

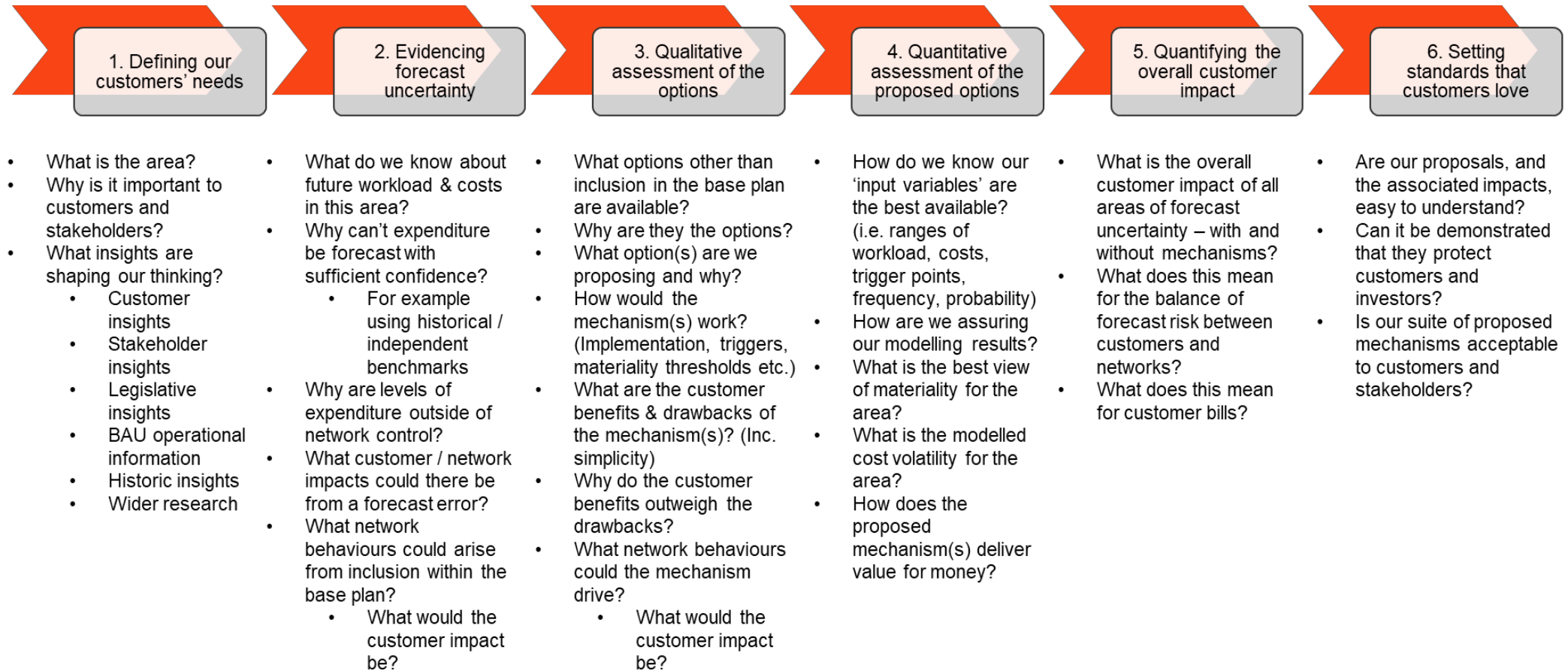
# Appendix 10.07

## Uncertainty Mechanism Case

### Specified street works (lane rental)

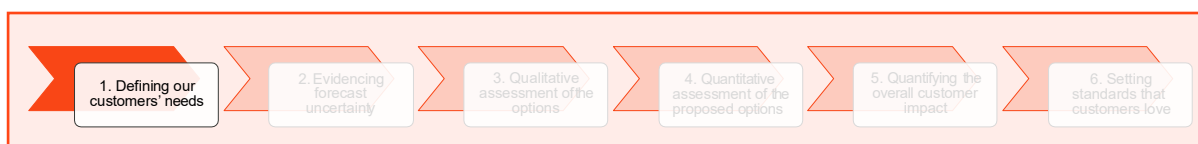


## Cadent's systematic approach to developing uncertainty mechanisms to manage forecast uncertainty



Uncertainty area			
Demand uncertainty	Legislative uncertainty	Cost confidence	Heat Policy
<p><b>Specified street works (Lane Rental)</b></p> <p><b>Referenced in Ofgem SSMD</b></p> <p><b>Re-opener Uncertainty Mechanism</b></p> <p>As a result of Government legislation in December 2018, local highway authorities are now able to bid for and set up lane rental schemes. There is considerable uncertainty over how many will look to adopt a lane rental scheme, and what each individual scheme will look like. We operate in 100 highway authorities, all of whom may or may not take decisions that will influence our costs in RIIO-2. With such levels of uncertainty, a re-opener mechanism is proposed to address lane rental costs when we have greater clarity on how schemes may develop.</p>			

## 1. Defining the need



### 1.1. What is the area?

In 2012, legislation was passed that allowed Highway Authorities to enact S74(A) of the New Roads and Street Works Act (NRSWA), commonly known as ‘lane rental’. From the onset of this date two Highway Authorities adopted these regulations on a trial basis. These Authorities were Transport for London (TfL) and Kent County council, where only the former falls within our footprint.

