Impact of the Local Sustainable Transport Fund: Synthesis of Evidence

Report to the Department for Transport, August 2018
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Executive Summary

The Local Sustainable Transport Fund (LSTF) supported 96 projects in local authorities between 2011 and 2015. At £540 million, it was the biggest-ever competitive funding programme for sustainable transport initiatives in England. Twelve 'Large Projects' received almost half (46%) of the total grant; the remaining 84 'Small Projects' each received grants of up to £5 million.

The combination of capital and revenue funding enabled local authorities to invest in infrastructure schemes to increase bus and rail patronage and active travel, and complementary initiatives such as new bus services, cycle training and travel support for job-seekers.

The two core policy objectives of the programme were to support local economies, and to reduce carbon emissions. The programme was successful in achieving these objectives.

Car use fell in LSTF areas. During the LSTF period, *per capita* traffic volumes in the Large Projects fell by 2.6%, whereas traffic volumes in a national comparator group of local authorities only fell by 0.3% (a difference of -2.3 percentage points). This superior performance in the Large Projects *during* the LSTF period was in contrast to the pattern *before* the LSTF period, when traffic volumes in the Large Projects had shown similar trends to the comparator group. Although LSTF schemes were not the only cause of this fall in traffic, they probably made a significant contribution.

Bus use went down in the LSTF Large Projects, but by less than in the comparator group: *per capita* trips fell by 3.3% in the Large Projects and by 8.5% in the comparator group (a difference of +5.2 percentage points). Again, the better trend in the Large Projects *during* the LSTF period was in contrast to the historic pattern: in the period before the start of LSTF, bus use fell more in the Large Projects than in the comparator group.

The proportion of adults who cycled increased slightly, by 2.8%, in the LSTF Large Projects, whereas it fell by 3.8% in the comparator group (a difference of +6.6 percentage points). All seven Large Projects that had implemented many cycling interventions had some evidence of increased cycling levels from automatic or manual cycle counts.

Many LSTF Projects implemented measures to reduce car commuting. Across 93 workplaces in the Large Projects, car driver mode share fell by 2.7 percentage points. This was equivalent to a 4.1% reduction in car driver commuting. This was less than for workplace travel interventions in the past, probably because most interventions focused on encouragement and information, rather than on more effective measures such as limiting parking.

The LSTF programme was intended to support local economies. It did this in a variety of ways, including:

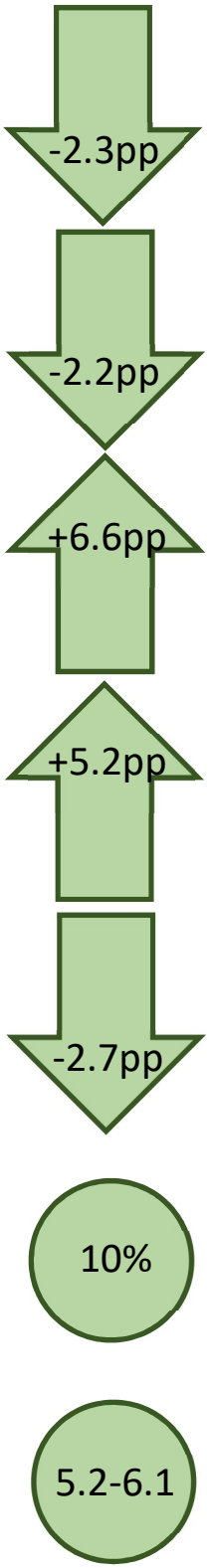
- Town centre public realm enhancements in some areas. A *Town Centres Case Study* found this had driven up retail confidence and growth.
- Help for unemployed people to get to interviews, training and new jobs. Over a two year period, 10% of all unemployed people in Large Project areas received this support. Survey evidence suggested it had helped job-seekers to secure employment, and had enabled them to accept jobs that they would otherwise have had to turn down.
- Improvements to bus punctuality, which in some cases were network-wide and in other cases tackled problems on targeted corridors. Some areas were able to improve bus punctuality even in the context of worsening congestion for general traffic.

- Other measures including support for the rural tourism economy; training to prepare people for transport sector employment; establishing new enterprises to provide sustainable transport services; working with businesses to reduce transport operating costs; and provision of bus services to peripheral employment sites, enabling businesses to recruit more widely.

The LSTF programme was also intended to reduce carbon emissions. *Per capita* CO_2 emissions from transport showed a larger fall in the Large Projects than in the comparator group (-6.9% compared to -4.7%, i.e. a superior performance of -2.2 percentage points). Other evidence, including assessment of the carbon savings from individual schemes, and a *Carbon and Congestion Case Study,* suggests that LSTF Projects may have reduced carbon emissions from transport by around 1.5 – 3% more than would otherwise have been the case, during a period when these emissions fell by around 7% in all. Although this estimate should be considered indicative, it suggests that the LSTF programme was a significant factor contributing to lower carbon emissions.

The programme delivered by the LSTF Large Projects was very high value for money, with a benefit-cost ratio that was above 5. The 'outturn' BCR (best estimate 5.2 - 6.1) was similar to the predicted BCR (5.2 for an equivalent group of 11 of the 12 Large Projects), suggesting that the programme was successful in achieving its expected outcome so far as value-for-money was concerned. The estimated cost per car kilometre removed was 4.8p, and this was broadly comparable with estimates from previous sustainable transport investment programmes.

LSTF impacts in numbers from evaluation of Large Projects



Traffic	Car traffic *per capita* relative to comparator group
CO_2	CO_2 *per capita* relative to comparator group
Cycling	Increase in proportion of residents who cycle, relative to comparator group
Bus use	Performance above comparator group in bus use[A]
Car Commuting	Average change in car driver commuting mode share for 93 business sites (pre/post intervention)
Jobseekers	Proportion of all unemployed people receiving travel assistance to access interviews/ training/ new jobs
BCR	Programme-level Benefit-Cost Ratio for Large Projects

pp = percentage points
A: Background trend is falling bus use: i.e. this number represents slower decline in bus use in Large Project areas than in the comparator group.

PART I: CONTEXT AND OUTPUTS

1. Overview of the Local Sustainable Transport Fund

1.1 Introduction

In 2011, the Department for Transport (DfT) launched a competitive grants programme called the Local Sustainable Transport Fund (LSTF). The Fund was open to all local transport authorities in England outside London, and offered capital and revenue funding for investment in sustainable transport projects.

The Fund supported projects that were designed to meet two core policy objectives[1]:

- To support the local economy and facilitate economic development, for example by reducing congestion, improving the reliability and predictability of journey times, or enhancing access to employment and other essential services
- To reduce carbon emissions, for example by bringing about an increase in the volume and proportion of journeys made by low carbon sustainable modes including walking and cycling.

Four secondary objectives were also identified:

- To help to deliver wider social and economic benefits (e.g. accessibility and inclusion) for the community
- To improve safety
- To bring about improvements in air quality and increased compliance with air quality standards, and wider environmental benefits such as noise reduction
- To actively promote increased levels of physical activity and the health benefits this can be expected to deliver.

In all, 96 projects were awarded funding. Twelve of these were 'Large Projects', receiving grants of more than £5 million (and in all, accounting for 46% of the total grant). The remaining 84 projects were 'Small Projects' and received grants of up to £5 million. The total grant awarded to local authorities was £540 million.

The main phase of the LSTF programme ran from July 2011 to March 2015. Some LSTF projects ('Tranche 1' and 'Key Components' of Large Projects) received funding for the whole of this period; others ('Tranche 2' and Large Projects) received funding between July 2012 and March 2015. There was also an 'extension' year of funding from March 2015 to March 2016, which enabled some LSTF projects to continue their projects.

1.2 Monitoring and evaluation data on which this synthesis report is based

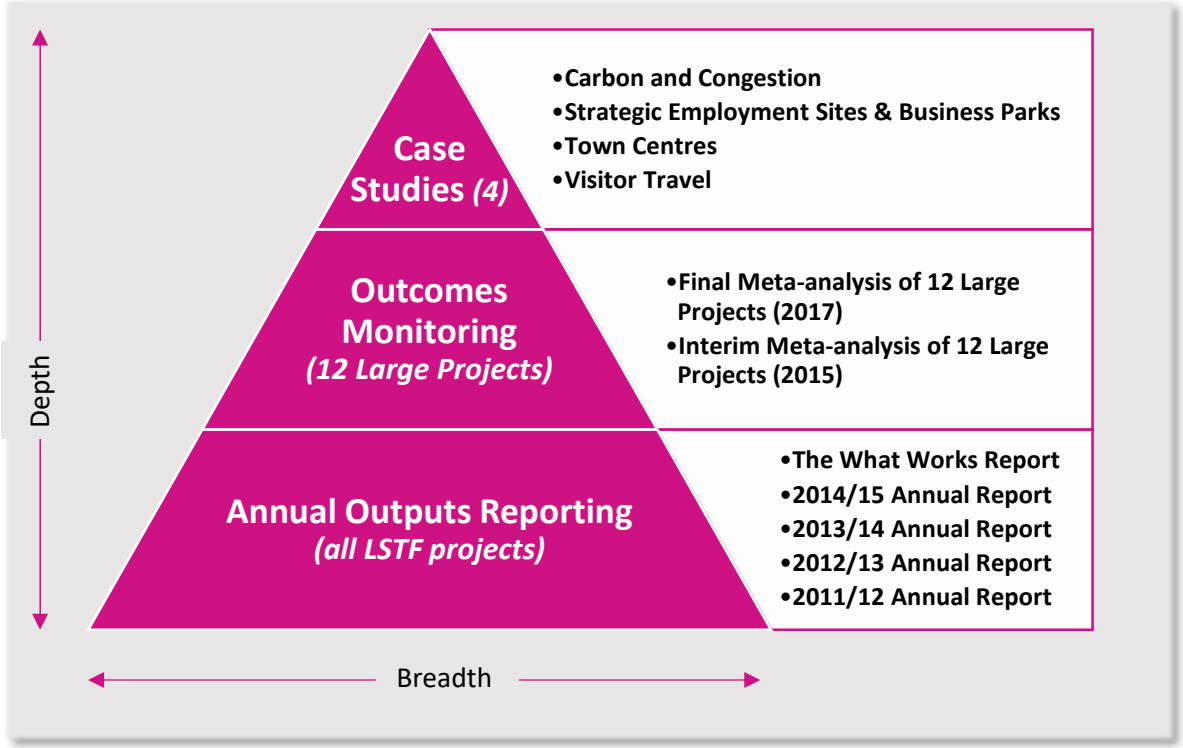
The monitoring and evaluation framework for the work of the LSTF projects is summarised in Figure 1. The main elements were as follows:

- All LSTF-supported projects reported the activities (outputs) they delivered in each year of the programme through an online **Annual Outputs Survey**. Information from the survey was analysed and published in four **LSTF Annual Reports**, from 2011/12 to 2014/15.

1 Department for Transport (2011) *Local Sustainable Transport Fund – Guidance on the Application Process*

- The 12 Large Projects were required to monitor the outcomes of their interventions, and to publish the outcome data in **Annual Outcomes Reports**. Information from Outcomes Reports was reported in an **Interim Meta-analysis** in 2015 and a **Final Meta-analysis** in 2017; these meta-analyses also involved extensive analysis of evidence from secondary datasets.
- Structured discussions with project managers took place to identify delivery lessons for sustainable transport projects. Findings were published in a practitioners' guide, **What Works? Learning from the Local Sustainable Transport Fund 2011 – 2015[2].**
- Four thematic case studies were commissioned to provide an in-depth evaluation of specific aspects of the work supported by the Fund. These focussed on **Carbon Emissions and Congestion; Strategic Employment Sites and Business Parks; Town Centres; and Visitor Travel.**

Figure 1: LSTF monitoring and evaluation framework



This **Synthesis of Evidence** draws together the most important findings from all these strands of evaluation. The reports on which it is based are listed in Appendix 1. In addition, experience from the Fund offers many delivery lessons for practitioners, and these may be found in the *What Works Report*[3].

1.3 Implementation context

The LSTF was the biggest-ever competitive funding programme for sustainable transport initiatives in England. It built on experience from two previous smaller-scale programmes, the Sustainable Travel Towns (STT) programme and Cycling Demonstration Towns / Cycling City and Towns

2 Referred to in this document as the *What Works Report*.
3 The *What Works Report* is available at https://www.gov.uk/government/publications/local-sustainable-transport-fund-what-works.

(CDT/CCT) programme, and also, to some extent, on the contemporaneous Better Bus Areas (BBA1) programme[4].

LSTF differed from these previous programmes in some significant respects that are important context for assessing the outcomes achieved. Firstly, LSTF entailed a considerable expansion of scale, involving a much larger number of local authorities. Some of the local authorities were therefore starting with less experience of implementing sustainable transport interventions. Secondly, LSTF adopted much wider-ranging objectives than previous programmes. While this meant that the funding could be used for a variety of schemes, as suited local circumstances, it also carried the potential for a loss of focus. A further difference was that the depth of peer-to-peer learning, through project manager 'communities of practice' that met regularly was less than for the CDT/CCTs, and there was also less expert specialist support built into the programme. A final difference was that the expansion to many local authorities achieved by LSTF inevitably could not retain the high 'pioneer' status gained by local authorities participating in previous smaller programmes, which could have led to less involvement and backing by senior officers and councillors[5].

