

# **Thames Gateway Bridge**

## **Alternatives and Options for Improving Public Transport**

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Lancaster  
May 2008**

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# **1. Introduction**

There have been several proposals to build a new bridge across the Thames at Woolwich. These proposals have all been controversial. Until now, no proposal has received approval for implementation. The most recent one, called the Thames Gateway Bridge, was promoted by Transport for London, and scrutinised at a Public Inquiry which finished in 2007. The Inspector recommended against its acceptance. The Government decided to re-open the Public Inquiry, which is now expected to occur in 2009.

Meanwhile, there have been some important developments in the policy context of transport strategies in London (both the Government and the Mayor having issued many new statements of principle and detailed policy), and the guidelines for how major transport infrastructure should be appraised have been evolving. The Government's appraisal framework NATA is at the time of writing in the middle of a process of 'refreshment' whose outcome is not yet determined, though it will be by the time the Inquiry re-opens. Among other transport developments, we draw particular attention to the growing importance of carbon emissions and their effect on climate change. By the time the Inquiry re-opens carbon reduction will not just be an aspiration, but embodied in law. Similarly, in London the Mayor has given great importance to the need for London to reduce carbon emissions, including in transport.

In this context, the TfL Board decided to instruct its consultants to look again at public transport aspects of the bridge, and the then Mayor agreed with the GLA Green Group to give a small amount of TfL funds to support a small separate exercise to widen the range of options looked at. Eco-Logica Ltd was commissioned on 29<sup>th</sup> February 2008 to carry out this work, which required a first list of suggested options by the end of March and a final report with an outline broad brush appraisal of selected options by the end of April.

At the time of our report, the main focus of TfL's own work takes the bridge as formerly proposed and looks at enhancing public transport operations on it, while this report has a wider remit to consider also other ways of improving arrangements for

river crossing in the area, including those which do not depend on a bridge, or which are based on a different type of bridge from that suggested by TfL.

The brief for this work is contained in an outline specification from TfL, modified in a proposal by Eco-Logica. (Both of these are included in the Appendix). The work was to be carried out by Professor John Whitelegg and Professor Phil Goodwin (who had been expert witnesses called by objectors against the bridge at the 2007 public inquiry), subsequently joined by Professor Carmen Hass-Klau with reference to the emerging importance of the Cable Car option on which she had particular knowledge.

After the draft final report was presented and discussed, elections resulted in a change in the Mayor of London and some members of the Greater London Authority. During the election campaigns, the incoming Mayor had expressed a view against the Thames Gateway Bridge proposal supported by the former Mayor and TfL. However, to avoid misunderstanding we point out that the references to statements by ‘the Mayor’ in this report all relate to earlier documents and statements, ie of the former Mayor. Of course, any new transport policy directions in London would need to be reflected in appraisal of the Bridge and its alternatives, but we assume that the general direction of transport policy in London will continue to give central importance to the need to avoid excessive traffic growth, improve public transport and conditions for walking and cycling, and favour long term sustainability. Therefore we consider that the line of argument in this report remains as relevant in the new situation as it was in the old one.

## 2. Appraising Options

### Option Generation

Because we are not confining our attention to the definition of the bridge as proposed by TfL, we have taken a broader view based on experience of current best practice in cities around the world. We looked at a variety of different options.

Some cities, of course, have built major road bridges aimed mainly at carrying car traffic in the context of continuing traffic growth and strategies based on building roads to cope with it. This is, however, becoming less and less common. In many cases, the same cities which are developing sustainable transport strategies to limit or reduce traffic growth and car dependence generally, are also developing innovative approaches to river crossings. There is special interest in choosing methods which reduce carbon emissions and traffic congestion rather than allowing, or encouraging, them to increase.

We have been impressed by a wide range of practical options which have already been tried in practice, and the creative, imaginative ways in which cities have found bold innovations, new iconic structures, and new ways of using old ones. Thus there now exist:

- Clever engineering which allows developments from the well established pedestrian travellers to systems which now can actually accelerate;
- Ferries which fan out across rivers coping with very large scale movements of commuters;
- Cable cars which have left their history of ski-lifts behind, providing for major urban flows of up to 5000 people per hour in each direction, with virtually zero waiting times, and running speeds comparable with buses
- Use of public transport systems for primary solutions, not just ‘add-ons’ to road traffic;
- Focus on walking and cycling options.

We have taken a broad view on these options. We included all of them in our first long-list, and report below that after an outline appraisal many of them seem to perform against policy objectives better than the former TGB concept. We give further details of some but not all of them below.

## **Appraisal Criteria**

Transport appraisal is carried out using formal procedures which are described in a series of Government guidelines currently under review. The two essential principles are:

a) Proposals must be tested for their contribution to (or against) specific policy goals. Currently the broad goals defined by the Government (included in ‘Towards a Sustainable Transport Strategy’ October 2007) are meeting objectives on economy, climate change, health and safety, quality of life, and equality of opportunity. These are expressed in slightly different language from Mayoral objectives, but they seem entirely compatible and at this broad brush stage we take them as giving a useful structure for our report.

In particular, we note that TfL has also stressed the very high importance of action to reduce carbon emissions and other causes of global climate change. For example, the climate change strategy document says:

“It is almost impossible to exaggerate the danger of climate change. I have no doubt that it is the biggest single threat to the future development of human civilisation...This action plan demonstrates that London can make deep and meaningful cuts in its emissions through actions by London public authorities, by businesses and by individual Londoners.”

The Inspector’s report at the end of the public inquiry also identified the increase in greenhouse gas emissions from the TB as presented to the Inquiry as “unhelpful”, and since the Inquiry the Government has proceeded with the Climate Change Bill which

will be enacted before the Inquiry re-opens. Therefore it is our clear and settled view that the Bridge proposal, and all options for increasing public transport offerings on the bridge or instead of it, and for delivering the Mayor's objectives for regeneration and poverty eradication should be subjected to a rigorous carbon evaluation as part of the appraisal process. Stockholm Environment Institute has developed a methodology called REAP for this type of appraisal, and we give more information in Annex 2. We recommend its use.

Concerning economic objectives, we are aware that TfL will be substantially recasting its claims and appraisal and it does not seem useful at this stage to make claims or counter-claims about the generation of jobs as a result of any of the options. We assume that the new approach will be informed by TfL work on agglomeration, and make our comments in this context.

We consider that the performance of all options should be tested against these objectives. Thus, in particular, we are looking for transport options which can contribute to other policy goals at the same time as reducing carbon emissions, not increasing them.

b) Options must be defined broadly, including 'policy' options (such as demand management) not only infrastructure projects, and must be based on realistic scenarios of how the future world will look both 'with' and 'without' the options. Appraisal must include forecasts of traffic, travel and transport conditions which contain the necessary information with an adequate degree of confidence.

We do not have the time or resource in this scoping project actually to carry out such formal appraisal. However, we have strictly adopted those principles at an outline level, and firmly recommend that TfL should also do so in their detailed appraisal.

In practical terms this must include a sensible approach to what in appraisal is sometimes called the 'do-nothing' or 'do-minimum' or 'core' or 'without' case.

This addresses the definition of the policy context and resulting traffic and transport conditions within which any of these options will operate. It is as vital for the



appraisal as definition of the options themselves, since in standard practice their performance is tested by considering how much better or worse they are than this base case.

Therefore all options must be appraised within a context of transport in London as it will have been created by the opening year of the bridge as presented to the public inquiry, and how it will be developed year by year after that. In our view this will be very different from the extrapolation of growing problems which had been shown in the former TfL appraisal at the 2007 Inquiry.

The reason for this difference is a tribute to TfL's own plans to implement one of the world's largest and co-ordinated efforts in applying Transport Demand Management (TDM). Approximately £100 million has been allocated to TDM in the financial year 2008-09 and there is no suggestion that this is a one-off blip which will then be discontinued. London has already embarked on a very clear policy trajectory that will reduce the demand for private motorised transport by the test 'opening' year for TGB and alternative appraisals.

Thus all options are, and must be, nested in what we are calling Maximum TDM (MTDM). We are assuming that in line with national policy on sustainable transport and TfL/Mayoral policy on TDM and its components (walking, cycling, public transport, travel plans) there will be a commitment to policies whose outcome will be a significant reduction in the use of single occupancy vehicles, expansion of use and attractiveness of public transport, greater numbers of trips made by walking and cycling. On the freight side, there will also be effects of innovative urban logistics strategies – and, if justified, priority measures for some categories of essential goods transport - to make the movement of goods more efficient and reduce less necessary HGV mileage. All these policies will be built up over the next decade, and continue such a trajectory in following years.

In defining the operating conditions which follow from MTDM the specific effects of a number of Mayoral pledges and plans will need to be included, involving a high level of implemented schemes and projects covering:

- Work place travel plans
- School travel plans
- Personalised journey planning
- Re-allocation of highway space to make more space available for pedestrians, cyclists and public transport
- De-commissioning of some car parking and its transformation into green space and high quality public space
- Congestion charging
- Clear development control interventions to reduce car use and increase the use of sustainable modes
- 20mph enforced speed limits
- Improvements in walking and cycling so that these modes give shorter routes and more direct access to a full range of activities
- Effective traffic priorities for pedestrians, cyclists and public transport.

