PIR Title**Title:** 'Free-Flow' Road User Charging at the Dartford-Thurrock River Crossing **PIR No: DfTPIR030** **Lead department or agency:** Department for Transport (DfT) **Other departments or agencies:** Highways England (HE) **Contact for enquiries:** Dan Pillay, DfT, 07977428805	Post Implementation Review **Source of intervention:** Domestic **Type of regulation:** Secondary legislation **Type of review:** Statutory - sunset clause **Date of implementation:** 01/10/2013 **Date review due (if applicable):** 01/10/2018
Summary: Intervention and Review	**RPC Opinion: GREEN**

1a. What were the policy objectives and the intended effects? (If policy objectives have changed, please explain how).

Background

The Dartford-Thurrock River Crossing is a key part of the strategic road network, forming a link in the M25 motorway between Essex and Kent.

A road user charge has been collected at the crossing since 2003 as a way of managing the high demand for its use. However, demand for crossing the Thames at Dartford has continued to grow substantially, exceeding the design capacity of the crossing, which causes delay, poor journey time reliability and congestion. This congestion reduces the efficiency of movement of people and goods to the detriment of business productivity and the economic and social activities of individuals. The congestion was compounded during the charging hours, under a payment booth and barrier arrangement, due to the need for drivers to stop and pay the road user charge at barriers on the south side of the Thames.

The Dartford 'free-flow' charging scheme was introduced on the 30 November 2014, removing the need for drivers to stop and pay the road user charge at the payment booths and barriers. Instead, road users pay the road user charge through a variety of payment methods e.g. online, by phone, at a payzone retail outlet or in advance by post. For additional convenience, road users can set up a pre-pay Dart Charge account, which offers discounts of up to one third off every crossing. Payment has to be made either in advance, or by midnight on the day after crossing. The scheme uses automatic number plate recognition (ANPR) camera technology, alongside continuity of an established Tag-based system. Penalty charge and recovery processes are administered to tackle evasion.

Objectives and Effects

The Government's objective was to improve traffic flow at the crossing through removing the requirement for road users to stop at a barrier to pay the charge, as this interrupted journeys and caused delay. The Dartford 'Free-Flow Charging Scheme' (DFFC) was intended to reduce congestion whilst continuing to maintain an effective road user charging scheme to manage demand for use of the crossing. The policy objective was to support delivery of a 'free-flow' road user charging operation which would reduce journey times and the variability in journey times whilst maintaining revenues to enable the Department for Transport (DfT) to continue to prioritise development and funding of improvements in the short, medium and longer term, which included looking at options for additional crossing capacity in the Lower Thames.

Policy intervention was deemed necessary and a new charging scheme order came into force on 1 October 2013, to support the introduction of 'free-flow' charging at the crossing. The charging scheme order introduced measures to ensure that the payment of the road user charge continued under a 'free-flow' charging operation. Compliance with the road user charging scheme under a 'free-flow' charging operation is vital so that demand (and therefore congestion) continues to be managed, as well as maintain revenue collection. The charging scheme order allows for enforcement of the road user charge. Although drivers are encouraged to pay the road user charge in advance of using the crossing, they also have the opportunity to post-pay at the same rate up to midnight on the day following the day of use of the crossing. This arrangement of both pre and post-pay is similar to other schemes from around the world which allow post-payment periods.

The policy objective was to support the Department's medium term measure of introducing a 'free-flow' charging operation at the Dartford Crossing, to:

- Improve traffic flow and reduce congestion at the crossings, and
- Continue to collect road user charges so that the scheme maintains the cumulative cash flows estimated to 2039 if the (then) existing barriered charging arrangement continued.

An improvement in traffic flow at the crossing results in a reduction in the cost of congestion to businesses and individuals, which in turn promotes economic activity and improves social wellbeing.

Retaining the road user charges at the rates set in DfT's *Revising the Charges at the Dartford-Thurrock River Crossing Consultation Response* preserves the revenue realised under the previous charging operation (barriered). This revenue continues to be passed to Government and allows the Department to continue to prioritise development and funding of proposals, particularly for the provision of additional crossing capacity on the Lower Thames.

