Nottingham Urban Area

Local Sustainable Transport Fund Main Bid

Business Case December 2011

Volume 2: Economic Case



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Information Note

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Executive Summary

This note has summarised the economic appraisal of Nottingham's Main LSTF bid. The appraisal made use of the Greater Nottingham Transport Model which has recently been scrutinised by DfT as it provided the evidence base of the Ring Road Major Best and Final Funding Bid.

A range of published evidence on the efficacy of the kinds of measures included in the LSTF proposals has been reviewed, including the LSTF Resource Library. Account has been taken of the how comparable evaluated schemes and settlements are to Nottingham and the LSTF proposals. The evidence has been used in most cases to define adjustments to model demand matrices, typically reductions in car travel and assumptions about the modes to which the journeys switch to. Care has been taken not to make overly ambitious assumptions about impacts. A sensitivity test has been undertaken which demonstrates the value for money of the proposals under conservative assumptions.

Most impacts have been appraised using DfT's standard TUBA software for economic appraisal. A number of measures could not be readily appraised using TUBA and so bespoke spreadsheet analyses were undertaken for:

- impacts of 20 mph zones on travel times and accidents;
- promotion of more economic driving styles;
- use of electrically powered buses on selected routes; and
- benefits of reduced mortality from increases in walking and cycling.

The outturn cost of the Main Bid is £29.6m (including an allowance for Optimism Bias). Costs to maintain the programmes beyond the LSTF period (ie after 2014/15) are £17.2m allowing for Optimism Bias. As required for appraisal these costs are discounted to 2002 and converted to 2002 prices, resulting in costs to the public purse of £26.9m.

Benefits are estimated as £120m (2002 prices, discounted to 2002) if only the impacts considered in the Analysis of Monetised Cost and Benefits (AMCB) Table are considered. The most significant benefits, £90m, are due to travel time and vehicle operating cost savings. The Benefit Cost Ratio (BCR) and Net Present Value (NPV) are 4.5 and £93m respectively.

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We have also quantified benefits which are not included in the AMCB Table: reliability (£51m), reduction in mortality due to increased walking and cycling (£34m), and Wider Impacts (£9m). When these are included total benefits are £214m (2002 prices, discounted to 2002). The Benefit Cost Ratio is 8.0 and Net Present Value of benefits is £187m.

The low impact sensitivity test has a BCR of 2.7 and NPV of £45m, or 5.1 and £110m respectively when reliability, walking/cycling and Wider Impacts are included. It is clear therefore that the proposed measures will deliver high Value for Money.

Consideration has been given to the Social and Distributional Impacts of the proposals. There are very few negative impacts and many of the measures are targeted at vulnerable groups such as young people and the unemployed.

The evidence presented in this Economic Case demonstrates the strategic fit of the proposals, in particular the primary objectives of LSTF. The objective to **facilitate economic development** is demonstrated by:

- benefits to business travellers are valued at £30m (present value) leading to a enhanced productivity and competitiveness;
- direct GVA uplift of £9m;
- benefits to commuters are valued at £32m (present value) which evidences reductions in disincentives to join the work force;
- enhanced journey time reliability (£51m, present value) allowing benefiting commuters and reducing inefficient use of time for businesses; and
- benefits due to reductions in mortality resulting from more walking and cycling have been quantified (£34m).

Benefits of carbon reduction are valued at £4.5m evidencing the proposals' impacts on the objective to **reduce carbon emissions**. The proposals also demonstrate the City Council's leadership in promoting low carbon travel choices through promotion of non-motorised modes and public transport, and deployment of electrically operated buses on high profile routes.

1 Introduction

1.1 The Nottingham Urban Area Local Sustainable Transport Fund (LSTF) Main Bid Initial Proposal was submitted to the Department for Transport (DfT) by Nottingham City Council, Nottinghamshire County Council, and Derbyshire County Council in June 2011. This bid was for a number of packages of interventions with a total cost of £25.1m including a DfT contribution of £10.82m. Nottingham (as the lead authority) and the partner bidders were invited in August 2011 to submit a full business case for the proposals to be submitted to DfT in December 2011.

1.2 This followed a smaller Key Component Bid submitted in April 2011 which was successful in securing funding of £4.9m from DfT in July 2011 for a total programme cost of £10.9m. This note contains the economic case for the Main Bid business case and informs the sections within the bid as well as being included as an appendix to the submission in support of the main Bid business case.

1.3 Following this introduction the note contains:

- A short summary of the main features of the LSTF process
- A summary description of the Local Sustainable Transport Fund bids and Packages:
  - Key Component; and
  - Main Bid packages.
- The Model and Modelling Approach;
- Appraisal including:
  - Economic Appraisal;
  - Environmental Appraisal; and
  - Social Appraisal.
- Programme costs;
- Public Accounts;
- Headline Value for Money Outputs; and
- Sensitivity tests.

2 Main Features of the LSTF

2.1 This section draws on the DfT's LSTF guidance to provide a short summary of the main points of the LSTF scope, packages to be considered, and assessment criteria.

