



Balfour Beatty
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Southampton City Council Lane Rental Scheme

Cost-Benefit Analysis

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Introduction

The development of a cost-benefit analysis (CBA) is required as part of the due diligence and decision-making process in the preparation and introduction of a lane rental scheme. The CBA provides a framework in which the costed impacts of a scheme can be compared against the cost of setting up and operating the scheme, to demonstrate whether the scheme will deliver value for money. The role of the CBA is further outlined in Government guidance¹, which states:

The cost-benefit analysis undertaken by authorities should be an assessment of all relevant positive and negative impacts of lane rental. This should include evidence of how the scheme is designed so that works promoters can reduce their exposure to charges through changes in working practices; and

The congestion benefits of disincentivising works being conducted during chargeable times should be compared against the congestion disbenefits associated with an increase in works undertaken outside chargeable periods. The cost-benefit analysis should also include evidence of how the proposed scheme is designed, so that works promoters can reduce their exposure to charges through changes in working practices.

The approach adopted for the CBA is based on the Department for Transport's (DfT) Transport Appraisal Guidance (TAG). Under this approach the outputs of the CBA are:

- Present value of benefits (PVB) which is the sum of benefits over the appraisal period; and
- Present value of costs (PVC) which is the sum of costs over the appraisal period.

The PVB and PVC allow comparison of the costs and benefits of a scheme. This can be done using several metrics — the two most commonly used metrics are the benefit-cost ratio (BCR) and the net present value (NPV).

- The **benefit-cost ratio (BCR)** is given by dividing the PVB by the PVC and so indicates how much benefit is obtained for each unit of cost. A BCR greater than 1 one indicates that the benefits outweigh the costs.
- The **net present value (NPV)** is calculated as the sum of future benefits minus the sum of future costs (PVB – PVC). A positive NPV means that discounted benefits outweigh discounted costs.

The Government guidance also includes a lane rental cost-benefit analysis form which is to be populated with the results of the cost-benefit analysis. In relation to the form the Guidance states:

The form should be completed using outputs from the authority's own comprehensive analysis of the costs and benefits expected to arise from the proposed scheme. The form also requires information on key appraisal assumptions, approaches to reducing uncertainty and assuring quality, and more specific lane rental scheme assumptions around behavioural change and volumes of works.

A completed form, reflecting the findings of this CBA, will be included in the application, post-consultation, to the Secretary of State.

¹ <https://www.gov.uk/government/publications/street-works-lane-rental>

Theory of Change

A theory of change outlines how an intervention or an input, in this case a lane rental scheme, will lead to a series of outputs, outcomes and eventual impacts. An impact could be considered as the end benefit of the lane rental scheme, which can be either positive or negative (dis-benefit).

The outcome from a theory of change would underpin the inputs required for the CBA, for example an estimated reduction in occupation for planned work would lead to reduced disruption on the highway, for which an impact cost can be estimated. The theory of change considered for this CBA is outlined in the table below.

Input	Outputs	Outcomes
Lane rental charges.	Behavioural change to avoid or reduce a charge.	Reduction in occupation for planned work.
		Reduction in occupation for unplanned (Immediate) work.
		Reduction in occupation at peak times for planned work.
		Increased planned work with a form of collaboration resulting in combined occupation.
		Reduced number of repeated works or follow-up works, such as remedial activities.
		Increased cost to Promoters to avoid or mitigate for charges.
		Reduction in planned work to maintain or improve assets and infrastructure.
	Charges paid by Promoters.	Income collected from lane rental charges.
		Use application of surplus funds (from charges) for purposes intended to reduce the disruption or other adverse effects arising because of street works.

Input	Outputs	Outcomes
Lane rental scheme administration.	Setup costs to implement the scheme.	Increased cost to the Authority to setup the scheme.
	Operating cost to administer the scheme.	Increased cost to the Authority to administer the scheme.
		Increased cost to the Promoter to administer the scheme.

Measuring the end benefits of a lane rental scheme

The anticipated changes in working behaviour from the introduction of a lane rental scheme (as outlined above) should bring about benefit to road users, including motorists, and to wider society. Reduced occupation of the highway at the most congested times should bring the following benefits:

- Journey time savings for business and non-business trips through reduced congestion
- Vehicle operating costs (VOC) savings from reduced idling and detours round works
- Reduced vehicle emissions
- Reduction in accidents

The value of these benefits can be quantified and monetised through modelling the societal impact of works taking place currently, and then estimating the anticipated changes in behaviour leading to a reduction in overall impact. More detail on the quantification of work impact cost and assumptions relating to behavioural change are set out in the next section.

