shows ferry departure location.

● **FT ferry to.** Shows ferry destination.

● **FI ferry time.** Shows normal crossing time.

● **FP ferry type.** Shows the type of ferry, for example boat, catamaran.

● **FR ferry restrictions.** For example all year, seasonal.

● **FE ferry access.** Shows method of vehicular access to ferry, for example roll-on or roll-off.

# Feature layers

This section contains a list of all the valid features used within Strategi. The list contains a description of each feature, its feature type, its feature code and a list of the attributes, other than FC, **which can be associated with that feature**. The list is segmented by feature layer.

Notes:
All features carry the attribute FC as the feature code.
Rep Pt = representative point for a seeded area. All layers can contain FC 5200 – unspecified nodes.

## Layer 1 – roads, railways, airports and ferries

| Feature description | Type | Code | Associated attribute(s) |
|---|---|---|---|
| **Roads** | | | |
| Motorway | | | |
|    normal | Line | 5310 | NU |
|      – under construction | Line | 5311 | NU |
|      – over other feature | Line | 5312 | NU |
|    tunnel | Line | 5313 | PN, NU |
| | | | |
|    services | | | |
|      – full access | Point | 5360 | PN |
|      – limited access | Point | 5361 | PN |
|      – under construction | Point | 5362 | PN |
| | | | |
|    junction | | | |
|      – full access | Point | 5370 | PN, NU |
|      – limited | Point | 5371 | PN, NU |
|      – under construction | Point | 5372 | PN, NU |
| | | | |
|    multi-level junction | | | |
|      – under construction | Point | 5378 | PN |
|      – normal | Point | 5379 | PN |

Layer 1 – Roads, railways, airports and ferries (continued)

| Feature description | Type | Code | Associated attribute(s) |
|---|---|---|---|
| Primary route | | | |
| dual carriageway | Line | 5320 | PN, NU |
| – under construction | Line | 5321 | PN, NU |
| – over other feature | Line | 5322 | PN, NU |
| – roundabout | Point | 5355 | PN |
| | | | |
| single carriageway | Line | 5323 | PN, NU |
| – under construction | Line | 5324 | PN, NU |
| – over other feature | Line | 5325 | PN, NU |
| – roundabout | Point | 5375 | PN |
| | | | |
| narrow | Line | 5326 | PN, NU |
| – over other feature | Line | 5327 | PN, NU |
| | | | |
| services | | | |
| – limited access | Point | 5364 | PN |
| – full access | Point | 5365 | PN |
| – under construction | Point | 5363 | PN |
| | | | |
| tunnel | Line | 5373 | PN, NU |
| A road | | | |
| dual carriageway | Line | 5330 | PN, NU |
| – under construction | Line | 5331 | PN, NU |
| – over other feature | Line | 5332 | PN, NU |
| – roundabout | Point | 5356 | PN |
| | | | |
| single carriageway | Line | 5333 | PN, NU |
| – under construction | Line | 5334 | PN, NU |
| – over other feature | Line | 5335 | PN, NU |
| – roundabout | Point | 5376 | PN |
| | | | |
| narrow | Line | 5336 | PN, NU |
| – over other feature | Line | 5337 | PN, NU |
| | | | |
| tunnel | Line | 5358 | PN, NU |

Layer 1 – Roads, railways, airports and ferries (continued)

| Feature description | Type | Code | Associated attribute(s) |
|---|---|---|---|
| B road | | | |
| dual carriageway | Line | 5340 | PN, NU |
| – over other feature | Line | 5342 | PN, NU |
| – roundabout | Point | 5357 | PN |
| | | | |
| single carriageway | Line | 5343 | PN, NU |
| – over other feature | Line | 5345 | PN, NU |
| – roundabout | Point | 5377 | PN |
| | | | |
| narrow | Line | 5346 | PN, NU |
| – over other feature | Line | 5347 | PN, NU |
| | | | |
| tunnel | Line | 5359 | PN, NU |
| Minor or other road | | | |
| normal | Line | 5350 | - |
| – over other feature | Line | 5351 | - |
| – roundabout | Point | 5374 | - |
| | | | |
| tunnel | Line | 5353 | PN |
| | | | |
| restricted access road | Line | 5384 | - |
| restricted access road 'over' other feature | Line | 5385 | - |
| Roundabout – all roads, under construction | | 5381 | - |
| Gradient – all roads other than minor roads | | | |
| 1 in 7 or steeper | Point | 5380 | OR |
| | | | |
| Toll | Point | 5382 | - |
| Railway | | | |
| standard gauge | Line | 5510 | PN |
| – over other feature | Line | 5511 | PN |
| narrow gauge | Line | 5512 | PN |
| – over other feature | Line | 5513 | PN |
| tunnel | Line | 5514 | PN |
| railway station | Point | 5520 | PN |
| level crossing (classified roads) | Point | 5530 | - |

Layer 1 – Roads, railways, airports and ferries (continued)

| Feature description | Type | Code | Associated attribute(s) |
|---|---|---|---|
| **Airport** | | | |
| without customs facilities | Point | 5840 | PN, AN, AO, CM, UN |
| with customs facilities | Point | 5841 | PN, AN, AO, CM, UN |
| heliport | Point | 5845 | PN |
| **Ferry** | | | |
| vehicular | Line | 5390 | PN, FF, FT, FI, FP, FR, FE |
| ferry route link | Line | 5393 | PN, FF, FT, FI, FP, FR, FE |
| National trails | Line | 5825 | PN |

# Layer 2 – water features

| Feature description | Type | Code | Associated attribute(s) |
|---|---|---|---|
| **Coast** | | | |
| natural, HWM | Line | 5110 | - |
| man-made | Line | 5111 | - |
| Sea area seed | Rep Pt | 5115 | RU |
| **Foreshore area** | | | |
| sand, outer limit | Line | 5120 | |
| sand, inner limit | Line | 5494 | - |
| sand – seed | Rep Pt | 5121 | PN, RB |
| other, outer limit | Line | 5122 | - |
| other, inner limit | Line | 5495 | - |
| other – seed | Rep Pt | 5123 | PN, RB |

Layer 2 – Water features (continued)

| Feature description | Type | Code | Associated attribute(s) |
|---|---|---|---|
| Lighthouse | | | |
| in use | Point | 5140 | PN |
| disused | Point | 5142 | PN |
| | | | |
| Lightship | | | |
| normal | Point | 5141 | PN |
| | | | |
| River – primary | | | |
| source | Line | 5211 | PN |
| middle | Line | 5212 | PN |
| lower | Line | 5213 | PN |
| | | | |
| River – secondary | | | |
| source | Line | 5221 | PN |
| lower | Line | 5222 | PN |
| | | | |
| River – other | | | |
| normal | Line | 5230 | PN |
| | | | |
| Canal | | | |
| normal | Line | 5240 | - |
| tunnel | Line | 5241 | PN |
| over other feature | Line | 5242 | PN |
| | | | |
| Lake, reservoir, lochs, ponds, shoreline and other inland water | | | |
| – outer limits | Line | 5250 | - |
| – inner limit | Line | 5490 | - |
| – area seed | Rep Pt | 5251 | PN, RB |

# Layer 3 – cities, towns and other settlements

| Feature description | Type | Code | Associated attribute(s) |
|---|---|---|---|
| Settlement – primary route destination attribute | Point | 5413 | PN, CM, UN |
| – satellite node | | 5443 | PN, CM, UN |
| Settlement – non-primary route destination attribute | Point | 5416 | PN, CM, UN |
| minor settlement | Point | 5419 | PN, CM, UN |
| – includes airport without customs facilities, heliport, hotel, oil refinery and so on | | | |
| – satellite node | | 5446 | PN,CM,UN |
| Settlement – no graphic text | | | |
| main node | | 5448 | PN, CM, UN |
| satellite node | | 5447 | PN, CM, UN |
| Urban area | | | |
| large – outer limit | Line | 5420 | - |
| large – inner limit | Line | 5492 | PN, CM, UN |
| large – seed | Rep Pt | 5421 | RB |
| small – outer limit | Line | 5422 | - |
| small – inner limit | Line | 5493 | PN, CM, UN |
| small – seed | Rep Pt | 5423 | RB |

# Layer 4 – ceremonial boundaries

| Feature description | Type | Code | Associated attribute(s) |
|---|---|---|---|
| National boundary | | | |
| boundary | Line | 5710 | - |
| seed | Point | 5715 | PN, RB |
| Ceremonial county, regional or island area | | | |
| boundary | Line | 5720 | - |
| area – seed | Rep Pt | 5725 | PN, RB |
| area (det'd) – seed | Rep Pt | 5726 | PN, RB |
| National or forest park | | | |
| boundary | Line | 5820 | – |
| seed | Point | 5821 | – |

# Layer 5 – woods and land use

| Feature description | Type | Code | Associated attribute(s) |
|---|---|---|---|
| Wood, forest | | | |
| outer margin | Line | 5610 | - |
| inner limit | Line | 5491 | - |
| area – seed | Rep Pt | 5611 | PN, RB |
| Land use | | | |
| Geographical area | Rep Pt | 5620 | PN, RU |
| parks, moors, woodland headland, fens, commons plains, large hills and summits, small hills and and other physical features | | | |
| Roman road | Line | 5810 | PN |
| Antiquity line detail | Line | 5812 | PN |
| Hill-fort | Point | 5815 | PN |
| Battlefield | Point | 5816 | PN |
| Television or radio mast | Point | 5835 | - |
| Wind powered generator | Point | 5843 | - |
| Windmill | Point | 5844 | - |

# Layer 6 – geographic names

| Feature description | Feature code | Associated attribute | Font |
|---|---|---|---|
| Descriptive text | | | |
| Minor settlements – includes airport without customs facilities, heliport, hotel, oil refinery and so on | 5016 | TX | 3 |
| Water text River, lake, loch, reservoir, bay, sea, ocean and so on | 5020 | TX | 6 |
| Road numbers | | | |
| – motorway number | 5031 | TX | 1 |
| – primary route | 5032 | TX | 1 |
| – A road | 5033 | TX | 1 |
| – B road | 5034 | TX | 5 |
| Tolls | 5038 | TX | 2 |
| Settlement names | | | |
| Settlements – includes airports with customs facilities | 5040 | TX | 3 |
| Primary route destination – selected places of major traffic importance includes towns, bridges, road juctions | 5041 | TX | 8 |
| Motorway junction numbers | | | |
| full access | 5042 | TX | 3 |
| limited access | 5043 | TX | 3 |
| National trails | 5045 | TX | 2 |
| National Park names | 5046 | TX | 2 |
| Geographical area names parks, moors, woodlands, commons, moors, plains | 5060 | TX | 6 |
| Large hills and summits | 5061 | TX | 7 |
| Small hills and other physical features | 5062 | TX | 6 |

| Feature description | Feature code | Associated attribute | Font |
|---|---|---|---|
| Antiquities text | | | |
| Roman (AD43 – AD420) | 5081 | TX | 4 |
| Other | 5082 | TX | 13 |

**Note:** see appendix D for text classifications.

# Transfer set structure

The beginning of each transfer set is structured with the following 'introductory', or 'leading', records:

**Database Header Record [DBHREC]:** this gives details of:

1.  The database name.

2.  NTF release date.

3.  Feature classification table name.

4.  Release date which applies to the whole of the transfer set.

**Attribute Description Record [ATTDESC]:** this lists and gives a description of the attributes that can be applied to features within the transfer set.

**Feature Classification Record [FEATCLASS]:** this lists and gives descriptions of all possible feature codes for the transfer set.

These 'introductory' records are followed by the data requested by you, which are contained in the section.

The section consists of two parts:

**1  Section Header Record [SECHREC]:** this gives the National Grid coordinates of the section and on unformatted media informs you that a new section is starting.

**2  Section body:** this comprises all the features within the section.

# General

The following are the record definitions for the transfer of Strategi data in NTF:

● Volume Header Record [VOLHDREC]

● Database Header Record [DBHREC]

● Feature Classification Record [FEATCLASS]

● Attribute Description Record [ATTDESC]

● Section Header Record [SECHREC]

● Section body – see point and line features

   ● Name detail

   ● Node detail

● Volume Terminator Record [VOLTERM]

# Section body

This comprises all the features within the tile that correspond to the feature types selected by you.

## Point and line features

### Point feature

Each point feature is depicted by the use of the following records:

**Description in NTF**

| | |
|---|---|
| POINT RECORD | [POINTREC] |
| GEOMETRY RECORD | [GEOMETRY1] |
| ATTRIBUTE RECORD | [ATTREC] |

**Line feature**

Each line feature is depicted by the use of the following records:

**Description in NTF**

| |
|---|
| LINE RECORD |
| GEOMETRY RECORD |
| \| GEOMETRY \| |
| \| CONTINUATION \| |
| \| RECORDS \| |
| ATTRIBUTE RECORDS |

[LINEREC]
[GEOMETRY1]

[ATTREC]

**Geometry records**

Geometry records contain the coordinate position(s) in metres of the feature. Point features contain one coordinate pair; line features contain 2 or more coordinate pairs. Geometry continuation records are used where required. {X_COORDS}, {Y_COORDS} and {QPLAN} are treated as separate fields.

# Name detail

Each cartographically positioned name is depicted by the use of the following records:

**Description in NTF**

| | |
|---|---|
| TEXT RECORD | [TEXTREC] |
| TEXT POSITION RECORD | [TEXTPOS] |
| TEXT REPRESENTATION RECORD | [TEXTREP] |
| GEOMETRY RECORD | [GEOMETRY1] |
| ATTRIBUTE RECORD | [ATTREC] |

**Records**

Text details are only given when a name has been cartographically positioned. The Attribute Record [ATTREC] contains the definitive name is pointed to by the Text Record [TEXTREC].

The Text Record points to the Attribute Record and also points to the Text Position Record [TEXTPOS].

The Text Position Record refers back to the Text Record and points to the Geometry Record containing the coordinates of the digitised position. The Text Position Record also points to the Text Representation Record [TEXTREP] which contains the standard digitising position and orientation of the text.

All other names are held as attributes only.

# Node detail

**Node feature**

Each node feature is depicted by the use of the following records:

**Description in NTF**

| | |
|---|---|
| NODE RECORD | [NODEREC] |
| NODE | |
| CONTINUATION | |
| RECORD | |
| GEOMETRY RECORD | [GEOMETRY1] |
| POINT RECORD | [POINTREC] |
| ATTRIBUTE RECORD | [ATTREC] |

**Records**

Node record transfers details of the bearings and number of lines that meet at a point or node.

The Node Record contains references to each Line Record that meets at that node and to the Geometry Record. The Geometry Record is referenced by the Point Records containing the feature attributes of the node.

Where lines do not meet at a previously specified point feature, a special point feature, with an attribute 'FC' of 5200 – 'unspecified node', are created.

The Node Record can contain details of up to five line features that meet at a node. Further lines meeting at that node are written to the node continuation record.

It is important to note that, although the Node Record contains references to its appropriate point and line features, the point and line features do not contain references to the node.

# Data supply structure

**Record size**

NTF data is written to the output device in variable length records, with a maximum record length of 80 characters, which includes {CONT_MARK} and {EOR}.

**Record terminator {EOR}**

The end of record terminator is the per cent (%) (ASCII 37) character.

