This is the author's version of the following article: Brake and Nelson (2007), A case study of flexible solutions to transport demand in a deregulated environment, *J Transport Geog.*, 15 (4), 262-273. http://dx.doi.org/10.1016/j.jtrangeo.2006.08.006

A case study of flexible solutions to transport demand in a deregulated environment

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Abstract

Since public transport deregulation in the UK the provision of solutions to transport demand in areas of dispersed demand has been met by local authorities’ attempts to “fill gaps” in the commercial public transport network, whilst the voluntary sector has addressed the needs of more specialised travel. Over the last five years more innovative solutions have been enabled by the development of Intelligent Transport Systems (ITS), which allow more flexible transport services in terms of time and space. In addition, new ways of thinking about the provision of what might be considered public transport has led to more flexible transport modes becoming available, permitting the general public on education contract services, the use of taxis for shared public transport and the provision of vehicles enabling access to work. However, these innovations tend to operate independently leading to overlap, gaps and misunderstandings about the purpose, delivery and receipt of services. To address these issues, future public transport services will need wider area network planning, greater co-operation between service providers (e.g. in the form of partnerships) and improved understanding of passenger requirements. The case study of Northumberland presented in this paper embodies many of the problems faced by residents in rural areas of the UK to-day and illustrates diverse solutions that have been made to address these challenges.

Keywords: Telematics-based Demand Responsive Transport (DRT); Intelligent Transport Systems (ITS); Flexible Transport Services (FTS); public transport; sustainable public transport
1. Introduction

The provision of solutions to transport demand in areas of dispersed demand in the UK has, since the deregulation of public transport services, been met by local authorities “filling the gaps” in the commercial public transport network, whilst the voluntary sector has continued to address the needs of more specialised travel requirements. Set against a background of the requirement to achieve sustainable transport whilst improving social inclusion, these conventional solutions have not proved satisfactory. Since 2001 more innovative solutions have been enabled by the development of Intelligent Transport Systems (ITS), which allow more flexible transport services in terms of time and space. In addition, new ways of thinking about the provision of all types of what might be considered public transport has led to more flexible transport modes becoming available. Examples include a “bottom up” approach to meeting demand which responds directly to end user needs; permitting the general public on education contract services; the use of taxis for shared public transport; and the provision of vehicles enabling access to work. Critically, these innovations are tending to operate independently leading to overlap, gaps and misunderstandings about the purpose, delivery and receipt of services. To address these issues, future public transport services will need wider area network planning, greater co-operation between service providers and a greater understanding of end user requirements. This paper explores these issues with a case study from Northumberland, the most rural county of England, highlighting in particular the need for partnership working if greater integration of transport services and providers is to be achieved.
2. The conditions that shape the provision of rural transport

2.1. The regulatory environment

In the UK the majority of public transport passenger trips by bus are made on fixed
route services registered with the UK Traffic Commissioners, such that specific routes
and service frequencies are guaranteed. The deregulation of registered public transport
services in the UK and the advent of on-road competition in Great Britain outside of
London under the 1985 Transport Act heralded a new era for transport provision in rural
areas. This Act outlined procedures for tendering non-commercial services, whereby
local authorities attempt to fill gaps in the commercial network. The former network of
public transport services was swiftly eroded in rural areas, being replaced by a skeleton
of commercial services alongside local authority supported services intended to serve as
many people as possible within the confines of budgetary restrictions. The registration
of a bus service normally entitles the operator to a fuel duty rebate from the central
government under the Bus Service Operators Grant (BSOG).

There have been few policies specifically directed towards rural transport issues,
although legislation does recognise the need for local authorities to supply socially
desirable services (Transport Act, 1978) and more recently local authorities in England
and Wales have been obliged to produce Local Transport Plans (LTPs) which address
accessibility issues with a strong emphasis on social inclusion, yet concurrently
requiring sustainable transport solutions. Similar requirements exist in Scotland. The
first LTPs were produced in 2001 with the next ones due in 2006. The Rural Transport
Partnership Fund was announced in the 1998 White Paper on Integrated Transport (DETR, 1998) and embraced the community and voluntary transport sectors, local authorities and the private sector. The Scottish Rural Community Transport Initiative makes similar provision. Funds are allocated to projects that reduce social exclusion of rural people, giving them accessibility to jobs, services and social activity by long-term improvements to public transport services.

