

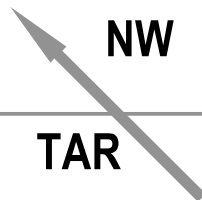
**ALL/3/1P**

**ECONOMIC**

**Proof of Evidence by  
Professor Alan Wenban-Smith**

**for the  
MERSEY GATEWAY PROJECT  
PUBLIC INQUIRY**

**on behalf of  
The Alliance  
comprising  
the North West Transport Roundtable**



**and**



**24 April 2009**

This proof of evidence relates to the implications of the following applications and proposed orders:

1. Planning application for full planning permission for works lying within Runcorn comprising improvements to the Central Expressway, Weston Link, the Weston Point Expressway and junction 12 of the M56 motorway, dated 31 March 2008.  
Appeal references: APP/D0650/V/08/1203385/2095113 and APP/D0650/V/1203384/2095069
2. Planning application for full planning permission for works lying within Widnes comprising modifications of the northern approaches to the Silver Jubilee Bridge. Dated 31 March 2008.  
Appeal reference: APP/D0650/V/08/1203386/2095114
3. Listed Building Consent Application for modifications to the Silver Jubilee Bridge, dated 31 March 2008.
4. The River Mersey (Mersey Gateway Bridge) Order (application under section 6 of the Transport and Works Act 1992 to the Secretary of State for Transport for an order under section 3(1)(b) of that Act).  
Reference: TWA/08/APP/05
5. The A533 (Silver Jubilee Bridge) Road User Charging Scheme Order 2008.
6. The Halton Borough Council (Mersey Gateway – Queensway) Compulsory Purchase Order 2008.
7. The Halton Borough Council (Mersey Gateway – Central Expressway) Compulsory Purchase Order 2008.
8. The Halton Borough Council (A533 Central Expressway) Side Roads Order 2008.
9. The Halton Borough Council (A533 Queensway) Side Roads Order 2008.

# **Mersey Gateway Bridge Inquiry**

## **Proof of Evidence – Alan Wenban-Smith**

### **1 Introduction**

#### **Qualifications**

- 1.1 My name is Alan Wenban-Smith. I hold the degrees of MA (Cambridge), MSc (Toronto) and DipTP (Newcastle) and am sole proprietor of the Urban & Regional Policy consultancy. I am a member of the Royal Town Planning Institute (MRTPI), and currently a member of the RTPI General Assembly and its Policy & Practice Committee. I am Visiting Professor of Planning at Birmingham City University.
- 1.2 I have held senior local authority planning posts in the North East and Birmingham, including lead responsibilities for transport, planning, urban regeneration, economic development and regional policy in both areas. I led regional and metropolitan planning and transport consortia in the West Midlands, producing the first (national) integrated transport 'Package' bids for the conurbation (forerunner of LTPs), the first Regional Planning Guidance and the first Regional Transport Strategy. I was an external adviser on transport research to DoT and DETR from 1995-98.
- 1.3 As a consultant I have worked with Cambridge-based economic development consultants SQW (formerly as a Director and now as an associate), transport consultants MVA (where I have acted as Planning Adviser since 1996), and in my own name as Urban & Regional Policy. I have spoken and written extensively on linking transport policy to other aspects of urban and regional policy, and was a special Adviser to the Commons Select Committee on the South East Growth Areas in 2002/3.
- 1.4 Recent projects undertaken particularly relevant to the present case include the following:
  - a) 2008: Chaired Peer Group Review of London Land Use Transport Integration model for TfL, including its potential use in the context of the regeneration case for the proposed Thames Gateway Bridge;
  - b) 2007-8: Advised the West Midlands Regional Assembly on reducing risks to urban regeneration from increased housing provision in the revised Regional Spatial Strategy;

- c) 2006/7: Acted as a transport expert in research for DfT on 'Public Acceptability of Road Pricing' carried out by the British Market Research Bureau and UWE;
- d) 2006: Advised English Regions Network on Implementation Plans for Regional Spatial Strategies;
- e) 2003/4: Principal and main researcher author of MVA report to DfT on '*Integration of RTSs with spatial planning policies*';
- f) 1996/7: Main author of MVA reports on transport and regeneration on Merseyside and in the West Midlands.

### **Commission**

- 1.5 I have been commissioned by the Alliance of the NW Transport Activists Roundtable and Friends of the Earth (hereafter 'the Alliance') to review the economic and regeneration case made by the promoters of the Mersey Gateway Bridge (MGB). The principal focus of this critique is the Wider Economic Impact Report (WEIR) by Amion Consulting (Feb 2009), which makes extensive use of the Economic Appraisal Report (EAR) by Mott MacDonald (Jan 2009).

### **Structure**

- 1.6 The Inspector must report in the context of Government policy, as set out in official statements and guidance. This is made quite difficult by the rapidly evolving state of official thinking on the connections between transport and regeneration. Section 2 summarises the key issues in this process of change and derives from this discussion a set of headings for a critical examination of the regeneration case put forward by the promoters. Section 3 reviews the economic and regeneration appraisals in this light, and Section 4 draws conclusions from this analysis.

## **2 DfT guidance on appraising economic benefits**

### **The basis of appraisal**

- 2.1 Project appraisal in the public sector is required to conform to the Treasury 'Green Book'<sup>1</sup>. This presents appraisal as part of a process that starts with a clear statement of the rationale for public intervention and the outcomes sought, puts forward practical options for achieving these outcomes, appraises these in terms of value for money, and finally

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<sup>1</sup> HMT (2003), '*Appraisal and Evaluation in Central Government*'

monitors and evaluates the actual results. Although the Green Book speaks of 'economic appraisal', it requires account to be taken of *all* economic, social, environmental and financial impacts.

- 2.2 DfT enjoys a degree of autonomy from Treasury oversight when applying its own Transport Appraisal Guidance system – WebTAG<sup>2</sup> – by virtue of its continual efforts to ensure compliance with Green Book principles. WebTAG is an extensive, sophisticated, elaborate and evolving system, currently comprising 96 separate modules, 10 of which are consultation drafts (including two particularly relevant to this Inquiry posted in April 2009<sup>3</sup>). The factors currently included or excluded from DfT's Cost Benefit Analysis (CBA) are set out in Table 2.1 below.