Following the review of these trials, in December 2018, the Government (Department for Transport (DfT)) initiated legislation to allow local highway authorities to bid for and set up lane rental schemes. Section 74A of the NRSWA enables highway authorities, with the approval of the Secretary of State, to charge street works undertakers a daily charge for each day during which their works occupy the highway.

The Government considers that well-designed and well-targeted lane rental schemes, which need to be focused on the most critical parts of the highway network and with charges applying only at the busiest times, should encourage those undertaking works (including highway works) to carry out their works in a less disruptive manner. For example, where appropriate and consistent with protecting public safety, schemes could provide real financial incentives that encourage works promoters to:

- Reduce the length of time that sites are unoccupied, hence reducing total works durations.
- Improve planning, coordination and working methods to maximise efficiency.

- Carry out more works outside of peak periods, reopening the highway to traffic at the busiest times (e.g. by plating over excavations) and/or making greater use of evening or weekend working where the local environmental impact is acceptable.
- Optimise the number of operatives on site to enable works to be completed as quickly as possible.
- Complete works to the required standard first time, and with permanent reinstatements, reducing the need to return to the site to carry out remedial works.

While works promoters may already employ these practices to some extent, their capacity to do so will be limited by the costs involved and the resources available to them given the terms of their regulatory settlements. Major infrastructure renewal programmes and other essential works will inevitably take time and cause some disruption, even with lane rental in place. But works promoters are more likely to be inclined to invest in practices such as those suggested above if, by doing so, they can reduce their exposure to lane rental charges that would otherwise be payable.

Legislation allows local highway authorities to cover the scheme operating costs from the revenue raised by charges. Surplus revenue can be used to fund projects that 'reduce the disruption or other adverse effects caused by street works'. Both TfL and Kent County Council have a programme for funding projects by a range of organisations, especially those involving innovation, trialling new techniques for speeding up road works, installing ducting on busy routes that can subsequently be used by utilities, and implementing extraordinary measures to mitigate congestion caused by road works.

While we are aware of what the DfT aims to achieve with this policy change, there is significant uncertainty over how exposed we will be to this. In the financial year 2018-19 we completed in excess of 400 works on the specified lane rental routes within the TfL area, with charges amounting to approximately £2m. If lane rental schemes become more prevalent across our networks during RIIO-2, there is potential for significant costs to be incurred.

## 1.2. Why is it important?

As we undertake maintenance and emergency interventions across our network, we are often required to occupy the highway in order to access our assets. We are therefore liable for costs incurred from any operating lane rental schemes, and face incentives in their design to minimise our exposure. It is therefore important to consider the potential exposure we may face to such costs during RIIO-2 through our operations.

The legislation announcement in December 2018 confirmed that the Department for Transport (DfT) would develop and issue the guidance for the administration of lane rental subject to certain parameters. This guidance was published in July 2019<sup>1</sup> and allows for bespoke rates to be charged by highway authorities, up to a maximum of £2,500.

Given the bespoke nature of these rates, it is difficult to predict what form future lane rental schemes may take, and whether they will align to the charges currently observed under either the Kent or the TfL regimes. There is also uncertainty over how many highway authorities will adopt a scheme in RIIO-2. As we operate within 100 highway authorities this creates the potential for a significant cost impact during RIIO-2.

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<sup>1</sup>[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/819199/lane-rental-bidding-guidance.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/819199/lane-rental-bidding-guidance.pdf)

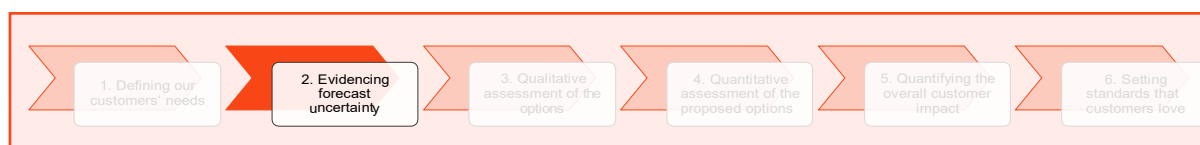
### 1.3. What insights are shaping our thinking?

We have engaged with the DfT and the highway authorities to understand the potential impact of lane rental scheme adoption in RIIO-2. However, the implementation of such a scheme is a decision that sits with each authority<sup>2</sup>.

Our engagement to date with individual authorities has demonstrated that there is no certainty on how exposed to lane rental schemes we will be during RIIO-2. Highway authorities are at different stages of planning for the implementation of such a scheme, and in some cases, preparation is in extremely early phases.

Further, as highway authorities consider whether to make applications for a lane rental scheme, the ultimate decision on implementation will remain with the DfT and Secretary of State once submissions are evaluated.

## 2. Evidencing the uncertainty



### 2.1. What we know about the future

We currently operate within the boundaries of 100 highway authorities within England, and recent changes to legislation imposed by the Government (DfT) have exposed all utilities to additional costs not forecast for RIIO-1.