The Rural Bus Subsidy Grant, first introduced in 1998, is administered by county councils, unitary authorities and the metropolitan Passenger Transport Executives (PTEs) for the general improvement of rural bus services including their marketing and administration. From 1998 the Rural Bus Challenge (RBC) Fund was administered throughout England and Wales by the Department for Transport (DfT), with the objective of introducing cost-effective innovations in rural public transport. It also took in any surplus from the Rural Bus Subsidy Grant. In 2004 the RBC programme finished – leaving many projects without future funding, partly because there was no obligation to provide an exit strategy when applying to the fund. In parallel, The Scottish Executive has sponsored a series of DRT pilots (DHC, 2005).

The RBC programme was largely responsible for the widespread development of many applications of Demand Responsive Transport (DRT) services, which offer a range of flexible transport solutions (discussed in Section 6.). However, prior to the DfT registration initiative (The Flexible Future, DfT, 2002), which had been trailed in the Ten Year Plan (DETR, 2000) and implemented in February 2004, the criteria for the registration of DRT services were not clear and not evenly applied between the
regionally-based Traffic Commissioners. The regulations for obtaining BSOG also
denied its receipt for any non-fixed elements of services. It is anticipated that many
more registered DRT services will be introduced in response to this initiative, whilst the
more recent 2004 White Paper (*The Future of Transport*, DfT, 2004) has pledged to
continue supporting DRT service development.\(^2\)

Operating on a not-for-profit basis, Community Transport groups can offer registered
bus services under Section 22 of the Transport Act or non registered services under
Section 19. The latter enables specified types of groups to hire a vehicle (with or
without a driver) in which they decide where and when the vehicle is used, but the
vehicle cannot be used to ‘ply for hire’ by picking up the general public. BSOG was

Statutory (local) authorities provide a range of non-registered bus services, such as
education, social and other care services transport and non-emergency Patient Transport
Services (PTS). Education journeys are fixed annually, with little variation from one
year to the next: this enables authorities to open up some of these services to the general
public by registering them. The pattern of movement of social and other care services
and PTS passengers is less rigid than for education trips.

Non-registered public transport options also include two types of taxi: hackney
carriages (usually described as taxis) and private hire vehicles (PHVs). Both taxis and
PHVs must be licensed with the local authority. In general taxis are licensed to ply for

\(^2\) Although in principle there are no flexible registrations in Scotland a more pragmatic approach has
traditionally been taken by the Scottish Traffic Commissioner (DHC, 2005).
hire, i.e. they can pick up a passenger in the street or from a taxi rank. PHVs can only carry passengers who have pre-booked the journey. There are no fixed routes.

2.2. The pattern of demand

Rural transport provision is a function of accessibility problems which are demonstrated by vicious cycles of decline (see Fig. 1). Since 1955 a major catalyst for this decline has been rural depopulation due to greater employment opportunities in urban areas. In addition, the increase in average income has enabled rising car ownership. In rural areas car ownership has always been relatively high – this is frequently based upon need rather than wealth as poor families make considerable sacrifices in order to maintain the family car. Farrington and Farrington (2005) noting that “accessibility” is a concept that has come of age point out that it has been particularly based on the decline of bus, rail and other public services in post 1950s rural Britain.

In one vicious cycle, rising car ownership enables people to make increased use of urban facilities where goods are frequently cheaper, there is more choice and it is convenient to shop near to the place of work. This leads to a decline in village facilities and a subsequent increase in the benefits of owning a car, with a further increase in car ownership. This causes, in another vicious cycle, a reduced demand for public transport. Bus companies suffer reduced revenues and may respond either by reducing the frequency of the service or by increasing fares. Both of these options are viewed by potential passengers as offering a poorer quality of public transport service: the utility of car ownership is again increased, giving rise to greater car ownership.
An alternative option for bus companies is to obtain a subsidy from the local authority: this is achieved by threatening to withdraw the least or non-viable services that the local authority will regard as essential for the public transport network. If no funds for subsidy are available (the local authority may not consider the service essential or may not have enough funding in the Rural Bus Subsidy Grant), the operator will again respond by increasing fares and/or reducing service frequency or withdrawing the service altogether. If the local authority is able to allocate further funds from the transport budget, service levels and fares will be held. But this is a state of temporary stability as the other pressures continue to erode the viability of public transport. Thus, problems are worsened by demographic changes such as the growth of counter urbanisation by higher income earners and the increasing number of relatively wealthy retirement home owners in rural areas. The eventual closure of public transport services is normally regarded as irreversible. Each time a cycle of decline is completed, the most vulnerable members of society – the elderly, disabled, young persons and low income earners – are left with less access to employment, goods and services.