**Formatted media (transfer set less than media capacity)**

| |
|---|
| 01 VOLUME HEADER RECORD                    01 |
| 02 DATABASE HEADER RECORD |
| 40 ATTRIBUTE DESCRIPTION RECORD |
| 05 FEATURE CLASSIFICATION RECORD |
| 07 SECTION HEADER RECORD |
| Tile 1 data |
| 99 VOLUME TERMINATION RECORD |

| |
|---|
| 01 VOLUME HEADER RECORD                    01 |
| 02 DATABASE HEADER RECORD |
| 40 ATTRIBUTE DESCRIPTION RECORD |
| 05 FEATURE CLASSIFICATION RECORD |
| 07 SECTION HEADER RECORD |
| Tile 2 data |
| 99 VOLUME TERMINATION RECORD |
| and so on |
| Tile n data |
| 99 VOLUME TERMINATION RECORD |

## NTF record list

This list comprises the valid record types used in the Strategi NTF transfer set.

| Descriptor | Description | Record name |
|---|---|---|
| 01 | Volume Header Record – defines the donor and data type. | [VOLHDREC] |
| 02 | Database Header Record – transfers data about the database. | [DBHREC] |
| 05 | Feature Classification Record – defines data classifications. | [FEATCLASS] |
| 07 | Section Header Record – coordinate and structure types, unit scale, factors, and so on. | [SECHREC] |
| 14 | Attribute Record – defines the attributes for line and point records. | [ATTREC] |
| 15 | Point Record – identifies the definition of node points. | [POINTREC] |
| 16 | Node Record – defines the topological relationship between links and nodes. | [NODEREC] |
| 21 | Two-dimensional Geometry Record – defines the two-dimensional geometry for a link or node. | [GEOMETRY1] |
| 23 | Line Record – identifies the definition of a link. | [LINEREC] |
| 40 | Attribute Description Record – defines attribute descriptions and their fields. | [ATTDESC] |
| 43 | Text Record – identifies the Text Position Record and Attribute Record. | [TEXTREC] |
| 44 | Text Position Record – identifies the Text Representation Record and Geometry Record. | [TEXTPOS] |
| 45 | Text Representation Record – defines the font, text height and digitised position. | [TEXTREP] |
| 99 | Volume Terminator Record – defines the end of the transfer set. | [VOLTERM] |

Ordnance Survey

v4.1 – 11/1999

Strategi user guide
© Crown copyright
**Page 7.1**

Chapter 7 Record structures for the transfer of Strategi in NTF

# Volume Header Record [VOLHDREC] 01

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 01 | |
| DONOR | 03:22 | A20 | ORDNANCE SURVEY<5S> | |
| RECIPIENT | 23:42 | A20 | <20S> | Not used |
| TRANDATE | 43:50 | DATE | yyyymmdd | Date of processing |
| SERIAL | 51:54 | I4 | 0000 | Not used |
| VOLNUM | 55:56 | I2 | | Volume number 01–99 |
| NTFLEVEL | 57:57 | I1 | 3 | |
| NTFVER | 58:61 | R4.2 | 0200 | (Version 2.0) |
| NTFOR | 62:62 | A1 | V | Variable length records |
| EOR | 63:63 | A1 | % | (%) on unformatted media |
| | | | <S> | Default '%' on formatted media |
| DIVIDER | 64:64 | A1 | \ | Divider used in [ATTREC] |
| CONT_MARK | 65:65 | I1 | 0 | No continuation record |
| EOR | 66:66 | A1 | % | Record terminator |

Record example:

```
01ORDNANCE SURVEY                        1993091000000130200V \0%
  |    1    |    2    |    3    |    4    |    5    |    6    |    7    |    8
123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890
  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
```
Template

# Database Header Record [DBHREC] 02

**Record 1**

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 02 | |
| DBNAME | 03:22 | A20 | Strategi_01.99<6S> | Database name |
| DDNAME | 23:42 | A20 | DEFAULT 02.00<7S> | |
| DDATE | 43:50 | DATE | 19920515 | Release date of NTF version being used |
| DDBASE | 51:70 | A20 | <20S> | Not used |
| DDBDATE | 71:78 | DATE | 00000000 | Not used |
| CONT_MARK | 79:79 | I1 | 1 | Continuation record follows |
| EOR | 80:80 | A1 | % | Record terminator |

**Record 2**

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 00 | Continuation record |
| FCNAME | 03:22 | A20 | Strategi_01.13<6S> | Data specification |
| FCDATE | 23:30 | DATE | 19990801 | Date of data specification |
| DQNAME | 31:50 | A20 | <20S> | Not used |
| DQDATE | 51:58 | DATE | 00000000 | Not used |
| DATA_MODEL | 59:60 | I2 | 00 | |
| CONT_MARK | 61:61 | I1 | 0 | No continuation record |
| EOR | 62:62 | A1 | % | Record terminator |

Record example:

```
 02Strategi_02.96      DEFAULT_02.00        19920515                          000000001%
 00Strategi_01.00      19960801                        00000000000%
    |    1    |    2    |    3    |    4    |    5    |    6    |    7    |    8
   12345678901234567890123456789012345678901234567890123456789012345678901234567890
    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
```

Template

# Feature Classification Record [FEATCLASS] 05

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 05 | |
| FEAT_CODE | 03:06 | A4 | | Contains a four-character feature code |
| CODE_COM | 07:16 | A10 | <10S> | Not used |
| STCLASS | 17:36 | A20 | <20S> | Not used |
| FEATDES | 37:* | A* | | Feature description |
| DIVIDER | *+1:*+1 | A1 | \ | |
| CONT_MARK | *+2:*+2 | I1 | 0 | No continuation record |
| EOR | *+3:*+3 | A1 | % | Record terminator |

* = variable integer.

Record example:

```
 055310                                         Motorway\0%
|          |    1     |    2     |    3     |    4     |    5     |    6     |    7     |    8
 1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890
|     |    |     |    |     |    |     |    |     |    |     |    |     |    |     |    |     |    |
                                            Template
```

# Section Header Record [SECHREC] 07

**Record 1**

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 07 | |
| SECT_REF | 03:12 | A10 | | Section of data ordered, for example (TQSW<6S>) |
| COORD_TYP | 13:13 | I1 | 2 | Rectangular |
| STRUC_TYP | 14:14 | I1 | 1 | Vector |
| XYLEN | 15:19 | I5 | 00005 | Five-character coord fields |
| XY_UNIT | 20:20 | I1 | 2 | Metres |
| XY_MULT | 21:30 | R10.3 | 0000001000 | Default |
| Z_LEN | 31:35 | I5 | 00000 | Not used |
| Z_UNIT | 36:36 | I1 | 0 | Not used |
| Z_MULT | 37:46 | R10.3 | 0000001000 | Not used |
| X_ORIG | 47:56 | I10 | | X coordinate of SW corner of unit |
| Y_ORIG | 57:66 | I10 | | Y coordinate of SW corner of unit |
| Z_DATUM | 67:76 | I10 | 0000000000 | Not used |
| CONT_MARK | 77:77 | I1 | 1 | Continuation record follows |
| EOR | 78:78 | A1 | % | Record terminator |

**Record 2**

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 00 | Continuation record |
| XMIN | 03:12 | I10 | 0000000000 | |
| YMIN | 13:22 | I10 | 0000000000 | |
| XMAX | 23:32 | I10 | 0000050000 | |
| YMAX | 33:42 | I10 | 0000050000 | |
| XY_ACC | 43:47 | R5.2 | 00000 | Not used |
| Z_ACC | 48:52 | R5.2 | 00000 | Not used |
| SURV_DATE | 53:60 | DATE | 00000000 | Not used |
| LAST_AMND | 61:68 | DATE | yyyymmdd | Date last amended |
| COPYRIGHT | 69:76 | DATE | yyyymmdd | Copyright date |
| CONT_MARK | 77:77 | I1 | 0 | No continuation record |
| EOR | 78:78 | A1 | % | Record terminator |

Record example:

```
07SSNE      210000520000001000000000000000001000000025000000001500000000000000001%
0000000000000000000000000000050000000005000000000000000000000019930501199307140%
 |     1    |     2    |     3    |     4    |     5    |     6    |     7    |    8
 1234567890123456789012345678901234567890123456789012345678901234567890123456789 0
 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
```
Template

# Attribute Record [ATTREC] 14

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 14 | |
| ATT_ID | 03:08 | I6 | | Given in [POINTREC] or [LINEREC] |
| | 09: * | * | | (fields) |

**Attribute Record: Point**

All point records have a **FC** attribute. The following attributes are optional:

| | | | | |
|---|---|---|---|---|
| **OR** | Orientation | | **FF** | Ferry from |
| **RB** | Representative point bounded | | **FT** | Ferry to |
| **RU** | Representative point unbounded | | **FI** | Ferry time |
| **PN** | Proper name | | **FP** | Ferry type |
| **AN** | Airport – International | | **FR** | Ferry restrictions |
| **AO** | Airport – other | | **FE** | Ferry access |
| **CM** | County name | | | |
| **UN** | Unitary name | | | |

**Point Record example:**

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 14 | |
| ATT_ID | 03:08 | I6 | 000001 | |

**First attribute: Feature code**

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| VAL_TYPE | 09:10 | A2 | FC | Feature code |
| VALUE | 11:14 | I4 | 5611 | Woodland seed |

**Second attribute: Bounded representative point**

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| VAL_TYPE | 15:16 | A2 | RB | Representative point |
| VALUE | 17:17 | A1 | 0 | Dummy argument |

Ordnance Survey

**Third attribute: Proper name**

| Field | Position | Format | Value example | Description |
|-------|----------|--------|---------------|-------------|
| VAL_TYPE | 18:19 | A2 | PN | Representative point |
| VALUE | 20:34 | A15 | SHERWOOD FOREST | |
| DIVIDER | 35:35 | A1 | \ | |
| CONT_MARK | 36:36 | I1 | 0 | No continuation record |
| EOR | 37:37 | A1 | % | Record terminator |

Would appear as:

```
14000001FC5611RBOPNSHERWOOD FOREST\0%
```

Other examples of use of ATTREC for point features:

```
14000002FC5115RU00%
```
This indicates {ATT_ID} 2, feature code 5115: the sea, which is a representative point of an unbounded area.

```
14000003FC5520PNSOUTHAMPTON PARKWAY\0%
```
This indicates {ATT_ID} 3, feature code 5520: a railway station, with the proper name of Southampton Parkway.

```
14000015FC5380OR08500%
```
This indicates {ATT_ID} 15, feature code 5380: a gradient 1 in 7 or steeper, symbol orientated at 85.0 degrees.

**Attribute Record: Line**
All line records will have the following attribute:
  FC**: Feature code**
The following attributes are optional:
  PN**: Proper name**
  NU**: Numbered feature**

Note: Because the PN and NU attributes are of variable length, they are placed last in the attribute list. It is possible for a feature to have both PN and NU attributes, although with the current structure of 1:250 000 scale data this does not happen at present. An example of a dual text attribute would be A 4091, HIGH STREET converted to NUA 4091\PN HIGH STREET.

**Line record example:**

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 14 | |
| ATT_ID | 03:08 | I6 | 000001 | |

**First attribute: Feature code**

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| VAL_TYPE | 09:10 | A2 | FC | Feature code |
| VALUE | 11:14 | I4 | 5810 | Roman road |

**Second attribute: Proper name**

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| VAL_TYPE | 15:16 | A2 | PN | Proper name |
| VALUE | 17:30 | A14 | WATLING STREET | |
| DIVIDER | 31:31 | A1 | \ | |
| CONT_MARK | 32:32 | I1 | 0 | No continuation record |
| EOR | 33:33 | A1 | % | Record terminator |

Would appear as:
14000001FC5810PNWATLING STREET\0%

Other examples of use of ATTREC for line features:

14000002FC5310NUM 27\0%
This indicates {ATT_ID} 2, feature code 5310: Motorway with road number M27.

14000003FC5825PNDORSET COAST PATH\0%
This indicates {ATT_ID} 3, feature code 5825: Long-distance footpath named Dorset Coast Path.

**Text record example:**

| Field | Position | Format | Value example | Description |
|-------|----------|--------|---------------|-------------|
| REC_DESC | 01:02 | A2 | 14 | |
| ATT_ID | 03:08 | I6 | 000001 | |

**First attribute: Feature code**

| | | | | |
|-------|----------|--------|---------------|-------------|
| VAL_TYPE | 09:10 | A2 | FC | Feature code |
| VALUE | 11:14 | I4 | 5040 | Positioned name |

**Second attribute: Independent text**

| | | | | |
|-------|----------|--------|---------------|-------------|
| VAL_TYPE | 15:16 | A2 | TX | Independent text |
| VALUE | 17:28 | A12 | CUDDER POINT | |
| DIVIDER | 29:29 | A1 | \ | |
| CONT_MARK | 30:30 | I1 | 0 | No continuation record |
| EOR | 31:31 | A1 | % | Record terminator |

Record example:

```
14000001FC5040TXCUDDER POINT\0%
       |    1    |    2    |    3    |    4    |    5    |    6    |    7    |    8
       12345678901234567890123456789012345678901234567890123456789012345678901234567890
       |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
```
Template

Ordnance Survey

# Point Record [POINTREC] 15

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 15 | |
| POINT_ID | 03:08 | I6 | | Sequential number of Point Record – starting at 000001. |
| GEOM_ID | 09:14 | I6 | | Sequential number of [GEOMETRY1] record – starting at 000001. |
| NUM_ATT | 15:16 | I2 | 01 | |
| ATT_ID | 17:22 | I6 | | Sequential number of [ATTREC] record – starting at 000001. If the point feature has no associated [ATTREC], then {ATT_ID} is set to 000000. |
| CONT_MARK | 23:23 | I1 | 0 | No continuation record |
| EOR | 24:24 | A1 | % | Record terminator |

Record example:

```
150004880048040010048040%
|    1    |    2    |    3    |    4    |    5    |    6    |    7    |    8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
|    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
                                    Template
```

# Node Record [NODEREC] 16

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 16 | |
| NODE_ID | 03:08 | I6 | | Sequential number of Node Record, starting at 000001. |
| GEOM_ID_OF_POINT | 09:14 | I6 | | Identity of a [GEOMETRY1] record containing the position of the node. |
| NUM_LINKS | 15:18 | I4 | | Number of links that meet at the node, on Ordnance Survey 1:250 000 scale data the maximum is 9. |

The following fields are the detail pertaining to each link – they are repeated as many times as the value of {NUM_LINKS}. Node records, with {NUM_LINKS} greater than 5, require a continuation record starting with 00 {REC_DESC}.

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| DIR | 19:19 | I1 | | 1 if the start of a line, 2 if the end of a line. |
| GEOM_ID_OF_LINK | 20:25 | I6 | | {GEOM_ID} of linked feature |
| ORIENT | 26:29 | R4,1 | | Bearing, measured clockwise from grid north, of the first or last segment of the linked feature. |
| LEVEL | 30:30 | I1 | | Relative levels of the links on the ground; always 1 (default) for level features; 'over' information by feature code. |

At the record end:

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| CONT_MARK | *:* | I1 | 0 | No continuation record or |
| | | | 1 | Continuation record follows |
| EOR | *+1:*+1 | A1 | % | Record terminator |

* = variable integer.

Record example:

```
160028960048040000420049212260120050343200110050350450110052101650 10%
       |    1    |    2    |    3    |    4    |    5    |    6    |    7    |    8
1234567890123456789012345678901234567890123456789012345678901234567890123456789 0
       |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
```
Template

# Geometry Record [GEOMETRY1] 21

**GEOMETRY1 associated with POINTREC**

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 21 | |
| GEOM_ID | 03:08 | I6 | | Sequential number of [GEOMETRY1] record – starting at 000001. |
| GTYPE | 09:09 | I1 | 1 | Point feature |
| NUM_COORD | 10:13 | I4 | 0001 | Point has 1 coordinate pair |
| X_COORD | 14:18 | I5 | | X coordinate |
| Y_COORD | 19:23 | I5 | | Y coordinate |
| QPLAN | 24:24 | A1 | <S> | Not used |
| CONT_MARK | 25:25 | I1 | 0 | No continuation record |
| EOR | 26:26 | A1 | % | Record terminator |

**GEOMETRY1 associated with LINEREC**

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 21 | |
| GEOM_ID | 03:08 | I6 | | Sequential number of [GEOMETRY1] record – starting at 000001. |
| GTYPE | 09:09 | I1 | 2 | Line feature |
| NUM_COORD | 10:13 | I4 | | Number of coordinates pairs, in the range 0002–9999. |
| X_COORD | 14:18 | I5 | | X coordinate. (Repeated until {NUM_COORD} has been transferred). |
| Y_COORD | 19:23 | I5 | | Y coordinate. (Repeated until {NUM_COORD} has been transferred). |
| QPLAN | 24:24 | A1 | <S> | Not used |
| CONT_MARK | *:* | I1 | 0 | No continuation record or |
| | | | 1 | Continuation record follows |
| EOR | *+1:*+1 | A1 | % | Record terminator |

This record may contain many CONTINUATION 00 records.
* = variable integer.

