SUSTAINABLE TRANSPORT
The Inside Track

A sustainable transport strategy for Greater Cambridge

The first version of this article (City Deal or No Deal?) was written in the autumn of 2016 as a critique of the City Deal following the failure of the Peak Congestion Control Points proposal – an event which led to a crisis of public confidence in a local government transport strategy widely regarded as lacking in coherence and vision. However, it is always easier to find fault with the ideas of others than to propose viable alternatives, so over a period of months this paper has evolved into a sustainable transport strategy for the South Cambridgeshire sub-region.

There have been many studies and papers published on various aspects of the Cambridge transport issue, some of them in great detail, but I have not seen much in the way of an all-encompassing concept for the future of transport in Greater Cambridge. This is the gap I have sought to fill with this paper. I believe this is a valid exercise, especially at a time when a fundamental review is taking place within local government about the future of transport for the sub-region – a debate to which this article seeks to offer a personal contribution.

The inordinate length of time taken in the UK to develop new infrastructure is something that has to be factored into any transport strategy from the outset. It means that any plans are dependent on sensible predictions for the needs of Cambridge at least 25 years from now.

Forecasting reliably this far ahead is always difficult but it has been made much more so by the uncertainties surrounding the long-term impact of Brexit. And yet no prediction about the growth of Cambridge over the next 25 years can fail to take a view of the long-term effects of this unprecedented event.

I see four possible outcomes of the current Brexit process:-
- The UK will be less prosperous after Brexit. The UK’s prosperity will be broadly unchanged after Brexit.
- The UK will be more prosperous after Brexit.
- Brexit will be cancelled.

In the case of outcomes 2, 3 and 4, I have assumed that Cambridge will continue its economic and demographic growth, based on its pre-eminance in key industries such as biotechnology, IT, and research and education.

One only has to consider how Cambridge has grown and changed over the last 25 years to imagine the changes that are likely to take place in the next 25 if the current rate of growth is maintained or accelerated.

In the case of outcome 1, the UK will decline relative to other countries but I predict that Cambridge will continue to advance, at least relative to the rest of the UK.

Nottingham NET Light Rail Vehicle at Park & Ride stop (courtesy of Colin Harris, Cambridge Connect)

This is because any government of a nation at risk of long-term economic decline will be forced to become more ruthless than ever at backing winners. In terms of its importance to the UK’s future economic prospects, Cambridge has become too big to fail. If I am right about this, it follows that, whatever the outcome of Brexit, the economic and demographic growth of Greater Cambridge will continue. I will leave the forecasting of the precise rate of growth for each scenario to economists, but suffice to say no-one ever made money betting against Cambridge (except in the occasional Boat Race), and I do not see this changing for the foreseeable future.

Since the crisis of 2016 the Combined Authority’s thinking on transport appears to have moved on, although it remains to be seen whether this will amount to more than a rebranding of the City Deal, now renamed the Greater Cambridge Partnership (GCP).

A not insignificant development has been the election of a new Mayor for Cambridgeshire & Peterborough with a remit to guide the formulation of a new transport strategy for the region in cooperation with the GCP.

In a much-needed injection of long-term thinking, James Palmer has been clear that he wants to go back to first principles and assess the feasibility of a variety of solutions and not simply carry on doing things the way they have always been done in the past. In response to his lead, the GCP has commissioned a high-level comparative review of public transport options, including the expansion of guided busways, light rail and a number of original but unproven concepts such as Affordable Very Rapid Transit (AVRT).

We will know what the outcome of this study will be before the end of 2017, but my expectation is that it will shake down to a choice between the two mainstream solutions: guided busways and light rail.

The County Council has a long record of backing bus-based solutions and I expect the GCP to favour the expansion of guided busways, ostensibly on the grounds of cost but in reality to remain within its comfort zone.

In my judgement, this would be an unambitious and short-sighted choice. Instead of persisting with the current approach, which has made no discernable impact on traffic congestion to date and could well be obsolete even before it is completed, the GCP needs to formulate, without preconceptions, a strategy which amply meets the current and future needs of the sub-region, and only then figure out how much it will cost and how it will be financed and developed.