2.3 Wider issues of accessibility

Accessibility is about the ease with which an individual can access services and facilities that he or she needs or desires and has increasingly been seen as a key to achieving greater social inclusion, social justice and sustainability of communities. In rural areas, such as Northumberland, emphasis is placed on the impacts of changes in the availability of private transport: the unavailability of a vehicle, either through cost or
where used by one member of the family, tends to impact to a greater extent on women and young adults (Gray et al, 2001).

Weber (2006) in a reflection on the future of accessibility notes that this fundamental topic of transport geography also has clear implications for the idea of sustainable transport. He notes that “sustainable accessibility” (which is as much a social and political as a physical property) has yet to be achieved for many citizens. Accessibility planning is however firmly placed within the British planning process and current research by the authors’ and colleagues is developing a tool which will guide decision takers towards planning for the most appropriate delivery of (flexible) public transport services appropriate to the objectives and constraints of a locality.

3. Towards a new definition of public transport

Historically, public transport has been regarded as an inflexible transport option, particularly when compared with the most flexible form of motorised transport – the private car. Ideally public transport would be as convenient as private transport, suggesting that “all public transport should be demand responsive with customer demand determining how each public transport service journey is operated. This affects the route taken, the vehicle used and the operator used.” Responsiveness can also be described in terms of what types of passengers are carried and how the trips are paid for. Fig. 2 shows the range of options for these aspects of demand responsiveness. To what extent is it possible to describe public transport as flexible?

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3 The DfT has recommended that local authorities use the Accession software for the preparation of detailed accessibility strategies within their Local Transport Plans (see http://www.accessiongis.com).
Closer examination of the perception that public transport is inflexible suggests that this is not true for two principal reasons. Firstly, the development of Intelligent Transport Systems (ITS) tools, as well as the availability of mobile communications, has allowed new public transport service options to be developed whereby the service is more responsive to customer demand in terms of time and space (Mageean and Nelson, 2003; Ambrosino et al, 2004; Brake et al, 2004b; INTERMODE, 2004). DRT services are ideally suited to rural areas, enabling wide coverage of sparse demand areas, often increasing service frequency compared with conventional fixed route services. The systems can handle substantial networks of services, manage the booking and reservations, allow the user to make bookings almost in real-time and can have real-time operational control. This has enabled the transfer of dial-a-ride type services to the registered sector, where it is usually known as DRT. This ability to provide services on-demand has opened up many operational opportunities and has enabled a new interpretation of public transport such that as a function of time it is demand responsive and flexible in terms of route, vehicle and operator. The route function is now well developed within the registered public transport sector, whilst selection from a pool of vehicles – by type and availability for use – and a pool of operators has yet to be developed. Furthermore, the development of Smart Card technology offers flexibility by allowing the automated management of payment operations by debiting top-up cards. Multi-function cards also allow the development of integrated payment services and different zone fares, thereby ensuring a fair distribution of revenues between service operators when intermodal passenger trips are made. Crucially, experience from both
the UK and across Europe shows that careful attention should be given to the level and appropriateness of the telematics solution adopted (Brake et al, 2006).

Secondly, the general public invariably thinks of registered fixed route bus services as being the sole form of public transport, whereas Sections 1 and 2.1 of this paper have identified taxis, PHVs and Section 19 services as public transport – and these are highly flexible in terms of when and where they operate. (However, as seen in Section 2.1, coverage is not offered to all members of the general public in terms of location and/or criteria for being carried.) A commercially operated registered fixed route service is demand responsive because historical knowledge of customer demand influences the route taken and the type of vehicle used. The operator is fixed for that particular service. It has some flexibility because the registration can be varied with 42 days notice (although it can be made with 7 days notice if there is local authority support) as a result of customer demand – although this will not be a frequent occurrence. In addition, some parts of fixed routes are demand responsive because they only operate if requested by the customer.

All other types of public transport can also be regarded as demand responsive and flexible to a greater or lesser degree: customer demand determines the route and vehicle used at varying timescales prior to travel; and the operator is fixed, being determined by the type of service offered (e.g. Social Services Departments provide their own transport for clients).
Public transport can be made more effective and efficient by being more demand responsive across all the functions of flexibility. However, this needs better understanding of public transport services and co-operation between transport providers. This has been explored in the EC-funded FAMS project (Brake et al, 2004a; FAMS, 2005). Early examples of DRT services were satisfactory as standalone services in terms of vehicles, operators and routes, particularly where demand was limited and a low level of scheduling technology was used by a Travel Dispatch Centre (TDC). However, the more integrated the services become, covering a wider area, the more important recent advances in ITS technologies have become – and in order to sustain it a greater number of services need to be dispatched, leading to a co-ordinated brokerage or Agency approach to providing DRT services. The technical, organisational and institutional requirements for this were considered by FAMS.

