Department for Business Innovation & Skills

AN OPEN NATIONAL ADDRESS GAZETTEER

Written by Katalysis Limited

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A report by Katalysis Limited for the Department for Business, Innovation and Skills

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An Open National Address Gazetteer

Executive Summary

UK society relies heavily on address data and current products have helped greatly to create benefit. The review has determined that Open usage would result in substantial and valuable growth among new user types and with even greater community benefit. The recommendation is that a basic address product should be free to all users at the point of use under the Open Government Licence while premium versions would still be sold, leaving current production and maintenance roles much as they are today.

Issue

There are increasing calls for address data to be treated as a national asset that is free to use and re-use. It has been widely accepted that addresses represent a Core Reference dataset and many consider that it should be part of Open Data. The argument put forward by proponents is that the wider economic and social benefits are likely to far outweigh the costs while recognising that there are quality, maintenance, legal and financial issues to be dealt with in achieving a transition from the current position involving commercial products.

In November 2012 the Open Data User Group (ODUG) presented the Data Strategy Board (DSB) with a case for the release of a free national address database. Ministers have asked a cross-government group of officials to assess the feasibility with a clear elaboration of the likely benefits and a clear statement of the costs.

While noting that the **free** national address database is desirable, Ministers have stated that securing the single **definitive** national address register remains the essential policy outcome, and as such, consideration of the feasibility of a free register should be assessed in this context.

A free address database would be a new policy direction for the Government. It has been recognised that work is needed on the feasibility of the proposal including the costs associated with the maintenance and upkeep of a free database, legal issues and the impact on the bodies that currently own, manage and distribute the data. The privatisation of Royal Mail and the role of its address data is also an important consideration.

Scope of the Review

Katalysis Limited was appointed in February 2013 to undertake this independent review. Analysis has been carried out of the current products along with consideration of user requirements and options for Open Addresses. The work has been conscious of the Open Data objective that public information should be accessible and freely available to the widest number of organisations, both internal and external to Government but also with

awareness of current structures and constraints. Detail appears in the main report.

The review has also considered the potential for efficiencies and cost savings in current practice. While not the focus of this review, it has received attention. The review particularly has not been focussed on issues of future ownership of the address products.

The work has been commissioned and facilitated by BIS and has involved government sponsors and data owners. These are BIS, Cabinet Office, the Treasury, Royal Mail (RM), GeoPlace, Ordnance Survey (OS) and the Local Government Association (LGA) as well as local authority (LA) representatives. There have also been discussions held with representatives of ODUG, the Open Data Institute, the Advisory Panel on Public Sector Information and selected other bodies. The review has concentrated on the situation that pertains in England and Wales, but taking account of parallel developments in Scotland and Northern Ireland.

It was not intended that this review would provide full economic appraisal, which would have required much more time and resources. Further discussion with data owners and evaluation of favoured options will be required. However, the approach has sought to ensure that the implementation options are properly evidenced to the extent possible with available data (pursuing gaps where they exist). The analysis has been complex and challenging, but there are a number of existing published papers setting out the issues associated with address databases, which have been drawn on such that work was not repeated. The report seeks to provide an independent assessment and sufficient evidence on which advice can be given to Ministers on feasibility and options. It was recognised at the outset that firm evidence on Open Data is extremely hard to obtain and there would remain details to be examined beyond the review.

Current Status

There are currently two principal sources of national address data, from Royal Mail (RM) and GeoPlace[1]. Royal Mail owns and maintains the Postcode Address File (PAF) of postal addresses, while GeoPlace produces spatial address products (with added grid reference coordinates) that include data from Local Government, Ordnance Survey and the Postcode Address File. This involves GeoPlace holding the IPR in the National Address Gazetteer (NAG), which is recognised by Government to be the single, definitive national address register. That sometimes differs from the common public perception that postal addresses are definitive.

The NAG is consistent with the British Standard for addresses (BS7666) and includes a Unique Property Reference Number (UPRN) for each address. This data linkage reference is the subject of increasing and important attention across a range of users.

Royal Mail earned some £27m in 2011/12 from sales of PAF, while GeoPlace revenues were approximately £10m in that year. Ordnance Survey sells and disseminates NAG addresses as the AddressBase series of products, incorporating data from PAF and from

[1] GeoPlace is a public sector limited liability partnership between the Local Government Association and Ordnance Survey.

Scotland and including Royal Mail terms in the licences. Recently, government and Royal Mail have been negotiating a Public Sector Licence for PAF to cover users of the Public Sector Mapping Agreement (PSMA), and discussions are ongoing. Notwith-standing umbrella agreements, address data is released as commercial products and any changes that would result in all or part of them being made free could result in considerable costs to government.

RM has over 37,000 licenced users of PAF, mostly serviced indirectly through its Solutions Providers, and some business sectors are particularly well represented. Similarly, there are some 1000 users of the OS AddressBase product range (about half of these are through the PSMA) that includes grid reference coordinates for the addresses. Principal commercial sector users of AddressBase are found in the utilities and in some financial institutions. The levels of usage have much to do with the relative prices of the products as well as respective market sizes and applications – most users of PAF do not require geo-referencing. However, in spite of success in gaining users, licence complexity and, in some cases, price has deterred large numbers of potential users of the detailed products, including academic researchers[2], Web platform providers, mobile App developers, vehicle navigation vendors, not-for-profit bodies, small businesses and SME product developers as prominent examples.

Since this review began there have been some material developments that are reflected in this report and its conclusions. These include:

- A government announcement that PAF would remain in Royal Mail ownership following privatisation;
- A Royal Mail decision, following discussions with the Cabinet Office, to make some concessions on availability of PAF to micro-businesses, small charitable organisations and online users;
- Publication of the Ofcom review of PAF;
- A Royal Mail consultation on simplifying the PAF licence.

Until 2011, there were competing address data sources and there was widespread call for a single, definitive gazetteer (an address database including spatial coordinates). Following the considerable step forward arising from the creation of GeoPlace, and alongside other government initiatives, attention has shifted to the argument for addresses as Open Data. This distinction between definitive addresses and ‘free at the point of use’ is important and has conditioned the focus of this review.

User Requirements for Open Addresses

The users and the applications for addresses are very wide ranging. Furthermore, the users of PAF are quite a different group from those using AddressBase. The emphasis of this investigation has been on potential usage and added benefit, largely in untapped

[2] There is no central purchasing of PAF or AddressBase for the academic community, but it has come to light that several bi-lateral arrangements have been made for use of AddressBase for specific academic research and there have been individual purchases of PAF. Ordnance Survey states that it is beginning to investigate the possibility of an Academic group licence, partly prompted by this review.

market areas, rather than to confirm the considerable value already achieved by traditional users. The review has found that there are significant levels of unmet demand in addition to the well-established user base.

Current users are clearly able to justify the prices of the products and to accept the licence arrangements. But that is not true for many non-users. However, it has been noticed that there are some user types that are not aware of special terms and discounts and, to an extent, communication is an issue.

The existing suppliers of addresses have been active for some years and know their markets and user requirements very well. New developments in e-commerce and mobile applications, while novel in many ways, appear to operate along traditional address lines. In general, engagement with users is good, the current content of the products represents largely what users require and there would not be a great change in specification as a result of a transition to Open Addresses. But important new markets are apparent and delivery mechanisms would need to change.

While there are calls for improvement to coverage and content, and additional needs for certain applications, it can be said that the current products are generally of high quality and fit for most purposes. Throughout this review consistent, strong opinion has been received that maintenance of the quality of the products must not be compromised by a drive to have Open Addresses.

Not all users need the full set of data that is available nor the immediacy associated with frequent updates. It is already recognised in the current products that one size does not fit all. Many advocates of Open Addresses would be satisfied with a fairly basic version with limited content or that is a periodic snapshot of the most valued aspects of the data, namely a full set of addresses together with their grid reference coordinates.

Access to Open Addresses would require new ways of packaging and delivery, including more online facilities. It would also imply managed measures to receive feedback from a wider audience of users and to include accommodation of improvements from increasingly effective 'crowd sourcing'[3] , implying that all users could propose changes to deal with issues that they have detected. Delivering definitive addresses to a much greater user base and interacting well with those users has the potential to achieve new benefits and enhance product quality.

It has been mentioned that Open Addresses does not equate to definitive addresses. Furthermore, Open does not have to mean free. Sometimes (as in The Netherlands) it might make sense to charge a small amount that does not discourage use in order to offset some of the cost of management and supply. Open does, however, tend to equate to minimal licence burden, such as the Open Government Licence, which does not restrict re-use of the data.

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[3] Crowd sourcing is the practice of obtaining needed services, ideas, or content by soliciting contributions from a large group of people, and especially from an online community, rather than from traditional direct customers, employees or suppliers. While there are obvious quality risks to be set against the value of a large resource, the practice is growing rapidly and being managed through formal update procedures to growing positive effect.

Benefits of Open Addresses

There have been many studies of the value of public sector information (PSI) and, within that, of Open Data. Across these exercises, huge benefits to society have been identified, some measurable, most intangible. Methods and robustness vary, but the common thread is that the benefits are often measured in billions of pounds, although the number of billions differs from study to study. According to a new McKinsey report (October 2013), "research suggests that seven sectors alone could generate more than $3 trillion a year in additional value as a result of open data." Even studies of the value of address data alone speak of many millions or even billions of pounds of benefits. It is incontrovertible that addresses are universally used as an identifier for individuals and businesses and therefore now have intrinsic value in the running of our society, delivery of public services, business applications and everyday life. Coupled with location coordinates, their ready availability becomes even more important.

Considering availability in the modern era, with the increase in World Wide Web facilities and inexpensive or free mobile Apps, one can see that the explosion of data usage has far exceeded expectations of, say, ten years ago. Usage of location searching is vast and it is reasonable to say that users exploit the facilities because they receive benefit. It is argued that the benefit would be even greater if the better quality address data that is currently underused in some sectors was to become more accessible. Today, there are many new ways in which usable surrogates for address data can be derived from tracking of mobile devices and from capturing Web data entries. Looking ahead some five years, it is very likely that the address products considered in this report will have to become more open or they will risk being supplanted by already emerging open sources that might not be as good, but will be adequate for the mainstream and that will improve over time. There is a real risk that such alternative sources of addresses will gain credibility and threaten the important work being done to establish and promote definitive addressing.

There is uncertainty over the level of growth in take-up that would occur if addresses were free at the point of use. Similarly, it is hard to estimate accurately what benefit would accrue to a growing number of users, many different from today. It seems apparent (from economic theory, logic, and similar experience) that there would be growth and that users would only take up data if they receive benefit. Of course, it is not just free data but the total cost of ownership, including skills, tools and support, which needs to be considered. Despite the lack of market demand data, it is generally accepted that some types of SMEs are currently a low usage group and that the efficiency of their businesses could be enhanced by ready access to more accurate and reliable address data. The report comments further on these points.

Parallels exist that indicate the expectation of growth and benefit. When data that has not been accessible becomes available (the Web is the extreme example), growth and benefit can be vast. The take-up of Open Data has been substantial. A few pertinent parallel UK examples, where data that was previously charged for became free at the point of use, are:

- Population census – at a high price and underutilised until the 2001 census when the Census Access Project allowed users to have free availability. The growth in take-up

was large, allowing better planning and services, allocation of resources, commercial activity and research.

- Public Sector Mapping Agreement – Over 3000 public sector organisations now have free access to important OS data, including addresses, with government purchasing this centrally from OS. Usage has grown considerably among many that were not buying the data and there is evidence of considerable benefit. The OS Web site says, “Membership of the PSMA gives you access to high quality mapping in a digital format which brings many benefits and supports a wide range of business activities.” and lists prominent examples of the benefits.
- OS OpenData – Eleven OS products that were previously charged for have been made free to all users with government also purchasing this centrally from OS. Usage has grown markedly and an independent report for BIS has indicated substantial benefit, although at a relatively high ongoing cost. Among the products is Code-Point Open (a representative grid coordinate for each unit postcode), which is directly related to addresses and which rapidly found its way into applications and products that did not exist under the old pricing regime.

It is hard to properly quantify or value Open Data activity since most usage is not tracked once enforced licensing ceases. More market analysis would help, but there is enough strong anecdotal evidence to see that the change to Open Data or free access can have striking consequences. The address suppliers certainly proclaim the merits of the Open Data and ‘free at the point of use’ initiatives that they have helped to sponsor so far and, through these, the Open Address process has already commenced, with significant numbers of additional users now having access.

There are tangible benefits available from Open Addresses, assuming that usage increases as anticipated. These range from organisations saving effort on licensing through to people saving time on journeys by having better directions or by not losing their way. It is likely that growth in the use of an Open PAF would result in better quality addresses in the mail, with more accurate postcodes, and that this would give Royal Mail an operational cost saving, although Royal Mail says it does not think this would be significant. Private and public sectors would use consistent addresses, bringing commercial as well as social benefits. This review has not sought to put numeric values on such results, many of them impossible to quantify, but individual user sectors are discussed and indication of growth and benefit is extensive. Wider social benefits, which can be greater than the direct financial consequences, are particularly difficult to measure. The benefits appear likely to be substantially greater than the costs of making the data Open although it is not possible to express them simply in monetary terms. As with many such topics, investment decisions will involve judgement and belief, rather than hard economics.

Finally, it is noted that a decision to treat addresses as Open Data will resonate with a series of government policy directions such as Open Data, Less Red Tape, Digital by Default, Innovation and Transparency. Similarly, it would be consistent with a general government drive to encourage re-use and a presumption that public sector data should be Open (free or at marginal cost), as reflected in the Open Data White Paper, Information Fair Trader Scheme, Exceptions to Marginal Cost Pricing, a National Information

Infrastructure and the EU Directive on the Re-use of PSI. It would support the recent signature of the G8 leaders' Charter on Open Data.

Options Considered (with detail in the main report)

The principal distinctive options (with some overlaps and variants) appear to be as follows:

Totally Open – To make the full range of address products free at the point of use requires a dramatic change to procedures, responsibilities, ownership, business models and funding. This presents risks to current business activity and to maintenance of data quality and it is recognised that many organisations can afford to pay for the considerable value received. The potential cost to government would be high, notwithstanding the benefits in some markets. It can be noted, however, that there is an expectation of some efficiencies in data collection, as described in the next option, which might reduce costs to an extent.

Evolving status quo – This is the base 'do-nothing' option, although it recognises that some things are changing anyway. The Ofcom review has identified that PAF licensing can be substantially simplified – RM launched a consultation in August 2013. Ofcom also considered that RM would be incentivised to reduce its PAF cost base through removal of the voluntary profit cap that tied costs to income. Efficiencies appear to exist elsewhere in the complete address management life cycle as indicated in the next section. With a critical review of costs and where they are allocated, it is considered that the cost, and hence the price, of address products can be reduced, resulting in greater take-up and benefits. There is also scope for more umbrella deals to purchase free access to address data for defined user groups. Outside influences are likely to result in competing, if less satisfactory, address products. Other than these points, there is little that suggests at present that OS or RM will develop Open approaches of their own accord, given their operating constraints.

Extended bulk purchases - It would be possible to arrange new group procurements or to extend existing ones, along the lines of the PSMA or the emerging PSL. This might cover academic research or a commercial consortium, for instance, or extend current deals to fringe participants such as Housing Associations or GPs. While such purchases would increase the number of organisations that have addresses free at the point of use, they would not open address data to several of the sectors that represent innovation and growth. This option would effectively be moving toward Open Addresses without going for a comprehensive solution.

New charging models – It is possible to identify different pricing structures that could bring some benefits of Open Data while retaining a charging regime. One model would be for data owners to charge to resellers who would build the addresses into their products or services, but who would not be obliged to charge or licence addresses on to users. There are complications with such models, including difficulties with defining the market fairly and avoiding bulk addresses being passed on, but it is conceivable that these can be overcome. The RM licensing consultation proposed such a model whereby Solutions Providers would pay for end-customer access to PAF an a usage basis, counting each search of PAF, but would not be obliged to pass charges on to users, only the requirement to count. This seems to be a feasible model in the traditional PAF market but it is difficult to see how it would work in a modern, Web-and-mobile-enabled world and it certainly does

not sit well with any attempt to develop Open Addresses.

Addresses as an Open Service – In discussion with the Cabinet Office, Royal Mail has offered (June 2013) to extend the number of free on-line PAF lookups for personal use from 15 to 50 per day. It would be possible to extend this model to include the grid references, UPRNs and other data that GeoPlace adds to PAF data. If OS made such added-value data available on the Web, it would stimulate certain types of Open Data activity. This seems to be a sensible 'quick win'. Its potential practicality and effectiveness will depend on rules for re-use determined by RM.

Freemium – It would be possible for data owners to elect to release a basic ('Lite') product as Open Data that would satisfy many users while leaving higher value products for sale. This Freemium model is a common market tactic with many data and software vendors with the aim to attract new Lite users who might subsequently upgrade. The product aspects that can be considered variable for addresses are content, resolution, detail and frequency of supply. The immediate candidate Lite product is AddressBase[4]. This product is simply PAF addresses with grid coordinates applied by GeoPlace – OS currently releases it every six weeks. With a few modifications, this would meet the needs of much of the research, Web developer, mobile App, not-for-profit and SME target audiences, while still allowing those that need frequent and more detailed data to purchase premium versions. It could be released less often, perhaps annually.

OS and RM do not consider that the additional upgrade, operational or image gains from a Freemium decision would offset their loss of revenue, so it is not likely that they would pursue this themselves. In fact, RM considers that an infrequent basic product would impact badly on PAF income and has indicated that, should OS wish to offer Open Addresses, it would contain most of the value of PAF and OS would still have to pay PAF royalties.

Another sub-option that can be investigated is that local government might produce a Freemium product from its gazetteers to contain the 'official' local authority address. Other data items that might be provided, such as postcodes, grid references and UPRNs, would be a matter for discussion with other parties.

A commissioned Open product – While Freemium is strictly a commercial decision for data owners, Government could work with users and the data owners to specify and commission a suitable Open Addresses product. This should be based on existing, available data and processes and, in principle, could be technically similar to the Freemium product described above. Open does not have to mean entirely free in this case and it is possible that data owners could gain new premium product users and costs could be covered to offset some of the investment required from government to support this option. At present, OS and RM have indicated that even a basic Open product would have substantial impact on their revenues, although this needs further consideration. An Open Addresses product commissioned by Government is the favoured option from this review.

[4] The basic version of AddressBase is the lowest content dataset in the address product family from Ordnance Survey, which also includes AddressBase Plus and AddressBase Premium. The data is sourced from the National Address Gazetteer and the One Scotland Gazetteer.

Seeking Efficiency

In commissioning this review, BIS also asked for thoughts on achieving cost savings in addressing. Essentially, this involves rationalising address change intelligence and reducing the need for separate organisations to hold and manage their own address databases.

There is duplication and other inefficiency in the way that addresses are managed in this country, some of it appropriate or necessary in the current environment, but some avoidable. Most notably, the difference that sometimes occurs between postal addresses and the definitive addresses contained in the NAG (sourced mainly from local government gazetteers) can be real but is sometimes artificial. This is generally manageable, although there is duplication in work to identify new and changed addresses. GeoPlace matches the definitive addresses to the PAF to identify common properties that have differing addresses, although it would be possible to bring the sources closer together by operational changes. Some government bodies that deal with addresses on a national level (particularly the Valuation Office Agency (VOA) and HM Land Registry) maintain their own address databases to deal with operational requirements, whereas it would be possible to devise methods for them to base their work on the NAG (there is a regular match of the VOA addresses to the NAG but the databases remain separate). Currently, local authorities keep and maintain copies of their parts of the NAG, but access to a more efficient centralised hub operation is feasible.

The concept of an address hub has been around for some years. While not specifically directed at Open Data, this efficiency proposal has benefits that would be compatible with the Open agenda and would facilitate the move to Open Data. The concept is that definitive addresses would be maintained and disseminated from a central repository (the NAG is the appropriate emerging model). All users would access the hub online with suitable linkage arrangements that would recognise their specific operational requirements. For example, Royal Mail would have access to postal versions of the definitive addresses where these need to differ, local authorities would use the Hub online rather than mirror the data locally, VOA and HMLR would use the Hub but associate their own references to tie in their specific data sources and the emergency services could use the Hub but hold their own compatible extensions for specific types of addressable object. The Hub vision would help to drive down costs and increase the penetration of definitive addresses in general use.

Operating the hub would not be the same as maintaining and verifying the address change intelligence, managing postcodes, defining the address location grid references or allocating UPRNs. Those specific and important tasks should be part of the life cycle of addresses involving cooperation between the parties best placed to provide the intelligence.

Conclusions and Proposed Actions

This review has reached the following conclusions, with more detail in the main report:

A. Open addresses

1. Interviews and familiarity with a range of bodies and parallel evidence indicates that there would be a substantial benefit from making some level of address data free at the point of use and it is considered that this would far outweigh costs of doing so.

2. As an immediate action, government should liaise with the data owners to encourage 'Addresses as an Open Service' – a more full-featured variant of the Royal Mail decision to allow up to 50 free online PAF lookups per day.

3. It is recommended that government should sponsor specification and provision of an Open Addresses product as a periodic snapshot of the main existing products. This can be a modified version of the basic AddressBase product for Great Britain and should be Open Data, free or inexpensive at the point of use. This will satisfy immediately most end user needs for Open Addresses, leaving the current data suppliers able to provide and charge to the sophisticated market that requires more frequent and detailed releases. This would be a durable approach that is achievable in the short term and would also provide valuable market evidence for future decisions on addresses.

4. The costs of this practical proposal and requirements for funding need to be developed with the data owners. There will be some loss of existing revenue against which can be set some savings or income from new users. A small charge for the product could defray some of the cost, although this would not result in a fully Open regime and is best avoided. Alongside this, current costs and prices associated with the main address products could be reduced over time. There appear to be no legal barriers to this proposal, although that will need inspection.

B. Address data management

5. Address data now underpins a vast range of vital activity. It is essential that definitive address data, as one of the most central Core Reference data resources, is of high quality and maintained to a reliable and predictable standard. Investment to ensure this central objective should not be lost due to an Open Addresses initiative.

6. The role of local government as a key player in addressing requires special care and attention to ensure that its ability to perform vital addressing functions is not compromised and, ideally, is supported with legislative guidance. In particular, local authorities should not have to find additional resources to support any move to Open Addresses without suitable funding.

7. A long-term aim should be to work toward a national address gazetteer maintenance and distribution hub (although not necessarily operated by the public sector) that is used by all bodies that need access to the definitive data. Among other benefits, this would increase emphasis on common use of definitive addresses and would reduce operational duplication. There are additional integration efficiencies available from a full recognition of the address creation and change life cycle that fit well with the hub concept.

8. There would be complex practical and financial issues in achieving this hub aim and it is possible to identify steps along the way. The hub and efficiency proposals require

further study and impact assessments.

C. Next steps

9. Subject to Ministerial consideration of these conclusions, it is recommended that data owners should be asked to help to fully evaluate the favoured option(s) so that their costs and implications can be assessed.

10. A dedicated governance structure with a public sector Senior Responsible Owner would be essential to oversee the evolution and management of the Open Addresses policy. It does not exist within current arrangements, although it is possible that current responsibilities could be modified. A plan for on going user engagement and representation would be required, including how the success of Open Addresses will be measured.

1 Introduction

1.1 Background and Scope of Report

This review was requested by Ministers following a recommendation by the Data Strategy Board. The prompt for that recommendation was a paper from the Open Data User Group entitled *The Case for an Open National Address Dataset*[5].

BIS commissioned the review, enlisting expert technical support from Katalysis Limited. Close liaison has been maintained with BIS, Cabinet Office and the Treasury on the conduct of the review and it has involved consultation with interested parties, including the principal address data owners – Royal Mail, the Local Government Association, Ordnance Survey and GeoPlace. The review has been focussed on the situation that pertains in England and Wales, but taking account of parallel developments in Scotland and Northern Ireland.

It is Ministers' objective that information should be accessible and freely available to the widest number of organisations, both internal and external to Government. While noting that a free national address database is desirable, Ministers have stated that securing the single definitive national address register remains the essential policy outcome, and as such consideration of the feasibility of a free register should be considered in this context.

In conducting this work, it has not been presumed that an Open Address resource is the correct current answer. Furthermore, it is not necessarily the case that Open in this context must mean free. The project team has discussed the pros and cons with participants and has considered the weight of evidence and options available.