Ordnance Survey

Note: {X_COORD} and {Y_COORD} are given in metres from the SW corner of the rectangular area defined in [SECHREC]. {X_COORD} and {Y_COORD} have a value between 0 and 50 000. {X_COORD} and {Y_COORD} have been redefined as I5 fields in field {XYLEN} in record [SECHREC].

Record example:

```
210048041000115640440330 0%
     |    1    |    2    |    3    |    4    |    5    |    6    |    7    |    8
1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890
     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
                                    Template
```

Ordnance Survey

# Line Record [LINEREC] 23

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 23 | |
| LINE_ID | 03:08 | I6 | | Sequential number of [LINEREC] record – starting at 000001. |
| GEOM_ID | 09:14 | I6 | | Sequential number identifier of attached [GEOMETRY1] record – starting at 000001. |
| NUM_ATT | 15:16 | I2 | 01 | |
| ATT_ID | 17:22 | I6 | | Sequential number of attached [ATTREC] record – starting at 000001. If the line feature has no associated [ATTREC] then {ATT_ID} is set to 000000. |
| CONT_MARK | 23:23 | I1 | 0 | No continuation record |
| EOR | 24:24 | A1 | % | Record terminator |

Record example:

```
2300480400536901005369 0%
        |      1        |        2        |        3        |        4        |        5        |        6        |        7        |        8
123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890
        |      |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
                                        Template
```

# Attribute Description Record [ATTDESC] 40

**Numbered feature – NU**

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 40 | |
| VAL_TYPE | 03:04 | A2 | NU | |
| FWIDTH | 05:07 | A3 | <3S> | Variable |
| FINTER | 08:12 | A5 | A* | Variable length character |
| ATT_NAME | 13:28 | A16 | NUMBERED FEATURE | |
| DIVIDER | 29:29 | A1 | \ | |
| FDESC | 30:57 | A28 | ROAD & ROAD JUNCTION NUMBERS | |
| DIVIDER | 58:58 | A1 | \ | |
| CONT_MARK | 59:59 | I1 | 0 | No continuation record |
| EOR | 60:60 | A1 | % | Record terminator |

**Representative point 'bounded' – RB**

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 40 | |
| VAL_TYPE | 03:04 | A2 | RB | |
| FWIDTH | 05:07 | A3 | 001 | |
| FINTER | 08:12 | A5 | A1 | |
| ATT_NAME | 13:40 | A28 | BOUNDED REPRESENTATIVE POINT | |
| DIVIDER | 41:41 | A1 | \ | |
| FDESC | 42:71 | A30 | POINT SEEDING BOUNDED FEATURES | |
| DIVIDER | 73:73 | A1 | \ | |
| CONT_MARK | 74:74 | I1 | 0 | No continuation record |
| EOR | 75:75 | A1 | % | Record terminator |

**Representative point 'unbounded' – RU**

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 40 | |
| VAL_TYPE | 03:04 | A2 | RU | |
| FWIDTH | 05:07 | A3 | 001 | |
| FINTER | 08:12 | A5 | A1 | |
| ATT_NAME | 13:42 | A30 | UNBOUNDED REPRESENTATIVE POINT | |
| DIVIDER | 43:43 | A1 | \ | |
| FDESC | 44:75 | A32 | POINT SEEDING UNBOUNDED FEATURES | |
| DIVIDER | 76:76 | A1 | \ | |
| CONT_MARK | 77:77 | I1 | 0 | No continuation record |
| EOR | 78:78 | A1 | % | Record terminator |

**Feature code – FC**

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 40 | |
| VAL_TYPE | 03:04 | A2 | FC | |
| FWIDTH | 05:07 | A3 | 004 | |
| FINTER | 08:12 | A5 | I4 | |
| ATT_NAME | 13:24 | A12 | FEATURE CODE | |
| DIVIDER | 25:25 | A1 | \ | |
| FDESC | 26:45 | A20 | NUMERIC FEATURE CODE | |
| DIVIDER | 46:46 | A1 | \ | |
| CONT_MARK | 47:47 | I1 | 0 | No continuation record |
| EOR | 48:48 | A1 | % | Record terminator |

Ordnance Survey

**Proper name – PN**

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 40 | |
| VAL_TYPE | 03:04 | A2 | PN | |
| FWIDTH | 05:07 | A3 | <3S> | Variable |
| FINTER | 08:12 | A5 | A* | Variable length character |
| ATT_NAME | 13:23 | A11 | PROPER NAME | |
| DIVIDER | 24:24 | A1 | \ | |
| FDESC | 25:39 | A15 | DEFINITIVE NAME | |
| DIVIDER | 40:40 | A1 | \ | |
| CONT_MARK | 41:41 | I1 | 0 | No continuation record |
| EOR | 42:42 | A1 | % | Record terminator |

**Orientation – OR**

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 40 | |
| VAL_TYPE | 03:04 | A2 | OR | |
| FWIDTH | 05:07 | A3 | 004 | |
| FINTER | 08:12 | A5 | R4,1 | |
| ATT_NAME | 13:23 | A11 | ORIENTATION | |
| DIVIDER | 24:24 | A1 | \ | |
| FDESC | 25:35 | A11 | ORIENTATION | |
| DIVIDER | 36:36 | A1 | \ | |
| CONT_MARK | 37:37 | I1 | 0 | No continuation record |
| EOR | 38:38 | A1 | % | Record terminator |

Ordnance Survey

**Independent text – TX**

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 40 | |
| VAL_TYPE | 03:04 | A2 | TX | |
| FWIDTH | 05:07 | A3 | <3S> | Variable |
| FINTER | 08:12 | A5 | A* | Variable length character |
| ATT_NAME | 13:16 | A4 | TEXT | |
| DIVIDER | 17:17 | A1 | \ | |
| FDESC | 18:33 | A16 | INDEPENDENT TEXT | |
| DIVIDER | 34:34 | A1 | \ | |
| CONT_MARK | 35:35 | I1 | 0 | No continuation record |
| EOR | 36:36 | A1 | % | Record terminator |

**Airport – International – AN**

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 40 | |
| VAL_TYPE | 03:04 | A2 | AN | |
| FWIDTH | 05:07 | A3 | <3S> | Variable |
| FINTER | 08:12 | A5 | A* | Variable length character |
| ATT_NAME | 13:25 | A13 | INTERNATIONAL | |
| DIVIDER | 26.26 | A1 | \ | |
| FDESC | 27.52 | A26 | AIRPORT INTERNATIONAL FLAG | |
| DIVIDER | 53.53 | A1 | \ | |
| CONT_MARK | 54.54 | I1 | 0 | No continuation record |
| EOR | 55.55 | A1 | % | Record terminator |

Ordnance Survey

**Airport – other – AO**

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 40 | |
| VAL_TYPE | 03:04 | A2 | AO | |
| FWIDTH | 05:07 | A3 | <3S> | Variable |
| FINTER | 08:12 | A5 | A* | Variable length character |
| ATT_NAME | 13:17 | A5 | OTHER | |
| DIVIDER | 18.18 | A1 | \ | |
| FDESC | 19.36 | A18 | AIRPORT OTHER FLAG | |
| DIVIDER | 37.37 | A1 | \ | |
| CONT_MARK | 38.38 | I1 | 0 | No continuation record |
| EOR | 39.39 | A1 | % | Record terminator |

**County name – CM**

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 40 | |
| VAL_TYPE | 03:04 | A2 | CM | |
| FWIDTH | 05:07 | A3 | <3S> | Variable |
| FINTER | 08:12 | A5 | A* | Variable length character |
| ATT_NAME | 13:23 | A11 | COUNTY NAME | |
| DIVIDER | 24.24 | A1 | \ | |
| FDESC | 25.35 | A11 | COUNTY NAME | |
| DIVIDER | 36.36 | A1 | \ | |
| CONT_MARK | 37.37 | I1 | 0 | No continuation record |
| EOR | 38.38 | A1 | % | Record terminator |

**Unitary authority name – UN**

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 40 | |
| VAL_TYPE | 03:04 | A2 | UN | |
| FWIDTH | 05:07 | A3 | <3S> | Variable |
| FINTER | 08:12 | A5 | A* | Variable length character |
| ATT_NAME | 13:24 | A12 | UNITARY NAME | |
| DIVIDER | 25.25 | A1 | \ | |
| FDESC | 26.47 | A22 | UNITARY AUTHORITY NAME | |
| DIVIDER | 48.48 | A1 | \ | |
| CONT_MARK | 49.49 | I1 | 0 | No continuation record |
| EOR | 50.50 | A1 | % | Record terminator |

**Owner – OW**

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 40 | |
| VAL_TYPE | 03:04 | A2 | OW | |
| FWIDTH | 05:07 | A3 | <3S> | |
| FINTER | 08:12 | A5 | A* | |
| ATT_NAME | 13:17 | A5 | OWNER | |
| DIVIDER | 18:18 | A1 | \ | |
| FDESC | 19:23 | A5 | OWNER | |
| DIVIDER | 24:24 | A1 | \ | |
| CONT_MARK | 25:25 | I1 | 0 | No continuation record |
| EOR | 26:26 | A1 | % | Record terminator |

**Ferry from – FF**

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 40 | |
| VAL_TYPE | 03:04 | A2 | FF | |
| FWIDTH | 05:07 | A3 | <3S> | |
| FINTER | 08:12 | A5 | A* | |
| ATT_NAME | 13:22 | A10 | FERRY FROM | |
| DIVIDER | 23:23 | A1 | \ | |
| FDESC | 24:33 | A10 | FERRY FROM | |
| DIVIDER | 34:34 | A1 | \ | |
| CONT_MARK | 35:35 | I1 | 0 | No continuation record |
| EOR | 36:36 | A1 | % | Record terminator |

**Ferry to – FT**

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 40 | |
| VAL_TYPE | 03:04 | A2 | FT | |
| FWIDTH | 05:07 | A3 | <3S> | |
| FINTER | 08:12 | A5 | A* | |
| ATT_NAME | 13:20 | A8 | FERRY TO | |
| DIVIDER | 21:21 | A1 | \ | |
| FDESC | 22:29 | A8 | FERRY TO | |
| DIVIDER | 30:30 | A1 | \ | |
| CONT_MARK | 31:31 | I1 | 0 | No continuation record |
| EOR | 32:32 | A1 | % | Record terminator |

**Ferry time – FI**

| Field | Position | Format | Value example | Description |
|-------|----------|--------|---------------|-------------|
| REC_DESC | 01:02 | A2 | 40 | |
| VAL_TYPE | 03:04 | A2 | FI | |
| FWIDTH | 05:07 | A3 | <3S> | |
| FINTER | 08:12 | A5 | A* | |
| ATT_NAME | 13:22 | A10 | FERRY TIME | |
| DIVIDER | 23:23 | A1 | \ | |
| FDESC | 24:33 | A10 | FERRY TIME | |
| DIVIDER | 34:34 | A1 | \ | |
| CONT_MARK | 35:35 | I1 | 0 | No continuation record |
| EOR | 36:36 | A1 | % | Record terminator |

**Ferry type – FP**

| Field | Position | Format | Value example | Description |
|-------|----------|--------|---------------|-------------|
| REC_DESC | 01:02 | A2 | 40 | |
| VAL_TYPE | 03:04 | A2 | FP | |
| FWIDTH | 05:07 | A3 | <3S> | |
| FINTER | 08:12 | A5 | A* | |
| ATT_NAME | 13:22 | A10 | FERRY TYPE | |
| DIVIDER | 23:23 | A1 | \ | |
| FDESC | 24:33 | A10 | FERRY TYPE | |
| DIVIDER | 34:34 | A1 | \ | |
| CONT_MARK | 35:35 | I1 | 0 | No continuation record |
| EOR | 36:36 | A1 | % | Record terminator |

Ordnance Survey

**Ferry Restrictions – FR**

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 40 | |
| VAL_TYPE | 03:04 | A2 | FR | |
| FWIDTH | 05:07 | A3 | <3S> | |
| FINTER | 08:12 | A5 | A* | |
| ATT_NAME | 13:30 | A18 | FERRY RESTRICTIONS | |
| DIVIDER | 31:31 | A1 | \ | |
| FDESC | 32:49 | A18 | FERRY RESTRICTIONS | |
| DIVIDER | 50:50 | A1 | \ | |
| CONT_MARK | 51:51 | I1 | 0 | No continuation record |
| EOR | 52:52 | A1 | % | Record terminator |

**Ferry access – FE**

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 40 | |
| VAL_TYPE | 03:04 | A2 | FE | |
| FWIDTH | 05:07 | A3 | <3S> | |
| FINTER | 08:12 | A5 | A* | |
| ATT_NAME | 13:24 | A12 | FERRY ACCESS | |
| DIVIDER | 24:24 | A1 | \ | |
| FDESC | 25:36 | A12 | FERRY ACCESS | |
| DIVIDER | 37:37 | A1 | \ | |
| CONT_MARK | 38:38 | I1 | 0 | No continuation record |
| EOR | 39:39 | A1 | % | Record terminator |

Record example:

```
40NU  A*   NUMBERED FEATURE\ROAD & ROAD JUNCTION NUMBERS\0%
     |    1    |    2    |    3    |    4    |    5    |    6    |    7    |    8
     12345678901234567890123456789012345678901234567890123456789012345678901234567890
     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
```
Template

# Text Record [TEXTREC] 43

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 43 | |
| TEXT_ID | 03:08 | I6 | | Sequential number of [TEXTREC]. |
| NUM_SEL | 09:10 | I2 | 01 | |
| SELECT | 11:12 | A2 | 00 | |
| TEXT_CODE | 13:16 | A4 | 0000 | |
| TEXP_ID | 17:22 | I6 | | Sequential number of [TEXTPOS] starting at 000001. |
| NUM_ATT | 23:24 | I2 | 01 | |
| ATT_ID | 25:30 | I6 | | Next sequential number of [ATTREC]. |
| CONT_MARK | 31:31 | I1 | 0 | No continuation record |
| EOR | 32:32 | A1 | % | Record terminator |

Record example:

```
430000030100000000000030100026670%
|      1     |     2     |     3     |     4     |     5     |     6     |     7     |     8
1234567890123456789012345678901234567890123456789012345678901234567890
|   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
                              Template
```

# Text Position Record [TEXTPOS] 44

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 44 | |
| TEXP_ID | 03:08 | I6 | | Cross reference from [TEXTREC]. |
| NUM_TEXR | 09:10 | I2 | 01 | |
| TEXR_ID | 11:16 | I6 | | Sequential number of [TEXTREP] starting at 000001. |
| GEOM_ID | 17:22 | I6 | | Field contains the {GEOM_ID} of the [GEOMETRY1] record that contains the coordinates of the igitised position of the name. |
| CONT_MARK | 23:23 | I1 | 0 | No continuation record |
| EOR | 24:24 | A1 | % | Record terminator |

Record example:

```
440000030100000300002670%
|    1    |    2    |    3    |    4    |    5    |    6    |    7    |    8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
|    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
                                  Template
```

# Text Representation Record [TEXTREP] 45

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 45 | |
| TEXR_ID | 03:08 | I6 | | Cross reference from [TEXTPOS]. |
| FONT | 09:12 | I4 | 0001–0008 | |
| TEXT_HT | 13:15 | R3,1 | 008–050 | Height in millimetres. |
| DIG_POSTN | 16:16 | I1 | | Standard Ordnance Survey digitising position 0–8. |
| ORIENT | 17:20 | R4,1 | | Measured anticlockwise from grid east in the range 0000–3599. |
| CONT_MARK | 21:21 | I1 | 0 | No continuation record |
| EOR | 22:22 | A1 | % | Record terminator |

Record example:

```
450000030004008300000%
```

|   | 1 |   | 2 |   | 3 |   | 4 |   | 5 |   | 6 |   | 7 |   | 8 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890

Template

# Volume Terminator Record [VOLTERM] 99

| Field | Position | Format | Value example | Description |
|---|---|---|---|---|
| REC_DESC | 01:02 | A2 | 99 | |
| FREE_TEXT | 03:* | A* | | See note below |
| CONT_VOL | *+1:*+1 | I1 | 0 | No continuation volume or |
| | | | 1 | Continuation volume follows |
| EOR | *+2:*+2 | A1 | % | Record terminator |

Notes: If there are further volume(s) to follow then the FREE_TEXT field comprises the following message:
'End Of Volume (nn). Transfer Set Continues On Volume (nn+1)'

If there are no further volumes then the FREE_TEXT field will READ:
'End Of Transfer Set'

\* = variable integer

Record example:

```
99End Of Volume 01 Transfer Set Continues On Volume 021%
99End Of Transfer Set0%
   |    1    |    2    |    3    |    4    |    5    |    6    |    7    |    8
123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890
   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
                                   Template
```

# Chapter 8  DXF explained

## Introduction

The purpose of chapters 8 and 9 is to:

● Provide a brief description of the presentation of Strategi in the DXF transfer format.

