Post Opening Project Evaluation (POPE) of Major Schemes

Executive Summary

Meta-analysis 2015

Executive Summary

Highways England (and its predecessor the Highways Agency) is responsible for operating, maintaining and improving England's strategic road network. One of its roles is to deliver improvements through investment in the Major Schemes Programme, which covers improvements to the strategic road network costing more than £10m. In the Road Investment Strategy published in 2015, the Government committed to investing £15 billion in strategic roads to 2021. This financial responsibility requires Highways England to have the tools available to support effective investment decision making.

Post Opening Project Evaluation (POPE) studies are undertaken for all of the Highways Agency's and now Highways England's Major Schemes. The key objective of POPE is to identify the extent to which the expected impacts of highway schemes have materialised and to inform thinking on current and future national scheme appraisal methods. POPE also forms the mechanism whereby Highways England can determine:

- The extent to which Major Schemes offer value for money; and

- The level of accuracy associated with estimates of costs and predictions of benefits emerging from Major Schemes and the main factors affecting the accuracy.

POPE studies are undertaken for each Major Scheme one and five years after opening. The purpose of this report is to review the whole programme and identify emerging trends in relation to Major Scheme impact and scheme appraisal accuracy. Key points relating to the sample used in this study are as follows:

81

Major Schemes which predominantly opened between 2002 and 2012 provide the evidence base for this Meta-analysis study.

73%

Of these schemes are at the five year after evaluation stage, with 23% of schemes represented at the one year after opening evaluation stage.

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Smart Motorway is included in the sample. Other smart motorways built by Highways England have not yet entered the POPE process. The remaining schemes are Bypasses (32), widening (25), junctions (16) and upgrade from A road to motorway (4).

This Meta-analysis is structured around a number of key questions. The remainder of this Executive Summary is split into 6 sections presenting the key findings relating to each of these lines of enquiry, together with the associated page number in the main report in order to find further detail.

- Scheme objectives – Presents results to identify whether the Programme of Major Schemes is achieving its objectives.
- Traffic – Presents the impacts of schemes on traffic flows, journey times and journey time reliability, and compares them to forecast.
- Safety – Presents the impacts of Major Schemes on the numbers of collisions and compares the impacts to those forecast.
- Economy – Presents the outturn economic results and compares them against forecast, together with an assessment of whether Major Schemes are delivering value for money.
- Environment – Presents a comparison of forecast vs outturn impacts for the environment objectives together with a consideration of a number of specialist topics of interest to Highways England.
- Further Analysis – Presents the findings from detailed investigations of a number of specialist areas.

Scheme Objectives

Are scheme-specific objectives being achieved?

Major Schemes are successful at delivering against their scheme-specific objectives with 93% of objectives being achieved for all schemes and only 2% not achieved. The remainder are either partially achieved (4%) or have insufficient evidence at this stage.

This finding is consistent across all scheme types. A greater proportion of scheme objectives have been achieved at the five year after opening stage when compared to the one year after opening stage.

Traffic

Do Major Schemes improve journey time reliability?

New bypasses, widening schemes and schemes upgrading A-roads to motorways significantly improve journey time reliability, with bypass schemes showing the greatest improvements.

Are Highways England traffic models accurately predicting traffic volumes?

A majority (68%) of schemes accurately forecast traffic flows (to within +/-15%), but there is much variability in accuracy between schemes.

There is evidence to suggest that the accuracy of traffic forecasting has improved over time.

Are Highways England traffic models accurately predicting journey times?

The limited forecast data available indicates that recorded peak hour journey time savings are lower than forecast. Journey time forecasts are more accurate for less congested periods, such as inter-peak and off peak, when compared to busy peak periods.

Does more complex traffic modelling improve forecasting accuracy?

Modelling guidance has changed to encourage consideration of the impact road schemes have on the demand for travel.

Use of 'elasticity models' has improved forecasting accuracy compared to fixed demand models. There are currently too few variable demand models to draw any conclusions as to any advantage over elasticity models.