Whilst 'free-flow' charging could have been implemented technically without legislative change, it would not have been possible to implement the enforcement or post-payment aspects. In effect therefore, the successful implementation of the 'free-flow' charging operation required legislative change in the form of a new charging scheme order under the Transport Act 2000. The A282 Trunk Road (Dartford-Thurrock Crossing Charging Scheme) Order 2013 (SI 2249), revoked and replaced the A282 Trunk Road (Dartford-Thurrock Crossing Charge Scheme) Order 2012 (SI 2387), making provision for the following:

- Enforcement of the road user charges in cases of non-payment
- Introduction of a discretionary post-pay period; and
- Requirements on how penalty charge values are to be communicated to road users.

The introduction of enforcement powers also required new enabling regulations as a separate statutory instrument to be introduced under provisions in the Transport Act 2000. The Road User Charging Schemes (Penalty Charges, Adjudication and Enforcement) (England) Regulations 2013, cover the civil enforcement of road user charging schemes, and include provision to impose penalty charges which may be payable in addition to the original road user charge.

1b. How far were these objectives and intended effects expected to have been delivered by the review date? If not fully, please explain expected timescales.

The DFFC launched in November 2014, but two necessary adaptation and improvement schemes obscured the intended effects of the DFFC being fully realised until 2017. These were:

1. Road works to support the introduction of DFFC. This finished in July 2015.

This involved infrastructure works to install roadside technology and communications to capture vehicle registrations, provision of four open traffic lanes north and southbound, safe removal of plaza and barriers, as well as a new traffic safety system to ensure the continued safety and integrity of the tunnels. Crossing characteristics impose a number of requirements for the regulation of entry into the tunnels for certain oversized vehicles and hazardous goods and when dealing with incidents and congestion. Delivery of equivalence in traffic control measures was of particular importance to support the removal of the existing northbound barriers and the continued safety performance for road users and workers.

2. M25 Junction 30 / A13 corridor congestion relieving scheme. This was close to the DFFC, and can reasonably be expected to have had an impact on it. The A13 work began in February 2015, and the M25 works started in November 2015. The scheme finished in Autumn 2016.

To account for both of these complications (i.e. road layout changes and the corridor congestion relieving scheme), the evaluation (Highways England's Post Opening Project Evaluation - POPE) considered four distinct time periods:

- Before period***: September and October 2014***
- Immediate after: ***September and October 2015*** – this provides an initial indication of how the scheme is performing, prior to the M25 roadworks relating to the M25 Junction 30 scheme, introduced in November 2015
- After, during nearby roadworks: ***September and October 2016*** – this provides context regarding the impact that the M25 Junction 30 scheme roadworks may have had.
- After, most recent: ***April and May 2017*** - this provides information relating to how the scheme is most recently performing, now that both schemes are in place concurrently.

The evaluation shows that the impacts of the neighbouring scheme was as follows:

- Journey times immediately after the introduction of the DFFC scheme were reduced, then increased during the period affected by the M25 Junction 30 scheme road works, before the journey times reduced again to lower than any of the preceding date periods;

The table below summarises how each of the main policy objectives were affected in each time period.

	Pre scheme (Sept and Oct 2014)	Immediate after (Sept and Oct 2015).Prior to M25 roadworks	During M25 roadworks (Sept and Oct 2016)	After construction works (Apr and May 2017)
Journey time improvements and reliability	-	Unaffected	Benefits suppressed	Unaffected
Cumulative cashflows	-	Unaffected	Unaffected	Unaffected
PCN value	-	Unaffected	Unaffected	Unaffected

It is also worth noting that the appraisal in the IA was done over a 25 year period, meaning the scheme is expected to deliver economics benefits for the duration of this time.

2. Describe the rationale for the evidence sought and the level of resources used to collect it, i.e. the assessment of proportionality.

