

Connecting Scotland

our broadband future



MINISTERIAL FOREWORD

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This paper sets out the Scottish Executive's strategy for extending the availability of broadband telecommunications services in Scotland.

Broadband gives faster, more reliable "always on" access to the Internet, high quality video-streaming and data transfer, and our aim is to make affordable and pervasive broadband connections available to citizens and businesses across Scotland.

To achieve this, we will invest in broadband capacity for public services in a way that stimulates providers to offer a wider range of services to businesses and consumers and in particular to:

- ensure that every school has access to a rich online world in which it will be possible to communicate with others by text, voice or video;
- ensure that all parts of the health service can transfer data and use telemedicine as necessary;
- ensure that all local authorities can provide modern, customer focused services.

At the beginning of this year, in the publication "A Smart, Successful, Scotland"¹, we set out our vision for the economic future of Scotland. At that time, we said that we wanted "a Scotland where creating, learning and connecting faster is the basis for sustained productivity growth, competitiveness and prosperity."

Since then, we have set about making the vision become a reality, and this brief strategy statement is part of that realisation process.

MINISTERIAL FOREWORD

A Scotland without fast, reliable, state of the art connections to global communications networks is a Scotland that will not prosper. It is a Scotland that will not be able to offer its businesses full access to all of the opportunities that the Internet can offer. It is a Scotland that will not be able to provide its citizens with the services that they expect and deserve. It is a Scotland that will not be able to offer its people the access to the educational opportunities that they need.

We are therefore putting in place a strategy which will help to ensure that all those who need to or want to participate fully in the digital revolution, can do so with ease and at a reasonable cost.

Information and communications technology can reduce the constraint of peripherality and enable the development of a less geographically centralised economy. There is real potential for the use of technology to make significant difference to many of the services and employment opportunities available to our rural communities. Demand is currently fragmented among customers and between suppliers. In more populated areas this may result in healthy competition. In less populated areas individual telcos may not have sufficient evidence of demand to invest. In the absence of substantial demand does this matter?

The Executive believes it does. We must anticipate what has been called the "Next Internet", which will deliver applications in e-learning, e-government, e-health and e-business. If there are indications that the current operation of the market will not provide connectivity when it is needed we need to identify solutions now.

That is why the initial focus of our strategy will be on two pathfinder areas where government leadership will be most beneficial in helping to secure high quality broadband services. We will start where the task is toughest, if we are to ensure no part of Scotland misses out: the Highlands and Islands and the South of Scotland.

In both of these areas, the Executive, in conjunction with local partners, will pursue procurement of telecoms requirements on a joined-up basis - in this we will be leading the way in the UK. Think of a Highland community you know - a primary school, a GP's surgery, a library and perhaps a community learning centre. In the past each part of government - local or central - bought the IT services it needed one by one. The health board made sure that GPs could be online, the local authority took care of the primary schools and so on. If we keep buying services in this way telecoms companies will struggle to supply remote areas with the most advanced services - because frankly they will not have sufficient guaranteed demand for their services across the public sector. We aim to change all that in the pathfinders by pooling our purchasing power so we can get the best services right across the country, much quicker.

But turning the buying practices of central government and local government upside down in key public services is not easy. So the Scottish Executive is making a brave decision to lead Britain in joined-up purchasing. Ministerial colleagues have signed up their departments and we owe them a debt of gratitude for their vision. It will not be easy - but it is right. By aggregating demands for connectivity we will be able to specify for the first time - on a defined timescale - the total volume requirements in a particular area. By the action of

Connecting Scotland: our broadband future

government we aim to stimulate investment in infrastructure in a way that would not otherwise occur. This will not only facilitate the delivery and reception of public services, but, as e-commerce becomes increasingly pervasive, will act as an invaluable tool to attract and support local business development.

From a business point of view, we want the world to be able to come to you regardless of your location. Communities will be strengthened. And from an individual point of view, whoever you are and whatever you do, you will have fast access to a world of opportunities.

The aim of the Scottish Executive is to work in partnership to improve the lives of the people of Scotland. I believe that this broadband strategy will help achieve that.

A handwritten signature in black ink, appearing to read 'Wendy Alexander'.

Wendy Alexander MSP



Online learning
Remote teaching



Surfing the net
Accessing cultural
heritage online



SCHOOLS

LIBRARIES &
CULTURAL CENTRES





Businesses can send data quickly across the world
Internet is "always on"

BUSINESSES

HEALTH



Remote diagnosis
from hospital to GP

MODERN PUBLIC SERVICES



Social workers and doctors can share information more quickly to help older people in the community

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EXECUTIVE SUMMARY

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The Vision

Our aim is to make broadband connections more affordable and pervasive. Aggregated broadband procurement for the public sector will support modern public services and stimulate improvements in broadband services to the wider benefit of businesses and individuals.

Why Broadband?

The use of Information and Communication Technologies (ICTs) is key to Scotland's economic and social well being. In the world of e-commerce, many businesses, particularly smaller businesses, will not initially need more than a telephone line to ensure that they make the most of these new technologies. However, if we wish to ensure that we have world-class services and the capacity to grow and maintain world-class businesses, we need to extend access to faster more flexible telecoms services for those who need it and be ready for the applications of the future. Broadband can provide this. It can offer a fast reliable "always on" link to the Internet that will streamline delivery of public services and benefit business. In short, we need a world-class broadband telecommunications infrastructure.

The Role of Government

The issue for Government is whether or not the current operation of the market will provide the infrastructure to which we aspire. Telecoms policy is a reserved matter and regulation of the market will have a key role. We are participating in the work of the UK Broadband Stakeholder group but we also need a Scotland specific strategy to stimulate early roll-out and take-up.

We believe all government activity in this field should be within the following clear parameters:

- Competition must be encouraged as far as possible.
- The broadband market is incipient; distortion or inhibition of growth must be avoided.
- We should aim to intervene only where activity would not otherwise happen, or to accelerate existing action.
- A range of technologies can be used to deliver broadband services, from fixed link fibre, copper, and wireless, to mobile and satellite.
- One technology should not be favoured over another without careful thought.