As an example, Fig. 3 outlines the flexibility of transport services in Northumberland in terms of the types of vehicles used and the level of registration in the horizontal dimension and the route options in the vertical dimension. It is populated with examples from rural Northumberland, where they exist. The delivery of these solutions will be examined further in Sections 5, 6 and 7. Fig. 4 locates a selection of these schemes.

Clearly, the flexibility of transport services will be governed by the regulatory context in which it is provided. This paper draws on a British case study where there is inherent potential for conflict between different potential service providers. Moreover, questions of ownership and control of the TDC will be similarly affected (Brake et al, 2004). The
role of the market environment as a factor influencing the introduction of DRT is explored thoroughly by Mageean et al (2003) drawing on examples from across Europe. Findings indicated that whilst in a more regulated environment DRT may be strategically more easy to implement, a long-term view of the service is required. The DRT tariff is unlikely to cover the cost of service in any market and although subsidies are more likely in regulated environments the influence of subsidies from other sources (e.g. health, social services) on DRT provision shows no pattern. Finally, as illustrated by the Northumberland case study, the deregulated environment has (in part) encouraged an innovative approach to partnership working.

4. Introduction to the Northumberland case study

Northumberland, the northernmost county in England, provides the case study to illustrate how flexible transport solutions are being applied in challenging operational environments. It was one of the first counties to benefit from telematics-based DRT services (promoted as Phone and Go) and to recognise the issues behind tackling the integration of transport services in order to provide an efficient and sustainable public transport network. The area of the county is 5013 km$^2$ of which 4876 km$^2$ may be described as rural. Northumberland has a very uneven population distribution, being densely populated in the south-east but is increasingly sparsely populated to the north and west. To the west Tynedale is hilly and is the least densely populated district in England, whilst the eastern coastal strip is a former coal mining area. Overall the population density of the county is 61.3 persons/km$^2$, whilst in the rural areas it is 33.8 persons/km$^2$ – compared to an average of 1992 persons/km$^2$ in neighbouring Tyne and
Wear (2001 Census) (www.statistics.gov.uk/census2001 and www.northumberland.gov.uk). Public transport provision tends to mirror the population distribution, thus creating major north to south flows, such as Berwick – Alnwick – Morpeth – Newcastle and Blyth – Ashington – Newcastle; and west to east flows from Haltwhistle – Hexham – Prudhoe – Newcastle. The rural areas have pockets of social exclusion amongst areas of varying affluence. Registered public transport is mostly used by the relatively few people without access to a private car and without radical changes to the delivery and perception of public transport, its use is unlikely to increase as north-east England has the most rapidly increasing car ownership rates in the UK.

The data collected for this case study have been assembled by the authors from a variety of sources including a major DRT research and development project (Phone and Go), supported by stakeholder interviews to elicit insights into the future development of DRT services.

5. Conventional solutions to transport provision in Northumberland

The conventional solution to the management of rural transport demand has been largely a “top down” approach, in which each statutory authority (largely) independently organises transport for the public according to specified criteria. Financial support for transport is achieved separately by each authority. In rural areas (less so in urban areas) this leads to the inefficient use of resources, with overlapping routes being provided and vehicles at much less than capacity. Centralisation of
funding is difficult as each authority protects its budget – and this is exacerbated since the boundaries of these authorities do not necessarily coincide or “nest” in a matching hierarchy. As an example, Fig. 5 shows the complex boundary relationships within the health sector in north east England. In the case of Northumberland, for example, one can identify five major categories of overlapping service provider: (i) The Strategic Health Authority (SHA) which also covers Tyne and Wear and comprises six Primary Care Trusts, six Acute Trusts and two Mental Health Trusts. (ii) The North East Ambulance Service is part of this SHA, whilst it is also part of the adjoining County Durham and Tees Valley SHA, giving rise to cross-boundary co-ordination issues. (iii) The provision of transport is further complicated by the largely independent bus scheduling of commercial and voluntary operators, whose boundaries are not well defined and are subject to change with little notice (by commencing or withdrawing services) or with reasonable notice (winning or losing competitive tenders). The local authority takes an overview of contiguous geographical areas within its jurisdiction (see Fig. 6), by identifying gaps in the commercial network through a consultation process and then acts within budgetary restrictions to supplement the registered bus service network. Consultation with adjacent authorities is also carried out. (iv) The operational areas for taxis and PHV vehicles are subject to District Council control (there are six districts within Northumberland). Finally, (v) within Northumberland County Council, the transport for the general public, education and social services is mostly arranged independently.