A high evidence PIR was considered appropriate as the DFFC had a total net present value impact of £1,628.8m. DfT considered that the evidence needed for this PIR could largely come from the formal evaluation undertaken by Highways England through their POPE programme. The POPE evaluation approach comprises before and after assessment against scheme objectives, in particular:

- Before and after comparison of journey time and journey time reliability
- Comparison of forecast against outturn traffic volumes
- Comparison of forecast costs and benefits v's outturn costs and benefits

When planning this PIR, DfT checked whether the remit of POPE was sufficiently comprehensive and would gather all relevant data in a robust and reliable way. We concluded that this evaluation would largely meet the needs of this PIR and would provide robust monitoring data. In addition, stakeholder analysis was also undertaken to provide evidence on the impact of the scheme on customers and businesses (see section 6 for more detail on the survey methodology and its limitations).

3. Describe the principal data collection approaches that have been used to gathering evidence for this PIR.

Data collection approaches

The principal data collection that has been used to gather the evidence necessary is Highway England's POPE evaluation. The evaluation analysed data for the following metrics:

- Traffic analysis: changes in traffic volume, displacement, traffic forecasts, journey time impacts and reliability
- Financial impacts: changes between pre and post scheme, changes to revenue, income, expenditure, scheme compliance and customer service analysis
- Safety impacts: collision rates and contributory factors
- Environmental impacts: noise pollution, air quality, greenhouse gases, landscape and townscape effects, cultural heritage, ecology, road drainage, water environment, physical activity and journey quality

Equivalent or improved safety performance for road users and no degradation of air quality are objectives of the Dartford Free-Flow Charging scheme (as outlined in the business case) but not objectives of the required legislative change in the form of the new charging scheme order under the Transport Act 2000 (the focus of this PIR). Therefore, even though the POPE evaluation reports on safety and environmental impacts, we have not provided details on whether these scheme objectives were achieved in this PIR. A secondary reason is that as only one year of post-scheme collision data is available, it is not yet possible to draw any firm conclusions about the effect of the DFFC on collisions. Similarly, it was not possible to evaluate change in CO2 emissions as detailed information on flow and speed by user class is not available. However, as the percentage differences between forecast and observed traffic flows are considered insignificant, impacts on local air quality are likely to be as expected.

Evaluation approaches

The Post Opening Project Evaluation (POPE) has used a before and after evaluation approach, comparing information collected before and after the introduction of the scheme in Nov 2014, against predictions made during the planning process.

Stakeholder surveys

Stakeholder surveys of individuals and businesses were also carried out. The surveys were split into two stages:

- Stage 1 sought to identify a range of users to participate in further questionnaires. 45 responses were received from business users, and 83 from individuals. Stage 1 was sent out via Dart Charge social media accounts.
- Stage 2 sought specific views from these respondents on the Dartford 'free-flow' charging scheme. 7 business users and 42 individuals responded to the respective surveys which were tailored differently to individual and business users. Stage 2 was sent to individuals and businesses through email.

A follow-up survey was sent specifically to Bluewater shopping centre, but no response has been received at the time of writing.

4. To what extent has the regulation achieved its policy objectives? Have there been any unintended effects?

The policy objective was to support the Department's medium term measure of introducing a 'free-flow' charging operation at the Dartford Crossing, to:

- Improve traffic flow and reduce congestion at the crossings, and
- Continue to collect road user charges so that the scheme maintains the cumulative cash flows estimated to 2039 if the (then) existing barrier charging arrangement continued.

This section will split up these objectives as follows:

1. Improve traffic flows
    a. Journey times
    b. Journey time reliability
2. Maintain finances and ensure proportionality
    a. Maintain cumulative cash flows
    b. Set the PCN level at a reasonable level relative to comparable schemes

The table below summarises whether the whether or not the objectives have been achieved, after which each objective is considered in greater detail.