An Open Address gazetteer would be a new policy direction for the Government. It was recognised that work was needed on the feasibility of the proposal including the costs associated with the maintenance and upkeep of a free database, legal issues and the impact on the bodies that currently own, manage and distribute the data. The privatisation of Royal Mail and the role of its address data is also an important consideration.

There is potential for efficiencies and cost savings in current practice. While not the focus of this review, it has received attention. The review was particularly not focussed on issues of future ownership of the address products.

[5] http://data.gov.uk/library/the-case-for-an-open-national-address-dataset-november-2012-0

1.2 Gazetteers, Registers, Lists, Databases and Sources

Several ways of describing an address resource exist and are interchanged in common usage. For clarity, in this report the following meanings apply.

Register – An official or authoritative list that implies registration or an obligation to maintain completeness and currency. In National Statistics terms, this might also extend to become an address list/gazetteer/database that includes statistical attributes that are linked rather than registered.

List – A relatively simple (in structure) compilation of addresses that might also include additional attributes about the address

Gazetteer – An address list or register that also contains geographic location details, such as grid references. A gazetteer can also contain data linkages that reflect topological structure.

Database – A computer representation of an address product

Source – a generic term that can refer to any of the above.

2 Status of UK Address Data

2.1 What is an Address?

In the widest sense, an address is an object that can be located on the ground and be given an identity. That is the meaning of an address in generic terms and as represented, broadly, in national gazetteer initiatives. The British Standard, BS7666, defines an address as “a means of referencing an object for the purposes of unique identification and location”.

This differs from the public perception of an address, which is a term for the building occupied by a dwelling or business, most often its postal address. The distinction is important, since it pervades discussions of a national address infrastructure.

Addresses have many forms, and applications differ by type of organisation. Examples of applications involving various types of address include:

- Postal and service delivery
- Verification of identity for services or to prevent fraud
- Identification of consumers for targeted marketing
- Transactions of land and property*
- Taxation*
- Connection of utilities*
- Emergency services*
- Location of events*

*These types can include non-habitable facilities and structures

It can be seen that, while most applications of addresses involve locations where people live and work, there are important needs for identification of a wider set of addresses. Nevertheless, the greatest interest remains in the use of postal addresses along with their positions on the ground. This also seems to apply to the call for Open Addresses.

Even without trying to accommodate all types of addresses, there are complicating factors in defining a conventional address. The dynamics of the addresses, both of the physical entities and the occupants, add to the complexity – dwellings with multiple occupants are a notable example and up to date business addresses are difficult to maintain.

A specific point of interest is the geographic referencing of addresses. Most commonly, addresses can be referenced to locational coordinates, from Ordnance Survey mapping or GPS. Sometimes an approximate reference is adequate, as in the representative centroid of a postcode (the Code-Point product). For some applications, it is appropriate to reference an address through a boundary polygon. Appendix B contains an illustrated clarification of these points.

2.2 Users and Non-users

Addresses and addressing are fundamental aspects of modern society. As indicated, they underpin delivery of goods and services but have much wider applications.

In the UK, address data is of high quality and is widely used in an active market. The main providers of address data in the UK currently charge for their products, at prices that reflect the quality and value but that are relatively high internationally. Furthermore, the current licensing models are complex. These factors naturally deter some important classes of users from taking the most accurate, definitive products, including:

- Web search providers that support location information
- Small businesses and small applications developers
- Small users at fringes of major usage (e.g. GPs, Housing Associations)
- Not-for-profit organisations

At an early point in this review, academic researchers were identified as a very important group that was frustrated by lack of ready access to address data. Although there is no central purchase agreement in place, it has been found that there have been some licences granted to individual research projects, but this remains a group that would benefit from improved consideration.

It can be noted that it is more usually licence conditions that are a barrier, although price is an issue, mainly for the location data. Royal Mail recently announced some limited concessions to small developers and small not-for-profit bodies, but many are outside the scope of those offers.

Until 2011, when the Public Sector Mapping Agreement was introduced, such that address data was free at the point of use, government (in several forms) was not using high quality address data at the level that was desirable. That has changed for the better, including a subsequent central payment of PAF royalties under the PSMA. More comment on the benefits appears in Chapter 5.

The argument that address data should be generally free at the point of use is largely premised on likely further growth of usage of this valuable resource rather than financial savings to those that are currently paying for licences. It is therefore necessary to identify the scale of penetration of usage under the current regime and how this might grow, and with what benefit. Saving on licensing effort has also been identified as material.

2.3 Recent Evolution of Addressing

Chapter 3 discusses the main address products. Postcodes were introduced from 1959 to 1974 by the General Post Office and incorporated in the National Postal Data File. A constant since the early 1980s has been availability of the Postcode Address File (PAF). Developed originally to support mail delivery, and with a focus on automated sorting of

mail, PAF has improved and evolved to be important well beyond its original applications.

In 1976, a government transport planning exercise, the Regional Highway Traffic Model, with support from the Office of Population Censuses and Surveys (OPCS), added a 100-metre resolution grid reference coordinate to each postcode for the locational coding of travel surveys. OPCS went on to maintain and release this inexpensive file under the title Central Postcode Directory (CPD). This launched a significant new application – spatial analysis or location based on address data.

Soon after, software tools to make PAF easily accessible were launched, beginning with the Quick Address product. These provided a correct PAF address to users that could give just a postcode and property name or number. The usage grew so that such tools, and variants, became widely adopted and now form an important and regular interface between public and private sector organisations and citizens.

In 1987, Ordnance Survey forged a relationship with Royal Mail to add high resolution coordinates to each address in PAF, under the name ADDRESS-POINT (later giving rise to Address Layer 2 as part of the MasterMap family of OS products). This was an important step and the spatial gazetteer became an essential element of the activity of key users such as utilities. It was sold at a fairly high price and many prospective users made do with a much cheaper derived product (Code-Point) that ascribed (1.6 million) single representative coordinates to unit postcodes, replacing the CPD under the multi-agency GridLink initiative. Code-Point Open became Open Data (free to all users at the point of use under a modified Open Government Licence) in 2010 as part of OS OpenData. It is, in itself, a suitable spatial reference product, adequate for many applications, although much less precise and detailed than the coordinates for some 27 million individual postal addresses.

During the early 1990s, Ordnance Survey, local government and others began together to develop the concept of the National Land and Property Gazetteer (NLPG) with the aim of creating a single, definitive address resource. Unfortunately, the parties were not able to agree on some technical and commercial matters and local government alone developed the NLPG as an essentially competing product to PAF/ADDRESS-POINT, basing it on the emerging British Standard for addresses – BS7666. Among the significant developments was to bring together the data of all local authorities in England and Wales and to forge an operational link with the Valuation Office Agency address data.

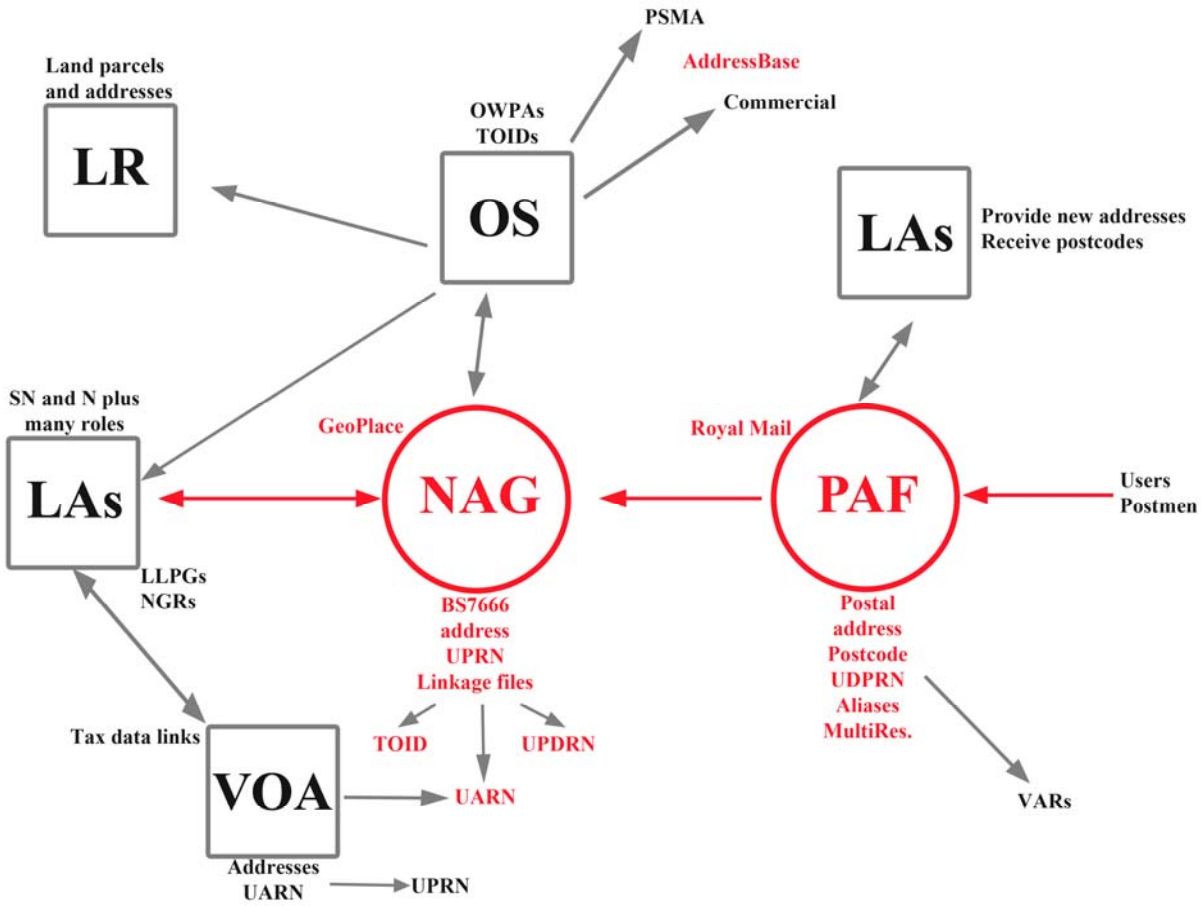
Local government and OS were not able to find a way to collaborate and, similarly, a satisfactory relationship was not developed between the NLPG and PAF activities. The details of the unproductive discord over a fifteen year period are not necessary to this report except to note that it led to a call by the Association for Geographic Information and others for a single, definitive set of addresses in the national interest. A notable requirement was for the 2011 population census, which had to spend several million pounds to merge the incompatible sources to obtain a best picture of the address base. Two separate attempts (Project Acacia and the ODPM National Spatial Address Initiative) were unable to resolve the impasse.

Finally, the welcomed GeoPlace initiative brought the parties together in 2011 to provide

the NAG as the basis for definitive addressing. The commercial AddressBase product family from Ordnance Survey is derived from the NAG and includes PAF addresses under licence.

The figure below shows the main entities and information flows in the current environment. The position in Scotland and Northern Ireland is somewhat different. That is described in Chapter 3.

The Address System Today



The box that follows presents some pertinent commentary on this diagram. The points illustrate some strengths of the current process but, also, areas where there is scope to reduce duplication and to seek greater efficiency (see Section 6.10).

1. Local authorities (LAs) are the most significant source of data on new addresses and on address change. This arises from their wide range of duties and they also provide the address grid references and UPRNs. They have a close and necessary relationship with the NAG, providing feeds from their local gazetteers to the national hub (NLPG) and also dealing with queries and issues raised by GeoPlace. In addition, LAs provide new addresses (but not change intelligence) to Royal Mail, for which English and Welsh LAs receive £1 per address.
2. GeoPlace maintains the NAG and ensures agreed levels of national consistency and quality. It also matches the NLPG to PAF and to the VOA address database on a periodic basis and develops the cross-reference tables.
3. VOA has regular data exchange with LAs to support the Council Tax and Non-domestic Rates functions but maintains its own address database. It has access to the equivalent NLPG addresses and UPRNs through the GeoPlace matching, and that matching also helps to improve the NLPG.
4. Ordnance Survey takes the NAG addresses and provides them to customers as the AddressBase range of products. It also provides some OWPAs for incorporation in the NAG and carries out additional quality assurance. Many parties, including LAs and Land Registry (LR), use detailed OS mapping.
5. Land Registry takes daily updates of OS mapping and maintains its own address data. There are currently no mechanisms for LR updates to find their way back into the other data sources.
6. RM adds postcodes to new addresses from LAs and maintains PAF. Most PAF sales to users are through resellers (Solutions Providers). RM receives update intelligence from postmen and from users of PAF but not, currently, from LAs or GeoPlace.

2.4 Relevant Developments

This section mentions recent developments that have a bearing on the issue of Open Addresses.

Open Data agenda – The UK government (and the international community) has embraced the concept of Open Data with considerable vigour and resources. There is a presumption in most cases that public sector information will be Open. While there are exceptions, notably for Trading Funds such as OS, these are becoming less common, and free at the point of use or marginal cost pricing have become the norm. The Open Government Licence is being adopted widely. Addresses were mentioned as an issue in the Open Data White Paper and it is a paper by the government sponsored Open Data User Group that has sparked this review.

Open Data parallels – Three specifically funded schemes have set the scene for Open Addresses by paying centrally for address data free at the point of use to public sector

bodies. These are:

- Public Sector Mapping Agreement (full range of OS address products included)
- OS OpenData (including Code-Point Open) – also free to all other sectors
- Public Sector Licence (PAF) – negotiation ongoing

Privatisation of Royal Mail – The Postal Services Act 2011 enabled the Government to privatise up to 90% of Royal Mail, with 10% being held by Royal Mail employees. On 12 September 2013 HM Government announced its intention to proceed with an initial public offering (IPO) of Royal Mail, which took place in October. It had been stated that PAF would be a component of that privatisation and, as regulated by Ofcom, controls are in place to ensure its continuing availability to users on reasonable terms.

Ofcom Review of PAF – Ofcom published its review of PAF in February 2013 as a consultation that closed on 21 March. It has since reported on the consultation in July. While not commenting on the issue of an Open PAF, it made some proposals that have a bearing, notably:

- The PAF profit cap linked to costs should be withdrawn since it has poor incentive qualities for cost minimisation
- Efficiencies should be sought in PAF costs
- The costs of PAF (2011/12 revenues £27m pa) should continue to be recovered entirely from sales of the product
- PAF licensing should be simplified

The impacts of the above proposals are likely to result in a PAF that is less costly to maintain and with more permissive licensing, factors that would make the move to Open PAF more feasible, depending on the licensing decisions.

PAF price concessions – In June 2013, Royal Mail unveiled new measures designed in collaboration with Government that included:

- Free access to PAF for independent small charitable organisations;
- Free access to PAF for one year for independent micro businesses to support them in developing PAF-based products and taking them to market;
- An increase in free online address look-ups on Royal Mail's website from 15 to 50 per day.

The first of these represents a small move toward Open Data but leaves out most important not-for-profit organisations. The second seems likely to have little impact in Open Data terms, since RM already has an effective developer licence arrangement. The third is a useful concession with wider potential and features in one of the options identified in this report.

PAF licence consultation - In August 2013, Royal Mail launched a consultation that was prompted by the Ofcom review. The consultation (now closed) presented four options

designed to simplify licensing and make it more permissive, but strongly favoured one option. That approach is to focus licences on its resellers (Solutions Providers), allowing them to decide how to charge end users. But it does involve counting each access to PAF, even for end users. In that respect, while the 'click' concept might be appropriate in traditional PAF markets, it is hard to see how it might operate in a Web-and-app-enabled world and it certainly does not seem to support any move to Open Data. The consultation does recognise that the putative Public Sector Licence would not fall under the click regime, so that leaves open the possibility that there might be exceptions for other markets, including an Open agreement.

International parallels – There is a growing international recognition of the importance of addresses to society and their role as foundation data. Danish and Dutch experiences, in particular, are cited as examples of government decisions to open address data. The Danish model has made address data free while the Dutch levy a small supply charge. Both have claimed substantial benefits relative to the costs. While there are significant differences of national culture and practice to be borne in mind, the policy decisions and outcomes are still relevant.

Also on an international basis, the Universal Postal Union has published a White Paper[6], which states:

> *"There is no doubt that addressing – the network of road names and house numbers – constitutes a key element of functioning societies. While a single address in itself does not constitute a public good, the national address infrastructure, of which it forms a part, is an essential public good, and through interoperability with international systems the totality of addressing networks can be determined as global public good. Address infrastructure provides access to the rights and duties of citizens from the local to the international level, as well as providing businesses with access to markets. All echelons of society should thus have equal access to address infrastructure in order to capture the social and economic benefits at the local, national and international levels."*

2.5 Issues of the Status Quo

Addresses are a special case relative to most candidate Open Data in two main ways. First, in addition to their direct applications, they are a most important foundation for referencing other information. Second, the data products are able to generate considerable income from many users that find them valuable. In other respects the normal principles and objectives of Open Data can apply, but there is a balance to be struck between commercial and taxpayer funding.

This review has encountered considerable informed opinion that the current pricing levels of address products (particularly locational versions) is a deterrent to use in some markets. But a more strongly held view is that the existing licensing models are particularly onerous in terms of both take-up and the cost burden that they place on users and intermediaries.

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[6] From the Executive Summary *Addressing the world – An address for everyone* The White Paper, Universal Postal Union, Berne Switzerland, 2012.
http://www.upu.int/fileadmin/documentsFiles/activities/addressingAssistance/whitePaperAddressingEn.pdf

There is a strong, evident tide of opinion and evolution that suggests that address data should be made Open.

Although they are inter-connected, there is a distinction to be made between PAF (postal addresses) and AddressBase (spatially referenced addresses, including PAF and a wider set). The call for each of these to be made Open differs by user community, and it is the addresses with spatial referencing that appear to be of greatest interest.

CodePoint Open already provides a degree of spatial referencing for addresses and is adequate and useful in many contexts. Its grid references are generally good approximations that can be applied to a range of applications such as location mapping, area analysis and navigation, although in the latter case suppliers have done extra work to interpolate the real address locations. But there are many examples where it is clear that users are making do with CodePoint Open when they really require the individual address coordinates.

There appears to be a growing adoption of the UPRN[7] for data linkage in public sector databases. Local government has pioneered the advantages and The Department of Work and Pensions is a prominent new adopter. It is understood that some utilities are also considering use of the UPRN. However, unless a large proportion of private sector organisations adopt the definitive address products and the UPRN, there will continue to be differences and inefficiencies between activities. It is thus important that the UPRN, like the postcode and the national grid reference should be in the public domain, free of any commercial control.

In principle, addresses seem a simple concept, but this is not true in practice. While people can relate readily to a common concept of the domestic address in a house or flat, these can often be complex entities, with an overlay of institutional establishments, unconventional dwellings, mixed commercial/residential properties, varied household structures and multi-occupancy. The picture is further complicated when considering the vagaries of business addresses and, further, non-habitable, non-postal entities that have an ‘address’ of interest to the utilities, emergency services, tax collection and many other operational functions.

As indicated in the diagram in Section 2.3, there is duplication and other inefficiency in the way that addresses are managed. Further thoughts on the issues are presented in Section 6.10.

[7] The Unique Property Reference Number as specified in the British Standard BS7666:2006 and contained in the NAG and AddressBase range.

3 Current Address Products

3.1 Two Principal Sources

As indicated in Chapter 2, there are two main modern addressing resources – the Postcode Address File from Royal Mail and the National Address Gazetteer from GeoPlace. There are important operational links between the two and Ordnance Survey sells and distributes variants of the NAG under the product name AddressBase. Some legacy products remain in use and are supported, notably ADDRESS-POINT and Address Layer2 from OS.

There are also equivalent but distinct sources in Scotland and Northern Ireland, as described below.

3.2 Postcode Address File (PAF)

Royal Mail (as the Post Office) created and has the IPR in PAF. The Royal Mail Web site profiles PAF as follows:

> The Postcode Address File (PAF®) is the most up-to-date and complete address database in the UK, containing over 28 million addresses. PAF® is an invaluable tool for creating and maintaining mailing lists and databases, as well as reducing the number of returned or undelivered items.
>
> - Database of all known UK addresses and Postcodes
> - Reduce address input time for your call centre staff
> - Eliminate database spelling mistakes and formatting errors
> - Improve or remove poor quality address data and validate your customers' identity
> - Create new customer mailing lists
> - Allow people to look-up addresses online
> - Save time and re-posting costs by correctly addressing mailings
> - Capture "verified" customer address details
> - Quicken your web checkout process with "address auto-fill" and help avoid abandonment's
> - Use postcode data for customer profiling
> - Promote a professional image by getting it right
> - Available in a range of file and media formats
> - Daily, monthly or quarterly data updates
> - Try before you buy with our First Steps CD-Rom
> - Prices from £75 for an annual licence, with data supply from £300
> - PAF® is the only complete source of all known UK Postcodes.
>
> **Please note -** Raw Data contains no software and must be processed for use in IT applications.

It is important to recognise that the addresses in PAF represent 'delivery points' for mail. This is a distinct strength of PAF in terms of its utility but also its limitation for some applications. PAF is a very high quality representation of delivery points and has useful but partially complete companion files for multi-occupied addresses (those that are known to Royal Mail) and for address aliases where parts of the address can have alternative names. While business names appear in PAF (and are important for delivery in multi-occupied buildings), these are not always essential for delivery of mail and are incomplete. PAF is not geocoded at source – this function is performed under its agreement with GeoPlace. Appendix A shows the contents of PAF.

Under section 116 of the Postal Services Act 2000[8], "the owner for the time being" is required to maintain PAF and to make it available to any person wishing to use it on reasonable terms (which can include the payment of a fee). Royal Mail makes PAF available through a licensing regime[9] whereby end-users pay licence fees in order to use PAF data, either directly to Royal Mail or (more often) indirectly via resellers of products that incorporate PAF data. Public online lookup of PAF is also provided and, since July 2013, this has been extended from up to 15 to 50 free lookups per day.

PAF is distributed to entities via the terms of a generic Data Supply Agreement. Approximately 250 Solutions Providers, 150 licensed Bureaux and 900 Direct End-Users regularly receive PAF. Updates to the dataset are available on a daily, monthly or quarterly basis. Additionally a developer licence offers free access to sample PAF data for innovation purposes – over 700 organisations have taken up this trial licence and over 50 of these have converted to PAF users. Micro-businesses (less than ten employees) can now have full PAF free for pre-commercial development for up to a year.

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[8] 116. **The Postcode Address File**.—

(1) The owner for the time being of the Postcode Address File shall—

(a) maintain the File, and

(b) make the File available to any person who wishes to use it on such terms as are reasonable. *….more….*

(2) Compliance with subsection (1) shall be enforceable by civil proceedings brought by the Commission for an injunction or for interdict or for any other appropriate relief or remedy.

(3) In this section—"the Postcode Address File" means—

(a) the collection of relevant information which, immediately before the coming into force of this section, was owned by the Post Office, or

(b) that collection as it is from time to time revised, and "relevant information" means postcodes in the United Kingdom which may be used to facilitate the identification of delivery points for the purpose of providing postal services.

(4) The terms which may be imposed under subsection (1)(b) include terms as to the payment of such fee (if any) as the owner considers appropriate.

[9] In August 2013 RM launched a consultation on new licensing options that might impact on options for Open Addresses identified in this report. The outcome of that consultation is not yet known.

In more than 95% of cases PAF is licensed to an End-User as part of a wider software solution or service. With this reseller role comes the responsibility of administering the user licences and the royalty payments back to Royal Mail. In some cases of larger Solutions Providers, this can be a considerable cost to business. The large majority of Solutions Providers and End-Users require access to 'Full' PAF – i.e. premises level data rather than Part PAF (or postcode level data - the partial file excludes property numbers and business names).

A key example of a PAF reseller is Ordnance Survey, which takes the grid references applied to PAF addresses by GeoPlace and sells the resulting added-value product in the AddressBase range (and continues to sell legacy products called Address Layer 2 (AL2) and ADDRESS-POINT). OS also provides the derived product Code-Point, a representative centroid coordinate for each unit postcode, which is now released to the public as an element of OS OpenData.

There are over 37,000 end-users of PAF, the vast majority of which are outside of the mail and delivery sector. About 2000 licenced organisations are in the public sector. These numbers indicate that there is a substantial market that is able to pay current prices and that can accept current licence arrangements. Appendix A shows the pricing of PAF.