In Northumberland many of the longer distance registered local bus services have a destination outside the county in Newcastle upon Tyne, with a few also terminating in
Edinburgh to the north and Carlisle to the west. Most of the shorter rural services serve the main towns of Hexham and Prudhoe to the west, Morpeth and Berwick to the north, and Ashington and Blyth in the south east of the county where the greater population density benefits from a denser network of more frequent services. As described in Section 3, “regular” fixed route services can be adjusted at relatively short notice – however, the prompt for change is more often to rationalise journeys rather than improve routes. Lack of consultation between commercial providers and planners leads to instances of the public being left without a service at short notice, which the local authority cannot replace.

The registration of mail delivery vehicles as Post Buses to more remote areas, such as upper North Tynedale, enables some movement of the general public, but the time and direction of travel is not suitable for commuting purposes. Flexibility is limited due to limited possibilities for altering the mail delivery route and time.

Local authorities also have a statutory duty to provide education and social services contract transport, which are largely organised independently of registered services. Northumberland is no exception: the County Council arranges, by tender to commercial operators, a large number of education transport movements for pupils living more than 3 miles from their designated school (2 miles for junior school pupils). The highly rural character of Northumberland entails long distances to school for many pupils. Where pupil numbers do not fully occupy the designated vehicles, the routes have been registered, enabling the general public to use the service. Flexibility is constrained by the timing of school buses – not suitable for commuters in the afternoon – and the
availability of space. Indeed, the estimation of space excludes pupils aged over 16 years, who are not entitled to free transport, yet need to travel to school. In turn, this restricts the space available to the general public. This situation is not readily understood by the general public, leading to lost patronage and dissatisfied passengers.

Social Services trips to day care centres are centred on the larger towns in Northumberland, as with the registered services. These trips are provided in-house by the County Council on behalf of the Northumberland Care Trust. Routing is based on client needs, but there is little route variation as most trips are routinely made by the passengers – this contrasts strongly with the neighbouring urban area of Tyne and Wear where the PTE offers a county wide Care Services dial-a-ride service with greater flexibility in time and route, in addition to the Social Services trips (with the more stringent criteria for carriage of passengers) offered by the constituent local authorities.

The Health Sector provides yet another network of overlapping services taking non-emergency patients to and from hospital appointments in Hexham, Ashington, Berwick and Newcastle upon Tyne. These services are provided by the regional ambulance service, whose boundary does not coincide with that of the County Council (Figs. 5 and 6). Non-emergency service routing is determined on the day prior to travel – since many are repeat appointments, a basic route pattern has evolved.

The voluntary sector is able to further fill the gaps for the disabled and elderly by providing Section 19 services and gaps for the general public with Section 22 services, but coverage is irregular. Section 22 services are often designed to provide a shoppers’ service, such as between Corbridge and Hexham in Tynedale and between Hexham and
a large Tesco supermarket on the north-west edge of Newcastle upon Tyne. Dial-a-ride services have been the province of the voluntary sector, in which the vehicle is routed according to customer demand using manual scheduling, which requires at least previous day booking. The voluntary sector has successfully worked with a “bottom up” approach, carefully identifying end user needs. However, their efforts are hampered by lack of permitted input to wider network planning, access to funds and access to sufficient vehicles to meet identified demand. In Northumberland there are three community transport groups based in Hexham (Tyndale), Ashington (serving an urban population) and Berwick. This leaves a section of eastern Northumberland without any form of Community Transport. Lack of flexibility in Community Transport services often centres on the non-availability of vehicles due to the absence of volunteer drivers to meet demands.

Taxi and PHV operators are again centred on major towns, with the more remote areas in north and north-west Northumberland lacking access to a local operators. Without support from the local authority, these services are group or single occupant bookings.

Thus, the application of independent conventional transport solutions has not enhanced the accessibility to public transport in rural areas, either because coverage does not exist or there are restrictive criteria for carrying passengers – sometimes giving rise to the inefficient duplication of vehicles on the ground or there are potentially unnecessary overlaps between services.
6. Recent innovative solutions in Northumberland

6.1. Demand Responsive Transport (DRT) services

The Northumberland case study of the *Phone and Go* services demonstrates how DRT has been implemented, the factors that have led to its successes and problems that have emerged in delivering such services. As with most local authority initiatives a “top down” approach was used to fill known service gaps.