The Picture Today: Where Are We Starting From?

Scotland's telecoms infrastructure is relatively advanced in terms of backbone, but heavily dependent on copper at a local level, and there is some evidence that island and remoter links are not robust. For many uses, our broadband infrastructure has been assessed as probably adequate for current business needs. However, there is less optimism about future widespread commercial provision of broadband services to meet anticipated demand.

The generally held assessment is that the commercial market is unlikely to invest in infrastructure to provide rural areas with broadband in the short to medium term. There are further difficulties with the current pricing structure of broadband, which, at the moment is distance-related and therefore places Scottish companies at a commercial disadvantage.

Broadband Strategy

Our strategy for Broadband has 3 main strands:

- Close liaison at a UK level on regulatory proposals and on UK policy developments.
- A programme that will progressively aggregate public sector demand for broadband infrastructure – building out from the needs of schools, local authorities and the health service – with government support concentrated in areas which would otherwise be demand deficient.
- Identify if there is any need for direct support measures, as anticipated under the Highlands and Islands Special Transitional Programme.

Aggregated procurement is a new approach to telecoms procurement for the public sector. It will encompass an upgrading of connections to broadband capacity. Aggregation of this enhanced demand from main public sector players such as schools, local authorities and the health service will create economies of scale and purchasing power that should encourage telcos to invest in broadband in the more rural parts of Scotland. Such infrastructure will also benefit local communities and crucially, businesses that are based in rural areas.

Aggregated Procurement

We are favouring a zonal procurement strategy. This will promote competition among companies at the bidding stage and, with the award of a contract, will avoid the creation of a Scotland wide monopoly supplier.

Pathfinder Areas

We plan to test this approach first in two pathfinder areas: one in the Highlands and Islands and one in the South of Scotland. Both of these areas have been selected on the basis that the market is unlikely to meet anticipated demand under current procurement practices.

This approach will bring together the substantial financial resources that the potential partners already plan to spend on ICTs, and the Scottish Executive will support the cost of upgraded services.

THE VISION

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1. This paper sets out the Scottish Executive's strategy for extending the availability of broadband telecommunications services in Scotland.

2. Our aim is:

- to make affordable and pervasive broadband connections available to citizens and businesses across Scotland.

3. The Executive will work with the world of the public sector to put in place broadband connections which will:

- ensure that every school has access to a rich online world in which it will be possible to communicate with others by text, voice or video.
- ensure that all parts of the health service can transfer data and use telemedicine as necessary.
- ensure that all local authorities can provide modern, customer focused services.

4. Our objective is that, by providing broadband to the public sector, we stimulate providers to offer a wider range of services to business and individuals.

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1. Use of ICTs is already key to Scotland's economic and social well-being. The operation of many businesses and public services relies on the electronic transmission of data, both within and between organisations, and between organisations and the end customer.

- For business, maintaining competitiveness will increasingly require effective e-business strategies. That is why the Enterprise Agencies have a range of programmes to promote e-business.
- In education, the use of ICTs allows learners of all ages and in all situations, continually to develop new knowledge and new skills through enhanced levels of communication. The all-embracing nature of global ICTs offers our learners the opportunity to engage with citizens across the world and thereby to better understand their own place in society, locally, nationally and internationally.
- Universities, and increasingly FE Colleges, are already major users of ICTs.
- Libraries are investing over £20 million in ICTs over the next five years, funded by the New Opportunities Fund and other initiatives such as *learndirect scotland*.
- ICTs are also a key enabler of better public services as recognised by the Executive's Modernising Government agenda.

2. Much data transfer relies on the use of ordinary telephone lines providing dial-up narrowband communications. That is where many, particularly smaller, businesses can and do start. But many need to move on. "Always on" Internet provides real benefits in speed and efficiency. Higher bandwidth facilitates high volume data transfer and certain applications, such as video-streaming and concurrent design. If we are to have world-class education, world-class health services and globally competitive business, it will be vital that the latest applications can be used and for this we need "always on" broadband.

WHY BROADBAND?

3. Demand for broadband connections, where these are available, has not increased in the UK as quickly as some had expected. ***However that does not mean that availability of broadband connections is not important.*** To be world-class, we need to be at the leading edge in the use of ICTs. That will require action to promote use, supplementing the stimulus of competition and the market. Plans for the public sector will not only have an impact on, for example, education and health services but can have a demonstration effect elsewhere. In addition to this demonstration effect, we plan action to promote demand.
4. Demand is important, but the market does not always respond quickly enough. Therefore the focus of this paper is how we ensure that when demand exists, services can be supplied.
5. *In short, we need a world-class broadband telecommunications infrastructure.*

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1. Telecommunications services are provided by private sector companies. The issue for Government is whether the current operation of the market will provide the world-class infrastructure to which Scotland, and the UK more generally, aspires, on the timescale required.

2. The importance of broadband has been recognised at UK level by the Cabinet Office report "UK online: the broadband future"², published in February of this year. This set the target of the UK having "... the most extensive and competitive broadband market in the G7 (sic) by 2005, with significantly increased broadband connections to schools, libraries, further education colleges and universities." The report examines current infrastructure in the UK and its likely development and concludes that the strategy needs further development, in consultation with a wide range of stakeholders. To help achieve the UK Government's target, a Broadband Stakeholder Group, involving key players from the private and public sectors, has been created to advise Government and contribute to the development of a strategy for broadband Britain. The Scottish Executive is represented on the Stakeholder Group.

3. This forum is considering all the means to encourage access to broadband, including the important reserved areas of regulation and tax regime. The UK Government sets the regulatory framework which aims to promote effective competition while ensuring a level of universal service. Steps are being taken to modernise this framework with the creation of OFCOM³. The remit of this body will be wider than OFTEL⁴ in recognition of the convergence of different technologies in providing data transfer and broadcasting.