Is there evidence of induced traffic?

Sometimes road improvements can lead to more people travelling. This phenomenon is referred to as 'induced traffic'.

The majority of schemes, of all types, do not appear to have induced traffic. It should be noted that the lack of induced traffic in recent years may be due to the economic downturn. The reduced background traffic growth may also have masked any induced traffic.

Is there evidence of a change in peak spreading?

The limited data available on peak spreading shows a reduction for the majority of schemes. However, the general rerouting of traffic onto the schemes from other routes, increasing traffic flows for all hours, can mask a reduction in peak spreading.

Safety

What impact do Major Schemes have on the number of collisions?

The sample size available is too small to draw meaningful conclusions. However, there is evidence to suggest that:

- Major Schemes with a statistically significant impact on collisions are successful at reducing the numbers of collisions.
- Bypass schemes are the most successful type of scheme in terms of improving safety.

How accurate are safety predictions?

Accuracy of collision safety predictions is poor. Less than half of schemes have collision savings within 50% of the prediction.

What are the changes in observed collision rates and how does that compare to forecast?

Major Schemes which have involved improvements to A roads have seen a considerable decrease in the collision rate. Motorways typically have low collision rates compared to other types of road. Major schemes involving improvements to motorways have resulted in little change to these rates.

The DfT collision rate forecasts for four lane motorways are broadly in line with those observed.

Economy

What are the main benefits of Major Schemes?

Journey time benefits are the key monetary benefits derived from Major Schemes, accounting for 79% of all monetary benefits. Safety benefits (as measured by reductions in numbers of injury collisions) form the second largest contribution.

The average total monetary benefit for schemes appraised over the standard 60 years is £117.5million, and £86.7million for schemes appraised over 30 years.

Other impacts which are appraised using a monetary value, positive or negative, include changes to the users' vehicle operating costs, indirect tax impact for the Treasury, and cost of delays during construction and future maintenance periods. In total, these average only an average 1% net impact.

The Treasury is expected to benefit from many schemes through a net increase in indirect tax revenue but, on average, this impact is less than £1million.

Widening schemes have substantially higher average total benefits per scheme than bypass and junction schemes. However, the greatest benefits are seen in the four schemes which were an upgrade to motorway and the one smart motorway scheme; all of these where larger schemes. Safety benefits are the highest for bypass schemes which is due to these types of scheme including the greatest step change in road standard.

How accurate is the forecasting of Major Scheme benefits?

Benefits arising from journey time savings are moderately accurate for most schemes. 28% of schemes have journey time benefits within 15% of that forecast and 74% of schemes are within 50%.

Safety benefit forecasts, however, are inaccurate for the majority of schemes with only a third having outturn benefits within 50% of forecast.

Net change in Vehicle Operating Costs and indirect tax impacts are mostly lower than forecast.

There is some indication of an improvement in benefit forecasting accuracy since 2000.

How accurate is the forecasting of Major Scheme costs?

Half of the Major Schemes had estimated costs in the business case within 15% of the outturn cost.

Since 2004, accuracy of cost estimating in scheme appraisal has been consistently improving.

What is the average cost of a Major Scheme?

Major Schemes cost £39.5million on average and 60% of schemes costs below £50m.

Are Major Schemes offering value for money?

Post opening evaluation shows that the average Benefit Cost Ratio of major schemes is 2.7, which means that on average, for every £1 spent on the scheme, the return will be £2.70 in long term economic benefits.

73% of schemes achieved high value for money and 88% achieved medium or high value for money. A scheme is high value for money if the benefits are over double the cost.

Has value for money improved over time?

In recent years, from 2008 onwards, the proportion of schemes achieving high value for money has improved compared with that seen in the earlier part of the decade.

Do value for money assessments vary between Highways England's regions?

There is no evidence in the outturn value for money assessments of Major Schemes differing between the regions.

Are Major Schemes stimulating economic development?