Definition of the ‘without’ case will include the effects of all these measures. We recommend that this is a vital priority for TfL modelling and forecasting activities, including improvements to the less adequate parts of their previous forecasts notably the volume of walking and cycling movement and their interaction with each of the vehicle modes.

The first result of this will be to change the nature of the ‘without’ case. In advance of the detailed modelling it is not possible to say what the effects will be on a road by road basis, but we can say that traffic congestion will be less problematic than in the ‘do-minimum’ case presented to the 2007 Inquiry. Overall we make a tentative assessment that the volume of vehicle traffic will be approximately 10% lower in the base case at the modelled opening year, with reductions effects building up further over subsequent years. This in turn will ease some cross-river movements on existing crossings.

In turn, the marginal changes to travel patterns produced by each of the options will be against this new base, changing their impact and ranking.

So the overall effect of implementing all these policies, building up over the period to the test year ('opening' date) is calculated to give a picture of the travel conditions and context at that date. Then each of the options is tested for its performance against each of the goals, for the same date. Then the forecasts are rolled forward, giving further build up of policy effects and the effects of each of the options for a time profile of the longer terms effects.

There are then some modifications to consider, for example some of the options considered here can be implemented earlier than the TGB 'opening date' so give additional years of benefits and/or costs. In particular options considered below for ferries and cable car can produce several years of economic benefits before any major bridge options could be constructed. This is likely to increase their net present value significantly.

Some options may also need additional sensitivity tests for different technical variants, scenarios or assumptions.

## Key Metrics

We do not at present have details of the extent of modelling that TfL plans to carry out during the present phase of appraisal of the options, but assume that this may fall short of the detailed appraisals which will be eventually presented to the Inquiry. However there are some key indicators which will be necessary, and we add here those which we guess might otherwise be overlooked, namely:

- Total carbon dioxide emissions for several test years (eg opening year, 2020, 2030), for each option including for comparative purposes the most recent actual year, and the base 'without' options as discussed below.
- Total numbers of person trips and vehicle movements using any new river crossing by mode (including walking and cycling separately).
- Proportion of trips with both ends, one end, and neither end within the designated boroughs as at the 2007 Inquiry.
- Average journey distance by each mode.
- Split by journey purpose.

### 3. The Options Considered

#### First List of Options

Our initial list of options for examination (as provided to the Green Group and TfL at the end of March) is summarised in Table 1

**Table 1 First Outline List of Options**

<b>Option</b>	<b>Remarks</b>
<b>No bridge at all</b>	3 no-bridge options will be necessary for consistent appraisal purposes: <ul style="list-style-type: none"> <li>• do-minimum as presented to last Inquiry;</li> <li>• revised do-minimum including Mayor's and government's new policy statements (the MTDM base case);</li> <li>• 'Plan B' with enhanced local movement in case all bridges are rejected.</li> </ul>
<b>Ferry</b>	Lots of examples around the world. Works well and they are very popular. Creates a high quality travelling experience (e.g. Sydney, Vancouver, Hamburg and Stockholm). Should look at zigzag routes. Ferries carry bicycles and should be seen as an important way of encouraging cycling as well as a mode in its own right.
<b>Cable Car crossing</b>	Very sustainable. The most interesting application of current international interest. High capacities, frequencies and excellent effective speeds possible with recent proven technical advances. Now used also at river crossings.
<b>Walk, cycle and bus bridge</b>	Very sustainable. Major boost to walking and cycling with links into cycling and walking networks and high-capacity bus with links into busways. No access to motorised vehicles except emergency vehicles, but could include a variant with access by freight vehicles.
<b>LRT bridge (no traffic lanes)</b>	The normal case around the world for LRT systems needing to cross a river. Some provide for pedestrian and cycle access.
<b>Heavy rail</b>	Not clear that the benefits could be greater than other options
<b>TfL bridge with 2 lanes reserved for buses</b>	We gave evidence against this version of the TGB as proposed to the Inquiry. Can its weaknesses be solved? We understand TfL's own work programme is focussed on improvements to the public transport operations within this option. However, 2 bus lanes can easily be diverted back to car lanes if policies change – no defence against change of policy.
<b>TfL bridge with full LRT from Day 1</b>	Would depend on clear connections into rest of light rail network.
<b>6 lane road bridge no lanes reserved</b>	Not an acceptable option for anybody but is at the other end of the spectrum from "no bridge"

#### Further Information about Some of the Options

We do not try to give here an account of all the applications of well-known public transport practice in the world, which is surely common currency among transport professionals. However, some of the options we want to consider may be less familiar to the readers of this report, especially those which are substantially different from TfL's proposals to the 2007 Inquiry, and therefore we give some further details of successful practice elsewhere, and the principles which would apply to their appraisal.

## **General application to all options**

An evident weakness of the previous options considered was that the issue of public transport on the bridge was considered without any detailed design of the specific improvements which would be necessary for the bridge. This makes public transport perform worse than it need, since the present pattern of public transport facilities in the neighborhood of the bridge had grown up with a different orientation and function.

We are strongly of the view that a new bridge of any kind, ferry or cable car offers a significant opportunity to re-cast the pattern of bus services and interchanges so that bus network planning is clearly targeted both spatially and in terms of target groups (e.g. BME, lowest quartile in income, children in poverty) to achieve Mayoral objectives. Bus planning is not an add-on to this discussion. It is a fundamental part of the structure of opportunity across east London and needs to be guided by a clear concept of what is desirable and why and a clear vision of what London should look like in 2016 or 2020. Only in this way can we implement a recognition that sustainable communities, carbon neutral developments and compact urban forms need a re-structured set of connections with life-enhancing opportunities and activities.

Therefore the pattern of north-south services would need to be rethought. Thus

- A heavy rail bridge only makes sense in the context of major new investment in north-south movements for longer distances. (Since this is not currently seriously discussed, this is our main reason for not pursuing this option).

- An LRT-only bridge would make sense mainly in the context of a strategic network plan for light rail services which required a crossing at this point, not as a shuttle service across the river.
- Ferry, cable-car and bus/pedestrian/cycle bridge options all share the same requirement to undertake a major re-planning of bus routes, fanning out from the end points. For the ferry and cable cars there is also a need for immediate and well-designed interchange arrangements close to their landing points. From this point of view, the land acquisitions and safeguarding put in place to prepare for the major infrastructure works necessary for a bridge could then develop into a new and more fruitful use.

For avoidance of misunderstanding, our own exercise was never planned to have the resources to carry out such detailed design work, interchange and re-routing plan, etc. We will depend on the appropriate specialist sections of TfL to contribute the detail on these points.

## **Tolls and Prices**

There are three issues for consideration of tolls which we consider should be part of the new work programme.

When considering options with a potential 60-year appraisal period, tolls need to be seated much more sensibly within an overall framework of transport pricing in London than has been done previously. This should include:

- a. An option (conveniently located at the latest date for which a specific traffic forecast is made) of what traffic flows would look like with an overall road pricing system for the whole of the London network, using summarised and simplified charging structure related to mileage travelled by time of day, and intending to reflect congestion and environmental costs. These need not be at the level of detail necessary for an appraisal of such a road pricing scheme itself, but rather to see if the river crossing options are at all robust to such a possibility. The

toll charged on the crossing itself would then be set at the corresponding level as though it were any other transport link.

- b. Separate consideration of the tolls that would be charged on a road bridge, and the public transport fares that would be charged on each public transport option. (It seems to us that a case can be made that the normal public transport fares should be charged, but also look at the option of special fee for the crossing).

The costs of fuel for road vehicles should be a realistic extrapolation including allowance for fuel shortages and carbon targets, not a presumption of indefinitely prolonged low fuel costs.

### **Wider Economic Impacts**

An important consideration for appraisal of the Thames Gateway Bridge, its variants and alternatives is the extent to which they support, are necessary to, or undermine wider economic objectives of increasing local employment opportunities in the designated boroughs. At the time of the Inquiry, witnesses for TfL claimed that the Bridge was a necessary condition for additional employment, and estimated a number of jobs which would exist with the bridge, but would not exist without the bridge. This proved to be a controversial and problematic claim, because (a) in the traffic forecasts, the same number of jobs were assumed in the 'with' case and the 'without' case; (b) the procedure for estimating the wider economic benefits was different from that which at the time had been specified in DfT guidelines of 2005; (c) this was one of the areas which the Inspector considered an unsatisfactory aspect of the appraisal; (d) it is one of the areas that the Secretary of State has required be re-examined in the re-opened Inquiry. However, meanwhile the DfT guidelines themselves are under review and new guidelines will be issued in the next few months. We understand that TfL has commissioned new work on this subject but that is not yet complete.