PAF revenues and costs

PAF financial figures for the last two years were:

Financial Year	**2011/12**	**2012/13**
Revenue	£27.1m	£27m
Cost	£24.5m	£25m - £19m People costs, £2m Other
Profit	£2.6m	£2m

The 2011/12 figures were taken from the Ofcom review of PAF while the 2012/13 totals are from the Regulatory Financial Statements[10]. Ofcom, the Royal Mail regulator, notes that a significant majority of the costs of PAF are internal costs that would need to be incurred by Royal Mail for the purposes of providing the universal postal service. They are described as necessary costs for the provision of PAF in its current state. The additional costs associated with making PAF available for third party use are relatively small. However, all costs allocated to PAF are currently recovered from licensees as part of their licence fee. At present, Royal Mail pays a standard large user licence fee for its own internal use of PAF.

[10] http://www.royalmailgroup.com/sites/default/files/Regulatory_financial_statements_2012-13_v2.pdf
Notes to the 2012/13 numbers: On operating profit: In 2012-13, costs were allocated to each product channel by allocating daily collection and delivery common costs across all services. However, management believes that the cost of the combined network should most appropriately be allocated to USO products in the first instance. If this were the case, under the current revenue structure, USO services would be significantly loss making, whilst the non-USO products would be profitable. (USO=Universal Service Obligation)

The markets for PAF in terms of revenue shares in the previous year were:

Percentage of PAF licence revenues by type of end-user, 2010-11

Sector	%
Distance selling	10.8
Education	3.2
Financial services	17.3
Government & Health*	19.0*
Manufacturing	4.6
Media & co-suppliers	3.2
Other business	10.8
Publishing	12.4
Retail	10.7
Utilities	4.4
Wholesale & distribution (including mail operators)	3.6

* Around 2,000 public sector organisations use PAF.

There is ongoing discussion for Government licences to be subsumed in a new PAF Public Sector Licence.

PAF Advisory Board

The PAF Advisory Board (PAB) was created in 2007 (see below) to give independent advice to the Address Management Unit of Royal Mail on behalf of PAF users. Its members cover independent postal operators, value added resellers of PAF (Solutions Providers), web platform companies, mail users and public sector users. It is independent of Royal Mail and Ofcom.

The PAB Web site states:

"The role of the Postcode Address File is very considerable in the UK; providing data that underpins all types of public sector, financial, and commercial activity with citizens and customers.

The main uses of PAF include:

- *in postal services and goods distribution*
- *address data capture software*
- *database cleansing, and data quality management*
- *market research and statistical work*
- *geo-location products and services e.g. in-vehicle navigation*
- *identification and authentication tools*
- *direct marketing and location based marketing services*

- *public services planning and provision*
- *acting as a core reference tool, enabling data sharing and integration"*

In 2012, the PAB published a report "*Estimating the Economic value of PAF*". While the numbers are naturally speculative, the report estimated its value to the UK economy to be between £992m-£1.38bn per annum.

PAF regulation and reviews

The previous postal regulator, Postcomm, completed a review of PAF in 2007, followed by a further review in 2010/11. Its 2007 review set a 'co-operative' regulatory approach to PAF (which was essentially retained following the later review) including:

- creating the independently chaired PAF Advisory Board (see above) to represent users and influence Royal Mail's behaviour on operational issues;
- ring-fencing PAF into a distinct Address Management Unit (AMU) within Royal Mail;
- setting a voluntary target profit cap on PAF of 8-10% above operating costs.

Ofcom is now the regulator and has reviewed PAF following a direct request from the UK Government. In November 2011, Ed Davey MP, then Government Minister for Postal Affairs, wrote to Ofcom requesting that it conduct a review of PAF's pricing and licensing framework and suggesting that the review should seek to:

- ensure the licensing framework incentivises wider take up and use of PAF data;
- ensure the data is made easily accessible to customers and users on reasonable terms;
- ensure that the licensing terms are as simple and light touch as possible;
- drive efficiency in the maintenance and distribution of PAF;
- ensure the integrity of the data is maintained.

In June 2012, Ofcom received a letter from Norman Lamb MP, the then new Postal Affairs Minister, requesting that Royal Mail's cost base for PAF should be explicitly brought within the scope of its review.

As a result of the review, Ofcom has made proposals on three key aspects within the scope its review:

- In terms of cost allocation and recovery, that Royal Mail should continue to be able to recover all the costs of PAF from licensees.
- On the pricing and licensing framework, encouraging Royal Mail to simplify the licensing regime as part of their current review of the pricing and licensing framework, supported by PAB.

- With regard to the terms on which PAF is made available, providing high level guidance as to the factors Ofcom may consider when assessing whether such terms - both price and non-price terms - are reasonable.

Ofcom also set out its concerns about the current profit cap applied to the profits of PAF, and its negative impact on Royal Mail's incentives to grow the take-up and use of PAF and to make efficiencies in the cost base.

The review was published in the form of a consultation on 7 February 2013 and the consultation period ended on 21 March. The report on the consultation, published in July 2013 re-confirmed these proposals. Ofcom will continue to have a regulatory role over PAF following the privatisation of Royal Mail.

3.3 National Address Gazetteer (NAG)

GeoPlace is a limited liability partnership owned equally by the Local Government Association and Ordnance Survey. It has built a synchronised database containing spatial address data from 348 local authorities in England and Wales, combining them with Royal Mail, Valuation Office Agency and Ordnance Survey datasets. The NAG Hub database is owned by GeoPlace and is the authoritative single source of government-owned national spatial address information, containing over 225 million data records relating to about 34 million address features. GeoPlace is a production organisation with no product sales or supply operations. The NAG is made available to public and private sector customers through Ordnance Survey's AddressBase products.

The data structure of the NAG data is based on the British Standard BS7666:2006. This relates to addresses in the widest sense and goes beyond postally addressable premises to form a definitive national infrastructure of addressing. It uses the persistent UPRN as its designated data linkage mechanism. A special category of entity is termed Objects Without Postal Addresses (OWPAs) – OS provides many of these to the NAG from its map data and other sources. The local authorities now provide the grid references for addresses – until recently a special unit in OS set up to manage AL2 did this work.

GeoPlace allocates to the Local Land and Property Gazetteer (LLPG) custodians in local authorities sequential batches of UPRNs, which are assigned by the LLPG custodian at the creation of a new address. Other bodies are also allocated UPRN ranges, including Scottish and Northern Ireland gazetteer managers and, in principle, emergency services and utilities, which have a need to hold extended, compatible gazetteers about their special interests.

As a key component of the NAG, GeoPlace also maintains and owns the National Street Gazetteer (NSG). BS7666 requires all addresses to be related to a street and the NSG is a composite of local highway authority inputs.

GeoPlace matches the NAG to the VOA address database every month, providing a valuable mutual check of contents and giving VOA a UPRN for each of its addresses. It also matches to PAF, again for NAG quality improvement and to include postal versions of

addresses in the NAG. Through these processes, an important series of equivalences are maintained, with linkage of unique references – UPRN (NAG), UDPRN (PAF), UARN (VOA), TOID (OS).

Prior to the establishment of GeoPlace, a company called Intelligent Addressing (IA) maintained the National Land and Property Gazetteer (NLPG) Hub on behalf of local government. That process of consolidating LLPGs remains a central element of the NAG. The NLPG design principles were very similar to the current NAG approach except that the earlier NLPG did not have direct content from OS or RM. Separately, OS produced and sold address products (ADDRESS-POINT and AL2), which were based on PAF with grid references added by OS and including a feedback loop to RM on intelligence from its grid referencing and surveying.

IA was purchased by GeoPlace in 2011, with a transfer of IPR and staff, which allowed the NAG to be created, linking the main address sources. In its last year of trading (2010), IA had a cost of £2.7m and 30 staff. GeoPlace now has 35 staff and its cost (2011/12) was £6.3m. This includes some continuing cost for the purchase of IA plus some additional functions and enhancement to facilities and IT in keeping with operating a formal national hub. GeoPlace contracts and is charged for certain services from Ordnance Survey, such as HR support. It receives its income from AddressBase sales after a 5% deduction by OS to support marketing and sales activity, data supply and product management. GeoPlace recorded net revenues of £9.5m in 2011/12 and a profit of £3.1m. Currently, the profit is divided between OS and LGA in a 75:25 ratio, reflecting initial investment inputs.

AddressBase

There are three products sold by OS that are based on the NAG and the One Scotland Gazetteer (see below):

- **AddressBase** – essentially reformatted PAF addresses that have been matched to the NLPG plus their grid references
- **AddressBase Plus** – with further address details, classifications, LA versions of the addresses, street information and OWPAs
- **AddressBase Premium** – a full representation of NAG content, including entity history and unique code linkages

Appendix A shows the data contents of the AddressBase range. The products are released as snapshots of the NAG every six weeks and a change only update option is available.

AddressBase products are high value data for specialist usage, priced as shown in Appendix A. Because of the price, AddressBase products are not used as widely as PAF, although it has been argued that those customers that receive sufficient value have justified the expense. While the headline cost of AddressBase appears very high (£189,370 per year for the full specification and national coverage for 101+ terminals), for most users the cost will be much lower (e.g. 12.5% of this for a single seat licence and national cover). Usage and geographic discounts can reduce the price considerably,

although still appearing relatively high for many types of user.

The annual income is about £10m as reflected in the GeoPlace accounts with about half coming from the PSMA. The number or breakdown of actual users is hard to estimate since half of the revenue comes from the bundle of OS data in the PSMA and usage in the PSMA is not tracked (in common with many Open products). However, OS states that over 568 PSMA users take address products direct (sales via resellers are not disclosed for reasons of confidentiality). As with PAF, many users outside the PSMA consider the OS licences (which refer to PAF terms) to be restrictive and difficult.

AddressBase is a candidate in this review to become Open Data, rather than just PAF, since it contains a wider set of addresses and the grid coordinates that many users require. It also contains the UPRNs that are seen increasingly as a common currency for data linkage.

3.4 The Role of Local Authorities

Local authorities require special mention as the primary source of address intelligence. Through their statutory Street Naming and Numbering duties, they allocate addresses to new properties and, through other statutory functions, including Planning, Electoral Registration, Council Tax and Housing Benefits, they detect changes in the addresses. Their ongoing business needs ensure attention to the addressing function although, as with all activities, their resources are stretched.

LAs each maintain a Local Land and Property Gazetteer (LLPG) to a common specification and supply these to GeoPlace under a data cooperation agreement to support the NLPG and, hence, the NAG. All LAs comply with the requirements to a basic level and most do excellent work, although there are some differences in practice and in diligence, most often due to pressure on resources. With 348 authorities involved, it is difficult to ensure consistent performance and GeoPlace provides quality checks and support where needed.

Sometimes LAs are asked to take on extra duties, like checking NLPG/PAF matching anomalies for the 2011 population census or differences found in VOA or PAF matching by GeoPlace. There are sensitivities over the scale of this work, again mainly due to resource constraints, and particularly when they find that address data referred to them from third parties is incorrect and could have been improved by using the LA version or, as often happens, it is found that a notified change was already present in the LLPG. There is scope to improve efficiency in addressing by a better recognition of the LA functions although there is also a need to improve uniformity and effectiveness across LAs.

In any future policy direction regarding addresses, it is essential that the central role of LAs is understood and used as a foundation for quality and efficiency. It will be important not to load extra effort onto the Councils without providing additional resources, and there is an argument that the functions should be further supported with investment and mandated in order to maintain the high standard of addressing that is required.

3.5 Products in Scotland and Northern Ireland

It should be noted that PAF covers the entire UK. This national coverage and consistency is significant in terms of future decisions regarding addresses.

The One Scotland Gazetteer (OSG) is separate from the NLPG for England and Wales but is essentially the same in terms of principles and operation, although with some difference in specification. The OSG Portal is managed by Forth Valley GIS Ltd, under a service level agreement with the Improvement Service, funded by Scottish Government to manage, operate and develop OSG as one of the foundations of modern public services in Scotland as part of the Improvement Service's Customer First Programme. This Scottish Government-backed programme is designed to help councils deliver more convenient and responsive public services, encourages online access to services and ensures that at least 75% of core service requests can be handled at first point of contact. The Improvement Service is a partnership involving all 32 Scottish local authorities, the Convention of Scottish Local Authorities (COSLA) and the Society of Local Authority Chief Executives (SOLACE).

While the OSG operates independently of the NAG, there is considerable cooperation. Furthermore, the OSG contributes separate but compatible data to the AddressBase products through a formal Data Supply Agreement with Ordnance Survey and receives £145,000 pa in return, which is used to offset the running costs of OSG. Scottish local authorities decided not to take the Royal Mail offer of £1 per new address that is paid to the LAs in England and Wales as there was a view held over many years that as accurate address data as possible was essential to support public services, either through PAF or OSG. It may also be noted that Scottish Government, after taking legal advice, did not recognise any Royal Mail IPR in OSG, partly based on the premise that address data from Street Naming and Numbering was provided to Royal Mail free of charge for them to update PAF and to then return the postcode for the OSG address back to the originating local authority, also free of charge.

Pointer is the address database for Northern Ireland and is maintained by Land & Property Services (LPS), with input from Local Councils and Royal Mail. Pointer was created originally by a data-matching exercise on address datasets maintained by OSNI, Royal Mail and the Valuation & Lands Agency. This was followed up by an extensive ground validation exercise to verify addresses that did not match.

This is now the common standard address data for every property in Northern Ireland. It is important to note that Pointer is a dataset for addressable buildings in Northern Ireland. Each building uniquely identifies a Primary Addressable Object (PAO). A PAO is defined as the 'physical footprint', i.e. the building shell. Each property has a Unique Property Reference Number (UPRN) that represents the Secondary Addressable Object (SAO), e.g. a residence or business within a building.

While Pointer is available in BS7666 format (as distinct from being BS7666 compliant), it is not strictly compatible in specification or combinable with the NLPG and OSG data. However, Pointer has been allocated a set of UPRNs from the NLPG national hub, and UPRNs are thus allocated to all addresses within the dataset. This is intended to ensure

consistency of UPRNs across the UK. Each building is assigned a geographic position (Irish Grid coordinate) and a postal address.

4 User Needs from an Open Address Gazetteer

4.1 A Vision to Support Requirements

As stated in Chapter 3, there has been great progress in the last few years in working toward a definitive address gazetteer (the NAG) and on improving the quality and inter-connectivity of the main sources. However, none of the existing address products yet meets the full set of current needs, and licensing and operational barriers to progress remain. To help develop a specification for a National Spatial Address Infrastructure in 2004, a set of fundamental requirements was listed by ODPM and ONS and an update of this (to current terminology) appears in the box below. These remain valid and have been used as a frame to express a high level specification of requirements that are presented in this Chapter.

Fundamental requirements to be satisfied by a National Spatial Address Gazetteer
(Source: National Spatial Address Infrastructure, ODPM, 2004)

An agreed territorial extent (GB, UK).

Comprehensive, covering all types of addresses/properties:

- all postal points/addresses;
- all households/dwellings at multi-occupied addresses;
- all communal establishments;
- all business addresses;
- all non-residential addresses used by people;
- other objects (potentially useful for activities and local events that are not person-based).

Constantly updated to retain currency.

Maintained to meet a minimal quality specification (e.g. a high level of coverage of 99% and no differential under-coverage (at least 98%) such as in complex inner cities or fast changing areas).

Maintained dynamically with a facility for virtual access and available on a regular basis (at least monthly) or on customer-driven spot dates.

Clearly identified address introduction and termination dates to provide a capability to produce historic files.

Data obtained from the widest available sources to maximise coverage, currency and quality.

Not constrained by the Intellectual Property Rights of any organisations.

Updating information from Local Authorities from LLPGs or other sources but to an agreed regular process.

Addresses with spatial locators:

- a Unique Property Reference Number to facilitate data exchanges;
- a high resolution grid reference (GB, and Irish if UK coverage is required);
- links to other unique address references or other parcel identifiers.

Compliant with address structure standards (i.e. the BS7666 standard) and with INSPIRE.

Owned by government in the national interest

The points that follow reflect an abstract high level statement of requirements for combined definitive and Open addressing that would need to be detailed further in a project plan by the lead body charged with implementation and management, under appropriate governance and in liaison with appropriate stakeholders. In practice, many of these requirements are now in place.

The vision is thus for a resource that is government owned, under ministerial sponsorship, and which can be discharged at a national and coordinated local level. A distributed approach to address maintenance is anticipated, under central coordination, with a central hub repository in the longer term, and with persistence of existing data and referencing where possible.

4.2 Principles of a Specification of Requirements

The brief for this review called for a statement of user needs. This section lists the main considerations related to user requirements. Many of these points are already reflected in current products. The intention here is to relate requirements to an ideal future for definitive and Open addresses, with the transition to that state described later.

A Fundamentals of the Specification

Geographic coverage – The aim should be to achieve a UK resource. It is recognised that the Scottish Executive has sponsored the One Scotland Gazetteer initiative and there are differences between the Northern Ireland Pointer development, which has been in action longest, and the likely structure of a GB approach. Initially, a GB solution is required. This would capitalise on the work done in England, Wales and Scotland but with an aim to continue to reflect or harmonise with NI to the extent possible, particularly for a core set of addresses.

National Infrastructure – The Gazetteer should be an essential part of the e-government national information infrastructure and be seen as a Core Reference.

Standards – The database must be consistent with the British Standard BS7666. An appropriate interpretation and implementation of the standard is required, with extensions where justified. Conformance with (appropriately extended) e-Government standards and with the EU INSPIRE Directive is also required.

Address Identifiers – The UPRN should be the primary unique reference. A maintained link to other codes in common usage is required (e.g. UDPRN, UARN, OSAPR, representative TOID). This linking can be designed both to facilitate data interchange and as an aid to data quality and change intelligence.

Postcodes – Postal addresses must carry the current and accurate postcodes.

Relationship with Existing Address Sources – The gazetteer must build on the good work that has been done in creating PAF, NLPG, NAG, active LLPGs and the AddressBase products and reflect their key content. It must also address the known deficiencies in this existing set of address gazetteers by continuing to improve:

- coverage
- quality
- identification of multi-occupied addresses
- business names
- objects without postal addresses
- maintenance arrangements that reflect the complete address life cycle

Treatment of these matters should be the subject of ongoing detailed and agreed design.

Specification of Contents – In general, the current contents of the NAG and PAF are what are needed although not all elements are needed by most users in an Open gazetteer. See item E.

B Issues to be Resolved

Reflection of User Requirements –The existing products have developed with a close link to users and are generally what is required. The involvement of users will continue and will need to develop somewhat in an Open environment. The current data owners will have their own product development plans that include additional user requirements, and these need to be integrated and assured of adequate resources.

UPRN Authority – It will be necessary for blocks of UPRNs to be allocated so that various parties can apply them. In particular, local authorities need to be able to set UPRNs in an operational timeframe, and possibly other bodies (e.g. emergency services) in addition to the Hub manager. The concept of accredited address matching bureaux may be required, with UPRN authority under an agreed protocol. As this practice grows, care is needed to ensure validation and to avoid duplicate UPRNs, and existing practice is a good guide in this respect.

UPRN Availability – As the primary national reference for data linkage, it is important that the UPRN is in the public domain with no ownership constraints.

Relationship to Other Existing Address Registers – The work plan should state how the integration of external address lists with the definitive gazetteer is to be achieved. This includes LR and the VOA, plus special addresses collected by emergency services. The ultimate aim is for all address requirements to be served by a Hub, but recognising the specific needs of different parties.

Distribution in an Open Environment – Open address facilities and online access will require a different approach to the current distribution of products and will involve new capabilities, and some investment, to take on user feedback. E-commerce and self-service are game changing evolutions, as is the advent of increasing mobile location applications. Addresses are well suited to being presented as Linked Data to support automated information management.

Address Matching and Development Services – Some users may need technical support to work with the definitive hub and to convert their address data and activities in a period of transition. It can be expected that many intermediaries will produce services and products for access for the wider market.

Royal Mail Liaison – There will be an operational need to ensure that RM continues to have access to PAF at the current level of quality, at minimum. Also, the field intelligence provided by postal staff will still be important, although there are opportunities to take on more update intelligence from LAs and hence rationalise the use of postal staff. Ideally, RM will gradually adopt the formal and official addresses in the definitive set, as operational and technology constraints permit, but recognising there will always be special needs for postal versions.

Official Naming – It is also desirable to establish more national consistency and definitive rigour in the street naming and numbering process, and this should be pursued.

C Sources of Addresses and Change Intelligence

Main Sources – It is recognised that existing address files and information on changes can originate in several places. The desired model requires that these are understood and that intelligence is gathered at appropriate times and logical points in the address life cycle, and not in a many-to-many cross-matching relationship. Originators mainly include LAs, VOA, RM, OS, Scotland/NI parallels, but possibly others, such as Land Registry or the Inter-Departmental Business Register. At present, there is scope for improvements in how change intelligence is detected and more focus is proposed on local authority functions. Existing sources should be the basis of future evolution, but crowd sourcing and new commercial providers are likely to grow in importance.

Maintenance Inputs – The maintenance structure should be specified such as to capture change in a timely and quality controlled manner and to ensure minimal duplication of effort and the proper authentication of input. It is particularly important to allow for the address churn (e.g. property splits and merges) that is detected first in the local authority

property taxation and planning functions and in other operational activities. Online, remote data entry may be appropriate in some cases and it will be necessary to allow a wider range of user feedback. Control of live content on the database should rest with the Hub custodian.

Effort by Data Providers – The development and maintenance plan must recognise the processes and status of address management in individual local authorities and other data providers. It must aim to not cause them unnecessary additional work or a repeat of work done previously. These sources are the guarantee of on-going supply and data quality and their continuity needs to be assured.

D The Role of Streets and Towns

Street Database Infrastructure – The British Standard requires any address to be related to its street. This needs a street gazetteer. Ideally, the current NSG should also be made Open and be rationalised to perform this role properly and in conjunction with the OS MasterMap ITN layer.

Standard Towns – The addresses should use a standard list of towns and localities. Post towns are a valid optional location description as recognised in the British Standard.

E Contents and Characteristics

Scope – Not all users need the full set of data that is available nor the immediacy associated with daily updates. It is already recognised in the current products that one size does not fit all. Many advocates of Open Addresses would be satisfied with a fairly basic version that is a periodic snapshot of the most used aspects of the data, namely a full set of addresses together with their grid reference coordinates. Others might be content with just the basic postal address without coordinates. Some users just require local area or topic subsets. All postal addresses in PAF should be in the data, not just those that have matched to the NLPG, while recognising some of these unmatched entries might be erroneous. It is important that subsets are based on maintenance of the high quality and comprehensive master databases and that their continued availability must not be compromised.

Improvements – Continuing special attention is needed to sources of intelligence to support the identification of dwellings in multiple occupancy, under definitions to be agreed. Better sources of business names are needed – an Open user community can help in this regard.

Classification – A classification of all the address entity types exists and is important to some users. Separate specialist gazetteers may be maintained in the database by type rather than combining all addresses into a single gazetteer. The national high-level classification should be based on the NAG starting point, and should support a hierarchy of the various fine level classification systems that are used in application databases.

Objects Without Postal Addresses – it is desirable that a core set of standard OWPAs should be agreed with users, defined and included in an Open product. A wider set might be maintained independently in LLPGs and other databases to a consistent structure, but

need not necessarily be added to the national resource. However, this is not a priority requirement if it would add greatly to costs or impact badly on revenue streams.

References and Codes – As mentioned above, the primary unique reference is to be the UPRN. These should be linked to other references and in the public domain.

Grid References – The current approach to National Grid References is appropriate, with flags to describe the positional accuracy. More consistency checks are advisable now that individual LAs are providing the coordinates with a variety of methods. Others might provide coordinates for some types of addresses but these would require spatial verification at the Hub.

Aliases – The design must allow for whole addresses or address components to have alias names, as PAF and the NAG already recognise. Postal addresses are the most important type of alias for the NAG.

Quality Flags and Metadata – The database will include appropriate quality indicators related to status, precision and accuracy. Metadata is needed, to include provenance, change, date stamping and indication of terminated addresses. A subset of metadata might be adequate for an Open product.

5 Benefits of Open Addresses

5.1 Would Free Addresses Increase Usage?

The value of address data in the UK, and benefits of definitive addressing, have been discussed and examined elsewhere. The essence of a specific case for addresses to become Open Data has to be that it would greatly increase usage and thereby deliver benefits that far outweigh its costs.

There is uncertainty over the growth in take-up that would occur if addresses were universally free at the point of use. The considerations naturally apply somewhat differently to users of PAF on its own and those that would require the spatial address data represented by AddressBase. Some sectors seem well served by current arrangements while others show potential for growth. Similarly, it is hard to estimate what benefit would accrue to a growing number of users. It seems apparent (from economic theory and from logic) that there would be growth and that users would only take up the data if they receive benefit.

