REDACTED VERSION

Missing text sections and white-out boxes are redactions for the publicly available version of this bid, due to commercial sensitivities and information relating to upcoming competition

Kent County Council

Executive summary

A bid for % of the cost of 33 electric opportunity-charging buses and associated infrastructure, on a thriving Bus Rapid Transit network, for delivery from 2022.

Total funding sought: £9.5m

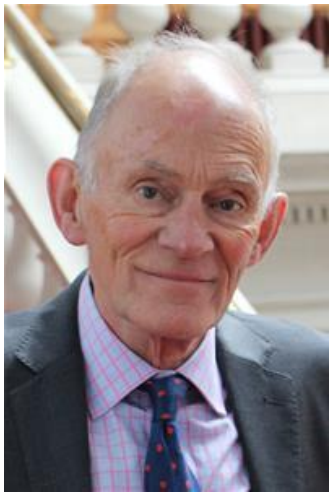
Benefit-Cost-Ratio:

Zero Emission Bus Regional Areas (ZEBRA) Scheme

Business Case

August 2021

Foreword



"We are at a critical point where change is needed, and the actions of today can shape the Kent of tomorrow. In 2019 Kent declared a climate emergency; The Kent and Medway Energy and Low Emissions Strategy sought to set a single goal to ensure that Kent's residents and businesses do their bit to care for and protect The Garden of England.

It is one thing, however, to recognise this climate emergency but another to act. In Kent there is huge pressure for growth, but we must ensure that it is sustainable. Our flagship Fastrack Bus Rapid Transit service is a singular tool designed to enable continued economic development and sustainable regeneration in Kent, crucially helping to prevent unacceptable traffic congestion in and around such key traffic interchanges as The Dartford Crossing, and shortly, The Port of Dover.

Fastrack is a major contributor to Kent's Growth Without Gridlock strategy. In Kent Thameside, 22% of modal share locally is attributable to the service, with a forecast of 25% by 2025. That's one in four journeys. By the aggregating of individual journeys, Fastrack is also a positive force for improving local air quality. Nonetheless, we believe Fastrack can do more. For Dartford, Gravesham and Dover, a zero-emission fleet would immediately further improve air quality and visibly set the trend for local communities and other industries.

Through the National Bus Strategy, Kent County Council is working even closer with our bus operators, and it is only through these strong partnerships that we can achieve the bold ambitions that we have set for ourselves. This bid is not just about influencing the future of Fastrack – it is about a cleaner future for all buses in Kent. We see Fastrack and the ZEBRA initiative as a torch for lighting the way to that."

David Brazier
Cabinet Member for Highways and Transport
Kent County Council

Kent County Council
kent.gov.uk

Acknowledgments and Summary

" 'Fastrack belongs to the communities it serves and is a community lifeblood'.

When I joined Kent from Transport for London in 2019, my new colleagues told me this, but they needn't have. Within my first week I saw just how many stakeholders were actively engaged with the network, from the users, local housing developers and those wishing to emulate our Bus Rapid Transit model from all over the world.

The vision for Fastrack brought me to Kent; the confidence in its future brings me to ZEBRA.

With sincere gratitude to all of the Fastrack customers, staff, stakeholders, and friends who have helped the team shape this document, I believe this application demonstrates that Kent County Council will use all its powers and partnerships to remove emissions from the forecast four million annual passenger journeys made on Fastrack from 2023. You will read how, by improving the fleet of the current Kent Thameside service and launching the new Dover service in the cleanest possible way, the Department for Transport will get 'Bang for Buck' through a scheme that has a solid structure to ensure delivery and longevity."

Shane Hymers
Fastrack Development Manager
Kent County Council

A bid for % of the cost of 33 electric opportunity-charging buses and associated infrastructure, on a thriving Bus Rapid Transit network, for delivery from 2022.

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The Strategic Case: summary

This chapter introduces the customers, vehicles and location of the existing Fastrack service on Kent Thameside, which from 2022 will run at least every 15 minutes, 24/7, 365 days a year, and the new Fastrack service in Dover launching in 2023.

It sets out a strategic context for this bid, detailing ambitions for the Fastrack network and more widely throughout Kent County Council.

It describes Fastrack's desire to innovate around the Bus Rapid Transit model, with several specific examples of how the service continues to set itself apart.

It goes on to describe the impact of COVID on the service's patronage, alongside a more optimistic future driven by several expansions to new markets.

It sets out the environmental, air quality, noise and health issues driving the need for a zero-emissions service, including specific problems in the network's area and KCC's strategy to address these.

It describes the options appraisal behind this bid – why Fastrack? Why opportunity charge?

Finally, this chapter summarises how all these elements come together to meet the core objectives of the ZEBRA scheme.

For attention of: **Department for Transport**
Prepared by: **Shane Hymers, Fastrack Development Manager, Kent County Council**
Daniel Gillen, Principal Fastrack Planner, Kent County Council

This Business Case will be published online at https://www.go-fastrack.co.uk/2021-dft-zebra-bid/.

If you need information in an alternative format, such as braille or a language other than English, please email alternativeformats@kent.gov.uk or call 03000 421 553.

Summary of changes to bid since Expression of Interest

- Funding amount changed (lower per bus cost, but warranty included)
- replaced by for energy supply due to more favourable terms
- Night buses added to Fastrack Kent Thameside, thus changing the annual mileage
- Fewer pantographs required (6 not 14) since full depot charging is not deemed a requirement, following extensive modelling by
- Fewer depot charger packs demonstrated to be required (now 2 for each route for resilience)

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The Strategic Case

Executive Summary

This chapter introduces the customers, vehicles and location of the existing Fastrack service on Kent Thameside, which from 2022 will run at least every 15 minutes, 24/7, 365 days a year, and the new Fastrack service in Dover launching in 2023.

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Scope and place

The place

Fastrack is Kent's **Bus Rapid Transit** (BRT) brand. The service provides fast, reliable, and affordable transport across Kent Thameside. The service model will be emulated in Dover from 2023.

Kent Thameside comprises of several new and existing housing developments and business units around Dartford, Ebbsfleet and Gravesend. The Fastrack network in Kent Thameside connects communities to Bluewater shopping centre, a hospital, local town centres and national and international rail stations. From 2022, the Fastrack service in Kent Thameside will run at least every 15 minutes, 24/7, 365 days a year.

A new Fastrack network in **Dover** connects the town centre, with its High Speed 1 rail link, the Port of Dover, and new housing developments around the suburb of Whitfield. The network will connect local communities with their amenities, places of work and commuter rail, but also key tourist markets with the historic Dover Castle and White Cliffs attractions and international travellers heading to France.

Network maps for both Kent Thameside and Dover are overleaf.

Fig 1: Kent transport links

Our two BRT networks are strategically situated in high pressure traffic areas. Fastrack Kent Thameside operates in the shadow of the UK's busiest estuarial crossing, the Dartford Crossing, which averages over 130,000 vehicle movements per day. Dover Fastrack will operate alongside the Port of Dover, where over nine million vehicle movements per annum are recorded.

The Fastrack networks in both Kent Thameside and Dover comprise exclusive busways, **bus priority measures**, and purpose-built **bypasses**, making travel by Fastrack a significantly quicker and more convenient option for local journeys and onwards connectivity versus the private car. Significant infrastructure investment continues in Kent to retain this edge.

Fig 2: Dover Fastrack bypass over the A2

Fig 3: Kent Thameside Fastrack tunnel to Bluewater Shopping Centre, bypassing A2 (very different section of it to Dover!)

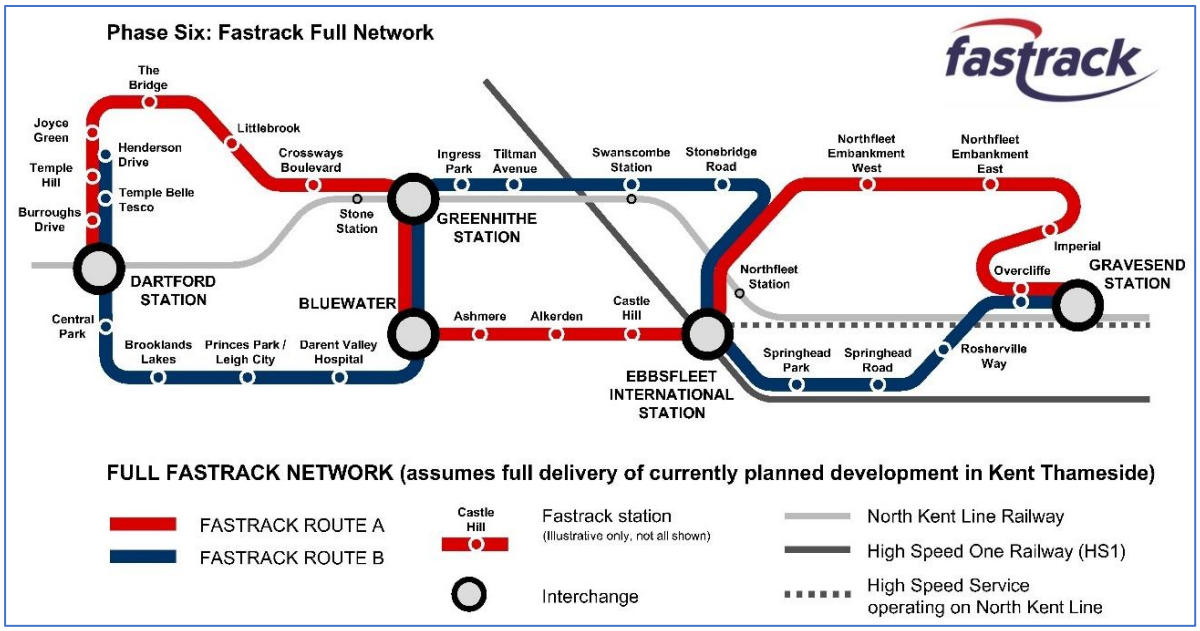


Fig 4: Fastrack Kent Thameside network

Fig 5: Springhead Park, served by Fastrack Kent Thameside

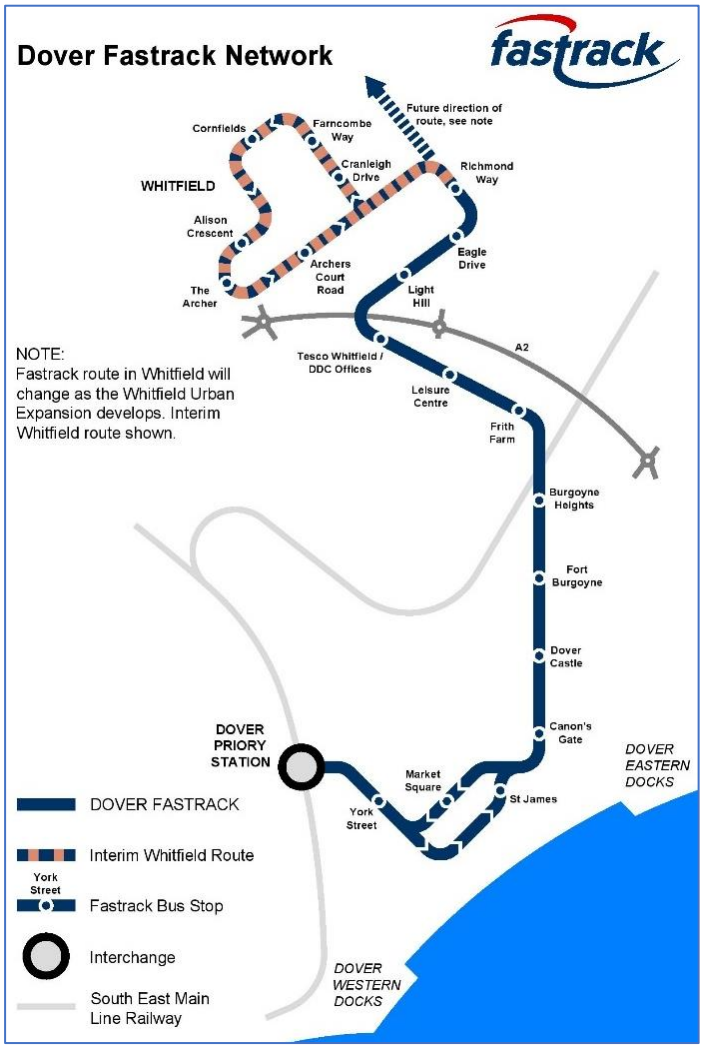


Fig 6: Fastrack Dover network

Fig 7: Dover docks

Fig 8: Dover Castle and the White Cliffs

Fig 9: Whitfield urban expansion in Dover

The customer

A large (and growing) part of Fastrack's customer base in Kent Thameside is residents of the housing developments delivered by Ebbsfleet Development Corporation. EDC are overseeing the delivery of **Ebbsfleet Garden City**; with 15,000 new homes this is the first Garden City under the current government, and a key component of the Thames Estuary growth corridor. The recent Letwin Report notes that EDC's delivery remains on target, despite the pandemic: a reassuring backdrop for Fastrack development in the area. We are "building back better" and will recover through connectivity.

Fig 10: Ebbsfleet Development Corporation visual for development around Kent Thameside

The current Kent Thameside network is the transport mode of choice for 22% of local journeys and is internationally recognised as a proven example of BRT. We are targeting a 25% modal share by 2025 in Kent Thameside – a quarter of all journeys made locally (within 500 metres of the network).

It is our view that the Fastrack networks belong to the communities they serve, and the services provided must be directly influenced by them. This is distinct from just service users, in that we also include the views of non-users who live and work closely in forming our service plans, including local businesses.