Conversely, the expansion brought the large benefit, in policy terms, of supporting many local authorities to trial unfamiliar sustainable transport initiatives, with the potential for this to lead to wide adoption of new approaches if the experimentation funded through LSTF was found to be effective.

1.4 Main strands of activity

Although the activities implemented by LSTF projects varied widely, there were some common themes:

- There was a strong (but not exclusive) emphasis on **travel to work**, reflecting the Fund's core focus on supporting the local economy while reducing carbon.
- Many Projects adopted a **corridor approach** or an **area approach**, in which infrastructure, such as bus priority measures and cycle paths, and behaviour change activities, such as personalised travel planning and workplace travel planning, were concentrated along a limited number of main routes into a town, or in an area with many employment sites. Some had a particular focus on improving non-car access to 'hard-to-reach' car-dependent employment sites, thereby increasing access to jobs and widening the workforce pool available to employers.

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4 Sustainable Travel Towns: 2004-2009; £10 million revenue funding split between Darlington, Peterborough and Worcester, for behaviour change ('smarter choice') measures. Cycling Demonstration Towns / Cycling City and Towns: 2005-2011; approximately £63 million revenue and capital funding for 18 towns and cities. Better Bus Areas Fund: 2012-2014; £70 million revenue and capital funding for 24 local authorities.

5 These issues are not unique to LSTF, and also apply to large-scale roll out of pilot schemes in other fields such as medicine. Epidemiologists draw a distinction between the high 'efficacy' that interventions tend to show when delivered by experts under ideal conditions with carefully selected patients in a teaching hospital, and the generally less impressive 'effectiveness' the same interventions show when delivered under routine conditions by GPs to patients nationwide. But even if effects are smaller, the greater scale of delivery may mean that the interventions are worthwhile and represent a good use of public money. It is therefore important not to judge LSTF against what has previously been achieved under conditions that were, arguably, much closer to optimum 'clinical trials', but rather to judge it against the benchmark of other transport interventions delivered under 'real world' conditions. This is the benchmark applied in this synthesis of the evaluative evidence.

- Most Projects promoted **bus travel** through measures that included bus lanes, bus priority at traffic lights, new or more frequent bus services (often aimed at commuters), real-time passenger information, bus shelter upgrades, improvements to existing buses such as free WiFi and on-board 'next stop' information, multi-operator smartcard ticketing, and marketing.

Brighton's LSTF project focused on the A270 Lewes Road corridor. The scheme included traffic signals with bus and cycle priority; bus and cycle lanes in both directions for 5km; and new bus shelters with seating and real-time information. Pedestrian and cycle crossing facilities were improved, and the public realm was enhanced by tree-planting and new paving. The personalised travel planning team spoke to over 8,000 people on doorsteps and over 2,000 people at events, offering services such as eco-driver training and bike maintenance.

- Most Projects **promoted active travel** (cycling and walking) through measures including cycle paths, cycle parking, adult cycle training, bicycle loan schemes, public bike hire schemes, cycle 'hubs' with secure parking and storage lockers, walk and cycle challenges, led walks and cycle rides, 20mph zones, 'safe routes to school' traffic calming and public realm improvements.
- Many Projects developed **innovative approaches to travel behaviour change** such as workplace-based personalised travel planning and free bus ticket offers; marketing along public transport corridors (including distribution of free bus tickets to households); neighbourhood-based approaches such as virtual 'community smarter travel hubs'; and engagement with people at times of transition (e.g. from school to college or the workplace).
- Most behaviour change interventions tended to **rely on 'pull-factors' (carrots)** and did not attempt to create a supportive environment through intervening with 'push-factors' (sticks).
- Some Projects developed services to **support job-seekers in finding work**, such as free travel passes, free bicycles and cycle training, and personalised travel information.
- Some Projects sought to reduce carbon emissions through **eco-driving schemes** and an **ECO Stars fleet efficiency scheme.**

Local Sustainable Transport Fund in numbers

Nearly 90% of LSTF Projects included activities to increase cycling. They built 740km of cycle routes and 33,600 cycle parking spaces. They gave 62,000 adults the skills to repair a bike, or serviced their bike for them. They gave 27,900 adults cycle training, and 55,900 took part in led cycle rides.

More than half of LSTF Projects funded new bus services, or upgraded existing bus services to run more often, operate longer hours, or serve more places. 90% of Projects included actions to improve bus travel, and 3,800 bus stops received major improvements such as real-time information displays, new shelters or higher kerbs for step-free bus access.

Over 90% of LSTF Projects helped people travel to work by sustainable transport. Commuters to 6,600 workplaces are estimated to have been assisted by LSTF-funded schemes.

Over half of LSTF Projects encouraged train travel or sustainable travel to stations. Better access routes and station facilities for pedestrians, cyclists and bus users were installed at 230 stations. Thirty stations received more train services, and two completely new stations were built.

A quarter of LSTF Projects helped unemployed people to access work. About 116,000 job-seekers received some form of support as a result of LSTF-funded schemes*.

Personalised travel planners contacted more than 390,000 households, of which 206,000 requested sustainable transport information, taster bus tickets, free cycle training or other offers.

* Total increased from estimate published in the *What Works Report?* in light of subsequent data.

PART II: CHANGES IN TRAVEL PATTERNS

2 Car traffic

Key findings

Car traffic volumes (measured *per capita)* went down in the LSTF Large Project local authority areas during the LSTF period *(Meta-analysis of the LSTF Large Projects)*. This decline in *per capita* car traffic was greater in the Large Projects than it was in a comparator group of local authorities (-2.6% versus -0.3%). The superior performance of the Large Projects during the LSTF period was different to past trends: before the start of LSTF, *per capita* car traffic in the Large Projects changed in a way that more closely tracked the comparator group.

The *Carbon and Congestion Case Study* points to a similar conclusion of superior performance (i.e. greater reduction in car driving) in localities that received LSTF interventions, compared to localities that did not.

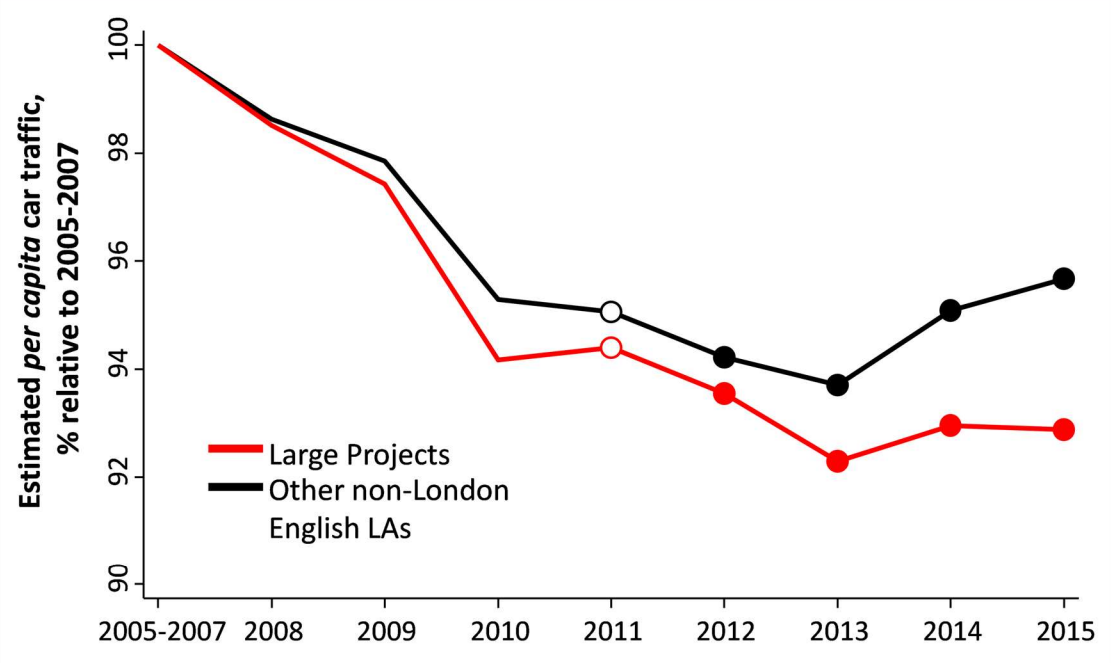
2.1 Evidence from the Meta-analysis

The *Meta-analysis* used DfT road traffic statistics to compare changes in traffic in the LSTF Large Projects with changes in traffic in a 'national comparator group' of all other English local authorities excluding London. It found that car traffic volumes in the Large Projects and in the comparator group fell between 2009 and 2013, and then increased over the period to 2015. This reflected wider economic trends of recession followed by economic recovery. Figure 2 (on next page) shows changes in *per capita* car traffic in the Large Projects and the comparator group.

During the first half of the LSTF programme (from 2011 to 2013), the rate at which *per capita* traffic levels fell was greater for the Large Projects as a group than for the comparator group. After the economy began to recover, between 2013 and 2015, the rate at which *per capita* traffic levels rose was lower for the Large Projects group than for the comparator group.

Between a 2009-11 LSTF baseline average and the end of the LSTF programme in 2015, *per capita* total volumes of traffic in the Large Projects as a group fell by 2.6%, whereas *per capita* traffic in the comparator group only fell by 0.3%: a statistically significant difference of -2.3 percentage points. All 10 Large Projects experienced a greater fall in *per capita* car traffic in this period than the fall in the comparator group – that is, the trend was not due to a few Large Projects showing an anomalously large change.

Figure 2: Indexed change in *per capita* car traffic in the Large Projects and the comparator group



	Change in Large Projects group	Change in comparator group	Difference-in-ratios*	Large Projects trend relative to comparator group
Pre-LSTF 2005-07 to 2009-11	**-2.6%**	**-2.2%**	**-0.4pp**	**Slightly better**
During / post-LSTF 2009-11 to 2015	**-2.6%**	**-0.3%**	**-2.3pp**	**Better**

'Large Projects' trend is for 37 local transport authority areas covered by 10 LSTF Large Projects. Local transport authority areas that received a very small proportion of Large Project investment were excluded. Data for two Large Projects, in Hertfordshire and Surrey, was also excluded because the county (i.e. the local transport authority) is very much larger than the area where Large Project investment was made. Some district council areas where Large Project investment took place were excluded because data was only available at the level of the much larger (county) local transport authority.

'Other non-London English LAs' trend is for the comparator group of all local transport authorities in England that are not part of a Large Project or in London. It therefore includes areas that received some LSTF funding as Small Projects, as well as areas that did not receive this funding.

Filled circles show years when all Large Projects received funding; open circles show years when some Large Projects received funding.

* Here and in subsequent figures, we report difference-in-ratios (not difference-in-difference), as the percentage point (pp) difference between the *indexed* change in the Large Projects group and the indexed change in the comparator group. Difference-in-difference figures, based on *absolute* change, would differ slightly in magnitude but show the same general pattern.

The difference between the Large Projects trend and the comparator group trend was more marked ***after*** 2009-11 than it was ***before*** 2009-11. In the period before LSTF, from 2005-07 to 2009-11, *per capita* car traffic in the Large Projects group fell by the same amount as after the start of LSTF, i.e.

2.6%, while in the comparator group it fell by 2.2% (a difference of -0.4 percentage points, i.e. nearly six times smaller than the -2.3% difference observed after 2009-11)[6].

The general picture in the LSTF Large Project local authority areas was therefore one of *per capita* traffic volumes declining relative to a comparator group, and also in absolute terms, with an increasing difference in the post-LSTF period as compared to the pre-LSTF period.

At a more detailed level, most LSTF Large Projects reported absolute traffic levels for the specific areas where LSTF activities had been focused. Six Large Projects reported stable or falling absolute traffic levels; three reported absolute traffic growth but at a lower level than in either the wider local authority area or a local comparator; and three reported mixed evidence of absolute traffic growth or decline, depending on which metrics and locations were used. This geographically finer-grained evidence, focussed on areas where activities were focussed, tends to support the inference that the positive picture at a bigger scale was at least partly attributable to the LSTF interventions at the finer scale.

Large Projects were asked to assess the scale and 'effect size' of their interventions, as a basis for estimating what proportion of the change in traffic might be attributable to LSTF. The estimates suggested that the magnitude of change that could have occurred as a result of LSTF schemes was non-trivial and would probably constitute a discernible proportion (although not all) of the overall changes in traffic. Other factors that may also have played a part in traffic reduction are discussed in Section 2.3.

2.2 Evidence from the Carbon and Congestion Case Study

The *Carbon and Congestion Case Study* compared changes in travel patterns in five local authority areas that received LSTF funding ('treatment areas') and three 'control areas' that did not. All treatment areas received a combination of physical measures (such as cycle infrastructure or public transport interchange improvements) and 'softer' measures (such as personal travel planning).