Size and Scope

- The LSTF is a fund of £560m available to bidders from any English transport authority outside London.
- Small Projects (up to £5m DfT funding) and Large Projects (£5m-£50m DfT funding) are to be considered. Within Large Projects there can be a Key Component Option (up to £5m DfT funding) which is assessed earlier and separately from the main bid.
- LSTF is intended to provide funding for the delivery of sustainable transport solutions that support economic growth while reducing carbon. It is not intended to fund major infrastructure or service improvements for inter-urban travel but to address the needs of local communities.
- Partnership working with local communities and the private sector is important and will be treated positively in the assessment process

Packages to be Considered

- The approaches should be integrated to meet local challenges and deliver benefits for local people focused on economic growth and carbon reduction but delivering a range of additional benefits covering a range of environmental and social objectives.
- Examples given include measures to:

- **Encourage modal shift** – integration, information, ticketing, travel planning, cycling and walking initiatives.
- **Manage demands on the network** – park and ride, car clubs/sharing, business support for flexible and home-working, freight management.
- **Improve traffic management** – signal and junction improvements, red routes, 20mph zones, cycle lanes, bus lanes, pedestrian zones, management of street works and incidents.
- **Improve access and mobility** – work and school based travel plans, cycling and walking improvements in street design/facilities, demand responsive services and community transport.

Assessment Criteria

- The **scheme proposals must**:
  - Facilitate economic development
  - Reduce carbon emissions
- With **additional objectives**:
  - Deliver wider social and economic benefits
  - Improve safety
  - Improve air quality
  - Reduce noise
  - Promote increased levels of physical activity
- The **Overall Bid must**:
  - Represent good value for money and deliver additional benefits above those in the Local Transport Plan
  - Be financially sustainable with benefits enduring beyond the LSTF period
  - Incorporate a credible delivery plan
  - Be affordable
  - Include a commitment to a local contribution
- **Bids** will be **favourably considered** if they:
  - Have the support of a range of community interests
  - Incorporate partnership working with external bodies including private sector, community and voluntary organisations, and transport operators

3 The Local Sustainable Transport Fund Bids and Packages

3.1 As mentioned in the introduction, Nottingham and the partner authorities have submitted two LSTF bids:

- Key Component Bid:

  - total package cost £10.9m;
  - DfT contribution £4.9m; and
  - Funding secured in July 2011.
- Main Bid
  - total package cost £25.1m;
  - DfT contribution £10.8m; and
  - Invited to submit full business case in December 2011.

3.2 The two sections that follow include a short summary of the Key Component and Main Bid packages. For a full description please refer to the main documents for each of the two bids.

Key Component Bid

3.3 The Key Component bid contains five packages with funding for years 2011-2015 as follows:

- Package A: **Smartcard** development and integrated multi-modal ticketing - **£3m**;
- Package B: Establish **Community Travel Hub** as a pilot for the local delivery model for travel behaviour change - **£0.6m**;
- Package C: **Worksmart** phase A to provide an enhanced package of business travel support - **£0.4m**;
- Package D: Maintaining **Active Travel** partnership working with Nottingham Universities and extension to FE colleges - **£0.9m**; and
- Package E: **LSTF Programme Management** - **£0.1m**.

3.4 This bid has secured funding and so when testing the economic case of the main bid is included in the "without scheme" scenario.

Main Bid

3.5 The Main Bid contains five packages as follows:

- **Package A** – Enhanced smartcard and integrated ticketing and personalised travel planning – **£4.4m**
- Package B – Establish liveable neighbourhoods with community smarter travel hubs - **£6.6m**
- Package C – Developing a low carbon transport network - **£11.6m**
- Package D – Active travel solutions - **£2.1m**
- Package F – LSTF programme management - **£0.4m**

3.6 Within each package there are a number of components. Please see the modelling methodology note included in the submission supporting documents, or the main application form.

4 The Model and Modelling Approach

4.1 A modelling approach note is provided in the supporting documents. What follows in this section is a brief summary of the modelling approach.

The Model

4.2 The model used is the Greater Nottingham Transport Model. This has been used previously for a number of applications and in particular to support the Nottingham Ring Road Major (RRM) Transport Scheme which was submitted for consideration in the Major Schemes Best and Final Funding Bid process in September 2011. The main points of the model are:

- demand model implemented based on current WebTAG guidance;
  - trip generation, mode choice and destination choice;
  - uses 12 hour production-attraction matrices segmented by purpose and car availability;
- PT and highway assignment models in Voyager and SATURN respectively; and
- morning peak hour, average interpeak hour, evening peak hour assignment models.

4.3 The base model version used is identical to that used for the RRM work and hence validation is as per RRM work. The RRM model has a base year of 2008 with modelled years at 2016 (opening year for RRM) and 2031, and an appraisal of 60 years from opening year.

4.4 The **appraisal period** is the 15 year period 2012-2026. This covers the implementation of the fund packages and a period of 11 years after implementation during which time the scheme impacts will be experienced. Costs have been included in the appraisal for ongoing operation of the schemes beyond the initial fund period.

4.5 The **modelled years** are 2016 and 2026.

4.6 Three **scenarios** have been modelled to capture the impacts of the main bid in isolation, and to capture the overall impact of the key component plus main bid. These are:

- Do Minimum – RRM do minimum scenario;
- Key Component – Do Minimum plus Key Component Bid packages; and
- Main Bid – Do Minimum plus Key Component plus Main Bid packages.