At this stage we recommend that the appraisal of wider economic benefits should be carried out along the following lines:

1. No claims should be made for any of the options that they are necessary conditions for, or will generate, new employment, without very much better evidence than has been provided so far. We are not aware that credible evidence of this kind, not provided to the last Inquiry, has become available since.
2. If such evidence is produced, its underlying relationships must be clearly reported and open to scrutiny, and must be applied in an even-handed way to all the options under discussions, not just the option favoured by TfL. The first and most important task will be to apply these relationships to the difference between the ‘deteriorating’ without option considered at the last Inquiry, and the ‘improving’ without option specified here, as this is likely to be a much greater magnitude than any difference between the river crossing options.
3. Any results that there are consequences for the total volume of employment or its geographical location must be accompanied by parallel calculations of the effects on traffic congestion and environmental impacts of those employment changes.
4. There must be a strong predisposition to favouring local employment opportunities over longer distance journeys to work. This must be done by identifying the origin and destination patterns of existing and claimed new jobs, distinguishing between those within and outside each of the designated boroughs.
5. Current DfT thinking seems to be moving in the direction of favouring ‘agglomeration’ benefits over ‘regeneration’ benefits when it comes to any wider economic impacts. These have the character of arising due to the close working contacts within dense employment areas, rather than from increasing catchment areas to those areas, and therefore are likely to favour those options providing most for easier communication within very short distances rather than slightly increased journey speeds for longer distances.
6. Real employment analysis requires a finer level of breakdown of different types of skills and jobs than has been possible using TfL data sets. Especially if claims are made that there would be improved employment opportunities on



both sides of the River, it would be necessary to identify the specific trades, skills and jobs for which this could be true.

Due to these uncertainties we do not ourselves make claims that any of the options will generate jobs part from those specific local jobs connected with the crossings themselves, eg services at interchanges or tourism interest. Therefore we do offer some thoughts about the job value of iconic and exciting new transport facilities, albeit with due caution.

Overall our view is that dubious claims for employment generation are unlikely to be a major issue in choosing between the options, especially at this early stage before the results of the DfT's and TfL's new thinking has been open to scrutiny. Therefore the issue of facilitating contact across the river, by residents of the neighbouring boroughs, should be part of the reporting process.

## Cable Cars

Traditionally cable cars have been used in mountainous areas for the transportation of goods and people, and many readers in London will be most familiar with their use as ski-lifts. What is less well-known is that in recent decades cable cars have increasingly been built for exhibitions, fairs, airports and in cities, especially those with different height levels, e.g. Singapore, Barcelona, Grenoble, Funchal, Zagreb, Istanbul, Vancouver.



The main characteristics are:

- needs little space
- independent of other traffic
- carbon emissions can be as low as the source of the basic electricity used., so that they are as close to being zero-emission as any powered mode of transport can be.
- The same capacity as a high frequency bus/tram system (which, with a 3 min headway carries 2,500-4,000 passengers per hour each way, compared to a cable car with 4000 passengers per hour each way)
- Virtually zero waiting time due to continuous cycle of cars.
- speed up to 35km/h

- low investment cost
- low operating cost
- high tourist attraction and tendency to generate local affection, due to its innovative character, maximum scenic opportunities, and ‘buzz’.

## Cable cars used for river crossings

### - New York

Cables cars are also built for crossing rivers. One of the best examples is the cable car in New York, the *Roosevelt Island Tramway*, an ‘aerial tramway’ which opened in 1976. Originally the cable car was supposed to be temporary until the underground was built (1989) but meanwhile the cable cars had become so popular that they could not be closed.

It spans the East River and connects the Upper East Side with Roosevelt Island. Its length is 945m (3100ft) with an operating speed of 26km/h (16mph); the highest elevation is 76m, (250ft). Each cabin has a capacity of 125 people and it makes 115 trips a day taking 4.5 min to cross the river. On average it transports about 15,000 people a day. The headways are every 15 min from 6.00 -2.30 (3.30 at weekends). The cable car is accessible for wheel chair users and bicycles are permitted.



### **- Cologne**

A cable car has crossed the river Rhine in Cologne since 1957. It runs parallel to a bridge (Zoobruecke) and it is used only in summer, as a rather low capacity leisure mode.

### **- Koblenz**

The next large federal garden show will be in Koblenz in 2011. Thousand of visitors are expected and the existing road network would not be able to cope with the traffic. A cable car crossing the river Rhine has been approved as part of an architectural competition. It will carry some thousands of passengers per day.

## **Most recent examples**

### **- Medellin**

Medellin is the second biggest city in Columbia with about 2 million inhabitants. Its metro system, which was started in 1995, consists of 4 lines. Whereas Line A and B are typical metro lines (25 stations), Line K and J are cable cars. Line K began operation in 2004. It has four stops and its length is just over 2km (6,800ft); its operating speed is 16km/h (10mph) and highest elevation is 399m (1,310ft). It runs every 12 seconds and its capacity is 3000 people per hour. It links the metro stop Acevedo to Santo Domingo Savio.

Line J (also a cable car) will open in 2008. It is slightly longer 2.8km but otherwise has the same technical characteristics as line K. It links the metro stop San Javier with 3 other stops to the hilly neighbourhood of La Aurora.

### **- Portland**

The Portland Arial Tram is carrying commuters from the City's South Waterfront district to the Health and Science University which takes 3 min. The span is just over 1km (3,300 ft) and maximum speed is 35km/h (22mph). The height is 152m (500ft). The number of passengers transported is 7,400 per day. The project was mostly privately funded and the majority of the funding came from the university, the rest from the South Waterfront property owners and the City of Portland. The cable car is part of the public transport network and its headway is every 5 min. From December

2006 when it opened, up to October 2007 it had carried over one million passengers. The tram is closed on Sundays. The aerial tram has won several architectural awards.

## **Other projects**

### **- Madrid**

2.5km length, used for crossing a park: from Paseo de Pinto Rosales – Rosales and Casa Campo

### **- Caracas**

The cable car line has a length of 7km and takes 15 min for it. It reopened in 2002 and carries about 2000 passengers an hour.

## **Planned cable cars**

### **- Hamburg**

The city is discussing a cable car from the city centre via the Harbour City to Wilhelmsburg where a garden show is planned in 2013.

## **Application to Thames Gateway Crossing**

When it became clear at an early stage of our work that cable cars looked promising, we approached the firm Doppermayr for some preliminary advice. This company, together with its Swiss partner Garaventa AG, are the world leaders in cable car planning and production. Together they have offices in 29 countries and have built so far 13,850 cable cars in 79 countries, including the system mentioned in Portland and current discussions in Hamburg.

We asked them whether a cable car crossing at the points where the bridge is planned is realistic, taking into account the navigation and airport constraints on flight paths and shipping movements, based on technical drawings of aviation and navigation requirements provided by TfL from the 2007 Inquiry. Their initial assessment is that



this is technically feasible, subject to detailed design work on the exact location of the supporting towers<sup>1</sup>.



An initial outline assessment is based on that firm's *Funitel-System* using cars which give space for 24 passengers, 8 seated and 16 standing. (There is flexibility to change this balance). With existing navigation and aviation constraints the maximum number of passengers is 4000 people per hour in each direction. The average speed would be about 22km/h, and with cars arriving every 22 seconds there would be virtually zero waiting time. Crossing times depend on the exact location of the termini but will be of the order of a couple of minutes.

We note that there has recently been a suggestion of ceasing using the current City Airport for aviation. If this were to happen, there is effectively no upper limit on capacity of the Cable Car system since the operating conditions would allow up to 5000 people per hour in each direction for a single loop, and this can be doubled or trebled if the demand justified it, potentially with a number of different routes and starting points. However, at this stage we do not consider this idea further, and our option does not depend on the closure of City Airport.

The initial design provides for high stability in weather condition up to 100kmph wind force. The maximum distance between pilons is 1km. The cars and station platform would be at the same level which allows easy access with wheelchairs (see photo), push-chairs and bicycles. All these parameters are variable. We note for interest that the system has also been designed for use to carry cars (see photo) though

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<sup>1</sup> We suggest that TfL might want to make direct technical approaches to this company to seek its detailed advice. We can help with contacts and translation, if desired.

we do not see this as part of the design in this case. CCTV cameras can be included in each car for added security if this is thought desirable.



A necessary part of the design of this system is the provision for interchange with existing public transport networks and the development of a new bus routes system designed for very rapid interchange. Our concept is that some of the land area designated for the construction of the Bridge would be instead made available for a new interchange facility, but we note an alternative option to extend the system to current and planned rail stations.

There are three additional substantial advantages to this option.

First, it can be implemented swiftly and relatively cheaply, giving benefits well before a conventional Bridge could be opened. Technically this could be in time for the 2012 Olympics, maybe of symbolic advantage.

Secondly, it can then evolve flexibly in the future, with other crossings added (no doubt with a different orientation) or indeed converted into a public transport bridge at a later date if this became justified.

Thirdly, there is an excitement and iconic importance which would generate great interest, tourist visits, local and user affection, and scope for suitable market development of support facilities, additional venues of interest, etc, in the vicinity. Such systems are seen as adding an uplifting and refreshing stage in people's routine journeys. As a contribution to efficiency, quality of life, environmental improvement, and fun, the option will score very highly.

# Public Transport Bridges with provision for cyclists and pedestrians





Although there are many well known rail bridges with access for cyclists and walkers, including traditional rail, metros, light rail and monorails, the use of this approach for buses is less well-known so we give more details here.

A bridge designed to carry buses, bicycles and pedestrians offers significant gains in accessibility for tightly defined local communities with minimal environmental and climate change disbenefits. A “bus only bridge” (BOB) will by definition provide for pedestrians, cyclists and emergency vehicles and will bring considerable advantages for emergency vehicles in the capital.