Two of the five treatment areas (Rochdale and Tameside) were part of the Transport for Greater Manchester LSTF Large Project. Two other treatment areas (Eastleigh and Gosport, in Hampshire) were part of the Solent LSTF Large Project. The final treatment area was Coalville, which received LSTF funding as part of the Leicestershire Small Project. The control areas were Wigan (Greater Manchester), Fareham (Hampshire), and Hinckley (Leicestershire).

Change was measured by means of a self-completion postal survey and seven-day travel diary administered in November 2013 and repeated in November 2014[7].

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6 We report *per capita* trends here and elsewhere in this evidence synthesis because they are more directly comparable with the results from the *Carbon and Congestion Case Study.* The *Meta-analysis* also reported overall changes in traffic. There was higher population growth in the Large Projects than in the comparator group over the LSTF period, but despite this, overall traffic volumes still increased less for the Large Projects as a group, and for each Large Project individually, than for the comparator group.

7 The sample for the postal survey was drawn at random from the electoral register. The 'before' survey was completed by 8,461 people (a response rate of 13.2%) across the treatment and control areas. Of those surveys returned, 6,797 were sufficiently complete to be used for the analysis (10.6% of initial contacts). From the original 6,797 people who responded fully to the 'before' survey, a follow-up survey of 6,745 questionnaires was dispatched in November 2014 (excluding people who did not wish to be re-contacted, had moved, etc.). A total of 3,562 'after' surveys were completed (response rate 52.8%).

Comparing changes in the treatment areas with those in the control areas, there was a relative reduction in *per capita* car driving of 8.4 miles per week. This was equivalent to 7% of the levels of car driving in the treatment areas in 2013. This was made up of a fall in *per capita* car driving distance of 3.1 miles, from 116 to 113 miles, in the treatment areas, and an increase in *per capita* car driving distance of 5.3 miles, from 149 to 154 miles, in the control areas (pre/post comparison). The difference was not statistically significant. The fall in car driving was partly due to a relative reduction in overall travel, but there was also a relative increase in travel as a car passenger (+6.1 miles per week), by bus (+1.6 miles per week), and by walking / cycling (+0.4 miles per week).

Analysis of survey responses suggested that the public were only aware of some LSTF measures, but that those measures were the ones associated with the greatest levels of self-reported behaviour change. For example, 14-20% of Gosport respondents said they had changed their behaviour a lot or a little because of cycle infrastructure, bus priority measures or public transport interchange improvements. These small self-reported changes were consistent with the scale of changes in travel behaviour suggested by the travel surveys.

2.3 Evidence synthesis

Taken together, the evidence points towards the conclusion that an ongoing programme of sustainable transport interventions, taking place over a number of years, and of which the LSTF programme formed one of the most recent manifestations, was a primary cause of the observed traffic changes, but with other factors also likely to have played a significant role.

The *Meta-analysis* records a reduction in *per capita* car driving of 2.3 percentage points relative to the comparator group during the LSTF period, considering entire project areas. This difference is statistically significant. Importantly, the better performance of the LSTF Large Projects during the LSTF period does not appear to be simply a continuation of a pre-LSTF trend: in the pre-LSTF period, the difference in performance between the LSTF Large Projects and the comparator group was smaller. There is also some evidence that seems to suggest traffic reductions in the localities within project areas that were the focus of LSTF activity.

The *Carbon and Congestion Case Study* also suggests a reduction in car driving. It finds that there may have been relative reductions in *per capita* car driving of around 7% in the localities within project areas that received LSTF interventions, although the difference is not statistically significant. The evidence is suggestive of at least some of this change being due to a shift to sustainable modes of travel as a result of LSTF interventions. But there is also evidence that part of the reduction in car use may be because of other factors, unrelated to LSTF.

Calculations of the scale and effect size of LSTF interventions, undertaken by Large Projects and reported in the *Meta-analysis,* suggest that they could have accounted for a discernible proportion, but not all, of the relative change in traffic volumes. This raises the question of what else could be the cause, or partial cause, of the reductions in traffic, if it was not solely due to the LSTF schemes. The *Meta-analysis* hypothesised that the following factors may have been significant:

- Other (non-LSTF) improvements to public transport and cycling and walking infrastructure over the same time period.
- Earlier improvements to public transport and cycling and walking infrastructure (pre-LSTF) that took time to take full effect.
- Demographic or socioeconomic changes (e.g. if the age profile or income profile of the population changed in a different way in the Large Project areas and the comparator group over the LSTF period, such that car licence-holding, ownership and use also changed differentially i.e.

different ‘peak car’ effects in different areas). This might have happened because the Large Project local authority areas included large urban areas which tend to have a younger ‘trend-leading’ population profile.

- Land use changes (e.g. if the growing population in the Large Project areas was accommodated to a greater degree through densification of residential areas, or in housing with lower car parking allocations, or in areas with higher public transport accessibility, compared to the growing population in the comparator areas). This might have happened if the Large Project local authorities were more committed to sustainable transport and therefore more concerned to ensure that their land use planning strategies were supportive of sustainable transport patterns.

Nottingham achieved the biggest reduction in *per capita* car traffic of any English local authority outside London during the LSTF period (-8.2% between 2009-11 and 2015). LSTF funded development of a pay-as-you-go smartcard covering bus, tram and local rail, which can be topped up at on-street ticket machines or local shops. The smartcard also provides access to a car club, 17 secure cycle parking hubs and a network of 500 bikes for hire. Five community-based behaviour change programmes ran local events, activities, services and a travel support package for job-seekers. 600 bikes were loaned to staff and students at the universities. Nottingham’s LSTF programme was in the context of major expenditure on public transport and introduction of a workplace parking levy.

3 Bus use

Key findings

Bus use in the LSTF Large Projects was on a long-term declining trend that pre-dated the LSTF programme. This was also true of the comparator group of local authorities.

However, the *pre-LSTF trend* was for bus use to decline faster in the group of Large Projects than in the comparator group, whereas the trend *after the start of LSTF* was for bus use to decline more slowly in the group of Large Projects than in the comparator group.

One tactic that contributed to the improved relative performance in the Large Projects was revenue investment in new bus services. This revenue investment is likely to have long-term benefits, beyond the LSTF period, because a high proportion of new services were able to achieve commercial viability by the end of the LSTF funding period. Three-quarters of new bus services examined (21 of 28) were likely to continue beyond LSTF; these routes achieved an annual patronage uplift of 2.5 million trips, replacing 12 million car kilometres per year, and avoiding 2,300 tonnes CO_2e per year.

3.1 Evidence from the Meta-analysis

Five Large Projects undertook many interventions intended to increase bus use, and six undertook some interventions. Interventions included increased bus services; bus priority measures; improvements to bus waiting facilities; and real-time passenger information. Some Large Projects introduced smartcard ticketing schemes near or after the end of the LSTF funding period.

Increased bus services might be expected to show near-immediate effects on patronage on the routes concerned. Effects due to bus priority measures, better waiting facilities and real-time passenger information might be expected to take longer to show up in patronage data, although possibly yielding quicker effects where multiple works were focussed on key bus corridors. Network-wide interventions such as smartcard schemes came to fruition too late to influence patronage within the period of the evaluation.

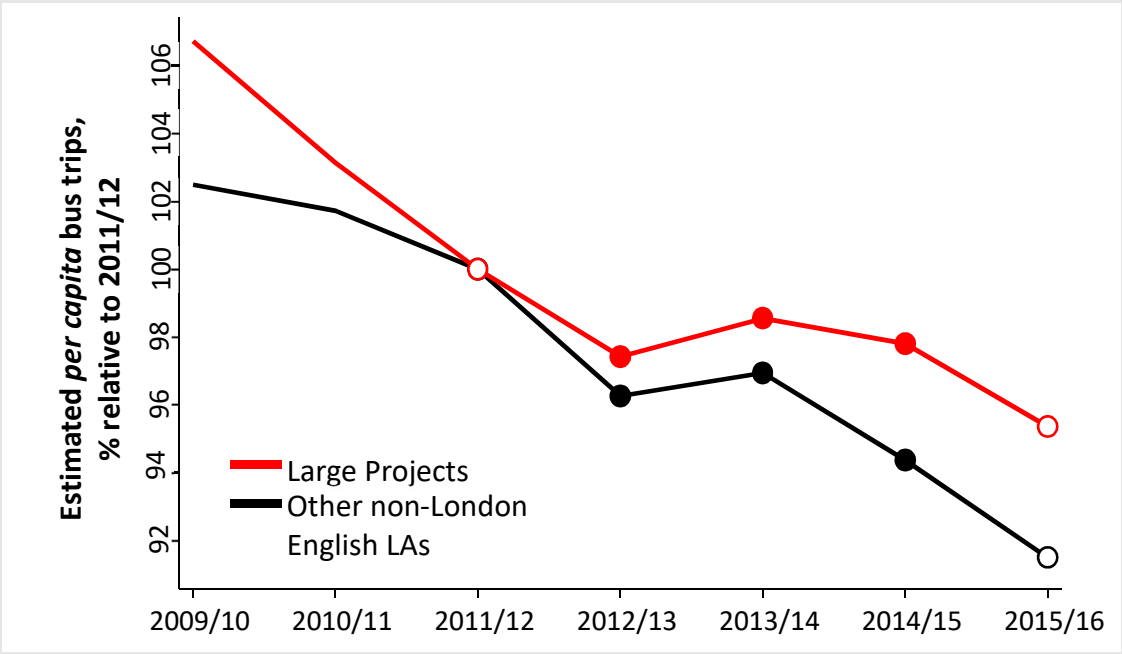
The *Meta-analysis* used DfT bus statistics to compare changes in bus trips in the LSTF Large Projects with changes in bus trips in the national comparator group. It found that bus trips showed a downward trend since before the start of the LSTF programme, both when measured in absolute terms and when measured *per capita*, for both the Large Projects group and the national comparator group.

However, the *pre-LSTF trend* was for bus use to decline faster in the group of 10 Large Projects[8] than in the comparator group, whereas the trend *after the start of LSTF* was for bus use to decline more slowly in the group of 10 Large Projects than in the comparator group (Figure 3).

Pre-LSTF, between 2009/10 and 2011/12, *per capita* bus trips fell by 6.1% in the Large Projects, compared with 2.4% in the comparator group, a difference of -3.7 percentage points. In contrast, after the start of LSTF, between 2011/12 and 2015/16, *per capita* bus trips fell by 3.3% in the Large Projects group, but by 8.5% in the comparator group: a difference of +5.2 percentage points.

The distinction between trends in the Large Projects and the comparator group since the start of LSTF was statistically significant. The difference in pre-LSTF trends was smaller, and was not statistically significant. This nevertheless indicates that the more favourable trend in the Large Projects since the start of LSTF was not simply a continuation of a pre-existing advantage.

Figure 3: Indexed change in *per capita* bus trips in the Large Projects and the comparator group



	Change in Large Projects group	Change in comparator group	Difference-in-ratios	Large Projects trend relative to comparator group
Pre-LSTF 2009/10 to 2011/12	**-6.1%**	**-2.4%**	**-3.7pp**	**worse**
During / post-LSTF 2011/12 to 2015/16	**-3.3%**	**-8.5%**	**+5.2pp**	**better**

'Large Projects' trend and 'Other non-London English LAs' trend are for same groups of local transport authority areas shown in Figure 2. For bus patronage data, the baseline year was *a priori* chosen to be slightly later than the years used for other analyses, and a shorter period was used to compare pre-intervention trends, because the data series in question is only available from 2009/10 onwards. Filled circles show years when all Large Projects received funding; open circles show years when some Large Projects received funding.

8 Hertfordshire and Surrey's bus interventions were limited to small proportions of the counties so they are excluded from this discussion of local-authority level bus patronage.

The better performance of the group of 10 Large Projects was strongly influenced by exceptional rises in patronage in two Large Projects (Reading and WEST), and to a lesser extent in another two (Bournemouth and Solent). Most of the other six Large Projects tracked close to the comparator group.

It is improbable that the strong performance in Reading is primarily attributable to LSTF, since the LSTF bus measures in Reading were not of a scale or intensity likely to have caused area-wide patronage increases. Other factors, perhaps related to other work by the local authority and the main (municipal) bus company in Reading, are likely to have been more important. The strong patronage increase in WEST could partly represent the influence of LSTF schemes, of which there were many. However, it may also be partly attributable to Bristol's earlier investment in bus priority measures and bus infrastructure and its recent Better Bus Areas project (and significant investment in new buses by commercial bus companies, partly due to the public investment programme). Better Bus Areas funding, as well as LSTF, could have contributed to the patronage rises in Bournemouth and Solent.

Nine Large Projects provided route-specific patronage data where LSTF funded entirely new bus routes or more frequent bus services. This covered 28 sets of bus routes. Detailed scrutiny of all 28 routes was undertaken to assess the amount of patronage uplift and the extent to which any uplift could be attributed to LSTF intervention. In all but one case, patronage uplifts could be attributed to the interventions, based on an assessment of timing and nature of the intervention, the timing of the change in patronage trend, comparison with pre-existing patronage and comparison with other routes where no investment had taken place. Of these routes, 21 were likely to continue beyond the end of LSTF funding, either because they had reached commercial viability or because they were part of a longer term strategy for the local authority concerned. These 21 routes together resulted in an annual patronage uplift of 2.5 million trips, replacing an estimated 12.0 million car kilometres per year[9], and avoiding an estimated 2,300 tonnes CO_2e per year. Some 90% of these car mileage and carbon savings were due to routes that appeared fully commercial at the new level and hence likely to continue indefinitely.