4.7 The **core appraisal** is the Main Bid scenario vs the Key Component scenario, as the key component scenario is funded and approved. However it is also important to show that the Main Bid scenario vs the Do Minimum scenario also performs well to ensure the overall package scores well.

Modelling Approach

4.8 A detailed description of the modelling approach is included in Technical Note 03 included as a supporting document to the bid. The approach is summarised in Table 4.1. The approaches can be split into two main types:

- An adjustment to the 12 hour production-attraction matrix to reflect the impacts of behavioural change; and
- A post process to reflect some other impact on the operation of the vehicle fleet, or localised impact.

4.9 The approaches used are based on evidence from a literature review and sources such as the sustainable travel towns reports.

Table 4.1 Summary of Modelling Approach

Intervention	Modelling Approach
Smartcard and integrated ticketing	5% increase in PT trips within Kangaroo area. From walk:cycle:car:generated in ratio 37.5:37.5:20:5
Community smarter travel hub in Bulwell	6% reduction in car productions within 2km of hubs. To walk:cycle:PT:suppressed in ratio 60:20:15:5
Worksmart Phase A	9% reduction in car attractions, EB and commute in densest employment areas representing 100,000 jobs. To PT:carshare:walk:cycle in ratio 50:35:10:5 – applied only to 25% of demand.
Transitional training for education journeys & community cycling and walking promotions	10% reduction in car attractions of education based proportion of home based other trips to school zones. To walk:cycle:PT in ratio 50:20:30
Places for people including 20mph limits in residential zones	Calculate journey time impacts from increases in link times (of 0.9mph) and assume no reassignment impacts. Accident benefits based on 15% reduction in accident costs on affected links.
Community smarter travel hubs in Arnold, Beeston, Clifton, and Hyson Green	7.5% reduction in car productions within 2km of hubs. To walk:cycle:PT:suppressed in ratio 60:20:15:5. Larger reduction justified by more widespread measures in main bid vs key component.
Low carbon PT vehicles	Route km calculated. Diesel and electric vehicle emissions calculated based on fuel consumption and average grid electricity carbon density.

Intervention	Modelling Approach
Smarter choices infrastructure to support business	Extension of worksmart phase A to cover zones employing a further 30,000 employees.
Eco driving.	5% reduction in fuel for 600 vehicles each travelling 70,000km p.a.

4.10 A low-side sensitivity test was also carried out which varied the adjustments to produce a smaller beneficial result in each case. The assumptions used for the low side sensitivity are summarised in Table 4.2. Changes from the core scenario are highlighted in bold.

Table 4.2 Summary of Sensitivity Test Modelling Approach

Intervention	Modelling Approach
Smartcard and integrated ticketing	**2.5%** increase in PT trips within Kangaroo area. From walk:cycle:car:generated in ratio **47.5:47.5:0:5**
Community smarter travel hub in Bulwell	**4%** reduction in car productions within 2km of hubs. To walk:cycle:PT:suppressed in ratio 60:20:15:5
Worksmart Phase A	**6%** reduction in car attractions, EB and commute in densest employment areas representing 100,000 jobs. To PT:carshare:walk:cycle in ratio 50:35:10:5
Transitional training for education journeys & community cycling and walking promotions	**7.5%** reduction in car attractions of education based proportion of home based other trips to school zones. To walk:cycle:PT in ratio 50:20:30
Places for people including 20mph limits in residential zones	Calculate journey time impacts from increases in link times (speed reduction of **1.2mph**) assume no reassignment impacts. Accident benefits based on **10%** reduction in accident costs on affected links.
Community smarter travel hubs in Arnold, Beeston, Clifton, and Hyson Green	**5%** reduction in car productions within 2km of hubs. To walk:cycle:PT:suppressed in ratio 60:20:15:5. Larger reduction justified by more widespread measures in main bid vs key component.
Low carbon PT vehicles	Route km calculated. Diesel vehicle emissions calculated based on fuel

	consumption etc from TAG. Assume 30% reduction in carbon for electric vehicles
Smarter choices infrastructure to support business	Extension of worksmart phase A to cover zones employing a further 30,000 employees.
Eco driving.	**3.5%** reduction in fuel for 600 vehicles each travelling 70,000km p.a.

5 TUBA Inputs and Output Processing

Annualisation Factors

5.1 The annualisation factors used are the same those used for RRM and are derived from counts for the 12-hour period between 0700 and 1900, and further factors to produce full annual benefits. The derivation of the factors is described in more detail supporting documents. In summary, they are based on traffic flows recorded at the Roadside Interview sites around the Ring Road, with unit user benefits directly proportional to flow and therefore total benefits proportional to the square of the flow. For impacts that are more directly related to flow, such as accidents and greenhouse gases, a straight flow-based annualisation has been used. The annualisation factors used are shown in Table 5.1.

Table 5.1 Annualisation Factors – User Benefits and Flow-based Benefits

Benefets	Morning Peak (0800 to 0900)	Inter-peak (Average hour 1100 to 1400)	Evening Peak (1700 to 1800)
User Benefits	625	2732	662
Flow-based Benefits	687	3803	706

TUBA post Processing

5.2 The economy appraisal is based largely on model outputs processed through TUBA to calculate levels of benefits. The model was run through with the adjustments outlined above, and included in more detail in the modelling approach note, for 2016 and 2026 for the three scenarios outlined in paragraph 4.6. The resulting demands and time, distance and fare skims were input to TUBA and the outputs were used to inform the economy and social appraisal.