Within our footprint only one authority currently runs a lane rental scheme (TfL<sup>3</sup> within the centre of London). This scheme has been operating as a pilot scheme since 2012, when the original regulations and concept were agreed. Another scheme operating outside the Cadent footprint is run by Kent County Council<sup>4</sup>. This scheme is also a pilot scheme, operating since 2012.

The two schemes operate on differing parameters within the local legislation put in place (as summarised in references above) and this leads to differences in financial and procedural impacts. Guidance issued by the DfT in July 2019 indicated that future schemes will have the opportunity to set out the level of charges that will be applied, up to a maximum of £2,500 per day.

While there is uncertainty over the final form of future schemes, the DfT has already stipulated certain parameters that must apply to all future applications to run a lane rental scheme. These include, but are not restricted to:

- **Permit schemes:** Authorities would need to have an existing well-run permit scheme. This would involve proportionate permit fees, discounts for joint works, compliance with permitting regulations and guidance, and schemes fully supporting the delivery of national infrastructure projects like HS2 and broadband or full fibre roll-out. Incentives

<sup>2</sup> The following report from the regulatory policy committee supports the implementation of the lane rental scheme policies  
[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/773407/RPC\\_-\\_DfT\\_-\\_4138\\_-\\_lane\\_rental\\_v2a.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/773407/RPC_-_DfT_-_4138_-_lane_rental_v2a.pdf)

<sup>3</sup> <https://tfl.gov.uk/info-for/urban-planning-and-construction/lane-rental-scheme#on-this-page-0>

<sup>4</sup> <http://www.kent.gov.uk/roads-and-travel/highway-permits-and-licences/kent-lane-rental-scheme>

could also be offered for high quality performance, including right-first-time reinstatements.

- **Local authority:** Schemes would apply to a Local Authority’s own works in the same way as is the case with the existing lane rental schemes in Kent and London.
- **Charges:** Lane rental charges should be used to incentivise work outside of peak times and should be waived for joint works. Caps should also be put in place for major works to install and to replace apparatus so that these works are not unfairly penalised and delayed.
- **Pilots:** Schemes are trialled for a period before ‘going live’ and reviewed annually to ensure charges remained proportionate and are applied to the most congested roads. Schemes can only apply to a maximum of 5% of the network, as is the case in Kent.

The detailed design of a lane rental scheme, and the exact streets which should form part of it will, subject to certain criteria, be determined at a local level. This will need to be undertaken by highway authorities in close consultation with works promoters of utility and highway works and other interested parties.

### Comparing uncertainty to costs included in our base plan

We have included costs in our base plan for the North London network, recognising the operation of the existing lane rental scheme under TfL. These costs are summarised in the table below:

**Table 1: Baseline costs associated with lane rental in London**

Base costs £m, 18/19 prices	2021/22	2022/23	2023/24	2024/25	2025/26
Lane rental costs	1.45	1.50	1.68	1.79	1.79

Our proposal for an uncertainty mechanism does not interact with these costs. As discussed in Section 4, the costs we propose to reclaim through this mechanism relate to additional lane rental schemes that may be implemented during RIIO-2. Our uncertainty modelling presented in this Appendix presented ranges incremental to the costs included in our base plan.

## 2.2. Why we face forecasting difficulties

While the information above provides insight into the form of future lane rental schemes under consideration by DfT, there are several variables applicable to each individual scheme, by each individual highway authority, that makes it very difficult for us to understand the cost impact within our business. These variables, which result in significant uncertainty for us, involve:

- **Adoption:** The specific time at which an authority may choose to deploy a lane rental scheme, if at all.
- **Applicable streets:** Lane rental charges will need to be targeted to the most critical parts of an authority’s street network. These are the streets (or parts of streets) where evidence shows that works in the highway cause the highest levels of disruption and thus require the greatest efforts to smooth traffic flow. Therefore, streets should be selected only where the daily charge will have the greatest effect in reducing disruption

caused by works. Methods for demonstrating the reduction in disruption will need to be put in place so that it can be used to inform the evaluation of the scheme.

- The Regulations leave open the possibility of charging for works that do not take place within the carriageway but, to secure the Secretary of State's approval, a scheme would need to demonstrate a strong cost-benefit case. To help authorities demonstrate this, the Department for Transport is also publishing a calculator alongside this guidance.
- **Location of works:** The Regulations also exempt street works whose impact is confined solely to the verge of a highway; in a traffic-sensitive street, other than at a traffic-sensitive time; or in the footway of a traffic-sensitive street, at a traffic-sensitive time, so long as the works do not involve breaking up the street, tunnelling or boring under it.
- **Exemptions:** In respect of genuine emergency (not immediate) works that must be carried out during the charging period in order to avoid significant danger to public safety or significant damage to property, schemes will be expected to provide a charge-free period to enable the emergency to be dealt with and the road re-opened to traffic. This is consistent with the principle that charges must be genuinely avoidable, so a period for such genuine emergencies of 48 hours is recommended, but the Department may be open to alternative propositions.
- **Charging Regime** - The Regulations prescribe a maximum daily lane rental charge that may be applied of up to £2,500. 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 enough for scheme promoters simply to apply the maximum charge level without clear justification. In general, it is expected that, at any given location at any given time, the daily charge will be the same for all types of work. However, higher rates of charge may be acceptable (subject to the £2,500 maximum) in respect of remedial works, given the wholly avoidable nature of such works.
- The Regulations enable charges to be applied at weekends, as there will be some cases where works at weekends are as disruptive, or even more disruptive (e.g. streets with heavy tourist traffic). Authorities will need to determine the detailed arrangements (e.g. the specific days and times at which charges would apply) but scheme design will need to be consistent with the need to provide real opportunities to reduce or avoid exposure to charges by carrying out works in less disruptive ways.
- Different charges may be applied on different days of the week (for example, to differentiate between weekdays and weekends). However, no charges may be levied on a non-traffic-sensitive day, or on any traffic-sensitive day if the works do not obstruct or otherwise impact upon the carriageway (or the footway or cycleway, in a case where footway or cycleway charges apply) at any time during the traffic-sensitive period(s).
- Finally, a separate permit fee cannot be raised where an activity is liable to a lane rental charge, but the process and procedures as defined in the permit scheme will apply. Where an activity is not liable for a lane rental charge, then the relevant permit fee will apply.