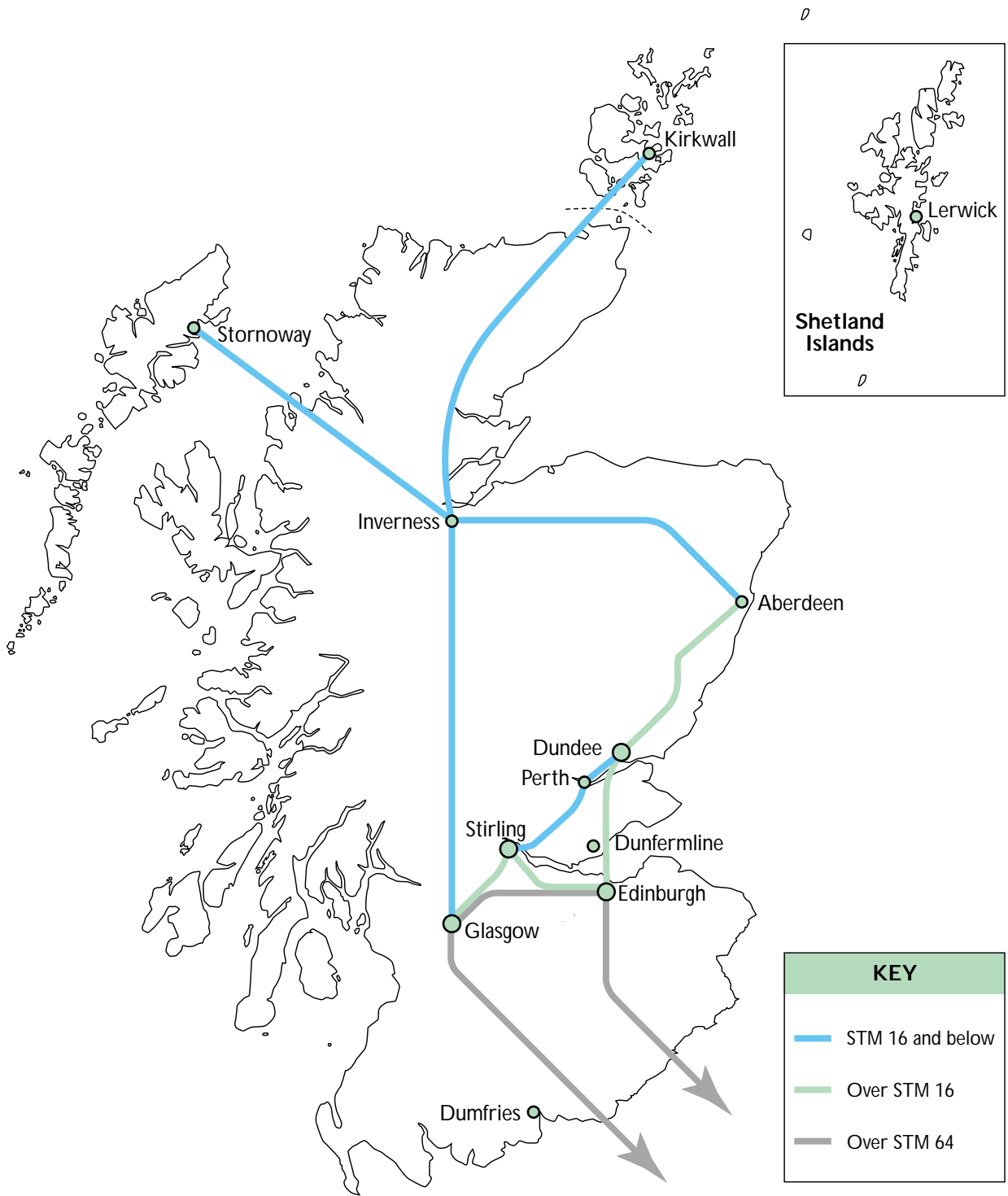
4. As the next section shows, Scotland currently has a better backbone infrastructure than has been generally acknowledged but the last mile connection and pricing regimes in a thin market are the source of real challenges. Scottish Ministers are conscious that these challenges are in part a reflection of our sparsity of population and peripherality. Returns on investment will be lower than in more populous areas. The Executive has therefore been determined to be at the leading edge of thinking and action on promoting broadband access. The UK Government will lead on regulatory matters but the Executive has a leading role in terms of its responsibility for economic development and for public services.

5. *However, any consideration of action by governments must occur within clear parameters:*

- Competition must be encouraged as far as possible.
- The broadband market is incipient; distortion or inhibition of growth must be avoided.
- We should aim to intervene only where activity would not otherwise happen, or to accelerate existing action.
- A range of technologies can be used to deliver broadband services, from fixed link fibre, copper and wireless to mobile and satellite.
- One technology should not be favoured over another without careful thought.

SCOTLAND'S BACKBONE INFRASTRUCTURE CAPACITY IN 2000

Adapted from "Connecting Scotland" Ovum for Scottish Enterprise June 2000



THE PICTURE TODAY: WHERE ARE WE STARTING FROM?

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1. There is much confusion about where we are starting from. The Scottish Executive has identified 2 main issues for Scotland to address if we are to obtain maximum economic and social benefit from broadband. These issues are:

- Local access
- Competitive pricing

The background is this.

2. None of the maps of telecoms trunk and local networks in Scotland are either comprehensive or definitive. This is because firstly, this information is very largely commercial-in-confidence and secondly, the network is constantly evolving.

3. Scotland has as good a trunk telecoms infrastructure as most European countries today, with a fibre backbone and modern transmission technologies. This is the conclusion reached by Ovum in a major research exercise which was carried out for Scottish Enterprise last year⁵. At that time, Ovum's report suggested that Scotland's telecoms infrastructure, including both fixed link and wireless provision, largely met the commercial needs of Scottish businesses. Network build and enhancement has been achieved through market forces in the more commercially attractive parts of Scotland, and by a series of publicly funded initiatives in the Highlands and Islands.

4. "UK online: the broadband future" stated in February that international comparisons are patchy but that the UK is rolling out higher bandwidth and broadband services at a rate which is comparable with most European countries, and that at present there are no European markets where broadband is already a mass market phenomenon. Sweden and Ireland are sometimes alleged to be far in advance of Scotland in terms of broadband coverage. As yet unpublished research which is being done for the UK Office of the E-Envoy, suggests that coverage of Asymmetric Digital Subscriber Line (ADSL) and cable-modems combined is higher in Sweden than in Scotland (though on a par with the UK as a whole). However other research, namely this year's "Broadband Benchmarking Study" carried out by Mason Communications for ScotlandIS, showed that Sweden and Ireland (where ADSL is barely available) both face difficulties providing broadband coverage in rural areas.