5.3 Table 5.2 summarises the processing and additional alterations carried out following the initial TUBA runs as part of the post processing.

Table 5.2 Appraisal post-TUBA processes

Description	Impacts on
Ramping of benefits 2012-2016	All TUBA output benefits
Separate TUBA Greenhouse Gases run with flow-based annualisation	Greenhouses gases benefits
20mph zone Analysis	User time benefits and accident benefits
Eco-driving analysis – spreadsheet based	Freight fuel costs, greenhouse gases, and indirect taxes
Electric buses – spreadsheet based	Greenhouse gases
Accident benefits pro-rated to RRM-DM	Accidents
Wider impacts assumed to be 10% of user benefits	Wider impacts
Reliability process using TAG equation	Reliability
Noise – using TAG process	Noise
Air Quality – using TAG process	Air Quality
Walk/Cycle Health Benefits using model outputs and HEAT website	Health Benefits

6 Economy Appraisal

6.1 The economy appraisal is largely based on transport model outputs modified as above. All figures used in this section are over the 15 year appraisal period (2012-2026) and in 2002 prices discounted to 2002.

Business Users and Transport Providers

6.2 Business users and transport provider impacts are output by TUBA using model demand, times, distances, and fares, and the annualisation shown above. The impacts are in the form of changes in journey times, vehicle operating costs, and charges or PT fares. Changes to a charge can impact both users and the body to which the charge accrues. The outputs from TUBA for business users and transport providers can be summarised as:

- Total Business Users and Transport Provider Impact of £51.0m of which:
  - Personal business user benefits of £14.2m (times, vehicle operating costs, and fares)
  - Freight user benefits of £16.2m (times and vehicle operating costs)

- Transport provider benefits of £19.9m (increase in PT fare revenue)

Reliability Impact on Business Users

6.3 Reliability impacts have been calculated in line with TAG Unit 3.5.7. The reliability benefit has been estimated using the equation in section 3.3 of the guidance and has been implemented using a TUBA process that takes modified time skims and demands as input. Some short distance trips have been removed from the reliability calculations as we judge that the specification of the process in TAG unit 3.5.7 meant that these were causing unrealistically high benefits.

6.4 The reliability benefits for business users can be summarised as:

- Total £20.5m of which:
  - Personal business user benefits of £11.4m
  - Freight user benefits of £9.1m

6.5 We consider these estimates to be high, at a level of around 50-60% of total user benefits (before the application of the 20mph zone adjustments). The figures are a result of the approach as specified in TAG, although such an approach requires an assumption of no re-routing of traffic effects, which does not hold in this case. An alternative approach is not available where this is the case.

Regeneration

6.6 The interventions will impact upon regeneration areas in the Nottingham urban area, although none of the measures themselves are targeted specifically at regeneration. Access to employment and the workforce will be improved by the LSTF proposals and travel times and costs to workplaces will be reduced. Regeneration has not been assessed as part of this appraisal.

Wider Impacts

6.7 Previous analysis of wider impacts in Nottingham using the DfT's own WITA programme have resulted in implausible results. The approach used here has been to estimate the wider impacts to be equal to 10% of business and consumer user benefits. This approach is the same as that used by DfT when calculating a BCR for schemes to inform the Comprehensive Spending Review in 2010.

6.8 This results in wider impacts of £9.0m.

Spatial Distribution of User Benefits

6.9 An analysis of the ramped TUBA output total user benefits (including business and consumer users) has been undertaken with benefits grouped into Local Authority sectors in the immediate vicinity of Nottingham and larger groups further away. The analysis is reported in an appendix to this note and shows that:

- 30% of user benefits are for trips entirely within the Nottingham City area;

- 80% of user benefits are experienced by trips within the four boroughs of Nottingham City, Broxtowe, Gedling, and Rushcliffe (which constitute the bulk of the urban area of Greater Nottingham); and
- The remaining 20% of user benefits are for trips to/from these four local authority areas.

7 Environmental Appraisal

7.1 The environmental appraisal is based on the environmental objectives included in the Appraisal Summary Table. The methodologies followed are those set out in the TAG units in section 3.3.

Noise

7.2 Noise impact has been calculated using the methodology outline in TAG unit 3.3.2 using the highway model outputs. This leads to a benefit of £4.5m.

Air Quality

7.3 Air quality impact has been calculated using the methodology in TAG units 3.3.3 and 3.3.4 using the highway model outputs. This leads to a benefit of £0.1m.

Greenhouse Gases

7.4 Greenhouse gases impact has been calculated for the main package using the model outputs. The (April 2011) TUBA economics file containing current values of carbon has also been used. The calculation of the greenhouse gases impact required an additional run of TUBA using the flow based annualisation factors, rather than the user benefit based annualisation factors.