It is better to design a system with long-term viability to be phased in over time as resources permit, than one with a lower initial price tag but built-in obsolescence. When it comes to transport, Cambridge needs to think big.

This paper proposes a strategy based on the following elements:-
- A hierarchy of public transport modes: (a) local heavy rail; (b) light rail; and (c) buses.
- The development of the missing link within this hierarchy: light rail.
- The upgrading of existing modes: local heavy rail; and buses.
- The integration of new and existing modes into a comprehensive sub-regional network.

At the same time, it seeks to place this approach to public transport within an holistic vision covering traffic restraint and pollution reduction measures, the expansion of cycling and walking, and the conservation and enhancement of the natural and built environment of Greater Cambridge.

With their large surface areas, Park & Rides could double up as solar farms and generate revenue to cover the cost of free parking.

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Cambridge Connect Light Rail proposal: sub-regional network map (courtesy of Colin Harris, Cambridge Connect)

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Enabling and restraining measures

Most transport measures can be assigned to one of two categories: enabling measures, which are designed to encourage desirable conduct; and restraining measures designed to discourage undesirable conduct.

Examples of enabling measures are:

- Improvements to public transport
- Improvements to cycling facilities
- Park & Ride (P&R)
- Roll-out of charging points for electric vehicles
- Car scrappage schemes.

Examples of restraining measures are:

- Peak Congestion Control Points
- Congestion/emissions charge zones
- Clean Air Zones (CAZ)
- Controlled parking zones, e.g. Paid Parking Dividend (P&D) and Residents’ Parking (RP)
- Increased vehicle/fuel taxes.

Restraining measures tend to be technically and financially easy because they are essentially prohibitive rather than creative, but politically difficult; no-one likes to be told they cannot do what they had previously been free to do, or start paying for something they previously could obtain free of charge.

Local government could eliminate congestion in Cambridge within 24 hours merely by closing off a handful of major arteries into the city but any council that proposed to do this would not last 24 hours in office. In contrast, enabling measures tend to be politically easy but technically and financially difficult: no-one objects to a new rail station opening in north Cambridge but this project has taken many years of planning and millions of pounds to achieve. In this context, we should not be surprised when cash-starved local authorities, under mounting pressure from the public to do something about the intolerable rise in traffic congestion and air pollution, will tend to reach for the cheapest solution, which is usually a restraining measure.

Such was the case with the abortive Peak Congestion Control Points scheme proposed by the Council in 2010 and withdrawn only a few weeks later following a barrage of public protest.

What this fiasco demonstrated was that restraining measures have to be preceded and balanced by communications of those measures, both to provide the public with a viable transport alternative to the one being curtailed. Ultimately, there are not many short cuts to reversing half a century of neglect and mismanagement of our national transport system.

CARS: RESTRAINING MEASURES

3.1 The pros and cons of congestion charging

There is no question that throwing a cordon around an urban area and imposing a charge on vehicles entering that area is an effective way of significantly reducing congestion inside the restricted zone.

However, in the case of Cambridge there are valid reasons for keeping congestion charging in reserve as the last measure to consider rather than the first. Congestion charging is an option for cities such as London that offer a comprehensive public transport system as an alternative to the private car. Such a system does not exist in the Cambridge subregion and, even with the necessary political and financial commitment, it would take many years to develop one.

A further consideration is the catch-all nature of a congestion charge. Given a comprehensive public transport system, a city could function without providing any access to private cars, but it cannot function at all without providing access to the fleet of small commercial vehicles which daily service the city.

Many small traders rely on Cambridge for their business and Cambridge relies on them – but cannot afford to buy a house or rent an office in the city.

Charging these van owners for entering the city on a daily basis could impose a punitive cost on their indispensable services.

Congestion charging is a powerful enabling strategy in order to gain public and political acceptance. Without this counter-balancing provision, congestion charging will be regarded by the public not as a justified deterrent but as just another tax to add to all the others they have to contend with. It is no coincidence that while congestion charge schemes have been considered by many city authorities in the UK, including Cambridge, the only city to have succeeded in implementing one is London, arguably the only UK city with a comprehensive and relatively well-integrated public transport network.