Going forwards, a parking ratio of 0.7 (spaces per dwelling) or less is going to be pursued along developing Fastrack corridors. Whilst we appreciate that Fastrack cannot fulfil the need of every journey, we will be rightly expected to provide an ever more comprehensive service.

Through regular engagement with communities, we are able to both continuously match the schedule to changing travel patterns, and reiterate the traffic management and air quality benefits of Fastrack. The latter heightens the support by all for such ambitious planning.

The table opposite shows the demographic profile of residents living within 500 metres of the Fastrack network in Kent Thameside.

FASTRACK USE	Yes	98%
	No	2%
GENDER	Male	45%
	Female	51%
AGE	Aged 16-24	3%
	Aged 25-34	27%
	Aged 35-44	41%
	Aged 45-54	16%
	Aged 55-64	8%
	Aged 65-74	2%
	Aged 75 & over	1%
WORKING STATUS	Working full time	75%
	Working part time	6%
	Freelance / self employed	6%
	Unemployed	2%
	Home maker	3%
	Retired	4%
	Student	2%
	Other	2%

Fig 11: Kent Thameside resident demographics

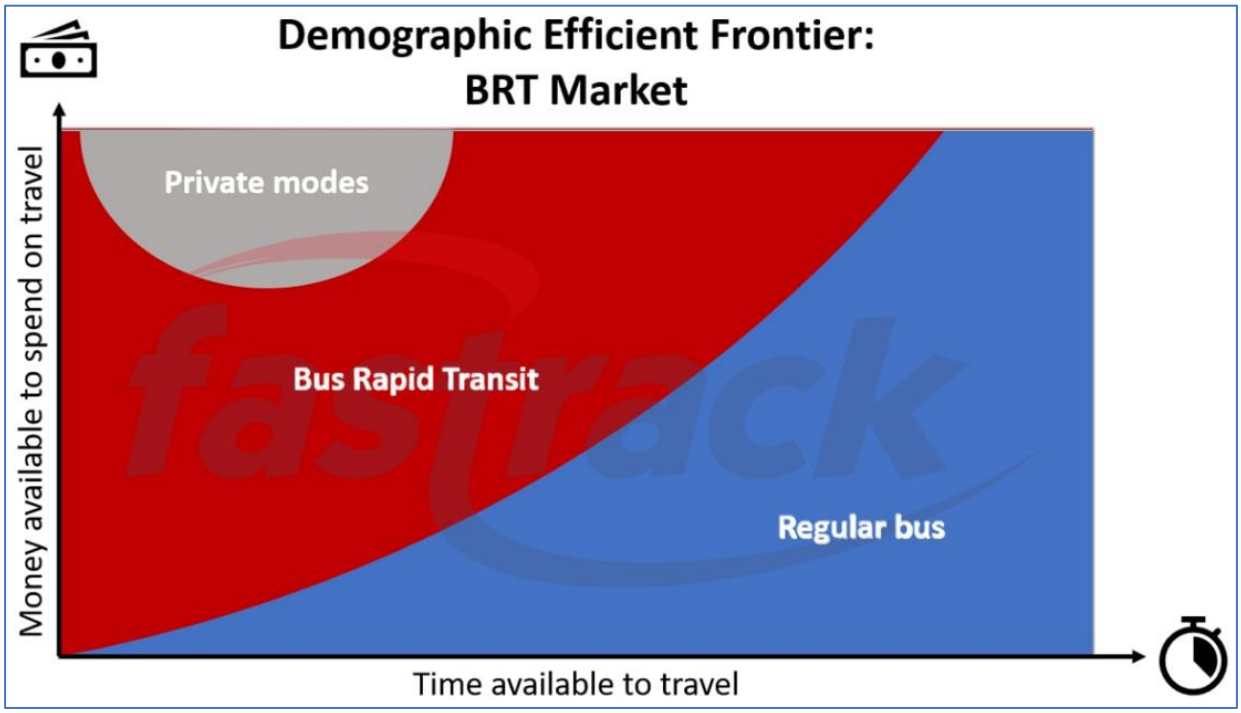


Fig 12: efficient frontier for BRT market

The vehicles and operators

There are currently no registered local bus operations in Kent using an electric fleet.

ZEBRA CORE OBJECTIVE

To support the roll-out of the 4000 Zero Emission Buses that the government committed to in February 2020

The ZEBRA funding would provide complete coverage of our two BRT networks in Kent: Fastrack Dover and Fastrack Kent Thameside (covering Dartford and Gravesham). Each of these networks would have just one operator. Therefore, there are no other bus operators in the bid's defined area as it's a closed network.

As contracted services, we don't yet know who the operators will be, but we have support of all operators who have expressed an interest in operating each network. The new operating contract for Kent Thameside Fastrack will commence in October 2022. The maiden Dover Fastrack operating contract will commence in April 2023.

Fleet requirement going forwards:

Please see the Sensitivity Modelling section for the BCR impacts of challenging this assumption.

*Local bus journeys made (or forecast to be made in Dover) within the districts on Fastrack

The fleet requirement noted above is the result of detailed analysis on the route length, service frequency, route capacity across the busiest hour, and vehicle warrantied mileage. The background calculations are detailed Appendix C. Different options are discussed in the Sensitivity Modelling section of the Economic Case chapter.

Under the current Fastrack contract for Kent Thameside, Arriva operates 21 buses. The entire fleet comprises single-decker, Euro V and Euro VI diesel buses. When the current contract expires in 2022, if electrification takes place or Arriva do not retain the contract, the 21 diesel buses would be

For Kent Thameside, the jump from 21 buses (current fleet) to 28 buses (fleet requirement going forwards) is explained by expanding timetables and routes. From August 2021 the service will run regularly throughout day and night, in contrast to the current non-night service. This coincides with the opening of an fulfilment centre en route where night shift staff, in significant number, must be catered for. The Kent Thameside contract renews in 2022, coinciding perfectly with the network expansion through Ebbsfleet Garden City and the ZEBRA bid for a new and expanded fleet.

Please refer to the later chapter on the Commercial Case for more details on the scheme's procurement plan, and the landscape of current operators and fleets across Kent more widely.

Strategic context

As a crucial element of Kent County Council (KCC)'s **Growth Without Gridlock** strategy, and an integral part of major regeneration in Kent, Fastrack is closely managed and contracted by KCC as the Local Transport Authority. The scale of growth in Dover and Kent Thameside demands carefully considered land use and transport planning to minimise unnecessary additional car use. To be successful, Fastrack is designed to prioritise access to jobs, facilities, and leisure close to where people live.

Electrifying Fastrack is included in **The Kent and Medway Energy and Low Emissions Strategy**. The strategy sets out how KCC will respond to the UK climate emergency and ensure that our re-emergence from the coronavirus pandemic is driven by clean and resilient economic growth. The goal is eliminating poor air quality and reducing fuel poverty, whilst also promoting the development of an affordable, clean, and secure energy supply chain across Kent and Medway. To be successful, the strategy will develop programmes in partnership with local businesses, community groups and residents. A technical implementation plan accompanies this strategy and provides detailed information on the specific actions that will be taken to achieve each priority, the partners involved, timescales and outputs. Progress, risks and issues are regularly reviewed by Kent Leaders, Kent Chief Executives and appropriate partnerships. In the case of Fastrack, the Fastrack Advisory Board provides an additional layer of scrutiny and support. Progress reports and the latest indicators for our scheme will be published online at www.kent.gov.uk/environment.

ZEBRA CORE OBJECTIVE

To support the government's commitment to decarbonisation and to reduce the transport sector's contribution to CO2

Fastrack features centrally in every local plan for decarbonisation, and is a key element in the following local strategies:

- Gravesham Transport Strategy
- Dartford's Local Development Framework (Strategic Transport Infrastructure Programme)
- Dover Transport Strategy
- Ebbsfleet Implementation Framework (by Ebbsfleet Development Corporation)
- KCC's Local Transport Plan 4 "Delivering Growth without Gridlock"
- The Kent and Medway Energy and Low Emissions Strategy

Fig 13: Fastrack at the heart of Ebbsfleet Garden City

Ambition

KCC's journey to electrify Fastrack began in March 2018, when Fastrack took part in an eight-week opportunity charge electric bus demonstrator trial commissioned by The trial aimed to demonstrate that electric buses can operate without disrupting current schedules, improving air quality, energy efficiency, noise and passenger comfort, as well as providing financial benefits.

The trial was conducted along Fastrack Route A, then 23.6km-long, operating 20 hours daily between Dartford and Bluewater.

Data gathered from the trial showed an energy saving of 69.3% on Fastrack based on annual energy use (2063MW for the current diesel buses; 634MW for the electric buses trialled).

Feedback from the current Fastrack operator (Arriva) and their drivers was positive, with the electric bus outperforming all expectations.

The public were also largely complimentary, with over 70% of social media comments being neutral or positive.

The demonstration proved that the electric vehicle and charging method could operate optimally within Fastrack's service requirements. So ideal, in fact, was the operating environment of Fastrack for the vehicle, that are exclusively showcasing their next generation single decked electric bus on Fastrack from December 2021 for the world to see. Their double decker version is being trialled with

The trial also helped raise the profile for the drive towards zero emissions technology more generally, attracting significant interest from local bus and transport operators. Whilst the vehicle itself drew attention, the visual element of the charging infrastructure actually proved to be the most effective and thought provoking for the general public and stakeholders alike.

A vision was born.

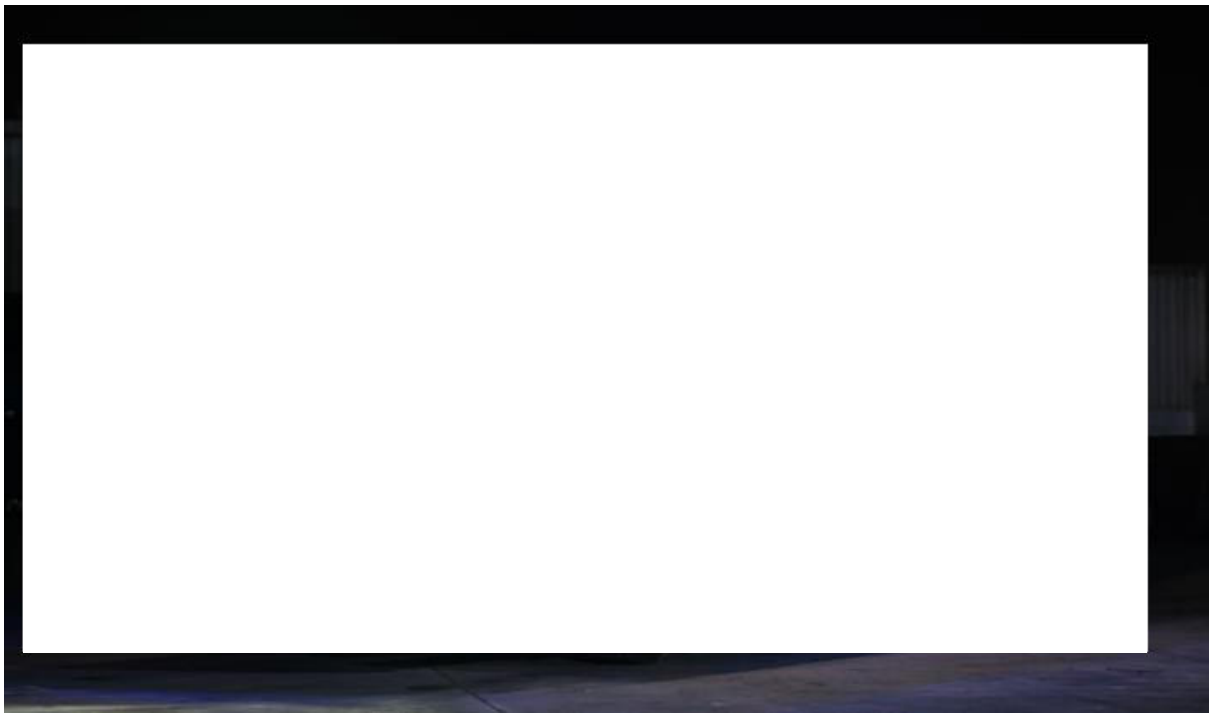


Fig 14: In our colours! prototyp electric bus to be showcased on Fastrack

Ambitions for wider Kent

Kent has the following ambitions related to this bid but outside of its Fastrack scope:

1. Spread BRT success elsewhere
2. Increase modal share and aggregate transport by "doubling down" on successful services
3. Bus electrification
4. Grow and level up the economy

Kent Ambition 1: Spreading BRT success

Fastrack Kent Thameside is considered the flagship bus operation of Kent. Its success attracted Dover to take on a 2nd Fastrack network, currently in development (approved). We anticipate the Fastrack model to spread further in Kent, as our existing success with BRT draws more interest from other areas trying to increase modal share of their buses and unlock Growth Without Gridlock. Next in our thoughts is

We think the Fastrack brand will also encourage more BRT schemes across the country, outside of Kent, and KCC often provide consultation and advice to other authorities (within the UK and internationally) given our expertise with BRT learned through Fastrack.

As part of our Bus Service Improvement Plan (BSIP) response to the DfT's National Bus Strategy, we will be providing an extensive response into the benefits of BRT as we know them, building upon the NBS's existing proposal to "support more bus rapid transit networks".

Exclusive BRT infrastructure provides the ideal environment for electric bus operation: there is less stop/start due to the fluid movement within the dedicated busways.

"…a game-changer for bus networks. It can deliver a large proportion of the benefits of rail-based schemes at much lower cost…
…BRT systems feature comfortable vehicles, fast journey times, real time passenger information and high-quality waiting environments. Costs are typically much lower than for rail- based schemes, owing to fewer engineering, planning and land acquisition constraints."