*Phone and Go* was a DfT funded Rural Bus Challenge project lasting for 3 years from April 2001 with an extension to August 2005 (Mageean et al, 2004). The overall objective was to demonstrate and evaluate telematics-based DRT services in two contrasting areas of Northumberland, the Allen Valleys and the Lower Coquet. These new services were fully flexible over their defined service areas: the former providing links to the small town of Allendale, with timed interchange to the market town of Hexham (and thence to the cities of Newcastle upon Tyne and Carlisle). The Lower Coquet service enabled interchange on the main Newcastle upon Tyne to Edinburgh bus route as well as providing trips to the small coastal town of Amble.

As the demonstration progressed, the objective arose of finding innovative ways of introducing further DRT services and sustaining the existing ones (Fig. 7). Several adjustments were made to the Lower Coquet service following customer demand, although this did not involve co-ordinated consultation with the general public. These alterations included extensions to the service area; the inclusion of extra fixed
destinations outside the service area at specified times; and the carriage of Social Services clients. With each extension to the service, the benefits were counterbalanced by costs, e.g. the perceived benefit of carrying Social Services clients – with added revenue – led to the loss of regular passengers who provided less revenue.

Prior to the commencement of the two core services, a telematics pilot was conducted which adjusted the fixed route Community Transport Hexham to Tescos (Newcastle) shoppers’ bus service to give a combination of fixed and flexible routes during the day.

During the demonstration, more service designs were experimented with, e.g. a semi-fixed bus route; the use of lay over time to provide a disabled persons’ service in Alnwick town; and a General Practitioner sponsored a weekly service in upper North Tynedale. Non-registered shared taxibus services were introduced at two locations, both in response to the rerouting of commercial bus services. At Shilbottle a pool of operators was used, whilst in Hexham the service was operated by a single operator.

The success of these services can be measured in several ways. Customer satisfaction was high for users of the service. In the Lower Coquet the passenger numbers per vehicle hour of operation compared favourably with DRT services elsewhere in the UK – however, the high percentage of concessionary passengers gave limited revenue. In contrast, education contract pupils were carried in the Allen Valleys, giving greater revenue to the service, but patronage by the general public was low. Similarly, the patronage of the other services remained low, this being symptomatic of service planning that did not take full account of potential end user needs and poor awareness...
by users of the services offered. The cost of operation for the taxibus services was low, as the County Council only paid the operator when a journey was made – unlike the cost of the tenders for the registered bus services. However, as with other comparable schemes, a substantial cost of the service came from staffing the TDC and the purchase and use of the scheduling software, which could not be covered by farebox revenues once the RBC funding ceased. These developments necessitated the development of an exit strategy for Phone and Go which is discussed in Section 7.1.

6.2. Other flexible transport services

Wheels to Work schemes exemplify a “bottom up” approach, in which a vehicle (car, bike or scooter) is only provided to persons who express a need to the administering organisation and who fulfil stringent criteria. At present, it is largely seen by statutory authorities as a stop-gap measure to enable low income earners to take up new jobs and to save money to buy a car. However, Wheels to Work could be used to identify real gaps in the public transport network, as the vehicle is only handed over to a client for trips that are to be realised. A Wheels to Work scheme in Tynedale is the only car-based flexible solution in Northumberland (Fig. 3). It is being administered by a Community Transport group, for three years from May 2004. Taxed and insured vehicles are loaned to attend interviews, training and education as well as places of work not accessible by public transport. Loan periods range from 1 day to 12 months.

Increasingly the voluntary Community Transport sector is providing brokered transport services by co-ordinating the use of vehicles owned by themselves and local community
groups - the latter groups frequently under-utilising their vehicle resources. This is a relatively simple form of transport brokerage which can be handled by manual scheduling. However, the lack of vehicles and manpower resources restricts the availability of these services.

Another local initiative is Flexible Transport Tynedale (FTT), a 2-year European Regional Development Fund (ERDF) project which aims to overcome such problems and to more closely meet user needs. A Community Transport organisation is co-ordinating this enhanced brokerage (Agency) scheme to provide access to work and training 7 days a week. The criteria are that a person who cannot access these functions at a reasonable time will be entitled to assistance. A critical step forward is the network of focus groups which identify the travel needs from the employer perspective as well as the end user; in addition, co-operation rather than competition between operators is being sought, with the objective of maximising the use of resources in time and space, so that eventually commercial operators will provide vehicles along side the voluntary sector – indeed this is paramount if the project is to be sustainable.

7. Towards sustainability: the further integration of transport services and providers

7.1. Existing co-operation between service providers

The implementation of DRT services such as Phone and Go has prompted moves towards co-operation between statutory service providers due to the need to provide
sustainable services. This was initiated by using education contract services to support the Allen Valleys service and the later carriage of Social Services passengers in the Lower Coquet. However, the logistical implications of combining trips for Social Services passengers with the general public proved difficult as it was not clear to the authorities or the end users which clients should take priority when scheduling the service, whereas in neighbouring Tyne and Wear there is some inter-working between Care Service and DRT vehicles. Furthermore, co-operation between statutory providers was low, partly due to the historical practice of each budget holder retaining independent control.