We are **unable to control** the form of future lane rental schemes that may or may not be introduced during RIIO-2. As outlined above, such schemes are complex and influenced by a range of factors that will be specific to each highway authority. Without knowledge of these factors, it is not possible for us to develop a cost forecast for inclusion in our base plan.



We regularly engage with the DfT and highway authorities and will continue to do so as their thinking on lane rental schemes develops. This will provide us with a better view of future schemes and allow us to analyse the potential impact on our nature. However, until highway authorities have developed their submissions, we cannot receive enough information from such engagement to develop a cost forecast.

### 2.3. Network impacts and behaviours from including in the base plan

**The risk with including all costs for lane rental schemes within our base plan** is that we would be required to rely on an uncertain estimate of the adoption of such schemes in RIIO-2, and the form they will take. This would require us to make assumptions across several key variables that will underpin each scheme. This creates a risk that our estimate either under or overpredicts the costs that we may efficiently incur through our operations in the highway.

**If we were to include all costs associated with lane rental schemes in our base plan allowances**, we would be required to pre-empt the decisions of the highway authorities in our network area.

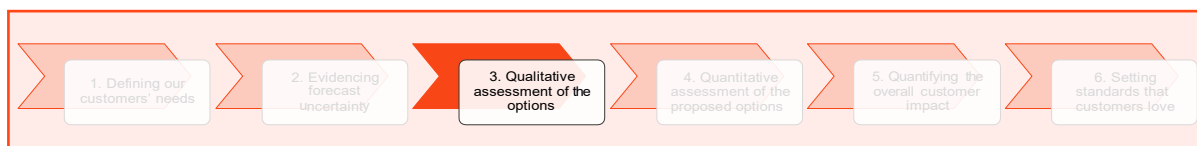
There is a **credible risk** that our estimate would underpredict the exposure of our street works to lane rental schemes, or the cost impact of any schemes that are introduced. We would face an incentive to price risk into a base plan estimate to ensure we were adequately funded to undertake required works, which are driven by safety and operational considerations and obligations.

However, this creates a **risk to customers**: there is potential that fewer highway authorities make an application for a lane rental scheme, or the DfT approve fewer schemes than we may assume to develop a base plan estimate. This creates the opportunity.

In summary, there is significant uncertainty over both the volumes of work that may be exposed to a lane rental scheme, and the costs associated with any such schemes in RIIO-2. While throughout the existing TfL scheme we have been able to identify the cost of efficiently avoiding the lane rental scheme, we note that this reduces the cost when set against the lane rental fee but it is still a cost that would not have been incurred prior to the advent of the lane rental scheme.



### 3. Qualitative assessment



#### 3.1. Options for addressing uncertainty

Given the uncertainty of costs associated with lane rental schemes in RIIO-2, we have identified and evaluated other mechanisms that could be used to address this risk:

**Table 2: Evaluating options for uncertainty mechanisms**

Mechanism Option	Description
<b>Volume driver</b>	This mechanism relies on the use of a relevant unit cost estimate to forecast costs when volumes of workload are uncertain. However, given the considerable uncertainty of the form of any lane rental schemes (alongside the volume of works that they would apply too), this would not be an appropriate mechanism.
<b>Re-opener mechanism</b>	A re-opener mechanism would account for the current uncertainty in understanding the costs and application of lane rental schemes. At present, it is not clear which highway authorities will adopt the schemes, or the charges that will be associated with them. This mechanism would allow a more accurate cost forecast to be developed in response to future applications by highway authorities to the DfT.
<b>Use it or lose it allowance (PCD)</b>	This would involve a price control deliverable (PCD) as part of our RIIO-2 plan. While this would protect customers from under-delivery, a PCD does not address the challenge we face in forecasting a total cost given uncertainty in the adoption of lane rental schemes.

We have also undertaken a qualitative assessment of uncertainty in this area to understand the challenges an uncertainty mechanism must aim to address.