　● Drawing Exchange Format (DXF) (conforming to AutoCAD release 12 with extended entity data).

As part of this description, data structure diagrams are used to give greater explanation where necessary.

● Provide Licensed Partners with as much detail as necessary to enable Strategi files in DXF to be easily understood and processed by application software.

The term 'data structure' used in these chapters refers to the organisation and sequence of the records in the data file and **not** to the geographical topology of the data.

These chapters should be read in conjunction with chapters 1 to 3 which describes the content of Strategi.

# An overview of the Strategi in DXF

## Drawing Exchange Format (DXF)

Strategi is available in DXF, conforming to AutoCAD release 12 using extended entity data to store attributes. The transfer format is that defined by the NEDO Working Party for the exchange of two-dimensional drawings in the construction industry. An overview of the data structure of a Strategi file in DXF is shown below.
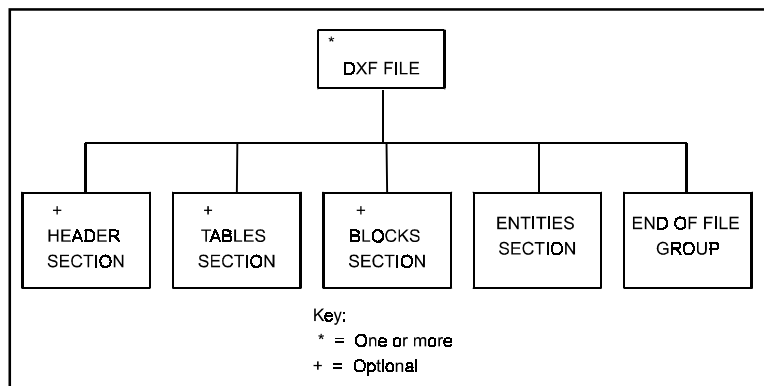


# Structure of Strategi in DXF

Strategi has a limited 'link and node' data structure; within this structure a feature may be a name, a point, or a line (or series of lines forming a coherent unit). Each feature is free-standing; that is, its topological relationship to any other feature is **not** expressed in the data.

# Feature representation

Features are classified by type and each type is placed in a separate DXF layer.

## Line features

A feature is a subjective entity; that is, so long as the constituent lines are of the same description (layer), a feature need not fully describe a logical piece of detail.

The extent of a feature is determined by digitising conventions and does not always coincide with the topology. Each linear feature is composed of a string of XY coordinate pairs implicitly joined by straight lines.

The colour and line weights of some layers may differ when DXF is used with certain software packages.

## Area features

Area features are not defined within vector link and node data. Features which might be thought of as 'areas' are treated in the data as linear features, for example a woodland outline is treated as a polyline in layer G8065610.

## Name features

Name features are treated as free-standing text data. There is no explicit relationship (in the data) between a text feature and the point or line feature to which it belongs.

Ordnance Survey distinguishes between layer name types, for example motorway numbers and water names – by placing each name type in a separate DXF layer.

Text has position, expressed as a single coordinate pair, held as X and Y offsets from the map origin (SW corner). Text which is double- or treble-banked is treated as two or three separate features. The text string may be considered to be contained within an 'envelope' whose bottom left corner is positioned on this coordinate pair. Text is oriented, that is, it may run from west to east across the map, or it may be plotted at some other angle measured anticlockwise from grid east.

# Information specific to DXF

## Coordinate system

The coordinate system is the National Grid.

The coordinates are to a resolution of 0.01 m. This is the resolution of the source data.

## Height

No height attributes are applied to any feature.

## Layer names

*Layer Naming Convention for CAD in the Construction Industry Version 2*, which is based upon the guidelines laid down in BS 1192: Part 5 – *Guide for structuring of computer graphic information* has been adopted.

Each layer name is an eight character string. The first four characters relate to the AUG/Autodesk® system, with G (GIS) as the source of the information, and 800–899 as the part code. This product is **G806**.

The remaining four digits relate to existing Ordnance Survey digital map data in their own NTF system and are leading zero filled.

For example:

G8065310 – Motorways

## Neatline

Neatline around the extent of the map data are added as lines in the ENTITIES section, (layer name G8060572).

## Grid

A grid is added as lines in the ENTITIES section (layer name G8060572). The grid is created by the translator and therefore must be specified before the translation takes place.

## Grid values

Full 100 000 metre National Grid easting and northing values followed by an 'm' are added as text strings in the ENTITIES section, (layer name G8060573) at each corner of the map extent either horizontal or vertical to read from the lower left corner of the tile.

Intermediate grid values are shown as multiples of 10 000 metres from the nearest 100 km National Grid, (layer name G8060572). These are horizontal.

# Strategi DXF layers

Ordnance Survey categorises map features into layers, the number of layers depends on the specific map content and the product specification.

| Layer name | Description | Linetype | Line weight | Entity | Colour | Block |
|---|---|---|---|---|---|---|
| | A road | | | | | |
| G8065330 | dual carriageway | CONTINUOUS | 2 | POLYLINE | RED | |
| G8065332 | – over other feature | CONTINUOUS | 2 | POLYLINE | RED | |
| G8065356 | – roundabout | CONTINUOUS | | INSERT | RED | RBOUT |
| G8065331 | – under construction | DASHED | 2 | POLYLINE | RED | |
| G8065336 | narrow | CONTINUOUS | 1 | POLYLINE | RED | |
| G8065337 | – over other feature | CONTINUOUS | 1 | POLYLINE | RED | |
| G8065333 | single carriageway | CONTINUOUS | 1 | POLYLINE | RED | |
| G8065335 | – over other feature | CONTINUOUS | 1 | POLYLINE | RED | |
| G8065376 | – roundabout | CONTINUOUS | | INSERT | RED | RBOUT |
| G8065334 | – under construction | DASHED | 1 | POLYLINE | RED | |
| | Airport | | | | | |
| G8065841 | with customs facilities | CONTINUOUS | | INSERT | GREEN | AIRCUST |
| G8065840 | without customs facilities | CONTINUOUS | | INSERT | RED | AIRNOCUST |
| | B road | | | | | |
| G8065340 | dual carriageway | CONTINUOUS | 2 | POLYLINE | ORANGE | |
| G8065342 | – over other feature | CONTINUOUS | 2 | POLYLINE | ORANGE | |
| G8065357 | – roundabout | CONTINUOUS | | INSERT | ORANGE | RBOUT |
| G8065346 | narrow | CONTINUOUS | 1 | POLYLINE | ORANGE | |
| G8065347 | – over other feature | CONTINUOUS | 1 | POLYLINE | ORANGE | |
| G8065343 | single carriageway | CONTINUOUS | 1 | POLYLINE | ORANGE | |
| G8065345 | – over other feature | CONTINUOUS | 1 | POLYLINE | ORANGE | |
| G8065377 | – roundabout | CONTINUOUS | | INSERT | ORANGE | RBOUT |
| | Ferry | | | | | |
| G8065390 | vehicular | DASHED | 1 | POLYLINE | WHITE | |
| G8065393 | ferry route link | DASHED | 1 | POLYLINE | WHITE | |
| G8065380 | Gradient – 1 in 7 or steeper | CONTINUOUS | | INSERT | WHITE | GRADIENT |
| G8065845 | Heliport | CONTINUOUS | | INSERT | WHITE | HELIPORT |

| Layer name | Description | Linetype | Line weight | Entity | Colour | Block |
|---|---|---|---|---|---|---|
| G8065381 | Roundabout | | | | | |
| | – under construction | CONTINUOUS | | INSERT | black | RBOUT_UNCON |
| G8065530 | Level crossing | CONTINUOUS | | INSERT | WHITE | LEVCROSS |
| G8065825 | Long-distance footpath | DASHED | 1 | POLYLINE | GREEN | |
| | Minor or other road | | | | | |
| G8065350 | – normal | CONTINUOUS | 1 | POLYLINE | WHITE | |
| G8065351 | – over other feature | CONTINUOUS | 1 | POLYLINE | WHITE | |
| G8065374 | – roundabout | CONTINUOUS | | INSERT | WHITE | RBOUT |
| | Motorway | | | | | |
| G8065310 | normal | CONTINUOUS | 3 | POLYLINE | BLUE | |
| G8065312 | – over other feature | CONTINUOUS | 3 | POLYLINE | BLUE | |
| G8065311 | – under construction | DASHED | 3 | POLYLINE | BLUE | |
| G8065370 | – junction | CONTINUOUS | | INSERT | BLUE | JUNCTION |
| G8065371 | – limited access | CONTINUOUS | | INSERT | BLUE | JUNCTION |
| G8065372 | – under construction | CONTINUOUS | | INSERT | WHITE | JUNCTION |
| G8065360 | services | CONTINUOUS | | INSERT | BLUE | SERVICES |
| G8065361 | – limited access | CONTINUOUS | | INSERT | BLUE | SERV_LTD |
| G8065362 | – under construction | CONTINUOUS | | INSERT | WHITE | SERV_CON |
| G8065379 | Multi-level junction | CONTINUOUS | | INSERT | WHITE | MULT_JUNC |
| G8065378 | – under construction | CONTINUOUS | | INSERT | GREY | MULT_JUNC |
| | Primary Route | | | | | |
| G8065320 | dual carriageway | CONTINUOUS | 2 | POLYLINE | GREEN | |
| G8065322 | – over other feature | CONTINUOUS | 2 | POLYLINE | GREEN | |
| G8065355 | – roundabout | CONTINUOUS | | INSERT | GREEN | RBOUT |
| G8065321 | – under construction | DASHED | 2 | POLYLINE | GREEN | |
| G8065323 | single carriageway | CONTINUOUS | 1 | POLYLINE | GREEN | |
| G8065325 | – over other feature | CONTINUOUS | 1 | POLYLINE | GREEN | |
| G8065375 | – roundabout | CONTINUOUS | | INSERT | GREEN | RBOUT |
| G8065324 | – under construction | DASHED | 1 | POLYLINE | GREEN | |
| G8065326 | narrow | CONTINUOUS | 1 | POLYLINE | GREEN | |
| G8065327 | – over other feature | CONTINUOUS | 1 | POLYLINE | GREEN | |

| Layer name | Description | Linetype | Line weight | Entity | Colour | Block |
|---|---|---|---|---|---|---|
| G8065365 | service area | CONTINUOUS | | INSERT | GREEN | SERVICES |
| G8065364 | – limited access | CONTINUOUS | | INSERT | WHITE | SERV_LTD |
| G8065363 | – under construction | CONTINUOUS | | INSERT | BLACK | SERV_UNCON |
| | Railway | | | | | |
| G8065510 | normal | CONTINUOUS | 3 | POLYLINE | WHITE | |
| G8065511 | – over other feature | CONTINUOUS | 3 | POLYLINE | WHITE | |
| G8065512 | narrow gauge | CONTINUOUS | 1 | POLYLINE | WHITE | |
| G8065513 | – over other feature | CONTINUOUS | 1 | POLYLINE | WHITE | |
| G8065514 | tunnel | DASHED | 1 | POLYLINE | WHITE | |
| G8065520 | Railway station | CONTINUOUS | | INSERT | WHITE/RED | STATION |
| G8065382 | Toll | CONTINUOUS | | INSERT | WHITE | TOLL |
| G8065313 | Tunnel | DASHED | 1 | POLYLINE | WHITE | |
| | Canal | | | | | |
| G8065240 | normal | CONTINUOUS | 1 | POLYLINE | CYAN | |
| G8065242 | – over other feature | CONTINUOUS | 1 | POLYLINE | CYAN | |
| G8065241 | tunnel | DASHED | 1 | POLYLINE | CYAN | |
| | Coast | | | | | |
| G8065111 | man-made | CONTINUOUS | 3 | POLYLINE | BLUE | |
| G8065110 | natural, HWM | CONTINUOUS | 3 | POLYLINE | BLUE | |
| | Foreshore area | | | | | |
| G8065121 | sand – seed | CONTINUOUS | | INSERT | YELLOW | SEEDPOINT |
| G8065120 | sand outer margin | CONTINUOUS | 1 | POLYLINE | YELLOW | |
| G8065494 | sand inner margin | CONTINUOUS | 1 | POLYLINE | YELLOW | |
| G8065123 | other – seed | CONTINUOUS | | INSERT | CYAN | SEEDPOINT |
| G8065122 | other outer margin | CONTINUOUS | 1 | POLYLINE | CYAN | |
| G8065495 | other inner margin | CONTINUOUS | 1 | POLYLINE | CYAN | |
| | Lake or reservoir | | | | | |
| G8065251 | area seed | CONTINUOUS | | INSERT | CYAN | SEEDPOINT |
| G8065250 | shoreline | CONTINUOUS | 1 | POLYLINE | CYAN | |
| | Lighthouse | | | | | |
| G8065140 | in use | CONTINUOUS | | INSERT | BLUE | LHINUSE |
| G8065142 | disused | CONTINUOUS | | INSERT | BLUE | LHDISUSE |

| Layer name | Description | Linetype | Line weight | Entity | Colour | Block |
|---|---|---|---|---|---|---|
| G8065141 | Lightship | CONTINUOUS | | INSERT | BLUE | LIGHTSHIP |
| | River | | | | | |
| | main | | | | | |
| G8065211 | – source | CONTINUOUS | 1 | POLYLINE | CYAN | |
| G8065212 | – middle | CONTINUOUS | 1 | POLYLINE | CYAN | |
| G8065213 | – lower | CONTINUOUS | 1 | POLYLINE | CYAN | |
| | secondary | | | | | |
| G8065221 | – source | CONTINUOUS | 1 | POLYLINE | CYAN | |
| G8065222 | – lower | CONTINUOUS | 1 | POLYLINE | CYAN | |
| G8065230 | minor | CONTINUOUS | 1 | POLYLINE | CYAN | |
| G8065115 | Sea – seed | CONTINUOUS | | INSERT | BLUE | SEEDPOINT |
| | Route destination | | | | | |
| G8065413 | primary | CONTINUOUS | | INSERT | GREEN | SEEDPOINT |
| G8065443 | – satellite | CONTINUOUS | | INSERT | GREEN | SEEDPOINT |
| G8065416 | non-primary settlement | CONTINUOUS | | INSERT | WHITE | SEEDPOINT |
| G8065446 | – satellite | CONTINUOUS | | INSERT | GREEN | SEEDPOINT |
| G8065419 | non-primary minor settlement | CONTINUOUS | | INSERT | WHITE | SEEDPOINT |
| | Settlement – no graphic text | | | | | |
| G8065448 | main node | CONTINUOUS | | INSERT | GREY | DLUASEED |
| G8065447 | satellite node | CONTINUOUS | | INSERT | GREY | DLUASEED |
| | Urban area | | | | | |
| G8065421 | large – seed | CONTINUOUS | | INSERT | GREY | DLUASEED |
| G8065420 | large – outer margin | CONTINUOUS | 3 | POLYLINE | GREY | |
| G8065493 | large – inner margin | CONTINUOUS | 3 | POLYLINE | GREY | |
| G8065423 | small – seed | CONTINUOUS | | INSERT | GREY | DLUASEED |
| G8065422 | small – outer margin | CONTINUOUS | 3 | POLYLINE | GREY | |
| G8065493 | small – inner margin | CONTINUOUS | 3 | POLYLINE | GREY | |
| | County | | | | | |
| G8065725 | area – seed | CONTINUOUS | | INSERT | WHITE | SEEDPOINT |
| G8065726 | area (det'd) – seed | CONTINUOUS | | INSERT | WHITE | SEEDPOINT |
| G8065720 | boundary | DASHED | 1 | POLYLINE | WHITE | |