**Figure 2.1: Current DfT CBA inclusions and exclusions<sup>4</sup>:**

<p><b>Included</b></p> <ul style="list-style-type: none"><li>• changes in business and consumer travellers' journey time, vehicle operating costs, fares and other charges;</li><li>• impacts on private sector providers' revenues and costs;</li><li>• changes in the numbers of accidents (but excludes impacts on personal/freight security);</li><li>• the effects of better transport interchange on traveller journey times;</li><li>• impacts of noise</li><li>• greenhouse gases<sup>5</sup>; and</li><li>• accessibility impacts to the extent that it takes account of behavioural responses.</li></ul> <p><b>Excluded</b></p> <ul style="list-style-type: none"><li>• option values (although these may be included for some rail studies);</li><li>• impacts on local air quality;</li><li>• reliability impacts<sup>6</sup>;</li><li>• impacts on landscape, townscape, heritage of historic resources, biodiversity, water environment, physical fitness and journey ambience (though rail overcrowding, station facilities and rolling stock quality may be included in some studies;</li><li>• any wider economic impacts, including impacts on land use; and</li><li>• the impacts on integration with land-use policies and other Government policies.</li></ul>
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- 2.3 Our increasing understanding of the relationship between transport interventions and economic, social and environmental change mean that some parts of WebTAG may now be inconsistent with the Green Book, or

<sup>2</sup> the DfT's web based Transport Appraisal Guidance system at [www.dft.gov.uk/webtag/](http://www.dft.gov.uk/webtag/)

<sup>3</sup> WebTAG 2.8 'Wider Impacts and Regeneration', and the related 'expert' paper WebTAG 3.5.14

<sup>4</sup> these lists are adapted from WebTAG 3.5.4 (2004), as amended by later information

<sup>5</sup> since April 2009: WebTAG 3.3.5; value is £25.50/tonne CO<sub>2</sub> equivalent, rising at 2% pa

<sup>6</sup> WebTAG 3.5.7 (April 2009) proposes methods suitable for some studies

with each other. This section aims to bring out the issues arising that are relevant to the economic appraisal of the MGB.

## **Evolution of appraisal guidance**

### ***Direct benefits (congestion, time savings and accidents)***

- 2.4 Until the 1999 SACTRA Report '*Transport and the Economy*' the overwhelming bulk of economic benefits of transport were considered to comprise direct benefits to users – primarily user time-savings from reduced congestion. Though these time savings could (and usually would) be transmuted into changed patterns of activity (and congestion benefits lost in the process), in a perfect market the benefits of the changed pattern of activity would be equivalent to the original user benefits, however long and tortuous the route between.
- 2.5 User time-savings can be forecast from the same transport models used to design roads, and on average accounted for around 80% of the monetised benefits of road schemes (with accident savings – also modelled – accounting for most of the rest). This was the basis of the traditional practice, followed for almost 50 years and still the dominant mode, of treating economic benefits and user time-savings as essentially synonymous. It is important to recognise that, even within this paradigm "*... in general, the value of direct transport benefits must decline if indirect economic benefits are to grow*".<sup>7</sup>
- 2.6 A technical change with major wider implications was imported into transport appraisal when the 2003 Green Book replaced its predecessor. Previous to this the period over which costs and benefits needed to be considered was 30 years from opening, and the discount rate (the annual reduction in the present value of costs incurred or benefits won in the future) was reduced from 6% to 3-3.5%. This greatly increases the significance of future incomings and outgoings (the present value of £1 in 30 years' time is 41p at 3%, but only 17p at 6% (at 60 years the equivalent figures are 17p and 3p).
- 2.7 While this makes longer term implications more influential in present decisions, which in theory should be good for environmental issues like

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<sup>7</sup> SACTRA (1999), '*Transport and the Economy*', para 23

climate change, it adds enormously to the weight that is placed upon the numbers used in long term forecasts

- 2.8 A review of forecast traffic against actual outcomes<sup>8</sup> shows that although there is a wide error range, at one year from opening these are as likely to be too high as too low. However, at five years 'induced traffic' becomes more significant and there is a systematic underestimation of traffic. This is in fact a symptom of the new travel patterns that result from the indirect economic and social impacts of new or improved roads.
- 2.9 Changes in patterns of economic and social activity, and in the patterns of housing and commercial development that flow from them (particularly out-of-town shopping malls and business parks), have dramatically changed the pattern and scale of travel demand since WW2 (Figure 2.2 below). In particular, it is notable that the *number of trips* has changed very little, and around 2/3rds of the increase in personal travel is the result of *longer trips*. Associated with these longer trips has been an even more striking increase in the proportion of travel being undertaken by car (Figure 2.2 below).

**Figure 2.2: Personal travel, GB 1952-2006**

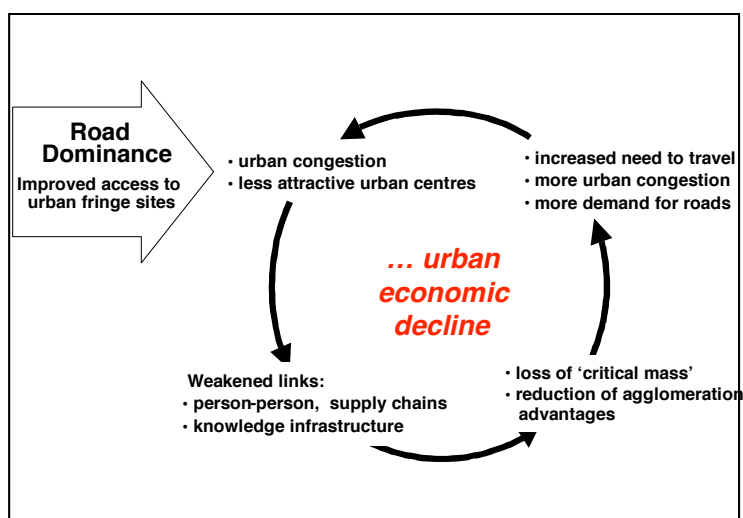
	<b>1952</b>	<b>1972</b>	<b>1992</b>	<b>2006</b>
All travel (bn km pa)	218	431	678	812
private (bn km pa)	65	331	588	692
public (bn km pa)	130	94	81	105
Trips per head (pa)	800	956	1053	1037
Average trip length (km)	5.7	7.5	9.8	11.04
Modal split (% private)	33	77	88	87
Source: DfT (2008) National Travel Survey 2006				