7.5 The additional package impacts on greenhouse gases have been added to the TUBA output in a post process. The breakdown of the impacts is:

- TUBA greenhouse gas output: £2.4m benefit
- Eco driving: £0.5m benefit
- Electric buses on Medilink and Local Link services: £1.6m benefit

Landscape

7.6 Landscape relates to impact on the rural landscape. As the package has no infrastructure schemes included and will result in relatively small but widespread changes (typically reductions) in traffic flows, particularly outside the Nottingham urban area, the impact on landscape has been assessed as neutral.

Townscape

7.7 Large parts of the LSTF programme relate to improvements in public realm to promote walking and cycling as well as to facilitate interchange between modes. No detailed assessment has been carried out of the townscape impacts, but in line with TAG unit 3.3.8 it could be expected that the LSTF would have a moderate beneficial impact on townscape in targeted areas leading to a slight positive impact overall.

Heritage of Historic Resources

7.8 The LSTF programme is targeted at a number of areas and includes some public realm improvement schemes but no major infrastructure so no direct impact on historic buildings or sites is expected. No detailed assessment of heritage of historic resources has been undertaken in line with TAG unit 3.3.9, but it is expected that such an assessment would lead to a neutral impact as the nature of the programme would be designed and implemented to mitigate any potential impacts.

Biodiversity

7.9 The programme does not include any major infrastructure schemes, with some local public realm improvements. These will be designed to mitigate any impact on biodiversity both during construction and when complete. The assessment in line with TAG unit 3.3.10 leads to a neutral impact.

Water Environment

7.10 Again, the programme does not include any major infrastructure schemes, with some local public realm improvements. These will be designed to mitigate any impact on water environment both during construction and when complete. The assessment in line with TAG unit 3.3.11 leads to a neutral impact.

8 Social Appraisal

8.1 The social appraisal includes impacts on users of the transport system who are not travelling during working time, and impacts on society as a whole. This therefore includes time and vehicle operating cost impacts on journey purposes other than employer's business, and other social impacts such as journey quality, physical activity impacts. The impacts are described in a mixture of monetised and non-monetised impacts.

Commuting and Other Users

8.2 Commuting and other users experience impacts in the same way as those for business users, using input demands, time, distance, and fare skims processed through TUBA. The impacts can be summarised as:

- Total Commuter benefits of £31.7m of which:
  - £22.9m are time benefits
  - £8.5m are vehicle operating cost benefits
  - £0.3m are user charge benefits
- Total Other purpose benefits of £27.7m of which:
  - £20.4m are time benefits
  - £7.1m are vehicle operating cost benefits
  - £0.3m are user charge benefits.

Reliability for Commuting and Other Users

8.3 As for employers business and freight, reliability impacts have been calculated in line with TAG unit 3.5.7. The reliability benefit has been estimated in line with the equation in section 3.3 of the guidance and has been implemented using a TUBA process that takes modified time skims and demands as input.

8.4 The reliability benefits for non business users can be summarised as:

- Commuting reliability benefits of £15.5m
- Other purpose reliability benefits of £14.7m

Physical Activity

8.5 The modelling approach used has estimated the switch to and from walk and cycling as a result of the measures in the LSTF programme. A further number of the measures which are aimed at increasing walking and cycling, have not been assessed directly in the modelling approach, but will contribute towards the mode switch modelled at targeted locations. Qualitative assessment of these would lead to a moderate positive impact alone.

8.6 The value of the modelled increase in cycling has been calculated using the World Health Organisation's Health Economic Assessment Tool (HEAT). This uses model output for increase in numbers of walking and cycling trips, average walking and cycling trip distances from the National Travel Survey, UK mortality rates and values of mortality, to calculate a benefit in terms of reduced mortality. This leads to a value of benefit of £34.2m of which £25.4m is from walking and £8.8m from cycling. The impact is based on an increase in walking and cycling trips of around 25,000 in the modelled area per day.

Journey Quality

8.7 Journey Quality has been assessed in line with TAG unit 3.3.13. This includes assessment against traveller care, traveller views, and traveller stress. The general reduction in traffic and delay, increased journey time reliability, and the measures put in place to improve journey quality for PT users leads to a slight positive impact.

Accidents

8.8 Accidents have been assessed using a previous Ring Road Major COBA-based assessment. This process takes output flows from the SATURN model, processed through a spreadsheet to give 12 hours flows, and then uses DfT's COBA program with the standard accident rates and traffic growth rates to calculate accident impacts. Accident benefits of 20mph zones are based on monitoring evidence carried out by Atkins and reported in "soft measures hard facts", and are calculated separately rather than through SATURN or COBA.

8.9 The values of total accidents in the RRM do minimum is used as a base from which to factor the value of accidents in proportion to changes in total vehicle kms within the detailed modelled area. This factoring of previous accident analysis produced the data in Table 8.1. The changes in accidents reported in the table equates to a benefit over the 15 year appraisal period of £3.1m.