BOB will require a substantial re-think of bus services to capitalise on this high quality, congestion free river crossing and this re-think should be integrated into the location, design and purpose of bus interchange facilities and links with cycling.

BOB also brings with it the clearest expression of the much quoted “road user hierarchy” in that it is by definition an expression of prioritisation for non-car modes and an expression that meshes perfectly with mayoral ambitions for changing transport choice behaviour over the next two decades. If there is a serious intent to change transport choices then this should be matched by a serious physical expression that the alternatives to the car have been prioritised.

BOB is already on the menu of options and choices in sustainable transport around the world.

## Australia

### *The Eleanor Schonell Bridge*

The Eleanor Schonell Bridge, also known as the Green Bridge, is a 390 metre (1,280 ft) long cable-stayed bridge which crosses the Brisbane River between Dutton Park and the University of Queensland's St Lucia campus. Its deck is 185 metres long, 20 metres wide and around 18 metres above the river's surface. The bridge was opened on December 17 2006, and is the first bridge in Australia exclusively designed

for buses, cyclists and pedestrians, as well as the first public transport bridge built in Australia since the early 1900s.



[http://en.wikipedia.org/wiki/Eleanor\\_Schonell\\_Bridge](http://en.wikipedia.org/wiki/Eleanor_Schonell_Bridge)

#### *The Shenton Park Bus Bridge*

The Shenton Park bus bridge in Perth is a single lane bridge with traffic light controls, introduced so high frequency bus services can cross the Fremantle railway line, also provides for pedestrian and cycle access. This was part of the Shenton Park Integrated Transport Plan - summary and reports available at:

<http://www.dpi.wa.gov.au/cityplanning/13673.asp>

Further information on Shenton can be found in:

[http://www.dpi.wa.gov.au/mediaFiles/planning\\_karrakatta\\_2000.pdf](http://www.dpi.wa.gov.au/mediaFiles/planning_karrakatta_2000.pdf)

Vienna, Austria

*Donaustadtbrücke*

The city authorities in Vienna constructed a new bridge across the Danube in 1997 for bus, walk and cycle traffic only. The Danube at this point is directly comparable with the Thames. This bridge was subsequently converted into a metro line (U2).



<https://www.wien.gv.at/verkehr/brueckenbau/donaubruecken/donaustadt.html>

# Accelerating Moving Walkway

An interesting variant of this option would be to include an Accelerating Moving Walkway (AMW), which have recently developed from the pedestrian travellers used most commonly in airports. It is not immediately obvious until one has used such a system how a continuously moving walkway can also accelerate: this is achieved by building in a curve or a merging section. There is a system in use at Montparnasse Station on the Paris Metro, and some other systems in operation. We do not currently have technical data on capacities and cost, but the concept of such a system in a covered glass tube over the River is worth considering. It would provide high capacities and much faster speeds than normal walking pace. (It is the experience of such systems that a high proportion of users also walk at the same time, as on Tube escalators).



Paris

# Ferries

The Thames has long been a significant “water highway” with ferry services linking the banks of the river and more ambitious lateral ferries connecting banks as well as origins and destinations upstream and down stream. In 2006/07 1.76 million tickets were sold on River Thames ferry services, a 9.9% increase on the previous year.

<http://www.tfl.gov.uk/assets/downloads/corporate/London-Travel-Report-2007-final.pdf> (page 39)

There are a number of world cities that have opted to develop ferry services as a key part of sustainable and integrated transport strategies. The example that has close parallels with the Thames is Brisbane in Australia. Brisbane has a population of 1.8 million and is located along the Brisbane River.

In 2006/07 the Brisbane city ferries carried just over 6 million passengers on a two tier system (fast ferries with few stops intermixed with slower ferries with frequent stops). The operating budget for ferries in the same year was \$18.35 million (Australian dollars) or £8.7 million with a fare box income of \$10.1 million Australian dollars (£4.8 million). This is an excellent level of financial performance for an urban transport system.

*Source: Personal communication from Meg Northcott, Brisbane City Council, 17.4.08*

The transport plan for Brisbane to 2026 puts a strong emphasis on developing integrated transport with ferry links a key component:

General improvements to bus, ferry and rail services, such as increased frequencies, high quality interchanges, Smartcard, service coordination and improved passenger information particularly for the city’s major centres.

[http://www.brisbane.qld.gov.au/bccwr/plans\\_and\\_strategies/documents/20071121\\_dr\\_afttransportplan\\_v2.pdf](http://www.brisbane.qld.gov.au/bccwr/plans_and_strategies/documents/20071121_dr_afttransportplan_v2.pdf)

The Brisbane transport strategy anticipates a significant expansion in ferry services and one that is linked to a spatial strategy directing the locations of key traffic generators:

#### **Ferry Infrastructure and Services**

Ferry services will continue to provide an important transport service to communities along the river. This mode is also an icon for Brisbane and investment will continue accordingly.

New and upgraded ferry terminals will build on the success of CityCats. A continuing Programme of upgrades to existing ferry terminals is proposed to safely cater for increasing passenger demand through to 2026.

Council will work with developers to provide new terminals where demand exists and where they contribute to transport system improvements. Possible sites include:

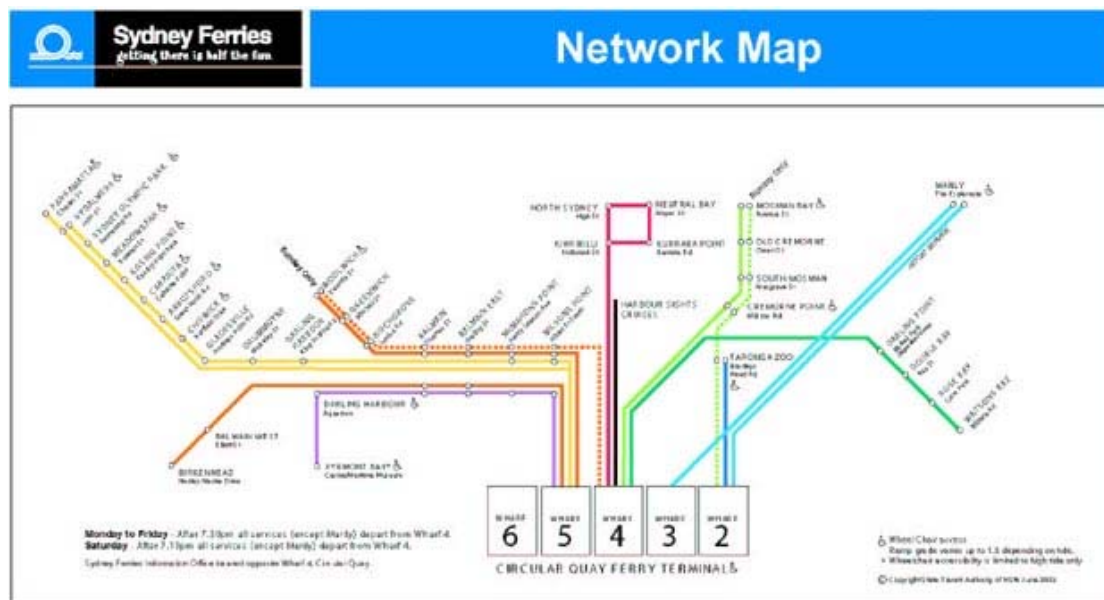
- Park Road (Milton)
- Riverside Drive (West End)
- Tenerife
- Newstead
- Apollo Road (East Bulimba)
- Northshore (Eagle Farm).

Ferries are ideally suited to full integration with cycling and offer substantial gains in cycling use for London. The ferries should be cycle friendly for access and storage and the ferry landing stages need to be directly connected to high quality cycling routes and to high quality bus interchange facilities for onward connections to key destinations on both sides of the river.

Within the wider context of peak oil and climate change it would be very wise indeed to develop a serious, high quality and heavily used water based transport system based on the Thames. This offers considerable reduction in fuel use, greenhouse gases and dependency on imported oil. If we wish to create a resilient London that is well adapted to a highly uncertain future of geopolitical conflict around oil and around the

demands made by China and India on oil we need to think of water-based transport as a top priority.

Technological change has now advanced considerably to the point where zero-emission ferries are under development. It would be a significant contribution to the global debate on clean shipping for London to opt for zero-emission shipping and to celebrate water transport as an iconic part of London's distinctive culture and geography. Pollution and technology issues are discussed in the European "Cleanest Ship Project" [www.cleanestship.eu](http://www.cleanestship.eu).



## **4. Shortlisting and Outline Appraisal of the Options**

### **Performance against Policy Goals**

Formulating the strategic policy goals in the form of those used by the Government in ‘Towards a Sustainable Transport System’ tends to favour systems which can provide speedy efficient movement within high density urban areas, emphasising local origins and destinations by sustainable low carbon modes of transport, and with the maximum accessibility to different groups of the population. Such systems tend to produce the best agglomeration benefits for local economies, minimum emissions, and maximum equality of opportunity. Systems providing for longer distance movement by car will tend to score less favourably.

We have considered each of our options against each of the five goals from this point of view, making an informed but essentially unquantified judgement on the basis of our professional experience. We do of course make the simple caveat that others may come to a different view about these assessments. The appraisals must be better informed by detailed and reliable forecasts before they can command a wider acceptance. However, we offer our judgements on this basis, in the hope that this will assist others to do the same.

