Forecasts from the Strategy Planning Model

Appendix A

A12.1 As reported in Chapter 4, we used the Greater Manchester Strategy Planning Model (SPM) to test our long-term transport strategy.

A12.2 The origins of the SPM are in the development of the Greater Manchester Transport Strategy, first presented in the July 1995 Greater Manchester Package Bid submission. The transport strategy identified the need to reverse self-reinforcing cycles that threatened the achievement of the Greater Manchester Authorities' core objectives. In particular:

- ***dispersal in the location of economic activity means that more of the trips people want to make can only be feasibly made by car. This in turn increases the quantity of car travel, which in turn worsens accidents, congestion and pollution, weakens the attraction of alternatives to the car, and strengthens the pressure for dispersal of economic activity***
- ***increased reliance on cars has reduced public transport travel. The loss of revenue to operators leads to a combination of higher fares and/or reduced services, which in turn leads to further reductions in patronage***

A12.3 The transport strategy seeks to reverse these cycles by integrating transport and land use policies and introducing a different set of self-reinforcing policies which will focus new development on town and city centres rather than edge-of-town locations, and improve public transport.

A12.4 However, no existing transport model enabled these mechanisms to be tested and quantified. Hence, a brief was prepared for the Greater Manchester SPM, one of the most ambitious transport modelling projects ever commissioned in the UK. The Highways Agency were co-sponsors of the model with the Greater Manchester authorities, and the Department of Transport and Government Office North West were also represented on the Steering Group for development of the model.

A12.5 The model represents the interactions over time of a wide range of factors affecting travel behaviour and land use in Greater Manchester. The interaction between travel and land use is two-way – land use affects travel and travel affects land use. The model represents choice of time of day of travel; choice of destination; frequency of travel; choice of mode; car ownership decisions. The model represents travel by car, bus, rail, Metrolink, walk, cycle, and taxi. The model anticipates how public transport operators might respond to changes in demand by changing their fares or service frequencies, so that costs and revenues remain in balance.

A12.6 The SPM was developed over the period 1996 to 1999. The model uses GMATS household and roadside interview survey data as the primary data source to represent the modelled base year of 1991. These data sources together provide information about the ultimate origins and destinations of trips and other information such as trip purpose, driving licence holding, and car ownership. The model won the Institute of Logistics and Transport's 1999 Annual Award for Achievement in Transport Planning.

A12.7 We reported the results of some early forecasts from the model in the Provisional LTP. Since then, the model has undergone further development and the forecasts we reported in that plan were subsequently found to contain some data input errors. Nonetheless, the conclusions from that analysis do not change substantially.

A12.8 In Chapter 4, we briefly reported the results of new analysis using the model and explained that in 1999 it was decided not to develop the highway investment option for further testing. In this appendix we provide further details of the Reference Case and the public transport investment test.

The Reference Case

A12.9 We first used the SPM to forecast the consequences of continuing with policies broadly similar to those pursued in the recent past. This is the Reference Case. In this test, minimal investment in transport infrastructure is allowed for, with the completion of the M60 orbital motorway assumed to take place in 2001. We believe that land use planning policy in this test reflects recent national planning policy guidance.

A12.10 Other key assumptions in the Reference Case include:

- ***incomes (and values of travel time) increase at about 2% per annum in real terms, in line with the central Highways Economic Note 2 projections***
- ***the escalator on car fuel duty is assumed to be applied at 5% per annum from 1996 to 2001 and at a lower rate of 2.5% per annum until 2006, with no increase thereafter***

A12.11 The table below shows forecast person travel (in thousands of kilometres) in the Greater Manchester Study Area by mode for an average weekday in the years 1996 and 2011. It should be noted since the model uses 1991 as its base year, the 1996 values are forecast rather than observed values, although the model's forecasts generally accord well with observations of travel behaviour in 1996.

Table A12.1: Forecast person travel in Greater Manchester by mode: Reference Case

Mode	(000s kms) 1996	(000s kms) 2011
Car	51200	58300
Bus	6130	3820
Rail*	1570	1570
Metrolink	414	476
Taxi	514	444
Walk**	1020	768
Cycle	95	70

*Note that the totals include the Greater Manchester sections of inter-urban trips. These trips comprise a particularly substantial proportion of rail person kilometres. These trips will be sensitive to many factors other than travel conditions in Greater Manchester and the SPM cannot therefore be expected to provide accurate forecasts of their growth – although the model does allow such trips to respond to relevant changes in Greater Manchester.

**Excluding walk access to or egress from trips by other modes.

A12.12 The table clearly shows the dominance of car travel. Travel by car is forecast to increase by 7.1 million person kilometres per day between 1996 and 2011, representing a 14% increase on 1996. Travel by other modes combined is forecast to decline by 2.6 million person kilometres per day, representing a 27% decrease on 1996. All non-car modes decline substantially, except rail, which holds steady, and Metrolink, which achieves modest growth, despite no extensions being built (even the extension to Eccles is excluded from the Reference Case).

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A12.13 The largest decline, in both absolute and proportionate terms, is experienced by bus travel, which is hit by a combination of growing car ownership and worsening traffic congestion. In order to prevent bus operators running at a loss (or at unrealistic levels of profit) the model adjusts bus frequencies and fares so that costs and revenues remain in balance. Clearly, in the Reference Case, bus travel remains caught in a vicious circle of higher fares, lower frequencies, and fewer passengers.

A12.14 The Reference Case presents an unattractive vision of the future for Greater Manchester. The decline in bus travel (and resulting higher fares and lower frequencies) would lead to hardship for people without access to a car (the model forecasts that car ownership in the Greater Manchester Study Area will have increased from 354 per 1000 population in 1996 to 443 per 1000 population in 2011). Non car-owning households would be increasingly excluded from many activities.