5. The main trunk routes in Scotland are all fibre, including routes to Wick and Thurso with some radio transmission (BT and Thus) in the Highlands and Islands. According to Ovum, the trunk network has ample capacity to handle anticipated traffic growth over the short to medium term⁶. However, more recent and detailed research undertaken by Ovum on infrastructure needs in the Highlands and Islands suggests that **the issue of the lack of trunk capacity is a real constraint on the promotion of economic development in island and remote rural areas**. Moreover, the later research casts significant doubts on the capacity of the 'junction' network in rural areas (that is the network linking local exchanges with the fibre backbone)⁷. Lack of spare capacity may well arise and a bottleneck created at this point between the local loop and the fibre trunk network if planned public sector demand and latent private sector demand increases network loading.

THE PICTURE TODAY: WHERE ARE WE STARTING FROM?

- 6.** Beyond the trunk and junction networks, local connections provided by BT are copper. This is a key point when looking at future access to broadband. Any future extension of broadband to rural areas by fixed link connections will have to overcome the technical difficulties of existing investment in the legacy copper local loop.
- 7.** The inherent commercial advantage of ADSL is its very utilisation of the legacy local loop. According to BT, by the end of September 2001, 60% of the UK population will be served by exchanges which are DSL-enabled⁸. The roll-out reflects predicted demand, and is therefore in the most populated areas where demand will be highest and give a return on investment. (By June 2001, 46 Scottish exchanges, all in the Central Belt, had been enhanced to allow access to ADSL.) Access is dependent upon being within 3.5km (network) distance from an enabled exchange. While technological advances have recently allowed BT to extend this distance to 5.5km (through rate adaptive DSL⁹), there will still be a percentage of consumers unable to receive services irrespective of future demand and investment.
- 8.** Local fibre connections are owned by other telecoms providers, although these are geographically limited and targeted on specific sectors. For instance the cable companies own fibre within their original franchise areas targeted at the residential market. NTL's fibre-optic network in Scotland stretches throughout Glasgow and the West of Scotland, and the company has more recently laid fibre to provide local access in Edinburgh. Telewest's network has nodes in Edinburgh, Dundee, Perth, Uddingston and Dumbarton.
- 9.** The local exchanges themselves are also a problem in some cases. The Public Switched Telephony Network (PSTN) is routed very largely through BT exchanges. The majority of the population is covered by modern digital exchanges, while the rural community is served by the older UXD5 exchanges¹⁰. Although these UXD5 exchanges have undergone a comprehensive upgrade programme by BT over the past few years, they still require constant updating by BT to keep them in line with digital services as these are introduced elsewhere in the network (for example 1471), and some such services are not yet available rurally. Any rural broadband programme using fixed links would have to overcome the technical and cost constraints posed by UXD5 exchanges.
- 10.** Other technologies will have a part to play in extending bandwidth throughout Scotland. Fixed Wireless Access (FWA) technology provides voice and data services by making use of the radio spectrum to connect customers to a traditional fibre-optic network. There is potential to extend the wireless provision of broadband. Energis hold a Scottish licence for 28GHz service and will have to meet a 10% population coverage obligation by 13th June 2002. Competitions are planned shortly across the UK for access to further FWA spectrum (at 3.4 and 10 GHz), and the Executive will be playing its part in the promotion of these awards. Satellite services may have some potential providing that a business model can be found to allow reasonable access tariffs. There are several proposals to supply rural telephony by means of satellite, including the recent announcement by BT to pilot a two-way satellite service in the Highlands and Islands from November this year, as part of a wider UK trial including a pilot in Northern Ireland.

11. Finally, the demand for mobile services has fuelled a rapid infrastructure build across the UK, and Scotland is no exception. Today we have a well-developed (and still developing) 2nd Generation (GSM) digital mobile network providing coverage to the majority of towns and along major road routes. As a result of European aid, this network also extends to 90% of A and B roads in the Highlands and Islands. 3rd Generation (3G) services will be launched in 2002 by the leading UK mobile companies, allowing high speed Internet access. The smaller cell size of 3G will necessitate in-fill mast build, and this cost, together with the 80% coverage requirements¹¹ makes the extent of commercial penetration into rural areas uncertain. However, such gaps may be filled by 2½G or General Packet Radio Services (GPRS), which will be introduced by all four current mobile operators over the next year¹².

12. In summary, Scotland's telecoms infrastructure has been assessed as relatively advanced in terms of backbone. However, it still remains heavily dependent on copper at a local level, and there is some evidence that island and remoter links are not robust. Monopoly provision persists in rural and remote areas. There is concern about whether it will achieve future widespread commercial provision of broadband services to meet anticipated demand.

13. The generally held assessment is that the commercial market is unlikely to invest in infrastructure to provide broadband connectivity in rural areas in the short to medium term. If additional investment is made this is likely to be in areas of high "teledensity" based on an anticipated return on investment. This is the reality of the current market and it leaves broadband access in less commercially attractive areas, uncertain.

14. In addition to the geographic extent of broadband connections there is concern about price where such connections are available. There is some evidence that large corporate users of telecoms services based mainly in the Central Belt are disadvantaged in terms of tariffs for internationally connected leased lines in comparison with their competitors in London. Leased line pricing is distance-related and is also dependent upon a competitive market. Scottish Enterprise are taking the lead in addressing this problem with the aim of ensuring the longer-term attractiveness of Scotland as an investment location. They commissioned consultants T J Soja to see if a business case existed for a wholesaler of telecoms capacity to enter the market in Scotland and create more competition for services. Soja's report presents a favourable response and Scottish Enterprise are following this up with interested suppliers.

15. The key challenge for the Executive is how to encourage building on existing network strengths whilst addressing the shortcomings of the existing infrastructure, particularly in rural areas¹³.