- 2.10 The effects described above are a consequence of a more dispersed *pattern of activity*, driven by economic and social pressures and enabled by transport improvements. In any one year, around 90% of this change in patterns of activity and location takes place through the turnover ('churn') of the existing stock of buildings, which offers about 10 times the volume of choice of new build (and a much wider range of locations).
- 2.11 The changes in locational choices by households and businesses since WW2 has been increasingly influenced by the dominance of road transport. Changes in the pattern of accessibility resulting from road

<sup>8</sup> referred to in WebTAG 2.7.1, para 1.8.6

dominance drive changing locational choices, which in turn dictate the transport response. This long-recognised symbiotic relationship of transport and urban change<sup>9</sup> has important economic and social consequences, as illustrated in Figures 2.3 and 2.4<sup>10</sup>. These will be discussed more fully in relation to regeneration in the next section; at this stage the point to note is that transport supply is a major and dynamic driver of transport demand.

**Figure 2.3: Dynamics of urban economic change with road dominance**

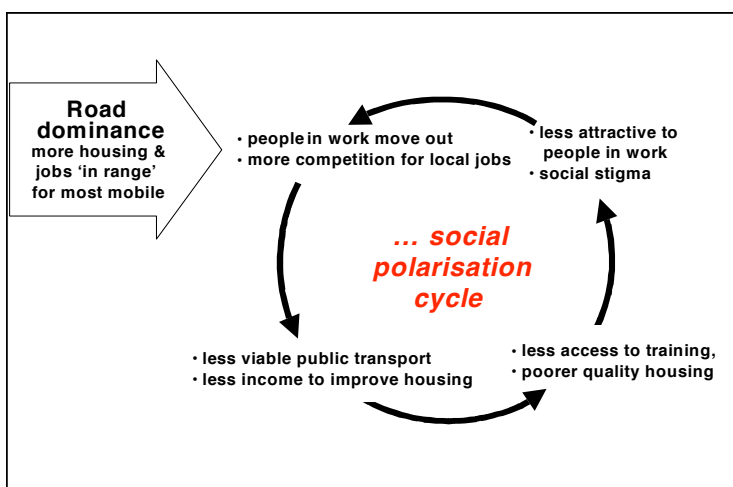


<sup>9</sup> Clark, C (1957) 'Transport: maker and breaker of cities', *Town Planning Review* **28** 237-250, reviewed by Peter Hall (1994) in 'Squaring the circle: can we resolve the Clarkian paradox?', *Environment and Planning*, vol 21, s79-s94

<sup>10</sup> Taken from A Wenban-Smith (2008) 'Planning and the Environment', paper to IHT Annual Conference (- the original research was done as part of a review of public transport and regeneration carried out for Merseytravel)



**Figure 2.4: Dynamics of urban social change with road dominance**



2.12 The transitory nature of user time savings is a major issue to be considered in reviewing the economic impact of MGB. Two questions arise:

- a) How much reliance can be placed upon traffic forecasts (and related time savings) as a measure of direct benefit beyond the short-term (5 years)?
- b) While the conversion of time-savings to new patterns of activity and travel may be assumed to benefit the individual traveller, how far does this further the wider economic, social and environmental aims referred to by the Green Book, including regeneration?

***Indirect benefits (regeneration and economic growth)***

2.13 The SACTRA Report concluded that, under conditions of perfect competition, a well-specified conventional CBA would capture all the economic costs and benefits at national level (see Figure 2.1 above for the coverage of the current DfT system). However, in imperfect markets, such as are generally found in the real world, there may also be 'wider economic benefits' (WEBs), and that these might be either positive or negative (though means for quantifying WEBs were not offered).

2.14 Formal current DfT guidance is contained in WebTAG Unit 3.5.8 (2003) and does not include the potential for *overall* economic changes that WEBs represent. However, it does require an Economic Impact Report (EIR) for major transport schemes to establish whether there is *redistribution* of a fixed total of jobs into or out of Regeneration Areas

(RAs), in recognition of the potential social impact. The EIR must be based upon an explanation of the working of the local economy of the area affected, and the role of transport in this. Though references are made to Eddington, the EIR work done for the promoters of MGB (the WEIR) seems largely to have been carried out seeking conformity with this more limited guidance about RAs, rather than the emerging guidance about WEBs.

- 2.15 For RAs to be valid in the context of WebTAG 3.5.8 they normally require designation as such in the relevant Regional Economic Strategy (these areas are defined in the relevant Regional Development Agency (RDA) Corporate Plan). Where regeneration benefits are considered to accrue to other areas, it will be necessary to examine a full range of indicators and build a case for the area to be regarded as an identified RA. WebTAG states that areas which do not currently conform to an identified RA but are felt to be in need of assistance in order to improve their economic position should not be considered<sup>11</sup>.
- 2.16 The Eddington Report pointed to the need for an overhaul of the transport appraisal system, so as to give more prominence to the wider economic effects that should drive investment priorities in the sector. It is this idea that the Eddington Report (Dec 2006) draws on in arguing for particular types and locations of transport investment.
- 2.17 In parallel with Eddington, a Discussion Paper issued by DfT in 2005 (and reissued alongside TIF bidding guidance in Jan 2006) picked up the broader economic issues raised in the SACTRA Report. Following the Eddington Report DfT issued a White Paper '*Towards a Sustainable Transport System*', followed in Nov 2008 by '*Delivering a Sustainable Transport System*' (DASTS). This established transport goals focusing on delivering strong economic growth while at the same time reducing greenhouse gas emissions.
- 2.18 Consequent changes to the appraisal process were consulted upon alongside these reports. The corresponding formal guidance is the

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<sup>11</sup> these requirements are summarised from the 2009 consultation version of WebTAG 2.8 (Section 4.3). They are carried over unaltered from the 2003 edition (Section 1.5)

subject of draft WebTAG units, posted in early April 2009<sup>12</sup>. These sources argue that in addition to effects derived from user time savings in a perfect market, WEBs arise from agglomeration, competition and labour market effects in an imperfect market. The main changes from earlier guidance concern increased prominence given to the potential for transport interventions to lead to additions (or reductions) in the *overall level of economic activity*. This is what is meant by 'WEBs'.