**Table 3: Qualitative assessment of uncertainty**

Volume risk	Unit cost risk	Impact on outputs	Material cost / bill impact
High	Medium	Medium	Medium

Further detail on our assessment is provided below:

- **Volume risk:** Our work in this area is driven by legislation and decisions made by individual highway authorities, resulting in uncertainty over the extent to which our RIIO-2 workload will be eligible for charges.
- **Unit cost risk:** There is considerable uncertainty over cost forecasts, given the number of variables involved in the lane rental charge calculation that is still to be determined by highway authorities. We can manage this to an extent through our engagement with DfT and highway authorities.

- **Impact on outputs:** This area of uncertainty has is largely confined to our outputs in relation to safety, reliability and connection services.
- **Material cost/bill impact:** As discussed further in Section 5, this may be a material area of cost in RIIO-2 with bill implications. There is significant uncertainty over the timing and prevalence of lane rental schemes. This is largely driven by cost uncertainty, and the timing of when payments would be required to highway authorities.

### 3.2. Our proposed uncertainty mechanism

We are proposing to address uncertainty related to lane rental schemes using a **re-opener mechanism** in RIIO-2, with a materiality threshold and an anytime trigger<sup>5</sup>. In practice, this mechanism would allow us to make a submission to Ofgem during RIIO-2 once the materiality threshold is breached. In this submission, we would propose the costs we intend to recover from customers, providing evidence on why they are appropriate and efficient. This mechanism ensures that scrutiny remains over any future costs we intend to reclaim. It also allows us to provide cost estimates based on the actual parameters of lane rental schemes that may be implemented across our network area in the future.

#### Operation of the proposed re-opener in practice

- **Form of the trigger:** The need to undertake additional work under this re-opener would be triggered by the approval of individual lane rental schemes by the Secretary of State, and the implementation of the scheme by the relevant highway authority. These triggers are externally determined, and readily observable.
- **Mitigating the likelihood of the trigger:** While the trigger would be externally determined, we will continue to engage with highway authorities and the DfT as proposals for future lane rental schemes are developed. It would not be possible for us to mitigate the likelihood of applications being approved by the DfT.
- **Claiming costs through the re-opener:** As outlined above, we have proposed that costs can be reclaimed at any time during the RIIO-2 period for this mechanism, once a materiality threshold has been breached. We propose that this includes a point in time whereby evidence can be presented that the threshold will be breached in the near future. As part of this process, we would demonstrate costs incurred or expected to be incurred in response to the implementation of new lane rental schemes.

### 3.3. Evaluating our proposed uncertainty mechanism

A re-opener allows us to evaluate the actual parameters of lane rental schemes adopted in the future, and therefore to develop cost estimates with greater confidence. As outlined in Section 2.3, there are risks associated with a cost estimate in our base plan at present, creating opportunities to make windfall gains or make losses.

Nevertheless, it is important to fully evaluate the behaviours that our proposed uncertainty mechanisms will encourage, to ensure they do not create perverse incentives. Below we consider positive behaviours that a mechanism should promote.

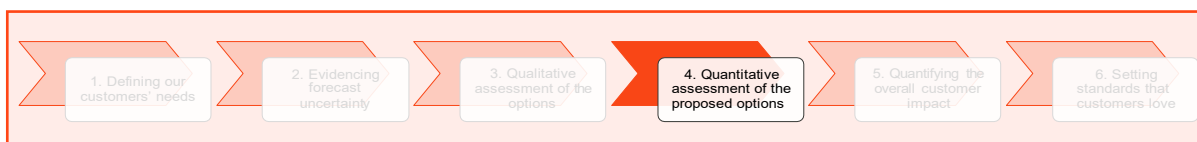
<sup>5</sup> For the purposes of our modelling and analysis we have used a 1% materiality threshold, as is used in RIIO-1. However, due to potentially significant changes in financeability and totex sharing arrangements in RIIO-2 we are assessing if the materiality threshold should be revised.

**Table 4: Evaluating incentives created by our proposed uncertainty mechanism**

<b>Behaviours and incentives</b>	<b>Evaluation</b>
<b>To minimise costs</b>	<p>The costs we submit to Ofgem through the re-opener process will be subject to review and challenge. Any costs identified as inefficient will be disallowed. This creates an incentive to focus on incurring or estimating efficient costs and demonstrating this with robust evidence.</p> <p>This includes the behaviours that lane rental schemes aim to promote working at less busy periods of the day and minimising disruption. We would be incentivised to articulate the measures taken to ensure the costs we incur through lane rental are efficient and represent a position that has been actively managed down through our roadworks strategy.</p>
<b>To deliver required work</b>	<p>Alongside reviewing the efficiency of costs submitted through the re-opener process, Ofgem will focus on ensuring that these only relate to relevant activities. Any costs submitted for work Ofgem do not believe to be required will be disallowed, creating an incentive to focus on work with a compelling need.</p> <p>Compared to the base plan, one could consider that a re-opener does not maintain the same incentive to work itself. However, the underlying drivers of work that lead to us incurring costs for street works are for the maintenance of our network. This includes emergency interventions. Failing to undertake such work would create safety risks and financial and reputational risks to our business.</p>
<b>To take a whole systems approach or identify strategic solutions.</b>	<p>Opportunities for taking a whole system approach or identifying strategic solutions whereby works occupying the street are required will remain incentivised under the re-opener mechanism.</p> <p>As described above, the evidential bar associated with the mechanism will encourage cost minimisation. Where this can be achieved through taking different approaches to future work, we would be able to demonstrate an efficient case to Ofgem. Working collaboratively with other parties on street works will remain a key part of this submission.</p> <p>Furthermore, as future lane rental changes have the potential to impact all GDNs, benchmarking undertaken by Ofgem during a re-opener submission creates a further incentive to find the most appropriate solution.</p>
<b>Interactions with expenditure included in our base plan</b>	<p>The costs and volumes included in our base plan are developed as a forecast based on our experience with the existing TfL lane rental scheme that is in operation, under which we incur costs.</p> <p>Our proposal is for all costs incurred under this lane rental scheme to be allocated to our baseline allowance. Any further costs incurred through the implementation of new lane rental schemes would be reclaimed through the re-opener process.</p>