Moreover, European cities considered exemplars of sustainable transport, such as Freiburg, Germany and Groningen in the Netherlands, do not impose congestion charges, although they do restrict uncontrolled parking. This suggests that congestion charging is not a necessary condition for the reduction of traffic congestion, at least in cities of a size comparable to Cambridge.

3.2 Congestion Charge Lite: elimination of uncontrolled parking

Eliminating uncontrolled parking throughout the city is essentially a more subtle and targeted form of congestion charging. Such an approach would involve: (a) the comprehensive introduction of controlled parking within the city boundaries, including residents parking for all residential neighbourhoods; (b) expensive city centre car parks and pay & display parking (which for the most part already exist); and (optionally) (c) the imposition of an annual levy on large companies based on the number of off-street parking spaces they possess.

This approach has the advantage of automatically exempting city residents, who can rely on their own private off-street parking or resident parking permits, and small businesses, whose van drivers can use their customers’ visitor permits when servicing the city.

The city-wide expansion of residents’ parking, as well as the levy on corporate off-street parking, would also generate more revenue for the Council for reinvestment in the P&Rs.

Parking policy is one of the few transport levers over which local government has complete control and yet County Council initiatives over the last few years have been moving the city in precisely the wrong direction. Especially lamentable was the decision (which may soon be reversed) to introduce charges for parking in the city’s P&Rs, thereby discouraging their use and swelling the volume of traffic in the city centre.

3.3 Eliminating vehicle emissions

Traffic congestion and traffic pollution are two distinct albeit overlapping problems. Cambridge could be in permanent gridlock and still experience very low levels of traffic pollution if all vehicles had zero-emission motors. It is therefore useful to decouple the two problems in order to widen the choice of possible solutions, not least because tackling traffic pollution is more straightforward than tackling traffic congestion.

In July 2017, the UK government, under orders from the courts to meet EU pollution directives, announced a moratorium on the sale of new combustion-engine cars and vans by 2040. This eye-catching commitment, while significant in resetting the direction of travel, is not as progressive as it might first appear.

Since it would take a further decade after 2040 for combustion-engine cars to disappear from our roads, the UK would not be free of fossil-fuel cars until the second half of the century, by which time another generation of Britons will have grown up in an urban environment characterised by health-destroying levels of air pollution.

Moreover, there is no detailed plan on how to meet even this unambitious target and local government has not been promised any resources adequate to the scale of the task.

Consequently, there remains a significant risk of years of continued inaction followed by a post-Brexit bonfire of EU regulations.

On the other hand, the Government’s emphasis on local initiatives presents an opportunity for local government to develop effective but low-cost solutions to make faster progress in the absence of a stronger central government lead.
The Tesla Model 3, released in the US this year, has a range of 300 miles. It is due to be released in the UK in 2019

The performance of this car is impressive. The 0 to 60 mph acceleration is 4.6 seconds and the range is 300 miles, which is significant for electric vehicle owners. The Tesla Model 3 is the most affordable electric car available in the UK, and it is expected to revolutionize the electric vehicle market in the UK.

The Model 3 is not just about performance; it is also environmentally friendly. The Tesla Model 3 has a carbon footprint of 0 g/km, making it one of the most sustainable electric vehicles on the market.

The release of the Tesla Model 3 has sparked a wave of interest in electric vehicles in the UK. The government has announced plans to phase out sales of new gasoline and diesel vehicles by 2030, and the electric vehicle market is expected to grow significantly in the coming years.