2.19 In this connection the emerging 'new economic geography' (NEG) suggests a tension between three effects of better transport links:

- a) Better transport lowers supply chain and labour market costs, enhancing their competitiveness; it also improves communication between businesses generating agglomeration advantages ('critical mass'); but
- b) Better transport also allows *every* business wider locational choices, with lower location-specific land and labour costs; but in their individually rational exercise of this choice they may collectively produce a more dispersed pattern of activity with higher costs and poorer communications;
- c) Particularly relevant to the issue of economic balance is the so-called 'two way road' effect: in general, improving the links between them will allow a stronger area to increase its penetration of a weaker area's markets, thus increasing disparities.

2.20 .The issues arising from this discussion are:

- a) Whether the proposed RAs meet the WebTAG criteria
- b) Whether the improvements in accessibility resulting from the MGB are more likely to produce positive or negative effects on residents and businesses in the RAs (as defined);
- c) Whether there are WEBs extending beyond the locality as a result of market imperfections such as agglomeration; and if so, whether these are positive or negative;
- d) Whether the estimate of Net Present Value of monetised costs and benefits (taking account of the above) is robust enough to form the basis of a decision.

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<sup>12</sup> WebTAG 2.8 'Wider Impacts and Regeneration', and the related 'expert' paper WebTAG 3.5.14 'The Wider Impacts Sub-Objective'

## **Summary of key issues**

- 2.21 Combining the issues described in paragraphs 2.8 and 2.20 leads to the following set of headings for review of the Economic Appraisal Report (EAR) and the Wider Economic Impacts Report (WEIR):
- a) Reliability of time savings as a measure of direct impact;
  - b) Conversion of time-savings to non-transport impacts;
  - c) Wider Economic Benefits;
  - d) The definition of RAs and the likelihood of benefits to them;
  - e) The overall balance between costs and benefits.

## **3 Economic Appraisal & Wider Economic Impact**

### **Introduction**

#### ***Economic Appraisal Report (EAR)***

- 3.1 The EAR uses the results of the traffic modelling undertaken for the design of the bridge and approaches to:
- a) Estimate the direct costs and benefits of the scheme to users (toll charges, time savings);
  - b) Convert these to money values using DfT's Transport User Benefit Appraisal (TUBA); and
  - c) Estimate the money value of accident savings on the network.
- 3.2 The Mersey Gateway Model (MGM) is a variable demand model, meaning it allows for traffic generation, redistribution and mode choice effects arising *directly* from the introduction of the scheme. However it is not a Land-Use/Transport Interaction (LUTI) model, and so cannot handle the consequent *indirect* changes in the pattern of economic activity and residence (which, in time, feed into further changes in travel demand).
- 3.3 MGM gives traffic forecasts for the opening year (2015) and the design year (2030), while the 60 year economic appraisal period is 2015-2074. In order to generate numbers to use in the economic appraisal, zero traffic growth is assumed for the 45 years from 2030-2074.
- 3.4 Tolls are assumed to remain constant in real terms throughout the appraisal period (and to be equal to those levied on the alternative Mersey crossings at the Silver Jubilee Bridge (SJB) and Mersey tunnel).

The MGB concession runs until 2042, after which toll income (and bridge costs) revert to Halton BC.

- 3.5 The output of the EAR is the standard DfT Transport Economic Efficiency (TEE) table, adapted to deal with the private funding component.

**Wider Economic Impact Report (WEIR)**

- 3.6 The EAR is a major input to the WEIR, the main elements of which are:
- a) Estimates of the GDP effect of the *direct* benefits identified in the EAR, plus the *indirect* effects arising from WEBs (principally labour supply and agglomeration impacts which are not covered by TUBA);
  - b) Benefits to households or businesses in Regeneration Areas (which form a separate element of the appraisal, not being additional to WEBs).
- 3.7 The WEIR aims to meet the economic appraisal requirements of DfT's most recent policy statements (Eddington and '*Delivering a Sustainable Transport System*', see para 2.17), but was prepared before the most recent edition of the relevant WebTAG Units (see para 2.18). However, given that the methodologies have been extensively trailed this need not have been much of a handicap. In the discussion that follows I will make use of the current (consultation) versions of the relevant WebTAG units.

**Time savings as a measure of direct impact**

- 3.8 The EAR provides the basis of the user time and accident savings, and as these are not revised in the WEIR, the following discussion refers to the former report. The key issues are:
- a) The validity of using the same 'land-use' when comparing transport performance with and without the MGB in the 2015-2030 modelling;
  - b) The validity of the assumption of no change in traffic levels from 2030 onwards;
  - c) The effect of this assumption on the robustness of the estimate of NPV; and
  - d) The inadequacy of the sensitivity tests carried out.

**The constant land-use assumption**

- 3.9 The use of the same land-use matrix when comparing delays to traffic with and without the bridge exaggerates the time savings attributed to the MGB, since part of the demand assigned to the 'Do minimum'

network will not arise without the MGB. The 'constant land-use' assumption is common practice, and may not produce a large error where the claimed regeneration effect is small, but that is not the case here.