Bus Back Better (2021), p66

Kent Ambition 2: Increase modal share and aggregate transport demand

KCC wants bus patronage levels observed in the best performing areas to be replicated across the county. So as Fastrack performs so well, particularly compared to most other services in Kent, why should it be the focus of more investment?

KCC believes that by 'doubling down' on services that are currently performing well in terms of their patronage per capita (modal share) and growing this demand further, this will continue to shift the 'patronage frontier' and the overall percentage of county residents that seek public transport and other sustainable modes increases by default. New generations in greater volumes will seek out non-car alternatives.

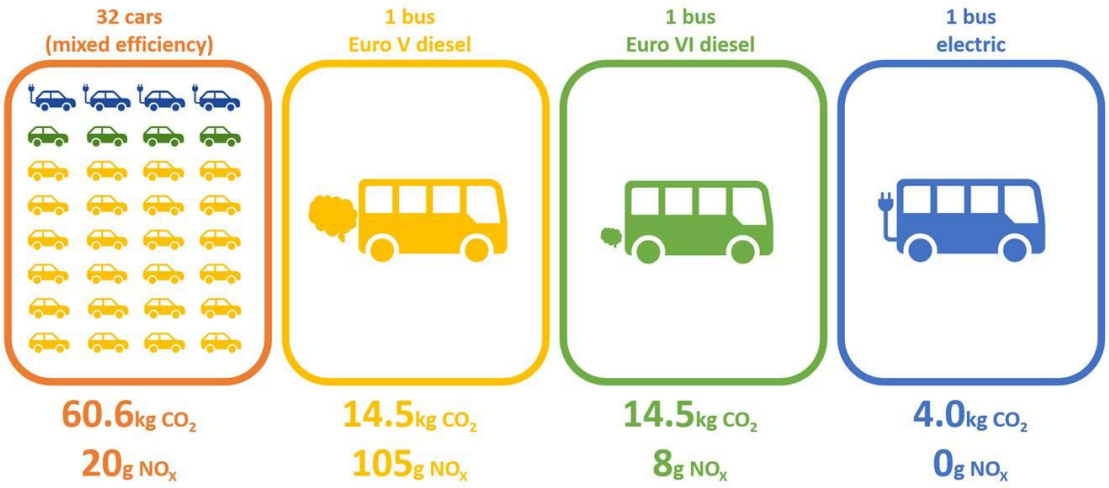


Fig 15: The impact of 50 people travelling 10km.
CO_2 and NO_x data from UK government's "Road to Zero" report.

Kent Ambition 3: Bus electrification

Aggregating transport has clear environmental benefits, even without electrification, as the infographic above shows. However, this point is not always appreciated by all.

Particularly in Dover, there has been outspoken concern around the introduction of more diesel buses, as these quotes from local residents and politicians show.

"I'd like to object to the proposed bus stop at [redacted] on the new fast track, the fast track appears at first glance to be a good idea but I have severe concerns, health related as to why there shouldn't be a bus stop outside my house. Can you tell me the best route on how to do this please?"

Quotation from local Dover resident from the 2020 Dover District Council consultation on Dover Fastrack, which indicate the use of Euro VI diesel buses. Subsequent engagement with the concerned resident revealed the health-related concerns were asthma and worries about air quality.

KentOnline

KCC's Green Party leader Martin Whybrow (Ind), who has called for the use of more environmentally-friendly power, such as electric and hydrogen, said: "Diesel can't fall into the category of ultra-clean, no matter how good it is."

He pointed out that KCC is working towards the UK national target of net-zero carbon emissions by 2050 and speaking to a panel of councillors, Cllr Whybrow said: "This is a really disappointing start to this service."

19 November 2020 article, following the 2020 Dover District Council consultation on Dover Fastrack, which indicate the use of Euro VI diesel buses.

KCC is concerned that this impatience with diesel buses is risking the success of public transport as a whole – and specifically Dover Fastrack – and therefore putting the environmental benefits of aggregated transport in jeopardy. The message on electric buses appears to carry much more weight in the public than the message on aggregated transport more generally.

ZEBRA investment for Fastrack is seen as the catalyst for an accelerated stream of interventions to reduce bus emissions on Kent's path to net-zero. KCC's Bus Service Improvement Plan, to be published later this year, will include a Low Emission Bus Delivery strategy.

"Buses are vital to ensuring the economy meets Net Zero carbon emissions and driving the green transformation. In congested areas, substantial modal shift away from the car will soon be needed if clean air targets and the Government's broader climate goals are to be met."

Bus Back Better (2021), p18

KCC wants 87% of buses to be electric by 2025, and 100% by 2030 (source: Kent and Medway Emissions Analysis and Pathways to Net Zero).

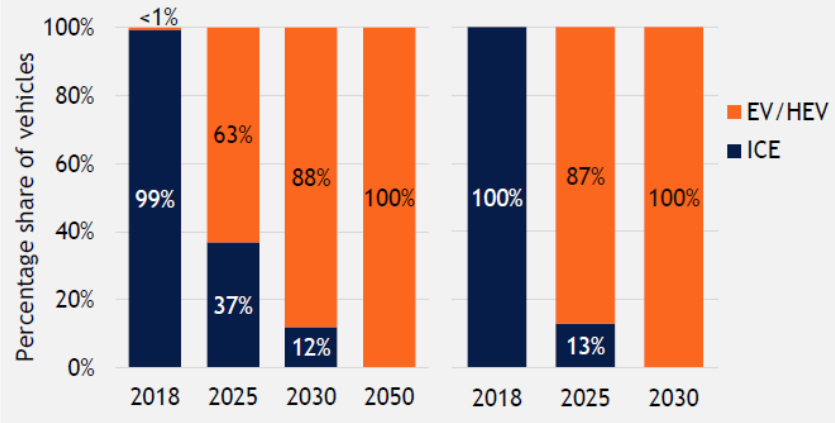


Fig 16: KCC targets for electric private vehicles (left) and electric public transport (right)

Kent Ambition 4: Grow and level up the economy

DfT STRATEGIC PRIORITY

Grow and level up economy

The later chapter on the Economic Case includes several Fastrack initiatives that support economic resilience, of particular note within Gravesham which was identified as one of four districts in Kent within the Government's list of 100 priority places for "levelling up" investment. The Fastrack ambitions include local apprenticeships, local recruitment advertising and staff transport, a new bus hub, and marketing of local businesses – please see the Economic Case chapter for more details on each initiative.

More widely in Kent, KCC wants to develop an understanding of zero-emissions technology and grow expertise – widening the ambition for this technology will create significant potential for new jobs and industry.

Kent Quality Bus Partnerships, evolving under our Enhanced Partnerships Strategy, are a platform for knowledge sharing across the county, with an open door for new technology companies and interested operators. This is a networking opportunity and business exchange platform for providers and consumers of new technology and services.

Ambitions within Fastrack

Aside from growing the Fastrack brand more widely in other areas of Kent, within the existing schemes KCC is still ambitious to continually improve. Fastrack ambitions include:

1. Go zero-emission and reduce fares
2. Grow the network
3. Improve service and customer satisfaction (+7% 'No improvement required' by 2024)
4. Grow modal share from 22% to 25% by 2025
5. Share knowledge
6. Encourage active modes complementary to public transport
7. Innovate

Fastrack Ambition 1: Go zero-emission and reduce fares

The 2021 National Bus Strategy placed a requirement on all Local Transport Authorities and Bus Operators to create a Bus Service Improvement Plan. Kent's BSIP will act as the vision for how we are going to try to improve bus services in Kent in the next few years.

KCC has an ongoing survey of Kent residents, to discover which areas of improvement to bus services should be prioritised as part of Kent's BSIP.

Fig 19: KCC Bus Service Improvement Plan

As the graph below shows, the highest three areas of improvement identified are:

1. More frequent services, running longer
2. Quicker journey times, bus priority measures
3. Improved reliability

What is noteworthy is that "better environmental standards" is very low down the priority list for this Kent-wide survey. However, Fastrack's own customer surveys directly contradict the wider Kent survey and place zero-emissions buses as one of the top priorities.

As Fastrack already delivers points 1, 2 and 3 above, our customers are fortunate enough to be able to consider "what next". However, there is clearly an issue in the county that needs addressing in getting residents to understand the value of investment in cleaner technology. This is where funding for Fastrack's electrification will come to the fore: KCC will have a clear example to use, reporting findings and sharing the message to educate other areas of Kent.

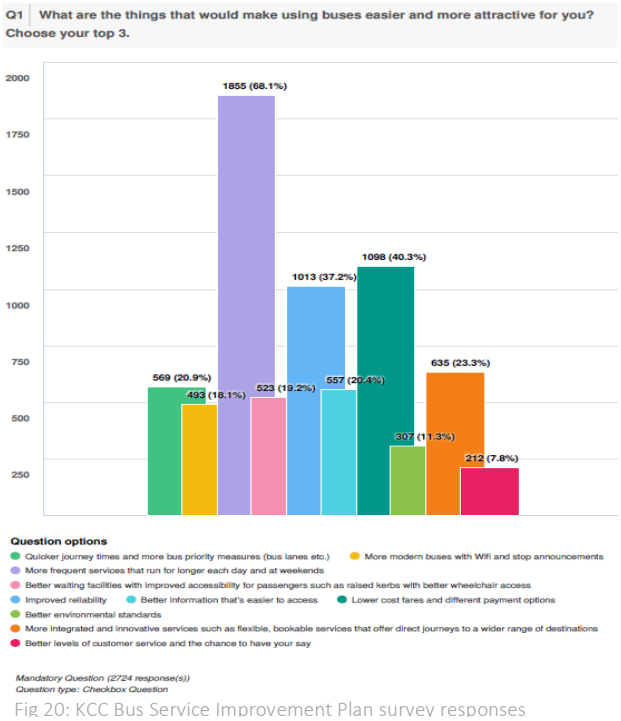


Fig 20: KCC Bus Service Improvement Plan survey responses

A summary of why Fastrack wants to go electric

- Make the most of ZEBRA funding opportunity now
- Cheaper operating costs from electric buses will give more space for reinvestment to maintain and improve the network, and financially allow Fastrack's continued investment in the wider network (for example Fastrack's bus stop cleaning regime covers other services too)
- With ZEBRA offsetting depreciation costs, electric operating costs would be lower; this would trigger a **fare review**, with a minimum ambition of a 2 year fares freeze and a targeted ambition of a unilateral fares reduction.
- Kickstart KCC's decarbonisation – we need something to pave the way
- Cleaner air. Dartford is one of Kent's most polluted areas. Later in this chapter, a section on Air Quality gives more details. Also, Fastrack's high-frequency service means that any emissions savings from electrification will be amplified versus quieter routes.
- Convince the public on electrification, as above.
- New jobs and apprenticeships in zero emissions technology within the Gravesham priority area for community renewal
- Learn for wider Kent benefit. Operator education.

Fastrack Ambition 2: Grow the network

Besides the new Dover service, continued development of the Thameside Fastrack service will establish a world-class rapid bus network to serve the Dartford, Gravesham and Ebbsfleet area. The existing Fastrack network has already proven popular with local communities, integrating the new developments at the Bridge, Crossways and Ingress Park areas of Dartford. Fastrack routes A and B have proved particularly successful and the 25km network now comprises 60% dedicated bus lanes or bus-only roads. However, there are significant areas where the buses still run on the general road network, causing significant delays to the system. Ebbsfleet Development Corporation are investing in completing new sections of dedicated Fastrack lanes to enable fast, frequent, reliable, and sustainable journeys and reduce car-dependency in the area. The completed network will bind together hubs and communities across the Ebbsfleet area and these public transport corridors will create the spine along which higher densities of both housing, employment and local facilities will be concentrated. Fastrack become a truly world class rapid bus system and maximise usage levels with the following attributes:

- A consistent, comprehensive, high-frequency service
- Varying priority along its route, but assuming the highest levels of segregation from traffic on dedicated roads. More than 80% of the system proposed will be on segregated routes.
- High quality bus stops and roadside infrastructure
- High quality vehicles
- Bespoke operating contract /arrangements
- Premium branding, promotion and marketing

Overall, the Thameside Fastrack network will connect all major development areas, providing a catalyst for further development, and could in time become an icon for Ebbsfleet.

The Ebbsfleet Development Corporation are work with developers and partners to complete the build-out of the missing sections of dedicated Fastrack lanes through the key development areas with maximum levels of priority and segregation.

