
Highways Forecasting and Analytical Services

Project: National Productivity Investment Fund Bid – Manchester City Council

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1. Introduction

- 1.1. As part of the Autumn Statement 2016, the Government announced the creation of the National Productivity Investment Fund worth a total of £23bn. A total of £1.1bn of this is to be made available for local roads.
- 1.2. Transport for Greater Manchester, representing the Combined Authority will coordinate the bid process including ranking bids from the GM Districts against local objectives.
- 1.3. The scheme is to improve junction capacity and increase throughput by signalling two key junctions of the Mancunian Way: Princess Road/Medlock Street and Cambridge Street/Higher Cambridge Street. The former will provide direct routes through the roundabout from Princess Road (northbound) to Medlock Street and the Mancunian Way eastbound, while the latter will enable active management of the signal timings to favour high demand movements throughout the day. The scheme will also support cycle movements through the junctions.

2. Overview of the Modelling

2.1. The highway benefits of the link road were assessed for the years of 2017 and 2032 using the validated SATURN Model used for the assessment of the Regent Road and Chester Road proposals. Separate model runs were carried out for a weekday morning peak hour 0800-0900, evening peak hour 1700-1800 and an average inter-peak hour for the 1000-1600 time period.

2.2. Three scenarios were tested for 2017 and 2032 and compared to current (Do-Minimum) conditions , namely;

Do-Something 1 - Mancunian Way/Cambridge Street Proposals

Do-Something 2 - Mancunian Way/Medlock Street Proposals

Do-Something 3 - Mancunian Way/Cambridge Street and Mancunian Way/Medlock Street Proposals

2.3. The proposed layouts and signal staging and timings were provided by Greater Manchester Urban Traffic Control.

2.4. The model was cordoned to the area of the proposed scheme including the Mancunian Way to the east of Cambridge Street, Stretford Road to the South, the Mancunian Way to the west of Medlock Street and Hulme Street to the North. This was done to allow shorter run times for scheme testing and to improve the network convergence to reduce the impacts of assignment noise on the appraisal results.

2.5. The proposed layouts and signal staging and timings were then incorporated into the appropriate Scenario to be tested.

2.6. Traffic was then assigned using a fixed matrix for the Do-Minimum and Do-Something Scenarios. Subsequently, signals and offsets were optimised to maximise junction performance and reassigned.

3. Appraisal Results

- 3.1. The results of the appraisal for each of the Scenarios .in 2017 and 2032 are summarised in Tables 3.1 to 3.6
- 3.2. Based on the modelling, the results of the analysis indicate that in the morning and evening peaks for all scenarios the proposed scheme generates travel time savings as a result of reductions in delay and travel distance savings as a result of traffic using the proposed cut through
- 3.3. The interpeak has improvements in travel distance as a result of traffic using the proposed cut through at each of the junctions. However, journey times generally increase as result of the introduction of the proposed schemes
- 3.4. The interpeak represents uncongested' conditions and does not experience the levels of delay seen in the morning and evening peaks. As there are no significant delays to mitigate at the junctions and given that signalisation of the junctions will incur some additional delay the overall journey time on the network increases.
- 3.5. It should be noted there may, be wider benefits from public transport associated with the scheme. This has not been assessed as part of this appraisal.

Table 3.1 Mancunian Way/Cambridge Street - 2017					
Scenario	Input Data / Key Performance Indicators	Unit	AM Peak Hr	PM Peak Hr	Inter-Peak Hr
			Weekday	Weekday	Weekday
Do-Minimum	Number of highway trips affected	vehicles	13,385	11,999	8,697
	Total vehicle travelled time	vehicle-hours	496	504	185
	Total vehicle travelled distance	vehicle-km	14,802	14,140	10,325
Do-Something	Number of highway trips affected	vehicles	13,385	11,999	8,697
	Total vehicle travelled time	vehicle-hours	472	485	215
	Total vehicle travelled distance	vehicle-km	14,612	14,052	10,158

Table 3.2 Mancunian Way/Cambridge Street - 2032					
Scenario	Input Data / Key Performance Indicators	Unit	AM Peak Hr	PM Peak Hr	Inter-Peak Hr
			Weekday	Weekday	Weekday
Do-Minimum	Number of highway trips affected	vehicles	14,040	12,629	8,923
	Total vehicle travelled time	vehicle-hours	545	646	207
	Total vehicle travelled distance	vehicle-km	15,608	14,290	10,344
Do-Something	Number of highway trips affected	vehicles	14,040	12,629	8,923
	Total vehicle travelled time	vehicle-hours	514	603	204
	Total vehicle travelled distance	vehicle-km	15,456	14,135	10,187

Table 3.3 Mancunian Way/Medlock Street - 2017					
Scenario	Input Data / Key Performance Indicators	Unit	AM Peak Hr	PM Peak Hr	Inter-Peak Hr
			Weekday	Weekday	Weekday
Do-Minimum	Number of highway trips affected	vehicles	13,385	11,999	8,697
	Total vehicle travelled time	vehicle-hours	496	504	185
	Total vehicle travelled distance	vehicle-km	14,802	14,140	10,325
Do-Something	Number of highway trips affected	vehicles	13,385	11,999	8,697
	Total vehicle travelled time	vehicle-hours	487	419	207
	Total vehicle travelled distance	vehicle-km	14,718	14,126	10,294