| Layer name | Description | Linetype | Line weight | Entity | Colour | Block |
|---|---|---|---|---|---|---|
| | National Park | | | | | |
| G8065820 | boundary | CONTINUOUS | 1 | POLYLINE | YELLOW | |
| G8065821 | seed | CONTINUOUS | | INSERT | YELLOW | SEEDPOINT |
| G8065710 | National boundary | DASH-DOT | 1 | POLYLINE | WHITE | |
| G8065715 | National boundary seed | CONTINUOUS | | INSERT | WHITE | SEEDPOINT |
| G8065812 | Antiquity detail – linear | CONTINUOUS | 1 | POLYLINE | WHITE | |
| G8065816 | Battlefield | CONTINUOUS | | INSERT | WHITE | BATTLE |
| G8065620 | Geographic area | CONTINUOUS | | INSERT | WHITE | SEEDPOINT |
| G8065815 | Hill-fort | CONTINUOUS | | INSERT | WHITE | HILLFORT |
| G8065835 | Radio mast | CONTINUOUS | | INSERT | WHITE | MAST |
| G8065810 | Roman road | CONTINUOUS | 1 | POLYLINE | WHITE | |
| G8065843 | Wind generator | CONTINUOUS | | INSERT | WHITE | WINDGEN |
| G8065844 | Windmill | CONTINUOUS | | INSERT | WHITE | WINDMILL |
| | Wood, forest | | | | | |
| G8065611 | area – seed | CONTINUOUS | | INSERT | GREEN | WOODSEED |
| G8065610 | area – outer margin | DASH-DOT | 1 | POLYLINE | GREEN | |
| G8065491 | area – inner margin | DASH-DOT | 1 | POLYLINE | GREEN | |
| G8065020 | Water feature | STANDARD | | TEXT | CYAN | |
| G8065031 | Motorway number | STANDARD | | TEXT | BLUE | |
| G8065032 | Primary route | STANDARD | | TEXT | GREEN | |
| G8065033 | A road | STANDARD | | TEXT | RED | |
| G8065034 | B road | STANDARD | | TEXT | ORANGE | |
| G8065038 | Tolls | STANDARD | | TEXT | WHITE | |
| G8065040 | Settlements | STANDARD | | TEXT | WHITE | |
| G8065016 | Minor settlements | STANDARD | | TEXT | WHITE | |
| G8065041 | Primary route destinations | STANDARD | | TEXT | GREEN | |
| G8065042 | Motorway junction number | STANDARD | | TEXT | BLUE | |
| G8065043 | Motorway junction limited interchange | STANDARD | | TEXT | WHITE | |
| G8065060 | Parks, moors | STANDARD | | TEXT | WHITE | |
| G8065061 | Important hills | STANDARD | | TEXT | WHITE | |
| G8065062 | Other physical features | STANDARD | | TEXT | WHITE | |

| Layer name | Description | Linetype | Line weight | Entity | Colour | Block |
|---|---|---|---|---|---|---|
| G8065081 | Roman antiquities | STANDARD | | TEXT | WHITE | |
| G8065082 | Antiquities | STANDARD | | TEXT | WHITE | |
| G8060575 | Default | CONTINUOUS | 1 | POLYLINE | WHITE | |
| G8060571 | Footnotes | STANDARD | | TEXT | WHITE | ST_FOOTNOTES |
| G8060572 | Grid lines and values | CONTINUOUS | 1 | LINE/TEXT | WHITE | |
| G8060573 | Grid values | STANDARD | 1 | TEXT | WHITE | |
| G8065200 | Unspecified node | CONTINUOUS | | INSERT | MAGENTA | CIRCLE(small) |

# Strategi footnotes

The following footnotes are added as an insert BLOCK in the ENTITIES section of the DXF data file. The positions of the footnotes are indicated in .

**Note 1:** Top margin centrally aligned, 1 750 ground metres, Layer: G8060571

```
Ordnance Survey®
```

**Note 2:** Top margin centrally aligned, 1 500 ground metres, Layer: G8060571

```
Strategi data
```

**Note 3:** Lower left margin, 500 ground metres, Layer: G8060571

```
Translation date dd Mmmmmmmmm CCYY
```

**Note 4:** Lower left margin, 500 ground metres, Layer: G8060571

```
Tile reference number __ __ __
```

**Note 5:** Lower left margin, 500 ground metres, Layer: G8060571

```
Reproduced from Ordnance Survey Strategi® data with
the permission of The Controller of Her Majesty's
Stationery Office.

© Crown Copyright CCYY
```

**Note 6:** Lower right margin, 500 ground metres, Layer: G8060571

```
The derived scale of the product is dependent upon
the source data.
```

**Note 7:** Lower right margin, 500 ground metres, Layer: G8060571

```
The representation of a road, track or path is no
evidence of a right of way. The alignment of tunnels
is approximate.
```

**Note 8:** Lower right margin, 500 ground metres, Layer: G8060571

```
Date of last amendment dd Mmmmmmmmm CCYY
```

**Note 9:** Lower right margin, 500 ground metres, Layer: G8060571

```
Product specification.
```

**Figure 8.1:** Layout of footnotes
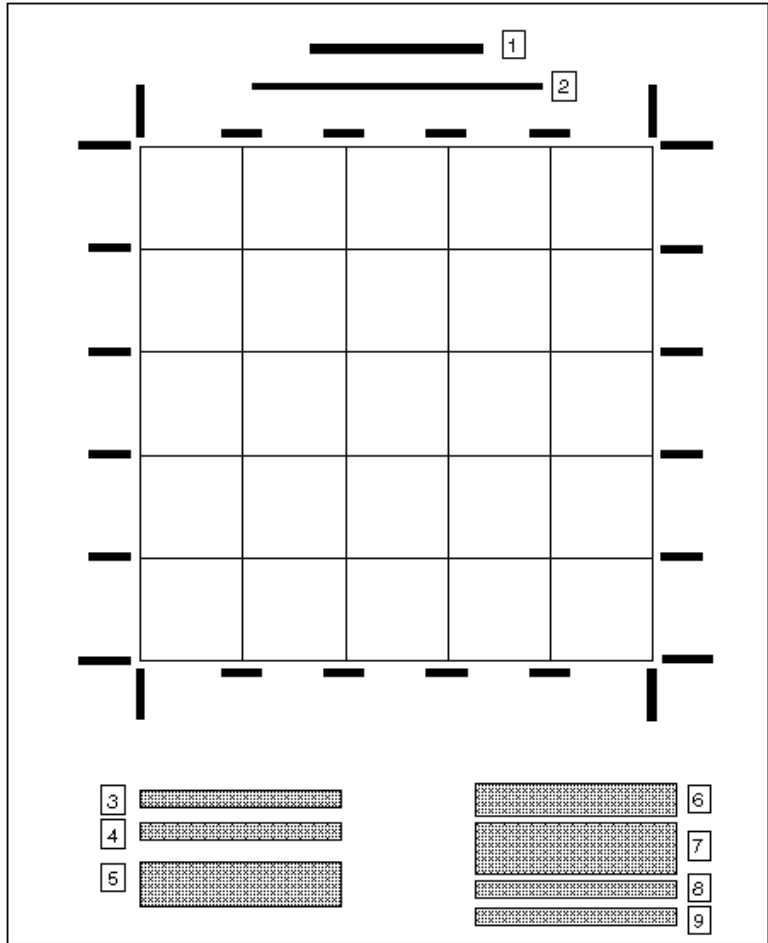
# Chapter 9  DXF file structure for Strategi

## General

The following paragraphs describe the DXF group and section structure for the transfer of Strategi.

It is assumed that the reader of this chapter is familiar with the AutoCAD reference manual, which is published by Autodesk Ltd., Cross Lane, GUILDFORD, GU1 1UJ, or an equivalent document published by the reader's software supplier if a CAD package other than AutoCAD is to be used.

The following section gives a detailed breakdown of the data structure of Strategi in DXF.

This is a two stage procedure which consists of:

1.  Diagrammatic view of the data structure with a preceding outline description of that part of the data structure.

2.  Detailed examples of the record sequence and contents of the data structure. A diagram of the record group precedes each example.

# Data structure

The following diagrams (figures 9.1 – 9.17) represent the data structure of DXF. Where one element of a figure is the starting point for another figure, this is indicated beneath the relevant box.

**Figure 9.1:** Level 1
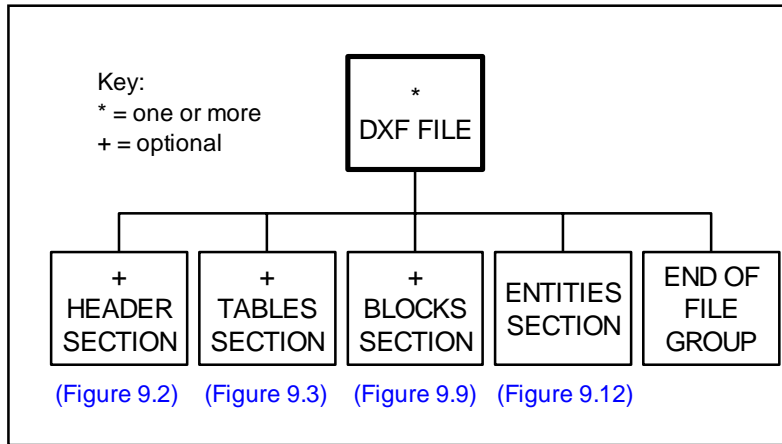
# Header

The header will be constructed as follows, with only those fields being supplied.

**Figure 9.2:** Level 2
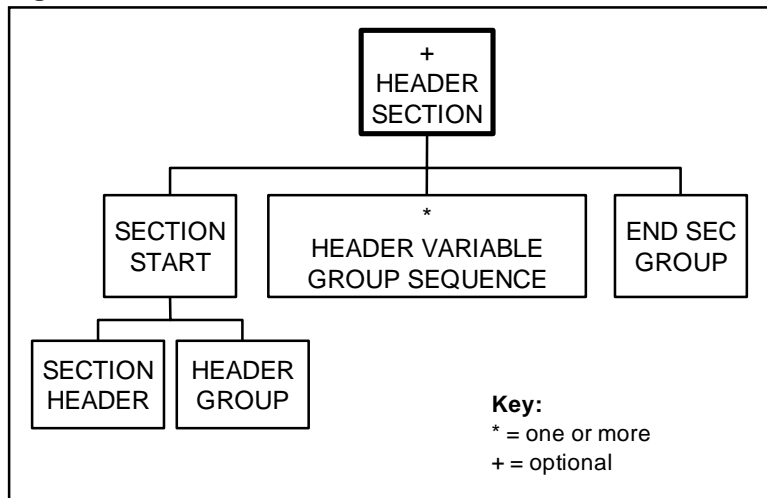


The header must be structured in the following order.

```
0
SECTION
 2
HEADER
 9
$ACADVER          AutoCAD drawing database version number.
 1
AC1009            This indicates release 11 or 12 (not 9).
 9
$EXTMIN           X and Y drawing extents, lower left corner.
 10
nnnnnnn.nn        Minimum eastings, (National Grid
                   coordinates).
 20
nnnnnnn.nn        Minimum northings, (National Grid
                   coordinates).
 9
$EXTMAX           X and Y drawing extents, upper right corner.
 10
```

| | | |
|---|---|---|
| `nnnnnnn.nn` | | Maximum eastings, (National Grid coordinates). |
| ` 20` | | |
| `nnnnnnn.nn` | | Maximum northings, (National Grid coordinates). |
| ` 9` | | |
| `$LIMMIN` | | X and Y drawing limits, lower left corner. |
| ` 10` | | |
| `nnnnnn.n` | | X drawing limit, lower left corner, (in the AutoCAD World Coordinate System (WCS)). |
| ` 20` | | |
| `nnnnnn.n` | | Y drawing limit, lower left corner, (in WCS). |
| ` 9` | | |
| `$LIMMAX` | | X and Y drawing limits, upper right corner. |
| ` 10` | | |
| `nnnnnn.n` | | X drawing limit, upper right corner, (in WCS). |
| ` 20` | | |
| `nnnnnn.n` | | Y drawing limit, upper right corner, (in WCS). |
| ` 9` | | |
| `$LTSCALE` | | Global linetype scale. |
| ` 40` | | |
| ` 250.0` | | |
| ` 9` | | |
| `$ATTMODE` | | Attribute visibility. |
| ` 70` | | |
| ` 1` | | This sets attribute to 'on' when the file is open. |
| ` 9` | | |
| `$TEXTSIZE` | | Default text height. |
| ` 40` | | |
| ` 1.0` | | |
| ` 9` | | |
| `$TEXTSTYLE` | | Current text style name. |
| ` 7` | | |
| `STANDARD` | | |
| ` 9` | | |
| `$CELTYPE` | | Entity linetype name. |
| ` 6` | | |
| `BYLAYER` | | |
| ` 9` | | |
| `$CECOLOR` | | Entity colour number. |
| ` 62` | | |
| ` 256` | | Indicates colour id BY LAYER. |
| ` 9` | | |

```
$LUNITS              Units format for coordinates and distances.
 70
       2
 9
$LUPREC              Units precision for coordinates and distances.
 70
       1
 9
$AUPREC              Units precision for angles.
 70
        1
 9
$ANGBASE             Angle zero direction.
 50
 0.0
 9
$ANGDIR              Angle rotation.
 70
        0            1 = clockwise angles, 0 = anticlockwise
                      angles.
 9
$PDMODE              Point display mode.
 70
        1
 9
$PDSIZE              Point display size.
 40
 0.0
$PLINEGEN            Sets the linetype pattern generation around
                     the 70 vertices of a two-dimensional polyline.
  1
 0
ENDSEC               End of section.
```

# Tables

**Figure 9.3: Level 2**
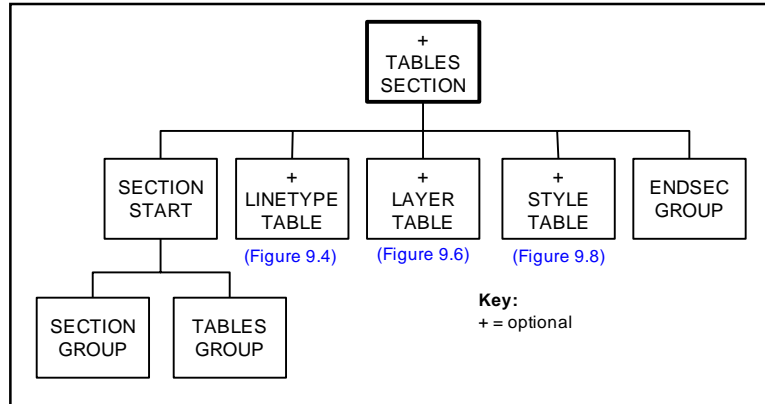


The tables section will follow the header section and will contain three tables:

● Linetype table

● Layer table

● Style table

**Figure 9.4:** Linetype table level 3
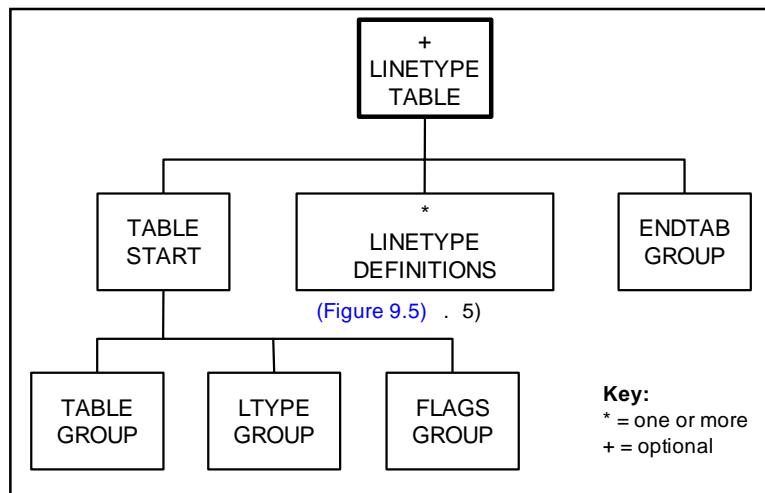
The linetype table will contain definitions for the following line types:

● solid line                (CONTINUOUS)

● dashed line               (DASHED)

● dash-dot line             (DASH-DOT)

**Figure 9.5:** Level 4
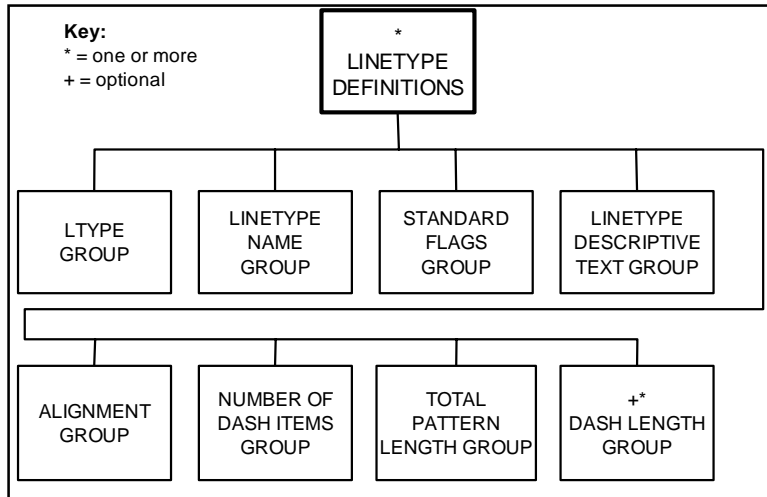


Thus:

```
 0
TABLE
 2
LTYPE
 70
     5
 0
LTYPE
 2
CONTINUOUS
 70
     64
 3
Solid Line
```

```
 72
     65
 73
      0
 40
 0.0
 0
LTYPE
 2
DASHED
 70
     64
 3
_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
 72
     65
 73
      2
 40
 0.75
 49
 0.5
 49
 -0.25
 0
LTYPE
 2
DASHDOT
 70
      0
 3
_._._._._._._._._._._._._._._._._._._._._._._._._
 72
     65
 73
      4
 40
 1.0
 49
 0.5
 49
 -0.25
 49
```

```
 0.0
 49
 -0.25
  0
ENDTAB
```

**Figure 9.6:** Level 3
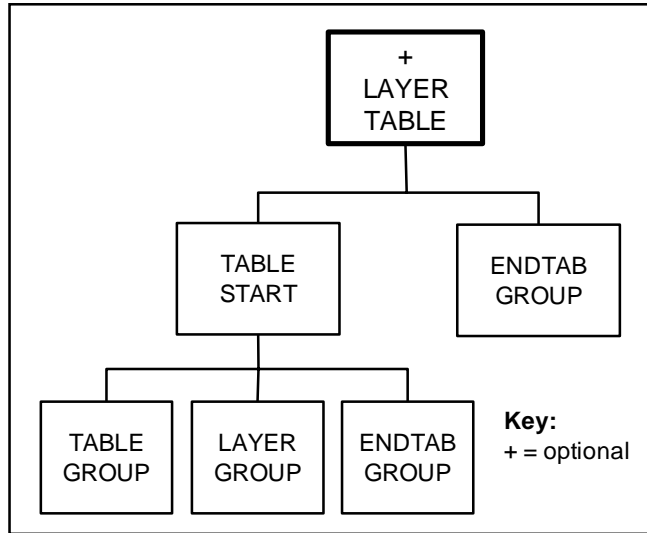


Details of the layer table can be seen in chapter 8.

**Figure 9.7:** Level 4
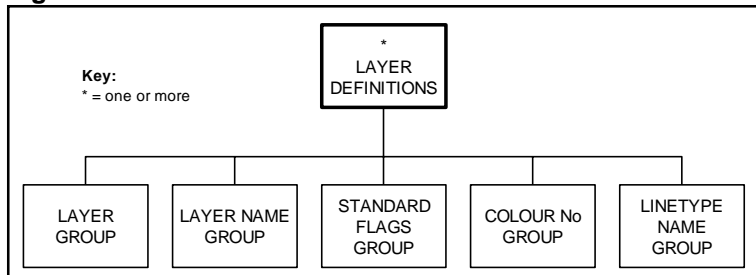
**Figure 9.8:** Style table level 3
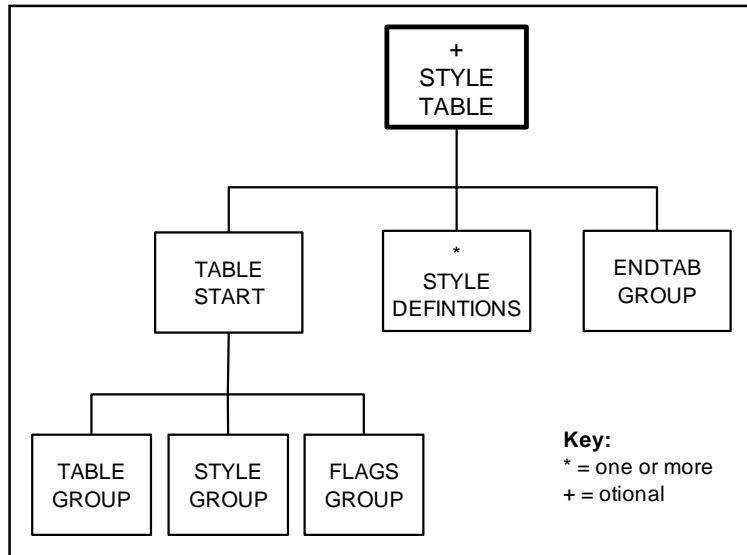


The style table will contain the text file load instructions for:

● SIMPLEX.SHX

● MONOTEXT.SHX

**Figure 9.9:** Level 4
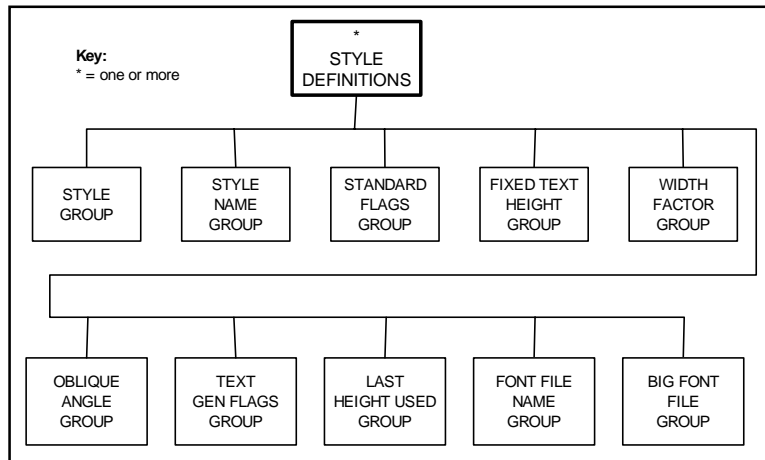
# Blocks

**Figure 9.10:** Level 2

```
                        +
                      BLOCKS
                      SECTION


      SECTION              *              ENDSEC
      START              BLOCK            GROUP

                      (Figure 9.11)

                                        Key:
                                        * = one or more
   SECTION          BLOCKS               + = optional
   GROUP            GROUP
```

**Figure 9.11:** Level 3

```
                          *
                        BLOCK


   BLOCK        LAYER        BLOCK        BLOCK
   GROUP        GROUP        NAME         TYPE
                                          FLAG


   BLOCK BASE TEXT      Z          *         END
   GROUP             GROUP     ENTITIES    BLOCK
                                           GROUP

               Key:
               * = one or more
```
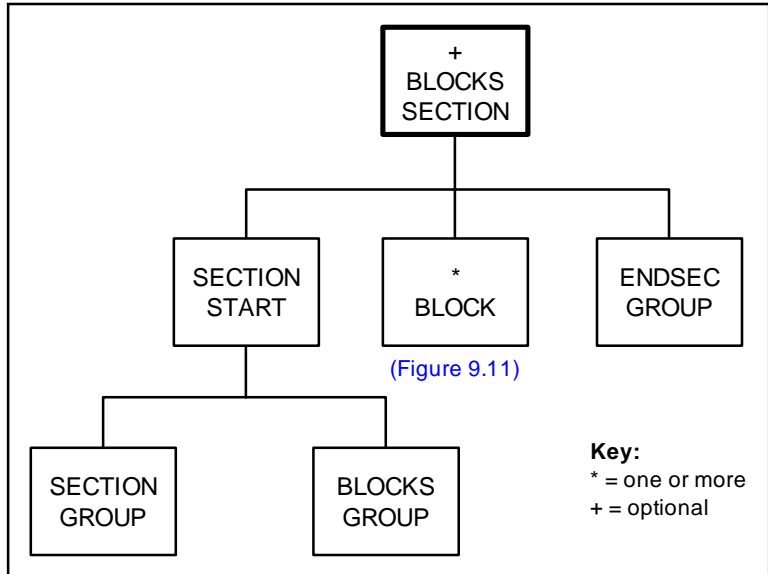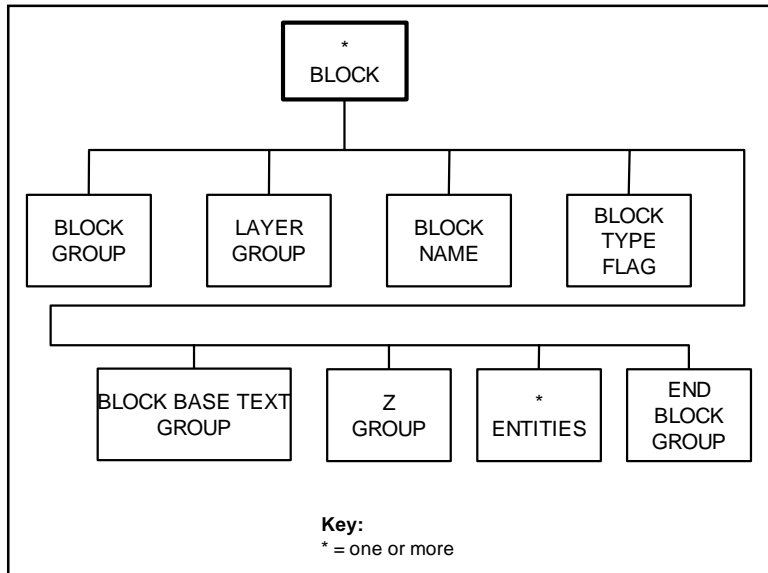
# Entities section

The entities section will contain DXF entities for:

- Ordnance Survey map footnotes data (INSERT entities).
- Grid and neatline (TEXT and LINE entities).
- Ordnance Survey features (TEXT, POLYLINE and INSERT entities).
- Extended entity data will be used to store attributes.

The structure of each different entity is as follows:

a. INSERT entities – these consist of:
   - INSERT entity type group (attribute number 0)
   - Layer name group                    (8)
   - Block name group                    (2)
   - X coordinate group                  (10)
   - Y coordinate group                  (20)
   - Z coordinate group                  (30)
   - X scale factor                      (41) [optional]
   - Y scale factor                      (42) [optional]
   - Z scale factor                      (43) [optional]
   - Rotation angle                      (50) [optional if 0]

b. LINE entities – these consist of:
   - LINE entity type group              (0)
   - Layer name group                    (8)
   - Start X coordinate group            (10)
   - Start Y coordinate group            (20)
   - Start Z coordinate group            (30)
   - End X coordinate group              (11)
   - End Y coordinate group              (21)
   - End Z coordinate group              (31)

c. POLYLINE entities – these consist of:
   - POLYLINE entity type group          (0)
   - Layer name group                    (8)
   - Vertices follow flag                (66)
   - X elevation                         (10) [set to 0]
   - Y elevation                         (20) [set to 0]
   - Z elevation                         (30)
   - Default starting width              (40) [optional if 0]
   - Default ending width                (41) [optional if 0]
   - A number of VERTEX entities    [shown below]
   - SEQEND group                        (0)

d.  VERTEX entities – these consist of:
- VERTEX entity type group (0)
- Layer name group (8)
- X coordinate group (10)
- Y coordinate group (20)
- Z coordinate group (30)
- Starting width (40) [optional]
- Ending width (41) [optional]
- Bulge (42) [optional if 0]
- Vertex flags (70) [optional if 0]
- Curve fit tangent (50) [optional]

e.  TEXT entities – these consist of:
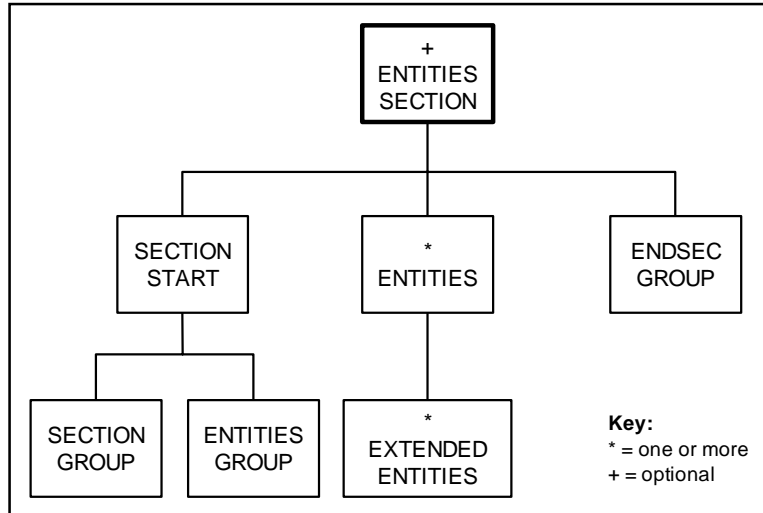- TEXT entity type group (0)
- Layer name group (8)
- X coordinate group (10)
- Y coordinate group (20)
- Z coordinate group (30)
- Text height group (40)
- Text value (1)
- Rotation angle group (50) [optional if 0]
- Relative X scale factor (41) [optional if 1]
- Oblique angle (51) [optional if 0]
- Text style name (7) [optional]
- Text generation flags (71) [optional if 0]
- Horizontal justification type (72) [optional if 0]
- Vertical justification type (73) [optional if 0]

f.  EXTENDED entities – these consist of:
- Application name (1001)
- Control string (1002)
- String (1000) [one or more]
- Control string (1002)

**Figure 9.12**: Level 2

```
                          +
                       ENTITIES
                       SECTION
                          |
        ┌─────────────────┼─────────────────┐
        │                 │                 │
     SECTION              *              ENDSEC
     START             ENTITIES           GROUP
        │                 │
   ┌────┴────┐            │
   │         │            │
SECTION   ENTITIES        *
 GROUP     GROUP       EXTENDED
                      ENTITIES
```