Fastrack Ambition 3: Improve service and customer satisfaction

DfT STRATEGIC PRIORITY

Improve transport for user

Our recent Fastrack survey of residents around the Kent Thameside network showed a good general level of satisfaction, with 33% answering "no improvement needed". However, we are always keen to improve and sought feedback on the following possible service improvements, which are all being addressed:

Suggested service improvement	%	How are we addressing this
Improved real-time information at bus stops	63	In 2022 we are tendering for next generation RTI screens, which will be interactive and provide more detail including current performance levels and live reasons for service disruption.
More buses in the evenings	55	From 23 August 2021 Fastrack will become a 24 hour service.
More reliable journey times	48	Junction delay modelling – see image below. Reconfiguration of traffic lights, putting Fastrack at the top of the modal hierarchy.
Improved timetable information at bus stops	44	RTI as above. From KCC will assume production and deployment of all timetabling for Fastrack.
More buses per hour	43	From frequencies will be increased with the fleet expansion.
Extend the routes to other destinations	36	Significant network expansion underway – more details below.
Lower / more affordable fares	34	Fare structure is being revised from with simplified and flexible ticket products. With ZEBRA offsetting depreciation costs, electric operating costs would be lower; this would trigger a fare review, with a minimum ambition of a 2 year fares freeze and a targeted ambition of a unilateral fares reduction.
More buses at the weekend	32	From as above.
Less road works en route	27	We have implemented a "lane rental" scheme within the Fastrack network to discourage non-emergency roadworks from being conducted during peak service hours.
Faster journey times	25	Continuous parts of priority infrastructure are in development, including an exclusive Fastrack tunnel between Bluewater and Ebbsfleet Garden City that will yield a journey time saving of 3-4 minutes.
More space on board	13	The 2022 fleet specification will increase capacity requirement per bus.
Improved personal safety on bus	5	From the new contract will require a significantly greater presence of inspectors.
More comfortable seating	5	The 2022 Fastrack specification includes a new and improved seat model.
Improved parking facilities at bus stops	4	Through our MaaS work on compatibility with the wider network, we are looking at ways to negate the requirement for car interaction with Fastrack.
Buses start earlier / more buses on weekday mornings	4	Night service introduced in August 2021.

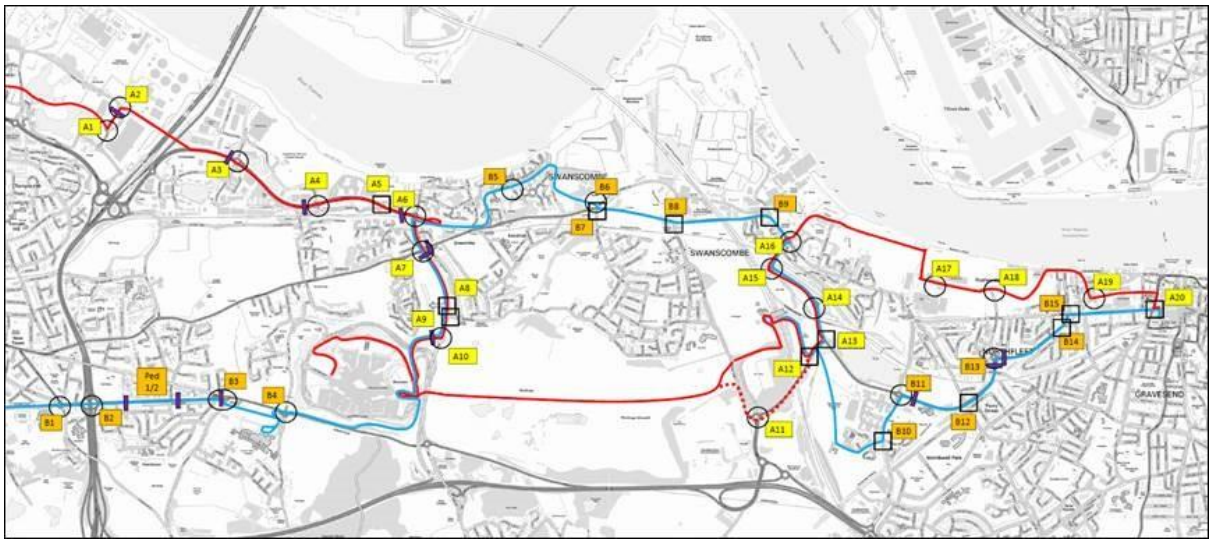


Fig 17: Junction delay modelling – where can journey times be improved?

An exclusive Fastrack tunnel between Bluewater and Ebbsfleet Garden City is to be built, starting 2021. It will yield a journey time saving of 3-4 minutes. As you can see in the diagrams below, the design for the new tunnel includes walking and cycling space. Walking and cycling facilities will be considered for all new Fastrack infrastructure, including a shelter replacement programme being tendered in early 2022.

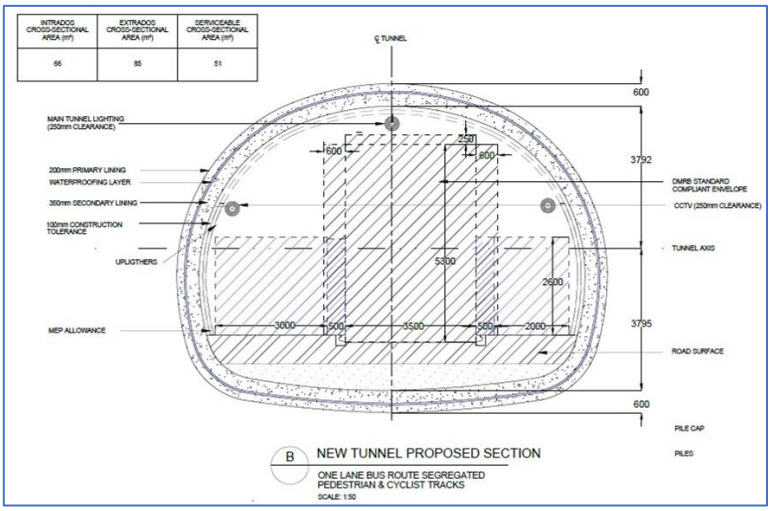


Fig 18a: plans for the new tunnel

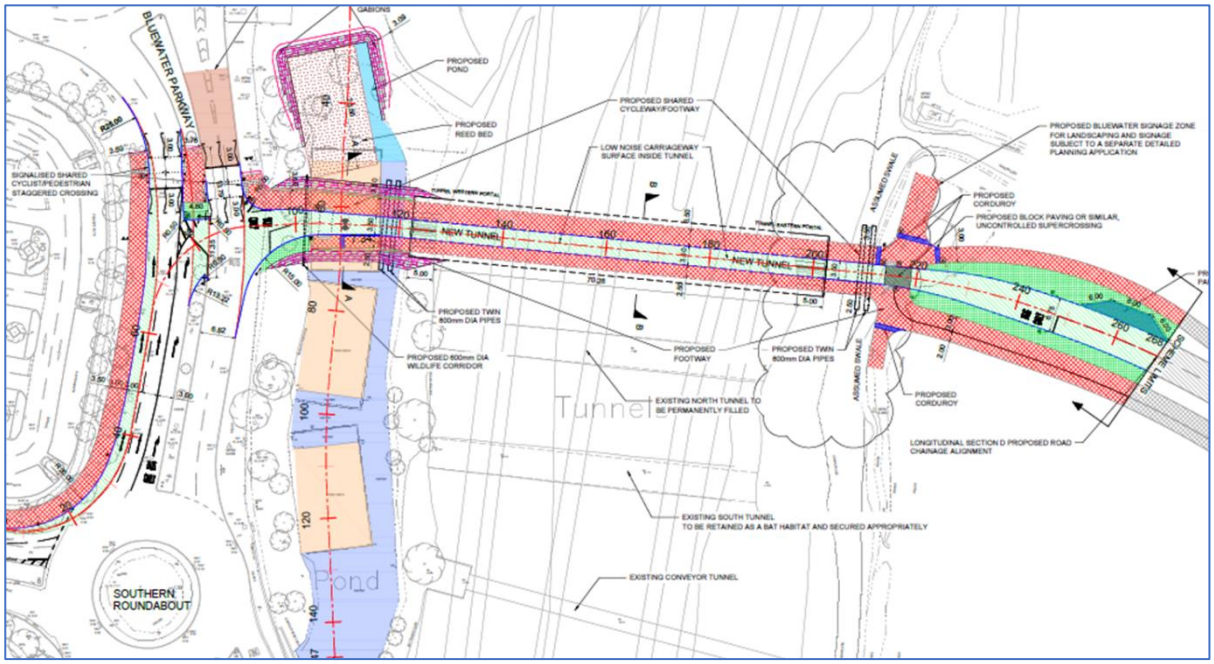


Fig 18b: plans for the new tunnel

Fastrack Ambition 4: Grow modal share from 22% to 25% by 2025

The current Kent Thameside network is the transport mode of choice for 22% of local journeys and is internationally recognised as a proven example of BRT. We are targeting a 25% modal share by 2025 in Kent Thameside – a quarter of all journeys made locally (within 500 metres of the network).

Fastrack Ambition 5: Share knowledge

ZEBRA CORE OBJECTIVE

To understand better the challenges of introducing zero emissions buses and supporting infrastructure to inform future government

An authority led, Zero-Emission Fastrack would unlock direct experience and insight. KCC will become well placed to work with our local operators to ensure further buses of the 4,000 committed by the Government are secured for other parts of the county. KCC will complement further investment directly by creating:

- Open Data Knowledge sharing for all Kent bus operators to inform investment decisions
- Workshops to help operators with financial modelling and business case structures
- A framework to contract the supply of vehicles, associated infrastructure, energy, and management platforms
- Additional (self-funded) ducting to bus stops where Fastrack pantographs would be situated, future-proofing potential expansion of opportunity charging.

Fastrack Ambition 6: Encourage active modes complementary to public transport

As part of KCC's regular benchmarking programme, in April 2021 we conducted an extensive public survey both on and off the bus within 500 metres of Fastrack. We asked what behaviours people may make to their lifestyles to improve their impact on the environment. Of relevance to this bid we asked:

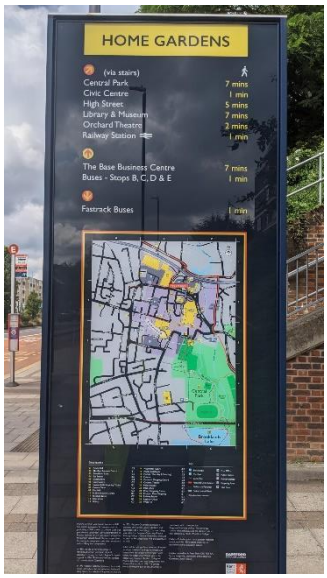


Fig 21: walking routes signposted on Fastrack

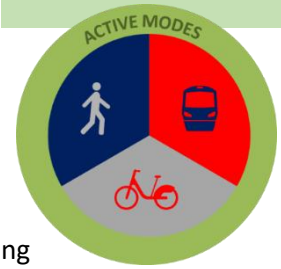
Would you use Fastrack instead of the car?

46% - I am already doing this

16% - I'm thinking about doing this

5% - I haven't thought about doing this

Fastrack is an active mode! On average, our customers walk just over 300 metres either side of a Fastrack journey, totalling 10 minutes of exercise per trip.



We are very clear that the local community understands the benefits that aggregated journeys have on the environment. By going zero emission with Fastrack we could push the environmental benefits even further and capture those considering more public transport use for more or all journeys, alongside walking and cycling.

Fig 22: newly installed cycle hire docks on Fastrack

Fastrack Ambition 7: Innovate

Fastrack's ideas around innovation deserve their own section, to be found overleaf!

BRT Innovation

As home to one of the UK's pioneering networks, KCC strongly endorses the DfT's stance on BRT. We estimate that that the implementation costs are 80-90% more cost effective than comparable rail schemes capable of equivalent passenger flows. BRT is also a nimbler deployment option than rail or tram in terms expansion and rerouting.

KCC is very protective of Fastrack busways, treating them as "tracks". Their exclusivity is upheld in all planning considerations and ongoing monitoring.

Although BRT is already seen as an innovative model, KCC is pushing the boundaries of innovation even further with Fastrack. A few innovations are laid out below.

"We want to stimulate innovation and enable it to thrive' (....) 'We want transport to be cleaner, safer, healthier, greener, cheaper, more convenient, and more inclusive."

Bus Back Better (2021), p52

Testbed for innovation

A 2022 autonomous shuttle trial is planned on the Fastrack network in Kent Thameside. Fastrack's busways are ideally suited as a testbed for this trial.

The main driver for this is the shuttle's potential as a partial service solution for "London Resort", a planned theme park in the area. Fastrack will form the heart of London Resort's local transport offering when it's live.

Fig 23: Plans for London Resort theme park

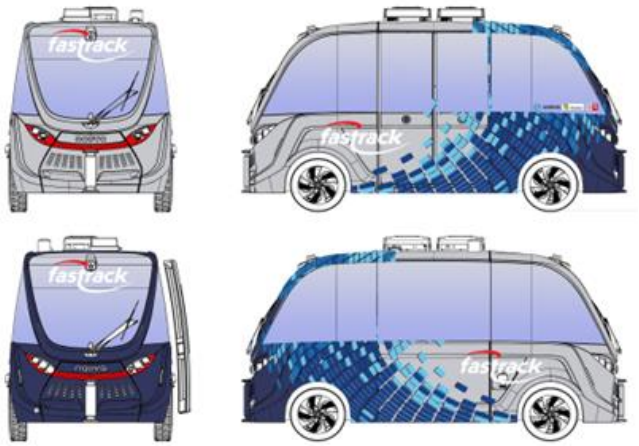


Fig 24: prototype designs for Fastrack autonomous shuttle

Blurring the lines between modes

Our Fastrack customer metrics show that our BRT network scores more similarly to light rail than bus in key areas. Significant uplifts are measured in satisfaction with 'stations', reliability and journey times. Perception of the unique offer is also fundamental to the success of BRT. Very few locals refer to the service as buses. Word trend analysis has shown the most common references are 'Fastrack' and to a lesser extent 'Rapid Bus'. 'Fastway' is even used more often than 'the bus'.

In Amiens, France, a local politician promised to install a tram service. Instead, after a cost/benefit and feasibility studies, they decided a BRT system was preferable and was deliverable within their political term. When the BRT system – or "BHNS" in French, for "Bus with a high level of service" – was installed, it looked almost like a tram and no political points were lost.