A potential drawback for customers is that any costs incurred through the re-opener mechanism may introduce some bill volatility, with adjustments made in-period to account for the additional investment we have undertaken. However, our submission to reclaim costs will be subject to scrutiny by Ofgem before any conclusion is reached on revenue adjustments. We would be incentivised to focus on articulating how the lane rental costs have been incurred efficiently. Customers are also protected by the application of a materiality threshold, which ensures that adjustments are only made for significant deviations from our base plan.

## 4. Quantitative assessment



### 4.1. Inputs for uncertainty modelling

We have undertaken an initial cost forecast based on the proposals aligned to the lane rental schemes, which depend on several assumptions in variables that have been previously described. In order to undertake uncertainty modelling, we have looked to develop a low, likely and high set of cost estimates to consider a potential range of impacts. These are dependent on the following inputs:

#### Workload

We have followed existing processes used in RIIO-1 for populating our workload of street works, which allow us to undertake a forecast of future volumes for RIIO-2. This data is in line with our latest RRP submission and forms a central case that is used in all scenarios for our uncertainty analysis. We are interested in the impact of different external decisions which are uncertain, rather than our volume of street works.

#### Conversion factor

In our methodology for forecasting workloads in RIIO-2, a conversion factor has been used to increase accuracy. Data from our RRP tables contains workload data for the total number of service connections, the total number of repairs and the length of mains replaced. In some instances, there may be multiple repairs within a works (or permit) and in other cases (for example new supplies) a permit may not be required.

A conversion factor is established by considering the actual workloads from 2017/18 and comparing them to the actual number of permits. This ensures that we do not overestimate the need for future permits when considering our future workload - this conversion factor normalises for the fact that not every job requires a permit.

#### Scheme adoption

There is uncertainty over the future rates of lane rental scheme adoption by highway authorities, which will impact the amount of our workload that is subject to charges. We have developed a central forecast of this rate, based on our engagement with the DfT.

Through this engagement, we understand that the DfT does not anticipate the approval of any lane rental schemes prior to Autumn 2019 at the earliest. We have developed take-up assumptions assuming a growth profile of approximately 10% per annum. This is equivalent to an approximate rate of 34% by the end of RIIO-2 as summarised in Table 5 below:

**Table 5: Input assumption – Lane rental scheme adoption rate**

<b>Cadent total</b>	<b>21/22</b>	<b>22/23</b>	<b>23/24</b>	<b>24/25</b>	<b>25/26</b>
<b>Lane rental scheme adoption rate</b>	10%	17%	21%	28%	34%

### Unit costs (costs per lane per day)

There is uncertainty over the future unit rates that will be charged under different lane rental schemes. At present, under the Kent County Council scheme a maximum rate of £800 is charged per day, while the maximum under the TfL scheme is £2,500. We have developed a range of unit costs that could apply on average under different scenarios. In a low case, we assume the lower Kent rate applies, equivalent to £400. In a likely case we calculate a weighted average of higher rates (75% Kent, 25% London). Finally, in a high case we calculate a simple average of higher rates (i.e. 50% weights). Table 6 below summarises these inputs by scenario.

**Table 6: Input assumption – Lane rental unit costs (£, 17/18 prices)**

<b>Cadent total</b>	<b>21/22</b>	<b>22/23</b>	<b>23/24</b>	<b>24/25</b>	<b>25/26</b>
<b>Low scenario</b>	£400	£400	£400	£400	£400
<b>Likely scenario</b>	£1,225	£1,225	£1,225	£1,225	£1,225
<b>High scenario</b>	£1,650	£1,650	£1,650	£1,650	£1,650

### Invoicing rate

Finally, there is uncertainty over is the rate at which we will receive an invoice for schemes. While work may take place in an eligible location, we may be able through management and proactive behaviours to work more effectively to minimise our exposure to these charges.

Our experience to date under the TfL scheme implies that approximately 26% of relevant works may be subject to an invoice. We have based the low scenario on this figure and have developed a range of scenarios that may occur if our ability to manage exposure through proactive measures changed in the future. We do not think it is plausible for this rate to decline given that it currently prevails in London.

