

# Adding value to the Isle of Wight Street Gazetteer using the Digital National Framework





Isle of Wight Council has successfully migrated their street gazetteer using the Digital National Framework (DNF) principles, using the model previously piloted in Oxfordshire. This means that the Ordnance Survey's OS MasterMap® Integrated Transport Network™ (ITN) Layer is now the base upon which each highway is modelled and to which it is cross-referenced.

Furthermore, the Oxfordshire model has been extended to allow the many urban paths and steps on the island to be included as a compatible extension to the ITN base, and also to build a network of 'C' class roads, cross-referenced to the base network of ITN links.

At the same time the Council took the opportunity to establish a highways terrier based on OS MasterMap polygons to upgrade the previous base of over 200 annotated paper maps. This means that the highways terrier now consists of the OS MasterMap road surface polygons from the roads and tracks layer, classified according to the type of road, and supplemented by the roadside layer, which delineates pavements and verges. Over time, the principles of the DNF architecture can now be applied to this base to represent the fine detail of public and private ownership of roadsides.

This piece of work now provides an accurate map to support public enquiries and provides the sound base needed for the collection of asset data. The integration of other highway information to meet the needs and spirit of the new Traffic Management Act (TMA) is much simplified.

Clear geographic referencing of the highways also simplifies the evolution of the Island's land and property gazetteer.





## The challenge

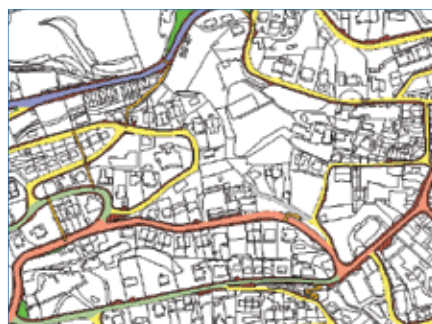
Isle of Wight had for some time been compiling an accurate level 3 street gazetteer based on sections digitised over Ordnance Survey data. Level 3 is a level of conformance introduced by BS7666. It means that streets are defined using individual junction-to-junction sections that are each then defined in terms of a sequence of vertices. There are many problems introduced by this, which are explained in other papers and publications on the DNF website ([www.dnf.org](http://www.dnf.org)). DNF and the use of ITN to source the junction-to-junction links is fundamental to creating a nationally coherent level 3 gazetteer. Local digitising is an essentially arbitrary process that will, at detailed level, produce a different result each time it is done, dependent on the underlying map that is being followed and the whim of the operator. A piece of curved road centreline so followed generates an arbitrary set of vertices dependent on the number of clicks of the digitising tablet, or mouse. The use of ITN dispenses with this local inaccurate digitising and replaces the link definitions with one unique identifier – the ITN Link TOID®, which represents the geometry of that object in a nationally consistent manner.

The network of C-class roads was completely missing from the gazetteer. These roads form an important network of local routes, below the A and B road DfT classification scheme. They are not present in ITN because there is no consistent and unique national numbering scheme for them. ITN links, which are classified as either 'local street' or 'minor road' in the base product, can, however, be usefully associated to these C Roads (83 in the case of Isle of Wight) and thus form a vital local extension to the product fully consistent with its intrinsic architecture.

The road tier defining road classification and ownership was present as colour-wash annotations on over 200 paper maps. These could have been simply scanned and converted to electronic documents. This would not, however, have permitted ready integration with GIS or other land use systems. OS MasterMap topography, which clearly separated roads and tracks from roadside and other land classifications was the desired base to generate this coverage in a consistent way.

A truly interoperable base for management of the highways network needed to be built, against which the data could be properly cross-referenced and managed. This possibility was given a boost by access to OS MasterMap under the new Mapping Services Agreement (MSA). The wish to prepare for a possible Private Finance Initiative bid also meant that more data needed to be collected, and this had to be done as effectively as possible.

The installation of a single point of contact for customers pointed to the need for a common network reference for all queries that might be raised. The customer centre would be able to identify the basic highway coverage, and whether the road in question was A, B or C road, whether public or private, and whether or not it had a pavement. Against this, the operator could service customer queries and directly interact with the Mayrise back-office systems to raise and interrogate queries on road condition, defects, street works or street lighting.



## The solution

Noting the work done to create an ITN-based gazetteer for the whole of Oxfordshire, and similar work just completed for the Brighton and Hove Unitary Authority, Isle of Wight commissioned Dave Simmons, (David C Simmons, GIS Consultant) to undertake a similar exercise for them, but with some new challenges thrown in!

The existing level 3 Street Gazetteer was of high quality in visual alignment to the road network and in completeness, but it did not relate to base network elements in a way that could be extended to other highway use. However, its accuracy did mean that it was a fairly straightforward exercise to establish the underpinning ITN links and cross-reference them.

There were streets not defined and outside the scope of ITN, mainly comprising the 223 urban paths, walks and steps common across the island. There were equally some 1 200 links in ITN, mainly delineating private roads, which were not immediately required for, and have for the moment been excluded from, the Isle of Wight gazetteer.