	Objective	**Objective Achieved?**
IMPROVED TRAFFIC FLOWS	**JOURNEY TIMES:** To improve average journey time through the Dartford Crossing	□
	JOURNEY TIME RELIABILITY: To deliver a quantifiable improvement in journey time reliability at the Dartford Crossing	□
MAINTAIN FINANCES	**FINANCIAL:** To maintain the cumulative cashflows estimated to the end of the M25 Design, Build, Finance and Operate (DBFO) contract in 2039 if the existing charging arrangement continued as part of the M25 DBFO contract	□

	PROPORTIONATE: To set penalty charge values considering levels imposed by comparable schemes and guidelines for other civil traffic enforcement penalties	□

Improved Journey Times

Average journey times have improved in both directions, in all time periods (i.e. AM and PM), except the Northbound AM peak – though even this has improved in the most recent period. The increased in the Northbound AM peak is likely due to the capacity constraints of the tunnels (to prevent queuing in the tunnel for safety reasons). The most notable improvements are the Southbound AM peak, which has improved by 15 minutes, and the Southbound PM peak, which has improved by 9 minutes. Average daily crossings have consistently grown every year since the introduction of the Dart Charge in November 2014, with growth being particularly pronounced in 2015 onwards. This suggests that the improved journey times are not caused by a reduction in traffic flows, and can possibly be attributed to Dart Charge.

Southbound Journey TimesTime Set	**Before**	**After (Immediate)**	**After (M25 J30 roadworks)**	**After (most recent)**
Overnight	11:19	11:13	11:38	10:12
AM Peak	26:38	11:39	12:27	11:30
Inter Peak	14:42	10:44	11:37	10:24
PM Peak	20:52	11:28	12:05	10:53
AM Shoulder Peak	14:46	10:37	11:38	10:43
Weekend Day	14:25	10:23	11:34	10:11
Other	11:35	10:15	11:10	10:06

Northbound Journey TimesTime Set	**Before**	**After (Immediate)**	**After (M25 J30 roadworks)**	**After (most recent)**
Overnight	09:01	09:11	09:15	08:52
AM Peak	11:32	12:19	18:06	10:25
Inter Peak	15:23	12:15	12:59	12:09
PM Peak	22:41	16:25	26:21	12:55
AM Shoulder Peak	09:35	09:41	11:13	09:29
Weekend Day	12:41	10:19	13:10	09:26
Other	09:34	08:55	09:38	08:38

The survey of users partly corroborates this, with respondents reporting better experiences with Southbound journeys. However, users also reported negative experiences on Northbound journeys which suggests that the improved journey time savings for Northbound journeys may not yet be perceived by

some users. The difference between the POPE findings and the survey findings can be accounted for as follows:

1. The survey sampling methodology means there will be a self-selection bias of survey respondents i.e. those who hold stronger opinions about the Dartford 'free-flow' charging scheme (whether positive or negative) are more likely to voice their opinions than those who had a more neutral experience or only perceived a slight improvement.
2. A greater, more consistent level of journey time savings perhaps needs to be achieved before it is noticed by users, reflecting why users reported more positive experiences on southbound journeys.
3. The Northbound and Southbound routes also have fundamental differences, with the Northbound route limited by capacity constraints. The traffic safety system, introduced as part of the scheme, modulates traffic entering the tunnels, identifies and stops oversized vehicles or those carrying dangerous goods. It enables dangerous goods vehicles to be escorted through the tunnels safely and stops traffic in the event of an incident.
4. There have been marginal increases in traffic flow over the crossing observed, year-on-year from 2013-2016, with no evidence of displacement either to or from the nearest other Thames crossing, the Blackwall Tunnel. The percentage increase in traffic due to the scheme (6.9%) is broadly in line with forecast projections (7.9%) undertaken as part of the scheme appraisal.

Overall, journey time reliability has improved in both directions, with variability of journey times showing substantially less spread of journey times. In the southbound direction, spread is substantially reduced, representing large improvements. Northbound, the inter peak and PM peak periods also show good improvement in reliability.