6

1. The Executive's approach to local access to bandwidth has 3 main strands:

- Close liaison at a UK level on regulatory proposals and on UK policy developments.
- A programme that will progressively aggregate public sector demand for broadband infrastructure – building out from the needs of schools, local authorities and the health service – with government support concentrated in areas which would otherwise be demand deficient.
- Identify if there is any need for direct support measures, as anticipated under the Highlands and Islands Special Transitional Programme.

Liaison with UK Departments

2. As noted, telecommunications policy is a reserved matter in order to preserve a level playing field for an important industry across the UK. The Executive's interest lies in the devolved areas of economic and social development including the provision of public services. The Executive is therefore working closely with the UK Government on their "UK online: the broadband future" agenda to ensure that action in reserved and devolved areas is properly co-ordinated. Important regulatory issues include the establishment and future operation of OFCOM, the switchover to Digital TV services, and radio spectrum allocation.

Public Sector Demand

3. A key issue determining infrastructure investment by telecommunications companies and service availability is the level of demand individual companies identify or anticipate for services they provide. Future demand is difficult to predict. Telcos cannot be sure how far applications requiring broadband will be developed and embraced. Some would argue that applications are not developed because they cannot, in the absence of broadband, be marketed. Others argue that little demand exists for those applications in existence. Undoubtedly there are interdependent sides to this picture. In addition, demand is currently fragmented among customers and between suppliers. In more populated areas this may result in healthy competition. In less populated areas individual telcos may not have sufficient evidence of demand to invest.

4. In the absence of substantial demand does this matter? The Executive believes it does. We must anticipate what has been called the "Next Internet", which will deliver applications in e-learning, e-government, e-health and e-business. If there are indications that the current operation of the market will not provide connectivity when it is needed we need to identify solutions now.

5. Arguably, there is first of all a market failure in information. Earlier this year the Scottish Executive, working with the Enterprise Agencies, undertook some internal work which attempted to identify, on an illustrative basis, prospective public and private sector broadband demand in five small Scottish towns. This exercise was not an in-depth piece of work but the results suggest that even in small towns such as Stranraer and Dingwall, there will be a sizeable demand for bandwidth, and one that is predicted to grow substantially over the next 5 years. The public sector's demand element in the above is particularly significant.

5 Small Towns				
	Population	Public demand (est. next 2-3 yrs)	Private demand (est. current)	Total
Airdrie	37,000	84 Mbs	56 Mbs	140 Mbs +
Elgin	19,000	78 Mbs	23 Mbs	101 Mbs +
Stranraer	11,000	46 Mbs	16 Mbs	62 Mbs +
Selkirk	6,000	33 Mbs	5 Mbs	38 Mbs +
Dingwall	5,000	51 Mbs	6 Mbs	57 Mbs +

6. The operators are used to dealing with public sector demand for services on a sectoral rather than a regional basis. These separate procurement processes mean that there is no visibility by potential suppliers of the overall demand in any geographical area. Hence operators have generally welcomed the 5 towns aggregated approach as potentially offering new insight to inform their geographical operations. However, most have emphasised that, in the current climate for telecoms investment, this sort of information would rarely be enough to inform real investment decisions.

7. But the purchasing power of the Executive and the wider public sector can, we believe, be a lever to investment from the private sector in telecoms infrastructure. **The aim is that investment put in place to meet the public sector's needs will result in more extensive and competitive services being offered to businesses and consumers.**

BROADBAND STRATEGY

8. The Executive has therefore taken this approach further to investigate the scope for an **aggregated procurement** process. The potential range of partners may include:

- Local authorities and their requirements for:
 - Schools– the Executive has a commitment to broadband access from Scotland’s schools.
 - Libraries.
 - Corporate networks.
- Health Service.
- Criminal Justice.
- Higher and further education sectors who already procure massive amounts of bandwidth to operate services and meet their research needs.

9. There are prospective increases in requirements in schools, who, at the very least, will need to be able to communicate with others by text, voice or video, as well as having access to the Internet and an Intranet. In the future, they will also be looking at making increased use of online learning materials and communities of interest. The all-embracing nature of communication on a global scale offers learners the opportunity to engage with citizens across the world and thereby to better understand their own place in society, locally, nationally and internationally. Learners throughout Scotland must be able to interact with the technologies and to develop their own capacity to exploit the technologies as they grow in power and pervasiveness.

10. Health service demands are also likely to increase, and we need to be able to ensure that all parts of the health service can transfer data and use telemedicine as necessary. Co-ordination of care can be improved through telemedicine, by enabling consultation with hospital specialists to take place in the GP’s surgery. Without leaving their GP’s surgery, a clinic, or sometimes even their own homes, patients can be examined over video links by specialists based at any hospital which is also connected to the NHS telecommunications network. Co-ordination of care can also be improved through speeding up the processes of transferring records, transmitting test results and making appointments.

11. The New Opportunities Fund (NOF) is funding broadband connections for libraries, which will become Internet hubs for individual communities. Local authorities need better connections to exchange information between departments and with local partners (e.g. the health service) so as to design more customer focused services. This will include websites not just providing information, but allowing users to request services online through interaction with the public sector.

12. An aggregation of demand, and of demand that is increasing, will bring investment in higher bandwidth services to communities which might not otherwise receive them.
13. The concept is daunting: all these sectors have their own needs for connectivity and are already engaged in a range of individual contracts with varying end dates, procured to meet particular needs. It seems reasonable to model aggregated procurement as a *process* which would gather in additional requirements over time.
14. Aggregation of demand may not provide all we want, but it is an important step on the way. It does not preclude public sector support for infrastructure outside a procurement context. The Executive is already directly involved in the Highlands & Islands Partnership, which, with the benefit of EU Special Transitional Programme funding, is currently determining how best to invest further resources in telecoms infrastructure to support development in the region's most remote areas. The Highlands and Islands Special Transitional Programme has Euro 9 million ring-fenced for telecoms infrastructure projects. A programme of action is being drawn up for presentation to the Programme Monitoring Committee in September.
15. The Scottish Executive has explored the concept of aggregated procurement with potential suppliers and with the public sector. Reactions have, in the main, been favourable and in many cases very enthusiastic. From the supplier side, public sector business is always of interest, although reactions of individual telcos to our plans will depend on their different commercial strategies. Our approach may suit some better than others and some may favour the status quo. For the public sector, the economies of scale and purchasing power, which this approach confers, is very attractive. The next section sets out how we intend to proceed.