3.2 Evidence from other sources

Evidence from the *What Works Report,* the *Visitor Travel Case Study,* and Outputs Surveys identifies many individual examples of bus interventions with successful outcomes. For example:

- BDRS Combined Authority Large Project doubled the service frequency of the X19 Jobconnector service. Patronage increased by more than 170,000 per year, and the service was commercially viable at the new frequency. A new bus service to a distribution warehouse for online clothing retailer ASOS reached annual patronage of 210,000 and also became commercially viable.
- Brighton Small Project funded comprehensive infrastructure changes along the busy A270 corridor into the city, including upgraded traffic signals with bus and cycle priority, bus and cycle lanes in both directions over a distance of 5km, and new bus shelters with real-time passenger information. The scheme improved journey times for buses while having minimal impact on general traffic; bus patronage increased by 7% compared to a city-wide increase of 4%.
- Cheshire East Small Project funded a new cross-town high frequency (15 minute) bus service in Crewe with brand new buses with WiFi. They introduced bus priority at 10 junctions, fitted main

9 Calculations drew on surveys of bus users that showed the proportion who previously drove.

bus stops with real-time passenger information, and publicised the new service through residential personalised travel planning and workplace travel planning. Bus patronage reached over 144,000 per year, making it commercially viable. After personalised travel planning was offered to households along the bus route, a follow-up survey found that 14% of respondents had increased their bus travel.

- Middlesbrough Small Project kick-started a new bus service to a previously unserved business park. Its contribution to the site's growth, and annual patronage of 193,000, persuaded private developers to underwrite its continued operation for at least three more years.
- In the New Forest and South Downs 'Two National Parks' Small Project, a third loop to the 'New Forest Tour' bus service was kick-started and supported with comprehensive marketing. By 2015, the whole Tour was operating without subsidy and LSTF had started a further 'Beach Bus' service. The longstanding 'Breeze Buses' in the South Downs received funding to extend their operation to include winter Saturdays, and this increased annual patronage from 88,000 to 97,000 trips.
- Reading Large Project funded a 22% fares reduction on two bus routes. After a year, patronage had risen 10% faster than elsewhere. The operator decided to retain a 17% fares cut and will also increase the frequency to grow the patronage further.
- Warrington Small Project funded a new orbital bus service to outlying employment sites and a university campus. Six new buses were purchased, new bus shelters were installed, and the service was promoted to businesses and households along the route via workplace travel planning and household personalised travel planning projects. After the end of LSTF support, the service had not reached full commercial viability, but patronage had grown sufficiently for the bus operator to retain the service on a commercial basis with a reduced route.
- In the Greater Bristol area, the WEST Large Project funded eight schemes involving new or increased bus services, of which five were operating without subsidy by 2015.

WEST Large Project introduced new and enhanced services on eight routes; bus lanes and bus gates; traffic management to improve bus reliability; bus stop improvements; real time passenger information improvements; on-board 'next stop' displays and WiFi. Across the four WEST local authorities, the number of bus trips *per capita* increased by 16.5% between 2011/12 and 2015/16. Services on the X1 (pictured) between Weston-super-Mare and Bristol increased from two to three per hour. This resulted in a 51% increase in annual patronage.

3.3 Evidence synthesis

The evidence from Outputs Surveys and from structured discussions with project managers for the *What Works Report* suggests that initiatives that involved kick-starting a new or more frequent bus service were often (but not always) successful. Where they failed, it was often quickly apparent that a service was unlikely to 'take off', and LSTF project managers switched funding to other routes. Nevertheless, it was also clear that kick-start funding for new services needed to be maintained for several years in order for a service to reach commercial viability. One LSTF Project felt that its LSTF bus initiatives might have created a longer-term benefit by changing the outlook of local bus companies, so that they might attempt kick-starting or kick-boosting routes on their own in future. The fact that such schemes were not being initiated by bus operators points to a degree of market failure.

Although support for new bus services was an effective way to achieve a rapid uplift in patronage, it was also clear from the LSTF Large Projects that sustained investment in network-wide improvements had the potential to increase patronage (or reverse historic decline) over time. Areas that had achieved patronage growth had introduced comprehensive bus priority measures to cut bus journey times and improve reliability on main corridors; high quality vehicles (e.g. with free on-board WiFi); and real-time passenger information. LSTF Projects that set out to establish multi-operator smartcard ticketing typically found that technical and procurement issues, and the need to work with multiple operators, made the process complex and prone to delay. This meant that smartcard schemes did not go 'live' until later than planned, at the end of the LSTF period, and so evidence of their effects is not yet available. It will be important to gather evidence on these effects within the next 1 -2 years, as the effects in the longer term may prove at least as significant as the other types of intervention[10].

10 For example, one review of areas in the UK, Europe and America that had introduced simplified integrated ticketing found that it had increased patronage by 6-20%: Booz and Co (2009) *The benefits of simplified and integrated ticketing in public transport* Report for pteg.

4 Active travel

Key findings

All seven LSTF Large Projects with significant investment in cycling showed indications from automatic counts or manual cordon counts of increased cycling levels during the LSTF programme. However, insufficient count data was available to estimate overall (project-wide) change.

The upward trends from automatic and manual counts were corroborated by data on cycling participation from the Active People Survey. This survey showed a slight increase in the proportion of people cycling in the Large Project local authority areas during the LSTF period, whereas the proportion fell in the comparator group of local authorities, such that the relative difference was +6.6 percentage points. The change appeared to be due to wider participation in cycling, rather than existing cyclists doing more.

4.1 Evidence from the Meta-analysis about cycling

Seven Large Projects delivered many interventions intended to increase cycling, and five delivered some interventions. Interventions included cycle routes; secure cycle parking; cycle training for adults and children; cycle maintenance courses and services; and cycle hire (both short-term on-street hire schemes and longer term loan schemes). Cycling was also promoted by means of events, led rides, cycle challenges and other activities.

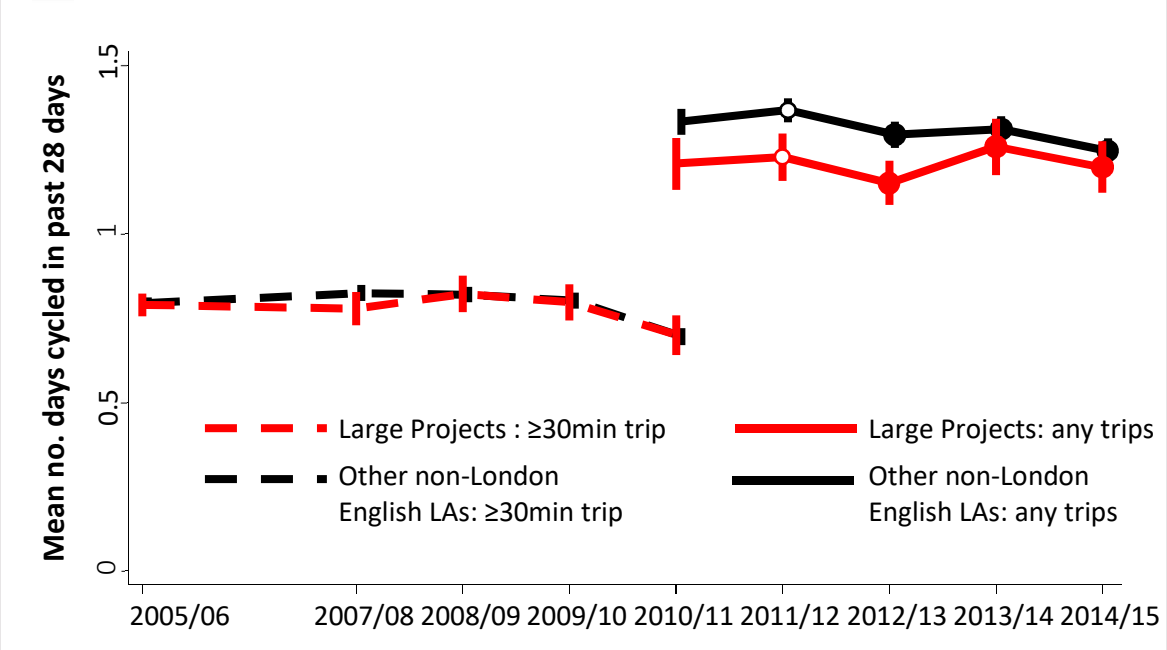
Despite a significant amount of activity to encourage cycling, there was rather limited collection of evidence to assess the effect of this activity on overall cycling levels (due to inadequate deployment and maintenance of automatic cycle counters, particularly). Nevertheless, accepting the limitations of the data, all seven Large Projects that had implemented many cycling interventions showed some indications of increases in cycling since the start of the LSTF programme, measured either by automatic counts or manual cordon counts.

Cycling uplift as recorded by data from multiple automatic counter sites was +46% in Merseyside and +28% in Greater Nottingham (pre / post comparison, both between 2010/11 and 2015/16), and +23% in WEST excluding the City of Bristol (pre / post comparison between 2010/11 and 2014/15). These figures do not necessarily imply an *overall* cycling uplift of 20-50% in these cities, as cycle counters are likely to have been preferentially located in places where improvements to cycle infrastructure had been made, but they are nevertheless suggestive of some increase in cycling activity. For CENTRO, data from 50 automatic counters close to LSTF intervention corridors also showed signs of increased cycling between 2012 and 2015: 31 sites showed a year on year increase, 15 showed an increase in comparison with the baseline and just 4 sites showed a decrease. Area-wide cycling uplift as recorded by manual cordon counts was +2% in Reading (between 2009-11 and 2014-16) and +9% in TfGM across all 10 district centres (between 2012 and 2015). In BDRS, manual cordon counts suggested cycling had increased for trips into two out of four urban centres, Sheffield and Rotherham (pre / post comparison between 2010 and 2015, +5% and +34% respectively).

In some cases, area-wide increases in cycling were a continuation of a pre-LSTF trend, suggesting that although LSTF schemes may have contributed to the uplift in cycling, other factors, including cycling investment prior to LSTF, were also likely to have played a part.

The indications of upward cycling trends from automatic and manual counts were corroborated by data on cycling participation from the Active People Survey (Figure 4). Among participants in this Survey, the proportion of adults who had cycled in the past month increased slightly in the Large Projects between 2010-12 and 2013-15 (from 14.1% to 14.5%, p=0.04 for difference i.e. a 96% chance the difference was 'real' and not simply a result of random variability). By contrast, the proportion of cyclists in the national comparator group decreased somewhat over this same time period from 16.0% to 15.4%, meaning that the change in the Large Projects was more favourable than the background national trend (p=0.02 for difference between the Large Projects and the national comparator group).

Figure 4: Trends in the mean number of days on which adults had cycled in the previous four weeks, and proportion of adults who had cycled in previous four weeks



Proportion of adults who had cycled in last four weeks				
	Change in Large Projects group	**Change in comparator group**	**Difference-in-ratios**	**Large Projects trend relative to comparator group**
During / post-LSTF 2010-12 to 2013-15	**+2.8% (+0.4pp)**	**-3.8% (-0.6pp)**	**+6.6pp**	**better**

'Large Projects' trend is for 53 unitary / district council areas covered by 12 LSTF Large Projects. Local authority areas that received a very small proportion of Large Project investment were excluded.

'Other non-London English LAs' trend is for the comparator group of all unitary / district council areas in England that are not part of a Large Project or in London. It therefore includes areas that received some LSTF funding as Small Projects, as well as areas that did not receive this funding. This means that it is not a 'no intervention' group, but is probably a 'lower level of intervention' group.

Filled circles show years when all Large Projects received funding; open circles show years when some Large Projects received funding.

Data is from the Active People Survey. Until 2010/11, the survey asked the number of days in the past four weeks when the respondent had made a cycle trip of at least 30 minutes. From 2010/11 onwards, the question was changed to ask about cycle trips of any duration.

Looking at survey respondents in the Large Project areas who reported that they cycled, the average number of days of cycling was 8.6 in 2010-12 and 8.5 in 2013-15, suggesting no change over time (p=0.48), and nor was there evidence of change relative to the comparator group (p=0.81). This provides an indirect suggestion that any increase in cycling in the Large Projects may have been driven by widening participation in cycling, rather than existing cyclists doing more.