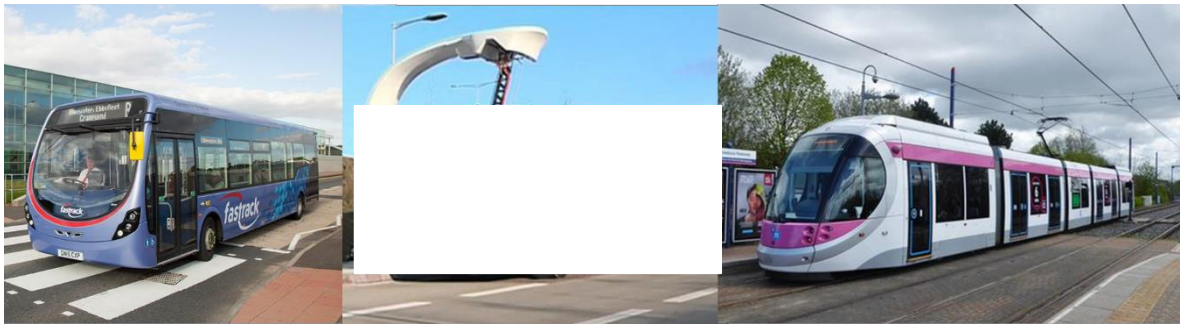


Fig 25: bus, tram-style bus, and tram

On-board experience

We recently asked our customers: “what do trains provide that Fastrack does not?”. The overwhelming response was, simply, “tables”. See below for a next-generation design and a cutting-edge onboard experience!

The 2022 Fastrack specification also includes a new and improved seat model.

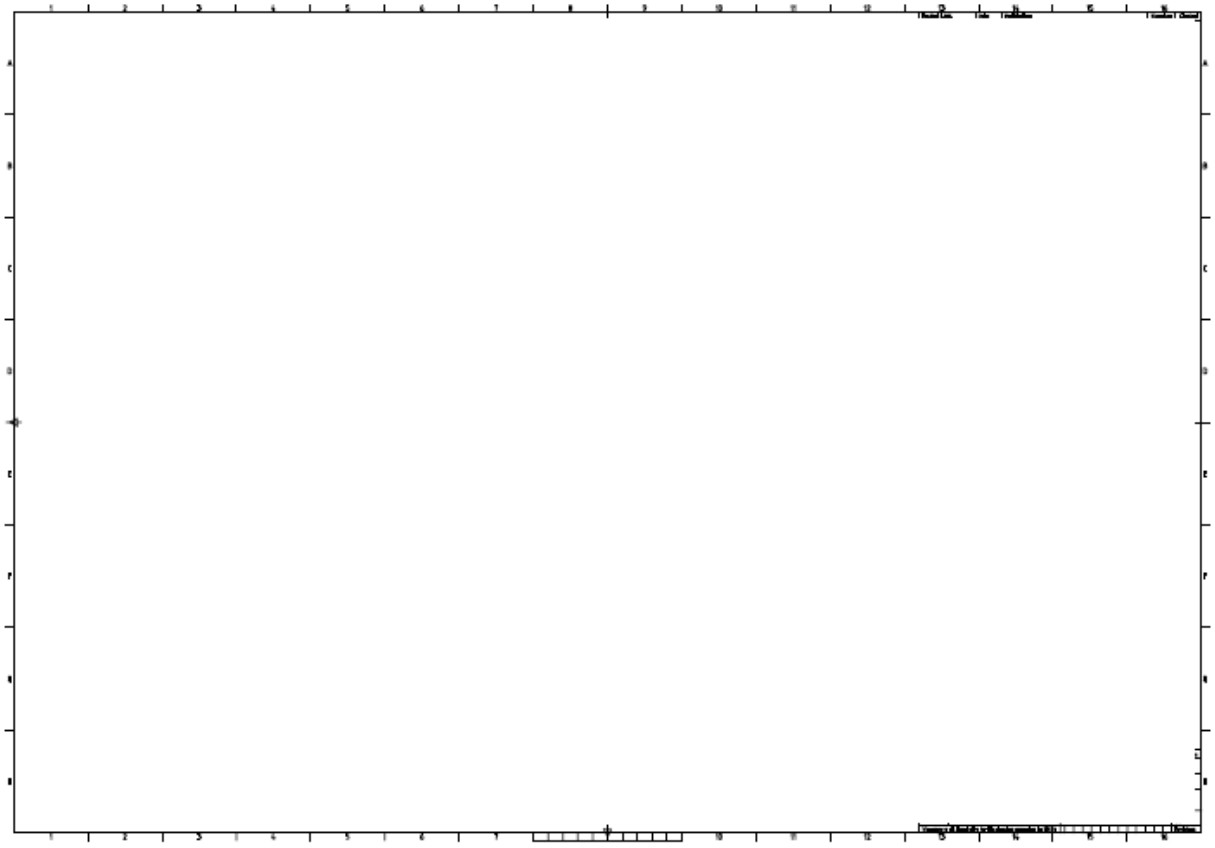


Fig 26b: onboard design with tables

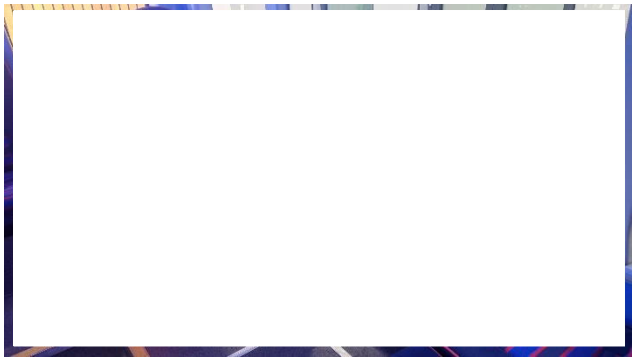


Fig 26b: onboard design with tables

Fig 27: new seats

Off-board experience

In 2022 we are tendering for next generation Real Time Information (RTI) screens. They will be interactive and provide more detail including current performance levels and live reasons for service disruption. They would also inform the public and users of the air quality benefits that the ZEBRA programme was achieving, in a relatable way.

Fig 29: next-generation RTI screens

Following the example of Essex County Council (and having completed mutual information-sharing workshops with them), the RTI screens will combine travel information with vetted commercial advertising. This strategy means they are largely self-funding.

Fig 28: existing Fastrack RTI screens

Elsewhere off-board, we are procuring "living roof" green bus shelters and planting our busways with environmentally friendly wildflower corridors. Please refer to the Air Quality section for more detail.

Stretch Target of 30 years: the Cableless Trolley Bus?

The average lifespan of a tram is currently 30-40 years. Based on conversations with operators, manufacturers, and engineers, KCC understands that, by electrifying buses on BRT, we can replicate this lifespan because:

- **Mechanically** there are fewer moving parts and accessibility is optimal, compared to fossil fuel vehicles.
- The **operating environment** of BRT, compared to other electric bus operations, is optimal as the networks are less congested and more free-flowing, leading to less wear and tear on the vehicles.

Longstanding conversations with manufacturers demonstrate that this is a shared view. Instead of shorter vehicle lifespans, the advice is that a regular, mileage-dependent refurbishment schedule should be implemented including battery replacement and technology upgrades.

A longer vehicle lifespan is naturally favourable from a sustainability perspective, with less production-line churn. Across different consumer areas, from fashion to furniture, the idea of reusing and repurposing goods – rather than disposal and replacement – is gaining a lot of traction.

KCC has sought the views of the on this topic:

Fig 30: Disposable consumer culture

Fig 31: Sir Peter Hendy's Euro VI 1960s Routemaster

"The move towards zero-emission and greater use of electronic telematic systems will give buses the potential for a longer life. Fewer mechanical parts and better interchangeability of propulsion components, as well as more accurate measures of wear, is key to achieving this.

Kent would only need to look a few miles along the Thames at the 1960's London Routemasters that only came out of service this year to demonstrate that, with good maintenance and refurbishment, a bus can last.

'Functional Obsolescence' occurs when the core vehicle cannot meet new standards or regulations. Accessibility to the bus through [PSVAR] has been the biggest driver to changing bus and coach fleets over the past 25 years and what would have retired the aforementioned Routemasters from public service had it not been for exemptions. Whilst there will continue to be innovation in software components for better accessibility, it is hard to see how more accessible a bus could become in terms of entering and exiting the core vehicle. Highway infrastructure is where the improvements can continue to be made in this regard. Whilst not accessible, Sir Peter Hendy's Routemaster RM1005 is a 1962 vehicle fitted to a Euro VI emission standard. Other than propulsion, the biggest changes to buses over the next 25 years are likely to be semi and full automation. As this is a developing area, it is not fully clear how vehicle design could be impacted but evidence to date shows that equipment is largely retrofitted and not reliant on vehicle design.

'Technical Obsolescence' comprises the bigger risks to a longer bus life lie. Parts and existing manufacturer support may no longer exist, and workforce skills could get lost. However, this risk can be mitigated through records of part designs and agreements to patents. Furthermore, written and visual evidence of manufacturing and engineering processes of components, as they change and evolve, mitigates loss of expertise.

Part of a net-zero strategy must seek to change a throw-away consumer culture without damaging the economy. Through careful planning, up-skilling and upcycling, a 30+ year life expectancy of a zero-emission bus is very possible."

In later chapters, the reader will see that a 30-year lifespan is a stretch target scenario for this bid's economic modelling. KCC sees this as a realistic and achievable scenario. However, since it is a somewhat untested model, we have included scenario modelling with other lifespans to illustrate the impact on the Benefit Cost Ratio. Please refer to the chapter on the Commercial Case for a description of the contract model relating to our expected 20-year vehicle lifespan (the "base case" of this bid upon which headline BCR figures are quoted).

Please see the Sensitivity Modelling section for the BCR impacts of challenging this assumption.

Through the procurement of the electric buses KCC would detail and create an **Obsolescence Management Programme**. This would include ourselves, the vehicle manufacturer, the operators and third-party equipment suppliers. The programme would include:

- A roadmap of the target lifespan and key intervals
- A 5-year general refresh programme to keep buses visually optimal (beyond warrantied elements)
- Technical specification of parts and changing intervals
- Bills of all materials used
- List of technical contacts
- Plan of required and possible upgrades
- Risk register for production and workforce changes
- Pricing forecast for new and existing components
- A recycling and sustainable disposal plan

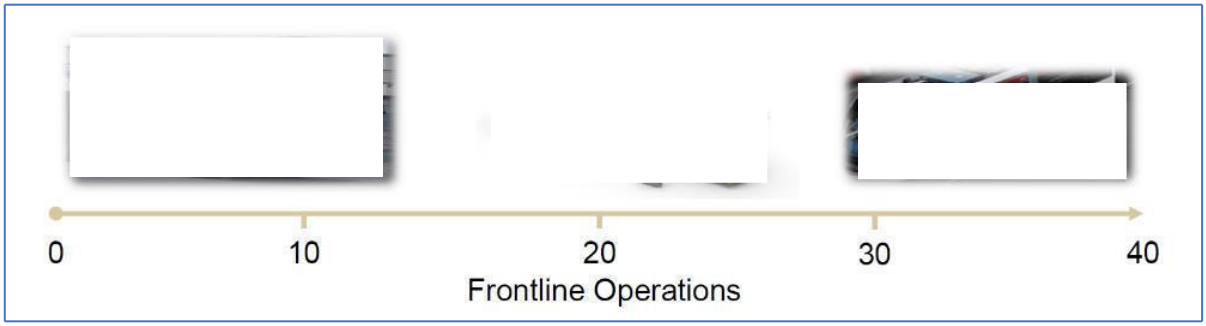


Fig 32: Source: Lifespans of diesel buses, electric buses and trams. Presented by at the 2016 National Air Quality Conference 10/11/16 QEII Centre, London

Mobility as a Service

KCC is currently developing a Mobility-as-a-Service platform, "Kent Connected", for which a pilot scheme will launch in Ebbsfleet in 2022, before a Kent-wide rollout.

Using Fastrack Kent Thameside as the cornerstone of the platform and building upon the Fastrack ticketing app, **Kent Connected** will organically and seamlessly link wider sustainable transport services into a single platform for affordable end-to-end journeys and connected real time information.

These links will expand our customer base with users from other services, and vice-versa widen the services offered to our existing customers.