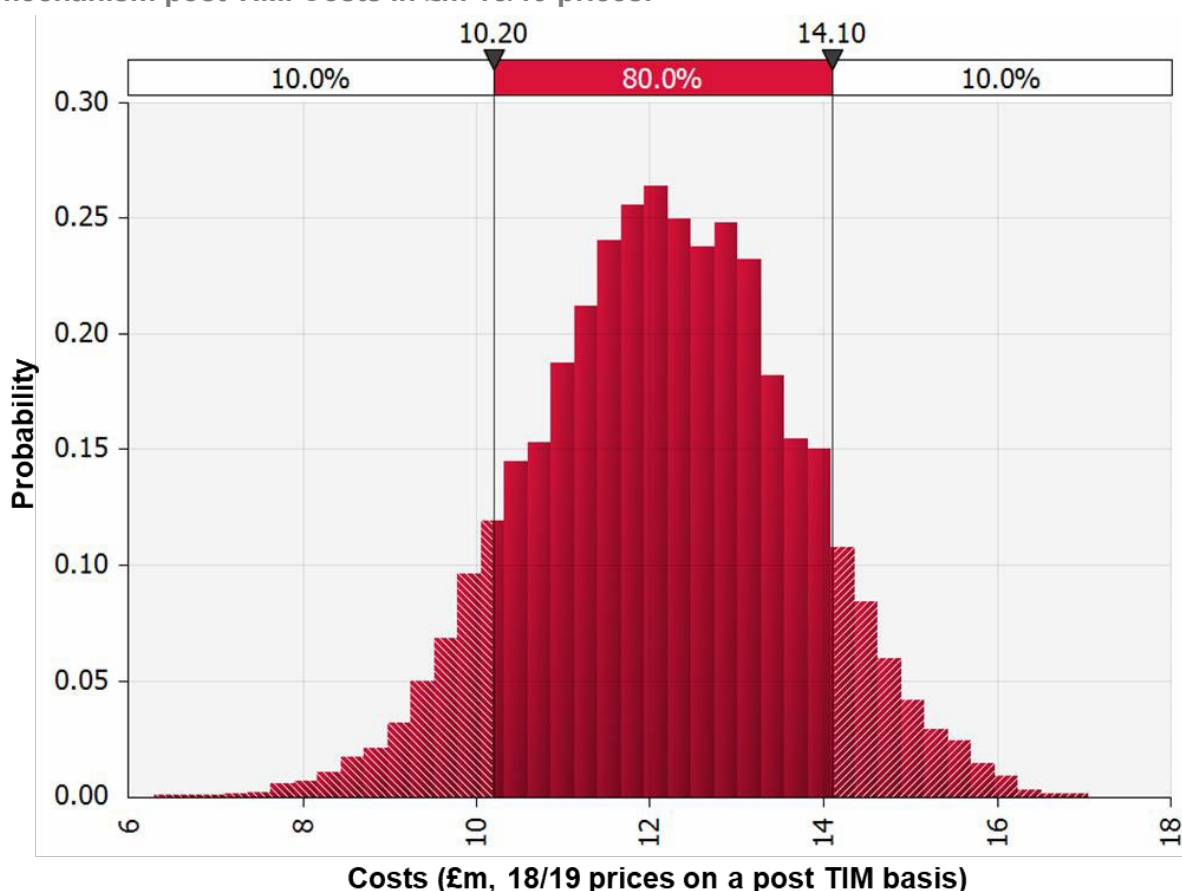
**Table 7: Input assumption– Invoicing rates**

<b>Cadent total</b>	<b>21/22</b>	<b>22/23</b>	<b>23/24</b>	<b>24/25</b>	<b>25/26</b>
<b>Low scenario</b>	26%	26%	26%	26%	26%
<b>Likely scenario</b>	39%	39%	39%	39%	39%
<b>High scenario</b>	52%	52%	52%	52%	52%

## 4.2. Assessing uncertainty

Using our input data described above, we have undertaken Monte Carlo analysis to understand the range of cost impacts for this area of uncertainty in RIIO-2. This provides a distribution of the potential cost outcomes for street works, based on 10,000 iterations. This approach illustrates the high and low scenarios of uncertain costs, alongside the mean cost outcome and associated volatility. Figure 1 below summarises this distribution, while Table 8 provides a breakdown of this risk by network.

**Figure 1: Monte Carlo: Total RIIO-2 cost risk for street works (lane rental), no mechanism post TIM. Costs in £m 18/19 prices.**



Minimum	Maximum	Mean	Standard Dev	Iterations
£6.29m	£17.05m	£12.17m	£1.51m	10,000

The results of our Monte Carlo analysis demonstrate the scale of uncertainty associated with potential future costs that may be incurred under new lane rental schemes. Without the introduction of an uncertainty mechanism, there is a considerable risk at the top end of the distribution that actual costs incurred in RIIO-2 may deviate from our base plan allowance.

**Table 8: Monte Carlo: Total RIIO-2 cost risk by network for street works (lane rental), no mechanism. Costs, £m 18/19 prices.**

Network	Minimum	Maximum	Mean	Standard Dev
East of England	£0.94m	£4.88m	£2.89m	£0.71m
London	£0.99m	£5.14m	£2.99m	£0.74m
North West	£0.98m	£5.27m	£3.07m	£0.76m
West Midlands	£1.15m	£5.41m	£3.22m	£0.79m



### 4.3. Impact of our proposed uncertainty mechanism

Table 9, below, summarises the impact of introducing a re-opener mechanism to address this risk. As shown, the use of a re-opener reduces the materiality of the residual risk that remains in costs after sharing associated with lane rental. As the uncertainty mechanism would ensure we only recovered appropriate and acceptable costs from customers, this is an improvement from including a potentially higher base plan allowance to mitigate against the cost risk identified without the presence of an uncertainty mechanism in Table 9.