The Tesla Model 3 is a great example of how electric vehicles are becoming more accessible and affordable for the average person. The electric vehicle market is expected to continue to grow, and we can expect to see more affordable and accessible electric vehicles in the future.
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Nevertheless, the arrival of AVs would present an opportunity for a more integrated public transport system in which trains, light rail, buses and taxis are all complementary elements of a unified system, as opposed to a motley array of independent services operating in isolation or even competing with one another in undesirable ways. But this opportunity can only be grasped if a single organisation has strategic control over all elements of the public transport system, including taxis, with the power to co-ordinate and where appropriate cross-subsidise between the various modes to optimise the efficiency and sustainability of the system as a whole. Such a system would indeed have the potential to revolutionise transport in the Cambridge sub-region and alleviate traffic congestion at the same time.

4 PUBLIC TRANSPORT

4.1 Heavy rail

In a foretaste reversal of half a century of decline, there are encouraging signs of a revival of heavy rail services in and around Cambridge sub-region, with the recent opening of the new Cambridge North station to serve the north of the city and the Science Park, and plans for a second station to the south to serve the Cambridge Biomedical Campus. A dedicated new shuttle service between Cambridge North Station and Stansted Airport is also a welcome addition. However, these improvements are just the start of the story; for reopening pre-Beeching stations, such as FULBourn and SAWSTON, as well as developing new stations along existing lines, is considerable. These are relatively cost-effective improvements to the transport network as they do not require new lines to be laid.

The location of Cambridge rail station over a mile from the city centre will remain a handicap of the regional heavy rail network, but it would be considerably mitigated by the first phase of the proposed light rail system (see 4.2 below) with its underground rapid transit link to the city centre. Finally, the rail authority could accelerate the decarbonisation of the system by completing electrification of the network.

4.2 Light rail

The impressive conceptual plan for a light rail network produced by Cambridge Connect offers great potential as a catalyst for the systematic upgrading and integration of the sub-region’s public transport network. Light rail, which has been adopted by more than 300 European cities, is capable of delivering a wide range of benefits to the area, not the least because the rise in bus use during the congestion problem rather than part of the solution, not least because the rise in bus use in the sub-region is currently being driven predominantly by population growth and not by commuters or motorists to public transport.

In my view, this is the fundamental flaw in the current local government strategy of scaling up bus services of one kind or another indeﬁnitely to keep pace with demand. In order to meet not only the current needs of the sub-region but also the projections for its future growth, I believe that a different strategy is needed: one based on a hierarchy of transport modes in which buses are integrated with, but subordinate to, a new light rail system. This approach would not only permit the expansion of the public transport system as a whole but, crucially, a reduction rather than an increase in the number of buses required to enter the city, thereby enhancing the quality of the urban environment.

Broadly speaking, there are six types of bus currently circulating in Cambridge:

i) Park & Ride buses - Since the Cambridge Connect plan would link all P&R sites to the light rail network. P&R buses could be eliminated.

ii) Sub-regional buses – Sub-regional bus lines connect Cambridge with other towns and villages in the sub-region. Bus lines currently serving the main settlements along the routes of the proposed light rail system could be discontinued. Villages not served directly by light rail could be linked to the nearest or most appropriate light rail station by bus shuttle services synchronised with light rail, instead of the buses terminating in Cambridge. The penalty of a modal switch would be offset by the faster light rail service to and from the city centre, with higher speeds and no vehicular trafﬁc to contend with.

iii) Guided busways – Guided busways are a subset of the sub-regional bus network. The Cambridge Connect scheme proposes to convert the guided busway from Drummer Street to the central rail station to light rail as part of the first phase of the new system (the Isaac Newton Line). However, in due course, all existing guided busways should be converted to light rail, as this would provide an efficient and cost-effective upgrading of the public transport network that should not require major land acquisitions or a lengthy planning process.

iv) Intercity buses – Intercity buses serve the sub-region and connect Cambridge with other cities such as London, Oxford, Bedford and Northampton, as well as London’s main airports. With Phase I of light rail in place, it would be possible to remove these buses from the Drummer Street terminal to a new intercity bus terminal at the southern P&R (currently in Trumpington but relocated beyond the M11 near Hauxton under the Cambridge Connect plan).

Unlike the intercity Drummer Street terminal, the new terminal would have the space for a variety of ancillary facilities. Buses would connect to light rail for rapid transit into the city centre via the central heavy rail station, while the penalty of the modal switch would be offset by reduced or at least more predictable travel times from the outskirts to the city centre and a greater choice of transport connections.