Maintaining cumulative cash flows

Net proceeds have increased since the introduction of Dart Charge on 30th November 2014, and so the scheme is considered to have been successful in maintaining cash flows. All revenue collected through Dart Charge is set against the Department for Transport's (DfT's) total expenditure, and net proceeds from the road user charge offset the DfT's wider expenditure.

The difference between income and expenditure is termed 'net proceeds'. It is important to recognise that proceeds generated through the operation of the Dartford Crossing are directed back into Transport. Treatment of income from road user charging schemes is covered by the Schedule 12 of the Transport Act 2000 which requires that any net proceeds be available only for application for the purposes of directly or indirectly facilitating the achievement of any policies or proposals relating to transport.

The table below shows the net proceeds for Dartford Crossing have increased over time. The expenditure relating to delivery costs, enforcement costs and income distort the Net Proceedings, so the figures that exclude these presents a clearer representation of Net Proceeds over time. This shows a step increase in proceeds since the introduction of free-flow charging that is likely due to a combination of increased flows on the crossing and marginal increases to the road user charge upon introduction of free-flow charging.

Net Proceeds (000s)

	2011/12	2012/13	2013/14	2014/15	2015/16
Net Proceeds (exl enforcement and Dart Charge costs)	£46,447	£42,253	£47,122	£70,634	£62,986
Net Proceeds	**£44,441**	**£37,771**	**£32,149**	**£12,189**	**£57,247**

This suggests that the objective relating to maintaining cashflow has been achieved, and that the scheme collects additional cashflow than through the previous arrangement.

This is reflective of the high-levels of compliance with the charge arrangements. Initial compliance (road users paying by midnight the day after making a crossing) is broadly in line with forecast projections undertaken as part of the scheme appraisal, between 91.5% and 94.5 % month-by-month. After the issuing of penalty charge notices, compliance increases to between 96.6% and 97.7%.

Setting of PCN charge levels

The penalty charge values used at the Dartford Crossing are in line with other civil traffic enforcement penalties.

Changing from a payment booth and barrier mechanism (which requires drivers to stop and pay the road user charge at a barrier), to 'free-flow' charging changes how revenue is collected. The 'free-flow' charging has an associated risk of non-compliance. To address this, it is important for payment to be straightforward. A variety of payment methods are available, and an extensive public information campaign was executed to build awareness and understanding of the changes, encouraging road users to take action to avoid non-compliance. Improved signage was also implemented to direct road users to further information about the new arrangements and support continued safe and compliant behaviour. Effective penalty charges and recovery processes were also introduced to tackle evasion.

If the road user charge is not paid by midnight on the day after a chargeable crossing, a penalty charge notice may be raised against the registered keeper of the vehicle. It requires payment of the original road user charge, and in addition:

- £35 if paid within 14 days
- £70 if paid between 15 to 28 days
- Further charges are applied if the penalty charge notice remains unpaid after 28 days

The type of penalty charge notice adopted is designed to encourage timely compliance, by reducing the penalty if it is paid within the first 14 days. To further build road user understanding and compliance of the scheme, upon introduction of the scheme, the first penalty charge notice issued for each vehicle included a warning letter giving the driver an extra 14 days in which to pay their original crossing charge without a penalty. In addition, any further crossings made in that vehicle could also be paid at the standard rate, as long as payment is received within the same 14-day period.

The appropriate penalty charge notice values were considered prior to the implementation of the scheme. This took into account a number of factors to determine the appropriate levels to apply, including;

- Guidelines on other civil traffic enforcement penalties
- Location of the scheme (specifically, not in London)
- Covering costs of enforcing penalty charges to maintain financial sustainability.

Further consideration was given to how to publicise the changes at the Crossing. This was to encourage compliance and reduce the risk of non-payment of the road user charge, thus reducing the number of PCNs issued in the first instance.