It is generally hard to quantify Open Data activity since most usage is not tracked once controlled licensing ceases. This has resulted in limited evidence of the real value of Open Data. The Deloitte report[11] for the *Shakespeare Review* confirms the paucity of firm evidence. Sir Tim Berners-Lee also makes the point[12]. In view of the role of addresses as Core Reference data, it is important that mechanisms should be put in place to monitor the effectiveness of any decision to make them free at the point of use and to support future decisions. More market analysis would help, but there is enough good anecdotal evidence to see that the change of charged-for data to Open Data or free access can have striking consequences. The address suppliers certainly see the merits of the Open Data initiatives that they have helped to sponsor so far and, through these, the Open Address process has already commenced. In relation to developing a Public Sector Licence, Royal Mail has said, *"Widening and increasing the use of PAF, continuously promoting good addressing – benefits everyone."*

There are broad parallels, and a hierarchy of examples, that indicate the expectation of growth and benefit from making data more available. When data that has not been accessible becomes available (the Web is the classic example), growth and benefit can be obvious and extremely large. The UK Open Data experience is equivocal but is regarded as a successful '*work in progress*' and many new applications have emerged to support the quest for accountability and economic value. However, the case of address data is a specific one that depends on the perspectives of a mature market that is currently paying for the data and the degree of new supply channels, usage and benefit that would arise in an Open scenario.

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[11] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/198905/bis-13-743-market-assessment-of-public-sector-information.pdf

[12] "It's a constant battle of mindsets – once people have got the open data bug they realise the benefit. They realise they're performing a service to the country. With the original web, people could see the benefits. But with this (data) you don't immediately know the benefits or who is using it….. – nobody's really able to work out the investment" Interview with Sir Tim Berners-Lee, Daily Telegraph, 2 November 2013

A few pertinent UK examples, where data that was previously charged for became free at the point of use, are:

- Population census – at a high price and underutilised until the 2001 census when the Census Access Project (supported by the Invest to Save Budget) allowed all users to have free availability. The growth in take-up was substantial, allowing for better planning and services, allocation of resources and research. The successful policy continued without question for the 2011 census.
- Public Sector Mapping Agreement – Over 3000 public sector organisations now have free access at point of use to important OS data, including addresses, with government purchasing this centrally from OS. Usage has grown considerably among many that were not buying the data and there is evidence of considerable benefit. The OS Web site says, *"Membership of the PSMA gives you access to high quality mapping in a digital format which brings many benefits and supports a wide range of business activities."* and lists prominent examples of the benefits. In terms of the address data, the PSMA provides half the total income for the AddressBase products and gives public sector users access to the full set of OS address products, including the highest specification product – AddressBase Premium.
- Open OS Data – Eleven OS products that were previously charged for have been made free at the point of use to all users with government purchasing centrally from OS – paying £20m p.a. since 2010. Usage of some of the products has grown markedly (others less so) and an independent report for BIS[13] has indicated substantial benefit although noting that it is early in the programme to assess the full impact. Among the products is Code-Point Open (a single representative coordinate for each unit postcode), which is directly related to addresses and which rapidly found its way into applications and products that did not exist under the old pricing regime. The independent study report stated:
    - The study estimates that the OS OpenData initiative will deliver a net £13.2m - £30.4m increase in GDP in 2016. The main components of this increase are net productivity gains (£9.8m – £22.1m) and additional real tax revenues (£2.9m – £6.11m).
    - The increase is also net of £3.7m per annum, applied as a negative shock to GB exports, to account for OS OpenData being integrated in to products of companies paying taxes abroad. Despite the fact that GB loses this export income, overall the value of exports to the economy increases by £6.0m – £10.0m as other sectors of the economy expand.
    - Another important metric is the increase in real national disposable income in the range £10.4m – £26.1m by 2016. This is an indication of the increase in economic welfare for British society as a whole.

[13] An independent study "*Assessing the Value of Ordnance Survey OpenData to the Economy of Great Britain*" was commissioned by Ordnance Survey on behalf of BIS from ConsultingWhere Limited and ACIL Tasman.

  - The change in policy to provide OS OpenData free at the point of delivery is argued by the study to be a specific form of implementation of a wider policy of marginal cost pricing. This is argued to be a "first best" option that avoids the need for segmented or structured pricing frameworks.
  - The results of the (CGE) modelling demonstrate an improved level of productivity in the economy, and higher overall levels of output, directly attributable to making OS OpenData free at the point of delivery

  Interestingly, soon after release as Open Data, Code-Point Open take-up (as measured by OS site downloads as distinct from usage or value) grew markedly, but demand since then appears to have been stable, indicating a latent level of requirement that was met quickly and is now being maintained.

- PAF Public Sector Licence – The planned implementation of this licence was announced in March 2013 although the formal licence is not yet in place. It is too early to estimate the likely impact of this licence, but the proponents of the initiative (Royal Mail and BIS) consider that it will increase usage of PAF considerably. The news release said, "*The PAF Public Sector Licence is intended to widen access to, and increase usage of PAF by public sector organisations.*" And Royal Mail added, "*The PAF Public Sector Licence will make it easier for Public Sector organisations to make greater use of PAF. In their recent consultation paper on PAF, Ofcom asked Royal Mail to simplify PAF licensing. We believe the PAF Public Sector Licence is the first step in delivering exactly that."*

While the likely take-up of free or much cheaper addresses is a matter for speculation, it is considered that there would be considerable growth of usage in certain markets and that the benefit would be substantial. Section 5.2 contains comments on views from specific sectors and Chapter 7 comments on possible impacts on current product markets.

5.2 Sector Views on Open Addresses

The range of applications for addresses and address geography is extremely wide. Many users of addresses are already served well by the existing infrastructure, although there are marked differences in take-up among sectors.

This section contains brief summaries (presented alphabetically) of the positions of specific user sectors regarding Open Addresses. In several cases, this has been developed from informed direct discussions with key participants or from public statements they have made elsewhere. Individuals have been quoted with their permission. Appendix C contains a list of organisations contacted during this review.

Academic research – A striking observation from this review has been the frustration of the academic community that it does not have ready access to address data to support its research – medical, social, property, etc. The Chancellor's 2012 Autumn Statement included a £64m ESRC investment in research on Big Data, which certainly requires high quality address location data for data linkage.

Two prominent academic researchers have provided these statements:

David Martin, Professor of Geography, University of Southampton, Deputy Director, ESRC UK Data Service, Co-Director, ESRC National Centre for Research Methods – *"My view is that having access to (whichever) definitive national address register would be a huge benefit to academic research and the reasoning goes something like this:*

Academic researchers undertake a huge range of social and economic surveys and at present these are not systematically coded with standard addresses because there is no clear route to access to these products. ESRC funds huge studies such as Understanding Society https://www.understandingsociety.ac.uk/ and the new Life Study http://www.esrc.ac.uk/funding-and-guidance/tools-and-resources/research-resources/surveys/bcf.aspx (the latter alone is a £30m investment). Academia pays time and time again for access to PAF as a sampling frame for specific studies, so there is some use of PAF addressing where the project can afford it, but there is no unified approach or access arrangement. The academic sector is not part of PSMA and access to (some) Ordnance Survey datasets, not currently including AddressBase, is only available through a system of institutional subscriptions called Digimap, brokered by JISC, (http://edina.ac.uk/digimap/description/products/) which means that researchers in some institutions have access and others not. The result is non-standard datasets that are (and will continue to be) harder to link and map and whose value – including potential impact beyond academia – is therefore impaired. At the same time, there is a big push within government and academia, especially of concern to ESRC and MRC for example, to move forward with research using linked administrative datasets – see the report at http://www.esrc.ac.uk/funding-and-guidance/collaboration/collaborative-initiatives/Administrative-Data-Taskforce.aspx. Even worse, there is a huge push from government for academic research to have greater economical and societal impact, yet things like this undermine it from the start by ensuring that the academic and administrative data don't match as well as they could and should. Vanessa Cuthill, named at the bottom of that page, would be the best contact for you to get an ESRC office input – although she might refer back to myself or others in her team."

Peter Wyatt, Professor of Real Estate Appraisal, Director of Undergraduate Programmes, Real Estate & Planning, Henley Business School, University of Reading – *"Tomorrow marks the 200th anniversary of the birth of John Snow, English physician and pioneer of epidemiology. His investigation into the source of a cholera outbreak in London in 1854 relied upon on the ability to trace the precise location of residents in and around Soho in relation to water sources. There can be no doubting the importance of work that uses addresses to combine data about people and places. And yet, over 150 years later, we are still unable to reassure ourselves that the addresses in various data sets reliably pinpoint where people live and work. Over 35 years ago Lord Chorley, in the Government enquiry into the handling of geographic information, reiterated the need to standardise address geography. From an academic perspective, I have spent my entire research career lobbying for the release and improvement of land and property information. Academic initiatives such as Domesday 2000, commercial developments such as the National Land Information Service, political lobbying for the release of Government data on property values (Valuation Office) and property ownership (Land Registry), Government projects such as the National Land Use Database, brownfield*

release and land use monitoring; all have required time-consuming and costly acquisition and matching of address data. Two recent projects undertaken on behalf of the Department of Energy and Climate Change illustrate the point perfectly. The first was linked information, at the property level, on Government-backed energy efficiency measures (DECC), gas and electricity meter readings (energy supply industry), property information (Valuation Office) and socio-demographic attributes (Experian). None of the address data sets were consistent with one another and a sample of 4m dwellings reduced by 25% simply as a result of poor address matching. The second project investigated whether home owners pay more for more energy-efficient homes, and linked property data from estate agents and valuers with energy performance data from Government. Again, no consistent addressing between data sets led to significant mismatching, particularly when attempting to analyse energy performance of apartments within buildings.

It is difficult to quantify the benefit to academia should a nationally consistent address base be made freely available but, equally, it is difficult to overstate the benefits that it would bring. So much work is not undertaken because geo-referencing of land and property data is so inconsistent and acquisition of Royal Mail and/or Ordnance Survey address data is so expensive. Research is, as a consequence, confined to small-scale snapshot investigations of market behaviour. Much of the discussion surrounding address data and its availability focuses on residential addresses. Geo-referencing of commercial and industrial premises is neglected; the relationships are complicated (premises within buildings, multiple buildings in single occupancy and so on) and the turnover of ownership and occupancy is high. But it is because this sector of the land and building stock is so complicated that we should be trying to understand it better. In a densely populated country, concentrated in the south-east, it is not good enough to ignore the geographically complex relationships between residential, employment and leisure locations simply because their geo-referencing is either inconsistent or prohibitively expensive, nor is it sufficient for academics to focus on small case studies as a consequence. Sooner or later, the big tools are needed to tackle the big jobs – the built environment is responsible for over half of national energy consumption. A freely accessible address base would be a good start."

Note – these are verbatim quotations from the two Professors and have not been edited, although a few of the points made relate to definitive data more than Open Data.

This situation seems entirely unacceptable – there is far too much investment and value involved in high quality research to allow it to be compromised by limited access to key reference data. At minimum, the academic sector should have an equivalent arrangement to the PSMA for a definitive, spatial address gazetteer, but many would be served adequately by a periodic snapshot.

Ordnance Survey has indicated that it has granted licences for AddressBase on application to individual academic research projects and now has 37 such licences in place in 20 institutions. Each case is confirmed separately with Royal Mail. This availability is not widely known, indicating that communication can also be a cause of an apparent barrier. Now, partly in response to discussion on this review, OS plans to open

dialogue with EDINA (the JISC-designated academic national data centre at the University of Edinburgh) to include AddressBase in the renegotiation of the Digimap licence for spatial data products. This would be a very valuable step forward, and James Reid at EDINA says, *"If the product was part of the Digimap licensed products we'd have a lot more use, more uptake and likely more researchers using it. FYI there are about 150 Higher Education Institutions and we serve the majority - that only 20 currently have a licence to address data likely reflects the larger research institutions' preoccupations but only represents a fraction of latent demand."*

This development does not resolve lack of convenient academic access to PAF data although AddressBase contains PAF content and the arrangements will require Royal Mail consent.

Devolved administrations[14] – The Scottish Government and the wider Scottish public sector are committed to "open up access to data created and held by the public sector"[15]. While it has no explicitly stated policy on address data, it can be expected to support Open Addresses. Scotland's first One Scotland Mapping Agreement preceded the PSMA and, while currently requiring additional usage payments to Royal Mail, OSMA generally provides access to data without payment at the point of use.

Scottish LAs declined to take the £1 per new address volunteered by Royal Mail that applies in England and Wales but do obtain royalties from AddressBase sales. It is considered that Scotland would, in principle, welcome an approach to make addresses generally free at the point of use. Loss of royalty income would be exchanged for a contribution to improvement in aspects of public services but a fuller discussion on any other implications would be required.

Northern Ireland has recognised the importance of Open Data as a stimulus for innovation and growth. Ministers have agreed recently that the Spatial NI geo-portal spatialni.gov.uk should be developed to provide a delivery platform for those Departments who wish to use it to publish their data in an Open format. From wider discussions with Northern Ireland government representatives, there does not yet appear to be a formal view on Open Data. However, there is a desire to engage in dialogue on how this will develop. Once there is a decision on addresses for Great Britain, it will be appropriate to investigate the possibility of a consistent approach in NI.

Wales is covered for addressing in general by arrangements for England and Wales together. However, it has its own supportive views on Open Data and some consultation on plans for Open Addresses will be required.

Individual citizens – While the public at large is not a direct user of address products, other than through the limited free look-ups available, it is worth noting that it is a group that is greatly impacted by services involving high quality addressing. The applications range from the role of addresses in identity validation as a preliminary to obtaining goods and services, through increasing trends to self service or Web searches on a location basis. The ability to provide more accurate addresses to organisations (e.g. emergency

[14] All statements here have been confirmed with devolved administration representatives.
[15] Quote from *Scotland's Digital Future: Delivery Of Public Services*

services) would be enhanced by wider public accessibility and penetration. Address data pervades society and it is reasonable to assume that widening the availability and usage of definitive addresses can only be of benefit to the public.

Land Registry – HMLR is committed to Open Data to the extent that one of its KPIs is that its Open Data must be at least four star (****) Linked Data by design. It already considers that it has the largest collection of Linked Data in government. LR does not, however, produce any address products, although it maintains its own address database and is a significant consumer, including PSMA membership enabling extensive use of OS products. In principle, LR would support the concept of Open Addresses since, like other PSMA members consulted, it sees value in a national common currency that would arise from wider usage and adoption of definitive addressing.

There is room for efficiency gain by more joined up working with others. LR has offered updates that it observes to OS and LAs but, so far, these have not been taken up. LR would like to take on daily addresses from OS if available but, at present, can only have daily MasterMap supply and then commission new property surveys from a pool of surveyors shared with OS. There is scope for LR to use a central definitive address Hub in future.

Local government – Discussion with the LGA and LA officials has found general, if cautious, support for Open Addresses from a very involved and informed sector that is creator, supplier and user. The caution relates mainly to concerns arising from pressure on LA resources and requirement for funding. Some pertinent comments follow.

From ***Michael Jennings***, former co-chairman of the Central-Local government Information Partnership (CLIP), and former chairman of local government's Information Management, E-Government, and Geographic Information Advisory Groups, local government representative on APPSI.

"1. Back in 2010, the LGA set out its priorities for addressing:

a) Maximum value for public services from public investment;

b) Benefit to the wider economy by freeing public, private and third sectors to exploit new opportunities to adopt applications for geographic information at competitive prices, with comprehensible and equitable intellectual property rights, in an open market; and

c) The aspirations of the 2008 Location Strategy to support public policy through a co-operative approach to developing and using geographic information.

2. Councils use geographical information in land use planning, infrastructure development, housing, environmental protection and conservation, emergency planning, services, economic development, employment, highways and transport, social care and health provision, schools planning and admissions, trading standards and environmental health, waste management, to name but a few. Such information is also a key enabler in consulting citizens and businesses to plan the future of areas and services and to help hold the public sector to account, and in council work to contract out services and to support businesses (and the independent/voluntary sector) in localities. Increasingly, local services are provided through cross-public, private and third sector co-operation.

Effective use of data and information that can be shared is vital.

3. There is a barrier and additional cost to local authorities of arranging data sharing and licensing with other organisations outside the public sector agreement. Making address data freely available could possibly mean that local authorities would also release their land and property data for free. Currently, local government funds the capture of data through their statutory street naming and numbering function (though this of course has taken a knock with the recession with the low levels of development). However, this does not cover the collation and provision of the national dataset through the NLPG/NAG Hub. At a time of such financial stringency (as of 1 April 2013 councils will have taken a 40% reduction in their funding), and whilst keen to help the local economy through the release of data, councils will be concerned about financing addressing given all the other priorities for keeping services going.

4. There is general support for the call for the definition of the core reference data including geographies, and then to ensure that the data were delivered and a healthy market developed. With the assumption that the core reference geographies were tax funded and made available at no charge, then much of the licensing, derived data and costing and pricing issues would disappear, which would make life easier for councils in the multi-sectoral approach to public services and economic development which most accept as the way forward. However there will be real concern about the resource implications."

A widely held local authority gazetteer custodian view is that public service is the main priority and if Open Addresses would improve service, then it would be welcomed. There is a natural concern about resources, but less on maintenance of income. If more users, including the private sector, were able to access definitive address data more readily, then interaction with citizens (including businesses) could be more effective. From a LA point of view, this involves daily updates to information and relates to addresses that citizens might glean from external sources as well as from LAs. There is also a strong opinion across LAs that the address lifecycle could be much more efficient and that RM could take on LA change intelligence much more effectively, with less need to rely on postmen. There are ongoing discussions between LAs and RM but with little progress so far. If major costs are taken out of the system (also requiring some enabling investment), addressing would become much more affordable. Making addresses Open would tend to drive costs down and LAs consider that they would remain incentivised to maintain quality to support their many address-based functions. The issues of efficiency, definitiveness and openness are clearly linked in these considerations.

Local government would not wish Open Addresses to be focused mainly on PAF at the expense of increasing access to the NLPG versions of addresses that involve neighbourhoods and towns rather than post towns and that include non-postal entities.

LGA confirms that it has a role as co-owner of GeoPlace but, more importantly, as a voice of local government. It states that addressing is key to how local authorities manage services and interact with citizens. There is the potential for efficiency savings through streamlining address collation and verification through a Hub approach as considered in this report. However, this requires a feasibility study to assess the impact on local authorities. LGA considers that releasing address data for free would benefit sharing and

access to the data – however, the cost for collating, processing and managing the data needs to be covered through some form of income or funding.

Mail and delivery industry – The original application of PAF, and still the main driver of its content and structure, was to support physical delivery to addresses. The mail industry has a wide range of licenced users of PAF (including RM itself) and many supporting businesses that add value to better delivery, including effectiveness of direct mail.

The over-riding concern of this industry is to ensure that the quality of PAF is not compromised by any move to make addresses free at the point of use. That said, there is also a view that more users of correct PAF data from a well-designed Open policy could actually help to enhance address feedback (including business names) and to improve the quality of addresses in the mail – more accurate and correctly postcoded addresses being of direct operational benefit to RM. However, postcode penetration in the mail is already high and RM has questioned whether the benefit would be substantial in practice. At the same time, Royal Mail is continuing to pursue a 'good addressing' campaign[16] and, as quoted earlier, has recently said, *"Widening and increasing the use of PAF, continuously promoting good addressing – benefits everyone."*

Market research – The main use of addresses in market research is for deriving survey samples from PAF. The Market Research Society submitted a response to the Ofcom consultation on PAF, which focused on the importance of a definitive source of addresses as much as the Open issues. It considers that a free and open policy based around definitive sources would drive innovation and improve quality. The MRS also considers that advantages from simpler licensing would stimulate business use and recommends that the proposed PSL provisions should be extended to the private sector.

Not-for-profit enterprises – Organisations such as charities and Housing Associations are not covered by the PSMA, even though they use address information and exchange data with others in the public sector. They are very cost sensitive, generally have few technical resources and could certainly benefit from Open Addresses[17].

Open Data community – As would be expected, the ODI is wholly in favour of making address data free at the point of use with minimal licensing and argues strongly for the case. Similarly, ODUG has led the recent campaign and publicised its views extensively.

In its response to the Ofcom consultation on PAF, the ODI said, *"The Open Data Institute believes that publicly owned reference data should be open data — freely available without restrictions on its use — so that society as a whole and public authorities themselves can gain the maximum benefits from that data. The ODI supports the Open*

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[16] PAF Advisory Board Minutes, 19 September 2013

[17] In June 2013, Royal Mail unveiled new measures designed in collaboration with Government that included free access to PAF for independent small charitable organisations (those charities not associated or affiliated with any existing Solutions Provider and with less than £10m per annum income). While this is clearly a positive step, it leaves the large majority of charity operations unaffected.

Data User Group's (ODUG's) case for an Open National Address Database and believes that the Postcode Address File (PAF) should be made available as open data." Other significant statements from the ODI included the expectation that it would soon be feasible to construct an alternative postcode database through published data on the Web, making the current model unsustainable, and that there are efficiency and quality gains to be made from Open PAF.

PAF solutions providers – The review has had contact with major resellers of PAF, individually and collectively. The consistent view received was that they would not feel threatened by Open PAF and would probably gain. There was some concern that new market entrants would take some business and that smaller resellers might have more to fear from this. Opening the market and widening usage were seen positively. It was thought that many new users would be satisfied with a basic product and would not need the full or daily PAF.

Several mentioned that current restrictive licensing is a problem – the largest reseller claimed that his firm spent £3-400,000 per year just on administering PAF licenses.

As with many other users, the need to ensure maintenance of quality under an Open regime was mentioned as paramount.

Private sector generally – The private sector is extremely diverse in activity and in size – some appear here in other overlapping sector categories. There are already many users of PAF in the private sector and these often see great value. Key users of AddressBase products are found in utilities and in financial services, particularly insurance – these can justify the relatively high costs. But there are also many firms that would use detailed address data but currently do without at current prices and thus make do with inferior methods.

At the APPSI meeting of 11 December 2012, a special session was held on Open Data and the private sector. Speakers attended from Sainsbury's, Deloitte, Google and GB Group (a major PAF Solutions Provider). The minutes record that, from the discussions, there was a clear message from these speakers that:

- The National Address Gazetteer should be free at the point of use.
- Public Sector Information (or some of it) is of real value to the private sector – to both end users, and to resellers (a vital distinction).
- Its use is currently patchy, both because some data is not yet Open, and also a great lack of awareness.
- Public Sector Information that isn't yet Open is underused, not only due to cost, but – in many cases – the complexities of licensing which cause potential users to walk away.

The Demographics User Group provided the following Executive Summary in its 2 September 2013 submission to the Public Administration Select Committee:

"The Demographics User Group (DUG)[18] represents 14 major commercial companies – Barclays, Boots, Camelot, Centrica, Co-operative Group, E.ON, Everything Everywhere, GSK, John Lewis, Marks & Spencer, Sainsbury's, Tesco, Serco and Whitbread – which make extensive use of government statistics and geographical data to understand local markets and consumers, and make decisions about large investments in delivering better services.

These are the tip of the iceberg of 2.3 million businesses in the UK, many of which can increase their efficiency, and grow, by using data gathered by government, which has the great advantage of consistent collection across the whole of the country.

The key themes of this note are to:

- *Recognise the importance of government open data to business*
- *Welcome the acceleration in progress in recent years*
- *Alert PASC to the fact that users outside the public sector (such as businesses and charities) are not able to enjoy all the free access arrangements which have been made for public sector users*
- *Urge PASC to press for the National Address Gazetteer and the Postcode Address File to be made open data"*

The Chairman of DUG has explained, "*DUG members have often discussed addresses. They would wish to use the Ordnance Survey products for customer database analysis and location planning but cannot justify the current prices. A much lower price would greatly increase commercial sales although even £5k pa would exclude smaller SMEs."* It can be noted that many of these organisations will use PAF in their customer relationship management functions and some might even have AddressBase in operational divisions, but they do not feel it is worth the cost for the stated applications, particularly in relation to other data that they acquire.

Public sector generally (PSMA/potential PSL users) – The development of the PSMA and its Scottish equivalent OSMA have already heralded a move to making addresses free at the point of use, with government purchasing centrally. This also applies to Code-Point Open in the OS OpenData product set. It is clear that the rationale is to remove the deterrents of price and licensing that were discouraging public sector users from adopting the most appropriate products to discharge their duties most effectively.