The Drummer Street site would be freed up for use as a start-up and would provide a prime site for the expansion of the public transport network that would serve the sub-region – though not the only one – for the location of the main light rail terminal should be central Cambridge. This could become the point of arrival for the majority of visitors to the city and should therefore involve an architectural solution of the highest order.

Nevertheless, the arrival of intercity buses, which it makes sense to concentrate at a single terminal to maximise connections, tourist coaches could park in designated coach parks at any of the P&Rs, with light rail providing rapid transit into the city centre. Facilities at the P&Rs could include concourse facilities for tourists arriving by coach or car and wishing to explore the city by bike.

v) Intra-city buses – These are local stage buses connecting different areas of the city to the centre and to one another. This is the only type of bus that would need to continue to circulate around the city, although light rail would to some extent reduce the number of lines required.

Serving shorter intra-city routes, many of these buses could also be smaller vehicles. This hierarchical and multi-modal approach would permit the wholesale reduction in the number of buses entering the city and, to a lesser but significant extent, the total number of buses required to serve the city. By converting many of the remaining sub-regional bus lines into guided busways, this would also guarantee the large volume of passengers required to make light rail service commercially viable.

Of course, such a solution would require a high degree of coordination between buses and light rail, something that is unrealistic within the current fragmented transport regime. It would also be based on a hierarchy of transport modes in which many bus services are either superceded by, or subordinated to, light rail.
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This is a very different, indeed almost utopian, vision from the strategy pursued to date by the City Deal, with its focus on facilitating access to the city centre for as many buses as possible, to the detriment of the urban environment.

Finally, buses do not have to be dirty old diesels. In Bath the ‘Poo Bus’, as it has been affectionately dubbed by its customers, connects the city to Bristol Airport. It runs on biogas produced by Wessex Water as a byproduct of sewage treatment. Biogas is carbon-neutral but still produces air pollution when burned as fuel.

For a zero-emission solution, on the other hand, a flash-charged electric bus is hard to beat. With current battery technology, the size and weight of a battery required to give a heavy vehicle such as a bus a range comparable to a diesel vehicle compromises the vehicle’s efficiency.

But with flash-charging a laser-guided probe pivots upwards from the roof of the bus and makes contact with an overhead charger capable of delivering a 600kW charge to the battery in as little as 10 seconds. The chargers, located at major bus stops where the bus is required to make a stop, top up the battery at regular intervals, extending the range of the bus indefinitely while obviating the need for a very large and heavy battery.

Flash-charged electric buses are already in use or under development in several cities around the world, including Geneva, Switzerland, and a number of Chinese cities.

5. CYCLING
Cambridge is fond of trumpeting its status as the ‘cycling capital of the UK’. This claim is based on statistics showing that a higher percentage of the population travels to work by bicycle than in any other UK city.

This is an enviable record of which the city is rightly proud but it is too often used to imply that Cambridge has excellent cycling facilities. To be clear, cycling was popular in Cambridge long before cycling provision became an integral part of transport planning because the city is mainly flat, relatively small and has a huge student population with no access to cars.

Given the importance of cycling to the city, the real surprise is how patchy and mediocre the cycling facilities are. Local government recognises the importance of improving cycling provision and significant progress is being made. But instead of forever congratulating themselves on the popularity of cycling in Cambridge, local government planners should be asking themselves why cycling in Cambridge remains such an evolving experience.

I have no recent experience of cycling in other UK cities, but having had extensive experience of the ‘cycling capital of the UK’, I dread to think what it is like elsewhere.

Our traditional road system consists of a network of arteries for vehicles (the roads and streets) and a network for pedestrians (the pavements and footpaths). There is no systematic and dedicated third network for cyclists of the kind to be found in The Netherlands.

For the most part, therefore, cyclists are obliged to alternate between sharing routes with motorists (where they are vulnerable) and sharing routes with pedestrians (where the pedestrians are vulnerable) and are generally treated as unwelcome interlopers in both domains. This is the root cause of the frustration cyclists often experience and sometimes display.

