

Positional accuracy improvement policy

**Positional accuracy improvement production
methodology**

Data Collection and Management
Corporate policy

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1 Introduction

This document defines the Ordnance Survey policy for revising rural 1:2500 vector mapping detail to a higher positional improved accuracy.

The policy is designed as a high level reference for Ordnance Survey staff.

Corporate Geospatial Data Manager is responsible the policy and ensuring it is adhered to.

2 Background

New survey technologies mean that it is now practical for Ordnance Survey to capture data to a greater absolute accuracy. Absolute accuracy relates the position of features to the Ordnance Survey National Grid.

This greater level of accuracy of data is however causing problems in rural areas mapped at 1:2500 scale. Fitting this higher accuracy work into existing data that has been captured using less accurate capture methods is causing problems. Data at 1:1250 scale is not affected. The survey capture methods used in these areas has no consequent fit problems when integrating data. Data captured at 1:10 000 scale is only affected where Ordnance Survey upgrades selected 1:10 000 areas to 1:2500 accuracy standards. Data captured at smaller scales, such as 1:50 000 are unaffected.

As a result Ordnance Survey has instigated a national programme, the positional accuracy improvement (PAI) flowline, to improve positional accuracy of 1:2500 mapping where accuracy falls below minimum standards.

The impact on PAI on customers and the consultation that took place with user groups resulted in the decision to create link files for existing customers.

3 Purpose

PAI will see the movement of existing data to an improved position. This movement will result in a more consistent accuracy standard of data for rural areas. Furthermore, it will benefit the future additions of new building developments and other changes, as well as providing better correlation between Ordnance Survey map data and customers' own GPS positioned resources.

For our existing customers, who use Ordnance Survey data to under-pin their own data, newly positioned Ordnance Survey data will not be synchronised with theirs. To assist existing Ordnance Survey customers in moving their data assets towards the new map data positions, a decision for Ordnance Survey to create link files was made. Existing customers on maintenance contracts will, on receipt of new PAI data also receive corresponding link files. This enables them to use link files and appropriate transformation software to move their data in accordance to any shift patterns that have been identified in the Ordnance Survey map data as a result of positional accuracy improvement.

4 Scope

The PAI programme in the main coincides with the current five year National Sweep Programme of rural areas for real world change (RWC).

Digital map units (DMU's) in the PAI programme are:

- all 1:2500 scale DMUs;
- DMUs captured at 1:2500 scale but stored at 1:1250 (quadrantised 1:2500);
- parts of 1:10,000 mapping upgraded to 1:2500 scale; and
- dual accuracy DMUs (of capture standard AB DMU's, the B part is updated for PAI).

All areas of the country updated for PAI will require the creation of link files. There will be the need for only one national cycle programme for PAI.

5 Deliverables

5.1 Description of terms

5.1.1 Link files

Pairs of corresponding old and new coordinates, which define the local shift due to PAI movement at each point. Link files will be supplied to existing customers to allow them to transform their own data towards the new map position using software. It is important that the link files are constructed to give an accurate representation of the underlying shift, so customers data can be transformed successfully.

Link files will be supplied with every PAI 1:2500 scale map tile that is resupplied to customers holding an existing maintenance agreement. The file is in comma separated value (.CSV) format and contains the coordinates (in metres) of both the original position and the new position of selected points together with the feature code of the selected points.

5.1.2 Geometric Fidelity

Geometric Fidelity is the measure of the integrity of the relationships of real world objects to their digital representations. The principal geometric fidelity is that any real world alignment or shape must be accurately reflected in the data, for example:

- detail which is square on the ground must be represented as square in the data and shapes must be accurate;
- alignments, which are straight in real life, must be represented as straight lines within the data;
- lines of sight, which pass through points should, when plotted at the scale of the original survey, pass through the plan positions of the corresponding points; and
- adjacent features should be in sympathy with each other as regards alignment, distance apart and orientation.

5.1.3 Relative accuracy

The relationship between the measured distance between two well defined points on the ground and the representation in the data of the same.

5.1.4 Absolute accuracy

The relationship between the true position on the National Grid of a well defined point on the ground and the representation in the data of the same.

5.1.5 Rural towns upgrade

The improvement of absolute and relative accuracy of small towns mapped at 1:2500 by upgrading the contents of the bricks and mortar of the plan to the accuracy and content standards of a 1:1250 (see 5.1.8). The rural area of the plan will be updated to the accuracy and content standards set out in 5.1.7.

5.1.6 Link files deliverables

See '*Positional Accuracy Improvement Link File Specification*'

5.1.7 Rural sweep deliverables

- To achieve absolute accuracy of +/- 1.10 metres Root Mean Square Error (RMSE), a normal distribution of errors and a maximum error of 3.00 metres.
- To achieve relative accuracy of +/- 1.00 metres RMSE, a normal distribution of errors and a maximum error of 1.90 metres. For short distances the following maximums apply:

Distance	Maximum error
0 to 10 metres	0.80 metres
10 to 50 metres	1.00 metres
Over 50 metres	1.90 metres

- To achieve geometric fidelity that is no worse than the original data.
- Data that already meets the required standard will not be moved unless required to maintain relative accuracy or geometric fidelity with improved data.

When revising rural 1:2500 vector mapping for positional accuracy improvement, there is a requirement to ensure relative accuracy and geometric fidelity are not degraded. When detail that requires repositioning is moved, it must be ensured that surrounding data is moved in sympathy, thus ensuring standards of relative accuracy and geometric fidelity are not degraded.

5.1.8 Rural towns upgrade deliverables

- To achieve absolute accuracy of +/- 0.40 metres RMSE, a normal distribution of errors and a maximum error of 1.0 metres.
- To achieve relative accuracy of +/- 0.40 metres RMSE, a normal distribution of errors and a maximum error of 0.80 metres. For short distances the following maximums apply:

Distance	Maximum error
0 to 10 metres	0.30 metres
10 to 50 metres	0.40 metres
Over 50 metres	0.80 metres

- To achieve geometric fidelity appropriate when viewing or plotting the data at 1:1250 scale.

When revising rural towns vector mapping for positional accuracy improvement there is a requirement to ensure relative accuracy and geometric fidelity meet the standards above. When detail that requires repositioning is moved, it must be ensured that surrounding data is moved in sympathy, thus meeting the standards.

5.1.9 Positional accuracy improvement (PAI) collar tiles

Where 1:2500 vector data has been updated for PAI, there will be instances where surrounding (collar) data will have not been updated for PAI. To avoid mismatch or jagged edges and to ensure seamless data, collar data will be edge-matched to the newly positioned PAI data. The collar data will have the SQNAME header field updated to NRPCOL for identification. The collar data will be updated for PAI at the soonest future date.