There is anecdotal evidence to show that Major Schemes have assisted local and regional economic development through congestion reduction and improved journey time reliability which provides improved access to potential employment centres.

Environment

How accurate are the forecasts for the environmental sub-objectives?

An evaluation of the performance of each environment sub-objective against the forecast impact shows that overall:

- 70% of environmental sub-objectives are 'as expected'.
- 16% of environmental sub-objectives are 'better than expected'.
- 13% of environmental sub-objectives are 'worse than expected'.

What are the carbon impacts of Major Schemes?

The majority of Major Schemes result in increased carbon emissions in the opening year. However, in general the observed carbon impact is lower than forecast

Is Highways England successfully maintaining biodiversity mitigation areas?

Biodiversity mitigation measures have generally been provided for all schemes considered in this meta-analysis. For 44% of schemes, certain elements of mitigation would appear not to have been provided, were no longer required post Environmental Statement, had been slightly amended to suit site conditions, were underestimated or design issues were raised.

Monitoring was available for 57% of schemes.

Based on the site visits for POPE and information provided within the landscape evaluations, it would appear that habitats such as grasslands, woodlands and hedgerows are establishing.

These evaluations are based on visual confirmation during POPE site visits and, when available, ecological surveys/reports received. Maintenance and management is generally being undertaken appropriately.

For fauna, issues tend to be scheme-specific caused by vandalism/damage, poor maintenance/ management, slow establishment or lack of clarity on responsibilities for the specific features.

How successful is Highways England in mitigating the landscape and townscape impacts of Major Schemes?

Overall 80% of schemes assessed show that overall landscape objectives set in the ES are set to be achieved. It is noted that when compared with the Meta-analysis 2013 (84%) and Meta-analysis 2010 (93%), a reduction in target achievement is evident.

This evaluation identifies deterioration in landscape scheme target achievements when compared with ES predictions of impacts. It also serves to highlight issues within individual schemes that impact upon growth target achievements.

Performance of schemes against targets set in their ESs is as follows:

- 7% of schemes had landscape impacts which were 'better than expected';
- 73% of schemes had landscape impacts which were 'as expected'; and
- 20% of schemes had landscape impacts which were 'worse than expected'.

Additionally, this section confirms that the use of locally appropriate materials within schemes where traditional resources identify location and history makes a positive contribution to scheme design and is generally welcomed by local councils and residents.

Assessment of the impact of schemes on designated sites confirms that 45 (56% of 81 schemes) schemes assessed for this Meta-analysis are located within or adjacent to designated landscapes which have included national designations such as National Parks or Areas of Outstanding Natural Beauty (AONB), greenbelt, historic parks and gardens or historic landscapes, as well as areas designated at a local level such as Areas of Great Landscape Value.

Finally, this section confirms that townscape/ streetscape initiatives undertaken particularly during de-trunking and as included in the ES design are generally well received when returning a previously congested urban space to a more locally appropriate village/town.

Further Analysis

Are local communities satisfied with Major Schemes?

Local communities are generally satisfied with Major Schemes with 65% of questionnaire respondents (across 15 schemes) either agreeing or strongly agreeing that the scheme had made their community a better place to live.

How long does Highways England Major Scheme appraisal take?

The average duration of Major Scheme appraisal is just over four years (for schemes with a construction start date between 2004 and 2009), although there is a wide variety between individual schemes.

There has been little change in the duration of scheme appraisal between 2004 and 2009.

How accurate are the forecasts for the accessibility objective?

Accessibility is concerned with increasing the ability with which people in different locations and with differing availability of transport can reach different types of amenities such as places of education, worship, leisure, healthcare and employment.

90% of schemes were evaluated 'as expected' for accessibility.

How accurate are the forecasts for the integration objective?

Integration is concerned with ensuring that all decisions are taken in the context of the Government's transport policy at the time of the scheme appraisal.

89% of schemes were evaluated 'as expected' for integration.