- 3.10 This issue arose at the Thames Gateway Bridge Inquiry, and the Inspector concluded that the then current WebTAG guidance did not in fact require 'constant land-use' as claimed by TfL. He took the view that transport and land-use will interact, and that the failure to consider alternative land-use scenarios or to use a LUTI model (see para 3.2) "... detracted further from the reliability of the promoters predictions".<sup>13</sup>

### **Traffic levels after 2030**

- 3.11 The fact that the transport model cannot accommodate changes in patterns of locational choice by households and businesses consequential on the introduction of the MGB has another effect. Although conventionally referred to as 'land-use', as discussed earlier (para 2.9-2.12) new development provides only a small proportion of the scope for change, and the evidence is that over periods over more than ~10 years improvements in accessibility are a major driver of dispersion, generating increased travel demand and more car-dependency (Figure 2.2 above).
- 3.12 The main countervailing influences are the imposition of tolls and the concurrent pursuit of urban regeneration policies in the Mersey Gateway area. However, tolls at a high enough level to counteract the effect of user time-savings on travel demand would reduce both the *direct* net user benefits and the *indirect* WEBS.
- 3.13 It might be argued that higher levels of traffic on the MGB and in the Mersey Gateway area generally would be a price worth paying for the improvements to the financial balance for the MGB operator, and the higher levels of economic activity with which more traffic might be associated. Against this we should note:
- a) The high priority given by DfT's current policies to combating climate change; and

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<sup>13</sup> Thames Gateway Bridge Inquiry – Inspector's Report (Aug 2006), this issue is fully discussed in paras 9.281-286

- b) The potential for dispersion to undermine both the economic agglomeration and the urban regeneration effects being sought.
- 3.14 The implication is that higher traffic flows may be experienced (on the MGB and elsewhere). While this could produce higher toll income, it could also be symptomatic of a failure of the effort to regenerate the Mersey Gateway area – effectively continuing the long tradition of major road schemes in Greater Merseyside which have undermined its economic cohesion and critical mass (discussed further at 3.27 below).
- 3.15 Without the assistance of a LUTI model these issues cannot be explored much further, but the implications for the robustness of the appraisal are potentially very serious, as discussed in the next subsections.

***Robustness of the NPV estimate***

- 3.16 The time savings benefits of the MGB are estimated from the difference between model runs with and without it. As noted above, the speeds and flows of traffic for the 45 years of the appraisal period remaining after 2030 are based upon 'no change' from that date, so the quantity of time-savings at that date is crucial. The income to Halton BC from the end of the concession (34 years from 2042) is similarly dependent on this flow level.
- 3.17 Reasons were given above (paras 3.9-3.10) for believing that the time savings attributed to TGB have indeed been exaggerated in the EAR. If higher general levels of traffic were to result in the modelled period (2015-2030) from the processes discussed in paras 3.11-3.15, the exaggeration would be likely to increase.
- 3.18 Paradoxically, the greater part of the distortion imported into the CBA relates to the period *after* that modelled (2015-2030). This will have a major effect on the user benefits because any exaggeration of time savings at 2030 is increased by the 45 years that the appraisal period has to run. Since the discount rate for benefits (3.5% pa) and the assumed growth in the value of time (~2.0% pa WebTAG 3.5.6 Table 3 – EAR 3.20) counteract each other, the multiplier to be applied to any error would be over 30.

- 3.19 How much of the projected benefit depends on this 'post-modelled period' depends on data which is not currently available, but it may be expected that a substantial proportion of the estimated benefit relates to a period for which there are no modelled results (and for which, if there were modelled results, they would be unreliable). As at the date of submission of this document planned discussions between consultants acting for the Alliance and Halton BC staff had not yet taken place.
- 3.20 However, this information would only tell us the degree of dependency of the estimate of time-savings benefits on the 'post-modelled period', and so something about its *robustness*. The *scale of the distortion* that is introduced depends upon information about changes in spatial patterns of economic activity and residential choice which cannot be estimated without a LUTI model.
- 3.21 The value of the toll revenues accruing to Halton BC *after* the concession period (ie from 2042-2074) is similarly dependent on the accuracy of the predictions for 2030, though the multiplier applicable to any error is somewhat smaller since the period to run is shorter (33 years) and there is no real income growth assumption to set against the 3% discount rate. Nevertheless the relevant multiplier would be over 20. In this case the extra traffic likely to be predicted by a LUTI model would tend to increase the financial benefit to the MGB operator (the concessionaire and then Halton BC) but at the cost of increasing the amount of tolls paid by bridge users, the volume of CO<sub>2</sub> emissions and other environmental impacts.
- 3.22 Both the costs and benefits given in EAR Table 3.1 are critically affected by these considerations, with serious implications for the robustness of the estimates of NPV and Benefit/Cost Ratio (BCR):
- a) Most of the net benefit to users is the difference between the value their time savings plus the closely related Vehicle Operating Cost savings (£847m) and the toll charges they pay (£626m). The positive NPV is the relatively small difference between these numbers, each of which is vulnerable to major errors. As indicated above, time savings are likely to be much lower and toll payments higher: this could easily wipe out *any* net benefit;



b) The net public sector cost (£73m) is the difference between public sector costs – £300m much of it up-front – and toll revenues received by Halton BC after the end of the concession in 2042 (£228m). Once again both numbers are independently vulnerable to major errors. Though the financial outcome for the concessionaire and Halton BC as bridge operators may be enhanced, this would come at the expense of the users and the environment.

### **Sensitivity tests**

3.23 The points discussed above represent major risks to the favourable CBA outcome presented. However, the only sensitivity test that is reported in the EAR is the use of local values of time in place of national, which makes only a trivial difference to the estimated net benefit (EAR 3.22). This is not compliant with WebTAG advice, which contains numerous and extensive warnings and guidance on the subject, as can be seen from the following example.

*"... the Department recommends ... developing central, optimistic and pessimistic scenarios. ... Development of these scenarios should be based on a risk analysis. This should identify and assess the risk associated with all relevant land use, transport, patronage and other factors that could affect the impact of the project being considered. Development of the three scenarios required for sensitivity analysis should be based on the assessed risks, taking account of any dependencies between factors as appropriate.*

*WebTAG 2.7.1, para 3.8.10*

3.24 Not only does the single sensitivity test performed not meet DfT requirements, but also it is clear from the discussion above that there are indeed major risks to the estimated benefits. This deficiency carries through from the EAR to all the subsequent economic and regeneration work that depends upon it<sup>14</sup>.