The (then) Highways Agency undertook public consultation on the plans to introduce free-flow charging on the Dartford Crossing, encouraging the public and other interested parties to provide feedback regarding introducing PCNs. On the subject of whether there should be an enforcement of the road user charge, 60% of respondents agreed. Furthermore, 69% of respondents agreed the penalty charge should

be below the maximum possible. Some feedback suggested that PCNs should only be at the level required to pay for enforcement to be conducted. The public consultation provided an opportunity to listen to feedback. The feedback resulted in some changes to the original plans, such as extending the payment window to allow for payments up until the end of the day after crossing. The original plan was for payment to be on the day of crossing.

The user survey had a number of respondents who suggested that the penalty charges should be reduced. As mentioned earlier, the survey did not have a representative sample, so a self-selection bias may affect the survey responses.

Penalty charge levels were set proportionately, much lower than the maximum permissible values, and more closely aligned with parking offences. Further to this, the public were consulted and concerns were listened to, with appropriate adjustments made to the scheme rules before introduction, e.g. inclusion of a post-payment window to allow payment of the road user charge following use of the Crossing.

Unintended effects

The unintended effects can be summarised under two broad areas:

1. Increase in Northbound AM peak journey time, and a decrease in Northbound AM peak reliability in the initial after period analysis (see section 1b for an explanation of why this occurred). This is reflected in the survey responses. However, journey time savings are apparent in all time periods in the most recent time period analysed.

2. Some negative user experiences of the charging and enforcement management services, which stemmed from teething problems with the new system, that meant that some customers experienced problems paying the road user charge or were sent PCNs in error. The frequency of these errors has decreased over time.

Some of the other recurrent themes expressed through the responses to the surveys were that:

a. The road user charge is too high. Many individual users suggested a reduction of the charge as the main way of improving Dart Charge.
b. Users perceived a lack of action on non-payers. Some users were concerned about whether foreign drivers are pursued to the same extent as domestic users. This led to some users regarding the system as unfair.
c. Some users felt the system was inaccessible for those who do not have access to the internet.

It should be noted that the survey did not explicitly ask for views on the road user charge level because the policy decision to increase the level of the road user charge was separate and not part of the changes introduced through the legislation, as a road user charge already existed. Therefore the views cited above were expressed when respondents had the opportunity to raise any other views.

Penalty charge levels are considered to be proportionate for the reasons set out above. Effective penalty charge and recovery processes are administered to tackle evasion, including the use of a European Debt Recovery Agency (EDRA). The use of such an agency to pursue and recover these charges is considered the most practicable and efficient means of doing so within the current legislative environment. A wide variety of payment channels are available, designed to make the scheme easy to interact with and there is a pre-pay account available to users for added ease and convenience.

These survey findings are mostly from individual users rather than business users. There were very few responses from business users, so it is difficult to reach a conclusion about business experiences.

However, the small number of responses from the business users highlights similar themes about the level of the charge, lack of action on non-payers and the road user charge payment deadline.

Overall, when setting the survey findings within the overall context of the POPE analysis, it is clear that customers are benefiting from no longer having to stop at the crossing to make a payment which had previously interrupted their journeys and caused inconvenience.

5a. Please provide a brief recap of the original assumptions about the costs and benefits of the regulation and its effects on business (e.g. as set out in the IA)

The costs and benefits presented in the IA for the overall scheme are based upon a model, so the results in the IA are dependent on any assumptions used in the model. A summary of the key original assumptions is provided below:

- Charge revenue features as both a cost and benefit.
- Charge revenue further assumes that charges increase when free-flow charging was introduced. DfT announced two increased rates in *Revising the Charges at the Dartford-Thurrock River Crossing: Consultation Response*; the charge revenue is based upon the higher rate of the two.
- The road user charge is also assumed to increase in line with RPI for the remainder of the assessment period.
- The charge revenue is also based upon the compliance rate, which was assumed to be 93% for domestic users, and 86% for international users.
- The percentage of users who pay by account is assumed to increase from 33% to 50% after the introduction of free-flow charging, based on the key assumption that frequent users would be more likely to take up accounts than casual users.
- The model used for estimating costs and benefits depends upon the accuracy of traffic forecasts, which have been set in line with best practice guidance set out in WebTAG.