**Key:**
* = one or more
+ = optional

**Figure 9.13:** Level 3

```
**Key:**                      *
* = one or more            LINE
+ = optional              ENTITY
                             |
     ┌───────────┬───────────┼───────────┐
     │           │           │           │
   LINE       LAYER       START X      START Y
  GROUP        NAME       GROUP        GROUP
             GROUP
     ┌───────────┬───────────┬───────────┬───────────┐
     │           │           │           │           │
     +         END X       END Y         +           *
  START Z     GROUP        GROUP       END Z      EXTENDED
  GROUP                                GROUP      ENTITIES
```
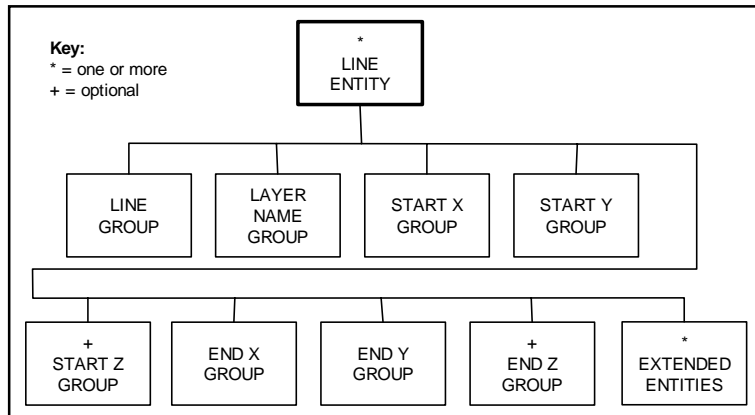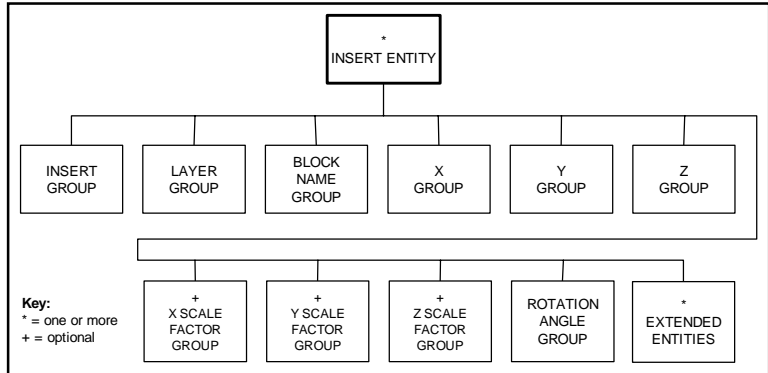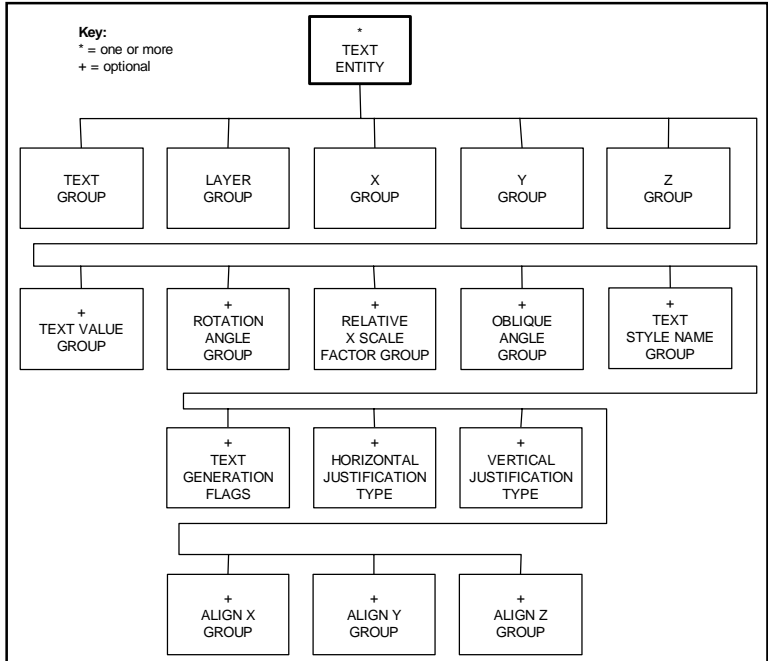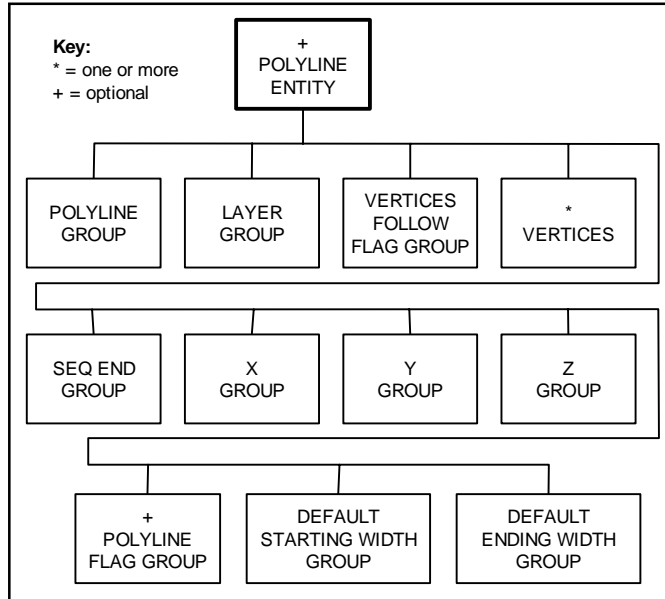
**Figure 9.14:** Level 3


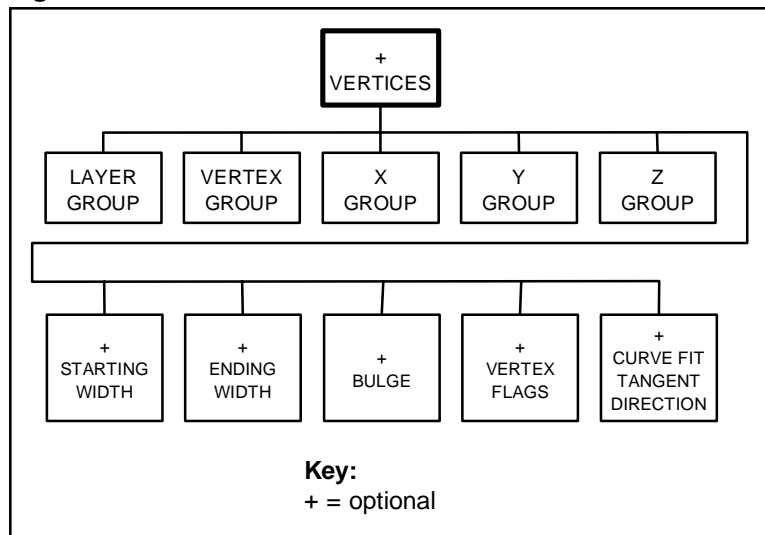
**Figure 9.15:** Level 3

**Figure 9.16:** Level 3



**Figure 9.17:** Level 4



# End of file group

This group will end with DXF EOF (end of file) group.

# Appendix A    Glossary

**accuracy**
The closeness of the results of observations, computations or estimates to the true values or the values accepted as being true. Accuracy relates to the exactness of the result, and is the exactness of the operation by which the result is obtained.

**administrative area**
A blanket term used by Ordnance Survey to refer to all public administrative areas, specifically local government management and electoral areas.

**ASCII (American Standard Code for Information Interchange)**
A 7-bit code for encoding a standard character set.

**area**
A spatial extent defined by circumscribing lines that form a closed perimeter that does not intersect itself.

**area seed**
A point within an area that can be used to carry the attributes of the whole area, for example ownership, address and use type.

**asset management or facilities management (AM or FM)**
An American term for computerised information systems involving digital mapping used by utilities, for example, to manage their plant.

**attribute**
An attribute is a property of an entity, usually used to refer to a non-spatial qualification of a spatially referenced entity. For example, a descriptive code indicating what an entity represents, or how it should be portrayed.

**attribute class**
A specific group of attributes, for example those describing measure, serviceability, structure, or composition.

**attribute code**
An alphanumeric identifier for an attribute type.

**attribute value**
A specific quality or quantity assigned to an attribute.

**bearing**
Bearings are angles measured against National Grid bearings in degrees. They are measured clockwise from grid north.

**block**
Data on magnetic media may be recorded in blocks of characters for more efficient movement within or between computer systems. The length of the block will vary according to the medium and the data transfer format used.

**boundary**
A boundary is the limit of a predefined and established area whose limit is determined by one or more **lines**, for example county area boundary and reservoir boundary.

**byte**
A unit of computer storage of binary data usually comprising 8 bits, equivalent to a character. Hence **megabyte** (Mb) and **gigabyte** (Gb).

**CAD**
Computer-aided design.

**cartography**
The organisation and communication of geographically related information in either graphic or digital form. It can include all stages from data acquisition to presentation and use.

**ceremonial county**
An area to which is appointed a Lord Lieutenant and High Sheriff.

**character**
A distinctive mark; an inscribed letter; one of a set of writing-symbols.

**character string**
A one-dimensional array of characters held either in memory or in another storage medium.

**coordinate pair**
A coordinate pair is an easting and a northing.

**coordinates**
Pairs of numbers expressing horizontal distances along original axis. Alternatively triplets of numbers measuring horizontal and vertical distances. Row and column numbers of pixels from raw imagery are not considered coordinates for the purpose of the standard.

**coding**
Allocation of a feature code to a feature being created from constituent construction data – points and/or segments; with optional linking to an existing feature of the same feature code.

**CD-ROM**
A data storage medium. A 12 cm disc similar to an audio CD.

**continuation mark**
A logical record may contain more data than can be held in a single physical record. The physical record contains a continuation mark – the penultimate character of the record in NTF – to indicate whether more data is to be found in a continuation record.

**continuation record**
A specific NTF term. A continuation record is used where space does not allow one logical record to be contained wholly within one physical record.

**copyright**
Copyright is a legal property right which enables the creator of an original work to protect it from unauthorised use. Through the *Copyright, Designs and Patents Act 1988*, Crown copyright will continue to subsist in all Ordnance Survey products until the end of the period of 50 years from the end of the year in which they were published, and in the case of digital data from the end of the year in which it was extracted from the Ordnance Survey database. Crown copyright is vested in The Controller of Her Majesty's Stationery Office, who has delegated powers to the Director General, Ordnance Survey for the administration of copyright in publications and data, including the determination of rules and terms under which permission for their reproduction is given.

**currency**
An expression of the up-to-dateness of data.

**data**
A representation of facts, concepts or instructions in a formalised manner suitable for communication, interpretation or processing.

**data capture**
The encoding of data. In the context of digital mapping, this includes map digitising, direct recording by electronic survey instruments and the encoding of text and attributes by whatever means.

**data format**
A specification that defines the order in which data is stored or a description of the way data is held in a file or record.

**data model**
An abstraction of the real world which incorporates only those properties thought to be relevant to the application or applications at hand. The data model would normally define specific groups of **entities** and their **attributes** and the relationship between these entities. A data model is independent of a computer system and its associated data structures. A map is one example of an analogue data model.

**database**
An organised, integrated collection of data stored so as to be
capable of use in relevant applications, with the data being
accessed by different logical paths. Theoretically it is
application-independent, but in reality it is rarely so.

**dataset**
An Ordnance Survey term for a named collection of logically
related features arranged in a prescribed manner. For example,
all water features. A dataset has more internal structure than a
layer and is related to another dataset only by position.

**density**
A measure of the number of units of data held on a stated length
of storage surface. For example some magnetic tapes may be
recorded at a density of 1 600 bits per inch (bpi). Often referred
to as packing density.

**detached part**
A term applying to a part of a local government or parliamentary
area which is completely surrounded by other local government
or parliamentary areas, and is not connected to the 'parent' area
by direct access on the ground.

**digital**
Data which is expressed as numbers (digits) in computer
readable form is said to be digital.

**digital map**
A term used by Ordnance Survey to describe a particular tile of
digital map data.

**digital map data**
The digital data required to represent a map. The data includes
not only map detail but also feature header data, map header
data and management data.

**digitising**
The process of converting analogue maps and other sources to a computer readable form. This may be point digitising, where points are only recorded when a button is pressed on a cursor, or stream digitising where points are recorded automatically at pre-set intervals of either distance or time as the cursor is traced along a map feature.

**distinctive name**
A text feature consisting of text string(s) which form(s) a proper name.

**DXF (Drawing Exchange Format)**
A proprietary data format, devised by Autodesk, by which digital drawings may be transferred between users of CAD systems. DXF has become an industry standard data format and is used for the transfer of Ordnance Survey data products.

**eastings**
See **rectangular coordinates.**

**edgematch**
The process of ensuring that data along the adjacent edges of map sheets, or some other unit of storage, matches in both positional and attribute terms.

**entity**
Something about which data is stored in a databank or database. For example, building, tree. The data may consist of relationships, attributes, positional and shape information, and so on. Often synonymous with feature.

**Extended Binary Coded Decimal Interchange Code (EBDCDIC)**
An 8-bit character encoding scheme.

**feature**
An item of detail within a map which can be either a point or symbol, a line or text.

**feature classification record**
A specific, named NTF record which lists the feature codes in use in the current database.

**feature code (FC)**
An alphanumeric attribute code used in digital map data to describe each feature in terms of the object surveyed, its representation on the map, or both.

**feature serial number (FSN)**
A number used as a feature identifier usually allocated on a sequential basis. For example, the order in which features are digitised.

**field**
A specific part of a record containing a unit of data, such as the date of digitising. The unit of data may be a data element or a data item. In NTF, a field is a subdivision of a physical record. Every field has a name and a predefined interpretation.

**file**
An organised collection of related **records.** The records on a file may be related by a specific purpose, **format** or data source – the records may or may not be arranged in sequence. A file may consist of records, fields, words, **bytes, characters** or bits.

**font**
The style of text character used by a printer or plotter.

**foreshore**
The foreshore is taken to be the area of land between mean high water (MHW) or mean high water springs (MHWS) in Scotland and extent of the realm (EOR).

**format**
The specified arrangement of data. For example, the layout of a printed document, the arrangement of the parts of a computer instruction, the arrangement of data in a **record**.

**free end**
The end of a line feature which does not connect with any other feature.

**geographical information system (GIS)**
A system for capturing, storing, checking, integrating, analysing and displaying data that is spatially referenced to the Earth. This is normally considered to involve a spatially referenced computer **database** and appropriate applications software.

**geometric structure**
The ground is modelled in the data as a series of lines and points.

**gigabyte (Gb)**
1 073 741 824 bytes, a measure of data storage capacity.

**grid**
The planimetric frame of reference. For example, the National Grid.

**hard copy**
A print or plot of output data on paper or some other tangible medium.

**junction**
A connection between two or more links at a common node. Junctions may be X-junctions or T-junctions.

**kilobyte (kb)**
1 024 bytes; a measure of data storage capacity**.**

**layer**
A subset of digital map data, selected on a basis other than position. For example, one layer might consist of all features relating to roads, and another to water features.

**line**
A series of connected coordinated points forming a simple feature with homogeneous attribution.

**line feature**
The spatial abstraction of an object in one dimension. Lines may intersect with other lines. They are defined as a series of two or more coordinates and may be curved or straight. Curved lines consist of a series of very short straight line segments. Lines may be concurrent with other lines under certain conditions. As an object abstraction a line has no width.

**line segment**
A vector connecting two coordinated points.

**linear feature**
Map feature in the form of a line, for example road centrelines, that may or may not represent a real-world feature.

**link and node data**
A form of vector data in which linear features are represented as links. Links are terminated where they intersect other links. These intersection points, and link ends, may carry nodes whose feature records express the geometric relationships between links.

**link and node structure**
A data structure in which links and nodes are stored with cross-referencing.

**map**
The representation on a flat surface of all or part of the Earth's surface, intended to be communicated for a purpose or purposes, transforming relevant geographic data into an end product which is visual, digital or tactile.

**map generalisation**
A reduction in map detail, so that the information remains clear and uncluttered when map scale is reduced. May also involve re-sampling to larger spacing, and/or a reduction in the number of points in a line.

**map header**
Data at the start of the digital map file describing that data. It may contain information on the source and history of the geometric data within the map and the coordinate system in use as well as holding information essential to the management of Ordnance Survey's digital mapping system.

**map scale**
The ratio between the extent of a feature on the map and its extent on the ground, normally expressed as a representative fraction, for example 1:1250, 1:50 000.

**megabyte (Mb)**
1 048 576 bytes, a measure of data storage capacity.

**name or text feature**
The proper name or label of an object (real-world) or feature (object abstraction) consisting of one or more text strings. A name position is defined by a coordinate pair.