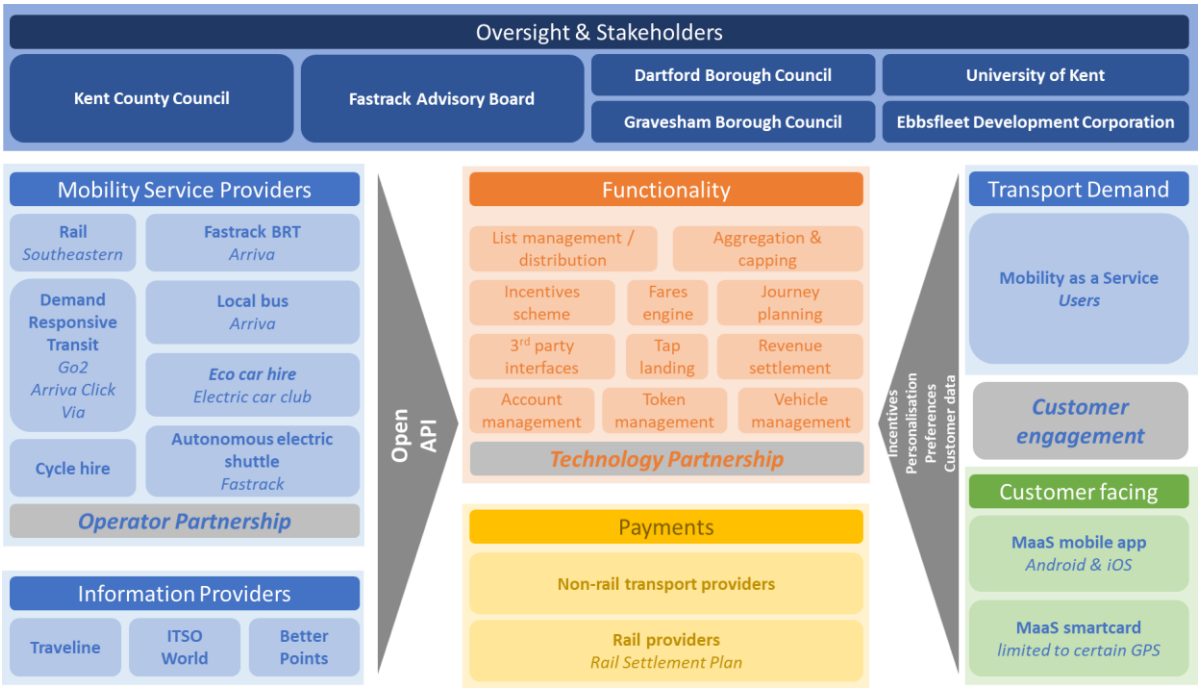


Fig 33: system architecture for Mobility as a Service platform

Ticketing app

As a foundation of Mobility-as-a-Service, Fastrack will shortly have its own mobile ticketing app. This will simply provide real-time information and timetables, ticketing options, and direct communication lines for issue resolution.

Fig 34: Fastrack mobile app concept

Covid Impacts and Attracting New Markets

The landscape of the UK's bus industry has changed following the COVID-19 pandemic. The resulting decline in bus patronage, and associated social and economic changes, are now beginning to be understood. With Fastrack, what had previously been a heavily used bus network has required significant public funding support, and the confidence for bus operators to invest in new buses has been compromised.

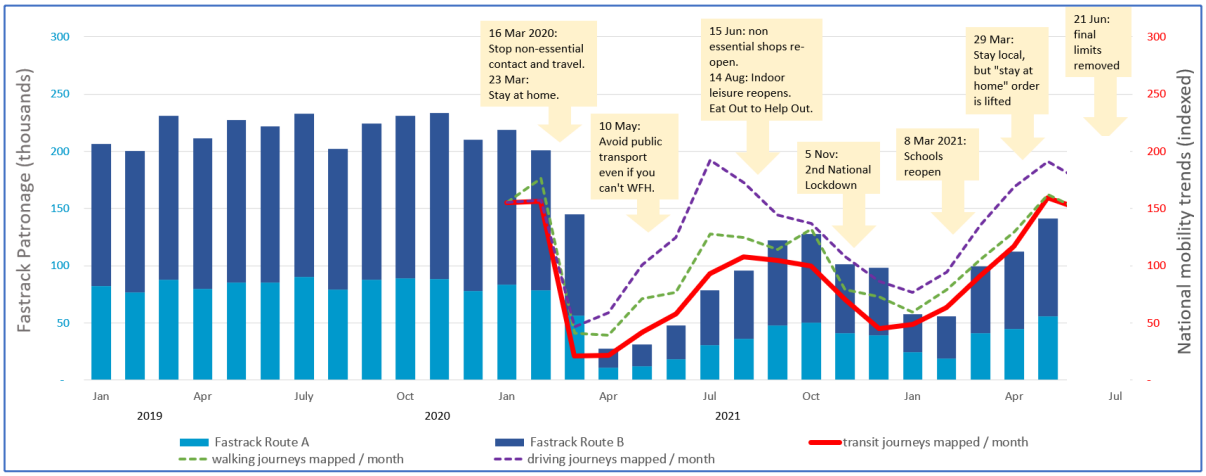


Fig 35: COVID restrictions and their impact on Fastrack patronage and national mobility (transit, walking and driving).
Sources: Fastrack, Apple Mobility Trends, gov.uk

Nonetheless, buoyed by the National Bus Strategy, KCC is cautiously optimistic about the future, particularly Fastrack.

This is why KCC will be moving to a 'franchise-esque' gross contract model for Fastrack. As Kent's flagship service, continued investment is vital to demonstrate the benefits of bus and a move towards zero emission operation.

There are specific projects afoot that should significantly grow patronage and expand into new markets:

- **warehouse in Dartford:** opening in August 2021, this is forecast to generate 1,200 passenger journeys per day on Fastrack Kent Thameside.
- **London Resort:** Fastrack is signified as the main transport partner for local journeys in and around the planned theme park 'London Resort', which is coming to the Swanscombe Peninsular from 2024 (subject to planning consent). Serving both staff and guests, this development for Fastrack could almost double the size of the Kent Thameside network. The planned network expansion is shown in the map overleaf.
- **Crossrail extension, AW2E (Abbey Wood to Ebbsfleet):** this is still in consultation.
- **Lower Thames Crossing:** development of this is ongoing. At worst, it takes away pinch-point traffic pressures on Fastrack in and around Dartford. At best, it creates potential new links to Thurrock and Essex.

Fig 36: Fastrack extension for London Resort

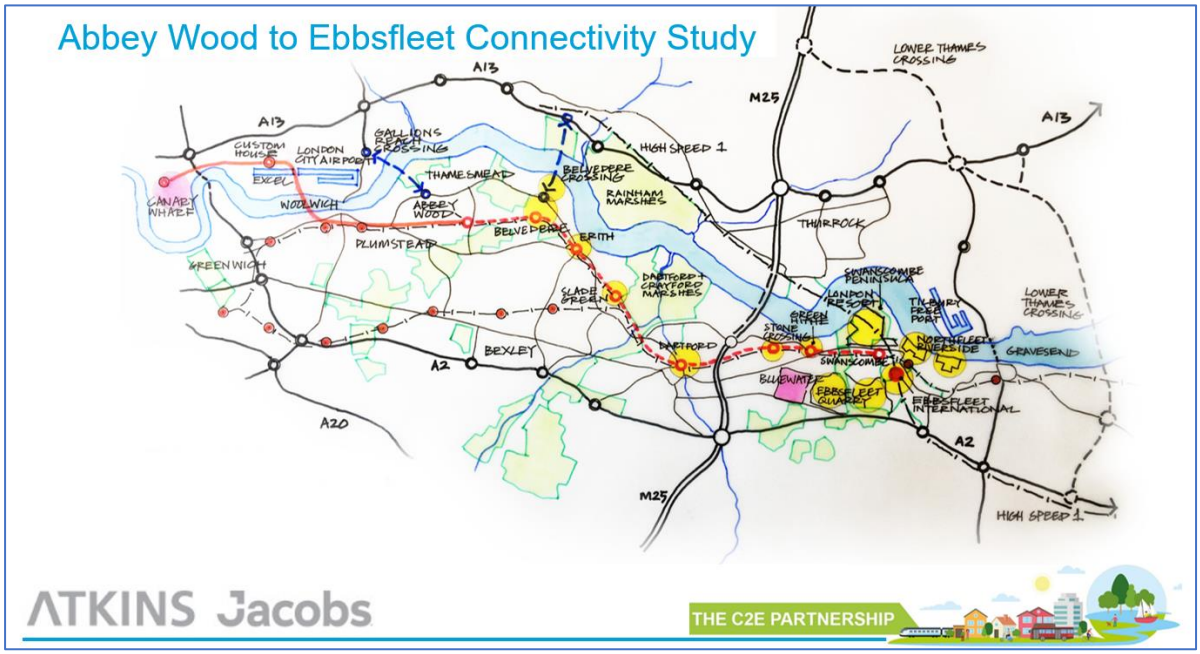


Fig 37: connectivity study for Crossrail extension

Ex Londoners and new homeowners

Part of Fastrack's winning formula is accredited to our neighbours, Transport for London and High-Speed Rail (HS1).

HS1 has made journey times from Kent so attractive and convenient that it has caused a migration of Londoners moving into the new homes built around Fastrack that link to HS1. These ex-Londoners are used to a comprehensive public transport offer on their doorstep and non-car dependency.

Fig 38: Londoners are used to public transport

Furthermore, new homeowners are an ideal target market for growing modal share. When people move homes, they must adjust their daily routines and travel habits, and it is therefore an ideal time to offer them a convenient public transport network and discourage them from investing in a private car. Fastrack's new-build housing developments (in Kent Thameside and Dover's Whitfield) mean the proportion of new homeowners is higher on our networks than in other locations.

Fig 39: new home, new habits

Environmental and Air Quality benefits

KCC declared a Climate Emergency in May 2019 and this has influenced what is in KCC's next **Five Year Plan**. There are seven key outcomes in the plan, two of which are highly relevant to our project:

- Outcome 3: Connected Transport and Communities
- Outcome 4: A cleaner and Greener Kent.

The diagram below is a rough illustration of the key decisions in public transport that can impact air quality and, ultimately, global warming and premature deaths.

In this section, we will go on to explain why the first decision in this tree (good vs bad public transport) is key – and the Fastrack premise of Public Transport Oriented Development (PTOD). We will then look at statistics showing how ZEBRA funding will go one step further to achieve the best possible outcome.

Fig 40: public transport decision tree for air quality

DfT STRATEGIC PRIORITY

Reduce environmental impacts

Road traffic and congestion

The primary source of local pollution is derived from road traffic vehicles. Air quality is heavily influenced by the strategic road network managed by Highways England and KCC. Achieving the necessary reductions in traffic on these routes and the knock-on effects they have on the local road network will be extremely challenging, but increased modal share for public transport is now universally acknowledged as crucial to improvement. Diesel is the most significant source of NOx emissions, which contribute to exceedances in the levels of NO2.

Poor air quality around Fastrack

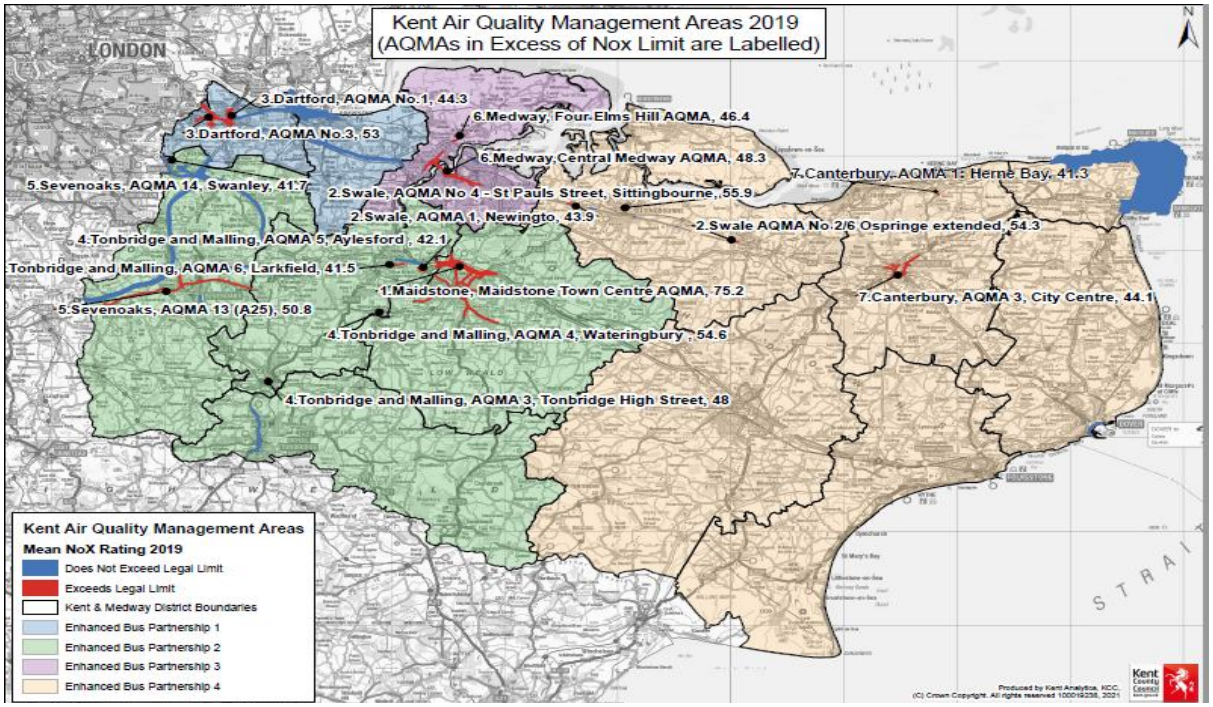


Fig 41: AQMAs in Kent

As the map above shows, there are Air Quality Monitoring Areas (AQMAs) near the Fastrack networks, with exceedances. Details on the latest AQMA readings are in the table below.

District by severity of air pollution	Dartford		Gravesham	Dover
AQMA areas breaching legal limits	Approach road to the Dartford tunnel	Dartford Town Centre & Approach Roads		
Annual Mean Nox µg/m3 Exceedances over the legal limit – Automatic monitors [2019]	44.3	53		
No2 Annual mean µg/m3 over the legal limit – diffusion monitors [2019]	8 locations: 54.6, 46,45.2, 44.3 44.0, 43.7, 41.8, 41.1		9 locations: 59.8, 49.5, 46.1,43.9, 43,7, 43.4, 42.9, 42.7,40.2	1 location: 40.4
1hr Nox µg/m3 exceedances	likely			
PM10 Annual mean monitored levels [2019]	32; 28; 24		22; 15	21
Exceedances of the annual mean objective for 24-hour mean objective for fine particulate matter (PM10) were predicted or actual	predicted			
Mortality rate (per 100,000) attributable to PM2.5 [2017]	19.4		16.6	17

Fig 42: AQMA readings for Fastrack areas

The table overleaf summarises findings from Kent Public Health Observatory's Air Quality Report, showing that particulate air pollution is sadly the third or fourth leading cause of premature death in some Kent districts, and in particular in Dartford, Gravesham and Dover.