The original assumptions used to assess the direct costs and benefits of the regulation and its effect on business were based on the computer programs TUBA, INCA and COBA.

The cost estimates to businesses of incorrectly issued PCNs are based upon the following assumptions:

- Only Penalty Charge Notices (PCNs) issued to UK registered vehicles have been included.
- Business vehicles are assumed to include all two-axle and multi-axel goods vehicles, and 5% of cars.
- It would take a user 15 minutes to submit a representation against a PCN.
- The WebTAG value for working time, used to calculate costs to business users is £34.12 in 2010 prices, deflated to £33.20 in 2009 prices, as provided in section 3.5.6 of WebTAG.

The main direct benefit to business is improved productivity from improved transport economic efficiency and journey time reliability. Businesses will also benefit from the reduction in accidents, though this was treated as an indirect benefit in the IA.

The main cost to business is incorrectly issued PCNs or PCNs that are correctly issued but which are cancelled following successful representation. A minimum, maximum and most likely mid-range estimate of the cost to business of dealing with incorrectly issued PCNs has been generated by varying the percentage of PCNs issued incorrectly to business users.

5b. What have been the actual costs and benefits of the regulation and its effects on business?

There is no available data on the actual costs to business. Data would have to be obtained from businesses themselves, as the Dartford-Thurrock River Crossing Charging scheme accounts do not distinguish between business and non-business users. Also, evaluating the costs to business was determined to be out of scope of OITO, so obtaining costs from business would be disproportionate.

In light of the actual data available post scheme implementation, some of the initial forecasts have been revised compared to the Business Case. Actual data on Journey Time improvements has been added to the calculation. This has led to the BCR changing from 13.43 to 7.62 (see table below) – reflecting a slightly reduced journey time benefit and increase in operating costs. This is driven by softer behavioural aspects and transactional nature of the scheme, which drives resource demand. This remains very high Value for Money. A more accurate BCR will be produced for the 5 year POPE report, as more data will be available.

	Forecast (EAR)	Outturn Reforecast
Journey Time	£1,383.3m	£1,143.8m
Safety	£7.1m	n/a
User Charges	-£36.2m	-£36.2m
Vehicle Operating Costs	£51.9m	£51.9m
Carbon	-£3.5m	-£3.5m
Indirect Tax	£34.1m	£34.1m
Noise	£0.0m	£0.0m
Local Air Quality	£0.1m	£0.1m
Total PVB	**£1,436.8m**	**£1,190.2m**
Total PVC	**£107.0m**	**£156.2m**
BCR	**13.43**	**7.62**

It is worth noting that the cost-benefit analysis in the POPE differs from that used in the Impact Assessment. The NPV calculated for the purposes of the IA was £1,629m and the BCR was 4.2. The main reason for the differences is that the IA was produced earlier than the Full Business Case, so the IA used estimated costs and benefits from the Original Business Case. The FBC included procurement costs of detection, charging and enforcement management services provider, as well as the update of the forecast costs for the roadside infrastructure and savings from the M25 Design Build Finance Operate (DBFO) contract. Additionally, the categorisation of costs and benefits differed between the IA and business case.

6. Assessment of risks or uncertainties in evidence base / Other issues to note

Data sources used

To understand the traffic changes that have occurred as a result of the scheme, including flow, journey time and reliability impact, long-term traffic count data from the following sources have been considered:

1. WebTRIS: Highways England's online database of traffic count sites

2. Vehicle road user charge data from the charging and enforcement services provider
3. Traffic volume counts from the crossing operator.

All three sources are reliable and robust.

Journey time and journey time reliability

DFFC was potentially affected by the works which commenced in February 2015 to increase the capacity of the highway network centred on M25 Junction 30 and even more so by the A13 through Junction 30, to the junction with the A126. This scheme formed part of a £1.4 billion package of investment in roads across London and the South East, and was needed to improve access to the ports in the Thames estuary. To help account for this, four distinct time periods were considered (as mentioned in Section 1b).