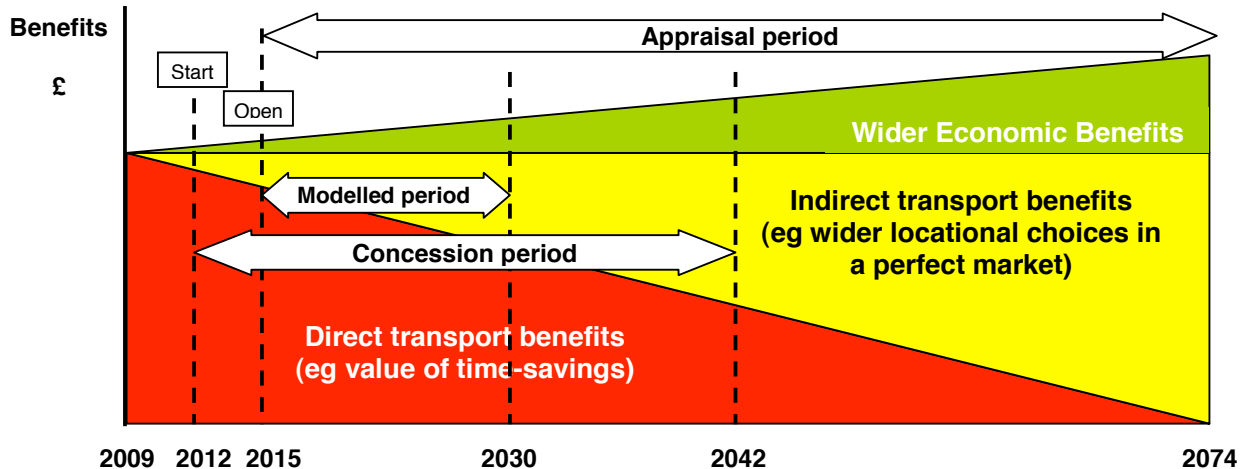
### **Conversion of time-savings to wider impacts**

3.25 In general, as noted earlier (paras 2.4-2.10) accessibility improvements are converted to changed locational preferences and their value declines over time. As noted by SACTRA (see para 2.5 above), in a perfect market *"in general, the value of direct transport benefits must decline if indirect economic benefits are to grow"*, as represented diagrammatically in Figure 3.1. This also shows the relationship to the modelled and concession periods, in the context of the overall appraisal period. The

<sup>14</sup> the sensitivity tests of numbers of jobs from regeneration in the WEIR address a different issue and do not compensate for this deficiency

Wider Economic Benefits, arising because markets are imperfect, are additional to those discussed in the EAR and above and are dealt with later (paras 3.29-3.39 below).

**Figure 3.1: Direct and indirect benefits over time**



3.26 The point for discussion here concerns the conversion of the initial transport benefits into economic benefits of different kinds. While these will be of equal economic value (in a perfect market), it does not follow that they will be of equal *policy* value, since regeneration has social and environmental, as well as economic, dimensions.

3.27 The discussion in paras 2.10-2.11, and the processes illustrated in Figures 2.3 and 2.4 , suggest that the transport benefits may well not convert to economic and social benefits of equivalent value. In fact there is evidence that in Merseyside the benefits of past improvements in road transport, in particular, have been distinctly double-edged, as indicated in the following quotation:<sup>15</sup>

*"In the past transport has had a strongly dispersive tendency, and this could be reinforced by the increasing influence of telecoms. If these continue unabated, the 'critical mass' advantage of the conurbation may be severely reduced or even negated. Two factors are involved here:*

- the continued physical dispersion of activity and settlement reduces the effective size of the interacting mass of activities*
- the ease of access of businesses to each other and to the potential labour market is reduced by increasing congestion, particularly of the central core.*

*Both factors are the consequence of the increasing dominance of road transport, leading to a policy 'double bind'. Inward investment, crucial to*

<sup>15</sup> this and a broader study of transport and regeneration in the West Midlands were discussed in E Hill, A Wenban-Smith, D Simmonds *et al* (1997), 'Demonstrating the regeneration effects of transport investment', European Transport Conference, PTRC 1997

*rebuilding the industrial base, requires sites well-serviced by roads linking to the regional and national network - but without other action these roads facilitate the processes of dispersion. The results could be both to undermine Merseyside's potential agglomeration advantage, to generate additional traffic and congestion and to worsen environmental conditions."*

MVA (1997), "Merseytravel Regeneration Study"

- 3.28 It is not possible to place a value on these effects in the absence of LUTI modelling, but two points should nevertheless be noted:
- a) The user benefits calculated using the standard DfT methodologies, as reported in the EAR, may be significantly reduced in value by their conversion into locational changes *unfavourable* to regeneration;
  - b) Where direct user benefits convert into *favourable* locational changes, care is required in estimating the WEBs (paras 3.29-3.39 below) to avoid double counting.

### **Wider Economic Benefits**

- 3.29 WEBs are dealt with in WEIR Chapter 7, which discusses Eddington's seven 'micro drivers' of productivity, for three of which it proposes quantitative estimates (adding up to £311m), while qualitative comments are made on the others:
- a) Business efficiency;
  - b) Supporting business investment and innovation;
  - c) Clusters and agglomeration;
  - d) Labour market improvements;
  - e) Increased competition;
  - f) Domestic and international trade;
  - g) Globally mobile investment.

### **Business efficiency**

- 3.30 This is by far the largest component (£222m), being simply the modelled business user benefits from the EAR which have already been discussed (paras 3.8-3.22 above). As noted there, the lack of adjustment for the land-use effects of the changed accessibility offered by MGB mean that benefits will have been over-estimated, with the discrepancy increasing over time and further compounded by the long appraisal period and low discount rate.
- 3.31 It should be noted that virtually all the net benefit of MGB accrues to business users (£222m: £472m benefits - £250m tolls), mainly because

business users' time is much more highly valued. The balance for 'consumer users' is much closer (£7m: £376 benefits - £368m tolls), and therefore even more susceptible to error. Taking into account the issues discussed above, a large negative balance is very likely. Though the latter is not a direct business impact, it is an economic welfare issue in Green Book terms.

### ***Supporting business investment and innovation***

- 3.32 The 3MG multimodal logistics centre in Widnes, taking advantage of port, rail and motorway access is said by the project owner (Stobarts) to have some degree of dependence on MGB. 315,000 sq m of additional warehousing may be involved (and 40 jobs and an investment in cranes is said to have been secured by the prospect). No other quantification or monetisation is offered.
- 3.33 To serve the UK market a logistics centre self-evidently needs to be in the UK – and if not here then elsewhere. Only the additional efficiency over such alternative locations would be a net gain to the UK economy, and therefore a legitimate WEB. However a location within or near an RA (if validly defined) might rank as a (non additional) regeneration benefit.