The optimal solution would be the adoption of the Dutch approach, with a third network of dedicated routes, running either independently of the road network or between the road and the pavement but segregated from each by a verge, with through-way traffic lights to control intersections.

Full segregation between cyclists and vehicles, as opposed to lines painted on the road, is in my view essential, and has been shown in many European cities to be the most effective measure for expanding cycling, especially among women, children and older people – that is to say the great majority of people.

Full segregation between cyclists and pedestrians is also ideal, although a more flexible approach (inclosing lines painted on the ground) can be taken where conditions require it, given that cycling is more compatible with walking than either of these modes is with vehicular road transport.

Taking back control

Of all the many failures of the neo-liberal model of capitalism, which, regardless of the political party or parties in office, has held sway in the UK for almost 40 years, none has been more egregious than transport. It is no coincidence that the only UK city with a comprehensive and relatively well-integrated public transport system is also the only city that escaped the wholesale privatisation and fragmentation of its transport services: London.

Some day a national government may be elected with the courage to bring back our railways, buses and airports under public ownership and invest in a high-quality, integrated and not-for-profit public transport system for the whole country.

If and when this happens the scope for the wholesale upgrading of the UK’s transport sector will be limitless. Without resolving the fundamental issue of control, however, no amount of investment in new services will bring about the necessary transformation of our dysfunctional transport sector.

Eliminating the urban blight caused by vehicles is not impossible but it is difficult: it is not enough to get one or two things right; you have to get everything right. The first imperative, therefore, is to achieve a very high degree of integration between the various transport modes – something which I do not believe is possible within the present fragmented regime that currently operates in the UK outside London. The second imperative is to recognise that public transport is a public service: we do not expect our schools or hospitals to make a profit; we should not expect our buses or trains to do so.

Indeed, a prerequisite of a successful public transport service is that it be much cheaper than motoring. If your public transport is expensive – and the UK’s is the most expensive in Europe by a country mile – you are not doing it right.

For example, there is nothing in the current transport regime to prevent the Government from financing the construction of a light rail system for Cambridge if it wished to do so. But why should the taxpayer be expected to stump up a billion pounds for such an asset, only to see it handed over to a poorly-regulated private operator whose very first act would probably be to slap a £10 fare on a trip from the Park & Ride to the city centre?

Nevertheless, the Government has indicated its willingness to devolve more powers to city regions, at least by establishing the new elected mayoralty for Cambridgeshire & Peterborough. This should be made use of as an opportunity for local government to lobby Westminster for the power to create ‘Transport for Cambridge’ (TFC) to do for the sub-region what Transport for London has done for the capital.

TFC would take control of bus, light rail and local heavy rail services and, in addition to developing and operating a transport system fit for a world-class city like Cambridge in the 21st Century.

SUMMARY: AN EIGHT-POINT STRATEGY FOR GREATER CAMBRIDGE
I – Reform parking policy: Impose controlled parking throughout the city and cross-suburbs to finance free P&Rs.
II – Eliminate vehicle emissions – Phase 1: A 5-year countdown to a permanent ban on diesel cars (eg, 2018-23/28); Phase 2: A 10-year countdown to a ban on petrol-engine cars (eg, 2020-30).
III – Future-proof the city: Prepare for the transition to electric cars and vans by subdividing residents parking zones into exclusive parking bays equipped with charging points.
IV – Develop a network for pedestrians (the roads and streets) and a network for cyclists (the pavements and footpaths) that encloses traffic lights to control intersections.
V – Develop a light rail system for the sub-region: Exploit the development to integrate other public transport services and create a comprehensive sub-regional transport network.
VI – Employ the lines of Transport for London’s model to develop a network of routes fully segregated from vehicular routes and from pedestrian routes as far as practical.
VII – Reform cycling strategy: Develop a network of cycle routes fully segregated from vehicular routes and from pedestrian routes as far as practical.

TFC to take control of bus and light rail services, as well as local heavy rail services.