Air quality as a cause of death

District Councils in Kent	Ranking of air quality in causes of premature death	"Indicator 3.01" – fraction of mortality attributable to particulate air pollution	Overall premature deaths per 100,000	% of premature deaths caused by particulate air pollution
Dartford	**3**	19.4	353.3	5.5%
Gravesham	**3**	16.6	322.1	5.2%
Maidstone	**3**	15.9	288.8	5.5%
Ashford	3	14.7	289.4	5.1%
Tonbridge & Malling	3	14.6	267.5	5.5%
Dover	**4**	17	340.9	5.0%
Thanet	4	20.1	395.6	5.1%
Swale	4	18.7	350	5.3%
Canterbury	4	15.7	321	4.9%
Sevenoaks	4	12.5	248.7	5.0%
Shepway	5	17.3	355.4	4.9%
Tunbridge Wells	5	14.1	267.9	5.3%

Fig 43: Air quality as a leading cause of premature death, Kent Public Health Observatory, Air Quality Report April 2018

Public Transport Oriented Development, modal share

Fastrack follows the principles of 'Public Transport Oriented Development'. This means that Fastrack is built around: developments are in close proximity to the network by design. As the modal share statistics showed in earlier chapters, for example "Ambition" within the Strategic Context, the modal share of Fastrack versus the car is strong.

As road traffic is often the biggest contributor to poor air quality in places where people live and work, it is the responsibility of Fastrack to be a good neighbour to mitigate the impact of our footprint.

Our plan is to further enhance the Fastrack network across more of Kent, as it truly represents a viable and attractive alternative to the private car. Through aggregated journeys, we alleviate both emission levels and gridlock. With a 22% modal share locally on the existing Kent Thameside network, and a forecast of 25% by 2025, our high frequency Fastrack network forms a critical part of local air quality by providing nearly a quarter of local journeys.

	Car	Rail	Bus
Kent district	**91%**	**4%**	**6%**
Dartford	**85%**	**6%**	**9%**
Thanet	**88%**	**3%**	**9%**
Gravesham	**89%**	**4%**	**7%**
Canterbury	**90%**	**3%**	**7%**
Folkestone & Hythe	**93%**	**2%**	**6%**
Dover	**93%**	**2%**	**5%**
Ashford	**92%**	**3%**	**5%**
Swale	**92%**	**3%**	**5%**
Tunbridge Wells	**91%**	**4%**	**5%**
Maidstone	**93%**	**3%**	**5%**
Sevenoaks	**91%**	**4%**	**5%**
Tonbridge & Malling	**91%**	**4%**	**4%**

Fig 44: current modal share of Kent commuter journeys by district

Carbon emissions and global warming

Beyond Fastrack, it is KCC's ambition as the local transport authority to only purchase non fossil fuel vehicles for any services contracted by the authority where KCC provides the vehicles or vehicle specific funding. KCC wants this ZEBRA fund to be the catalyst for this pledge and would not look back. Through the new National Bus Strategy, KCC hopes to have greater influence over the quality of buses in Kent generally and will use Fastrack for learnings and as an example of good practice.

In addition to the on-street air quality benefits, electric vehicles also demonstrate **well-to-wheel** greenhouse gas emissions savings. The trialled on Fastrack in 2019, on the then-renewable energy mix, ran the Low CVP Low Emission Bus test cycle of the time. The vehicle provided a near 70% saving compared to the equivalent Euro VI diesel vehicle. If green energy is used, a 100% savings can be achieved. If Fastrack Route A was converted to electric vehicle operation the following would be achieved in terms of on street air quality improvements.

Emissions- Fast Track A in Kent		Diesel - Euro V	Electric
CO_2 emission per route & year	Tonnes	545	0
NOx emissions per route & year	Kg	1 531	0
PM emissions per route & year	Kg	23	0
NMHC emissions per route & year	Kg	421	0
CO emissions per route & year	Kg	3 063	0

* Environmental impact according to EU directive 2009/33/EC

Fig 45: air quality improvements for Fastrack Electric compared to Euro V diesel buses, based on propulsion elements

Noise Reduction

Fastrack operates around the clock and frequently comes into close proximity of a very large number residential dwellings. Noise reduction is therefore of high importance.

In 2018 on the Fastrack Kent Thameside network, a noise comparison study was carried out on diesel and electric propulsion bus operations. Three aspects of noise were considered, and all of them had drastic reductions when using compared to a Euro V diesel bus:

- Exterior: 8 dBA less than diesel
- Interior: 8 dBA less than diesel
- Indoor: 15 dBA less than diesel

Notwithstanding some negatives of a quieter operation, which must be mitigated (see EQIA), the reduced noise pollution is an additional environmental benefit of an electric operation. It would further Fastrack's reputation as a good neighbour.

Options appraisal

Why Fastrack?

The sections above have separately demonstrated the need for zero-emissions technology in Kent, and the success and strategic importance of the Fastrack BRT networks. This section explains why Fastrack was chosen by KCC as the most appropriate recipient of ZEBRA funding:

- Fastrack is under the **contractual control** of KCC and KCC set the minimum specification for the vehicles and operation.
- With ZEBRA offsetting depreciation costs, electric operating costs would be lower; this would trigger a **fare review**, with a minimum ambition of a 2 year fares freeze and a targeted ambition of a unilateral fares reduction.
- KCC is a common denominator for residents, businesses and political **stakeholders more widely**. It's also worth considering KCC's operation of other fleets, for example gritters, which may be able to benefit from the electric infrastructure.
- KCC underwrites the contracts giving an extra layer of security for the funding's **longevity**.
- As a public body, KCC are also willing and obligated to **share information** freely without competitive motives for shielding.
- Unlike most bus routes contracted by local authorities, which require subsidy to operate, Fastrack is in fact wholly viable but is contracted because of its strategic importance to the road network. The **financial returns** make the additional capital costs for zero emission vehicles affordable via higher farebox returns.
- Fastrack is forecast to be the fastest growing bus service in the South East of England. With the confirmation of the fulfilment centre, and the prospects of London Resort and the A2WE Crossrail extension. By ZEBRA electrifying Fastrack, we would set a zero emissions **blueprint for the network**, and zero emissions would become the standard approach as the network grows.
- KCC believes that an increase in modal share of sustainable transport is most effectively achieved by **doubling down** on services that are already performing well, thereby amplifying a positive public perception of public transport and shifting the patronage frontier organically.
- **Cleaner air** benefits are greater if there are more journeys. Fastrack has high patronage and high frequency: the volume of diesel journeys being replaced is high. In August 2021, Fastrack Kent Thameside is becoming a 24-hour service, 365 days a year. Furthermore, Dartford is one of Kent's worst areas in terms of air quality; this also increase the impact of a switch to zero-emissions.
- **Public transport oriented development** equates to routes with high density residential areas – more homes passed to get noise reduction benefits of electric over diesel vehicle
- **BRT**: the government's national bus strategy "Bus Back Better" champions BRT. Fastrack could be a heralding example of BRT and ZEB combined.

- A successful business case must demonstrate a good **cost/benefit ratio**. Fastrack has significant patronage (£ per passenger journey) and significant mileage (£ per operated miles).

- **Timing** is favourable. Dover Fastrack is a new service and we are in the specification phase. Fastrack Kent Thameside is coming to the end of its current contract cycle and a new service specification is being designed for a service tender later this year. This for the new operation from 2022.

- Fastrack is considered **oven-ready**. Following a successful trial of Opportunity Charge operation in Kent Thameside in 2018, KCC had all the data and learnings ready to make this bid. We are confident it is the right option for the service.

- **Governance** is also a key factor. The Fastrack Advisory Board supports the bid and includes all the right partners required to implement the scheme. It includes KCC, local districts and relevant operators and suppliers.

- Fastrack has an established **brand**, wide community reach, and strong marketing platform.

- **Residents** in the new housing developments around Kent Thameside and Dover's Whitfield will be forming new habits as new homeowners. The opportunity for modal shift is therefore greater in terms of practicalities and timing. Furthermore, social incentives are higher for people establishing themselves in a new area: messaging like "Your bus is doing its part, are you?" can have a high impact on behaviour.

- While bids need to be led by transport authorities, a **financial commitment** is required by bus operators for ZEBRA. No other operators/operations came forward to KCC with any schemes. Some Quality Bus Partnership schemes were mooted but the timing was not right, or the financial commitment was not fully understood.

- A condition of the DfT funding is the **sharing of data and best practice**. Fastrack already partakes in international benchmarking activities and frequently hosts guests from all over the world looking to emulate our model. The team, therefore, is already set up for such engagement.

Why DC Opportunity Charge?

Several options have been considered for zero-emissions buses. In short, we trialled opportunity charging, and it worked. Nonetheless, since our initial trial of the opportunity charged bus, both battery-charge electric and hydrogen operations have also been trialled for Fastrack. Whilst both yielded good results, neither reached the benchmark set by the opportunity charge trial. Pantograph-down is preferred due to the weight of on-bus pantographs and energy efficiency impacts.

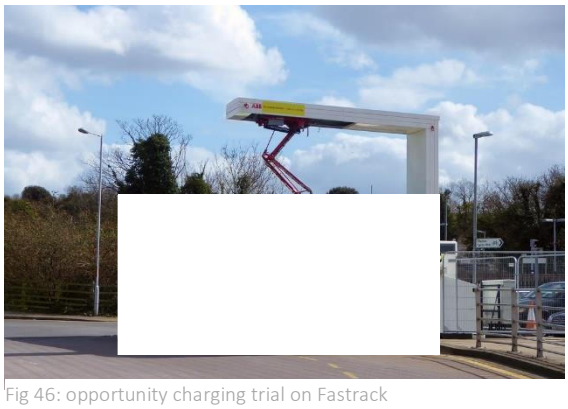


Fig 46: opportunity charging trial on Fastrack

The option of overnight battery-charge electric fell down on available range across the intensive operational day of a Fastrack vehicle. This shortcoming would only be further compounded by near-term plans for a 24-hour operation. The estimation of a local bus operator was that up to six additional buses could be required to fulfil the same Fastrack operation, using a battery-charge approach.

KCC's Hydrogen trial performed extremely well in terms of energy consumption and would not (by KCC's own calculations) require additional vehicles. However, our calculations for the vehicle and infrastructure capital costs , as well as ambiguous information provided relating to both the required infrastructure and sustainability of the energy supply chain made the prospect less compelling for Fastrack as it stands today.

ZEBRA CORE OBJECTIVE

To support bus manufacturers in the development of zero emission bus technology

In the 2018 opportunity charge trial, the energy consumption averaged on Fastrack was 1.17kWh/km, s best result for their For comparison, the city centre trial in Manchester achieved a 1.26kWh/km average. On Fastrack, the vehicle operated with only electric heating and the average speed was 11.4mph (including dwell time) compared to 4.8mph in Manchester. This demonstrates that the higher speeds achieved by dedicated busways on BRT improve vehicle efficiencies with this technology.

The energy consumption of the existing diesel buses on Fastrack A are 3.1litres/km. Currently Fastrack Route A's annual energy use from 207 kilolitres of diesel is 2063 MWh per year. Compared to the 634 MWh per year used by the equivalent electric buses, an energy saving of 69.3% would be realised.

Fluidity of movement and average speeds are a fundamental element of BRT, and the correlation between journey time and ridership have been demonstrated on Fastrack. An ecosystem exists where the cleaner the operation, the more passengers we attract.

have conducted research on behalf of KCC to demonstrate the efficiencies of various zero-emission bus options for Fastrack, simulating the operational scenarios. Opportunity charging has been shown to be the clear preferred option. Below is a snapshot from their analysis.

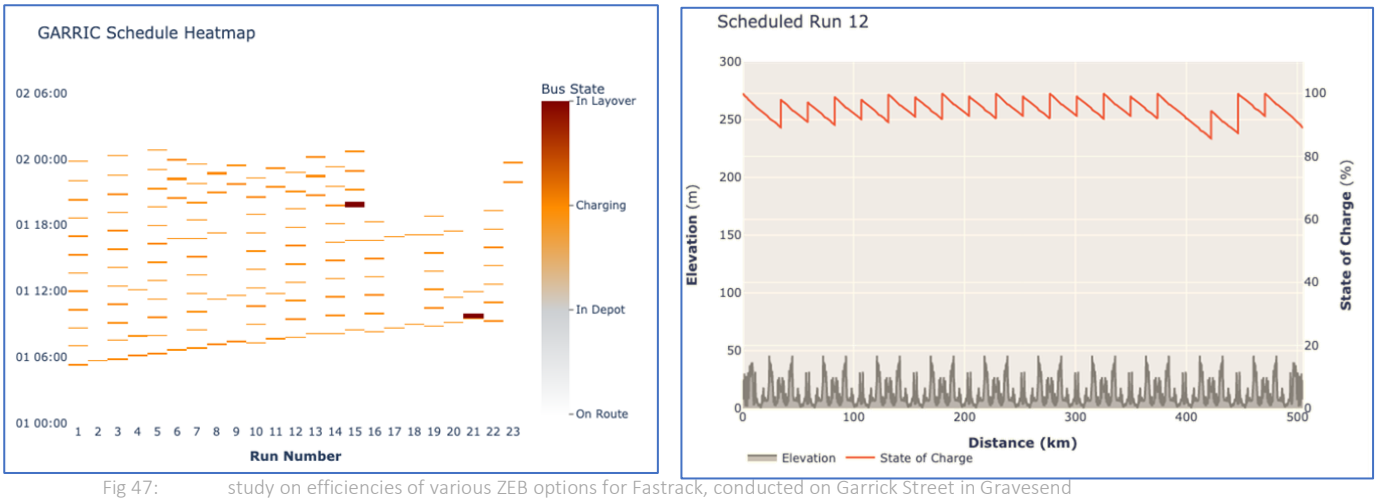


Fig 47: study on efficiencies of various ZEB options for Fastrack, conducted on Garrick Street in Gravesend

Monitoring and Evaluation

Please refer to the chapter on the Management Case for details on monitoring and evaluation, including that of air quality.