Table 8.1 Accident and Casualty Numbers and Costs (2012 - 2026) Main Model

	RRM DM	DM (inc Key Component)	LSTF Main Bid	Impact
Injury Accidents	12,014	11,993	11,929	-64 (-0.5%)
Casualties – Fatal	74.8	74.6	74.2	-0.4 (-0.5%)
Casualties – Serious	1,121.9	1,120.0	1,114.0	-6.0 (-0.5%)
Casualties – Slight	15,469.8	15,442.8	15,360.1	-82.7 (-0.5%)

8.10 In addition there are accident benefits which accrue from the imposition of the 20mph limits. These have been calculated using COBA accident rates for other single carriageway urban roads using the same flows as those used for the 20mph limit time disbenefits calculation. Atkins reported a casualty reduction in the region of 15% for 20mph zones. It might also be expected that casualty severity totals would be shifted towards the slight category, further increasing benefits, although this is not accounted for in the calculations. The calculation resulted in changes in casualties as shown in Table 8.2. This shows that the reduction in accidents is much larger than the main model but that the split of severities is more heavily weighted in favour of slight as opposed to serious and fatal.

Table 8.2 Accident and Casualty Numbers and Costs (2012 - 2026) 20mph zones

	DM (inc Key Component)	LSTF Main Bid	Impact
Injury Accidents	2,941	2,560	-381 5 (-13%)
Casualties – Fatal	13.0	11.4	-1.7 (-13%)
Casualties – Serious	189.5	165.4	-24.1 (-13%)
Casualties – Slight	4,101.0	3,565.9	-535.1 (-13%)

8.11 The calculations show that a 15% (13% is the result of ramping of the benefits in early years) reduction in casualties on the links for which 20mph limits were imposed would lead to a total benefit of £14.8m (2002 prices discounted to 2002) over the 15 year appraisal period 2012-2026.

8.12 This compares with journey time disbenefits calculated for the 20mph zones of £21.8m the effects of which are included in the above economic and social user benefits figures. There will be other non-monetised benefits of the 20mph zones, such as noise, severance, perceptions of safety and community, which will contribute to give an overall positive impact from their implementation.

Security

8.13 The LSTF programme looks to improve public realm to promote walking and cycling as well as PT and as part of this improvements to security for all users will be implemented. The provision of safer routes to access local facilities and PT services will impact on safety and security while walking. Improvements in PT facilities will be designed to improve a number of security indicators at targeted locations.

8.14 The impact on PT users is judged to be moderate positive, while the impact on road users will be neutral. The overall impact is therefore judged to be slight positive.

Access to Services

8.15 Access to services, described in TAG unit 3.6.3 concerns access to the transport system and to facilities. The full approach, including an accessibility analysis and audit has not been carried out. The criteria to be judged include access to locations such as health facilities, employment locations, educational establishments, recreational and social facilities and amenities, and shopping areas.

8.16 A large number of the programme elements are targeted at improving access for those with current problems. These measures include personalised travel planning and information/marketing to remove perceived barriers, the inclusive accessibility scheme for vulnerable groups, provision of discounted PT travel for 16-19 year olds in education, access to loan cycles and mopeds for access to education and employment and a number of cycling and pedestrian improvements. Overall the impact on access to services is considered to be moderate positive.

Personal Affordability

8.17 Personal affordability concerns the financial costs of using the transport system. As mentioned in the access to services objective, the programme includes a number of interventions that also look to reduce the cost of transport for low income groups. These measures include those listed above under the access to services objective. The impact on personal affordability will be targeted at certain low income groups (unemployed and 16-19 year olds in education) where the impact will be moderate but overall the impact on personal affordability is judged as slight positive.

Severance

8.18 The impact of the scheme is not concentrated so much in any one area that a large impact will be felt. Such small infrastructure or public realm improvement schemes that are implemented will be designed to prevent any increase in severance and reduce it where possible. Overall the impact on severance is judged to be neutral.

Option Values

8.19 The LSTF programme does not provide any significant additional services beyond those existing, but simply seeks to remove barriers, perceived or otherwise, to accessing those services. The assessment against option values is judged to be neutral.

9 Local Sustainable Transport Fund Costs

9.1 A note containing a detailed description of costs included for economic appraisal has been prepared and is included in the supporting documents. Please refer to this note for detailed information on cost data. What follows in this section is a summary of the costs input to and output from the TUBA process.

LSTF Programme Costs

9.2 The LSTF programme outturn costs are summarised in Table 9.1. The total costs are £25.1m in 2011 Q1 prices, with a DfT contribution of £10.8m and a local contribution of £14.3m. The costs are spread over the three financial years (4 calendar years) 2012/13 to 2014/15.

Table 9.1 Main Bid Costs Summary (£000s 2011 Q1 prices)

	Source	2012/13	2013/14	2014/15	TOTAL
Work Package A – Enhanced Smartcard, Integrated Ticketing and Personalised Travel Planning	DfT	DfT	479	484	484
	Local	Local	915	915	915
	Total	Total	1,394	1,399	1,399
Work Package B: Establish liveable neighbourhoods with community smarter travel hubs	DfT	DfT	545	1,754	1,754
	Local	Local	763	763	649
	Total	Total	1,308	2,517	2,404
Work Package C: Developing a low carbon transport network	DfT	DfT	1,081	1,019	1,019
	Local	Local	2,952	2,450	2,450
	Total	Total	4,033	3,469	3,469
Work Package D: Active Travel Solutions	DfT	DfT	393	540	540
	Local	Local	156	197	194
	Total	Total	550	738	735
Work Package E: LSTF Programme Management	DfT	DfT	33	66	66
	Local	Local	71	71	71
	Total	Total	104	137	137
TOTAL	DfT	DfT	2,532	3,864	3,864
	Local	Local	4,858	4,397	4,280
	Total	Total	7,390	8,260	8,144

Ongoing Costs

9.3 As discussed in the costs note in the supporting documents there is a need for some level of ongoing cost to maintain the LSTF impacts at the modelled level. This has been calculated, for

the main LSTF bid alone, to be £1.2m p.a. split between the four work packages A-D or £14.3m over the 11.75 year period following the LSTF programme.