The *Meta-analysis* found a large amount of evidence of specific cycle interventions leading to increases in cycling (and also some evidence of specific interventions having unsuccessful outcomes). This evidence came from pre- and post-scheme counts at sites where cycle lanes had been built or secure cycle parking installed; from post-intervention surveys of people who had received cycle training, a bicycle loan, or cycle maintenance classes; and from pre- and post-intervention surveys at sites such as schools and colleges which had participated in cycling promotional programmes. Examples of intervention-specific evidence included:

- BDRS: 2,430 people registered to lease a bicycle; surveys suggested that 70-77% had previously used a car to commute, and 65-71% committed to cycling to work at least once a week.
- Nottingham: 14 secure cycle parking hubs were accessed over 900 times per month in 2014/15, and survey evidence indicated that the hubs had encouraged 38,500 additional cycle trips.
- Reading: following provision of a secure cycle parking hub at the station, cycle parking counts showed an increase of 5% in the number of parked cycles in the area of the station.
- TfGM: 25% of cyclists crossing city centre cordons whose route was affected by LSTF interventions said that improved cycle routes to the city centre had influenced their decision to cycle.

Transport for Greater Manchester secure cycle parking

4.2 Evidence from the Meta-analysis about walking

Seven Large Projects delivered many interventions intended to increase walking, and four delivered some interventions. A few Large Projects made significant public realm improvements – for example, Telford's redesign of part of the town centre Box Road as a shared space. Other interventions included 20mph zones, pedestrian route improvements, and behaviour change measures such as led walks.

At the local authority level, data from the Active People Survey on the average number of days when adults had done any walking in the previous four weeks showed similar trends in the group of 12 Large Projects and in the comparator group, both before and during the course of the LSTF programme. However, one Large Project, Nottingham, showed an increase in walking relative to the comparator group between 2012 and 2014/15 that was statistically significant.

Data from area-wide manual counts (and in one case a large-scale mode share survey) in six Large Projects showed mixed evidence. Using a three-year rolling average, three Large Projects showed an increase in walking between 2009-11 and the most recent period (either 2013-15 or 2014-16), while three showed a decrease.

Intervention-level evidence was of variable quality. Some of the stronger evidence included:

- BDRS: Three months after participating in 'WalkBoost' initiatives, 62% of the 567 respondents reported walking more than when they first joined the programme, with an average increase of 81 minutes per week, while 14% reported driving less.
- CENTRO: 64% of car owners and 50% of non-drivers reported walking more after personal travel planning on two corridors.
- Merseyside: surveys of over 700 people using traffic-free routes found that almost half of respondents said the route had encouraged them to walk or cycle more.
- Reading: a 'Beat the Streets' scheme found that four-fifths of participants said that it helped them to walk or cycle more.
- TfGM: surveys of 1,750 people at sites where routes had been improved for walking or cycling found that 70% said the presence of the route had increased their level of physical activity.

Six Large Projects reported pre and post-scheme manual counts at locations where footways had been widened, new paths built, or (in one case) a new pedestrian / cycle bridge installed. In all, results were reported for 17 schemes: eight of these showed increasing pedestrian flows, six showed mixed results, and three showed a fall in pedestrian flows.

The general picture was therefore of some activity to encourage walking, but with a less strong focus than for cycling. Some intervention-level monitoring data demonstrates that specific schemes have resulted in increased levels of walking (or reported increases), although these are small in scale.

4.3 Evidence from the What Works Report

Structured discussions with project managers identified some implementation lessons with regard to cycling. On their own, promotional activities such as led rides, cycle challenges and cycle festivals were judged unlikely to be worthwhile unless they were in the context of good quality cycling infrastructure. However, where this infrastructure was in place, rounded approaches that included a combination of bicycle provision (e.g. bike loan schemes, public cycle hire schemes, refurbishment and re-sale), cycle training and promotional activities had been felt to be successful.

5 Travel for commuting

Key findings

The *Meta-analysis* investigated the extent to which workplace-level interventions had led to a shift from car driving to other modes of travel for commuting. Data from 93 workplaces in Large Project areas showed a fall in car driver mode share of 2.7 percentage points (equivalent to 4.1% fewer car driver trips). The change was statistically significant.

This was a smaller change than reported from previous studies. Evidence from the *Strategic Employment Sites and Business Parks Case Study* suggested that car parking restraint (or lack of it) was a key influence on car driver mode share. Evidence from *Outputs Surveys* and *Outcomes Reports* suggested that there was a tendency for LSTF workplace travel interventions to concentrate on easy 'pull' initiatives, such as providing encouragement and information, rather than more challenging, but more effective, 'push' initiatives such as reducing or restraining parking.

This suggests that in order for workplace travel planning interventions to be effective, easy 'pull' initiatives need to be combined with measures to reduce or ration car parking.

5.1 Evidence from the Meta-analysis

Nine Large Projects delivered workplace-based activities designed to encourage a shift away from single occupancy car use for the journey to work. More than 2,400 businesses and other organisations received some form of support.

Across eight Large Projects, 93 workplaces had useable data from baseline and follow-up employee surveys before and after involvement in workplace travel initiatives, suitable for assessment of the change in car commuting. Workplace travel survey data from a further 547 workplaces was also obtained from Small Projects, for comparison purposes.

Changes between baseline and follow-up surveys showed both decreases and increases in car driver mode share[11] across different workplaces. However, taken overall, random effects meta-analysis of the workplaces in the Large Projects found statistically significant evidence that car driver mode share for travel to work decreased on average in absolute terms by 2.7 percentage points[12]. The pooled estimate of car driver mode share at baseline was 65.9%, so this absolute change of -2.7 percentage points corresponded to 4.1% fewer car driver trips.

11 That is, the share of employees' commuting trips to a workplace made as car driver (as opposed to trips made as car passenger, by bus, by walking, etc).
12 Statistics are: 95% chance that the reduction lay between -1% and -4.4% with a 99.9% chance that the reduction did not result from random fluctuation.

The change in car driver mode share was smaller for the workplace data from Small Projects (average change in absolute terms of -0.9 percentage points, or a 1.5% relative decrease), although the difference between the result in the Large Projects and that in the Small Projects was not statistically significant.

5.2 Evidence from the Strategic Employment Sites Case Study

The *Strategic Employment Sites and Business Parks Case Study* examined the outcomes of workplace interventions in two Large Project Areas, WEST and Hertfordshire[13]. In WEST, the study focussed on seven employment 'clusters' in an arc north and west of Bristol covered by the North Fringe Area Travel Plan and the Portside Area Travel Plan. LSTF business engagement included grants to employers for on-site facilities to boost sustainable commuting; promotional 'roadshows'; 'Dr Bike' cycle maintenance; bike loans; car-sharing partnering services and electric vehicles. Other LSTF interventions in these areas included cycle and footpath improvements; cycle hire and parking at stations; bus service improvements; bus stop and bus information improvements (including real-time information). Further bus service improvements were funded from other sources and by some local employers.

Two pre-existing local business networks, SusCom and SevernNet, provided useful contacts for LSTF engagement, and partly compensated for the problem that short-term LSTF staff contracts militated against establishing the sustained business relationships likely to be most productive. SusCom is a North Fringe employer group dedicated to improvement and promotion of sustainable commuting options. SevernNet in Portside is a broader business and community development organisation, whose aims include improvement of transport.

Aggregated results across all sites, for all employees that responded to travel surveys, showed a statistically significant absolute reduction in single occupancy car commuting of 1.7 percentage points. There was a 2.6 percentage point absolute increase in bus commuting. These changes were during a period when petrol prices fell and national car use rose. However, in finer grained analysis, only four (out of 20) employers, all in the North Fringe, showed a statistically significant fall in car use. In Portside car use rose. The fall at two very large employers dominated the aggregated results, and one of these changed site between surveys, resulting in less car parking.

Car parking restraint appeared to have been a key influence. Controlling for other factors, sites with restricted car parking showed lower single occupancy car commuting and higher cycle commuting than other sites. Interviews with senior managers confirmed restricted parking was a main motivator for firms to engage with sustainable transport initiatives.

The amount of change attributable to LSTF could not be distinguished. Asked about a list of LSTF interventions, 29% of employees who had changed their travel said these had influenced their behaviour and 64% said they had made no difference.

13 The case study report for Hertfordshire was not finalised as at March 2017.

Swindon's workplace personalised travel planning team used a Smoothie Bike to capture employee attention. They worked with 15 employment sites to reduce car travel. Over 1,600 people received bus taster smartcards; 900 signed up to an Active Swindon Challenge; 216 received cycle loans; 488 had bike maintenance training; and 450 cycle parking spaces were provided.

Leicestershire's business travel network had a membership of 52 organisations representing 13,500 employees.

5.3 Evidence synthesis

The reduction in car use found in the *Meta-analysis,* and also in the *Strategic Employment Sites and Business Parks Case Study,* was small compared to previous evidence of the effects of workplace engagement programmes (e.g. 15 percentage point median reduction amongst twenty workplaces undertaking 'best practice' travel planning reviewed in Cairns et al. 2004[14]). This may be because the intensity of interventions was low at some workplaces: the information in Outputs Surveys and Outcomes Reports tended to suggest a focus on relatively easy 'pull' initiatives, such as providing encouragement and information, rather than more challenging, but more effective, 'push' initiatives such as reducing or restraining parking. It also seems likely that the 'first mover' companies considered in earlier analyses were at the forefront of workplace travel planning as a result of local or company-specific push factors around parking and planning, which may be less prevalent in the companies drawn into workplace travel planning in a more reactive way through LSTF. This conclusion is supported by the evidence from the *Strategic Employment Sites and Business Parks Case Study* that sites with restricted car parking showed lower levels of car use, and by the interviews with senior managers that confirmed restricted parking was a main motivator for firms to engage with sustainable transport initiatives. This has important lessons for future workplace travel planning interventions, suggesting that in order to be effective, easy 'pull' initiatives must be accompanied by measures to reduce or ration car parking.

14 Cairns et al. (2004) *Smarter Choices Changing the Way We Travel*

6 Travel for other journey purposes

Key findings

Most Projects delivered a range of behavioural change programmes designed to encourage a shift away from single occupancy car use to more use of public transport, walking and cycling. These included household personalised travel planning projects and work with schools.

Some of these interventions produced quite significant changes in travel behaviour amongst those participating, although monitoring used different methods and so results cannot be aggregated. It is unclear over what period the benefits will be sustained. However, it seems plausible that change is more likely to be sustained where the context is supportive – for example, in places where bus services or cycling facilities were also improved.

6.1 Evidence from the Meta-analysis

Amongst the Large Projects, seven implemented household personalised travel planning projects (five on a fairly large scale and two on a medium scale). Eight Large Projects had significant programmes of engagement with schools, including cycle training and a wide range of activities to encourage sustainable travel, and involving more than 750 schools. There were also initiatives with universities, at railway stations, through community hubs, and in new residential developments.

Five Large Projects cited evidence of outcomes of schemes with schools and colleges. Survey data from schools in the four local authority areas in BDRS (i.e. Barnsley, Doncaster, Rotherham and Sheffield) and in Bournemouth showed a fall in car mode share, although data from schools in Telford showed a rise in car mode share. In CENTRO and Nottingham, surveys of colleges showed a fall in car use amongst staff and students.

Large scale household PTP programmes in CENTRO, Hertfordshire and TfGM reported positive results for reduction in car use and increase in active and sustainable travel modes. The results were variable, probably reflecting differences in the targeted areas, approaches and options available. There was some evidence from TfGM that without continued input there may be reversion to previous travel behaviour.

6.2 Evidence from Annual Reports

The LSTF Annual Reports identified many examples from Annual Outputs Surveys of behavioural change activities undertaken by Small Projects and aimed at residential areas, schools and colleges.

Examples of activities focussed on residential areas included the following:

- In an area of major residential development in Leighton Linslade, 6,824 households were offered personal travel advice and information in 2012/13 by Central Bedfordshire Council. Some 2,275 people were engaged, and in a survey of participants, 37% of respondents said they had reduced their car use.

- Travel advisers spoke to 1,910 residents in Basingstoke in 2012/13, providing tailored travel information packs and bus taster tickets and persuading 620 households to complete a challenge to replace a car trip with a sustainable alternative. A survey of participating households showed an 11% reduction in car trips.
- Travel advisers contacted 14,330 households in Thurrock in 2012/13. Monitoring of households receiving personal travel advice in the previous year suggested that the service was effective, reducing car trips by 9% and increasing bus trips by 30%.
- In Birmingham, seven community cycling hubs ran a wide range of regular cycling activities, including leisure rides, cycle training, cycle maintenance training and bike MOT sessions, and in some cases offered bikes for loan. A follow-up survey found that 41% of respondents had replaced some of their regular car trips with cycling and there was a 10%-point increase in those saying they cycled for leisure once or twice a week.

Workplace cycle maintenance workshop in Swindon

Examples of school-based activities included:

- A well-established programme of work with schools in Darlington, which started when the town was one of the Sustainable Travel Towns between 2004 and 2009 and continued thereafter, including as part of LSTF. This programme demonstrated the benefits of long-term consistent engagement: by September 2013, almost three-quarters (72%) of journeys to school in Darlington were by sustainable modes of travel, the highest level since comparable recording started in 2004/05.
- In Suffolk, pupil surveys in 2013/14 show that in the previous two years the proportion of pupils who said they regularly cycled to school had increased by 10%-points (i.e. 10 more pupils

cycling per 100 pupils) and those saying they regularly walked to school had increased by 4%-points. Over the same period there was a 10%-point drop in pupils who usually travelled to school by car.