7

Geography

1. Aggregating procurement of public sector requirements across service areas (sectors) will provide that, for any relevant geography, a telco who contracts to provide services can anticipate substantially greater levels of demand than is usually the case at the moment. This aggregation could be organised on a pan-Scotland basis or by dividing Scotland into a number of zones. We consider that a sub-division into regions or zones is preferable both to promote competition among companies at the bidding stage and to avoid, with the award of a contract, the creation of a monopoly supplier. Some companies have regional strengths and/or may view the volume of a national contract as too large to deliver. We believe a zonal approach is most likely to engender competition and to encourage imaginative and cost-effective options for meeting public sector requirements.

2. ***The Scottish Executive intends to support procurement of connectivity on a zonal basis.*** We believe aggregated demands may most easily and effectively be expressed for basic network (i.e. connection to switches). An approach focusing on connectivity would allow separate contracting for some managed services, for example, e-mail and Intranets. This has a number of benefits. First, such service requirements may require to be met on a national basis, e.g. for a schools Intranet. Secondly, a wider range of companies can supply such managed services and the option of separate contracts will again promote competition. However, local partners may choose to procure connectivity and managed services together through a zonal contract. This will require further discussion in the light of local circumstances.

3. As part of the Executive's Modernising Government agenda, local government is being asked to work with local partners, e.g. NHSScotland Boards and Trusts, to design more customer focused services and to use ICTs as a means to achieve this. Aggregated procurement of connectivity will take account of the impact of increased transfer of data between local partners. But, as noted, it will be for local partners to decide whether, in redesigning services, they should procure "higher" level services together too.

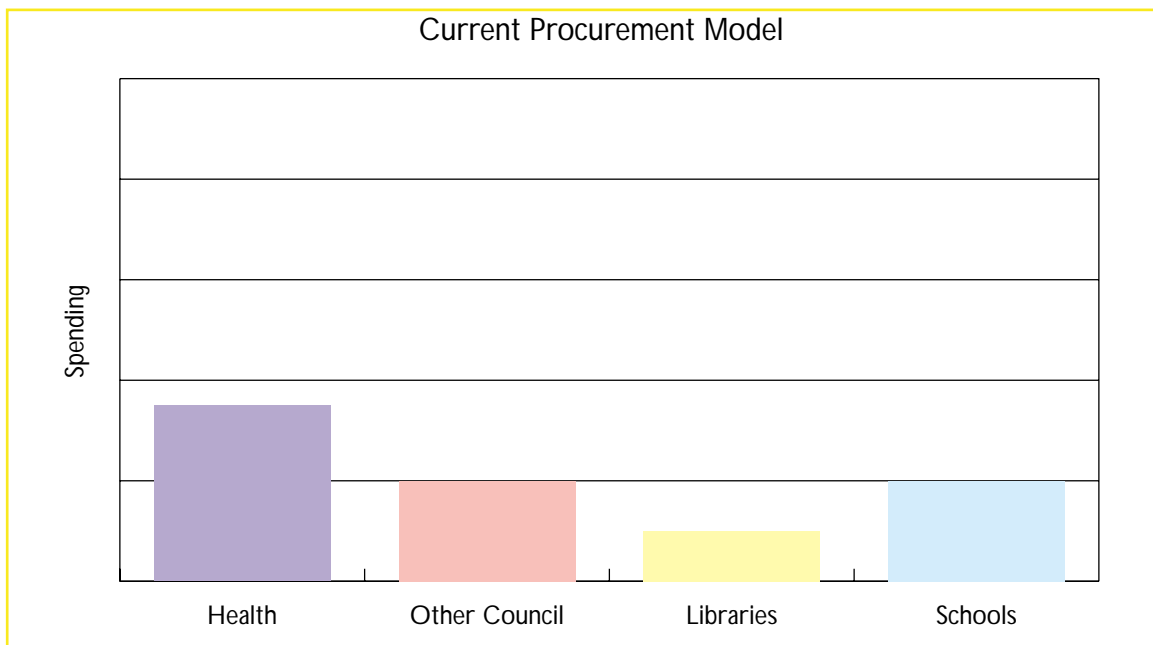
4. Aggregated procurement is a new approach. We believe it should be tested first in pathfinder areas. Discussions have taken place to identify pathfinder areas where local partners wish to work with the Scottish Executive and where this new approach can be expected to have significant impact. We expect key partners to be local government and the health service. As noted, local government requirements for connectivity are increasing – to meet the changing demands of education, of services such as libraries and for transfer of information within authorities and between partner organisations. NHSScotland organisations currently use the UK-wide NHSnet that aggregates traffic across the UK to secure consistent and beneficial contract terms for all parts of the NHS. The effect is that a GP on a Scottish island has access to the same terms as one in central Glasgow. NHSScotland will bring that experience to local partnerships and work to ensure that what is put in place in the pathfinder zones fits sensibly with the wider replacement for NHSnet. We anticipate that other partners will join aggregated procurement as current arrangements allow, e.g. higher and further education are currently in a procurement cycle for regional connectivity through their metropolitan area networks, but we anticipate alignment with an aggregated procurement strategy in the medium term.

Funding

5. The Executive is making a substantial commitment to achieving a Scotland which is online, open to the rest of the world, and able to make use of the latest applications. We have already allocated an additional £250 million to a range of initiatives which will improve access to and use of ICTs.