Optimism Bias

9.4 Optimism bias has been applied as described in the costs note in the supporting documents. Different levels of optimism bias have been applied to different items based on their characteristics. The resulting aggregate levels of optimism bias implied are 25%, (20% for DfT costs and 28% for local contributions).

9.5 Optimism bias is also applied to ongoing costs at a rate of 20%. This results in ongoing costs increasing from £1.2m p.a. to £1.5m p.a. or £17.2m during the appraisal period.

Table 9.2 Main Bid Optimism Bias Impacts (£000s in 2011 Q1 prices)

Source	No Optimism Bias	Including Optimism Bias	Implied Optimism Bias Level
DfT	10,259	12,306	20%
Local	13,535	17,337	28%
Total Programme	**23,793**	**29,643**	**25%**
Ongoing Costs	14,347	17,214	20%

Cost Inflation Assumptions

9.6 We have adjusted the outturn costings for inflation at an aggregate level. It has been assumed that costs will increase with RPI and that RPI will be 2.7% pa. Using these assumptions the inflation increase from a 2011 price base would be:

- 2.70% for 2012
- 5.47% for 2013
- 8.32% for 2014

9.7 The average uplift for inflation over the 3 year fund period would therefore be approximately 5.47%. This uplift has been included in the estimated outturn costs for each of the 3 years.

9.8 Output costs have been reduced by 5.47% to rebase them to 2011 Q1 for input to TUBA. Cost inflation is assumed to be 2.7% p.a. The same level is assumed for RPI and hence no further adjustment is required before the costs are input to TUBA.

Costs Input to TUBA

9.9 The LSTF programme costs do not readily fit the categorisation of costs used for input to TUBA (land, construction, supervision, operating etc). The approach used has been to identify all DfT contribution costs as being operating costs and locally funded costs (including ongoing costs after 2014/15) as being maintenance costs. TUBA treats all costs the same so this does not have any impact on the calculated values from TUBA, but it does allow different cost time

profiles for the DfT and locally funded costs to be input. Table 9.3 shows the total input costs. The profiles over the appraisal period are included in the costs note.

Table 9.3 Total Scheme Costs input to TUBA (£000s in 2011 Q1 prices)

	Cost
DfT	12,306
Local Contribution	34,548
Total	**46,854**

10 Public Accounts Impacts

10.1 The Public Accounts impacts concern the costs to the broad transport budget and the impact on overall indirect tax revenues to central government.

Cost to Broad Transport Budget

10.2 The cost to the broad transport budget includes investment costs, and maintenance and operating costs less any changes in revenues relating to transport provision that accrue to local government operated services, and any developer contribution.

10.3 The costs and cost profile as described in the previous section and supporting documents are input to TUBA and the program outputs costs discounted and re-based to 2002 prices and adjusted to the market unit of account. The output costs to broad transport budget are summarised in Table 10.1. The main programme costs have been included as investment costs while the ongoing costs are presented as operating costs.

Table 10.1 Cost to Broad Transport Budget

Cost Item	60 year appraisal period £000s (2002 prices discounted to 2002)
Local Government Funding	
Operating Costs	8,161
Investment Costs	11,116
Developer Contribution	
Central Government Funding	
Investment Costs	7,666
TOTAL	**26,943**

Indirect Tax Revenues

10.4 The calculation of indirect tax revenues is carried out by TUBA using the same inputs and annualisation as for user benefits. The outcome of the scheme is that indirect tax revenues decrease by £17.2m over the 15 year appraisal period (2002 prices discounted to 2002). This is because of reduced car use and hence reduced fuel duty, and an increase in zero VAT-rated PT fares. This also includes a small reduction of £1.3m from the eco-driving initiative due to reduced duty paid on fuel.

11 Headline Value for Money Outputs

11.1 The full details of the output of the economic analysis is included in the Transport Economic Efficiency and Analysis of Monetised Costs and benefits tables, and summarised in Table 11.1.

Table 11.1 Headline Economic Outputs (£m in 2002 prices discounted to 2002)

Business User and Provider Benefits	51.0
Business Reliability Benefits	20.5
Consumer (Commuter) User Benefits	31.7
Consumer (Other Purpose) User Benefits	27.7
Consumer Reliability Benefits	30.2
Greenhouse Gases	4.5
Accidents	17.9
Air Quality	0.1
Noise	4.5
Walking and Cycling Health Benefits	34.2
Wider Impacts	9.0
Wider Public Finances	-17.2
Present Value of Benefits	**214.3**
Local Government Impacts	19.3
Central Government Impacts	7.7
Broad Transport Budget	**26.9**
Net Present Value	**187.3**
Benefit to Cost Ratio	**7.95**

11.2 The scheme exhibits very good value for money with a **Net Present Value** of **£187.3m** (2002 prices discounted to 2002) and a **Benefit to Cost Ratio** of 7.95. N.B. The NPV and BCR figures reported here are not the same as those in the Analysis of Monetised Costs and Benefits (AMCB) Table as the AMCB does not include Reliability, walking and cycling health benefits, or wider impacts. The NPV without these items is £93.3m and the BCR is 4.46.