The results are given in tabular form overleaf.



## Thames Gateway Bridge Options: Initial Outline Appraisal for Short-Listing

		Main characteristics of option	Feasibility	Consistency and Contribution to Government's Five Goals as set out in 'Towards a Sustainable Transport System' (October 2007) and with consideration of 'The NATA Refresh: Reviewing the New Approach to Appraisal (October 2007)					CONCLUSION
Option	ECONOMY			CLIMATE CHANGE	SAFETY, SECURITY AND HEALTH	QUALITY OF LIFE	EQUALITY OF OPPORTUNITY		
A. No Bridge Base Cases  (Three no-bridge options will be necessary for consistent appraisal purposes)	A1. Do-minimum as presented to last Inquiry;	Yes	Yes	Performs poorly in every way (though we have criticised its realism). No conditions under which it is likely to be a positively chosen option. But it is necessary to repeat the calculation in order to identify the causes of changed forecasts and benefit cost calculations in the new appraisal.					Ignore at this stage but prepare for reconvened Inquiry
	A2. Revised 'without-bridge' base case including Mayor's and Government's new policy statements;	Yes		Significantly better than A1 in every way. Congestion will be less, CO2 and other transport emissions less, and full effect of policies of 20mph in residential areas, cycling expenditure building up over a 60 year time-scale, expanded concessionary fare availability. Needs to include realistic appraisal of fuel costs, and include London-wide road charging as a sensitivity test within the option. Essential calculations as all old and new TGB options and alternatives will be tested against this new base. It cannot be presumed that it will not perform better than some TGB versions, possibly including the original TGB proposal.					Needs to have full appraisal at this stage
	A3. 'Plan B' with enhanced local movement in	To be assessed	A1 and A2 relate to application of Mayor's and government's policies in general (London and nationwide), with application at the same level in the Gateway Boroughs. This option considers – in the event of a decision not to proceed with a Bridge (for whatever reason) would a more intensive application					Include as sensitivity tests on the application of	

	<b>case all bridges are rejected</b>			of improved demand management, public transport, walking ,and cycling within the Boroughs improve general levels of accessibility other than by river crossing. We note that TfL suggest ‘nothing more can be done’ but we reserve judgement on that at this stage.					A2. We suggest an extra 10% reduction in car use and 30% increase in other modes use on top of A2.
<b>B. Ferry</b>	Lots of examples around the world. Works well and very popular. Creates a high quality travelling experience (e.g. Sydney and Stockholm). Should look at zig-zag routes.	Yes	Some improvement over A2, but may not be much. Advantage is that route structure can change as the local economies change. Can provide for car and lorry use if required	Good	Good	Good	Good	Suggest include in the current stage, with two depots on south and two on north.	
<b>C. Cable Car crossing, combined with new public transport</b>	Very sustainable. The most interesting application of current international	Compatible with navigation and aviation constraints.	Substantial time savings, and agglomeration benefits in neighbouring boroughs.	Virtually zero direct emissions	Good. Should include CCTV monitoring	Engaging and spirit-lifting travel experience	Good. Provisions can even be made for wheelchair users.	A substantial and exciting option. Should be taken seriously	

<b>interchanges fanning out with new bus routes and connections with rail</b>	interest. Very high capacities, frequencies and excellent effective speeds possible with recent proven technical advances. Now used in many river crossings.	Regeneration opportunities due to iconic interest and sightseers. Good.	Excellent	Good, provided reasonable traffic and safety enforcement at approaches. Best for health.	Good	good for local residents/workers, and those longer distance travellers living near relevant public transport routes.	Good option for continued assessment.
<b>D. Walk, cycle and bus bridge (no motorised transport except emergency vehicles) Include variant D2 with accelerating moving walkway for extra speed and capacity</b>	Very sustainable. Major boost to walking and cycling with links into walking, cycling and high capacity public transport routes. Fits in perfectly with mayoral ambitions for sustainable modes	Good if connected with new interchange centres as in (C). Most benefits locally, reduced traffic generation for longer trips	Yes.	Good if connected with new interchange centres as in (C). Most benefits locally, reduced traffic generation for longer trips	Good if connected with new interchange centres as in (C). Most benefits locally, reduced traffic generation for longer trips	Good if connected with new interchange centres as in (C). Most benefits locally, reduced traffic generation for longer trips	Good if connected with new interchange centres as in (C). Most benefits locally, reduced traffic generation for longer trips

<b>E. LRT bridge</b>	Lots of models of LRT including ones we are very familiar with including river crossings (Duesseldorf)	Technically yes, financial unknown	Time savings, agglomeration and regeneration benefits likely. Extra benefits over and above bus need to be demonstrated but these exist in other contexts. Must be part of an integrated bus/LRT system anyway and carry bikes	Intermediate	Excellent	Good	Good	
<b>F. Heavy rail</b>	Not clear what benefits could be greater than other options	Unclear		Intermediate	Good	Good	Likely to attract higher SEG and not be of great value to target area	Unlikely to be interesting unless part of radical new long distance NS rail strategies, not currently under discussion. Not shortlisted.

<b>G. 6 lane road bridge with 2 lanes reserved for buses</b>	We gave evidence against this version of the TGB as proposed to the Inquiry. Can its weaknesses be solved?	TfL say yes	Improved base case A2 will reduce apparent time savings. Less agglomeration and regeneration benefits.	Negative	No particular advantages. Increases car dependence.	Medium	Likely to attract long-distance and higher SEG traffic and dilute social and economic gains to target area. Poor	We do not think well of this option but understand that TfL will want to include it in the appraisals. Our expectation is that it will perform worse than C and D, maybe even worse than base case.
<b>H. 6 lane road bridge no lanes reserved</b>	Not an acceptable option for anybody but is at the other end of the spectrum from “no bridge”	Probably	Poor value for money	Negative	Negative	Medium	Divisive and inequitable	Reject

## Broad brush ranking of options in advance of detailed appraisal.

With the same caveats as made above, we can thus approach a ranking by converting the qualitative assessments into a simple summary chart using '+' and '-' indicators of desired and undesired impacts. The final column is our judgement of how the scores might come together to produce an overall ranking, though without necessarily assuming there is equality of importance among the five goals. (Note that the 'economy' criterion only gives small weight to wider economic benefits as discussed above, but does include allowance for value for money favouring cheaper options).

<b>Provisional Broad Brush Ranking of Options (an advance of detailed appraisal)</b>						
<b>Option</b>	<b>ECONOMY</b>	<b>CLIMATE CHANGE</b>	<b>SAFETY, SECURITY AND HEALTH</b>	<b>QUALITY OF LIFE</b>	<b>EQUALITY OF OPPORTUNITY</b>	<b>OVERALL PRELIMINARY RANKING</b>
<b>A2. Improved base</b>	Detailed rankings not given as this is the base case for appraisal (ie other options are defined above or below this). It will be substantially better than the previous 'do-nothing' so may turn out to be around 3 <sup>rd</sup> or 4 <sup>th</sup> in the rankings when value for money is taken into account..					
<b>B. Ferry</b>	+++	neutral	+	++	+++	<b>=2</b>
<b>C. Cable Car</b>	+++	++	++	+++	+++	<b>1</b>
<b>D. Walk, cycle and bus bridge (D2 variant with AMW)</b>	++	++	+++	++	++	<b>=2</b>
<b>E. LRT bridge with cycling and walking</b>	++	++	+++	++	++	<b>=2</b>
<b>F. Heavy rail only</b>	?	-	++	+	-	<b>6</b>
<b>G. 6 lane road bridge, 4 for general traffic and 2 for buses</b>	?	--	-	+/-	+/-	<b>5</b>
<b>H. 6 lane road bridge no lanes reserved</b>	?	---	--	-	-	<b>7</b>

## Hybrid Options

All the options described above are treated initially as stand-alone alternatives. The next stage is to consider whether there could be enhanced benefit in combining two or more together. In this case there are three issues which arise – first we have to consider whether there are other changes which would be necessary in order to make them effective. Secondly, we consider whether they can be combined together in the form of ‘bridge-plus-ferries’, ‘cable-cars-plus- bridge’ etc. Thirdly we could consider a potentially very large number of variations eg a four lane version with one lane for public transport and one reserved for commercial vehicles in each direction, but no cars; a commercial vehicle only version, a public transport only version, and an unreserved general traffic version, then extending the same variations to six lanes.

There is considerable scope for investigating hybrid options. In Table 2 we summarise what are in our view the “front runners” for hybrid options.

	<b>HYBRID OPTIONS – POSSIBILITY FOR COMBINATIONS</b>					
<b>Option</b>	<b>A2.</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>G</b>
<b>A2. Improved base</b>	Xxxxxx	Required	Required	Required	Required	Required
<b>B. Ferry</b>		xxxxxxxxxx	Possible in all cases, as flexible addition to whatever else is offered. Unlikely to be much used in the case of B/G, but could have significant role in other cases.			
<b>C. Cable Car</b>			xxxxxxxxxx	Possible but unlikely	Unlikely	In principle possible but technical difficulties, and reduces benefit of availability of space for new interchange.
<b>D. Walk, cycle and bus bridge (D2 variant with AMW)</b>				xxxxxxx	Mutually exclusive	Mutually exclusive
<b>E. LRT bridge</b>					xxxxxxxxxx	Possible as a variant
<b>G. 6 lane road bridge, 4 for general traffic and two for buses</b>						Also include variants of different numbers of lanes and different allocation as between public transport, cars, commercial vehicles.