### ***Clusters and agglomeration***

- 3.34 An estimate of agglomeration benefits from increased 'effective density' (ie shorter travel times) is constructed using estimates of agglomeration elasticities by industry group from national research<sup>16</sup> and transport model results. There are several reasons for regarding the result (£67m) as being (at best) only indicative, and likely to be on the high side. In particular:
- a) The tendency of firms to take advantage of accessibility improvements to relocate in a more dispersed pattern will reduce any initial gains in effective density over time;
  - b) The effect of tolls is to increase the costs of interaction, again reducing effective density;
  - c) The elasticities relate to national figures, and may well not be representative of Greater Merseyside.

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<sup>16</sup> eg Eddington Report (2006), 'Appendix 4 Investigating the link between productivity and agglomeration for UK industries' Dan Graham

3.35 Reference is made in the WEIR to a business survey as supporting evidence for a positive business effect. However, little reliance can be placed on such evidence – essentially a ‘free throw’ in which respondents do not have to demonstrate any commitment to their views. As the TGB Inspector noted in respect of similar evidence: *"I assign less weight to assertions made in interviews than I would, for example, to evidence of planning applications rejected on the grounds of poor transport provision."*<sup>17</sup>

#### ***Labour market improvements***

3.36 These have not been estimated. However, it is likely that any effect will not be additional and would in any case be covered by the RA analysis (see para 3.40-3.45 below).

#### ***Increased competition***

3.37 Like the agglomeration benefits discussed above, this depends upon improvements in access times between businesses in the supply chain, and with customers. The estimate here is simply 10% of the business travel benefit, or £22m (an approximation suggested by WebTAG in the absence of other analysis). As with the business user benefit and the agglomeration benefit, it therefore depends upon the accessibility improvement being maintained. As noted in these connections, this is unlikely to be the case.

#### ***Domestic and international trade***

3.38 The proximity of the bridge to John Lennon Airport, Garston Docks and the proposed Weston docks is identified. However, no valuation is placed upon this.

#### ***Globally mobile investment***

3.39 The additional accessibility afforded to the airport, docks and logistics facilities referred to above is suggested as possibly significant to internationally mobile investors. However, only investments which would not consider an alternative UK location would be valid as a WEB; attraction of investments which could be accommodated elsewhere in the UK should rank as regeneration benefits, not WEBs.

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<sup>17</sup> TGB Inspector's Report (2006), para 9.293(c)

### **Benefits to Regeneration Areas**

3.40 The direct transport benefits and the WEBs discussed above aim in principle to estimate *net increases* in national welfare arising from transport interventions. However, in transport appraisal practice 'Regeneration' represents a distinct and separate dimension in that (in principle) it values benefits to RAs more highly than equivalent benefits elsewhere (thus a transfer of jobs from outside an RA to within it with *no net increase* would qualify as a regeneration benefit). This has two important implications:

- a) The wider policy purpose of RAs needs to be clearly defined to qualify – normally by inclusion in the Regional Economic Strategy (RES);
- b) The regeneration benefits cannot be added to economic benefits calculated by other means.

3.41 Confusingly, the WEIR deals with Regeneration (in Chapter 8) as though it is a component of WEBs, when it is not. In what follows I have sought to maintain the distinction.

### **Definition of RAs**

3.42 The RA used for the analysis reported in the WEIR is self-defined, in terms of the incidence of deprivation (using the CLG 2007 index), and covers the most of the Greater Merseyside conurbation area. The 'hinterland' is based upon a 40 minute isochrone from the MGB and includes a wider area extending into West Lancashire, Salford, Trafford and Chester.

3.43 The 'Second Mersey Crossing' is identified as one of 45 'Transformational Action' within the RES for the North West, but the RES does not define a Regeneration Area in the terms required by WebTAG (in either the 2003 or 2009 consultation versions). The summary of WebTAG 3.5.8 in WEIR 8.2.3 is inaccurate in this respect.

### **Potential for benefits to RAs**

3.44 Although, as noted above, not WebTAG compliant, the RA defined does provide a means of considering the impact of MGB on the most deprived areas, and this is valuable in its own right. The key questions in this respect are:

- a) Does the MBG increase the number of jobs within the RA? (And if so, how many are relocations from the hinterland?)
  - b) Does the MGB improve the prospects of RA residents winning new and existing work? (and if so, how far is the benefit reduced by more competition from hinterland residents?)
- 3.45 The methodology used (WEIR Section 5.4) relies upon improved accessibility (above a 10% threshold) as the principal measure of increased job opportunities. However, there is no information about the penetration rate used (ie the proportion of suitably skilled people with improved access that actually win the jobs – 2003 WebTAG 3.5.8, para 7.3.3). Without this it is difficult to say whether or not the numbers are credible.
- 3.46 A further issue concerns the attribution to MGB of 25% of the overall totals of jobs arising from the overall Mersey Gateway Regeneration programme. No rationale is offered for this estimate.
- 3.47 The results of the analysis (WEIR Section 8.3) are presented in an extremely confusing narrative fashion. Figure 3.2 aims to provide a more accessible summary, with comments.