However, the funding implications arising from the *Phone and Go* project suggests that the way forward is by integrating the provision of services. Although the development of a formal exit strategy was not a requirement of RBC funding the project management team developed a strategy for those areas of the project critical to the future development of the services (Fig. 8). The process of integrating services commenced with the transfer of the TDC (October 2004) to Nexus (the Tyne and Wear PTE) which already dispatched registered DRT services, Care Services and some Social Services. Economies of scale have been derived from the utilisation of dispatchers and by sharing their existing scheduling software. An added advantage of this transfer is that from the scheduling perspective cross-border services will be facilitated.

Following the transfer of the TDC the core *Phone and Go* DRT services have been subsequently withdrawn on financial grounds over a period of 12 months although the taxibus services remain. In parallel, the County Council has completed a preliminary
analysis of vehicle logs from Social Service vehicles has revealed the potential for carrying the general public when the vehicles are not in use: once again institutional issues need to be overcome, such as the transfer of drivers from care duties at day care centres – with implications for wage structures and job satisfaction – to driving for the general public. Nevertheless this raises the prospect of an emerging regional TDC at Nexus (Fig. 9) taking up the dispatching of the Northumberland Social Services vehicles in due course – thus adding to the portfolio of services they already provide for other authorities.

7.2. The need for partnerships

This paper has contrasted the “top down” and “bottom up” approaches to service planning in a deregulated environment. The “top down” approach of the statutory sector does not lend itself to consultation with the voluntary and the taxi/PHV sectors, which are legislated for and funded in a different manner to the commercial bus sector with which local authorities normally co-operate. Meanwhile, the voluntary sector has been employing a “bottom up” approach to provide flexible transport solutions, but tends to lack co-operation and financial support from the statutory sectors.

Furthermore, as seen in Section 5 (Figs. 5 and 6) the organisational structures of the major entities involved do not necessarily lend themselves to greater integration. This is partly due to the problem of limited co-operation between transport providers. However, it is exacerbated by physically overlapping boundaries together with area
gaps in provision by most types of transport providers – the exception being those for which there is a statutory duty to provide a service to the general public.

This challenging situation would suggest that partnerships will be increasingly important in facilitating the integration of transport services and providers which the future development of DRT and other forms of flexible transport relies upon. In pursuit of this it is helpful to distinguish between two main types of partnership: management partnerships and brokerage partnerships (Brake et al, 2006).

There is already sufficient experience to suggest that the most successful DRT services are those where there are strong links between the stakeholders, who hold regular management and strategy meetings, such as through a Steering Committee. In a management partnership each member will have clearly defined responsibilities. The purpose of developing a partnership is to ensure that the needs of stakeholders are understood and met, such as ensuring that commercial services are not jeopardised or that the differing functions/ethos of Community Transport and commercial operators are recognised. For instance, volunteer drivers may be highly focused on the local community and may not wish to become part of a wider transport provision remit; they may also prefer to have minimal technological applications. Partnerships are also an opportunity to break down suspicions about new forms of transport services, whether from the provider or end user perspective. Partnership extends to co-operation within organisations such as local authorities as well as between them. Even then, it takes a long time to set up new services, partly due to the different organisational structure of
the entities involved. However, over time such a partnership should be characterised by stability.

The principles of partnerships to manage a standalone service can be extended to the brokerage of vehicles and staff. A well structured brokerage partnership offers the opportunity to save marginal and operating costs, e.g. through the pooling of education, social and health services and registered public transport passengers – and even extension to non-registered bus public transport, taxis and PHVs. The opportunities for reducing total operating costs for the partnership as a whole are very high but can be difficult to achieve if initial effort is not put into the creation of a stable partnership in which the purpose of the services and how they are delivered is clearly established. In a true partnership, all funds would go into one central pot and this would be used to commission all services including education, health transport and social services transport so that when ‘savings’ are made, these become the partnership’s savings and not a saving to any one budget holder. However, in order for this to work, governance issues need to be clear and based on outcomes and not inputs. The impediments to setting up a true partnership are usually jointly fear and power – to run a true partnership members need to be prepared to cede power to the partnership and also be unconcerned that when the partnership carries out activities the contribution of the individual is lost. Equally, issues that look simple, for example, how a vehicle should be branded may take much time and co-operation to resolve if it is of overriding sensitivity to one partner.
8. Conclusions