Table 3.4 Mancunian Way/Medlock Street - 2032					
Scenario	Input Data / Key Performance Indicators	Unit	AM Peak Hr	PM Peak Hr	Inter-Peak Hr
			Weekday	Weekday	Weekday
Do-Minimum	Number of highway trips affected	vehicles	14,040	12,629	8,923
	Total vehicle travelled time	vehicle-hours	545	646	207
	Total vehicle travelled distance	vehicle-km	15,608	14,290	10,344
Do-Something	Number of highway trips affected	vehicles	14,040	12,629	8,923
	Total vehicle travelled time	vehicle-hours	525	521	228
	Total vehicle travelled distance	vehicle-km	15,528	14,236	10,319

Table 3.5 Mancunian Way/Cambridge Street and Mancunian Way/Medlock Street - 2017					
Scenario	Input Data / Key Performance Indicators	Unit	AM Peak Hr	PM Peak Hr	Inter-Peak Hr
			Weekday	Weekday	Weekday
Do-Minimum	Number of highway trips affected	vehicles	13,385	11,999	8,697
	Total vehicle travelled time	vehicle-hours	496	504	185
	Total vehicle travelled distance	vehicle-km	14,802	14,140	10,325
Do-Something	Number of highway trips affected	vehicles	13,385	11,999	8,697
	Total vehicle travelled time	vehicle-hours	471	389	234
	Total vehicle travelled distance	vehicle-km	14,531	14,006	10,115

Table 3.6 Mancunian Way/Cambridge Street and Mancunian Way/Medlock Street - 2032					
Scenario	Input Data / Key Performance Indicators	Unit	AM Peak Hr	PM Peak Hr	Inter-Peak Hr
			Weekday	Weekday	Weekday
Do-Minimum	Number of highway trips affected	vehicles	14,040	12,629	8,923
	Total vehicle travelled time	vehicle-hours	545	646	207
	Total vehicle travelled distance	vehicle-km	15,608	14,290	10,344
Do-Something	Number of highway trips affected	vehicles	14,040	12,629	8,923
	Total vehicle travelled time	vehicle-hours	475	521	231
	Total vehicle travelled distance	vehicle-km	15,528	14,236	10,159

4. TUBA Analysis

4.1. The scope of the economic appraisal considers the evaluation of the scheme using TUBA (Transport Users Benefit Appraisal), v1.9.5. This has been carried out in accordance with published DfT guidance in TAG Unit A1.1.

4.2. This appraisal is based on the supply of trip and cost matrices from the SATURN cordon model. The Model has been cordoned to an area of influence for the proposed scheme.

4.3. Economic parameters used for the appraisal are consistent with Tag Unit A1-1. The standard 60 year appraisal is adopted for the Scheme.

Assumptions

4.4. Presented below is a description of the modelling assumptions that have been applied in this economic appraisal.

Appraisal Period

4.5. Appraisal of benefits and costs has been considered over the standard 60 year evaluation period, from 2017 (scheme opening year) to 2076.

Modelled Time Periods

4.6. The modelled forecast years for the economic appraisal are as follows:

- Opening Year - 2017
- Second Forecast Year - 2032

4.7. Model forecasts have been interpolated and extrapolated accordingly to obtain economic benefits for all other years, which are then discounted to 2010.

4.8. The appraisal has used model outputs for the following time periods:

- AM Peak Hour (08:00 to 09:00)
- Average IP Hour (10:00 to 16:00)
- PM Peak Hour (17:00 to 18:00)

Annualisation

4.9. Annualisation factors have been calculated from reference to recent 2014 ATC count data collected at a number of points in the area of influence of the scheme. The factors are shown in Table 4.1, and represent the conversion of hourly benefits by time period to an annualised total.

4.10. The annualisation for this appraisal only considers weekday time periods and does not consider weekend time periods. The economic benefits presented in this report are, therefore, conservative estimates. Although inclusion of weekend period in the appraisal would improve the BCR for the scheme further, this would not change the Value for Money scheme categorisation.

Table 4.1: Annualisation Factors	
Time Period	Annualisation Factor
AM peak (7:00-10:00)	707
Inter-peak (10:00-16:00)	1518
PM peak (16:00-19:00)	713

Scheme Costs for Appraisal

4.11. The scheme investment cost covering the preparation and construction period £8.21m as detailed in figure 4.2. The investment and operating cost covering the remainder of the appraisal period from 2018 to 2076 is valued at net value of zero because the

scheme is over an existing transport infrastructure whose existing maintenance costs are unlikely to be affected by the changes proposed as part of the scheme.

Figure 4.2 Scheme Costs	
Item	Order of Issue Costs
Construction Costs	3,984,925
Sub Total	3,984,925
Design Costs and Professional Fees (Including Design, Project Management, Cost management, Site Supervision	996,231
Miscellaneous Client Costs and Project Burdens	199,246
Sub total	5,180,403
QRA	1,873,000
Sub total	7,053,403
Inflation	1,058,012
Land Costs	100,000
Total	8,211,414

4.12.TUBA converts the scheme costs to 2010 present year values. The scheme costs prices are deflated to 2010 prices from using a GDP deflator value for 2017 of 110.9. These costs are then discounted to a 2010 base from application of a discount rate of 3.5% for the first 30 years of the appraisal; and then for subsequent years a rate of 3.0% has been applied (e.g. $1/(1.035^{\text{Years from base year}})$).

4.13.The 2010 factor costs are then converted to market prices from application of the indirect taxation factor of 1.190. This produces a 2010 present value year cost of £6.45m.

4.14.The present value of benefits (PVB) for the Scheme is estimated to be £28.85m, and the present value of costs (PVC) is £6.36m. This generates a benefit to cost ratio (BCR) value of 4.54, and results in a net present value (NPV) of £22.5m over the 60 year appraisal period.

4.15.A BCR value of 4.54 is categorised as Very High Value for Money according to DfT's Value for Money guidance.