The take-up has been marked in some areas, most notably emergency services and health, where use of previous inferior approaches were commonplace to the detriment of their vital activities. Government and the data suppliers have been positive about the growth in usage and benefits, so it is logical that the same thinking should apply in other sectors.

Health is a good example. Prior to the PSMA, the NHS Digital Mapping Agreement provided a framework for the provision of Ordnance Survey data, including addresses, and there was a reasonable take-up (130 organisations at peak), particularly in Primary Care

[18] http://www.demographic.co.uk/dug.html

Trusts and Ambulance Trusts. Since the PSMA was introduced, usage at March 2013 has more than doubled to 310 organisations, with most of the growth (101 users) in NHS Trusts that had been deterred by cost but now can have better intelligence on referrals. The Organisational Data Service provided by the new Health and Social Care Information Centre is considering adding address UPRNs to records for better data interoperability. Now, while much of the NHS can use address data free at the point of use, there is still restriction on related bodies, including GPs, and it is considered that Health would welcome Open Addresses so that all data exchange with other bodies could be based on consistent terminology and referencing.

It should be noted that address products offered by the PSMA include the highest specification ones (e.g. AddressBase Premium) even if a lower grade product would have been adequate. This would be expected to continue under an Open Addresses scenario, unless renegotiated.

SME market – The general collection of small businesses is a large but very diverse group and, arguably, the majority would not have any interest in or a need for a national address gazetteer. But this category also contains some that might benefit most, including small commercial product developers, producers of mobile apps and those serving local information interests – collectively representing some of the main targets for Open Data in the emerging information economy.

A minority of SMEs would actually take on the Open Data products directly but very many would access them through the major Web platform providers or through mobile services. While the large Web providers would clearly gain (and few are UK-based), the larger benefits from access to better data would clearly be to their many users, mostly in the UK in this case.

One prominent small GIS developer has stated that he could probably add 10 more staff and could grow annual revenues by about £1m if (spatial) address data was Open. It is impossible to anticipate all the possibilities for mobile Apps using Open Addresses, but experience has shown that it will be varied and extensive. There is a large potential in this vibrant but unpredictable market[19].

Statistics users – There is a strong interest in Open Addresses from the many users of statistical data, both in the public sector and outside. Statistical information often needs a locational base and it is apparent that use of definitive addresses is important. Free availability of the same addresses beyond PSMA beneficiaries will support better application of statistics.

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[19] In June 2013, Royal Mail unveiled new measures designed in collaboration with Government to offer free access to PAF for one year to independent micro-businesses to support them in developing PAF-based products and taking them to market. Micro-businesses have 1-9 employees and less than £2m turnover pa. While this is a positive step, there was already a successful PAF developer licence that offered similar advantages.

The President of the Royal Statistical Society (RSS) in a response to the Ofcom review of PAF stated this in the context of the government's Open Data initiative:

> *"Consideration of the future of the PAF should be an opportunity to think about the importance of moving towards a single, definitive national address dataset. PAF alone does not constitute such a dataset, but it forms an important element of the whole, with the frequent updates embedded in PAF adding value to addressing data overall. A number of bodies have called previously for a move to such a national address dataset, including several Parliamentary Select Committees, the Statistics Commission, The Advisory Panel on Public Sector Information, and this government, in the Open Data White Paper."*

The RSS has continued to call for addresses to be Open Data in subsequent statements.

ONS, in its response to the Ofcom review of PAF, gave examples of positive impacts of making its own data Open, suggesting the same would occur with PAF and said:

> *"ONS has a strong interest in ensuring that data collected and referenced are consistent and accurate, using a single definitive source of address referencing. Therefore ONS supports a model that increases take-up of a single definitive source of addresses. Our own experience is that making products freely available increases their uptake and thus ensures that more users are working with, and producing outputs, from the same base data and single standard. This means datasets are easier to integrate, and this also delivers huge efficiencies during every part of the statistical production process that is dependent on having accurate and complete addresses.*
>
> *ONS expects to be increasingly reliant on administrative and possibly commercial data sources in the production of official statistics, so having a national single source of addresses used universally in both the public and private sector would significantly help us to deliver the high quality statistics on which public policy and the economy relies."*

Vehicle navigation vendors – While there were no interviews with in-vehicle navigation equipment suppliers, the review author has a background in this industry and it is understood that they do not currently use the most detailed address gazetteer data, contrary to expectation. The appreciation is that they have taken more approximate postcode level data and interpolated it themselves to achieve more precision. Partly, there is an issue about quantity of data that can be used conveniently in their devices; partly it is due to an issue of cost and licensing complexity.

It would be expected, however, that they would welcome Open Addresses, mainly to receive a periodic high quality benchmark update for their own data variations rather than have to continue to maintain deteriorating content.

Valuation Office Agency – The VOA maintains its own property address database containing the hereditaments (taxable property units – 'units of assessment') that underpin valuation for Council Tax and Non-domestic Rates. Through a close relationship with local billing authorities, these are similar to the council LLPGs, but not in sync and sometimes different when the VOA adds its own addresses, divides properties differently or assigns pseudo-postcodes to non-postal addresses. There is a monthly supply of VOA addresses to GeoPlace for matching to the NLPG, with the VOA receiving UPRNs of the NLPG

addresses in return. In principle, the VOA could utilise the NAG Hub for its addresses, although this would require a considerable investment to change its databases.

The VOA does not supply address products and would thus not be an active player in an Open Addresses initiative. It has ready access to all the address data sources and does not need addresses to be Open for its operations. It would, however, benefit somewhat from wider general adoption of definitive free products. There are occasions where there is confusion about versions of an address – working with the Stamp Office or some local authorities, for instance. As has been found in discussion with other government organisations, the common currency that could arise from an Open Addresses initiative would be of value and would be supported in principle.

Web platform providers – A meeting was held with Google. Google is not specifically deterred by cost – its basic approach is to pay for data that is charged at reasonable prices but it will not enter into restrictive licences. Accordingly, Google does not use PAF or AddressBase to underpin its Web location searches but, instead, uses Code-Point Open for postcode centroids and is gradually infilling from many online activities to create its own address infrastructure.

Previously, Google did pay for Code-Point before it became Open Data. Google confirms, *"Google used to license map data sets in the past with restrictive terms. These agreements quickly turned out to be blocking issues in our product development. Therefore, we changed our strategy and started a different approach, which enabled us to focus on building the best maps and great user experience (as opposed to trying to build something around a set of licensing restrictions)."*

There are over a billion users of Google worldwide and the UK is the second largest market. Some 30% of searches have a geographic component and over 50% on mobile devices. There are hundreds of thousands of crowd-sourced updates received each day. Google argues that users must receive benefits to make such searches and would logically derive greater benefit from more accurate data. The major beneficiaries of Open Addresses would probably be smaller companies, although Google thinks all users would be better off and that the address data suppliers would also win from an Open arrangement.

Google feels the UK address product situation is unfortunate and counter-productive relative to other countries that have Open Addresses of high quality. If addresses were Open with permissive licensing, it considers that millions of users would receive better quality location information and derive even greater benefit from Web searches and new online products.

Other umbrella bodies – Meetings have been held with the PAF Advisory Board (PAB) and the government's Advisory Panel on Public Sector Information (APPSI).

Following reviewer attendance at a **PAB** meeting, the PAB Chairman wrote:

> *"We had a good discussion, the main point of which was, irrespective of what is decided about a national address database, there is an overwhelming need to protect the integrity*

of PAF as a postal delivery database. On open data, views were mixed, ranging from "charge a modest fee but use the government open data licence" to "charge users so as to tie them into a relationship with the data, including who really needs what given that data maintenance is not cost free, but have a more permissive though not totally unlimited use licence." On balance I'd say the PAB is concerned about (1) an adequate return to the owner of PAF IPR so as to preserve quality and focus; (2) maintaining a close independent user relationship with the postal and the SP market; and (3) on balance thinks that "free at the point of consumption" would favour the bigger players who would be able to exploit scale to the disadvantage of smaller or new entrants. The PAB is also strongly in favour of operational cost minimisation."

The independent **APPSI** position has been stated in a variety of responses to activities and consultations. For the Ofcom consultation on PAF, APPSI stated:

"The APPSI approach has consistently been to ensure that the UK has a proper information infrastructure to support governance, business, public services, the environment, and social and community well-being. This has been summarised in our paper on the National Information Framework[20]. Addressing is a core part of that information infrastructure. We remain of the view that Core Reference Data – such as address data including PAF- are best treated as Open Data and controlled by the public service in the interests of the public good."

Summary of Sector Views – The following table summarises the author's assessment of the position on Open Addresses of the user sectors described above.

Usage sector	Open View	Benefit H/M/L	Open Lite OK?	Notes
Academics	✓✓✓	H	Y	Better quality research from more accurate data. Some access possible now on application but full, convenient availability is needed.
Individual citizens	--	M	Y/N	Indirect benefit from improved identity authentication and service delivery; better e-products
Devolved administrations	✓✓	H	N	Scotland strongly in favour; NI interested; Wales supportive
Land Registry	✓	L	N	No great consequences. Can see wider benefits
Local government	✓✓✓	H	N	Good for citizen engagement. Worried about any resource impacts. Support for Open Addresses is growing

[20] http://www.nationalarchives.gov.uk/documents/nif-and-open-data.pdf

Usage sector	Open View	Benefit H/M/L	Open Lite OK?	Notes
Mail and delivery industry	--	L	N	Some benefit from better quality address feedback. Concerned to ensure maintenance of quality
Market research	✓✓	M	Y	Will save money on buying addresses; more consistent research
Not-for-profit enterprises	✓✓	M	Y	Better quality use of data and data exchange
Open data community	✓✓✓	H	Y	Open Addresses is one of their most important requirements
PAF Solutions Providers	✓✓	M	N	Generally positive views from larger resellers. Smaller ones may feel threatened. Quality is a concern
Private sector generally	✓✓	M/H	Y	Considerable saving and simpler licensing will free up activity for some user types; not needed by all
Public sector generally	✓✓	M	Y/N	Already well covered by PSMA/PSL but can see merits in wider extension for community benefit
SME market	✓✓✓	H	Y	Considerable value for software developers and some end-users
Statistics users	✓✓	M	Y	Interested in wider data linkage benefits
Vehicle navigation	✓	L	Y	Some gain from reliable benchmark updates
Valuation Office	✓	L	N	No great consequences. Can see wider benefits
Web platform providers	✓✓✓	H	Y	Will open considerable growth opportunities with benefits to their millions of users
PAF Advisory Board	--	n/a	n/a	Individual members in favour. Some caution, mainly among those closest to the mail delivery industry
APPSI	✓✓	n/a	n/a	Says there will be major benefit

'Open View' – ✓✓✓ strongly in favour ✓✓ in favour ✓ mildly in favour -- -neutral

'Benefit' refers to the enthusiasm for Open Addresses or the expected value
'Open Lite OK?' refers to general suitability of a less detailed or less frequent address product

5.3 National Benefits of Open Addresses

There have been many studies of the value of public sector information and, within that, of Open Data. Across these exercises, huge benefits to society have been identified, some measurable, many intangible. The common thread is that the benefits are measured in many millions or often billions of pounds, although the number of billions varies from study to study.[21] Even studies of the value of address data speak of many millions or some billions of pounds.

Considering this in the modern era, with the increase in World Wide Web facilities and inexpensive or free mobile phone Apps, one can see that the explosion of data usage has far exceeded expectations of, say, ten years ago. Usage of location searching is vast and it is reasonable to say that users exploit the facilities because they receive benefit. It is argued that the benefit would be even greater if the better quality address data that is currently underused became more accessible. Today, there are many new ways in which usable surrogates for address data can be derived from tracking of mobile devices and from capturing Web data entries. Looking ahead some five years, it is very likely that the address products will have to become more open or they will risk being supplanted by already apparent other sources that might not be as good, but will be adequate for the mainstream. One aim of Open Addresses should be to ensure that all applications could be founded on the sound benchmark of definitive addresses.

The benefits of some improvements would be intangible, e.g. better statistics to inform fairer decisions, higher quality research, more satisfied citizens, while others would have economic benefits – the public saving money, better service delivery, more tax revenue, better fraud avoidance, more joined-up contact with the public, and certain address improvements are literally a matter of 'life or death' (from callers to emergency services). Even some of the apparently measurable benefits have intangible edges. While the PSMA has had an important impact in facilitating usage in the public sector, several of those bodies also favour Open Addresses in the national interest and it is clear from the overall review that the gains from wider and consistent usage of definitive addressing would be extensive and, in some areas, very substantial.

It is likely that a growth in the use of PAF would result in better quality addresses in the mail, with more postcodes, and it seems that this would give Royal Mail an operational cost saving. However, postcode penetration in the mail is already high and RM says it is not convinced that this benefit is significant, although it continues itself to pursue good addressing campaigns.

There is a probability that Open Addresses and definitive addressing are inter-linked. Greater usage of a common set of free addresses would be likely to increase the take-up of that set and its identification as definitive. It should help to deter the use of less

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[21] According to a new McKinsey report (October 2013), *"research suggests that* ***seven sectors alone could generate more than $3 trillion a year in additional value as a result of open data,*** *which is already giving rise to hundreds of entrepreneurial businesses and helping established companies to segment markets, define new products and services, and improve the efficiency and effectiveness of operations."* http://www.mckinsey.com/insights/business_technology/open_data_unlocking_innovation_and_performance_with_liquid_information

adequate alternatives, as occurs today. Furthermore, effort on improvement of that definitive set, by users and suppliers, would also increase its authoritative standing.

This review has not sought to put numeric values on these results, most of them hard to quantify reliably, but the evidence of growth and benefit is everywhere. Wider social benefits, which can be greater than the direct financial consequences, are particularly difficult to measure. The benefits appear overwhelmingly greater than the costs of making the data Open although it has not been possible to express them simply in monetary terms.

There is a good argument that many organisations already benefit greatly from address data in the UK and are able and willing to pay for this at current prices. However, the contact and familiarity with a range of market sectors, described in Section 5.2 above, shows that many more are not making use of the data and that there is much to be gained from making it more accessible. The strength of positive opinion on Open Addresses is strong and well informed and has been growing noticeably during the course of this review. It does not seem likely that this can be resisted in the longer term.

5.4 National Policy Context

Finally, it is noted that a decision to treat addresses as Open Data will resonate with a series of government policy directions, including the Open Data White Paper, Less Red Tape, Digital by Default, Innovation, Transparency.

Other consistent government directions implying a tendency to Open, encouraging data re-use and marginal costing of public sector information (PSI) include:

- Information Fair Trader Scheme
- Exceptions to Marginal Cost Pricing (recently reviewed with an increased presumption of free PSI)
- Establishment of bodies with Open Data remits – ODI, ODUG, Transparency Boards
- Establishment of PSMA, PSL and OS OpenData to make data free at the point of use in the public sector and outside
- National Information Infrastructure
- Increasing role of APPSI in information strategy (now represented on the Public Sector Transparency Board)
- EU Directive on Re-use of PSI (under review with an increased presumption of free PSI)
- G8 leader's Charter on Open Data

Open Addresses stands to be one of the most prominent and important Open initiatives, sending a clear public message about the government and supplier commitment to the Open agenda.

6 Options, Implications and Costs

6.1 Consideration of Options

The review has identified seven feasible ways forward, with some overlaps and variants. These are presented here as options, with comments as appropriate. For each case, the possible working model and the implications are described briefly. Some discussion on the scale of possible costs to government is presented but, in the absence of detailed cost data from the data owners, this is speculative until they become directly engaged in evaluation of preferred options.

The likely outcomes and cost estimates also cannot be defined exactly since there are several unknowns. The suggestions here are indicative, for reasons explained, and more detailed work and negotiation will be required to take things forward. In all cases, the arrangements are assumed to extend to include Scotland but not necessarily Northern Ireland in the first instance.

The Option titles are:

1. Making Addresses Totally Open
2. Evolving Status Quo
3. Extended Bulk Purchases
4. New Charging Models
5. Addresses as an Open Service
6. Freemium Model
7. A Commissioned Open Product

6.2 Option 1 – Making Addresses Totally Open

Concept – This review began with the premise that addresses might become Open Data, possibly involving the full set of address data that is currently available if that was considered necessary to meet the needs. It is appropriate to list this option first. The full set would include the Postcode Address File and the spatial National Address Gazetteer, with its commercial AddressBase spinoffs. In fact, the NAG incorporates PAF addresses in an adapted form so, in principle, making the NAG Open has a broadly equivalent effect.

Under this option, government would decide that addresses should be Open in full, made available under the Open Government Licence and would negotiate payments to the owners to compensate them for loss of income/profit and to maintain their on-going operations, revised accordingly. It is difficult to describe just what form the arrangement would take since many factors would be expected to change.

Implications – It is assumed initially for this option that Royal Mail would continue to

manage the PAF in the current manner and that the NAG operation would also continue unchanged. In practice, that is unlikely, partly since there are changes afoot, as described in Option 2. Also, if the current owners had no continuing commercial incentive to seek revenue and to pursue licensing, they would be likely to want to change their business models.

At minimum, the owners would no longer be involved in licensing and collecting revenue, with costs reducing accordingly. However, utmost care would be needed in defining arrangements and securing sustainable funding to ensure maintenance of product availability and quality. The incentive to drive a quest for efficiency and quality would depend on the structure of the negotiated roles and service level agreements, which would also require ongoing investment.

Costs – Two variations could be considered for costing purposes: a) maintenance of current processes; b) reduced or streamlined operations in the Open context.

The maximum cost to government of a Totally Open option can be considered to be the reimbursement of current income streams plus some setup investment for Open products. In total, this would amount to almost £40m per year based on recent revenues – some £27m for RM and £10m for GeoPlace. However, such payments would assume that there is no scope for cost reduction, which is not considered to be the case. There is, conversely, no consensus as to whether the existing businesses might grow under current pricing and licensing regimes, but that is also a consideration. It is not yet clear if there would need to be balance sheet write-offs for IPR.

A reduced payment is possible if activities become consolidated such that one centre manages the Open Addresses function while RM continues to undertake only that supplementary activity necessary to maintain PAF quality for its own operational purposes. Based on an appreciation of RM PAF costs, the main scope for cost savings would appear to be:

- Ceasing all licensing and charging;
- A quest for operational cost savings (see Option 2);
- Less need to rely mainly on postal staff for updates if there is a better operational link to local authority data.

In addition, it can be argued that a greater share of the remaining PAF cost should be borne by RM for its operational needs. This cost allocation point was highlighted in the Ofcom review of PAF but did not form part of the recommendations.

Such savings are only speculative at this point. If it is decided to pursue this option further, it will be necessary to examine the issues with RM in detail. It would also be appropriate to consider the reimbursement of the current profit from PAF rather than the gross income, although the exact profit levels are somewhat difficult to define under current cost allocation assumptions.

There might be scope for some cost saving in the GeoPlace cost base, say about 10% for removal of the sales and licensing element performed by OS. Otherwise, little scope for cost reduction has been detected. However, there is likely to be more Open duty placed on GeoPlace, so no overall GeoPlace saving should be assumed.

Thus, the Totally Open cost reimbursement total for government can be seen to be up to £40m per year (replacing all lost income) less money already paid through the PSMA. It is unlikely to fall below approximately half that in a reduced cost scenario unless it is agreed that replacing lost profit, with costs removed or moved elsewhere, is the correct measure. Cost savings cannot be achieved instantaneously, and can themselves involve costs, so a transition needs to be accommodated.

A small charge to users could be possible to cover supply of the Open products. If this was similar to The Netherlands example, say £200 on first supply (there might also be a charge for refresh), this might yield several million pounds of initial year income, assuming market growth and that only direct national sets are charged for. Income in subsequent years would be lower.

In practice, the scenario is more complex, since the likely mix of product requirements, from basic to premium, is not known, nor is the support load for a Totally Open option and many customers would receive the data through resellers. Also, it should be recognised that Open Addresses will require modifications to supply arrangements and user engagement that will involve some new costs, although these are unlikely to be major.

In considering costs, the current PSMA (address component) and potential PSL annual payments could be assumed to continue and can be deducted in all cases. Further reduction is likely to be possible by substantially redefining roles – see section 6.10 "*Seeking Efficiency: Changes to Operations and Cost Savings*".

Paying to retain the exact status quo is probably unrealistic. Of course, the potential to save costs, as indicated above, is open to debate. The adaptations to reduce costs could not be made overnight, so it is likely that a higher cost would occur initially and reduce on a sliding scale. Securing availability of long term operational budgets and investment would be essential.

Summary – To make the full range of address products free at the point of use requires a dramatic change to procedures, responsibilities, ownership, business models and funding. Development of this option is likely to be a slow process. There are considerable risks to the maintenance of quality, and the status of PAF within a privatised Royal Mail makes arrangements awkward. It is recognised that many organisations can afford to pay for the considerable value received and do not need the data to be free. The potential cost to government is high initially, notwithstanding the benefits in some markets, and overall this major change cannot be recommended at this time.

6.3 Option 2 – Evolving Status Quo

Concept – A base case for the review is that things are left alone, to take their own course, and that there is no government action taken to develop Open Addresses. Naturally, there will be continuing development and investment by the suppliers in response to market requirements. But there are reasons why things will change of their own accord. Already, RM has consulted on quite different licensing approaches, aiming to reduce the burden on both end users and on intermediaries.

Implications – The Ofcom review has identified that PAF licensing can be simplified and considered that RM would be incentivised to reduce its PAF cost base through removal of the voluntary profit cap. Efficiencies appear to exist elsewhere in the address management life cycle (see Section 6.10). With a critical review of costs and where they are allocated, it is considered that the operational cost, and hence the price, of address products will naturally be reduced, resulting in greater take-up and benefits. This assumes, of course, that the address market is price-elastic, which is probably truer in some sectors than others. It is also possible that there will be more umbrella deals to purchase free end-user access to address data for defined user groups. Other than these points, there is little that suggests at present that OS or RM will develop Open approaches of their own accord, given their operating constraints.

The current data owners will be very aware how things are changing in their markets, however. In particular, rapid developments in e-commerce and mobile information are game changing. Competing sources of address locations are emerging and, while not as complete or as high a quality, there is sufficient momentum to impact on the existing products. If the PAF and the NAG are to continue to thrive and be the benchmark for other address sources, they will need to adapt to operate in the context of those emerging developments. It is considered likely that the data owners themselves will in due course recognise the need for more Open approaches to influence and stay in tune with technology and new markets.

Costs – There is no explicit short-term investment implied from government in the status quo, other than to continue with PSMA and (forthcoming) PSL arrangements. In the longer term, it would be important for the Ofcom PAF regulation role to be effective and interventions might be needed if the continuing quality or accessibility of products appears threatened.

Summary – The evolving status quo will overlap anyway with whatever initiative might be taken by government, although probably in a longer timescale than desired. It is a realistic base option to ‘let the market decide’, but one that risks little prospect of any Open Addresses solution, loss of control of evolving markets and a possible eventual supplanting of the high quality products that are greatly valued with a regression from definitive addressing. As such, it does not seem ideal to just let matters drift.

6.4 Option 3 – Extended Bulk Purchases

Concept – It would be possible to arrange new group procurements or to extend existing

ones, along the lines of the PSMA or the emerging PSL. This might cover academic research or a specific commercial consortium, for instance, or extend current deals to fringe participants such as the larger charities, Housing Associations or GPs.

Implications – While such purchases would increase the number of organisations that have addresses free at the point of use, they would not be likely to open address data to several of the sectors that represent innovation and growth. It does not seem probable that the private sector would arrange many consortium deals or that government would act to procure for commercial interests. The model is well understood, so it would be possible to identify specific groups and include them in the benefits of 'free' access.

Costs – Current deals might provide a guide to future negotiations but the real test will be the assessment by data owners of the value of business foregone. In general, the main group value has already been recognised through the PSMA and OSMA, so user types that are near to the public sector should probably not be very costly to include. That would not be true for the private sector, where the greatest growth potential lies. It is possible that some sectors (e.g. academic research) might be able to raise funds to meet their own requirements or to contribute to a wider scheme and OS has stated that it intends to engage in dialogue on an arrangement.

Summary – This option would effectively be moving toward Open Addresses without going for a comprehensive solution. It does not deal with the objectives or issues of Open Data, so appears a sub-optimal way forward.

6.5 Option 4 – New Charging Models

Concept – It is possible to identify different pricing structures that could bring some benefits of Open Data while retaining a charging regime. An example is for data owners to charge to major resellers who build the addresses into their products or services but who do not then charge or licence addresses on to users. Instead, they would make their returns from adding value. Another example (beginning to happen) is to identify target small user types that would have preferential access. It might be possible to offset these to an extent by increasing prices to major users, subject to legal constraints. In effect, the concept is to encourage end-use and re-use, while allowing revenue streams to continue at some level.