Observed outcomes and impacts from lane rental schemes

Sources

In establishing the likely outcomes and impacts of a Lane rental scheme, evidence can be drawn from the observed changes in Authorities that already have schemes already in operation. A review of the available evaluation material from these schemes has been conducted to inform the CBA.

A summary of the identified evidence sources and main findings from this literature review is presented in the table below. Where applicable, the most recent source has been used (where available) on the assumption that this allows for the most established behaviour change. The exception to this is for the TfL Lane Rental Scheme (TLRS) where the most recent report covers the period with COVID-19 and is therefore considered an anomaly for research purposes.

Lane Rental Scheme	Source
Kent County Council Lane Rental Scheme (KLRS)	12 Month Progress Report covering the period June 2013 March 2014.
Surrey County Council Lane Rental Scheme (SLRS)	Year 2 Monitoring Report covering the period April 2019 to March 2023.

Transport for London Lane Rental Scheme (TLRS)	Monitoring Report covering the period April 2019 to March 2020.
West Sussex Council Lane Rental Scheme (WLRS)	Lane Rental Scheme Evaluation Report covering the period December 2022 to March 2024.

In addition to the sources listed above, referenced was also made to an evaluation of lane rental schemes commissioned by the DfT, published on December 2015², which includes findings from both the Kent Lane Rental Scheme (KLRS) and the Transport for London Lane Rental Scheme (TLRS).

Observations

Key observations from the evidence sources are outlined in the table below. Whilst these observations provide useful indicators, they are considered and applied conservatively (where applicable) recognising differences between network composition, work characteristics and existing work behaviours within Southampton.

Outcomes	Observations
Reduction in occupation for planned work.	KLRS reports the average duration of (1) Standard category planned work has decreased from 8.1 days to 6.69 days and (2) Minor category planned work has increased from 1.61 to 2.12, since the start of lane rental. TLRS reports 1,638 lane rental days saved to planned carriageway works through coordination discussions which equates to a 21% decrease compared to requested days of occupation. WLRS included a CBA assumption of a 25% reduction in work durations.
Reduction in occupation for unplanned (Immediate) work.	KLRS reports the average duration of [unplanned] Immediate permits has decreased from 3.92 days to 2.87 days since the start of the scheme.
Reduction in occupation at peak times for planned work.	TLRS observes a 30% increase in planned utility works taking place overnight since the scheme was implemented (from 11% 41%). SLRS reports a decrease of between 9% and 11% of planned work at peak time, with a decrease of 3% in total duration, compared to

² <https://www.gov.uk/government/publications/street-works-lane-rental-evaluation>

	pre-scheme work. This is delineated by duration band (days). SLRS reports increases for planned work undertaken at weekends within the Electricity (26% to 51%) and Water (9% to 24%) sectors. SLRS reports an increase in planned work undertaken out of hours of 7% total work and 8% of duration (% of total duration).
Increased planned work with a form of collaboration resulting in combined occupation.	SLRS reports an increase in the volume of work planned work with a form of collaboration (4.4% to 8.8%) although the % of total duration of work with a form of collaboration decreased.
Reduced number of repeated works or follow-up works, such as remedial activities.	No data.
Increased cost to Promoters to avoid or mitigate for charges.	No data.
Reduction in planned work to maintain or improve assets and infrastructure.	TLRS reported total number of works undertaken has decreased (compared to the period 2010/11) for Highway Authority work by 22% but increased by 7% for utility company works.
Income collected from lane rental charges.	SLRS reported 6% of works with a charge, including discounted charges, during the first two years. This is delineated by sector. TLRS reported 98% of TfL [roadworks] avoided a charge and 85% of utility [street works] works avoided a charge. This was delineated by utility sector.
Use application of surplus funds (from charges) for purposes intended to reduce the disruption or other adverse effects arising because of street works.	No relevant assessment of benefit.
Increased cost to the Authority Increased cost to the Authority to setup the scheme.	No relevant data for assessment of cost.
Increased cost to the Authority to administer the scheme.	No relevant data for assessment of cost.
Increased cost to the Promoter to administer the scheme.	No data.

Methodology

The CBA has been developed through a ‘theory of change’ approach to identify the changes anticipated under a lane rental scheme, compared to works continuing under the current regime (without scheme).

Projected changes in the behaviour of organisations undertaking work (referred to as Promotors) affected by the scheme, in order to avoid or mitigate lane rental charges, forms the benefits case.

Business costs and benefits also considers the cost of scheme operation and the impact of scheme charges. Whilst there may be potential secondary benefits arising from the *application of surplus funds* from lane rental charges, which could bring greater benefits than their cost, this is not included within the CBA methodology.

The overall methodology for the CBA is summarised in the table below.