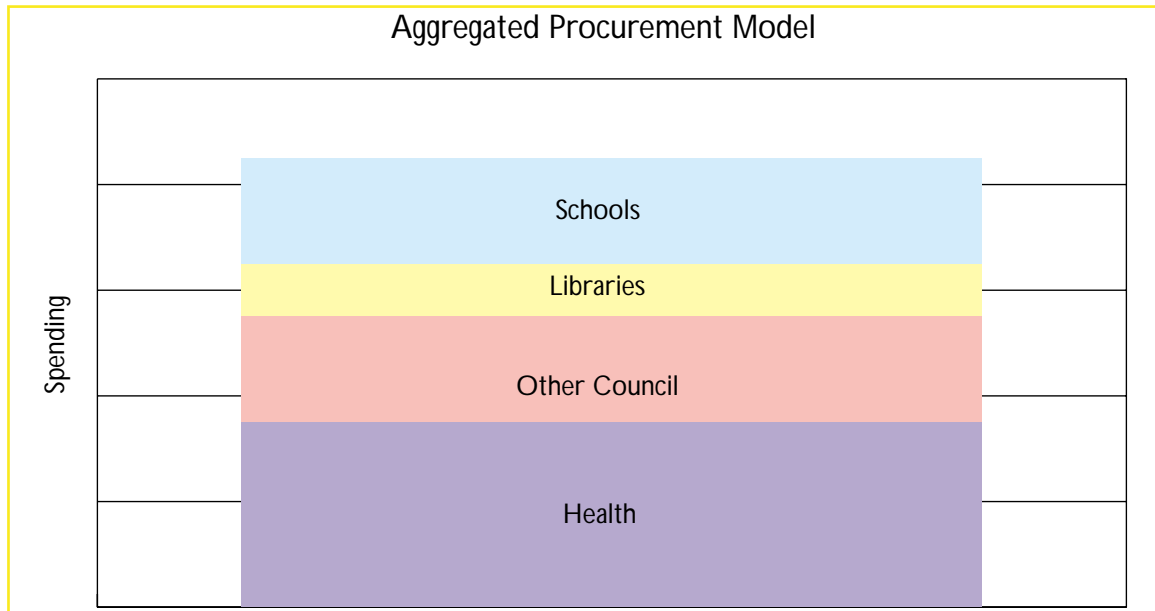
6. Aggregated procurement will rest in part on the substantial funding which public sector bodies currently allocate to buying telecoms services. These resources will now be deployed in a way that will give greater value for money. In addition, the Scottish Executive will make additional funding available in pathfinder areas towards the costs of upgraded requirements for schools, health and local authority networks.

7. In this way existing and new resources can be brought together. It is not possible to say at the moment the volume of additional funding that the Executive will allocate to pathfinders. While estimates have been made, the quoting of figures could adversely affect the procurement process. The Scottish Executive will also support the costs of forming appropriately skilled project teams to take work forward - both centrally and at local level.



Current procurement practices mean fragmented demand with poor economies of scale.

AGGREGATED PROCUREMENT



By aggregating procurement and awarding contracts over appropriate time horizons, we will provide certainty and a volume of revenue to a supplier that should stimulate them also to provide more extensive and affordable services to business and individuals.

[Please note that these graphs are included simply to illustrate the differences in current and proposed ICT procurement models. They are in no way representative of procurement volumes of telecoms services anywhere in Scotland.]



1. Pathfinder areas will be:

- South of Scotland: covering the geographical areas of Dumfries and Galloway and Scottish Borders Councils.
- Highlands and Islands: comprising the geographical areas of The Highland Council, the Islands Councils, Moray Council and Argyll and Bute Council.

2. These areas have been selected on the basis that the market is unlikely to meet anticipated demand under current procurement practices.

3. Infrastructure in the Highlands and Islands is better than might be expected, given sparsity of population, as a result of imaginative European funded partnerships between the private sector and Highlands and Islands Enterprise and the development of the University of the Highlands. But, as set out in Section 5, the delivery of local services beyond ISDN (Integrated Services Digital Network) poses challenges (and indeed ISDN is not universally available). In the Highlands and Islands a number of relevant partnerships already exist, e.g. the Highlands and Islands Partnership Programme, the Highlands and Islands Learning Grid and the Wellbeing Alliance. These form valuable experience for the operation of a steering group and project team for telecoms procurement.

4. Arguably, much of the South of Scotland faces a greater challenge. These areas have major difficulties to overcome, such as those imposed upon them by Foot and Mouth. Development of telecoms infrastructure is identified in Foot and Mouth recovery plans as a key need. The local agencies in both Dumfries and Galloway and the Borders have increasingly been working together, and again this forms a useful basis for the pathfinder proposal.

5. Initial discussions have taken place between the Executive and pathfinder partners. Local partners in both areas are keen to co-operate with the Executive in the development of pathfinder projects. It is anticipated that in each area pathfinder, partners will create a steering group of which the Executive will have membership. These will oversee a project team for each pathfinder. These teams will benefit from leadership and support from the Digital Scotland Unit who will be able to allocate specialist support to the teams, (e.g. procurement, technical, legal etc). The Digital Scotland Unit will work closely with the Executive's Procurement and Commercial Services Directorate.

6. It will be for local partners to agree the precise organisational structure to take forward procurement but the Scottish Executive is supporting and will support these discussions and decision making. This will include determination of the contracting authority. The immediate objective is to establish quickly organisational structures that will take procurement forward. At the same time local partners and the Executive are working to gather more detailed information both on current contracts and on anticipated requirements.

PATHFINDER AREAS

These two strands of work will allow a procurement process to proceed. As work proceeds, a key role of the Scottish Executive will be to ensure close co-ordination and exchange of information between the two project teams and the Executive.

7. The procurement process can be expected to be reasonably lengthy. Requests for information and/or proposals will be advertised in the Official Journal of the European Community (OJEC) and detailed negotiations can be expected to follow that. Contracts will be negotiated depending on the needs of the individual pathfinder areas, but will be of sufficient duration to consolidate aggregation opportunities and to offer bidders an acceptable return on their investment.