Implications – There are complications with such models, including difficulties with defining the markets fairly (with possible legal issues) and avoiding bulk addresses being passed on, but it is conceivable that these can be overcome. If this option were of interest, it would be appropriate to discuss suitable approaches with the data owners.

The RM consultation on PAF licensing was premised on such a model, with RM's favoured option being to pass all licensing through Solutions Providers (resellers) and allowing them to decide whether to charge end users. But RM would require a royalty payment from the SPs on a 'per-click' usage basis (including from OS with all its types of customers for AddressBase) and thus requiring end-users to count access clicks. While this format seems to fit the concept that those that use the data should pay, and would generally work

in the traditional PAF market, there are many cases where it seems untenable. In particular, it does not fit well with modern mobile or Web applications and certainly precludes an Open Data approach. It is not clear how it would apply to RM itself as a major user of PAF. It seems likely (prior to publication of the outcome) that this method will not be adopted or will have to sit alongside other licensing models.

Costs – Solutions providers already contribute most of the income for PAF, while half the NAG/AddressBase revenue comes from the PSMA. As such, creation of new, more permissive end-use licensing might maintain most of the current income and require little government support to make the change to a more 'Open' model. In order to estimate a cost for this option, it would be necessary to specify how it would function realistically in practice and then how the markets would react. This can only be done in conjunction with the data owners. It is possible that there would be no government support required but, more likely, a subsidy would be needed for an effective solution (perhaps as high as £10m per year) to allow free re-use for some high priority growth parts of the market.

Summary – This is a compromise and fairly clumsy option and is not very attractive in the longer term. It might satisfy some immediate calls for Open Addresses and achieve a degree of the available benefit, but might not endure in the face of market challenges.

6.6 Option 5 – Addresses as an Open Service

Concept – Following discussion with the Cabinet Office, Royal Mail has increased (June 2013) the number of free on-line PAF lookups for personal use from 15 to 50 per day. It would be possible to extend this model to include the grid references, UPRNs and other data that GeoPlace adds to PAF data.

Implications – If OS made such added-value data available on the Web, it would stimulate certain limited types of Open Data activity. This seems to be a sensible 'quick win'. Its potential practicality and effectiveness will depend on rules for re-use determined by RM. For example, it is not yet clear whether a Web site or mobile App developers can use the data and feed it up to a customer. To simplify the offering, it is possible that it could be supported on the RM Web site rather than OS developing a parallel service.

Costs – There appears to be little cost to government for this relatively simple option. RM did not require any financial support to make this adaptation to its service. However, there would be some resource implications for OS to add and manage such a facility. Linking it with the PAF lookups seems more elegant.

Summary – This is an attractive concept that can be implemented readily and quickly. It will require both RM and OS to rethink what is being offered to some extent. It does not meet the demand for Open Addresses, but would be seen as a positive move.

6.7 Option 6 – Freemium Model

Concept – It would be possible for data owners to elect to release a relatively basic product as Open Data that would satisfy a majority of the target users while leaving higher

value products for sale to existing and future premium customers. This is a common market tactic with many data and software vendors. It is termed Freemium[22] and sometimes involves the provision of a Light or 'Lite' variant of a product, itself a useful offering. The commercial logic is that some users will appreciate the experience and decide to upgrade. Furthermore, it keeps the users involved with the suppliers rather than with alternatives.

Implications – The product aspects that can be considered as variable in requirement for addresses are content, resolution, detail and frequency of supply. Many users that would benefit from locational or spatial Open Addresses and grow the usage substantially do not require frequent (e.g. daily) releases, address histories, property classifications, reference code equivalences, application-specific address forms, aliases, etc. Others might just want the basic addresses frequently but without grid coordinates and with little embellishment. Those that do need such refinements have tended to value the data sufficiently to already purchase it at current prices or through collective arrangements.

The immediate candidate Lite product is the basic AddressBase[23]. This product is simply reformatted PAF addresses with UPRNs and grid coordinates applied by GeoPlace, and OS currently releases it every six weeks. With a few modifications[24], this would meet the needs of much of the research, Web developer, mobile App, not-for-profit and SME target audiences, while still allowing those that need frequent or more detailed data to purchase premium versions. Open does not have to mean entirely free in this case (see Option 1) and it is highly probable that premium revenues could grow and loss of income be offset to some extent (although the data owners have not yet accepted that this growth would be significant).

It should be noted that there would be different levels of impact on PAF and AddressBase premium products from such an approach. For PAF, most of its value is in the list of addresses while the value of AddressBase extends, importantly, to the grid coordinates. While full PAF contains some additional details of properties, the premium upgrades in the AddressBase family are more distinct. The value of frequency of supply is currently higher for PAF than for AddressBase. These differences need to be considered in any decision to pursue a free basic, infrequent product.

Basing the model on AddressBase would satisfy those that need a location product of addresses, UPRNs and grid coordinates but not frequently. It could be released less often than six-weekly, perhaps annually, although such lower frequency will reduce some of the

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[22] The APPSI Glossary on Public Sector Information and Open Data (http://www.nationalarchives.gov.uk/appsi/open-data-psi-glossary-pilot.htm) describes Freemium as, "A business model by which a product or service (typically a digital offering such as software, media, games or web services) is provided free of charge, but a premium is charged for advanced features or functionality."

[23] AddressBase is the lowest content dataset in the AddressBase product family from Ordnance Survey, which also includes AddressBase Plus and AddressBase Premium. The data is sourced from the National Address Gazetteer and the One Scotland Gazetteer.

[24] The current product only contains those PAF addresses that have been matched to the NLPG. It would be necessary to include all PAF addresses, even if some carry an unmatched code. Some additional specification changes might also be warranted, such as to include a selection of more popular OWPAs, but this is not essential to the concept if it is considered that it would impact badly on premium product revenues.

benefit. An alternative low-end group of PAF users might welcome greater frequency but without coordinates – small customer-facing businesses or some that are involved in validating identities at a simple level, for instance. These might appreciate online simple PAF addresses in a rapid addressing format, but noting that there are many PAF customers that already will pay for rapid addressing. There might be a case for offering both variants and for local or topic subsets for some types of users.

The basic AddressBase does not contain the local government version of addresses, only the PAF version. While it is desirable to provide both (and see the local authority sub-option mentioned below), these are not yet in common use and the greater Open Data market priority is for PAF addresses with location details.

Freemium is a supplier initiative, so Option 7 below considers a variant that is initiated by government. However, it would make sense for any Freemium products to be considered as Open Data that should be made available under the Open Government Licence, which would require a decision from RM and OS/GeoPlace to waive any claim to royalties or requirement for additional licensing for these versions.

OS and RM have made it clear that they do not consider that the additional upgrade, operational, quality or image gains from a Freemium decision would offset their loss of revenue, and might require re-pricing of the premium versions, so it is not likely that they would pursue this themselves. In fact, RM considers that even an infrequent basic product would impact badly on PAF revenues and has indicated that, should OS wish to offer Open Addresses, it would contain much of the value of PAF and, therefore, OS would still have to pay PAF royalties.

Another sub-option that has been mooted, and is gaining currency, is that local government in Great Britain might produce and release a Freemium product from its own gazetteers to contain the ‘official’ local authority addresses. Other data items that might be provided, such as postcodes, grid references and UPRNs, would be a matter for discussion with other parties. This is not an ideal prospect in that placing local government addresses in the public domain would fragment the aim to achieve a consolidated definitive basis for addresses and, if provided without postcodes, would be an incomplete product for many applications. This would result in reasonable criticism as to how this could be allowed to happen. However, the LA addresses are a most important set and, if released as Open Data, would soon attract a following (and the addition of crowd sourced data such as postcodes and coordinates at some level of accuracy and precision) to challenge the traditional products if not done in liaison.

Costs – As indicated, a Freemium approach would be a decision for the data owners, if they saw advantages from the tactic. It is possible, however, that it could be pursued with a mixture of supplier and government funding. The cost implications are very similar to those presented below in Option 7, although modified by the supplier-led decision Freemium process.

Summary – It seems very unlikely that RM and OS will decide that Freemium on its own is in their direct interests, so more attention can be paid to the similar impacts of Option 7.

6.8 Option 7 – A Commissioned Open Product

Concept – While Freemium is strictly a commercial decision for data owners, Government could work with users and the data owners to specify and commission a suitable Open Addresses product. This should be based on existing, available data and processes and, in principle, could be technically similar to the Freemium product described above. That product is a modified version of the basic AddressBase, released relatively infrequently, perhaps on the current six-week cycle or perhaps less often.

Implications – The considerations are very similar to those described for Option 6 – Freemium, above. However, with external involvement beyond the commercial perspectives of the data owners, it would be necessary to consider wider issues, such as the operations required to support an Open product, the impact (negative or positive) on the data owners' ongoing revenues (and costs) and negotiation of payment to data owners.

If government were to take the lead on development of a basic Open Addresses product, many aspects would need attention. These are considered in Chapter 7 "Practical Considerations".

Costs – It is assumed for now that the PSMA and prospective PSL payments would carry on. These would continue to purchase the premium PAF and AddressBase products for many public sector users. It is certainly the case that some public sector users would happily make do with the standard AddressBase Lite or online PAF Lite versions – if considered relevant, this can be a basis for some renegotiation of the extent of PSMA and PSL user coverage.

RM and GeoPlace would continue to earn income but would initially expect to see loss of revenue from this option. While most users would take the 'free' version, the premium products would be needed by sufficient organisations to maintain some of the earnings. In fact, familiarity with the basic product would probably encourage some new Open users to upgrade to become customers for the premium products. Set against this, a free product would require review of the price that could be charged for the premium versions and this, again, will impact on income.

It is not clear how much money would need to be found for this approach. The concept should have some attractions to the data owners as a market tactic in any case. Alongside considerations of how competition is emerging plus the opportunities to reduce operating costs, the development could be considered as a good approach without complete government intervention. At present, OS and RM have indicated that even a basic Open product would have substantial impact on their revenues and would not be pursued without support, although the extent of the issues needs further consideration and is fairly intricate.

As a starting point, it is suggested that the Open Addresses model be pursued without assuming additional high costs to government. The discussions could focus on:

- The likely impact on current markets;

- Positive aspects for the data owners – upselling, data quality enhancement and image;
- Potential to reduce the cost base, with or without the initiative;
- Whether any cost can be levied for the Open product to offset costs;
- Replacement of profits foregone rather than revenues;
- Investment required to maintain viability, quality and to operate the Open service.

Meeting the special access and support needs of Open Data users does carry some costs and it is possible that, while fairly modest (perhaps a £2-3m set up phase and then £1m per year), these should be met by government.

There are many uncertainties about what would actually transpire. It is conceivable that an arrangement could be structured that was conditional on actual outcomes. A basis for monitoring outcomes with periodic review of costs and returns would form part of a negotiated deal. Even if the actual payments under such a deal might be less than the level initially sought by the data owners, it would be necessary for government to budget to meet full figures if that proved to be the result.

As mentioned, Open does not have to mean entirely free and it is possible that data owner revenues could grow and costs be covered to offset some of the investment required from government. If some small charge is levied for supply of the Lite products, this can defray any new operational cost or even make a surplus. However, it is the essence of Open Data that there is no charge for re-use and, with this in mind, it might be best to make the products truly free.

It is recognised that some campaigners for Open Addresses will not be wholly satisfied by a partial approach, however appealing. This solution can be considered as a very suitable, durable and substantial ‘taster’ for Open Addresses that will demonstrate the concept at a more affordable cost and allow the evolution of the market and the supply chain to be monitored and adapted.

Summary – This Commissioned Open Product is the favoured approach (and seemingly the most feasible and practical) from this review if there is to be an Open Addresses solution. A basic, infrequent release can be put in place quickly, to good effect, would be immediately popular and would represent the largest Open Data ‘win’ to date. It would meet many requirements for Open Addresses without compromising the quality or availability of the foundation data. Thus, new user developments would be more likely to be based on the quality benchmark of PAF and NAG while allowing data to be added by others, with greater value to both users and suppliers.

6.9 Overview of the Options

The table below summarises the seven options outlined above. Cost indications are a subjective assessment by the author of this review based on knowledge of current products, markets, and group purchasing and assume that PSMA/OSMA and proposed PSL payments will continue. However, there are insights not available to the review and

any preferred option would have to be subjected to detailed evaluation, involving the data owners.

Option	Open result	Feasibility	Cost level	Comments
1. Totally Open	H+	L	H	Many complexities and risks. Would not be agreed quickly. High cost initially, reducing. Not recommended in current climate
2. Evolving status quo	L-	H	L	Little control over how this will develop or how Open it might become. Carries longer term risks of failure due to emerging competing sources
3. Extended bulk purchases	L	M	M	Will help some communities but not a solution
4. New charging models	L	L	L	Possible to recast pricing and licensing but likely to present anomalies and be a less good option
5. Addresses as an Open service	M	H	L	Quick win interim approach with some benefits. No apparent reason to delay
6. Freemium model	H	L	L	Data owners decision; might need government support
7. Commissioned Open product	H	M	M	**Recommended** for evaluation. Meets most immediate needs; gives a base for development; preserves product lines. Shares some complexities and risks with Option 1

Notes:
Open result refers to the extent to which the Option meets the government aspirations to have addresses free to all users under an Open licence.
Feasibility relates to practicality of implementation, considering complexity of issues
Cost level is a broad subjective indicator of the cost to government to secure its objectives (as far as the option can deliver). It is not a reliable guide to the eventual financial outcome. On this basis H =£20-30m+; M =£10m+; L =<£10m pa.

6.10 Seeking Efficiency: Changes to Operations and Cost Savings

In commissioning this review, BIS also asked for thoughts on achieving cost savings in addressing. This might, indirectly, counter some of the costs of achieving Open Addresses. Essentially, this involves rationalising address change intelligence and reducing the need for separate organisations to hold and manage their own address databases.

In the text above there have been suggestions that there is scope for efficiency in current operations. Some of this arises from identifiable duplication, while there is also opportunity to consolidate activity or seek cost reductions or reallocations. The Ofcom review of PAF has indicated considerable field cost that might arguably not be passed on to customers and there appears to be scope for RM to benefit more from local authority intelligence rather than using its own personnel for all field inspection. An independent investigation of change intelligence sources, relative quality, timeliness and efficiency is suggested.

There is certainly duplication and other inefficiency in the way that addresses are managed in this country, some of it appropriate and necessary in the current environment, but some avoidable. Most notably, the difference that sometimes occurs between postal addresses and the definitive addresses contained in the NAG (sourced mainly from local government gazetteers) can be real but is sometimes artificial. Neither set is consistently the correct or incorrect one – the point is that there are differences. This is generally manageable, although there is duplication in work to identify new and changed addresses. GeoPlace matches the definitive addresses to the PAF to identify common properties that have differing addresses, although it would be possible to bring the sources closer together by operational changes.

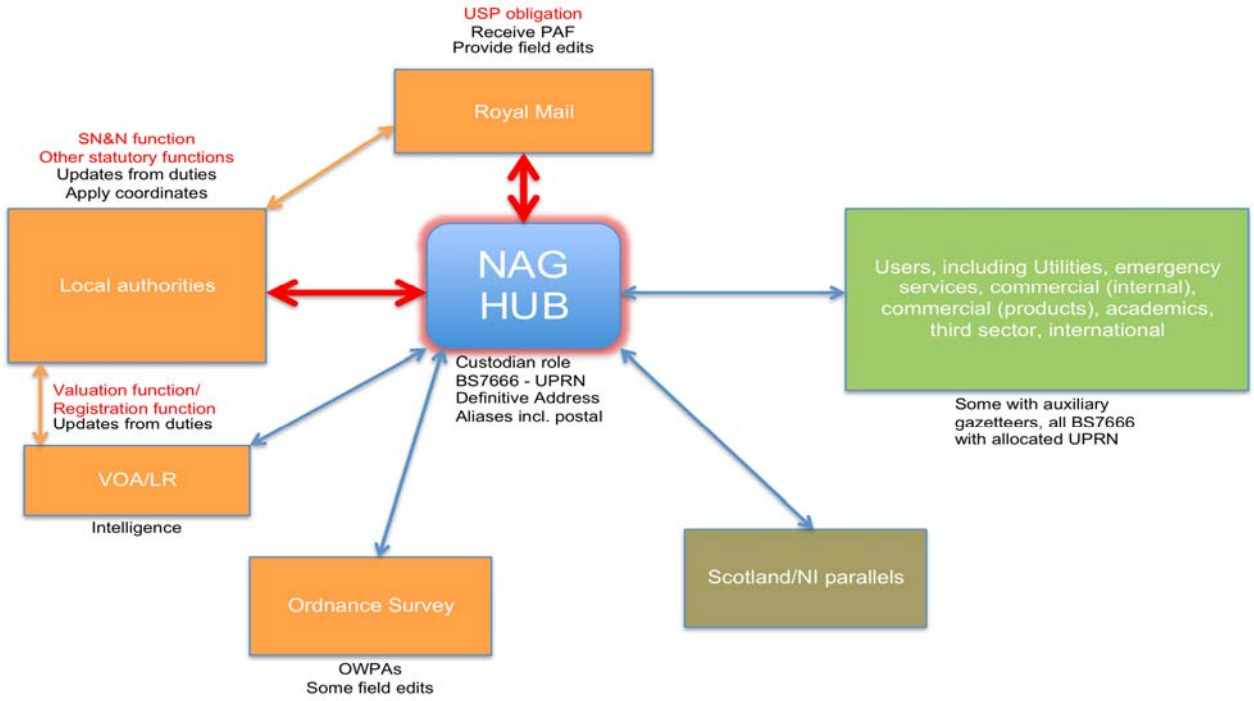
Some government bodies that deal with addresses on a national level (particularly the Valuation Office Agency (VOA) and HM Land Registry) maintain their own address databases to deal with operational requirements, whereas it would be possible to devise methods for them to base their work on the NAG (there is a regular match of the VOA addresses to the NAG but the databases remain separate). Currently, local authorities keep and maintain copies of their parts of the NAG, but access to a more efficient centralised hub operation is feasible.

As a development of that thought, there is currently insufficient attention to the life cycle of addresses and there are greater efficiencies available. GeoPlace has made considerable progress in this regard and Royal Mail is discussing more harmonisation of information flows on address change intelligence with local government (it is not necessary for both local authorities and Royal Mail to be spending resources finding the same address changes in parallel). But, several other bodies that have a role in detecting address change are not joined up in sharing the information – as an example, HMLR has offered to provide intelligence that it observes in the field but OS and local authorities are not yet able to take this on. A thorough review of processes is warranted to seek better opportunities for efficiencies and the fostering of definitive addressing.

In a wider view, there is a possibility of much greater consolidation around definitive addressing. The diagram on the next page shows the concept of an eventual Hub operation. This is a schematic representation of a vision for efficiency and definitive quality. The arrows indicate access to addresses and feedback of change intelligence. It would require a series of transitional steps to reach this point from the status quo.

The idea is a known one in which the NAG Hub (enhanced) becomes an online resource for most usage by the key organisations and other users. Nowadays, with available communications bandwidth and Cloud computing methods, it is quite feasible that a resilient Hub could serve the requirements. Organisations would not store addresses in their own databases but would use the UPRN to establish the necessary linkage. This will seem alien in the current environment but is technically entirely feasible. Even LAs and Royal Mail, in the longer term, could use the Hub rather than maintain local databases, although they might hold security backups for resilience.

Address Hub Concept



The concept of an address hub has been around for some years. While not specifically directed at Open Data, this efficiency proposal has benefits that would be compatible with the Open agenda and would facilitate the move to Open Data. The concept is that definitive addresses would be maintained and disseminated from a central repository (the NAG is the appropriate emerging model). All direct users would access the hub online with suitable linkage arrangements that would recognise their specific operational requirements. For example, Royal Mail would have access to postal versions of the definitive addresses where these need to differ, local authorities would use the Hub online rather than mirror the data locally, VOA and HMLR would use the Hub but associate their own references to tie in their specific data sources and the emergency services and utilities could use the Hub but hold their own compatible extensions for specific types of addressable object. In time, various intermediary suppliers of data products would

naturally migrate to online access to the Hub. The Hub vision would help to drive down costs and increase the penetration of definitive addresses in general use.

Operating the hub would not be the same as maintaining and verifying the address change intelligence, creating and managing postcodes, defining the address location grid references or allocating UPRNs. Those specific and important tasks should be part of the life cycle of addresses involving cooperation between the parties best placed to provide the intelligence.

For some organisations the change would be quite dramatic, with risks and cost implications. Investment will be required. It will be necessary to have a thorough feasibility review and impact assessment before pursuing this vision

7 Practical Considerations

7.1 Overview

This chapter considers issues of implementation for the favoured approach, which is to make a relatively basic national address gazetteer product free at the point of use to all users. That product is close to the existing AddressBase standard offering, which contains PAF addresses with national grid references and UPRNs and is currently released as a snapshot every six weeks. Some enhancements to AddressBase can be considered, including adding all PAF addresses, not just those matched by GeoPlace, and some OWPAs if that would not impact badly on other products. Charging can continue for premium versions of the PAF and AddressBase products

Timing – An advantage of this proposal is that the Open Addresses product can be in place very quickly. It exists in a suitable form already and needs little adaptation. Once the negotiations have been concluded and operational arrangements have been established, the process can be similar to the release and management of OS OpenData.

Costs – The cost implications need to be developed with the data owners. There will be some loss of low-end revenues by RM in particular and a knock-on adjustment required to prices of the AddressBase family. There are likely to be some compensating gains from extra interest in the premium products and operational and quality feedback gains from extended exposure to a much larger market of consumers. With an expectation that PAF operating costs will fall anyway, and taking account of PSMA/OSMA payments, government funding can be affordable. There will be some setup cost, to prepare the data and facilities for the Open environment plus resources to manage and monitor an Open dataset.

Frequency of product release – AddressBase is currently released every six weeks. It would be possible for the Open Addresses product to be made available less frequently, if it was considered that would still meet the objectives and help maintain interest in the premium products. It is mainly certain types of PAF users that require very frequent updates, although some AddressBase users would prefer it.

In considering frequency, one objective is to encourage Open users to base their usage on a continued availability of the Open Addresses product, underpinned by the definitive set, rather than have them take an initial supply and then build an alternative resource from that. It would be unwise for users to develop independent variants, knowing that an authoritative refresh is always just around the corner. Clearly, a more frequent release will encourage loyalty.

It can also be noted that the data does not represent the ‘total cost of ownership’. In that regard, many users find it difficult to receive updates too frequently, either because of the effort of maintaining their systems or because they purchase support to assist on each update. There is a balance to be struck.

Free or charged? – A decision can be taken as to whether the Open Addresses product is entirely free or if there is some small charge to cover management and distribution costs. The latter involves a limited complexity of licensing but helps to cover costs and gives a base for monitoring take-up and benefits. However, to be properly Open, there should be no restrictions on re-use.

Licensing – It is recommended that the Open Government Licence will be suitable for Open Addresses, with small adaptations to support any charging, attribution and possible mechanisms to identify those that acquire the dataset. But, in general, Open Data implies minimal licensing and no payment of royalties to owners. It is also anticipated, separately, that licensing for the premium products will be made simpler.

Ownership – There are some questions surrounding the ownership of elements of the address sources but varying the ownership of address products has not been a topic for consideration by this review. However, there is no technical need for change from the current position, since PAF and AddressBase commercial premium products will remain in place. There will be data owner background IPR in Open Addresses but any foreground IPR resulting from government funding is a matter for discussion.

Impact on current products – It is extremely difficult to estimate the effect of Open Addresses on PAF and AddressBase with any certainty, although it is possible to role-play different scenarios. The result could be quite profound in terms of migration of users or, alternatively, the premium products could do better.

RM and OS have both indicated that they would expect considerable loss of income. Looking across the market sectors, it can be seen that some current users could make do with the Open product and might migrate, but others would not wish to. This is complicated by possible licence changes and the involvement of resellers who add value and the likelihood that they would mostly continue to base their services on premium versions. Further, OS feels that the current price differentials in the AddressBase family means that all pricing would have to reduce. That, of itself, might bring in new customers or might reduce income. These factors need careful consideration as part of an agreement.

Another serious impact could be on the maintenance of product quality. LAs and RM have operational incentives to ensure that quality is not compromised, but it is vitally important that the structure and funding is in place to ensure that security and development of the products is facilitated.