Estimate scheme benefits	Quantify the impact of historic works on society, including motorists, to project future impact (without Scheme) Apply adjustment for predicted behavioural change under the Scheme, drawing on evidence from existing schemes Estimate the reduction in works impact resulting from behaviour changes Project benefits over the appraisal period (10 years as per Government guidance)
Estimate scheme costs	Quantify implementation and ongoing costs to operate and evaluate the Scheme Estimate lane rental charges based on projected works patterns and predicted Promotor behaviour change Project scheme costs over the appraisal period
Establish scheme value for money	Comparing the net present value of costs and benefits

Estimating the cost impact of work

The estimated impact of works has been modelled using the **QUEues And Delays and ROadworks (QUADRO)** programme. QUADRO was originally developed for the DfT to assess and monetise the impact from works, for example increased fuel and lost time arising from a diversion route for a road closure or time spent at temporary traffic signals.

The QUADRO runs provide a societal impact which includes the following elements:

- Road user travel time (delay caused to consumer and business as a result of works);
- Road user vehicle operating costs (the impact of delay and/or diversion on vehicle operating costs for consumers and business);
- Accident costs;

- Emissions costs (resulting from congested conditions and diversion); and
- Indirect tax revenue (increased tax revenue to the exchequer because of higher fuel consumption).

Multiple QUADRO model runs were used to provide estimates of the impact for different characteristic of work taking place on the Council's road network, including; road classification; road classification by minor or urban and traffic management type. This impact was then assigned to a work using the individual work characteristics and timing (cost per minute) within different works periods, including all day (24hr), off-peak and out-of-hours. This provides highly granular results, especially when compared with the typical aggregated CBA approach adopted for many evaluations

The dataset used was taken from the DfT's digital streetworks service, Street Manager, and comprised three years' worth of work undertaken between 2021 and 2023. This data contained a few works with significantly high work impact cost due to long durations. These works (as anomalies) were removed or adjusted from the analysis to ensure the baseline works impact reflect a *typical year*.

Corresponding impact costs observed for work undertaken on the proposed lane rental streets within Southampton are shown in the table below.

	2021	2022	2023
Number of works	656	596	660
Days of works (aggregate)	1,267	1,253	1,811
Total works impact £ (2010 prices)	6,715,919	5,111,265	7,499,470
Average work impact per day £ ^(2010 prices)	5,301	4,078	4,141

Works impact fluctuates year on year reflecting differing volumes of work and their characteristics. An average impact has been taken from the available works data to provide a base-year impact assumption:

Annual works impact £	6,442,218	2010 prices. Approximately £8.9m in current prices
Average impact cost per day	£4,462	2010 prices. Approximately £6,186 in current prices

The modelled impact of typical works across the Council's lane rental network will form the basis of the projected lane rental scheme benefits calculation.

Benefits already being derived from the Council's network management function, *such as the application of permit conditions to ensure works are undertaken outside of peak times*, were also taken into consideration for the CBA. Where applicable, works and/or their impact cost were removed or adjusted on the assumption that the current regime would remain effective and a lane rental scheme would complement, not replace, existing powers.

Quantification of lane rental scheme benefit

Scheme benefits are quantified by outcomes within a theory of change compared to the current regime (pre-Scheme). The expected changes to Promoter behaviour have been assumed with reference to the observed evidence. These assumptions naturally involve an element of estimation that have a potential for variation.

With consideration to the complexity to predict a with-scheme scenario that is not yet in existence, and to provide a robust CBA, sensitivity testing has been conducted to understand how differing assumptions would impact the overall economic case. Three sensitivities have been defined, low, medium and high.

Outcomes	Low	Medium	High
Reduction in occupation for planned work.	-3%	-6%	-9%
Reduction in occupation for unplanned (Immediate) work.	-5%	-10%	-15%
Reduction in occupation at peak times for planned work.	-5%	-10%	-15%
Increased planned work with a form of collaboration resulting in combined occupation.	-3%	-6%	-9%
Reduced number of repeated work or follow-up works, such as remedial activities.	0%	-1%	-2%
Increased cost to Promoters to avoid or mitigate for charges, per peak work moved to off-peak (2024 prices)	£300	£238	£160
Reduction in planned work to maintain or improve assets and infrastructure.	0%	0%	0%
Use application of surplus funds (from charges) for purposes intended to reduce the disruption or other adverse effects arising because of street works.	Secondary benefits of charge income not included in this CBA.		

Lane rental scheme costs

Income from lane rental charges

Historic works used to determine behavioural changes for the quantification of scheme benefits were also used to estimate the income from lane rental charges. For each work, a charge was estimated using the work location, traffic control and duration (with associated work timings).