**Figure 3.2: RA employment effects of Mersey Gateway Project (including MGB)**

<b>Effects of better access</b>	<b>Benefit to RA residents</b>	<b>Comments</b>
Existing jobs in hinterland won	<b>654</b>	<ul style="list-style-type: none"> <li>These estimates depend upon the validity of the penetration rates assumed, and on a non-LUTI transport model in a situation which demands one (see paras 3.10-3.11 above)</li> </ul>
Existing jobs in RA won	<b>1118</b>	
1170 new jobs in RA won	<b>1195</b>	<ul style="list-style-type: none"> <li>Comments as above</li> </ul>
RA residents win 3030 new jobs in hinterland (2.6x new jobs in RA)		<ul style="list-style-type: none"> <li>The use of a single multiplier (2.6) is extremely dubious: many of the regeneration projects are well down the supply chain and would have lower multipliers (especially retailing)</li> </ul>
Jobs lost to RA residents from better access from hinterland	<b>-1309</b>	<ul style="list-style-type: none"> <li>The balance between gains and losses depends upon whether RA residents achieve a higher or lower penetration rate than hinterland residents (see para 3.45 above). The impact of toll charges on low income job-seekers could be particularly significant (para 3.49 below)</li> </ul>
Wage competition	<b>0</b>	<ul style="list-style-type: none"> <li>The relatively low wage rates assumed reinforce the point about multipliers and toll charges</li> </ul>
Retail competition	<b>0</b>	<ul style="list-style-type: none"> <li>Retailing is essentially a zero-sum game: gains in one part of the RA will tend to be offset by local losses. There should be a negative number here to reflect this.</li> </ul>
1000 jobs lost in redevelopment	<b>-50</b>	<ul style="list-style-type: none"> <li>Small firms affected by redevelopment are often 'hanging on' in temporary premises. In my experience the casualty rate is much higher than this ~50% or 500 jobs lost</li> </ul>
Displacement of 50% existing jobs by inward investment	<b>-375</b>	<ul style="list-style-type: none"> <li>It is not clear which are the 750 inward investment jobs being counted here</li> </ul>
<b>Net effect on RA residents</b>	<b>+1233</b>	<ul style="list-style-type: none"> <li>The net effect seems likely to be at least 500 lower for redevelopment alone</li> </ul>

3.48 It is clear from this discussion that little reliance can be placed upon the estimates of employment benefit to RA residents. Direct losses of jobs from redevelopment, in particular, are likely to be much higher; the multipliers used seem excessively generous; and there is a lack of information about the crucial assumptions on penetration rates. In addition, the accessibility information on which it all depends is derived from an inappropriate type of model for the scale and significance of the results being claimed.



- 3.49 A further issue concerns the impact of tolls on the RA residents either side of the Mersey, who are intended to be amongst the main beneficiaries of the increased cross-river capacity (a point accepted by Amion – Summary Proof 4.2.4). Even if additional jobs were forthcoming on the scale suggested, access to them from those on the lowest income would be inhibited by the cost of tolls on both the existing SJB and the new MGB. Those at present using the SJB toll-free would be placed in a markedly worse position.
- 3.50 While rebates and exemptions might help address this problem, complex procedures will be necessary to ensure appropriate targeting, and these can in themselves create barriers for new or marginal labour market entrants. Improvements in public transport provision might help, but the trend towards a more diffuse pattern of employment (to which TGB will contribute) will limit the range of beneficiaries<sup>18</sup>.
- 3.51 My own research in Merseyside and elsewhere (see para 3.26 above), suggests strongly that benefits to the most marginal entrants to the labour market, and to the most deprived communities, are associated with improvements to public transport accessibility rather than cars. The evidence of Dr Twigger-Ross tends to update and support my earlier work on the relationships between transport and regeneration. In this connection she points specifically to the problems arising from poor public transport across the SJB (T-R Proof, paras 6.23-5). Rather surprisingly, in the light of this, public transport is not mentioned in a lengthy discussion of access to the additional jobs projected by the WEIR (T-R Proof, paras 12.3-22).

### **Summary of economic and regeneration benefits**

- 3.52 Figure 3.3 presents a summary critique of the principal economic and regeneration benefits claimed for the MGB proposal.

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<sup>18</sup> Analysis of the MGM results by Keith Buchan suggests declining public transport use

**Figure 3.3: summary of economic and regeneration benefits**

<b>Category</b>	<b>Claimed</b>	<b>Critique</b>
<b>TEE:</b> Direct business benefit from increased transport efficiency	£222m – difference between MGB business user benefits and tolls	<b>High and not robust</b> Depends on constant land-use and maintenance of time-savings for 45 years from end of modelled period; takes no account of reduced time-savings and increased toll take from traffic generated by land-use change
<b>TEE:</b> Direct consumer benefit from increased transport efficiency	£7m – difference between MGB consumer user benefits and tolls	<b>High and not robust</b> As above
<b>WEB:</b> Clusters and agglomeration	£67m – result of improved accessibility	<b>High and not robust</b> Depends on initial accessibility benefits being maintained, rather than eroded by locational changes
<b>WEB:</b> increased competition	£22m – 10% of direct benefit	<b>High and not robust</b> Depends on same factors as direct benefit
<b>Regeneration:</b> net new jobs won by RA residents	1233 net	<b>High and not robust</b> Access to jobs depends on non-LUTI model; allocation of benefits to MGB, multiplier and penetration rates not explained or justified; effects of redevelopment understated

## 4 Conclusions

4.1 I conclude that the economic and regeneration case put forward by the promoters of MGB is substantially overstated, for the following reasons:

### **Direct transport efficiency benefits**

- a) The transport model underestimates traffic flows in the Study Area because (as a non-LUTI model) it cannot deal with the dynamic effects of the MGB itself on land-use;
- b) This discrepancy will already be significant by the end of the modelled period (2030) and increase throughout the appraisal period (to 2074);
- c) The effect of this systemic deficiency is to over-estimate the user time savings between the 'do nothing' and 'do something' scenarios;
- d) It also has the effect of under-estimating the aggregate values of the tolls paid – by both business and consumer users;
- e) By far the greatest part of the benefits is the difference between the value of user time savings and tolls paid. This relatively small difference between these two large numbers is highly sensitive to their estimated values;
- f) The estimated NPV of benefits is therefore not robust and is likely to be substantially too high.

### **Wider Economic Benefits**

- a) The cluster and agglomeration benefits claimed depend on the aggregate effect of individual businesses' locational choices being such as to maintain initial accessibility benefits. In practice these are more likely to be eroded over time;
- b) Benefits from increased competition depend on the same factors as the direct transport efficiency benefits, and are subject to the same criticisms.

### **Regeneration Benefits**

- a) The regeneration benefits are related to an area which does not meet the requirements of WebTAG in terms of designation in the RES;
- b) The estimates of jobs gained by the residents of this area depend on high multipliers applied to new RA jobs to estimate additional jobs in the hinterland;
- c) Assumptions about the relative success of RA and non-RA residents in winning both existing and new jobs are unsubstantiated;
- d) An optimistic view is taken of the likely success of relocation of directly affected businesses;
- e) The allocation to MGB of 25% of all jobs created by the Mersey Gateway regeneration is not substantiated and seems generous.

- 4.2 All the above deficiencies are compounded by the absence of appropriate sensitivity tests, in accordance with good practice and DfT guidance.