Risks – While a major change to make all address data Open would carry real risks of losing data quality and unknown consequences for the data suppliers and users, the recommended approach does not hold that threat to the same extent. In fact, it has the potential to help to improve quality and content from involvement of a wider user base. Nevertheless, the risks should be evaluated.

Longer term – This relatively lower cost, quick approach will satisfy the majority of new market entrants in a durable way while leaving the valuable premium address data available for those that need and can realistically pay for it. It is assumed that licensing will become simpler in any event. The proposals are designed to increase the role of definitive addressing. There will inevitably be calls from some quarters for the more detailed and frequent data to be made Open – that presents much more substantial issues. In that regard, the initial release plan will prove a valuable proving ground, providing substantive evidence of real take-up and benefits and a firm foundation for evaluating extensions to the initiative. The concept of a central definitive Hub, presented in Chapter 6, is a larger issue that requires a proper impact assessment along with a review of how address data is best maintained.

Measuring results – It is in the nature of Open Data that its success is difficult to measure. However, funding by government should be accompanied by an ability to evaluate the results. This is covered further in Section 7.6, “Next Steps”.

7.2 Change Plan

There is little need for operational or organisational change under this proposal. RM should still manage PAF, with its delivery needs in mind as well as its focus on premium customers. NAG would continue to be the responsibility of GeoPlace, with little fundamental change required.

Both organisations should continue to seek efficiencies to bring down the costs of addressing, within their own operations and in liaison with others.

The changes naturally require close involvement of the data owners and their full cooperation. They will need to be involved directly in the development of the financial business case and in agreeing arrangements for funding. It will be necessary to agree that all claims on royalties for the Open products will be waived.

The role of local authorities requires special attention since they will continue to have a central role in the addressing process. It is important that their already stretched resources do not meet with more demands (without compensating investment) due to an Open Addresses decision and that their ability to ensure maintenance of high quality and consistent operations is not compromised. Special discussion with LA representatives will be necessary.

Making such significant data Open will involve some new resource requirements. A special unit should be set up, perhaps in GeoPlace, OS or in a private sector firm, to handle data packaging, promotion, guidance, release in modern ways, any charging and (simple) licensing and managing feedback from users, which is likely to be substantial. As a guide, this might require up to six additional staff plus some use of development and Web Service contractors.

A governance structure is needed to guide the introduction and maintenance of the Open regime, but can be fairly lightweight. With the importance of this data to the Open agenda,

it should be under Ministerial direction. An advisory board should be created to include a variety of stakeholders, including data suppliers, PAB and user representatives. That board could take responsibility for development and maintenance of the specification and for monitoring the results.

In the longer term there is scope for more substantial change in the interest of seeking efficiencies and greater attention to definitive addressing. But that can be considered in a measured way, with the benefit of real experience from the initial steps. The eventual vision for a single Hub of definitive addresses can also be pursued in a staged manner, beginning with a full impact assessment.

7.3 Devolved Administrations

Scottish data should continue to be included in the Open Addresses gazetteer, as it is in AddressBase today. It will be necessary to agree the approach with Scottish officials. Discussions should be held with NI officials to see if a parallel arrangement can be found for the Pointer data. Consultation with Welsh officials is also recommended, although Wales is covered with England under relevant current arrangements.

7.4 Legal Considerations

The precedents of the PSMA and OS OpenData suggest that there will be no legal obstacles to an Open Addresses decision. However, experts must be asked to examine this as part of the evaluation of a preferred approach.

7.5 Unexpected Consequences

The proposed approach is a fairly simple one and it is not anticipated that it will cause any major distortions in the market. However, it is not always possible to predict how Open Data will play out and the take-up might be different from expected. It is certain that novel and unanticipated applications will emerge, but these should generally prove to be favourable.

Unexpected results can occur. When GP prescribing data was made Open it was anticipated by the NHS that user support would reduce but it seems that FOI requests increased. Changes among users need to be monitored with appropriate reactions.

The growth in usage is unknown, as is the burden that it will place on support infrastructure. Again, this is considered to be manageable with the limited Lite release that has been recommended.

Some current users of premium versions of the data might elect to switch to the free Open version. Most will probably stay with the benefits they already receive from more detail or greater frequency, provided the resulting price differentials between products are dealt with. PSMA users already receive AddressBase Premium.

Some data intermediary firms might be challenged by the impact of new entrants to their markets. But, in general, most are expected to benefit.

The knock-on pressure for more Open Data (including more data to be termed Core Reference) is also not easy to gauge, but the experience of this initial phase will help to create methods and assess future demands.

7.6 Next Steps

Following the Ministerial decision, assuming it supports the recommendations of this review, it will be necessary to reach agreements with the data owners based on their support to evaluate the impacts thoroughly. That will include complicated details on implementation and costs as well as the waiving of royalties for the Open products. While the conclusions of the review are not onerous, it may take some months to agree the way forward. It has been suggested that the proposals are affordable, but this and the basis of funding need to be agreed.

After negotiations and legal review, it should be possible to release the first version of Open Addresses in 4-6 months. The operations of the process need to be put in place and assured for the future.

Most Open developments have lost sight of their users once active licensing has ceased. It is very important that usage and benefits from Open Addresses are monitored to inform future decisions. The officials responsible for its introduction and management should be charged with this requirement. The mechanisms for user contact and follow-up might include:

- Community Norm – an Open construct where users are encouraged to register to support the community and its future;
- Registration for benefits – where users obtain news, extra data, tools, etc. if they register and take part in feedback;
- Market research – funding periodic studies of the impact.

The initiative needs to be managed and fostered to achieve its full benefit. Developments of the governance structure and user interaction are important aspects.

8 Summary of Conclusions and Recommendations

8.1 Findings

UK society relies heavily on address data and current products have helped greatly to create benefit.

The review has found large support for Open Addresses. The investigation has been focussed on those parts of the market that are not using the data but even the more traditional users consulted see benefits or are neutral to the concept. It is expected that Open usage would grow substantially and help to deliver even greater community benefit from definitive addressing.

Firm evidence on the success of Open data is difficult to find but there are parallels that indicate considerable benefits when charged for data becomes free.

Not all potential users need the highest specification product. Current users already purchase premium releases but the wider target market has less need of the full set of information available.

The main interest for social gain, innovation and growth is to have Open access to spatial address data, not just the list of addresses.

There is scope for improvements in efficiency in current processes and this can be developed to offset the community costs of Open Addresses.

8.2 Conclusions and Proposed Actions

This review has reached the following conclusions, repeated in the Executive Summary:

A. Open addresses

1. Interviews and familiarity with a range of bodies and parallel evidence indicates that there would be a substantial benefit from making some level of address data free at the point of use and it is considered that this would far outweigh costs of doing so.

2. As an immediate action, government should liaise with the data owners to encourage ‘Addresses as an Open Service’ – a more full-featured variant of the Royal Mail decision to allow up to 50 free online PAF lookups per day.

3. It is recommended that government should sponsor specification and provision of an Open Addresses product as a periodic snapshot of the main existing products. This can be a modified version of the basic AddressBase product for Great Britain and should be Open Data, free or inexpensive at the point of use. This will satisfy immediately most end user needs for Open Addresses, leaving the current data suppliers able to provide and

charge to the sophisticated market that requires more frequent and detailed releases. This would be a durable approach that is achievable in the short term and would also provide valuable market evidence for future decisions on addresses.

4. The costs of this practical proposal and requirements for funding need to be developed with the data owners. There will be some loss of existing revenue against which can be set some savings or income from new users. A small charge for the product could defray some of the cost, although this would not result in a fully Open regime and is best avoided. Alongside this, current costs and prices associated with the main address products could be reduced over time. There appear to be no legal barriers to this proposal, although that will need inspection.

B. Address data management

5. Address data now underpins a vast range of vital activity. It is essential that definitive address data, as one of the most central Core Reference data resources, is of high quality and maintained to a reliable and predictable standard. Investment to ensure this central objective should not be lost due to an Open Addresses initiative.

6. The role of local government as a key player in addressing requires special care and attention to ensure that its ability to perform vital addressing functions is not compromised and, ideally, is supported with legislative guidance. In particular, local authorities should not have to find additional resources to support any move to Open Addresses without suitable funding.

7. A long-term aim should be to work toward a national address gazetteer maintenance and distribution hub (although not necessarily operated by the public sector) that is used by all bodies that need access to the definitive data. Among other benefits, this would increase emphasis on common use of definitive addresses and would reduce operational duplication. There are additional integration efficiencies available from a full recognition of the address creation and change life cycle that fit well with the hub concept.

8. There would be complex practical and financial issues in achieving this hub aim and it is possible to identify steps along the way. The hub and efficiency proposals require further study and impact assessments.

C. Next steps

9. Subject to Ministerial consideration of these conclusions, it is recommended that data owners should be asked to help to fully evaluate the favoured option(s) so that their costs and implications can be assessed.

10. A dedicated governance structure with a public sector Senior Responsible Owner would be essential to oversee the evolution and management of the Open Addresses policy. It does not exist within current arrangements, although it is possible that current responsibilities could be modified. A plan for on going user engagement and representation would be required, including how the success of Open Addresses will be measured.

Appendices

Appendix A: Details of PAF and AddressBase Products

This appendix contains

- Lists of the file contents of PAF and AddressBase
- Price lists for PAF and AddressBase
- NAG diagram of the address lifecycle

The material has been extracted from Web sites or provided by the data suppliers.

PAF Contents (from Ofcom Review of PAF)

Fields in Full PAF	COMMMENTS
Organisation Name	The Organisation name is one of the elements that may be used to generate a postal address e.g. Lloyds TSB plc rather than 10 High Street. This may also be a company or firm's name.
PO Box	Details of users of the Post Office Box (PO Box) service are allocated a separate postcode to their normal geographic address and are held on PAF® to facilitate the identification and sortationof PO Box mail.
Sub Building Name	This field is used where a building number and / or building name exists and is sub-divided into separate delivery points. Examples may include:-Flat, Apartment, Block, Maisonette, Suite or Unit.
Building Name	This field may contain: •House names for properties without a premise number.•A Building name for a property that is occupied by an organisation/organisations. •If a delivery point has no known identifiable address other than the occupants Surname, the Surname is held in the building name field within brackets e.g. (Jones) but this is very uncommon.
Building Number	This field holds the premise numbers where they exist.
Dependent Thoroughfare	A Dependant thoroughfare name may be required where two instances of the same name occur in an area.
Thoroughfare	Where an officially named thoroughfare name exists e.g. High Street, it will be held in this field.
Dependent Locality	A Locality name may be required to differentiate between duplicate road names within a local area or for routing and sorting purposes. A Locality name may have also been added as part of the PAF® Code of Practice process.
Double Dependent Locality	A secondary Locality name is sometimes required when there is duplicate road name within a Locality area. Locality names may have also been added as part of the PAF® Code process.
Post Town	The Post Town is also a clearing point for a particular district and is the basic unit of a Postal Delivery system.
Postcode	The Postcode is a combination of five and seven letters and numbers, which define four different levels of geographic unit 'Postcode Area', 'Postcode District', 'Postcode Sector' and 'Unit Postcode'. It is part of a coding unit created and used by Royal Mail across the UK for the sortation of mail. The Postcodes are an abbreviated form of address, which enable a group of delivery points (delivery point being a property or a post box) to be specifically identified. There are two types of postcodes large and small user Postcodes. Large User Postcodes are postcodes assigned to one single address. Small User Postcodes refer to a group of Delivery Points.
Address/Organisation Keys	The numeric address/organisation keys are fundamental to the PAF® database design and facilitate the identification and storage of addresses on PAF®.
Alias Data	The alias file holds details of address information e.g. building names, Thoroughfare, Locality and the County alias field contains up to three options of County names –former Postal, Traditional and Administrative County, which although not officially required are commonly used.
Welsh Alternatives	Welsh equivalent details are held for Thoroughfare and localities, where they exist.
UDPRN	An eight character numeric code allocated to each Delivery Point as a unique identifier.

AddressBase Product Range Contents (slide provided by GeoPlace)

Product differential

AddressBase	AddressBase Plus	AddressBase Premium
UPRN	UPRN	UPRN
Coordinates	Coordinates	Coordinates
Classification	Classification	Classification
Royal Mail Postal Address	Royal Mail Postal Address	Royal Mail Postal Address
Royal Mail UDPRN	Royal Mail UDPRN	Royal Mail UDPRN
	Local Authority Geographic Address	Local Authority Geographic Address
	Local Authority meta data	Local Authority meta data
	XREF to OSMM TOIDS	XREF to OSMM TOIDS
	Multiple occupancy addresses	Multiple occupancy addresses
	OWPAs	OWPAs
		Provisional properties (pre-build)
		Historic properties
		Alternative addresses
		Provisional addresses
		Historic Addresses
		Application cross references

PAF Pricing (extracted from the Royal Mail Web site)

Basis of Calculating Licence Fee	Fee per complete UK version of the Data (per annum)	Fee per Postcode Area or per Limited Record Selection (per annum)
User	£75 per Low Volume User £75 per High Volume User	£2 per Low Volume User £2 per High Volume User
Multiple User Block (up to 300 Users)	£4,125 per Multiple User Block (subject to paragraphs 3.6 to 3.8 of Annex 5)	£50 per Multiple User Block (subject to paragraphs 3.6 to 3.8 of Annex 5)
Unlimited Multiple User Blocks (Per End-User other than in respect of Extended Use Solutions, Associate Groups and Broker Groups)	£12,375	£150
Unlimited Multiple User Blocks for Associate Groups (Per Associate Group)	£24,750	£300
Unlimited Multiple User Blocks for Broker Groups and Extended Use Solutions (Per Broker Group and per Extended Use Solution)	£49,500	£600
Transaction (Internal Transaction Solutions, Extended Use Solutions, Associate Group Solutions and Broker Group Solutions) *	100 Transactions - £8	N/A
Transaction (External Transaction Solutions and Look Up Solutions) *	100 Transactions - £1	N/A
Unlimited Transactions (External Transaction Solutions only)	£4,000	N/A

PAF Pricing band principles for internal use per legal entity.

In practice the pricing is intricate and actual costs to a user can be a compound of the above. A complementary PAF data supply agreement covers costs for different methods and frequency of supply.

AddressBase Pricing (extracted from the Ordnance Survey Web site)

http://www.ordnancesurvey.co.uk/docs/ordnance-survey-business-portfolio-price-list.pdf

AddressBase products pricing

For AddressBase products it will be possible to select a predefined area of interest or to define your own individual area of interest. The price is determined by the area selected, the number of addresses in that area, the number of terminals required, any minimum charges as appropriate and the contract duration.

Examples of how pricing is calculated for AddressBase products are provided at annexe B.

AddressBase, AddressBase Plus, AddressBase Premium

Prices are calculated using the number of addresses in the dataset. The number of addresses in your area of interest are added up and priced as follows for a one-year contract for use on 101 or more terminals:

	AddressBase	AddressBase Plus	AddressBase Premium
Total price for a one-year contract covering Great Britain for use on 101 or more terminals	£129,950	£175,000	£189,370
No of addresses	**Licence fee per address**		
First five million	£0.0080	£0.0108	£0.0116
Next ten million	£0.0051	£0.0068	£0.0074
Additional addresses	£0.0030	£0.0031	£0.0030

The price is calculated individually for each order using the number of addresses based on a defined grid set at a resolution of one hectare, rounded up to the next nearest hectare.

The discount table on page 3 applies if your contract is for use on less than 101 terminals.

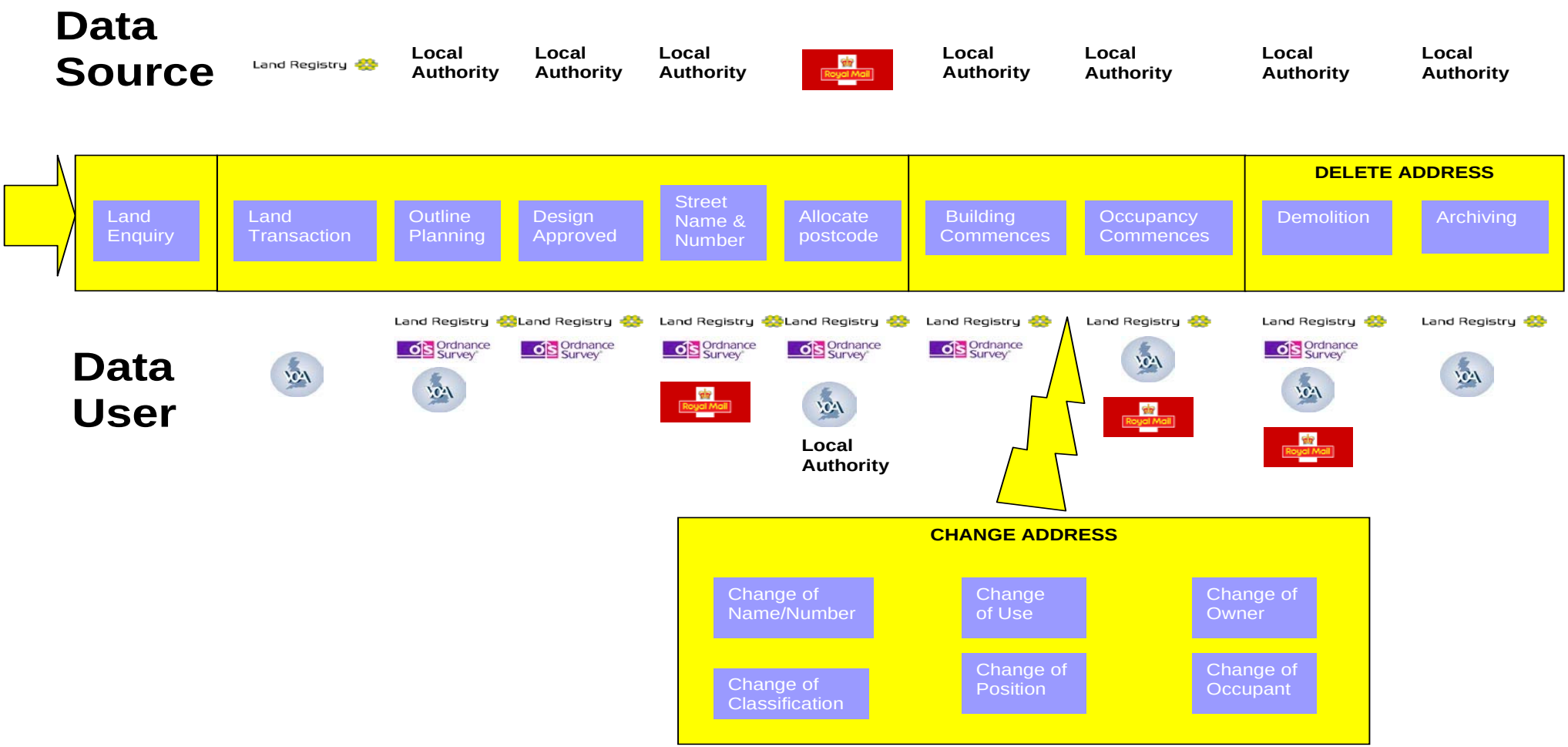
Additional fees

1. An additional annual fee of £4,000 applies if you use or display any AddressBase product on a publicly-available website.

2. If you are a central government department licensing Great Britain coverage and use the data on 900 terminals or above then an additional annual fee will apply. Please see table under the OS MasterMap Address Layer 2 entry on page 7.

NAG Address Lifecycle (slide provided by GeoPlace)

ADDRESS LIFECYCLE



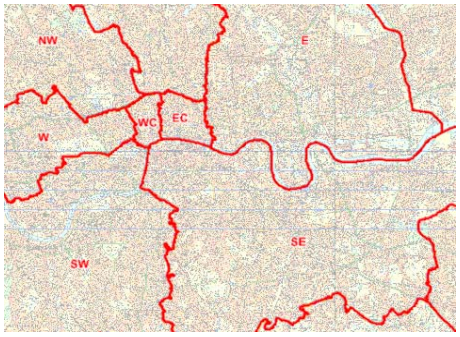
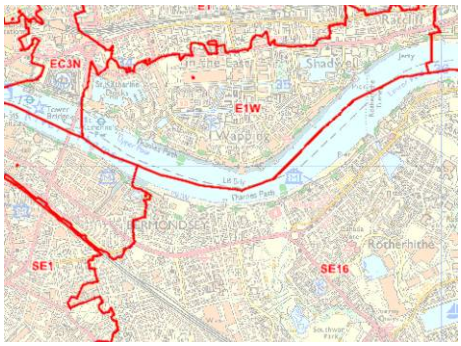
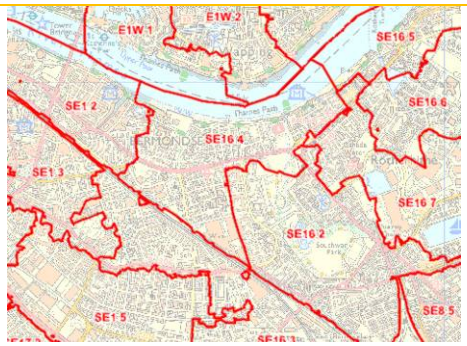
Appendix B: Maps of Addresses and Postcodes

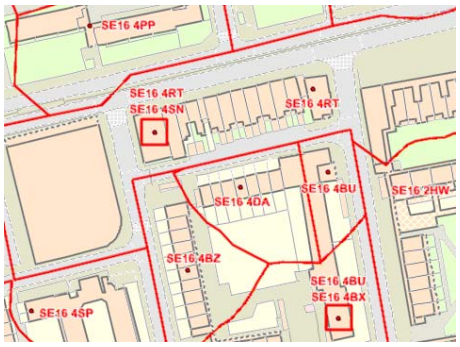
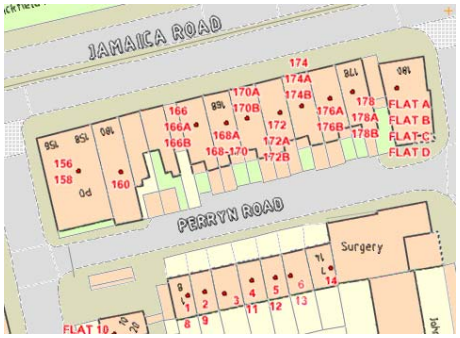
Prepared for Hugh Neffendorf, Katalysis Limited by Jamie Justham, Dotted Eyes Limited

The purpose of this appendix is to illustrate and explain certain concepts regarding the geography of addresses and address gazetteer products in Great Britain. In particular, the aim is to clarify the structure of postcodes, the difference between postcode and address geography, and characteristics of the related products. In passing, some relative advantages and deficiencies are exposed.

The review is grateful to Jamie Justham for his time and skill in preparing the material that follows. After discussion of the objectives, Jamie was able to illustrate the intended issues with considerable clarity.

The postcode hierarchy of Great Britain

Level	Illustration	Approx no	Average contents
Postcode areas such as: **SE**		120 in GB	24 postcode districts 82 postcode sectors 13,333 postcode units 225,000 delivery points
Postcode districts such as: **SE16**		2,850	3 postcode sectors 561 postcode units 9,474 delivery points
Postcode sectors such as: **SE16 4**		9,800	163 postcode units 2,755 delivery points

Level	Illustration	Approx no	Average contents
Postcode units such as: **SE16 4RT** Illustration shows both imaginary boundaries and also representative centroid points (coinciding with a delivery point)		1.6 million	17 delivery points The squares indicate 'vertical streets', in which more than one postcode occurs at the same location (such as in a block of offices with multiple tenants)
Delivery points such as: **Flat A, 180 Jamaica Road,** **London SE16 4RT**		27 million	PO Boxes (100,000), households and organisations PO Box locations are generally assigned to the relevant postal sorting office rather than the street address of the PO Box customer

Postcode areas and European Regions (formerly Government Office Regions)

Administrative areas such as wards, electoral divisions, civil parishes, boroughs, districts, unitary authorities and counties all nest perfectly into the 11 European Regions of Great Britain (dark red in this map).

The postal hierarchy of postcode units, postcode sectors and postcode districts all nest perfectly into the 120 postcode areas of Great Britain (bright red in this map).

There is little geographical correspondence between the administrative areas and the postal hierarchy, particularly in England and Wales. The two types of boundaries have been developed and maintained independently, for different purposes, and are generally not aligned with each other.