Similar behavioural changes were applied to the initial estimated lane rental charges, also considering observations on the proportion of work with charge in those Authorities operating lane rental schemes. This allowed further adjustment to identify works and days where lane rental charges would be avoided or discounted. Using this analysis, a potential income from charges was estimated at £374,000 per year based on the average across three years.

Setup and operational costs

Scheme benefits must be set against additional costs of operating the scheme to determine value for money. Considering the incremental costs fairly compares the 'with lane rental scheme' scenario with a 'business as usual' (current) scenario.

Lane rental scheme costs, which may include staff, including external resource, administration and capital, such as IT, included within the CBA are shown in the table below together with a cost estimate for the Council.

Cost	Estimate
Setup costs	£73,043 (2024 prices)
Scheme operating costs	£123,000 (2024 prices)
Scheme capital costs	£0

In addition to the costs of operating the lane rental scheme, it is important to recognise that Promoters will have to operate under the lane rental scheme and costs from them may include:

- lane rental charges which represent a business cost to the promoter;
- additional administration costs to administer lane rental scheme processes; and
- costs related to changes in working practices to avoid lane rental charges, such as greater use of traffic management or working off-peak or at weekends.

Lane rental charges are treated as a business cost to the Promoter and netted from the business benefits. However, the transaction is effectively a transfer payment between the Promoter and the Council, with the payment also treated as a public body revenue and therefore subtracted from scheme operating costs.

As the lane rental scheme operates alongside a permit scheme with shared or similar processes, the net additional administration cost for Promoters under a lane rental scheme is considered negligible and has not been quantified.

It is likely that behavioural changes required by Promoters to avoid or mitigate for charges, such as working additional shifts or out-of-hours, will result in additional cost. There is an absence of detailed data related to these costs, however the following sources provide a valid input.

- DfT Lane Rental Impact Assessment³ which estimates average daily cost for all day working to be £250, and for out of hours working £350 (2017 prices).
- DfT Lane Rental Impact Calculator tool⁴ which provides default estimates of a peak working cost of £500 and a 40% uplift for off-peak working giving an off-peak works cost of £700 (2018 prices).

³.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/640877/road-works-the-future-of-lane-rental.pdf

⁴ Lane Rental Schemes, Guidance for English Local Highway Authorities, June 2019 (now superseded), with supporting bid calculator

To quantify the cost to the Promotor of moving from peak to off-peak working, the differential between the costs defines the net impact of this change. To ensure a conservative appraisal, the higher of the work cost differentials has been adopted, taken from the previously published DfT Lane Rental Impact Calculator.

This gives a cost differential of £200 (2018 prices) between peak and off-peak works. Using the gross domestic product (GDP) deflator index set out by the Green Book this cost differential has been uplifted to £238 (between peak and off-peak working).

For the low case scenario, costs are assumed to be 25% higher than presented above.

Appraisal results

The CBA takes the benefits and costs estimated for the scheme implementation phase and first year of operation and projects these over a 10-year appraisal period. Future cost and benefits are discounted using the standard discount rate of 3.5%, meaning that near term costs and benefits are valued more highly than those occurring later in the appraisal period.

The performance of the lane rental scheme under a low and high case scenario are shown against the medium of 'expected' case. This recognizes the inherent uncertainty in estimating future behavior. The performance of the scheme under the different modelled scenarios for the 10-year appraisal period is shown in the table below.

	Low	Medium	High
Net Present Benefit of Scheme (NPC) ^(2010 prices)	-£3,708,251	-£3,214,069	-£3,214,069
Net Present Cost of Scheme (NPB) ^(2010 prices)	£9,515,296	£15,576,162	£19,708,461
Net Presented Value of Scheme (NPV) ^(2010 prices)	£5,807,045	£12,362,093	£16,494,392
Benefit to Cost Ratio (BCR) ^(2010 prices)	2.57	4.85	6.13

Under the medium (expected) appraisal result for a lane rental scheme there is a net present benefit of scheme (NPB) of £15.6 million (2010 prices) over the 10-year appraisal period.

The overall value of the scheme, as defined by the net present value of scheme (NPV) amounts to £12.3 million (2010 prices) over the appraisal period. The positive net present value demonstrates that the scheme brings greater benefits than it costs. The benefit to cost ratio (BCR) is just under 5 which meets the criteria for **High Value for Money**.

Sensitivity testing demonstrates that even under lower and more conservative assumptions relating to scheme benefits, and assuming higher scheme costs, the scheme performance remains positive, as demonstrated by the positive net present value (NPV) and a benefit to cost ratio (BCR) more than 1. It can be concluded that a lane rental Scheme in Southampton can demonstrate a positive impact to society.