

Hampshire County Council Lane Rental Scheme

Cost-Benefit Analysis

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 behavior leading to a reduction in overall impact. More detail on the quantification of work impact cost and assumptions relating to behavioral 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 Hampshire.

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.

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

Outcomes	Observations
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 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.

Outcomes	Observations
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 2022 and 2024. The corresponding impact costs observed for work undertaken on the proposed lane rental streets within Hampshire are shown in the table below.

	2022	2023	2024
Number of works	5,519	6,188	5,983
Days of works (aggregate)	21,334	21,741	21,763
Total works impact (2023 prices)	£62,146,426	£58,480,039	£71,949,006
Work impact per day (2023 prices)	£2,913	£2,690	£3,306

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:

	2023 Prices
Annual works impact	£64,191,824
Average impact cost per day	£2,970

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.

It should be noted that this impact estimate is based on impact to the carriageway only as there is no current method to accurately quantify impact to pedestrian traffic from work on the footway. Therefore, this means the overall estimated benefits remain conservative.

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 Promotor 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 (peak, off peak)	-3%, -0.3%	-6%, -0.6%	-9%, -0.9%
Reduction in occupation for unplanned (Immediate) work (peak, off peak)	-5%, -0.5%	-10%, -1%	-15%, -1.5%
Reduction in occupation at peak times for planned work.	-12%	-23%	-35%
Increased planned work with a form of collaboration resulting in combined occupation (peak, off peak).	-3%, -0.3%	-6%, -0.6%	-9%, -0.9%
Reduced number of repeated work or follow-up works, such as remedial activities (peak, off peak)	0%, 0%	-1%, -0.1%	-2%, -0.2%
Increased cost to Promoters to avoid or mitigate for charges, per peak work moved to off-peak (2023 prices)	£363	£242	£162
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.		

As a general rule, the benefits to efficiency gains in the off-peak period are 10% of the peak of the peak period. The Low case scenario benefits is 50% lower than the Medium case scenario. The High case scenario is 50% higher than the Medium case scenario.

Carbon Emissions

A component to the costed benefits is a reduction in carbon emissions. These emissions savings are driven by more efficient vehicle movements, and the avoidance of the 'stop-start' movements associated with works. QUADRO places a monetary value on emissions savings by applying a 'cost of carbon' to the amount of carbon generated because of works, such as additional fuel due to idling, or diversions. Taking the average calculated works impact, the carbon emission generated by works within the area (as calculated within QUADRO) are represent around 6% of overall work impact cost.

The implied carbon emissions attributable to works on the proposed lane rental network amounts to 39,862 tonnes. The emission saving benefits under a lane rental scheme related to working at less congested times and for shorter durations is estimated as a saving of over 8,200 tonnes of carbon. To set this emission saving in context, using the typical emissions of new cars sold in the UK currently, this reduction amounts to an equivalent saving of over 6.85 million annual car kms.

Lane rental scheme costs

Lane rental charge regime

The regulations allow a charge, to a maximum of £2,500 per day, for work on a lane rental street undertaken at any time within the designated timing. Work on the footway can also be charged if the work involves excavation (breaking up the street).

With consideration to the charge level, Government guidance *states each individual scheme must set out the level of charges that will be applied. Levels of charges set out in any proposed scheme will need to be fully justified in each case. It will not be sufficient for authorities simply to apply the maximum charge level without clear justification. Where maximum charges are applied, schemes should make clear and transparent any discounts available to works promoters.*

The charges therefore need to be proportionate to the estimated level of impact for work on the lane rental network, with consideration to the traffic impacted.

The average estimated impact of a day of works occurring on the proposed lane rental network in Hampshire is £5,811 (2023 prices). The impact of works varies according to the traffic control in operation. The following average values of works impact under different types of traffic management are as follows:

- Road closure - £13,595 per day at 2023 prices
- Lane Closure (including traffic control) - £4,695 per day at 2023 prices

The works impacts are seen to be more than the maximum permissible lane rental charge level (£2,500). Charging for these works is therefore justifiable based on the estimated impact to society.

The proposed Scheme charges are based the traffic control (impact) being deployed, road closure or lane closure. In this definition, the term lane closure means any form of traffic control deployed on the carriageway or where any traffic management reduces the number of lanes of a carriageway which can be safely used or there is any impact which reduces the traffic flow capacity or operation of a junction. The charges in the Scheme are therefore £2,500 for a road closure and £1,500 for a lane closure.

The Scheme provides opportunities for promoters to avoid or limit their lane rental charges, by either working outside of lane rental designated times, or other options for longer duration works spanning several days, these include:

- No charges for the initial 2 days of unplanned Immediate – emergency works;
- Reduced or waived charges, in a form of a discount, where work involves:
 - a form of collaboration with other Promoters or delivers significant infrastructure improvements;
 - changes to the traffic management deployed at peak times so that traffic is not disrupted;
 - an innovative approach that demonstrates the most efficient and effective delivery, thereby limiting disruption.

Lane rental is applied to the most congested streets at times when the impact of congestion is considered severe under an evidence based approach predicated on traffic data analysis to determine traffic flows and delays. As such, charges on these streets and the designated times is considered appropriate and justifiable relative to the impact of the work and expected behaviour changes.

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, either through avoidance or discount.

Works undertaken across the period 2022 to 2024 remained consistent, therefore an average of these three years was used to define annual charges. After adjustment, allowing for expected behaviour changes and application of waivers and discounts, it was estimated that 5.9% of total work could be subject to a charge, which would result in a potential income of £2.8 million per year in 2023 prices.

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 (including optimism bias)	£122,028 (2023 prices)
Scheme operating costs (including optimism bias)	£9,034,734 (2023 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 however 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).

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 £242 (between peak and off-peak working) in 2023 price levels.

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

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 Cost of Scheme (NPC) (2023 prices)	-£6,563,532	-£6,563,532	-£6,563,532
Net Present Benefit of Scheme (NPB) (2023 prices)	£14,733,065	£44,196,788	£70,521,583
Net Presented Value of Scheme (NPV) (2023 prices)	£21,296,597	£50,760,320	£77,085,115

Under the medium (expected) appraisal result for a lane rental scheme there is a net present cost of scheme (NPC) of -£6.6 million (2023 prices) over the 10-year appraisal period (negative costs indicate the scheme is expected to have a positive revenue impact to the 'broad transport budget' of the authority due to the expected revenues of the lane rental scheme).

The overall value of the scheme, as defined by the net present value of scheme (NPV) amounts to £50.1 million (2023 prices) over the appraisal period. The positive net present value demonstrates that the scheme brings greater benefits than it costs.

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). It can be concluded that overall, the Hampshire Lane Rental Scheme can demonstrate a positive impact to society.