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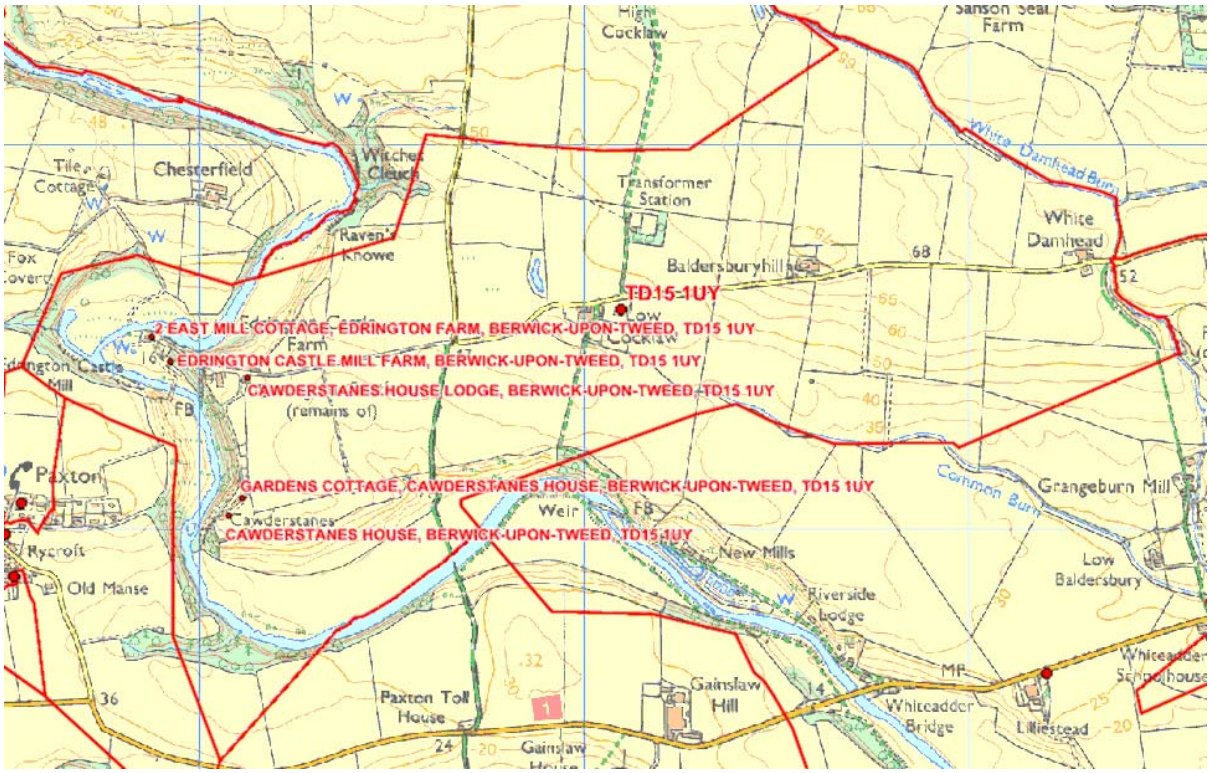
Examples of addresses where the postcode location produces incorrect results

The five delivery points labelled with their PAF addresses in the map all have the postcode TD15 1UY. The location of that postcode in Code-Point Open is at the property named Low Cocklaw. Postcode unit boundaries (imaginary) are shown as red lines.

The England/Scotland national border (shown as a dashed black line running North-South on the base map) falls between these address locations and the corresponding postcode location.



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	Based on address location	Based on postcode location
Nation	Scotland	England
Council	Scottish Borders	Northumberland
Ward	East Berwickshire	-
Civil Parish	-	Berwick-upon-Tweed
Ecclesiastical Parish	-	Berwick: Holy Trinity and St Mary

	Based on address location	Based on postcode location
Diocese	-	Newcastle
Westminster Constituency	Berwickshire, Selkirk and Roxburgh	Berwick-upon-Tweed
Holyrood Constituency	Ettrick, Roxburgh and Berwickshire	-
Court Area (inferred)	Duns Sheriff Court & JP Court	Morpeth & Berwick County Court
DVLA Office (inferred)	Edinburgh (reg. letters SK to SO)	Newcastle (reg. letters NA to NO)

While it is rare for postcode units to straddle a national border in this way, and it is shown to illustrate an extreme case, it is much more common for them to straddle the boundaries between smaller administrative units such as wards.

The diagram also indicates how use of the average postcode centroid can give a false position for some addresses, for delivery or navigation, including emergency services, as an example.

Examples of differences in the presentation of street and thoroughfare names

The following random excerpt from Ordnance Survey's AddressBase Plus product compares the spacing, spelling, and punctuation of road and thoroughfare names between the Royal Mail PAF and the local authority address, which has the street description from the National Street Gazetteer (NSG).

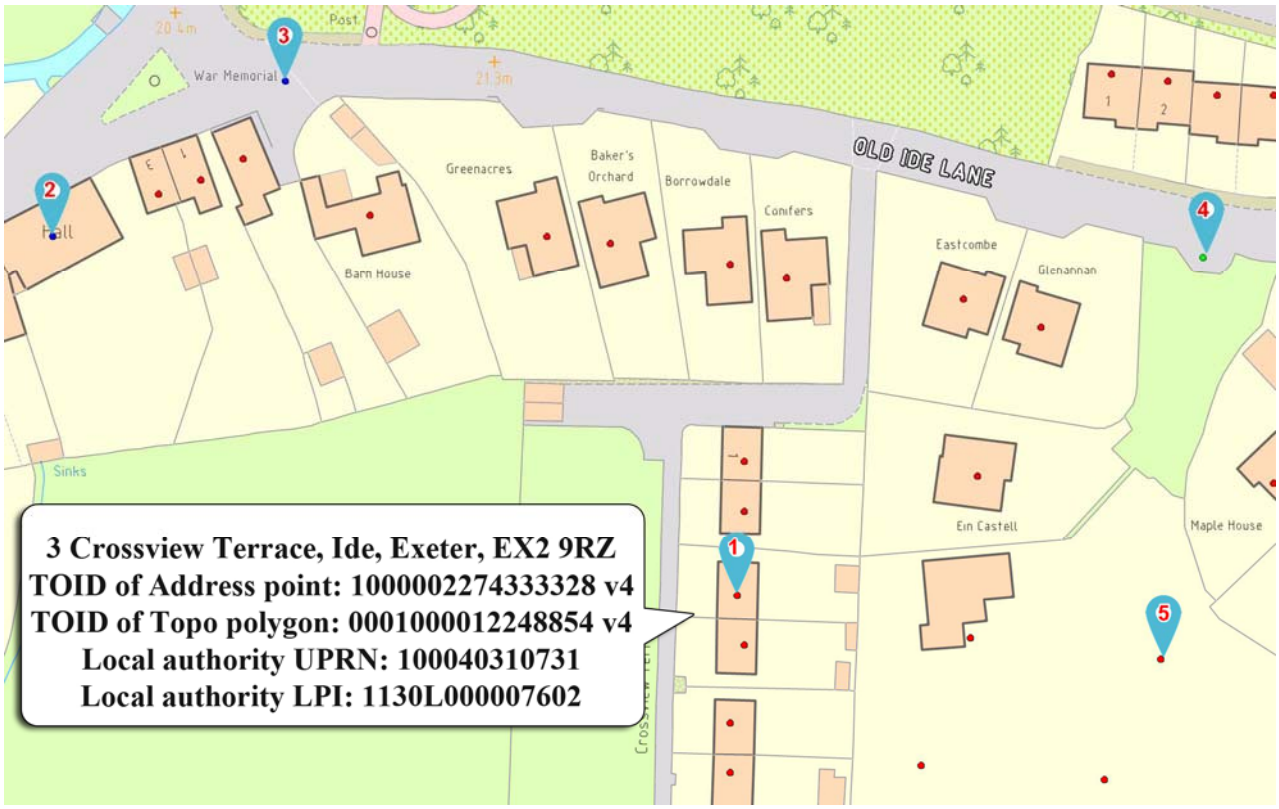
The information in each row of the table has been taken from a single record in the product. Various columns have been concatenated in order to simplify the two forms of address. In some cases variations are evident in other elements of the address, such as locality, in addition to the street or thoroughfare name.

PAF delivery point	LPI (Land and Property Identifier) address
BISHOPS PARK ROAD, LONDON, SW6 6DY	BISHOP'S PARK ROAD, HAMMERSMITH AND FULHAM, SW6 6DY
D'ARCY ROAD, SUTTON, SM3 8NH	DARCY ROAD, NORTH CHEAM, SUTTON, SM3 8NH
DE BROME ROAD, FELTHAM, TW13 5ER	DEBROME ROAD, FELTHAM, HOUNSLOW, TW13 5ER
GREAT SOUTH WEST ROAD, HOUNSLOW, TW4 6JS	GREAT SOUTH-WEST ROAD, HOUNSLOW, TW4 6JS
HAYDONS ROAD, LONDON, SW19 1AE	HAYDON'S ROAD, SOUTH WIMBLEDON, LONDON, SW19 1AE
HESTON GRANGE LANE, HOUNSLOW, TW5 0EJ	HESTON GRANGE, HOUNSLOW, TW5 0EJ
HIGH STREET COLLIERS WOOD, LONDON, SW19 2JE	HIGH STREET COLLIER'S WOOD, LONDON, SW19 2JE
HIGH STREET WIMBLEDON, LONDON, SW19 5AY	HIGH STREET, WIMBLEDON, LONDON, SW19 5AY
HILLFIELD ROAD, HAMPTON, TW12 2PX	HILL FIELD ROAD, HAMPTON, RICHMOND UPON THAMES, TW12 2PX
HOLLY TREE CLOSE, LONDON, SW19 6EA	HOLLYTREE CLOSE, LONDON, GREATER LONDON, SW19 6EA
METCALF WALK, FELTHAM, TW13 6YF	METCALFE WALK, FELTHAM, HOUNSLOW, TW13 6YF
PRINCE GEORGES AVENUE, LONDON, SW20 8BQ	PRINCE GEORGE'S AVENUE, RAYNES PARK, LONDON, SW20 8BQ
RAVENSDALE GARDENS, HOUNSLOW, TW4 7EY	RAVENSDALE ROAD, HOUNSLOW, TW4 7EY
SOUTHGATE AVENUE, FELTHAM, TW13 4RX	SOUTH GATE AVENUE, FELTHAM, HOUNSLOW, TW13 4RX
ST. ALBANS AVENUE, FELTHAM, TW13 6RW	ST ALBANS AVENUE, FELTHAM, HOUNSLOW, TW13 6RW
ST. ANN'S HILL, LONDON, SW18 2EZ	ST ANNS HILL, LONDON, GREATER LONDON, SW18 2EZ
ST. BARNABAS ROAD, SUTTON, SM1 4NL	ST BARNABAS ROAD, SUTTON, SM1 4NL
ST. CLAIR DRIVE, WORCESTER PARK, KT4 8UG	ST CLAIR DRIVE, WORCESTER PARK, SUTTON, KT4 8UG
ST. DUNSTANS ROAD, HOUNSLOW, TW4 7QP	ST DUNSTANS ROAD, HOUNSLOW, TW4 7QP
ST. GEORGES ROAD, FELTHAM, TW13 6RD	ST GEORGES ROAD, FELTHAM, HOUNSLOW, TW13 6RD
ST. HELIER AVENUE, MORDEN, SM4 6JE	ST HELIER AVENUE, MORDEN, SURREY, SM4 6JE
ST. HILDAS ROAD, BARNES, LONDON, SW13 9JQ	ST HILDAS ROAD, LONDON, RICHMOND UPON THAMES, SW13 9JQ
ST. JOHNS ROAD, FELTHAM, TW13 6NW	ST JOHNS ROAD, FELTHAM, HOUNSLOW, TW13 6NW
ST. LEONARDS GARDENS, HOUNSLOW, TW5 9DH	ST LEONARDS GARDENS, HOUNSLOW, TW5 9DH
ST. MARYS AVENUE CENTRAL, SOUTHALL, UB2 4LT	ST MARYS AVENUE CENTRAL, SOUTHALL, EALING, UB2 4LT
ST. MARYS AVENUE SOUTH, SOUTHALL, UB2 4LS	ST MARYS AVENUE SOUTH, SOUTHALL, EALING, UB2 4LS
ST. MARYS CRESCENT, ISLEWORTH, TW7 4NA	ST MARYS CRESCENT, ISLEWORTH, HOUNSLOW, TW7 4NA
ST. PAULS CLOSE, HOUNSLOW, TW3 3DE	ST PAULS CLOSE, HOUNSLOW, TW3 3DE
ST. PETERS GROVE, LONDON, W6 9AZ	ST PETER'S GROVE, HAMMERSMITH AND FULHAM, W6 9AZ

PAF delivery point	LPI (Land and Property Identifier) address
ST. PHILIPS AVENUE, WORCESTER PARK, KT4 8JT	ST PHILIPS AVENUE, WORCESTER PARK, SUTTON, KT4 8JT
ST. SIMON'S AVENUE, LONDON, SW15 6DU	ST SIMONS AVENUE, LONDON, GREATER LONDON, SW15 6DU
ST. STEPHENS AVENUE, LONDON, W12 8JH	ST STEPHEN'S AVENUE, HAMMERSMITH AND FULHAM, W12 8JH
WATER SPLASH LANE, HAYES, UB3 4QS	WATERSPLASH LANE, HAYES, HILLINGDON, UB3 4QS

It is not necessarily always PAF or the LA version that is correct or incorrect. The main point to note is that the intended definitive address (as provided by the Land and Property Gazetteers) is not necessarily the same as that used in PAF, generally for no good reason other than separate historic development. While some computer systems can manage the differences, there is clear scope for confusion and, often, there are more striking differences.

Examples from the various AddressBase products within an urban area



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This map highlights the detailed positional precision of AddressBase as well as some differences between the three variants of the AddressBase product family. The following notes refer to specific examples indicated by the numbered flags on the map.

1 The red dot indicates a record in standard AddressBase, AddressBase Plus & AddressBase Premium

The standard AddressBase variant consists of the Royal Mail PAF with added location coordinates. Buildings such as this are included in PAF as delivery points. The other variants have some additional records, as shown below.

2 The blue dot indicates a record in the AddressBase Plus and AddressBase Premium variants only

This building is identified as Ide Memorial Hall in the local authority's LPI record. Buildings such as this do not receive mail, so are not included in PAF as delivery points. They have mostly been captured by local authorities.

3 The blue dot indicates a record in the AddressBase Plus and AddressBase Premium variants only

This is not a building at all, so is not included in PAF as a delivery point. It is identified in the OS MasterMap Topography Layer as a War Memorial. Ordnance Survey calls this an Object Without Postal Address (OWPA).

4 The green dot indicates a record which exists in the AddressBase Premium variant only

This is not a building at all, so is not included in PAF as a delivery point. It is not an OWPA either, so is not included in AddressBase Plus. It is identified in AddressBase Premium as a 'Provisional' BLPU, relating to a planning application. The associated LPI, with a Start Date of 17/01/2006, calls it LAND AT NGR 290297 90620.

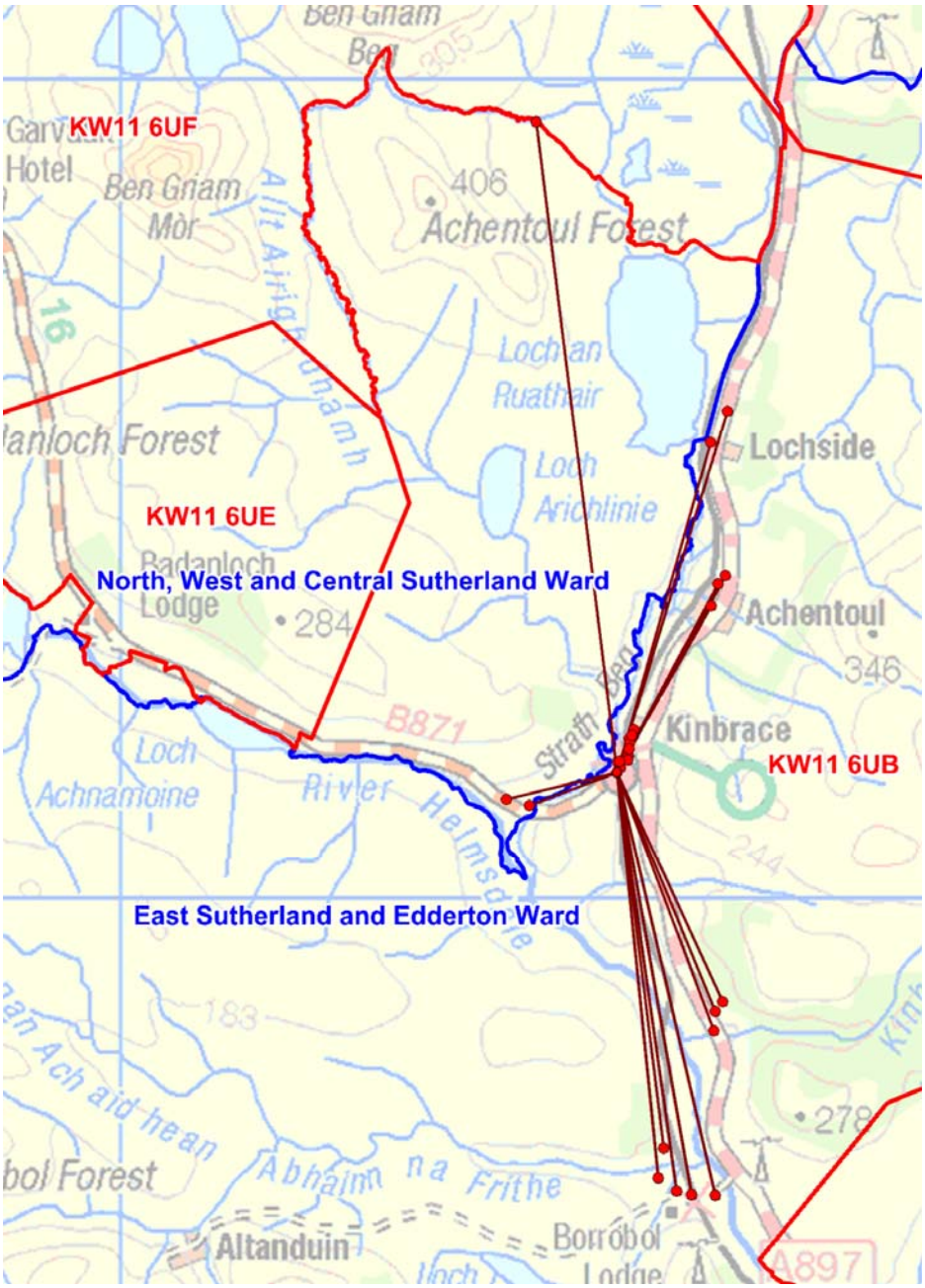
5 The red dot indicates a record in standard AddressBase, AddressBase Plus & AddressBase Premium

In this case the OS MasterMap Topography Layer used as the base map is not as up to date as the addresses. All the AddressBase variants include – in lieu of the large house with no name on the map – four new records with a Start Date of 15/01/2008, on Old Ide Close - presumably a new road created by the planning application above.

Examples of addresses in a rural area some distance from the postcode point

There are 33 delivery points with the postcode KW11 6UB. The location of a postcode in Code-Point Open is always snapped to the location of the delivery point nearest to the 'average' address location.

In this map the true location of each address is joined to the location of the postcode, using straight lines. The table on the next page provides more insight.



Mapped by Dotted Eyes, using Ordnance Survey data. Crown Copyright and database right 2013. All rights reserved. Licence number 100019918

The map also confirms that the rural postcode unit KW11 6UB straddles the boundary between two electoral wards (shown in blue).

This table is arranged in descending order of the distance as the crow flies from the location of the postcode centroid to each address. The longest distance from this postcode to any of its addresses is 8km. Rural addresses tend to expose the greatest distinction between postcode and full address geography. AddressBase avoids these positional errors by placing its coordinates in the buildings.

Delivery point address	Electoral ward	km
GRIAMACHARRY, KINBRACE, KW11 6UB	North, West and Central Sutherland Ward	8.0
HILL HOUSE, BORROBOL, KINBRACE, KW11 6UB	East Sutherland and Edderton Ward	5.3
HILL SIDE COTTAGE, BORROBOL, KINBRACE, KW11 6UB	East Sutherland and Edderton Ward	5.3
KINBRACE, KW11 6UB	East Sutherland and Edderton Ward	5.2
KEEPERS HOUSE, BORROBOL, KINBRACE, KW11 6UB	East Sutherland and Edderton Ward	5.2
BORROBOL LODGE, BORROBOL, KINBRACE, KW11 6UB	East Sutherland and Edderton Ward	5.2
KEEPERS COTTAGE, BORROBOL, KINBRACE, KW11 6UB	East Sutherland and Edderton Ward	5.1
KEEPERS HOUSE FLAT, BORROBOL, KINBRACE, KW11 6UB	East Sutherland and Edderton Ward	5.1
FARM MANAGERS HOUSE, BORROBOL, KINBRACE, KW11 6UB	East Sutherland and Edderton Ward	5.0
BORROBOL FARM, KINBRACE, KW11 6UB	East Sutherland and Edderton Ward	5.0
ACHENTOUL LODGE, KINBRACE, KW11 6UB	East Sutherland and Edderton Ward	4.6
DALCHARN, BORROBOL, KINBRACE, KW11 6UB	East Sutherland and Edderton Ward	4.6
ROSE COTTAGE, KINBRACE, KW11 6UB	East Sutherland and Edderton Ward	4.2
THE HATCHERY, KINBRACE, KW11 6UB	East Sutherland and Edderton Ward	3.4
OLD KINBRACE FARMHOUSE, KINBRACE, KW11 6UB	East Sutherland and Edderton Ward	3.2
KINBRACE FARM, KINBRACE, KW11 6UB	East Sutherland and Edderton Ward	3.1
IVY COTTAGE, BLARMHOR, KINBRACE, KW11 6UB	East Sutherland and Edderton Ward	2.7
BLARMHOR, KINBRACE, KW11 6UB	East Sutherland and Edderton Ward	2.6
ACHENTOUL FARM COTTAGE, KINBRACE, KW11 6UB	East Sutherland and Edderton Ward	2.3
HARVIESTON, KINBRACE, KW11 6UB	North, West and Central Sutherland Ward	1.4
HEATHER LODGE, KINBRACE, KW11 6UB	North, West and Central Sutherland Ward	1.2
THE SHEILING, KINBRACE, KW11 6UB	East Sutherland and Edderton Ward	0.6
KINBRACE, KW11 6UB	East Sutherland and Edderton Ward	0.5
TIGH-ACHANECHAN, KINBRACE, KW11 6UB	East Sutherland and Edderton Ward	0.4
MISSION HOUSE, KINBRACE, KW11 6UB	East Sutherland and Edderton Ward	0.4
FISHERY COTTAGE, KINBRACE, KW11 6UB	East Sutherland and Edderton Ward	0.3
PINE COTTAGE, KINBRACE, KW11 6UB	East Sutherland and Edderton Ward	0.3
GRIAM MHOR, 1 COUNCIL HOUSE, KINBRACE, KW11 6UB	East Sutherland and Edderton Ward	0.2
KINBRACE GARAGE, KINBRACE, KW11 6UB	East Sutherland and Edderton Ward	0.1
KINBRACE, KW11 6UB	East Sutherland and Edderton Ward	0.1
STATION HOUSE, KINBRACE, KW11 6UB	East Sutherland and Edderton Ward	0.1

Delivery point address	Electoral ward	km
SHOP HOUSE, KINBRACE, KW11 6UB	East Sutherland and Edderton Ward	0.1
GUSHETNEUK, KINBRACE, KW11 6UB	East Sutherland and Edderton Ward	0.0

The point of this example is that potential users of more accurate address locations are making do with approximations.

Appendix C: Organisations Contacted

Meetings or telephone conversations were held with individuals or groups from the following bodies (several more than once):

Organisations	
Ofcom	GB Group/Capscan
Open Data User Group	Demographics User Group
Open Data Institute	Datatalk
GeoPlace	LandInform
Royal Mail	Dotted Eyes
Ordnance Survey	EGiC
Local Government Association	Advisory Panel on Public Sector Information (Chair and Group)
Local Authority Contacts Executive Committee	Land Registry
LLPG Custodians (Wigan and Durham)	Valuation Office Agency
Intelligent Addressing	Office for National Statistics
One Scotland Gazetteer	Internal government group (from BIS, Cabinet Office and Shareholder Executive)
PAF Advisory Board (Chair and Group)	Government Information Commissioning Group
Universities (Southampton, Reading and EDINA)	Association for Geographic Information – Address Seminar
Google	Market Research Society
HSCIC (Health)	

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