Impacts on business and customers

The response to the surveys was limited. The Stage 2 survey received 42 responses from individual users and 7 responses were received from business users. The survey was sent out via email to those that agreed to being contacted after the stage 1 survey circulated on Dart Charge's Twitter account, which has 4,683 followers as of 10 January 2018.

This low response rate means that there is likely to be a self-selection bias and is therefore not representative of the free-flow charging user population; those who hold stronger opinions about the scheme, whether positive or negative, are more likely to voice their opinions than those who had a more neutral experience or only perceived the impacts to be small. Other forms of evidence gathering were considered disproportionate.

Whilst the survey response itself is limited there are other sources of evidence relating to the impact on customers. Issues relating to the traffic flow on the Northbound approaches to the Dartford tunnels are well documented within the public domain, including an on-line petition which obtained 17,000 signatures, thereby requiring a written response from government. The petition ran for six months in late 2015/early 2016 and was closed in Feb 2016, which aligns with the timings of the works on the neighbouring road work schemes (as set out above). There were also issues with the newly implemented charging and enforcement system, as documented within the Dartford-Thurrock Crossing Charging Scheme Accounts, which meant that some customers experienced problems paying the charge or have been sent penalty charge notices (PCNs) in error. While these have affected only a minority of customers it has meant they have had a negative experience of the new charging system. The frequency of these errors have decreased over time.

Overall, customers and business benefit significantly, predominantly through the journey time and reliability benefits. A wide variety of payment channels are available (online, by phone, at a payzone retail outlet and by post), as well as the option to set up a pre-pay account which has been very successful - there are now more than one million account holders. As mentioned earlier, compliance levels are high; initial compliance (road users paying by midnight the day after making a crossing) is broadly in line with forecast projections undertaken as part of the scheme appraisal, between 91.5% and 94.5 % month-by-month. After the issuing of penalty charge notices, compliance increases to between 96.6% and 97.7%.

7. Lessons for future Impact Assessments

As set out in the IA, introduction of free-flow charging at the Dartford Crossing had both a regulatory and an investment (infrastructure) aspect. An assessment was made of the direct costs and benefits to

business, specifically the one-in, two-out (OITO) approach[1]. It was very difficult to separate out the regulatory change from the investment in infrastructure because both elements were crucial in delivering the scheme and it would not have been possible to deliver the scheme without either element. The Regulatory Policy Committee advised that where infrastructure spending decisions require a small regulatory delivery component, the regulatory measures should be classed as 'out of scope' of OITO approach.

Risks and assumptions as set out within the IA are driven by the softer behavioural aspects and transactional nature of the scheme which drives resource demands. Key variables around account take-up, traffic volumes, and compliance influence the Dart Charge commercial model and service charges applicable but the financial objective remains that the scheme should pay for itself over the life of the contract.

These variables are sensitive to user behaviour which is difficult to model precisely. For example, the planned public information campaign prior to the launch of free-flow charging was successful in communicating the change to the payment mechanism and also in promoting the benefits of automated payment through accounts, which has driven account holding beyond assumptions, contributing to increased operational costs due to the transactional nature of the payment mechanism.

8. What next steps are proposed for the regulation (e.g. remain/renewal, amendment, removal or replacement)?

It is proposed that the Charging Scheme Order (CSO) should be retained indefinitely as it has proven fundamental to ensuring a credible 'free-flow' charging operation at the crossing.

The opportunity will be taken to review the provisions within the CSO in detail, alongside the enabling enforcement regulations, which are drawn upon through the CSO, as experience of them being brought to life within an existing contracting agreement now exists.

Sign-off for Post Implementation Review:

I have read the PIR and I am satisfied that it represents a fair and proportionate assessment of the impact of the policy.

Signed: Jeremy Grove **Date:** 09/04/2018

[1] This considers that every new regulation imposing a new financial burden on firms must be offset by reductions in red tape that will save double those costs

Evidence Base

Please provide additional evidence in subsequent sheets, as required.