The Northumberland case study demonstrates how the variety of public transport provision has evolved over a short period of time and illustrates the potential for greater integration of all public transport services in a deregulated environment. The difficulty of developing such a network requires the commitment and capability of all interested groups to share resources in order to streamline services and to enhance the rural network, possibly through the development of a regional Agency – exploiting the benefits to be gained by appropriate applications of ITS tools – capable of dispatching registered and non-registered services. These services could operate in isolation, whilst full integration would allow a combination of trip patterns, e.g. combining general public transport carriage with Community Transport, Social Services and PTS on the same journey or – more likely – the provision of general public transport trips when non-registered journeys are not required. However, the Phone and Go experience has suggested that a critical element of providing any service is the need to know and understand real user requirements and to disseminate information to the identified potential users; this seems most likely to be achieved by the “bottom up” approach of consultation over a wide area leading to substantial adjustments to the network of transport services. Finally, emerging experience suggests that the most successful flexible transport services are likely to be achieved where there is a strong link between stakeholders working in partnership.
Acknowledgements

Bob Dennis, previously Action for Differently Abled People in Tynedale (ADAPT), Community Transport, Northumberland; Alistair Ford, Research Associate, School of Civil Engineering and Geosciences, Newcastle University [Figs. 5 and 6]; Peter Mogridge, Tynedale Rural Transport Officer, Northumberland; Peter Stoner, Public Transport Officer, Northumberland County Council [now North East Traveline (Regional Journey Planner) Co-ordinator]; and two anonymous referees for their helpful comments.

References


Fig. 1. Vicious cycles of demand in rural areas.

Fig. 2. The demand responsiveness of public transport.

Fig. 3. The demand responsiveness of transport in Northumberland.

Fig. 4. Location of rural flexible transport schemes in Northumberland.

Fig. 5. Health sector boundaries in north east England.

Fig. 6. Boundaries and flows for local authority, commercial and voluntary transport operations in north east England.

Fig. 7. Multiple service provision: Phone and Go.

Fig. 8. Strategies developed for the transfer of Phone and Go services.

Fig. 9. The emerging regional TDC at Nexus.
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Fig. 5. Health sector boundaries in north east England.
The boundaries for general public transport, education transport and social services transport are identical in Northumberland.

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Fig. 6. Boundaries and flows for local authority, commercial and voluntary transport operations in north east England.
Fig. 7. Multiple service provision: *Phone and Go.*
Case Study: Phone and Go, Northumberland

This was a DfT Rural Bus Challenge (RBC) funded project to introduce DRT services in two rural areas of Northumberland, with a view to expanding the number of services.

Management: uniquely organised as a research project, the management of the project was achieved in several ways. A Management Board was composed of the following stakeholders: the public transport section of Northumberland County Council, Rural Transport Partnership officers, the University of Newcastle (Transport Operations Research Group), North East Ambulance Service, a Borough Surveyor, a district councillor, and representatives of the Primary Care Trust and Nexus (the Tyne and Wear PTE). The Board met monthly initially and then bi-monthly, offering an advisory role; however, final management decisions were held by Northumberland County Council, the named fund holder. Exit strategy: towards the end of the RBC funding discussion of the exit strategy led to the management of the services being transferred to the integrated transport section, with the establishment of a new advisory board for health transport issues.

Service management: registered services (including S22), special transport and shared taxi service. Integration between types of services was achieved with education and general public trips on one service, together with a short experiment carrying social services and general public trips together. Exit strategy: it was expected that a similar variety of services would continue to be operated.

Centralisation of management: day-to-day management of the service was carried out by the University of Newcastle where the TDC was located in order to maximise the opportunity for research and evaluation of the services. The area covered by the services included south and east Northumberland. Exit strategy: once the project ceased to be a research pilot, the TDC was transferred to Nexus rather than moving in-house at Northumberland County Council. Services already dispatched by Nexus cover Tyne and Wear. Dispatching staff were transferred as well, giving continuity for passengers whilst Nexus staff were trained to the new services.

Level of telematics: all services were scheduled using a software package. Most services were dispatched with this package directly to on-board units together with fax back-ups the day before travel. The remaining services including shared taxi trips were dispatched by phone and fax. Exit strategy: the services were transferred to a different software package at Nexus, continuing with the same dispatching procedures. This transfer means that – from the scheduling perspective – cross-border services will be simple to introduce.

Fig. 8. Strategies developed for the transfer of Phone and Go services.
Fig. 9. The emerging regional TDC at Nexus.