## 5. Conclusions and Recommended Action Plan

### Conclusions

This report moves beyond the debate on the Thames Gateway Bridge as at the 2007 Public Inquiry in three ways. First, it takes into account an evolution in the priorities of strategic policy goals that is now under way. Secondly, it considers a wider range of options than were considered at that time. Thirdly it makes an initial broad-brush appraisal of those options using a different and hopefully more realistic approach than was done at that time.

In summary:

- Considering the original TfL conception of a six lane bridge with four for general traffic and two reserved for public transport, we see advantage in testing different variations on this theme. This could include a four lane version with one lane for public transport and one reserved for commercial vehicles in each direction, but no cars; a commercial vehicle only version, a public transport only version, and an unreserved general traffic version, then extending the same variations to six lanes. The main benefit of these tests would be more clearly to distinguish the incremental costs and the incremental benefits of extra capacity, and of the different classes of user.
- We do not think there are likely benefits of a heavy rail only bridge, except in the unlikely circumstances of a major new national priority for long-distance north-south movement along an axis close to this area. For the moment it does not seem a priority for assessment.
- We see the ‘front-runners’ however to be arrangements for improving river crossing using options which are more distant from the original conception: a

high-capacity cable-car option, extended development of the ferry services, or a smaller bridge only providing for public transport (bus or light rail) plus pedestrians and cyclists.

- We see *all* these options being tested against an entirely different ‘base’ transport and traffic forecast, which has the property of making the ‘do-without’ option itself more favourable than was ever tested in previous work, and including a sensitivity test for extended road pricing at some point during the 60 year appraisal frame. This will substantially change the nature and intensity of ‘the problem’ which new arrangements for a river crossing are intended to solve.

As a result of our approach, it is notable that the original bridge concept comes out very poorly compared with any of the main new options we propose should be investigated. Although at this stage this conclusion is only at an outline level, even so it is not purely arbitrary. It arises because – as became clear during the Public Inquiry - the original TGB definition increases car use, provides for a greater proportion of long distance journeys, reduces walking and cycling, generates additional traffic, adds to traffic congestion in certain areas, and increases the total carbon dioxide emissions (55000 tonnes in 2016). And those categories of benefit that it does offer (of which the biggest proportion is cars and some commercial vehicles) the additional benefits against the improved base would be smaller.

Therefore it is not surprising that it would perform poorly on appraisal when all these issues are so important.

Concerning regeneration, and the putative generation of jobs, we note that there is now agreement that treatment of this question at the earlier inquiry was not satisfactory, and that substantial new work is to be done. However it is not yet possible to define the precise nature of that work. At this stage we consider claims for job generation very dubious, except in terms of the specific local employment concerned with the facilities for river crossing themselves. Until it is more advanced we must reserve judgement on whether this will prove to be a major, minor or even negative part of the new appraisal. However it is clear that if a satisfactory procedure can be devised, it must be applied fairly to all the options – and to the do-without

option – and it is essential that no option is artificially enhanced, or excluded, at this early stage by double-guessing what the results on wider economic impacts might be. Considering our major alternatives in turn, our provisional judgment is that:

- a. The redefined ‘without’ option, used as a starting point for all appraisal, itself reduces some of the problems expected to arise in future years, especially in providing for lower levels of congestion for all traffic including freight movements over the area as a whole, both North and South of the River. Most important, it represents a trajectory of continuing improvement which previously had not offered by any of the options considered. We consider this trajectory is of such great importance that it should trigger a rethinking of all the assumptions about continued deterioration of congestion, and that TfL should have serious pause for thought as a result.
- b. A public transport bridge, with provision for pedestrians and cyclists, can provide great benefits without the negative environmental and congestion impacts produced by a bridge for general traffic mainly private cars.
- c. A determined and carefully planned expansion of ferry systems can provide great benefits with the added advantage of much greater future flexibility than any fixed infrastructure.
- d. The system that we have learned most about, and find we have listed most highly at this stage, is the Cable Car option. We feel that this is a realistic and deliverable possibility which can change the nature of the public debate about Thames crossings, and we commend it for the most serious and careful examination. We recommend strongly that it should not be passed off lightly just because it is new. This is a system which manifestly can provide significantly improved arrangements for crossing the river, in the very area passed over by the bridge, but with emphasis on local movement and with positive rather than negative effects on congestion and the environment.

# Recommended Action Plan

The next stage in the process must consist of work to be carried out by TfL, both because it has far greater financial and therefore technical resources than we do, and because we envisage a learning process in which TfL must allow itself to be open to the conclusion that an approach rather different from the previous one is actually better from its own point of view. We see this as being progressed in six steps.

1. Until now, the mandate for new work sought by the TfL Board refers to strengthening public transport operations on ‘the bridge’, broadened somewhat by discussions between the Mayor and the Green Group. Just to avoid any ambiguity, we recommend that at political and Board level, TfL should make a simple declaration of principle that it is prepared to look very seriously at the whole range of options, with an open mind, and *not* committed to the outcome of a Bridge necessarily looking very similar to the previous proposals. TfL should start out by stating very clearly that the outcome of a revised appraisal will not be constrained by the former proposal, thereby empowering their staff and consultants to take an open view without pressure to come to a predetermined outcome. It may be that this is already their settled view (in which case there should be no difficulty in saying so) or it may be that there is not yet this degree of openness to alternatives (in which case we think that achieving it is a necessary condition of a genuine appraisal).
2. There are two new pieces of technical work that are common to all options. These are
  - a. *An immediate and urgent audit of data inadequacies* which produced significant gaps in the former appraisal. This will include primarily data on *walking and cycling, and on ‘smarter choice’ measures of behavior change*, and of sensitivity tests involving greater application of *road user charging* within the 60 year appraisal period, which were not previously included. We are aware that much more information should be available now due to TfL’s priority work in other policy areas, but it is not at all clear that it is in a form suitable for

incorporation in the present appraisal. That audit will probably find inadequacies and while we understand that in these cases there will be *resulting weaknesses in the preliminary appraisal, it is essential that they are corrected in the period of a year or more before the re-opened inquiry*, so a programme of work will need to be defined during the next few months and put in place rapidly. (We note that during the period of remaining weakness, it is essential not to exclude good options whose performance depends on better information of this kind).

- b. A major exercise in the *redesign of bus networks* of which a common core will be a fanning out of bus routes with a north-south orientation, linking of course with rail nodes, and then with different variants suitable for each of the options, that is each of the options will be served by a bus network most suitable for it, including the interchange arrangements for ferries and cable cars, and the through running arrangements for all the fixed bridge options. The capacities and service levels should be designed to obtain the maximum public transport share which each option is capable of providing. We understand that the TfL view formerly was that such a redesign would be necessary, but left until shortly before a bridge opens in order to be up-to-date. In operational terms that makes sense, but for sifting and appraisal it is necessary to allow for the enhanced use of public transport that would arise from better bus services, otherwise car use will be overestimated and public transport underestimated, and the wrong allocation of capacity made. Therefore although operational implementation and redesign can be delayed, the definition of enhancements necessary for appraisal cannot.
3. It is essential to put in place a major design and assessment exercise on redefinition of the 'without' case which takes full account of smart choices, public transport priority, new marketing, alternatives to travel brought about by land use planning, on-line activities etc, the whole range of instruments that are now accepted in transport policy though often ignored in forecasts, and sensitivity testing to include a network-wide application of road user charging at some date within the 60 year appraisal period. This will require the

definition of some form of outline trajectory of demand responses eg on a five year cycle, not simply a single year, to take account of earlier and later start dates, and allow for robustness of options to changing needs over time. The definition of that option should include outputs testing the efficiency of travel arising, including for freight movements, and some fine tuning so that (for example) changes in the use of priority measures for different classes of vehicle can improve its overall design. (Our own very provisional assessment is that the range of results from these measures would be a minimum of 10% lower overall traffic levels than forecast in the previous ‘without’ case, up to a maximum of 40% less, and with a different trajectory of growth replaced by reduction, not simply shifting the growth curve downwards. Allowing for technical change also, this would be within the brackets required for carbon reduction targets).

4. We note that TfL has suggested that our idea of a ‘Plan B’ option, i.e. an expanded programme of other measures which would be chosen if (for whatever reason) all the improved river crossings are rejected or indefinitely postponed, may not be feasible as in the revised do-without option they will be doing everything possible already. In that case, the argument goes, there would be no other measures available in the locality which would be justified in the absence of an improved crossing, but justified with. We urge them to reconsider this. It seems very unlikely.
5. *On this basis, we propose a systematic appraisal of all our recommended options – including the three versions of ‘do-without’ - on a common basis. The minimal first pass appraisal should consist of estimates of the following quantities for every case.*
  - A description of the revised base case, including an assessment of the effects on the nature of the transport problems expected after allowing for full implementation of maximum travel demand management building up over the next decade, and on to around 2050. This should be compared with the old without case to test which problems have been reduced, including on other river crossings.