**National Grid**
A unique referencing system which can be applied to all Ordnance Survey maps of Great Britain (GB) at all scales. It is based on 100 km squares covering the whole of GB based on a Transverse Mercator Projection. It is used by Ordnance Survey on all post-war mapping to provide an unambiguous spatial reference in GB for any place or entity whatever the map scale.

**NTF (National Transfer Format)**
A format designed in 1988 specifically for the transfer of spatial information; it is published as British Standard BS 7567 and is administered by the Association for Geographic Information. It is now the standard transfer format for Ordnance Survey digital map data.

**node**
An object representation of a point which either does not form any part of a link (isolated node or polygon seed point); or is the representation of a point at the start or end of a link (terminating node). The position of a node is defined by a single coordinate pair – which is repeated within all links logically connected at that node and/or containing it. A node is only deleted if the link containing it as a terminating node is deleted.

**northings**
See **rectangular coordinates**.

**orientation**
Orientation of a point or a text feature is measured in degrees anticlockwise from grid east.

**origin**
The zero point in a system of **rectangular coordinates.**

**packing**
Spaces used as fillers to complete a record or field.

**pecked line**
A line drawn as a series of dashes.

**physical record**
A physical record may be fixed length containing 80 characters, or variable length containing **up to** 80 characters**.**

**point**
A zero-dimensional spatial abstraction of an object represented as a coordinate pair.

**point and line data**
A form of vector data designed for map production in which all map features are designated as points, lines or text. Point and line data does not carry the topological relationships between features.

**point feature**
A zero-dimensional spatial abstraction of an object with its position defined by a coordinate tuple. Points are represented by nodes which may be isolated or part of a link (terminating). Points may also be represented by symbols which may have attributes such as rotation and size.

**polygon**
Polygons are a representation of areas. A polygon is defined as a closed line or perimeter completely enclosing a contiguous space and made up of one or more links. At least one node occurs on the perimeter of a polygon where the bounding link completes the enclosure of the area. There may be many nodes connecting the bounding links of a polygon. Links may be shared between polygons. Polygons may wholly contain other polygons, or be contained within other polygons. Each may contain a single isolated node (seed point) which identifies the polygon.

**polygon boundary**
The link or links which enclose a polygon, projected into the horizontal plane.

**polygon point**
A polygon seed.

**positional accuracy**
The degree to which the coordinates define a point's true position in the world, directly related to the spheroid or projection on which the coordinate system is based.

**precision**
The exactness with which a value is expressed, whether the value be right or wrong.

**record**
A set of related data fields grouped for processing.

**recording format**
The logical and/or physical levels of the protocol governing the laying down of data on the physical transfer medium.

**rectangular coordinates**
Also known as X-Y **coordinates** and as **eastings** and **northings**. These are two-dimensional coordinates which measure the position of any point relative to an arbitrary origin on a plane surface, for example a map projection, a digitising table, a VDU screen.

**representative point**
A point within a polygon that can be used to carry the attributes of the whole polygon. For example, the name of a city, such as 'Birmingham'.

**resolution**
A measure of the ability to detect quantities. High resolution implies a high degree of discrimination but has no implication as to **accuracy**. For example, in a collection of data in which the **coordinates** are rounded to the nearest metre, resolution will be 1 m but the accuracy may be ± 5 m or worse.

**satellite node**
A secondary node, placed in portions of a polygon overlapping tile edges.

**seaward extensions**
These are artificial extensions to the realm which have been made by Act of Parliament extending the local government and parliamentary areas seaward of MLW.

**section**
In NTF terminology, a subdivision of a database. In Ordnance Survey terms this equates to a single map sheet – a digital map file or a tile.

**seed**
A seed is a digitised point within an area, usually a defined polygon, for example lake or woodland, but not always, for example a geographical seed, such as the South Downs. See also **representative point**.

**seed point**
A coordinated point within a polygon to which alphanumeric information may be attached.

**segment**
A chord defined by two consecutive **coordinates** in a line string.

**source scale**
The scale of the source information from which the map was digitised, the scale of survey for a 'basic scale' map, or the scale of the source map for a 'derived' map.

**spatial data**
Data which includes a reference to a two- or three-dimensional position in space as one of its attributes. It is used as a synonym for geometric data.

**structured data**
Data within which collections of features – of any type – form objects. Topographically structured data also contains topological information defining the relationships between features and objects.

**terminator**
A character, character string, field or record used to signal the end of a record, section, volume or database.

**text coordinates**
Each text feature has a 'start-of-text' coordinate which is digitised.

**text feature**
A free-standing text string in the digital data describing a feature, or particular instance of a feature, for example Factory, Acacia Avenue.

**text height**
The height at which a text string is intended to be plotted out at the nominal map scale. This information is included in the feature header of the text feature.

**text position**
See **text coordinates**. Also known as original digitising position.

**tile**
Broadly synonymous with digital map file, it implies evenly sized map sheet units.

**topographic database**
A database holding data relating to physical features and boundaries on the Earth's surface.

**topography**
Topography is the study of the physical features of the Earth. A topographic map's principal purpose is to portray and identify the features of the Earth.

**topology**
The study of the properties of a geometric figure which are not dependent on position, such as connectivity and relationships between lines, nodes and polygons.

**transfer format**
The format used to transfer data between computer systems. In general usage this can refer not only to the organisation of data, but also to the associated information, such as attribute codes, which are required in order to successfully complete the transfer.

**transfer medium**
The physical medium on which digital data is transferred from one computer system to another. For example, CD-ROM.

**transfer set**
A specific NTF term for the data, together with its supporting information, which the customer receives.

**UNIX**
An operating system that supports multi-tasking and is used by many workstations and minicomputers.

**update**
The process of adding to and revising existing digital map data to take account of change.

**vector**
A straight line joining two data points.

**vector data**
Positional data in the form of coordinates of the ends of line segments, points, text positions, and so on.

**volume**
A physical unit of the transfer medium, that is, a single disc, a single cartridge or a single tape.

# Appendix B    Product performance report form

Please photocopy and send completed to:

> Ordnance Survey
> Small Scales Vector Product Manager
> Romsey Road
> SOUTHAMPTON
> SO16 4GU

Problem description or suggestion for:

.......................................................................................

.......................................................................................

.......................................................................................

.......................................................................................

.......................................................................................

.......................................................................................

.......................................................................................

.......................................................................................

.......................................................................................

Quotation or order reference: .....................................................................

Your name: ......................................................................

Company: ......................................................................

Address: ......................................................................

......................................................................

......................................................................

......................................................................

Postcode ......................................................................

Phone: ......................................................................

Fax: ......................................................................

E-mail: ......................................................................

# Appendix C    Extracted listing of sample NTF data

**Note**

The following contains a Strategi tile and is intended to illustrate records.

```
01ORDNANCE SURVEY                       1999103100000130200V \0%
02Strategi_02.99    DEFAULT_02.00    19920515                        000000001%
00Strategi_01.13    19990801               00000000000%
40NU  A*   NUMBERED FEATURE\ROAD & ROAD JUNCTION NUMBERS\0%
40RB001A1  BOUNDED REPRESENTATIVE POINT\POINT SEEDING BOUNDED FEATURES\0%
40RU001A1  UNBOUNDED REPRESENTATIVE POINT\POINT SEEDING UNBOUNDED FEATURES\0%
40FC004I4  FEATURE CODE\NUMERIC FEATURE CODE\0%
40PN  A*   PROPER NAME\DEFINITIVE NAME\0%
40OR004R4,1 ORIENTATION\ORIENTATION\0%
40TX  A*   TEXT\INDEPENDENT TEXT\0%
055310                              Motorway\0%
055311                              Motorway - Under Construction\0%
055312                              Motorway, over other Feature\0%
055313                              Motorway Tunnel\0%
055333                              A Road, Single Carriageway\0%
055334                              A Road, S Carriageway under Const\0%
055335                              A Road, S Carriageway over other Feature\0%
055336                              A Road, Narrow\0%
055337                              A Road, Narrow, over other Feature\0%
055330                              A Road, Dual Carriageway\0%
055331                              A Road, D Carriageway under Const\0%
055332                              A Road, D Carriageway over other Feature\0%
055323                              Primary Route, Single Carriageway\0%
055324                              Primary Route, S Carriageway under Const\0%
```

```
055325                              Primary Route, S C'way over other Feature\0%
055326                              Primary Route, Narrow\0%
055327                              Primary Route, Narrow over other Feature\0%
055320                              Primary Route, Dual Carriageway\0%
055321                              Primary Route, D Carriageway under Const\0%
055322                              Primary Route, D C'way over other Feature\0%
055343                              B Road, Single Carriageway\0%
055345                              B Road, S Carriageway over other Feature\0%
055346                              B Road, Narrow\0%
055347                              B Road, Narrow, over other Feature\0%
055340                              B Road, Dual Carriageway\0%
055342                              B Road, D Carriageway over other Feature\0%
055350                              Minor/Other Road\0%
055351                              Minor/Other Road, over other Feature\0%
055390                              Ferry, vehicular\0%
055370                              Motorway Junction\0%
055371                              Motorway Junction, Limited Access\0%
055372                              Motorway Junction, Under Construction\0%
055379                              Multilevel Junction\0%
055378                              Multilevel Junction, Under Construction\0%
055355                              Roundabout, Primary Route d/c\0%
055374                              Roundabout, Minor/other Road\0%
055377                              Roundabout, B Road s/c\0%
055357                              Roundabout, B Road d/c\0%
055376                              Roundabout, A Road s/c\0%
055356                              Roundabout, A Road d/c\0%
055375                              Roundabout, Primary Route s/c\0%
055365                              Primary Route Services\0%
055364                              Primary Route Services - Limited Access\0%
055360                              Motorway Services\0%
055361                              Motorway Services, Limited Access\0%
```

Ordnance Survey

```
055362                              Motorway Services, Under Construction\0%
055382                              Toll\0%
055510                              Railway, Standard Gauge\0%
055511                              Railway, Stan. Gauge over other Feature\0%
055514                              Railway, Tunnel\0%
055512                              Railway, Narrow Gauge\0%
055513                              Railway, Narrow Gauge, over other Feature\0%
055520                              Railway Station\0%
055530                              Level Crossing\0%
055110                              Coast, Natural, HWM\0%
055230                              Minor River\0%
055211                              Main River, Source\0%
055221                              Secondary River, Source\0%
055212                              Main River, Middle\0%
055222                              Secondary River, Lower\0%
055213                              Main River, Lower\0%
055240                              Canal\0%
055242                              Canal, over other Feature\0%
055241                              Canal Tunnel\0%
055251                              Lake, Seed\0%
055250                              Lake, Margin\0%
055611                              Woodland, Seed\0%
055610                              Woodland, Margin\0%
055421                              Large Urban Area, Seed\0%
055420                              Large Urban Area, Margin\0%
055422                              Small Urban Area, Margin\0%
055423                              Small Urban Area, Seed\0%
055123                              Foreshore, Other, Seed\0%
055122                              Foreshore, Other, Margin\0%
055120                              Foreshore, Sand, Margin\0%
055121                              Foreshore, Sand, Seed\0%
```

| | |
|---|---|
| 055820 | National Park Boundary\0% |
| 055821 | National Park Seed\0% |
| 055620 | Geographical Area Seed\0% |
| 055115 | Sea Seed\0% |
| 055413 | Settlement, Primary Route Destination\0% |
| 055416 | Settlement, not Primary Route Destination\0% |
| 055380 | Gradient, 1 in 7 or Steeper\0% |
| 055200 | Unspecified Node\0% |
| 055825 | Long Distance Footpath\0% |
| 055840 | Civil Aerodrome (No Customs facilities)\0% |
| 055841 | Civil Aerodrome (Customs facilities)\0% |
| 055845 | Heliport\0% |
| 055835 | Radio Mast\0% |
| 055843 | Wind Generator\0% |
| 055844 | Windmill\0% |
| 055142 | Lighthouse (disused)\0% |
| 055141 | Lightship\0% |
| 055140 | Lighthouse (in use)\0% |
| 055111 | Coast, Manmade\0% |
| 055715 | Nation Seed\0% |
| 055710 | National Boundary\0% |
| 055725 | Ceremonial county area - seed\0% |
| 055720 | Ceremonial county boundary\0% |
| 055726 | Ceremonial county area seed, detached\0% |
| 055816 | Battlefield\0% |
| 055815 | Hill Fort\0% |
| 055810 | Roman Road\0% |
| 055812 | Antiquity Detail, Linear\0% |
| 055020 | Carto Name, Water Feature\0% |
| 055031 | Carto Name, Motorway Numbers\0% |
| 055032 | Carto Name, Primary Road\0% |

```
055033                                  Carto Name, A Road\0%
055034                                  Carto Name, B Road\0%
055038                                  Carto Name, Tolls, Misc Carto Text\0%
055040                                  Carto Name, Settlements\0%
055041                                  Carto Name, Primary Route Destinations\0%
055042                                  Carto Name, Motorway Junction Number\0%
055043                                  Carto Name, Mway Junc Ltd Interchange\0%
055060                                  Carto Name, Parks, Moors\0%
055061                                  Carto Name, Important Hills\0%
055062                                  Carto Name, Other Physical Features\0%
055081                                  Carto Name, Roman Antiquities\0%
055082                                  Carto Name, Antiquities\0%
07NDSE    210000520000001000000000000000010000000350000000090000000000000001%
0000000000000000000000000000500000000050000000000000000000000199608011996080100%
23000001000001010000010%
21000001200030273950000 0098146874 0000045417 0%
14000001FC5390PNKIRKWALL - INVERGORDON\0%
23000002000002010000020%
21000002200041391450000 1619946835 3824716285 5000000000 0%
14000002FC5390PNABERDEEN - STROMNESS\0%
15000001000003010000030%
210000031000122271624999 0%
14000003FC5115RU00%
15000002000004010000040%
210000041000122530424999 0%
14000004FC5620RU0PNNORTH SEA\0%
16000001000005000110000001209410%
210000051000102273950000 0%
15000003000005010000050%
14000005FC52000%
16000002000006000110000002144210%
```

```
2100000610001139145000 0%
15000004000006010000060%
14000006FC52000%
16000003000007000120000001034010%
2100000710001000045417 0%
15000005000007010000070%
14000007FC52000%
16000004000008000120000002324210%
210000081000150000000000 0%
15000006000008010000080%
14000008FC52000%
43000001010000000000001010000090%
44000001010000010000090%
45000001000105000000%
2100000910001058240269 0%
14000009FC5020TXN\0%
43000002010000000000002010000100%
44000002010000020000100%
45000002000105000000%
210000101000108564020033 0%
14000010FC5020TXO\0%
43000003010000000000003010000110%
44000003010000030000110%
45000003000105000000%
210000111000111143020533 0%
14000011FC5020TXR\0%
43000004010000000000004010000120%
44000004010000040000120%
45000004000105000000%
210000121000113663020583 0%
14000012FC5020TXT\0%
```

```
430000050100000000000005010000130%
440000050100000500000130%
450000050001050000000%
210000131000115952020720%
14000013FC5020TXH\0%
430000060100000000000006010000140%
440000060100000600000140%
450000060001050000000%
210000141000120707020820%
14000014FC5020TXS\0%
430000070100000000000007010000150%
440000070100000700000150%
450000070001050000000%
210000151000123136020760%
14000015FC5020TXE\0%
430000080100000000000008010000160%
440000080100000800000160%
450000080001050000000%
210000161000125251020660%
14000016FC5020TXA\0%
99End Of Transfer Set0%
```

# Appendix D    Text classifications

| Font identity | Font description |
|---|---|
| 0001 | Helvetica |
| 0002 | Helvetica Bold |
| 0003 | Helvetica Narrow |
| 0004 | Helvetica Light |
| 0005 | Helvetica Oblique |
| 0006 | Helvetica Narrow Oblique |
| 0007 | Helvetica Bold Oblique |
| 0008 | Helvetica Narrow Bold |
| 0009 | Univers Condensed |
| 0010 | Univers Condensed Bold |
| 0011 | Univers Bold Oblique |
| 0012 | Gill Sans Bold |
| 0013 | Zapf Chancery Bold |

The above apply only to NTF; text for DXF is STANDARD.