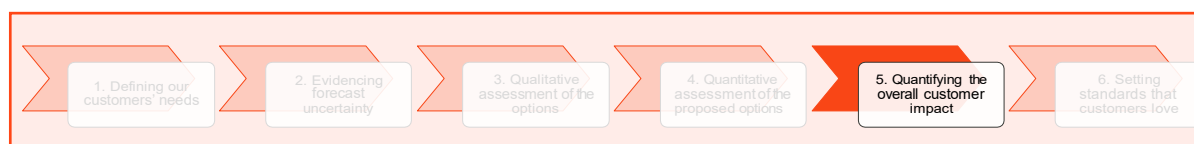
**Table 9: Range of cost impact with and without mechanism, street works (lane rental). Costs, £m £18/19 prices on a post TIM basis**

Value	Without mechanism	With mechanism
Range of Impacts	£6.29m to £17.05m	£2.03m to £14.77m
Materiality (mean risk)	£12.17m	£9.54m
10 <sup>th</sup> Percentile	£10.20m	£7.07m
90 <sup>th</sup> Percentile	£14.10m	£12.09m
Standard Deviation	£1.51m	£1.95m

Several assumptions have been made to produce these results:

- Figures are presented on a post TIM basis, using a totex incentive rate of 40%.
- In the case of re-openers, we have assumed a 1% materiality threshold of average annual revenues. We have also assumed 100% of costs are reclaimed in re-openers.
- Finally, we have not considered the phasing of income in this analysis – we have focused on the value of risk and potential incomes.

## 5. Quantifying the customer impact



In Section 5 of Appendix 10.00 Our approach to managing risk and uncertainty, we have analysed the overall customer impact of uncertain costs with and without our proposed package of mechanisms. We have also evaluated how our proposed package recognises the trade-off between sharing exposure of cost risk with our customers. In Chapters 10 and 11 of our Business Plan, we also quantify the impact of our proposed package of uncertainty mechanisms on customer bills in RIIO-2.

We have also quantified the bill impact associated with the street works (lane rental) re-opener individually. Table 10 below summarises the potential bill impact per annum by the end of RIIO-2 for the P10, mean and P90 costs estimated in our Monte Carlo analysis. As the costs associated with this uncertainty mechanism include an element of capex, this will include a bill impact that extends beyond the RIIO-2 period. For the mean cost impact, this is equivalent to £0.04 per annum.

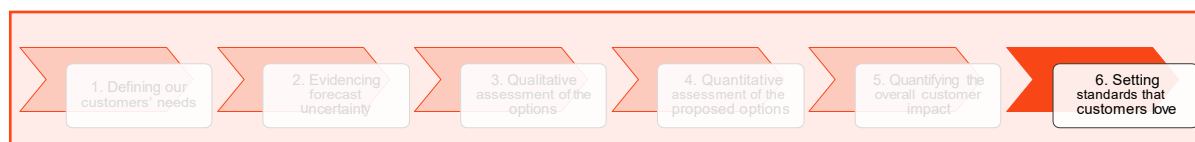


**Table 10: RIIO-2 end bill impact for P10 mean and P90 costs from uncertainty analysis**

RIIO-2 end bill impact (£, 18/19 prices)	P10	Mean	P90
<b>East of England</b>	£0.22	£0.26	£0.31
<b>London</b>	£0.42	£0.51	£0.59
<b>North West</b>	£0.40	£0.48	£0.55
<b>West Midlands</b>	£0.46	£0.55	£0.64

For the purpose of constructing bill impact estimates, we have evaluated the impact of the costs implied from our Monte Carlo analysis on a P10, mean and P90 basis. We have not considered the application of a materiality threshold in practice or the timing effects of revenue recovery from the use of a re-opener mechanism. In practice, bill impacts would materialise with a lag following a successful claim through the mechanism. Therefore, the values presented above represent an extreme scenario for customers with materiality thresholds always breached.

## 6. Setting the standards



Our proposals for a re-opener are clear and simple for our customers to understand. We only propose to request funding for costs incurred from the introduction of new lane rental schemes by highway authorities, which is an external decision outside of our control.

When making a notification through the re-opener process, we would clearly articulate to customers the supporting detail and rationale behind our proposed expenditure. This would also provide an opportunity for further engagement with relevant stakeholders during the re-opener window.

Our evaluation on the implications of including costs for street works (lane rental) in our base plan, as outlined in Section 2.3, and of the incentives associated with our proposed re-opener mechanism demonstrate the benefits of this approach for customers and stakeholders.

Our overall approach to managing risk and uncertainty using uncertainty mechanisms has been tested with customers through our acceptability testing. A full discussion of this engagement is provided in Chapter 10. It is noted here that customers found our approach to be acceptable, and that we had been thorough in our work to manage cost risk in RIIO-2.