- Total carbon dioxide emissions for several test years (eg opening year, 2020, 2030), for each option, comparing the trajectories from the most recent available actual year, and the base ‘without’ options as discussed below.
  - Total numbers of person trips and vehicle movements using any new river crossing by mode (including walking and cycling separately, and distinguishing private cars, goods vehicles, other commercial vehicles, public transport vehicles).
  - Proportion of trips with both ends, one end, and neither end within the designated boroughs as at the 2007 Inquiry.
  - Average journey distance by each mode.
  - Split by journey purpose
  - Average origin-to-destination travel speed for each mode separately, and in total, for all journeys.
6. Appraisal should include the concept of **robustness** tested by consideration of several different future scenarios, including the possibility that there may need to be an accelerated programme for carbon reduction of 80% (which will be one of the possibilities to be investigated by the Climate Change Committee under terms of reference currently discussed in Parliament in the context of the Climate Change Bill 2008), and an expanded programme of traffic reduction measures including specific applications of freight logistics and freight priority.
  7. Alternative price structures should be tested not only consisting of (say) 30% higher and lower tolls than considered previously, but also variant public transport fares structures for the crossing, fuel prices continuing and increasing from the present level, and a London-wide road pricing scheme.
  8. A full scenario-based carbon footprinting exercise using the REAP (or similar) methodology detailed in our report. REAP has the power to produce estimates of the greenhouse gas implications of transport, spatial development and regeneration strategies and importantly of the interaction between all three. The outputs from a REAP exercise will give a powerful steer towards a totally

integrated package of measures for the target area and one that can maximise the desirable outcomes (employment, opportunity, poverty reduction) whilst minimising the undesirable outcomes (extra greenhouse gases and congestion).

9. At this stage we do not see any prospect of convincing evidence on the ability of any options to generate or secure employment, but we do consider that the mode and journey length characteristics of the journeys to work carried by each of the options should be specified, with priority given to those journeys for which both ends are within the designated boroughs.

### **A smaller-scale short term sifting?**

We understand that TfL's own work programme seeks answers to the initial sift of options more quickly than is consistent with the programme of work we define above, and the question then arises about how thorough or useful that could be. Clearly, in the event of adequate data not being available at the first stage, it will be necessary to make a reasoned but approximate estimate of the quantity, justified by broad aggregate information, and with an explicit allowance for the lower reliability of such conclusions. But we insist that there should be no option excluded, or earmarked for only cursory later attention, at an early stage with inadequate information that might prove to be beneficial later with improved information.

Therefore we propose that the list of quantities in point 5 above should be the check list of 'boxes to be ticked'. There must be entries for every item, i.e. no blanks left, so that boxes for which the data are currently 'not-available' should contain instead a specification of what work is proposed to fill in those boxes later, and when.

The outcome of this initial appraisal should produce a shorter list of the best performing possibilities then to enter into the much more detailed assessment suitable for reporting to the Inquiry.

Thus we are proposing that TfL should appraise the range of options we have considered, with an open mind, and a spirit of genuine commitment to see how well they can be made to work. There are ways of making genuine improvements to travel opportunities North and South of the River which do not necessarily involve encouraging more long distance car commuting, added emissions, great



expense, and a further round of divisive controversy. This would be a great achievement.

There are some basic requirements about how the options should be appraised in order to give a fair test. These include a complete redefinition of the basic transport context within which any of the options will be operating, which include the successful and determined application of London and national objectives for sustainable transport systems. We do not consider that it is appropriate to forecast a prolonged failure to improve travel conditions and test new investments against this background.

We are firmly of the opinion that when it comes to the reconvened Public Inquiry, TfL should offer a type of appraisal that genuinely contributes to sustainable transport decisions. If there is a possibility of a meeting of minds about this, we should be happy to try and seek a common view about how the appraisal should be done, and what its outcomes imply.

# Annex 1 Scope of Work

Eco-Logica Tender Proposal 23.2.2008

## Introduction

Eco-Logica Ltd hereby tenders for work to assist TfL in considering public transport options related to TfL's proposal for a Thames Gateway Bridge, at a fixed cost of £15000. Under current provisions, VAT will not be charged.

The brief for this work is set out in Appendix 1. This has been discussed and clarified in a series of emails and phone conversations involving different people, and to avoid misunderstandings we set out here our clarification of what we would do and how the project would be carried out, which should be read together with the brief as defining the Terms of Reference.

The work will be carried out by Professor John Whitelegg (Eco-Logica Ltd.) and Phil Goodwin (Professor of Transport Policy at Centre for Transport and Society at the University of the West of England, and Emeritus Professor at University College London). TfL will know that they were both leading expert witnesses called by some of the objectors at the TGB Public Inquiry, their CVs, statements of competence, background material, and technical evidence all being available in the Inquiry documents. They have both also carried out professional work commissioned by TfL directly, and a range of other public and private clients.

We do not repeat that material here, but further information can of course be provided if required.

Relationship between this project and TfL's own in-house and commissioned programme of work.

We note that on TfL Board instructions, TfL already has a programme of work to review public transport options, within which our own contribution will form a part but not the whole body of tested options. It is essential that we are briefed on the content, scope and progress of that work, especially given the very short time scale and small budget for that part of the work involving us. This will be the starting point of our work.

## The policy and technical context

We will take the view that the criteria for assessment of the options will not be confined to the statements of policy and technique which were valid at the time of the last Inquiry (bearing in mind that TfL, the Objectors and the Inspector took different views about what were the relevant context factors even then). There will be consideration of other important developments since then, including the implications of full delivery of the assurances given by the Mayor to the Greens in recent budget discussions (whether yet incorporated in 'official' TfL policy or not), and also the implications of implementation of the Climate Change Bill which by the time of Inquiry re-opening will be an Act of Parliament, and of the effect of incorporating the principles of 'Towards a Sustainable Transport System' (DfT, 2007) into the NATA Appraisal guidelines on which the DfT is currently consulting. Other ongoing project

work which is clearly relevant, such as the current DfT study into another Thames crossing further east along the Thames gateway area, may also be taken into account. We will not confine our attention only to the do-minimum option as defined by TfL in the technical work leading up to the last Inquiry.

On questions of how the options should be appraised, we note that the Rule 6 parties to the TGB, who commissioned our advice at that time, have recently issued their own recommendations (Campaign for Better Transport, 2008) on how project appraisal procedures should be developed. These reflect some of the advice we have given previously on the interpretation of NATA principles, and we shall be taking them into account.

### Scale of the Work

In normal circumstances, a body like TfL commissioning consultants to devise public transport options on a serious professional basis would expect to spend considerably longer, and apply a much greater budget, than is being discussed in this case. This will be reflected in the outline, broadbrush scale we shall be able to adopt. Reports will not contain technical detail, design standards, designs or forecasts. We are advised that TfL has indicated that the phase 1 report at the end of March may need only to be one or a few pages long. In any case, the level of detail given in our options will not be greater than the level of detail chosen by TfL to define its own public transport options in the 'Base Report' (see below), though given the much greater resources and longer period of time that TfL has been able to apply, our level of detail may in this project be less.

### Required Inputs.

At a very early stage in the work (and not later than 12 working days before the delivery of our Phase 1 report) we shall need the following written information from TfL (we call this the 'base' report):

*The TfL base report will consist of:*

- a statement of what has *CHANGED* in their definition of bridge and their own public transport approach since the inquiry, including their work on public transport options following the TfL Board decision to develop these.
- statement of their own progress in what they have done on these since the notice of reopened inquiry,
- statement of in what way they propose to change the assessment criteria since their work for the last Inquiry
- their plans for collecting new/updated data - what data, and when?
- progress report on what they have done so far on data collection
- timetable of their work from now on, especially noting delivery milestones

### Project Control and Responsibility

A normal consultancy project in which TfL commissions consultants to carry out work at the instigation of TfL, and to meet TfL's own objectives, will naturally be controlled by TfL officials and payment made only if TfL is 'satisfied' with it.

In this case, it is explicitly recognised that this project is carried out by people and along lines which TfL has previously resisted, and indeed which called into question the value for money of the TGB as promoted by TfL. This project is therefore important as a way of giving insight to TfL of ways in which the thinking of the expert witnesses called by the Objectors is developing, but it is not guaranteed to produce results which support TfL's own current view.

To this end the consultants shall remain in contact with representatives of the two Objector organisations T2000 (now Campaign for Better Transport) and Friends of the Earth, who are apprised of this project and have been involved in agreeing its terms. That is done on a professional and open basis on both sides, recognising that the outcome may or may not be to TfL's liking, and that payment does not depend on this. Similarly, the consultants recognise that although they will make recommendations about fair and efficient ways of further defining and appraising the options suggested, they are not in control of that process of appraisal, and therefore will not necessarily be committed to its results if this advice is not followed.

We received the invitation to tender for this work not from TfL directly, but from the representative of the Green group on the GLA, who we understand will be responsible for receiving reports and authorising payment. We assume that satisfactory procedures have already been followed for TfL's own internal contract and budgeting (project code etc) and that award of this project to us includes confirmation that this has been done.

### Confidentiality

The launch of this project will be announced by either a joint agreed press statement approved by TfL, the Green Group, and the Consultants (or, if preferred, separate statements by each of them). During the progress of the work it will be kept confidential to TfL, its own chosen other consultants working on the TGB, the Green Group, the Consultants and the two Objector organisations. 'Confidential' in the context of this project is intended as meaning this group.