- A Suss the Bus programme run by Tyne and Wear ITA enabled pupils in the final year at primary school to meet the driver, ask questions and become familiar with the bus route to their new secondary school. It worked with almost 4,000 pupils from 28 primary schools.
- Walk once a Week (WoW) promotional campaigns were run at 532 primary schools across 13 local authority areas, as part of a Small Project delivered by Durham Council and Living Streets. The campaigns resulted in an average 23% increase in walking to school within five weeks. Free Your Feet (FYF) walking challenges were delivered in 112 secondary schools, with some also running Campaign in a Box, a student-led walking promotion. On average, schools running FYF achieved a 13% increase in walking to school and a corresponding 12% reduction in car journeys.

PART III: IMPACTS

7 Economic impacts of LSTF

Key findings

LSTF public realm initiatives and walking and cycling access improvements were found to improve perceptions of town centre accessibility. In the two towns evaluated in depth by the *Town Centres Case Study*, retailers considered that LSTF investment had been positive for retail. In Telford in particular, LSTF investment was seen as one of the factors driving retail confidence and growth.

In the LSTF Large Projects, activities to help unemployed people travel to interviews, training and new jobs reached about 10% of unemployed adults over a two-year period, according to the *Meta-analysis*. Survey evidence suggested these activities had helped job-seekers to secure employment, and had enabled them to accept jobs that they would otherwise have had to turn down, thus improving the efficiency of the local jobs market.

Rush-hour congestion worsened in the LSTF Large Projects, both in absolute terms and relative to the comparator group, according to the *Meta-analysis*. This was due to a range of factors, of which most were unrelated to LSTF. However, in a number of LSTF Large Projects, bus punctuality improved, either network-wide or on targeted corridors, and there was evidence that this was attributable to LSTF investment.

Activities to support sustainable travel for leisure (e.g. bus services aimed at visitors, cycle hire schemes) led to increased use of sustainable modes of travel, according to the *Visitor Travel Case Study*. Businesses that were involved in these programmes were more likely to report an increase in business volume than those that were not involved, although a causal link could not be demonstrated.

The programme delivered by the LSTF Large Projects was very high value for money, with a benefit-cost ratio that was above 5, according to the *Meta-analysis*. The estimated cost per car kilometre removed (4.8p) was broadly comparable with estimates from previous sustainable transport investment programmes.

7.1 Overview of how LSTF Projects supported local economies

The *What Works Report* identified a wide variety of ways in which LSTF Projects sought to achieve the LSTF core objective of supporting the local economy and facilitating economic development. Evidence about the types of activities undertaken to support local economies was available both for the Large Projects and also for the much larger number of Small Projects. The different approaches

are summarised in Figure 6. Interventions are described in the *LSTF Annual Reports,* and there is evidence of outcomes in the *Case Studies* and the *Meta-analysis*.

Figure 6: LSTF and economic impacts

7.2 Enhancing town centre vitality

Several Projects (Portsmouth, Telford, Redhill, Cheltenham and Gloucester) aimed to boost the town centre economy by improving access by foot, cycle and bus.

The *2014/15 LSTF Annual Report* describes the changes in Telford, where the pedestrianised retail area had been surrounded by a high-speed, three-lane, one-way circulatory system known as the Box Road, which acted as a constraint to development. An LSTF public realm scheme reconfigured the Box Road to connect the shopping area and the site of a planned major development including a cinema, hotel, bars and restaurants and other leisure attractions. Three sides of the Box Road were modified for two-way traffic, with a design to encourage lower speeds. Twelve pedestrian crossings were installed, and new cycle-ways built. The fourth side of the Box Road was modified to be a shared space for pedestrians, cyclists, buses and general traffic, with a 20mph speed limit.

In Redhill, LSTF schemes included infrastructure to improve sustainable travel and access from areas of deprivation to the centre, along with road modifications around the centre.

Telford Box Road: before and after

The *Town Centres Case Study* looked at the effects of the LSTF initiatives in Telford and Redhill. While evaluation took place only a short time after initiatives had been completed, there were early indications that they had been beneficial. The Case Study found that the LSTF investment in both towns had a positive impact on perceived accessibility of the town centre by sustainable modes of travel. In particular, in Telford, where improvements were on a larger scale, LSTF increased the attractiveness of active travel. There was no evidence of an overall shift towards sustainable modes within six months of implementation (either in transfer to non-car modes or in a higher proportion using sustainable modes), but the 'after' surveys were too early to reflect any long term change in travel patterns. However the proportion of people describing access by sustainable modes as 'easy' increased (by 12 percentage points in Telford and 8 percentage points in Redhill for access on foot and 17 percentage points in Telford for cycle access). There were also net increases in frequency of use of sustainable modes, particularly walking, among users of these modes. Survey evidence suggests this change is attributable to LSTF investment: those who perceived LSTF interventions to have had a positive impact on access to the town centre (by any mode) and those who perceived the change to have been more effective in delivering intended outcomes, were more likely to report using sustainable modes more often as a result of recent transport investment.

In terms of economic impacts, over half of the residents in each town thought that the improvements had helped to promote the town centre as a destination. In Telford where the investment was on a larger scale, there were indications of more trips into the centre but the impacts in Redhill were less clear. In both centres, retailers believed that LSTF investment had been positive for retail, but more so in Telford where the changes were more visible and were made at the same time as major investment in leisure facilities. In Telford, the LSTF investment was seen as one of the factors driving retail confidence and growth, and important as an enabler of retail and leisure development and therefore of increased inward investment. In Redhill, retailers felt that the retail economy would have been worse without the LSTF investment, and that the investment would, over time, encourage developers to invest in the town.

7.3 Helping job-seekers into work

A quarter of LSTF Projects included activities to help unemployed people get to interviews, training and new jobs. In the 12 Large Projects, the number of job-seekers helped across the whole funding period was equivalent to 10% of the number of unemployed adults of working age in those areas during 2013/14 and 2014/15 combined.

While there was no evidence to suggest that these activities reduced unemployment *per se,* there was evidence to suggest that they increased the efficiency of the local jobs market, by enabling unemployed people to find work more quickly than they would otherwise have done so. The *Meta-analysis* found that between 20% and 43% of job-seekers in BDRS, Bournemouth, Merseyside, Nottingham and Solent who were offered free or discounted public transport tickets or cycle vouchers to assist their job search subsequently succeeded in gaining work. Survey evidence from Bournemouth and Nottingham suggested that around 80% of these people felt that the public transport tickets or cycle vouchers had been important in enabling them to get a job, suggesting that people's success in securing employment was at least in part attributable to the intervention.

Some forms of support helped to broaden travel horizons. Amongst people in BDRS who received travel training via work clubs, job club meetings and other training schemes, 83% stated that they felt more confident in planning their journeys and learning different ways to travel. In Hertfordshire, more than half of young people with special educational needs and disabilities who undertook independent travel training were reported to have gained full or partial independence.

From BDRS, Hertfordshire and elsewhere, there was evidence that Wheels to Work schemes offering the loan of a moped or bicycle had enabled people to accept job offers that they would not otherwise have been able to take up. Similarly, from TfGM, there was evidence that nearly half (47%) of workers using community transport services to get to major employment sites would not have been able to get to work without the service.

There was some evidence that interventions had long-term benefits, and that intervening at a time when people were experiencing change in their lives (i.e. being out of work, or starting a new job) may have encouraged sustainable travel patterns in the future[15]. For example, CENTRO found that six months after people had received free bus travel for their initial period in a new job, nearly three-quarters remained in employment, and a similar proportion (76% - 81% in different survey waves) were still regularly using the bus. There was similar evidence from TfGM, where 37% of job-seekers who had received a 28-day ticket subsequently reported that they used public transport more, and 76% had continued to buy a public transport season ticket. A survey of job-seekers who had received a bike from the TfGM Bike Back to Work programme found that 59% were now cycling, whereas previously they were not.

CENTRO's Workwise programme offered free travel passes to job-seekers

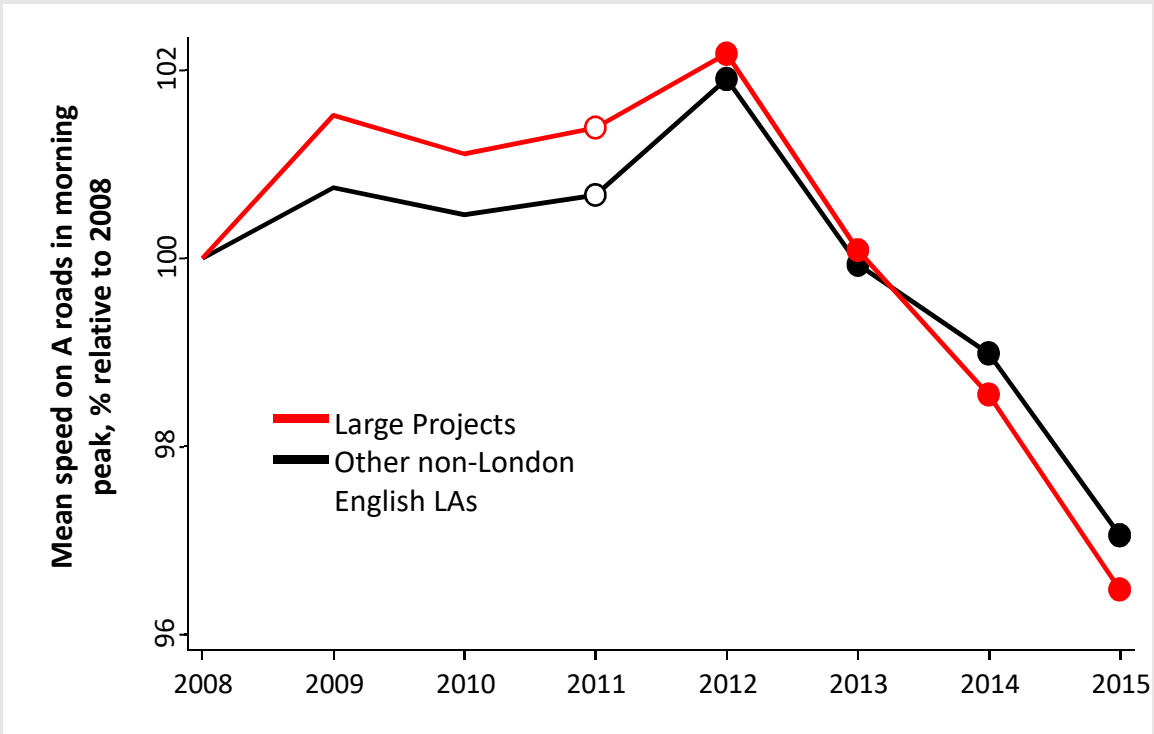
15 Note that the survey evidence on which the CENTRO findings are based does not enable construction of a 'counterfactual' i.e. it was not possible to compare effects amongst job-seekers who *had* received support with effects among a comparable group of job-seekers who *had not* received support.

7.4 Reducing congestion

Many Projects introduced measures to make traffic flow more freely. These included traffic signal management to optimise vehicle flow, parking enforcement, bus priority measures, and variable message signs to alert drivers to congestion ahead and parking availability. Although there is evidence from the *Meta-analysis* that some individual interventions had a good effect on congestion at a local level, there was no 'area-wide' improvement in congestion at a local authority level, relative to what would have happened in the absence of LSTF. This lack of a positive result was in part due to increases in population and jobs in some Large Project local authority areas.

At the end of the programme, the *Meta-analysis* found that rush-hour congestion at the local authority level for the Large Projects as a whole had slightly worsened relative to the comparator group. DfT congestion data for the comparator group showed a slight increase in rush-hour speeds (average vehicle speeds in the morning peak on locally-managed 'A' roads) from 2010 to 2012, followed by a fall in rush-hour speeds from 2012 to 2015 (Figure 7). The group of 10 Large Projects for which data were available showed broadly the same pattern, but with a slightly larger relative worsening of congestion. That is, rush-hour speeds fell by 5.2% in the group of 10 Large Projects between 2009-11 and 2015, compared to a fall of 3.6% in the comparator group. The difference between the group of 10 Large Projects and the comparator group was statistically significant.

Figure 7: Indexed change in rush-hour speeds in the Large Projects and the comparator group



	Change in Large Projects group	Change in comparator group	Difference-in-ratios	Large Projects trend relative to comparator group
During / post-LSTF 2009-11 to 2015	**-5.2%**	**-3.6%**	**-1.6pp**	**worse**

'Large Projects' trend and 'Other non-London English LAs' trend are for same groups of local transport authority areas shown in Figure 2. Filled circles show years when all Large Projects received funding; open circles show years when some Large Projects received funding.

Looking individually at the six Large Projects where congestion worsened relative to the comparator group, and comparing data on rush-hour speeds with data on population and employment levels, it appears that the relative worsening in rush-hour congestion can be attributed, at least in part, to increases in the population and growth in jobs in these Large Project areas.