1. The market for broadband and higher bandwidth connections is currently at an early stage in its development. However, once businesses and consumers realise what the digital revolution can offer, demand is expected to grow. We must act now to ensure all sectors of the population, in every area of Scotland, has access to this technology.
2. Ultimately the market will decide which services and which technologies succeed. We see our role as maximising the extent to which the opportunity for broadband access is available, ensuring that bandwidth requirements of as many sectors of the population are served in the future without distorting the market. It is our view that the ultimate solution will be a combination of various complementary technologies and bandwidths delivered by a range of companies.
3. The outcome of improving broadband connections is expected to be the improvement of innovation, economic productivity and competitiveness, and enhanced delivery of learning, health care and public services. Aggregating public sector procurement offers opportunities for achieving a more extensive broadband infrastructure which would benefit business and consumers, as well as providing enhanced infrastructure for public services such as schools, health, police, libraries and local authorities.
4. We are confident that the actions set out here should play a significant role in facilitating the development of broadband connections in Scotland. The strategy will be developed through pathfinder projects in the Highland & Islands and South of Scotland. In both of these areas, the Executive, in conjunction with local partners, will develop an aggregated broadband procurement strategy that will aim to facilitate the provision of up to the minute telecommunications technology being offered in rural communities. We anticipate that a similar approach can be taken across Scotland, and plan to open discussions with other local authorities early in the pathfinder projects.
5. The digital revolution is already changing how we work, communicate and live, and we must ensure we keep pace with demand for changing technologies. We are sure that the actions set out here will contribute to the promotion of Scotland as a great place to live and work.
6. The Scottish Executive has had extensive discussions prior to formulating these proposals, but we welcome continued reaction and feedback. Please feel free to write, phone or e-mail us at the Digital Scotland Unit with your thoughts. Our contact details can be found in Annex C.

ANNEX A: GLOSSARY

ADSL	Asymmetric Digital Subscriber Line ADSL is a compression technology that transforms a pair of twisted copper wires between a local exchange and a customer's telephone socket into a high speed digital line. It is asymmetric i.e. moves data more quickly from the exchange to customer than from customer to the exchange. This is suitable for applications where customers expect to receive more data than they transmit.
Backbone	The part of the network used as the primary path for transporting traffic between network segments.
Bandwidth	A measure of information carrying capacity on a communications link. The higher the bandwidth the greater the information carrying capacity.
Fibre-optic cable/Fibre	A transmission medium that uses glass or plastic fibres rather than copper wire to transport data or voice signals. The signal is imposed on the fibre via pulses of light from a laser or light emitting diode. Bandwidth capacity is much greater than that of copper.
ISDN	Integrated Services Digital Network A telecommunication standard being offered by telephone companies which enables the rapid transmission of voice, data and certain images over telephone lines.
Kbit/s	Kilobits per second A unit of measurement of the amount of information that can be transmitted in one second. 1000 Kilobits = 1 Megabit
Local Loop	Any network providing connectivity between customers and the nearest operator's building which supports service.
Narrowband	A communications link consisting of bandwidth less than or equal to 64 kbit/s.
POP	Point of Presence This is a connection point to a carrier network.
PSTN	Public Switched Telephone Network Used to describe the public fixed telephone system, including local lines, local exchanges and the complete system of trunks and the exchange hierarchy that makes up the network.

STM

Synchronous Transfer Mode Level

This is the standard unit of capacity for transmission rates on a Synchronous Digital Hierarchy network, used outside North America.

The rates are:

STM-1 = 155 mbit/s

STM-4 = 622 mbit/s

STM-16 = 2.5 Gbit/s

STM-64 = 10 Gbit/s

ANNEX B: NOTES

- 1 Scottish Executive, 30 January 2001 **"Smart Successful Scotland"**
<http://www.scotland.gov.uk/library3/enterprise/sss-00.asp>
- 2 Office of the E-Envoy, 13 February 2001 **"UK online: the broadband future"**
<http://www.e-envoy.gov.uk/publications/reports/broadband/index.htm>
- 3 Office of Communications
- 4 Office of Telecommunications
- 5 Ovum for Scottish Enterprise, June 2000 **"Connecting Scotland"**
<http://www.ecommerce-scotland.org> and enter download area.
- 6 Current ownership of the backbone is confined mainly to BT, Thus, NTL and Telewest, with BT owning the largest share. This is made up of a mainly fibre backbone with copper covering the local loops. BT run fibre between Glasgow and Edinburgh, up the east coast through Perth, Dundee and Aberdeen. They also have 2 fibre routes to Inverness from Glasgow and from Aberdeen and fibre to Dumfries & Galloway and the Borders. Thus owns an extensive backbone network of over 3,000 kms in Scotland based on Scottish Power's power grid, as well as leasing fibre from BT. The cable companies also own fibre within their franchise areas.
- 7 Report prepared for the Highlands and Islands Partnership Programme, December 2000 **"Broadband Network Infrastructure in the Highlands and Islands"**
<http://www.hipp.org.uk/downloadTMP/fnlrep.doc>
- 8 Within these exchange areas, availability of ADSL will be subject to survey.
- 9 Asymmetric Digital Subscriber Line is a distance-dependent technology. With rate adaption, reach is extended from 3.5km network reach from the local exchange to 5.5km. Subscribers living between 3.5km and 5.5km from the exchange will still receive the same level of service downstream (up to 500kbs) but the upstream bandwidth will vary according to the distance from the local exchange (typically from 64kbs to 250kbs).
- 10 BT have 1,100 exchanges in Scotland. These are of 2 types: older UXD5, and newer System X exchanges. There are 420 UXD5 exchanges covering some 4.5% of the Scottish population, mainly in rural and remote areas. The remaining 95.5% are served by System X exchanges. Both can provide ISDN but System X exchanges are more easily upgraded to provide ADSL.
- 11 Each licence holder must provide a service covering an area inhabited by 80% of the UK population by 2007.
- 12 GPRS provides high speed Internet access at a lower rate than 3G. Since 2½G operates at the same cell size as 2G, there is potential for extensive coverage.
- 13 Some of the infrastructure needed to deliver broadband services might require planning permission. The Executive's planning policy for Radio Telecommunications, which is set out in National Planning Policy Guideline 19 (NPPG 19), is to enable the industry to expand and diversify, but this must be done in a manner which keeps the environmental impact to a minimum. The aim is that the equipment becomes an accepted and unobtrusive feature of urban and rural areas. The general principles set out in the NPPG regarding sensitive siting and minimising environmental impact should apply generally to telecommunications infrastructure.

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