On completion, the Consultants' report will be put in the public domain, remaining the copyright and intellectual property of the consultants. It will be accompanied by a caveat clarifying that none of the other parties involved, other than its direct authors, are committed to its conclusions.

On the basis of the above clarifications, we accept the brief as discussed between TfL, its advisors, the Green group, and the two rule 6 parties, which is repeated below.

### References

Campaign for Better Transport (2008) Getting transport right

[http://www.bettertransport.org.uk/media/press\\_releases/february\\_2008/nata](http://www.bettertransport.org.uk/media/press_releases/february_2008/nata)

DfT (2007) Towards a sustainable transport system

<http://www.dft.gov.uk/about/strategy/transportstrategy/pdfsustainabletransportssystem.pdf>

## Invitation to Tender

The following text is the invitation to tender we received by email on 22.2.2008. As noted above, its interpretation is subject to the clarifications we have given in our Proposal.

## Generation of options to increase the role of public transport on the proposed Thames Gateway Bridge

### Appointment of consultants

Darren Johnson will advise TfL as to which consultants should be appointed to carry out this work, on the following basis. Due to the unusually tight timetable for undertaking this work (as set out in the consultants brief), preference will be given to consultants who have previously worked on the Thames Gateway Bridge inquiry and have direct experience of preparing options, traffic modelling and transport related regeneration projects.

### Consultancy Brief

#### Context

The Mayor of London made the following commitment in a letter dated 22 January 2008 to London Assembly members, Darren Johnson and Jenny Jones.

- TfL have put procurement for the Thames Gateway Bridge on hold until the outcome of the re-opened Inquiry
- TfL is working on reviewing public transport options on the Bridge in response to a request by the TfL Board, aiming to provide a thorough and objective assessment of a range of options which have the potential to increase the role of public transport on the Bridge
- TfL will make available funding as required of up to £15k for professional and consultancy assistance approved by the Green Group, in reviewing and defining options to increase the role of public transport on the Bridge. The options generated through this assistance will be assessed in TfL's review. All results from this work will need to be provided to TfL before the end of March 2008
- The TfL paper setting out the results of the review will be shared with the Green Group on a confidential basis, to allow TfL to consider any comments from the Green Group in finalising the paper and reporting to the Board

#### Purpose of the work

1. To define and provide initial review of options for increasing the role of public transport on the proposed Thames Gateway Bridge, which merit in depth examination by TfL (Part 1).
2. To consider the findings and conclusions of TfL's review of options (including their assessment of those options generated by this work), and comment on the robustness of those findings and conclusions (Part 2)

#### Criteria for identifying options

The work should seek to identify and define those options which (by themselves or in combination) are most likely to be capable of achieving all the objectives and policies of the London Plan and the Mayor's wider objectives and policies, including:

- Regeneration and economic development of East London
- Reduction of climate change emissions
- Improvement to the environment
- Improvement of conditions for pedestrians, cyclists and public transport
- Addressing the needs of business including freight

- Improvement to public safety and health.
- Value for money

The work should take full account of:

- National land use and transport planning policy;
- Current guidance on appraisal of major transport schemes, such as the Webtag process;
- TfL's previous work on public transport options for cross river links, using the proposed Thames Gateway Bridge.
- Proposed variations in the tolling regime.

The options may include integrated transport measures which would enhance public transport usage of the proposed bridge. They may also include options which disallow or severely restrict private cars on the bridge.

Output and timetable for part 1

Upon appointment, the consultants will hold an initial meeting in the week beginning the 3rd of March with TfL to establish a set of baseline information, covering TfL's existing work, future plans, appraisal systems, etc... for enhancing public transport on the bridge. This will be followed within a week of that meeting by the provision of any readily available written information being provided by TfL.

On the assumption that TfL have fulfilled their undertakings to meet with the consultants and supply any baseline information, as outlined above. The consultants will meet again with TfL in late March to present a preliminary assessment report of the possible options, likely work required and how those options could be taken forward. A written note of that meeting will be produced and agreed within a week of the meeting outlining the main options.

The final written report from the consultants should be delivered to TfL by the end of April 2008. This written report should explore further and refine the main options previously discussed and set out in writing those which they consider merit in depth examination by TfL, with the reasons for choosing these and their initial review of them. They should also set out the further detailed work considered necessary to test the options, such as scheme costing or demand/traffic modelling.

Output and timetable for part 2

Once TfL has completed its assessment of options (including those generated by this work), the consultants will be asked to review the findings and conclusions and comment in writing on their robustness. Their written comments should be prepared within one month of receiving the results of the TfL review.

Work in connection with both parts of the work may include discussions with TfL and their consultant, and other interested parties or stakeholders.

Payment

The full cost of both parts of this work is limited to £15k.

## **Annex 2 REAP Carbon Emission Modelling**

The Resources and Energy Evaluation Programme (REAP) is a software tool developed by SEI and can be used for the assessment, development and appraisal of the implementation of policy as well as a tool to formulate strategies for local, regional and national government.

REAP has been used at the request of the Yorkshire and Humber Regional Assembly to design a low carbon transport system for this region of 6 million inhabitants. REAP was used to model different scenarios and different policies to produce a mix of transport policies that would deliver the region's ambitions for economic and social development at the lowest possible output of greenhouse gases from the transport sector.

This methodology and the detailed use of REAP translates directly to the TGB situation and the ranking of options in terms of climate change impacts.

In our view it would be perverse to have as strong a climate change policy as that agreed for London and not to be as rigorous and robust as possible in testing policies and options for the best possible “deal” on climate change. REAP enables this to be done and provides a scenario-based approach so that it is possible to test policy options against climate change objectives.

### **Explanation of the REAP model**

The basis of the REAP model is an Input-Output (IO) table and uses economic returns from companies provided by the Treasury to construct a complete picture of the UK economy including all ‘inputs’ (domestically produced goods and imports) and all ‘outputs’ (domestic final consumption and exports). This matrix ensures that the complete supply chain of all products is taken into account.

In addition, REAP contains a database of environmental indicators available from the Environmental Accounts produced by the Office of National Statistics (ONS) for every local authority, government region and devolved nation in the UK. It provides

baseline data which can be updated and monitored over time for:

- Carbon dioxide and greenhouse gas emissions,
- Air pollutants and heavy metals,
- Ecological Footprints and material flows.

These indicators are region-specific, comparable, and standardised, and when combined with the IO table, measure the impact of changes in the consumption activities of individuals. They take into account the direct and indirect pressures of the consumption of products and services throughout the economic supply chain. The important clarification here is the apportionment of the impact to the consumer (final demand – private households, government, capital investment) and includes intermediate impacts as well. This approach differs from most other tools which measure the CO<sub>2</sub> emitted from production and direct fuel processes within a given region (known as the producer, or territorial responsibility).

Goods and services used by business are classified as an ‘intermediate consumption’ activity. This means that the environmental consequences of business activity are attributed to households, government or capital investment or to exports from the UK. To put it in simplistic terms, when someone buys a loaf of bread, REAP takes into account the emissions arising from growing the wheat (which may be in a different country), processing it into flour, baking in an oven and transporting it to a shop as well as the energy used for lighting in the shop through the emission for that person.

For each local authority, the average spending per person by household activity (apart from domestic energy consumption) is broken down by Acorn socio-economic group. Because Acorn groups are assumed to behave the same way wherever they live, local authorities need to be able to update their baseline data based on the influence of local policy and conditions. In REAP this is done using the update data functions and scenario manager.

REAP’s scenario manager can be applied to a wide range of policy areas including transport, food, housing, energy and planning. It can be used to assess the potential impact of regional strategies and policies against targets and objectives comparing alternative pathways of development and to monitor the actual impact of policies over time. REAP can model scenarios up to 2050.

### **Modelling in REAP**

Scenarios are developed in REAP through changes in the ‘functional units’ which are essentially variables (numbers that can change over time) describing a particular policy area, such as for example transport, food, or domestic energy. An example of a functional unit is the average number of passenger kilometres travelled by car in a given geographical area. When a functional unit is changed, the REAP model calculates the corresponding impact on the carbon dioxide emissions in that area.

Functional units can be used to update the baseline situation and can be used to develop scenarios for policy interventions which have an impact up to any given future year. For transport, the following functional units can be updated:



- Average passenger km travelled per person by mode of transport (car, taxi, motorcycle, bus, train or plane);
- Percentage occupancy by mode of transport;
- Vehicle ownership per 1000 people; and
- Fuel efficiency of each mode of transport.

Scenarios are visions of the future and rely on the knowledge and insight of trends, reactions of consumers as well as knowledge regarding the limits and thresholds of different variables. Much of this information is available in the published literature. Each scenario to be evaluated using REAP is comprised of a set of changes applied to the functional units.

REAP enables the user to specify how each functional unit will change from the baseline year over time using several techniques:

- Growth rates can be set as a percentage increase or decrease over a specific time period;
- A value can be entered for a particular variable in a step function;
- REAP can interpolate values between two years; or
- A hybrid version combining all three functions.

Scenarios can be applied to different local authorities or government regions and the results can be compared.