There is an apparent mismatch between evidence on rush-hour speeds and evidence on 24-hour traffic volumes. While rush-hour speeds for the group of 10 Large Projects worsened relative to the comparator group, 24-hour traffic volumes increased by less than in the comparator group. There are two possible reasons for this: either the fall in 24-hour traffic volumes is due to a rise in peak-hour traffic volumes coupled with a larger fall in off-peak traffic volumes; or the fall in rush-hour speeds occurred despite a simultaneous fall in traffic volumes, and is due to a temporary or permanent reduction in road capacity.

Discussion with the Large Projects indicates that in 11 Large Projects there were local factors at play that could have significantly worsened rush-hour congestion over the LSTF period. These included both factors *unrelated* to LSTF (e.g. disruptions due to utility roadworks, or disruptions due to major transport schemes involving roadworks at motorway junctions or highway maintenance programmes)[16]; and factors *related* to LSTF (temporary roadworks due to LSTF schemes; permanent reallocation of road or junction capacity; speed limit reductions). There were also cases where new development (housing or employment uses) had been expected to cause localised increases in traffic and worsen congestion, and where the Large Project officers judged that LSTF interventions had lessened the adverse impact.

Although rush-hour congestion for general traffic did not improve, some Large Projects were successful in reducing congestion problems for those road users who travelled by bus. In two Large Projects (CENTRO and WEST), bus punctuality improved at a network-wide level, and measures funded through LSTF seem likely to have contributed to this. In another two Large Projects (BDRS and Bournemouth), bus journey times improved on some corridors (although they worsened on others), and the improvements on some corridors in BDRS could be attributed to specific road network modifications funded by LSTF. In one Large Project (Telford) bus punctuality worsened somewhat, but this was not attributable to the LSTF programme.

7.5 Strengthening tourism economies in rural areas

Projects in visitor areas made tourism businesses (often SMEs) easier to reach by sustainable modes of travel or helped them develop their sustainable travel leisure offer. For example, on the Isle of Wight the 'Bicycle Island' scheme gave grants to tourism businesses for cycle parking and helped accommodation providers achieve 'Cyclists Welcome' accreditation.

The *Visitor Travel Case Study* examined the effects of LSTF activities in the South Downs (SD), New Forest (NF) and Lake District (LD) National Parks. LSTF activities, and the associated outcomes, included:

- **Buses:** investment in existing bus services (NF, SD); launch of new services (NF, LD); development of an integrated ticket for use on 15 operators (SD); and investment in a bike bus

16 While these works would affect all local authorities to some extent, the scale of non-LSTF roadworks in some Large Projects appeared to be out of the ordinary and would have had a significant impact on congestion levels: e.g. a Metro extension and refurbishment of New Street station in Birmingham; and a major ring road scheme, widening of dual carriageway and two new tramlines in Nottingham.

and cycle-carrying capacity on water buses (LD). Overall, between 2012 and 2014, visitor bus journeys in LSTF areas increased by 3.7% (+20,353 journeys). Services receiving funding showed more positive patronage trends than those which did not. In the New Forest, combined patronage on the two LSTF-funded services grew by 29%, whilst non-funded services experienced a patronage decrease of 2.1%.

- **Cycling:** improving existing cycle routes (NF & SD); extending existing routes and surfacing off-road routes (LD); more cycle parking, signing and information (NF, SD, LD); and increasing the availability of bike and e-bike hire (LD). Between 2012 and 2014, cycle counts showed an increase of 24% in the New Forest, and 93% in the South Downs. Cycle hire in the New Forest increased by 24% between 2012 and 2014. The number of cycles carried across Lake Windermere (LD) between 2012 and 2013 increased by 31%.
- **Pay-as-you-drive cars:** In the Lake District, 10 pay-as-you-drive cars were introduced, with the aim of offering visitors the 'back-up' option of a car for trips where it was needed, thereby encouraging them to travel to the Lake District by a more sustainable mode. Use of the cars declined between 2012 and 2013, before increasing substantially in 2014 (albeit to below 2012 levels).
- **Rail hubs:** All three National Parks had initiatives to enhance rail stations as hubs for sustainable transport. Between 2012 and 2014, station usage (for all purposes) increased in the Lake District (+5.7% passengers) and the South Downs (+3.3%), but fell in the New Forest (-1.8%).
- **Marketing and branding:** A range of activities were undertaken, including advising tourism providers on promoting sustainable travel information (NF, SD); promoting access to the park by rail and coach (LD); co-ordinating branding (LD) and developing promotional films (NF, SD, LD). Reaching people before they arrive at the National Parks is a particular challenge.

The New Forest Tour in Hampshire

There was an association between business involvement in the LSTF programme and improved business performance, although insufficient evidence to demonstrate a causal link. Two-thirds (66%) of engaged businesses reported an increase in business volume since 2012 (including 11% reporting a significant increase), and 26% reported an increase in the number of employees. For non-engaged businesses, figures were 47% (1%) and 19%. Interviews with tourism businesses in the three National Parks identified the New Forest Tour and Beach Bus services, and cycle hire, as highly successful.

There was also some evidence that the opportunity to try cycling, or use the bus, whilst on holiday may have some effect on visitors' future behaviour. A survey of users of sustainable transport in the National Parks (covering users of buses, trains, boat / ferry, open-top bus tours and cycling) found that the main motivations were to do with the experience (49% for a more enjoyable way to get around; 45% so they were better able to enjoy the views; 38% wanted to leave their car behind). Almost all respondents (94%) gave their experience a positive rating, and perhaps as a result of this, 61% of respondents said they would definitely be more likely to travel that way again on holiday, and 36% said they would definitely be more likely to use their travel choice when back home.

7.6 Other local economic impacts

Other economic impacts identified in the *What Works Report* included:

- **Transport sector training, work experience and employment:** Two Projects ran initiatives that offered training, work experience and support to job-seekers, to equip them to work in local transport industries. In Merseyside, bespoke training courses developed with employers prepared participants for employment in the bus, rail and maritime industries. Over the course of the LSTF programme, Merseylearn helped 247 people into transport employment.

Derby's bike recycling scheme worked with a prison, so nine inmates achieved City & Guilds qualifications in cycle mechanics.

- **New enterprises:** Some Projects supported development of new sustainable transport enterprises. Some were set up as social enterprises and others on a commercial basis. They included bike hubs providing cycle maintenance and secure parking, car clubs, Park & Sail services and Wheels to Work. In East Sussex, 'Wheels 2 Work' community interest company generated income from its motorcycle dealership and workshop that supported its Wheels to Work scheme.
- **Transport efficiency savings for businesses:** Some Projects helped businesses reduce the operating costs of fleet vehicles through more efficient practices and new technology. Initiatives included accreditation for good vehicle maintenance, freight consolidation centres, eco-driver training and electric car and bike pool schemes for business travel. For example, Thurrock facilitated a 114-member Freight Quality Partnership, certified 3,000 vehicles through its fleet efficiency scheme and trained 117 drivers in safe and fuel-efficient driving techniques.
- **Stronger rural economies:** Some Projects delivered sustainable transport schemes that made it easier for rural residents to reach local or regional economic centres. For example, in the Yorkshire Dales a £1 flat fare gave young people affordable access to jobs, shopping and entertainment in Northallerton, Ripon and Skipton.
- **Larger workforce catchments for businesses:** New bus services to peripheral employment sites meant that businesses at those sites were able to recruit from a larger pool of employees. For example, Transport for Greater Manchester's four Local Link services enabled employees to reach job locations that would otherwise have been inaccessible to them. A survey of users found that 75% agreed or strongly agreed that Local Link allowed them to look for work in more places. Interviews with senior managers at businesses, undertaken as part of the *Strategic Employment Sites and Business Parks Case Study,* found a perception that commuter travel was important to business performance. Employers experiencing congestion, parking limits, and recruitment difficulties, saw greater need for investment in sustainable transport.
- **Increased patronage for bus and train operators:** Most Projects worked with bus operators and train operating companies to increase patronage. For example, Wiltshire Small Project worked with First Great Western to quadruple train services and improve stations on the TransWilts rail line, increasing patronage from 10,000 per year before LSTF to 183,400 in 2014.

7.7 Value for money of LSTF

The *Meta-analysis* included an ex-post assessment of the value-for-money of the LSTF programme delivered by the Large Projects. This suggested that it had been very high value for money. For the group of 11 Large Projects for which assessment was possible on a consistent basis, the best estimate benefit-cost ratio (BCR) was 5.2 – 6.1.

This ex-post BCR was similar to the DfT-adjusted ex-ante BCR (5.2 for the equivalent group of 11 Large Projects), suggesting that the programme was successful in achieving its expected outcome, so far as value-for-money was concerned.

Sensitivity tests, varying the rate at which changes in traffic, bus use and cycling were assumed to decay after the end of the programme, and varying the assumptions about what proportion of change was attributable to the LSTF programme, suggested a lower-bound programme-level BCR of more than 4, and an upper-bound programme-level BCR of more than 14.

These BCRs did not include all benefits of the LSTF programme. Benefits that it was not possible to capture, due to lack of adequate data, included public realm enhancements; health benefits from increased walking (other than that associated with bus travel); and benefits associated with rail and station enhancements.

Journey quality benefits arising from interventions such as simplified (smartcard) ticketing, real-time passenger information, and new cycle infrastructure, formed a significant proportion of the overall benefits (around 49% of the total benefit at the programme level). Benefits arising from lower traffic levels were the next most-significant benefit (around 38% of the total benefit at the programme level, mainly comprising decongestion benefits[17], fewer accidents and lower greenhouse gas emissions, offset by drops in indirect taxation). Health benefits due to increased cycling and increased walking as part of bus trips represented around 8% of the total benefit at the programme level.

The cost of the programme per car km removed from the network was estimated to be 4.8p per car km. This was broadly comparable with estimates from previous sustainable transport investment programmes.

17 These benefits relate to congestion-relief that would have occurred if nothing except traffic levels had changed. However, the benefit might be taken in other ways: e.g. by reallocating road capacity to longer pedestrian phases at traffic signals. If this happened, 'on the ground' congestion (as measured by average traffic speeds) might stay the same but there would still be a 'decongestion benefit'.

8 Carbon impacts of LSTF

Key findings

Carbon dioxide emissions from transport fell in all 12 Large Projects, according to the *Meta-analysis.* The decline in *per capita* carbon dioxide emissions from transport was greater in the Large Project local authority areas than it was in a comparator group of local authorities (-6.9% compared to -4.7%, i.e. a superior performance of -2.2 percentage points). This superior performance during the LSTF period was different to the performance in the pre-LSTF period, when *per capita* carbon dioxide emissions in the Large Projects had changed in a way that more closely tracked the comparator group.

Incomplete evidence from individual Large Projects for individual LSTF schemes identified carbon dioxide savings representing between 0.03% and 1.6% of overall carbon dioxide emissions from transport. The total savings for the Large Projects were probably at the upper end of this range or above it (because evidence was only available for some schemes).

The *Carbon and Congestion Case Study* points to a similar conclusion of superior performance (i.e. greater reduction in carbon dioxide emissions) in the group of localities that received LSTF interventions, compared to localities that did not. The relative difference was equivalent to 3% of baseline emissions in the areas concerned.

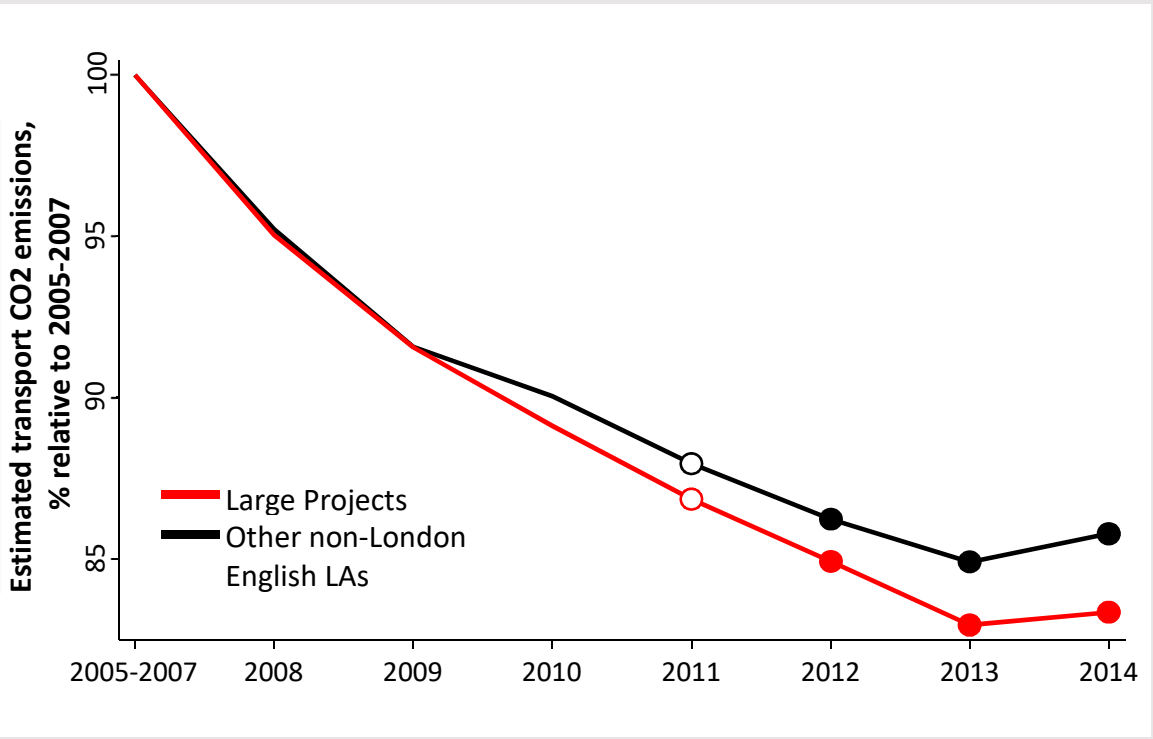
Taken together, this evidence suggests that LSTF projects may have reduced carbon dioxide emissions from transport by around 1.5 – 3% more than would otherwise have been the case, during a period when these emissions fell by around 7% in all. Although this estimate should be considered indicative, it suggests that the LSTF programme was a significant factor contributing to lower carbon dioxide emissions.