A12.15 Traffic congestion (and therefore pollution) would worsen substantially. Average road traffic speeds (including those on motorways) in the am peak period (0700 to 0930) are forecast to decline by 10% from 30 mph in 1996 to 27 mph in 2011. In the off-peak (0930 to 1530 plus early morning and evenings after 1830) average traffic speeds are forecast to decline by 10% from 35.8 mph in 1996 to 32.3 mph in 2021. These speeds are high for an urban area and reflect the importance of the motorway network for travel in Greater Manchester – 34% of car vehicle kilometres travelled in 1996 in the Greater Manchester Study Area are estimated to be on the motorway network.

A12.16 Away from the motorway network, average speeds in the am peak are forecast to fall by 14% from 17.7 mph in 1996 to 15.2 mph in 2011. In the off-peak, average speeds other than on motorways are forecast to fall by 15% from 21.9 mph in 1996 to 18.6 mph in 2011. In short, off-peak travel conditions on the all-purpose road network in 2011 would be similar to peak travel conditions in 1996.

A12.17 In the Reference Case, travel to Manchester City Centre is forecast to grow by 2% from 1996 to 2011 while trips to other town centres are forecast to decline by 5% in the same period.

Public transport investment test

A12.18 We also used the SPM to test a strategy of substantial investment in public transport. This was developed from the Public Transport Demonstration Test reported in the Provisional LTP. This is the public transport investment test. It incorporated the following changes input to the model for 2001:

- ***Metrolink Extensions to Eccles; Oldham and Rochdale; Manchester Airport; Ashton-under-Lyne; Trafford Park; Stockport via Didsbury***
- ***Bus lanes introduced on all major roads to and from Manchester City Centre, with consequent 20% reduction in bus wait times, and some reduction in highway capacity. Speeds of buses on the radial roads will increase because they will no longer be affected by traffic congestion. A 10% increase in bus speeds throughout the network was also allowed for, reflecting improved fare collection systems (eg Smartcards)***

- ***Improvements in public transport quality including more attractive vehicles, stops, and stations; implementation of the GMPTE Interchanges Strategy; better information at bus stops and via the internet, as provided for by the GMPTE Integration Project. These improvements were judged to be the equivalent of a reduction in bus and rail journey times by the equivalent of 5 in-vehicle time minutes and a reduction in Metrolink journey times by the equivalent of 2.5 in-vehicle time minutes***

In all other respects, inputs were identical to those in the Reference Case.

A12.19 It should be emphasised that the public transport investment test was indicative of the kinds of measures we would like to introduce. These will not necessarily be identical to the measures for which we have formed specific plans; hence the differences between the specification of this SPM test and the test of the five year strategy reported earlier.

A12.20 The forecasts from the public transport investment test in thousands of person kilometres are set out below.

Table A12.2: Forecast person travel in Greater Manchester by mode: public transport investment test

Mode	1996 (000s kms)	2011 (000s kms)
Car	51200	55900
Bus	6130	6160
Rail	1570	2210
Metrolink	414	858
Taxi	514	237
Walk	1020	759
Cycle	95	67

A12.21 In this test, the growth of car travel is contained to an increase of 4.7 million person kilometres per day between 1996 and 2011, representing an increase of 9% on 1996. This compares with an increase of 7.1 million person kilometres per day in the Reference Case, representing an increase of 13.6% on 1996. The sharp decline in bus travel seen in the Reference Case is transformed into a small increase. The vicious circle found in the Reference Case has been broken. Rail and Metrolink show strong growth. Taxi travel declines sharply (taxi and bus are often close substitutes).

A12.23 The trends in walk and cycle travel are similar to those in the Reference Case – note that growth in walk access and egress to public transport is not reflected in the numbers in the table. However, our proposed measures to improve conditions for walking and cycling have not been included in this model test, since they are difficult to represent in a computer model of this scale.

A12.24 Part of the higher usage of public transport in 2011 is due to people choosing not to own a car. This will include decisions by households not to purchase a second car. Car ownership in the Greater Manchester Study Area in 2011 is forecast to be 427 per household in the public transport investment test compared with 443 per household in the Reference Case.

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A12.25 Road traffic speeds in 2011 (including those on the motorway network) are forecast to be 27.3 mph in the am peak and 32.3 mph in the off-peak. Despite the substantial reduction in car travel relative to those in the Reference Case, these speeds are very similar to those forecast for the Reference Case for 2011 (in which they were 27 mph and 32.3 mph in am peak and off-peak periods respectively). This outcome appears to result from the 15% reduction in capacity of radial roads assumed to accompany the bus priority measures. That assumption will need to be reviewed in future model tests in order to reflect more closely the approach taken by the Greater Manchester authorities in implementing bus priority measures.

A12.26 The public transport investment test shows public transport interacting with land use to lead to increased travel to town and city centres. Trip legs (by all modes) with at least one end in Manchester City Centre are forecast to increase by 17% from 1996 to 2011. Trips with at least one end in one of the other nine centres are forecast to increase by 5% from 1996 to 2011. This contrasts with a forecast decline of 5% over the same period in the Reference Case.

Conclusion

A12.27 The forecasts from the SPM suggest that we are moving in the right direction with our strategy. The public transport improvements are forecast to enable bus travel to break out of its vicious cycle of declining patronage, higher fares, and lower frequencies. The public transport improvements are forecast to lead to a substantial slowing in the growth of car travel. This suggests that public transport can provide an attractive alternative to the car. Improved public transport is forecast to lead to increased travel to town and city centres, which can be easily served by public transport. As noted above, we believe that the model is understating the impact of our strategy on reversing the decline in walking and cycling and tackling traffic congestion and we will need to improve our understanding of these issues further as we develop our strategy.