The solution, as in Oxfordshire, was to use and cross-reference the DNF base of ITN links wherever possible. This would allow the geography to be aligned to the nationally maintained base and, over time, permit the use of the ITN link TOID as the common key across all highway systems.

Ordnance Survey has recently announced that the 'TOID' is royalty free. This applies to all the nationally unique identifiers for topographic objects (OS MasterMap Topography Layer), individual sections of highway and their road names (OS MasterMap ITN Layer) and property, whether postally addressed or not (OS MasterMap Address Layer 2).



What it means is that cross references amongst these objects can be built using TOIDs, freely transmitted and processed within relational database systems without their use attracting royalties or IPR concerns. It is only for those uses where map display is appropriate that geographic objects need to be displayed and the appropriate Ordnance Survey licences held.

#### Extending ITN cross references

1. Using textual information, 83 C-class roads were built with cross references to their constituent ITN links in the same way ITN builds A- and B- class roads using its inbuilt references.
2. The urban path network retained its local digitising to supplement the ITN network base.

#### Creating the road coverage terrier

The base of over 200 paper maps defining highway extents and characteristics had served well as a reference base for many years. However, reference required visits to a cupboard, and the establishment of a single centre for customer queries meant that the information needed to be much more readily available.

There was a concern that the difficulties of update meant that some of the information might be unreliable. A computerised version was needed.

One option explored was to scan and register the paper map information. But this would have provided only a backdrop, not create units of road and pavement surface that could be kept up to date, and would be difficult to relate accurately to the OS MasterMap base, which is increasingly being utilised under the MSA.

A radical course of action was proposed and implemented.

First, the C road network had already been created, so a full A, B and C network, based wholly on ITN links, now existed for the island – a motorway-free haven! Secondly, local knowledge was used to check the adoption status of all the remaining highway, to ensure that the classifications exported as part of Additional Street Data for use in the Electronic Transmission of Notices (ETON) were as accurate as possible.

Now DNF could swing into operation! The ITN links comprising each Unique Street Reference Number (BS7666 USRN) are known. ITN already has DNF association to all the OS MasterMap road and track polygon TOIDs. Therefore the underlying surface associated with each USRN could be cross-referenced and classified.

Extracting the pavements (man-made roadside) and verges (natural roadside) complete the underlying map of highway interest.





## The detail – and the future

## Benefits

### 1. Refining the ITN base.

Comparing the details of the local gazetteer to ITN is enabling ITN link naming to be improved, based on more precise local knowledge of where each road starts and finishes in rural areas.

### 2. Some street names are not public or private along their whole length.

There are some 90 cases on the island. In many cases the split occurs at a junction, and the surface associated with individual links rather than the whole USRN can be classified. In other cases if the need exists, surface polygons can be split locally using methods being developed as part of the DNF Expert Group work.

### 3. Representing the classification of junctions.

ITN links typically relate to three road surface polygons, a long one for the link, and boxes for the junctions at each end of the link. Neighbouring links also refer to those junctions, so there is a conflicting classification to resolve at the junction box.

The highways engineer expects that a junction will be associated with the highest class of road to indicate its importance. So, for example, if a B road crosses an A road, the junction should be considered as A.

Since ITN links are DNF compliant and have been cross-referenced to the OS MasterMap topographic base within the product, it was possible to apply these cross references to the surface topographic area TOIDs in the following sequence. Each assignment can be 'overridden' by the next ensuring the highways engineer's requirements are met.

Private is applied first, then Section 38, 'prospectively maintainable' roads (those soon to be adopted) followed by C, B and A.

### 4. Representing the urban path network.

Urban paths do not neatly fall in OS MasterMap polygons, so, in order to represent them, the simple expedient used was to 'buffer' the link, colour the buffer orange to conform to the existing Isle of Wight standard, and add it to the surface coverage layer. Work is underway within the DNF Expert Group to refine a linear referencing scheme, which can be applied to integrate this extended network data so that it can also be used for routing applications.

### 5. Currently, the pavement and verges are not split by a link.

Work is under investigation to assist with such splitting.

- Migrates an existing street gazetteer to an up-to-date, nationally consistent base.
- Provides a sound base to attach property to highway links in subsequent Local Land and Property Gazetteer work using OS MasterMap Address Layer 2 principles.
- Puts the paper maps onto a sound DNF footing for future updating.
- Allows map information previously available in cupboards to be easily shared.
- Enables C-class roads to be managed coherently as part of the overall network.
- Provides a clear visualisation of highway extent and classification for use in servicing customer enquiries.
- Provides a base for the collection of asset data.
- Provides a common framework for integrating all highway data, assuring compliance with the Traffic Management Act, and reacting to future requests for interrelated data.



This case study has been produced on behalf of the DNF Expert Group.

A more detailed study on this application can be found by visiting the DNF website at [www.dnf.org](http://www.dnf.org)

For more information on this case study please contact:

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