8.1 Evidence from the Meta-analysis

The *Meta-analysis* used DECC estimates for transport carbon emissions under the scope of local authority influence to compare changes in carbon emissions in the group of LSTF Large Projects with changes in the comparator group. Emissions in both groups fell between 2009 and 2013, and then increased in 2014. As with the traffic data presented in section 4.1, this reflected wider economic trends of recession followed by economic recovery.

Figure 8 shows changes in *per capita* carbon emissions in the Large Projects and the comparator group.

Figure 8: Indexed change in *per capita* CO_2 emissions in the Large Projects and comparator group



	Change in Large Projects group	Change in comparator group	Difference-in-ratios	Large Projects trend relative to comparator group
Pre-LSTF 2005-07 to 2009-11	**-10.9%**	**-10.2%**	**-0.7pp**	**slightly better**
During / post-LSTF 2009-11 to 2014	**-6.9%**	**-4.7%**	**-2.2pp**	**better**

'Large Projects' trend and 'Other non-London English LAs' trend are for same groups of local authority areas shown in Figure 4. Filled circles show years when all Large Projects received funding; open circles show years when some Large Projects received funding. Data are for carbon emissions from transport within the scope of local authority influence.

Between a 2009-11 LSTF baseline and 2014 (the most recent year for which figures were available), *per capita* CO_2 emissions for the group of 12 Large Projects fell by 6.9%, compared to a reduction in the comparator group of 4.7%, a difference of -2.2 percentage points. The difference between the Large Projects and the comparator group was statistically significant. Moreover, individually, all twelve of the Large Projects experienced a higher reduction in *per capita* emissions over this period than the comparator group.

The difference between the Large Projects trend and the comparator group trend was more marked ***after*** 2009-11 than it was ***before*** 2009-11. In the period before LSTF, from 2005-07 to 2009-11, *per capita* carbon emissions in the Large Projects group fell by 10.9%, while in the comparator group they fell by 10.2% (a difference of -0.7 percentage points), i.e. more than three times smaller than the -2.2 percentage point difference observed after 2009-11).

The general picture in the LSTF Large Project local authority areas was therefore one of *per capita* carbon emissions declining relative to the comparator group, and also in absolute terms, with an increasing difference in the post-LSTF period as compared to the pre-LSTF period.

Eight Large Projects made estimates of the carbon impacts of individual schemes including car sharing; public transport substituting for car journeys; promotion of cycling; workplace travel planning; personalised travel planning; ECO Stars fleet efficiency scheme; eco-driver training; promotion of ultra-low emission vehicles; and the development of a freight consolidation centre. These used a range of assumptions, not always fully described, and unlikely to be consistent with one another. However, for those Large Projects that estimated the carbon savings attributable to multiple initiatives, quoted annual emissions savings were in the order of 1,000 – 50,000 tonnes CO_2 per Large Project, equivalent to between 0.03% and 1.6% of total carbon emissions from transport in the respective local authorities. The schemes for which estimates of carbon impacts had been made represented an incomplete and unknown proportion of total LSTF investment, and it would therefore be expected that overall carbon savings would be greater than these figures. This is particularly the case for the Large Projects reporting figures at the lower end of the range, where estimations were typically only for minor interventions that formed a small part of the overall activity.

In addition, the study team carried out its own estimations of carbon savings from bus service enhancements. To a first order of magnitude, these were consistent with the estimates made by the Large Projects. As noted in section 3.1, for 21 bus routes in eight Large Project areas that had received funding to boost them to the point where they were likely to continue indefinitely (because patronage growth had made them commercially viable or justified continued revenue support) the ongoing annual saving in emissions was 2,300 tonnes CO_2e.

8.2 Evidence from the Carbon and Congestion Case Study

The *Carbon and Congestion Case Study* used pre- and post-intervention panel survey data in 2013 and 2014 to assess changes in transport-related carbon emissions. It found that, taken as a group, the five treatment local authority areas performed better than the control areas. Taking all five treatment areas together, *per capita* emissions from (land-based) travel were estimated to go down slightly (by 20kg per person), whilst rising slightly in the control areas (+30kg), giving a relative difference of 50kg CO_2e per person per year. This was equivalent to 3% of 2013 emission levels from land-based transport in the treatment areas.

However, emissions performance varied: for three treatment areas, emissions performance was better than in their respective control areas, and for two treatment areas, it was worse.

8.3 Evidence synthesis

Using travel survey data, the *Carbon and Congestion Case Study* suggested that there may have been relative reductions in *per capita* carbon emissions equivalent to 3% of total transport-related emissions in the baseline year (2013). This was for five local authority areas: two that were part of the Transport for Greater Manchester Large Project (Rochdale and Tameside), two within the Solent Large Project (Eastleigh and Gosport) and one within the Leicestershire Small Project (Coalville), and over a period of one year (from 2013 to 2014) during which some LSTF interventions took place.

The *Meta-analysis* took a different approach. It used high-level DECC estimates of carbon emissions, and compared the group of 53 unitary / district council areas within the LSTF Large Projects (including four of the five 'treatment areas' of the *Carbon and Congestion Case Study*) with a comparator group of all unitary / district councils that were not part of an LSTF Large Project or in

London. It found a relative drop in *per capita* emissions equivalent to 2.2%[18] of total transport-related emissions at baseline (2009-11), over a period of around four years.

The *Meta-analysis* also provides a third strand of evidence on the magnitude of effects. Calculations by the Large Projects of carbon impacts, generally based on data on scale and effect size of individual schemes, suggested that individual Large Projects may have delivered carbon savings equivalent to between 0.03% and 1.6% of total transport emissions. Allowing for the fact that data on scale and effect size was not available for all interventions, and that some Large Projects carried out less comprehensive assessments than others, the total savings would be expected to be at the upper end of this range, or above it. Although the calculations by most Large Projects should be considered indicative rather than precise, they provide evidence that a discernible proportion of the reduction in carbon emissions may be directly attributed to LSTF investment.

In summary, although methodologies and underlying assumptions differ, the figures arrived at by the *Carbon and Congestion Case Study* and the *Meta-analysis* are broadly consistent with one another. Taken together, they suggest that LSTF projects may have reduced carbon emissions from transport by around 1.5 – 3% more than would otherwise have been the case, during a period when these emissions fell by around 7%.

9 Road safety impacts of LSTF

Key findings

Improving road safety was a secondary objective of the Fund, but not a main focus for any Projects.

Trends in road casualties (KSIs *per capita*) in the Large Projects closely tracked trends in the comparator group of local authorities, both before and during the LSTF period.

9.1 Evidence from the Meta-analysis

The *Meta-analysis* found that Large Projects implemented a range of interventions that might be expected to offer road safety benefits, such as 20 mph speed limits, cycle infrastructure, cycle training, child pedestrian training and road safety training.

Road casualty data (STATS19) showed that the trend in KSI casualties *per capita*[19] in the group of Large Projects closely tracked the trend in the comparator group of local authorities, both before and during the LSTF period. This was also generally true when KSI was split up according to the victim's mode of travel, although there was some evidence of more favourable trends with respect to cycling KSI in the Large Projects than in the comparator group[20].

18 That is, a difference-in-ratios of -2.2 percentage points.
19 It was not possible to assess changes in KSI casualties relative to exposure (e.g. relative to distance walked / cycled).
20 That is, cyclist KSI casualties *per capita* remained approximately constant in the group of Large Projects between 2010-2011 and 2014-2015, whereas they rose in the comparator group.

At the intervention level, two Large Projects reported evidence on road safety in 20 mph zones. In Merseyside, the number of collisions fell by 16% between baseline and 2014 in the Liverpool and Sefton 20mph zones. In Nottingham, it was estimated that widespread 20mph zones had resulted in 28 fewer serious casualties and four more slight casualties over a period of just over two years (based on monitoring of the initial 20 mph zone).

Telford reported changes in casualties in the Box Road area around its town centre, where one aim had been to improve safety for pedestrians and cyclists. There was no change in the number of serious casualties, but the number of slight casualties fell from 12 per year in the five years before LSTF funding to four per year in 2013-15; there was also a reduction in pedestrian casualties.

Elsewhere, evidence of road safety effects was inconclusive or mixed, with some areas within Large Projects showing rises in casualties while other areas showed drops, and it was not possible to draw conclusions about overall effects.

9.2 Evidence from other sources

Data reported in Outputs Surveys and compiled by the *What Works Report* shows that although road safety was not a major focus for any Projects, many local authorities did put some effort into road safety training programmes. Although expenditure on road safety formed a small proportion of overall expenditure, these interventions are nevertheless likely to have benefits over the longer term. In all, 69,400 children received pedestrian road safety training funded by LSTF, and 26,100 received scooter training, which is a first step towards learning to safely ride a bicycle. Bikeability cycle training was separately funded, but during the LSTF period, over 1.1 million children in LSTF local authorities and elsewhere received Level 1 or Level 2 training.

10 Conclusion

Evidence from the *Meta-analysis* and *Case Studies* suggests that LSTF was successful in meeting its core policy objectives of supporting the local economy and reducing carbon emissions. It was also successful in achieving its secondary objectives of encouraging active travel and delivering social and economic benefits in relation to accessibility and inclusion. Its impact on air quality was not directly evaluated, but by reducing traffic it will have reduced emissions of NOx and particulates. It led to rather little investment in schemes to achieve the secondary objective of improving road safety.

For the Large Projects (which accounted for nearly half of LSTF funding), there was a 2.3 percentage point reduction in *per capita* traffic volumes, 2.2 percentage point reduction in *per capita* carbon emissions, 5.2 percentage point increase in *per capita* bus use and 7 percentage point increase in the proportion of adults who cycled (all relative to a comparator group). These changes were across a population in the 12 Large Project areas of over 8 million people, meaning that relatively small changes are likely to have had a large cumulative impact.

Indicatively, the change in carbon emissions in the Large Projects was equivalent to a reduction of 230,000 tonnes CO_2 per year[21]. If the Small Projects were, on average, equally effective as the Large Projects per unit of expenditure, the total carbon saved would have been more than double this figure. LSTF schemes were not the only cause of these changes, but they probably made a significant contribution.

Economic benefits are partly captured by an ex-post cost-benefit analysis, which found a 'best estimate' programme-level benefit-cost ratio for the Large Projects of 5.2 – 6.1, representing very high value for money. There was also qualitative evidence that LSTF interventions supported local economies in a variety of ways.

The estimated cost per car kilometre removed was 4.8p, broadly in line with estimates from previous sustainable transport investment programmes.

21 Assuming a population in the Large Project areas of 8.4 million people and an average emission of 1.25kT CO2 per 1000 people from transport within the scope of local authority influence (Table 11.3 of Meta-analysis).

Appendix 1: Reports on which this synthesis of evidence is based

Outputs evidence

Local Sustainable Transport Fund Annual Reports 2011/12, 2012/13, 2013/14 and 2014/15

Hiblin B, Taylor I and Sloman L (2016) *What Works? Learning from the Local Sustainable Transport Fund 2011-2015* Main report and companion appendices Report to the Department for Transport

Outcomes evidence

Sloman L, Cairns S, Goodman A, Hopkin J, Taylor I, Hopkinson L, Ricketts O, Hiblin B and Dillon M (2017) *Meta-analysis of outcomes of investment in the 12 Local Sustainable Transport Fund Large Projects: Final Report* to Department for Transport

Case studies

Atkins (2016) *LSTF Case Study Evaluation – Impact of Sustainable Transport Measures on Town Centres Headline Report* to Department for Transport

Cumbria Tourism in association with Lake District National Park Authority, New Forest National Park Authority and South Downs National Park Authority (2016) *Local Sustainable Transport Fund Visitor Travel Case Study Final Report*

Preston J, Wong A, Hickford A and Ghali K (2016) *Local Sustainable Transport Fund Evaluation: A Case Study of Carbon Impacts and Congestion Relief: Final Report: Executive Report*

University of the West of England Centre for Transport and Society (2016) *The Local Sustainable Transport Fund Case Study Evaluation: Strategic Employment Sites and Business Parks*