12 Social and Distributional Impacts

12.1 An initial step 0 screening stage has been carried out for the impacts of user benefits, noise, air quality, accidents, security, severance, accessibility and affordability. A summary is presented in Table 12.1. The full table is included in the supporting documents.

Table 12.1 Social and Distributional Impacts Stage 0 Screening Summary

Impact	A stated scheme objective	Impact on low income or vulnerable groups	Can Potential negative impacts be mitigated?	Is the impact significant and concentrated?	Further Comment
User Benefits	Yes	Yes	some localised journey time impacts in 20mph zones	Yes	No further analysis carried out. Benefits concentrated in urban areas.
Noise	Yes	Yes	No negative impacts envisaged	No	No further analysis. Benefits dispersed in urban area where vehicle flows are reduced.
Air Quality	Yes	Yes	No negative impacts envisaged	No	No further analysis. Benefits dispersed in urban area where vehicle flows are reduced.
Accidents	Yes	Yes	No negative impacts envisaged	Yes	No further analysis. Benefits concentrated in proposed 20mph zones.
Security	Yes	Yes	No negative impacts envisaged	Yes	No further analysis. Benefits will be concentrated in urban areas on PT services.
Severance	No	No	No negative impacts envisaged	No	No further analysis. No significant impact.
Accessibility	Yes	Yes	No negative impacts envisaged	Yes	No further analysis. Impact concentrated on low income and vulnerable groups.
Affordability	Yes	Yes	No negative impacts envisaged	Yes	No further analysis. Impact concentrated on low income groups.

12.2 The programme objectives directly relate to most of the impacts and for a number of them the impacts may be judged to be significant and concentrated. There are very few negative impacts and a large number of the modelled and non-modelled interventions are aimed at improving the travelling experience for vulnerable groups No further SDI analysis is proposed at this stage as the negative impacts are small and will be generally dispersed. It is expected that the positive impacts will be significant and concentrated on the targeted vulnerable groups, as well as concentrated locally near the community smarter travel hubs and targeted employment areas.

13 Sensitivity Tests

13.1 A low side sensitivity test has been carried out to assess the scheme assuming that the interventions have a lower impact on trip making than expected. The assumptions are outlined in Table 4.2 in this note. The output of the sensitivity test is shown together with the core appraisal in Table 13.2 on the next page.

13.2 The table shows that overall benefits are reduced by around 36%. This has the effect of reducing NPV by £77.6m and BCR from 7.95 to 5.07. The BCR reported in the AMCB is reduced from 4.46 to 2.67.

Sensitivity to Changes in Costs and Benefits

13.3 Further analysis has been carried out to calculate the changes in costs and benefits that are required in order to reduce the value for money of the programme below certain levels. Table 13.1 shows the aggregate changes in costs and benefits required to produce a BCR of 2 is generally the threshold for good value for money, while a BCR of 1 would indicate that the benefits are equal to the costs. The calculations have been carried out separately using the AMCB table benefits and the total benefits reported in Table 11.1.

Table 13.1 BCR Sensitivity to Changes in Costs and Benefits

		Core Value	BCR=2	BCR=1
AMCB Benefits	Benefit reduction required	£120.3m	-55% (-£66.4m)	-78% (-£93.3m)
	Cost Increase required	£26.9m	+123% (+£33.2m)	+346% (+£93.3m)
All Benefits	Benefit reduction required	£214.3m	-75% (-£160.4m)	-87% (-£187.3m)
	Cost Increase required	£26.9m	+298% (+80.2m)	+695% (+£187.3m)

13.4 The figures in the table show that the BCR is robust to large changes in both costs and benefits, costs would have to increase by 123% or benefits reduce by 55% for the scheme to stop being assessed as high value for money using the AMCB BCR value.

Table 13.2 Headline Economic Outputs (£m in 2002 prices discounted to 2002) Core and Sensitivity Test

	Core	Low Sensitivity
Business User and Provider Benefits	51.0	32.2
Business Reliability Benefits	20.5	15.8
Consumer (Commuter) User Benefits	31.7	19.7
Consumer (Other Purpose) User Benefits	27.7	14.6
Consumer Reliability Benefits	30.2	20.8
Greenhouse Gases	4.5	4.3
Accidents	17.9	11.9
Air Quality	0.1	0.1
Noise	4.5	3.8
Walking and Cycling Health Benefits	34.2	22.8
Wider Impacts	9.0	5.3
Wider Public Finances	-17.2	-14.7
Present Value of Benefits	**214.3**	**136.6**
Local Government Impacts	19.3	19.3
Central Government Impacts	7.7	7.7
Broad Transport Budget	**26.9**	**26.9**
Net Present Value	**187.3**	**109.7**
Benefit to Cost Ratio	**7.95**	**5.07**