ZEBRA Scheme objectives

This chapter has laid out the scope of this bid in terms of place, customer and vehicles. It has set the strategic context for this bid, including the front-of-mind issues of air quality and harmony with the natural environment and communities. It has laid out the options appraisal process KCC has undertaken to finalise the practicalities of this bid. Finally, this chapter has laid out KCC's ambitions for Fastrack and the wider county, including innovation and attracting new markets.

Below is a recap of how some of these points relate to the ZEBRA scheme objectives.

ZEBRA core objective	How does KCC's bid achieve this?	References for more detail
To support the roll-out of the 4000 Zero Emission Buses that the government committed to in February 2020	33 electric buses will be delivered. Fastrack's electrification will be a knowledge-sharing example (through FUMEs working group) for Kent to increase the demand for ZEBs elsewhere.	Strategic Case: scope & place. Management Case: governance.
To support the government's commitment to decarbonisation and to reduce the transport sector's contribution to CO2	KCC wants 100% of buses to be electric by 2030. Fastrack is a key first step towards this. Under the Fastrack electrification project, we will educate local communities (school competition) – relatable terms and meaningful actions.	Strategic Case: strategic context; air quality; ambition
To understand better the challenges of introducing zero emissions buses and supporting infrastructure to inform future government	Working groups Develop supplier frameworks Monitoring and evaluation – log of activity, lessons learned Open data knowledge Feedback in partnership with DfT but also academic partners, researchers	Strategic Case: ambition; marketing Management Case: monitoring and evaluation
To support bus manufacturers in the development of zero emission bus technology	Opportunity charging trial testing Fastrack BRT vs Manchester for optimal performance Engaged with 6 bus manufacturers – conferences and workshops ODK workshops to help operators with modelling, framework to contract supply	Strategic Case: options appraisal Commercial Case: procurement strategy
To support partnership working between LTAs, bus operators and other local stakeholders as set out in the national bus strategy	Partners: letters of support show we've actively engaged with many operators, manufacturers and other stakeholders Fastrack Advisory Board (LTAs, districts, operators), KCC also has QBPs across Kent. Will commit to actively feeding into these to promote ZEBs vision and share lessons learned. FUMEs working group. BRT – working relationships with MIT in Boston, USA, Cardiff & Canterbury Universities, MARTA- ATL, USA, Turkey IETT – all learning from Fastrack in recent times	Commercial Case: procurement strategy Management Case: governance

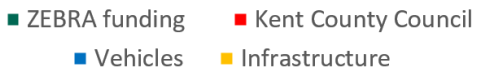
The Economic Case

Summary of funding requirement

The total cost of this scheme is £ m, of which KCC is seeking £9.5m under the ZEBRA scheme.

The total cost includes £ m for the purchase of **33** electric opportunity-charging single-decker buses and associated 15-year warranties.

The balance of £ m is for associated infrastructure, covering the supply and installation of **eight** on-street 450kw opportunity chargers and **six** secondary 50kw depot chargers.



Government funding under the ZEBRA scheme would allow KCC, financially, to get to an electric fleet now whilst not undermining the viability of continuing to invest in other elements of the network.

Without ZEBRA

Without the ZEBRA funding, Dover Fastrack would not be viable for electrification. This could jeopardise the Dover scheme's success as there has been significant public and political pressure locally to resist more diesel buses.

Whilst the Kent Thameside scheme could consider electrification independently, without supporting funds, the economic case is currently harder to justify for the capital investment, especially given competing demands for network expansions and improvement.

Greener Buses Model Outputs

The Greener Buses Model (ZEBRA Phase 2 version) has been used for this bid, and a copy of that spreadsheet accompanies the submission.

The benefit-cost ratio (BCR) from this tool is . This figure is based on an assumption of a 20-year lifespan, i.e. prudent compared to KCC's ambition for BRT electric bus lifespans (30 year preservation). If the standard bus lifespan of 17 years is used, the BCR would be If the 30 year lifespan is used (stretch target), the BCR would be

Please see the Sensitivity Modelling section for the BCR under more scenarios

The carbon impact from this tool has a present value of **£12.3m** (central carbon cost assumption). Under a high carbon cost (see sensitivity modelling section), this goes up to £18.5m.

Greener Buses Model Inputs

In the Greener Buses Model, for the cost of the zero-emission buses, we have used the lowest market quote we've received that meets our specifications for the service. This is £ per bus. Please note, this will be ratified through market-testing via a competitive tender. This cost is lower than the original estimates we used in our Expression Of Interest.

Please see the Sensitivity Modelling section for the BCR impacts of challenging this assumption.

The equivalent diesel bus cost is £ and under ZEBRA we are asking for

The infrastructure cost used in the Greener Buses Model are quoted from preferred suppliers, and , who are on KCC's Framework.

To calculate the annual mileage of each bus, we have used the sum-total of each service's planned annual mileage, and divided it equally across the 33 buses bid for.

.

To calculate the average age of the current fleet, we've used the actual fleet of the current Kent Thameside Fastrack service, and the age of the fleet serving the closest equivalent (sharing common route sections) current network in Dover, service 61.

Benefits not covered by the BCR / GBT tool

This section summarises some of the non-monetised benefits that are not reflected in the Benefit Cost Ratio produced by the Greener Buses Model tool, beyond that model's focus on financial factors, energy usage and emissions. These other benefits include noise reduction, biodiversity, socio-economic support for Gravesham – a priority area identified for economic resilience investment – and the advocating/exemplary role of Fastrack Electric in Kent's broader strategy to cut transport emissions.

Noise reduction

As noted in the section on "Environmental and Air Quality Benefits", under the chapter on the Strategic Case, the electrification of the Fastrack fleet will have significant benefits in noise reduction for local residents.

Biodiversity

Fastrack, perhaps, comes only in second place in the list of local treasures providing huge benefit to the environment. We share our network with another environmentally efficient group: the Shrill Carder bee. As the map below shows, Kent Thameside is home to one of the UK's largest populations of this rare species of bee.

To support the bees' work (and that of other vital insects), we are using our platform to promote the work of Kent's "Plan Bee" initiative, as well as the ongoing programme to plant all of Fastrack's busways with wildflowers which have been carefully chosen to be of optimal benefit. We are also committed to "green bus shelters" with living roofs, and we will be going out to procurement on this initiative in early 2022. We've also provided operational support for the 'school discovery' bus pictured below.

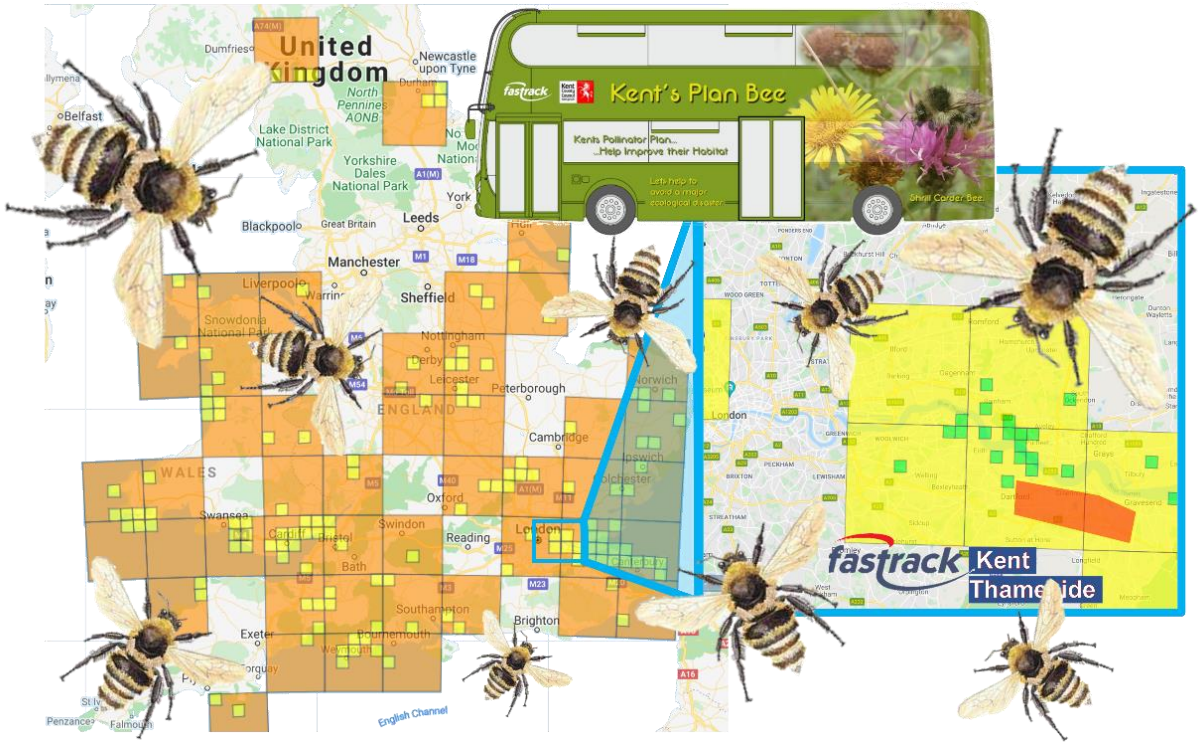


Fig 48: Shrill Carder bee populations in the United Kingdom. Source: NBN Atlas

Economic resilience for Gravesham (Priority 1)

DfT STRATEGIC PRIORITY

Grow and level up economy

Gravesham, a district directly served by Fastrack Kent Thameside, was one of four districts in Kent within the Government's list of 100 priority places for "levelling up" investment. This Government research took into account socio-economic characteristics to build an index of economic resilience.

Fig 49: Gravesend town centre within the Gravesham Priority 1 area for "levelling up" investment

Fastrack is supporting Gravesham in the four priority investment activities identified for the 2021 UK Community Renewal Fund, and the ZEBRA scheme would heighten these efforts further as follows:

- **Investment in skills**

As part of our service contracts for Fastrack, KCC will create nine local apprenticeships in zero-emission mechanical engineering and zero-emissions transport planning. These roles will be ensured by KCC if the ZEBRA bid is successful.

- **Supporting people into employment**

As part of an agreement to allow to use Fastrack to serve its new flagship fulfilment centre in Dartford for its staff shuttle bus, the buses should serve Gravesend (within the Gravesham priority area) beyond their traffic management plan's obligation of only serving Dartford. The arrangement will last until at which point s staff flows will be absorbed fully into the new Fastrack network. KCC has worked closely with on a marketing strategy for the /Fastrack bus service, and it has been agreed to promote local jobs on the buses/shelters. Local recruitment will grow Fastrack patronage. are particularly keen to encourage the ZEBRA electrification project.

Fig 50: bus shelter advertising jobs and Fastrack service

- **Investment in communities and places**

KCC has just broken ground on building a new bus hub in Gravesend town centre, within the Gravesham priority area. Fastrack is helping support the programme and has included maintenance elements within the existing service contract. The ZEBRA scheme would introduce additional infrastructure components and maintenance to the new bus hub, and therefore more investment directly serving the area.

Fig 51: Gravesend bus hub plans

"Strong bus networks connect our communities, getting people to jobs and services, giving them opportunities, and boosting economic growth and inclusion."

Bus Back Better (2021), p36

- **Supporting local businesses**

As part of Fastrack's new digital platform, which will include new RTI screens, on-bus information screens, and a ticketing app, KCC will be highlighting a "local business of the month" regularly in exchange for Fastrack passenger discounts at those businesses.

Contracts for services and materials on Fastrack will be sourced locally as far as possible. For example, KCC has just recruited a local company to apply the vinyls on the interim staff fleet.

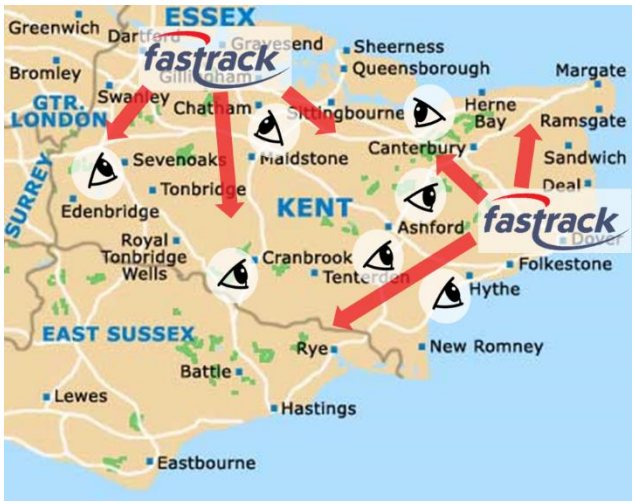
Fastrack's advocating/exemplary role in Kent's broader strategy to cut transport emissions

As shown in the Strategic Case, KCC's "Pathways to Net Zero" report targets 87% of public transport vehicles to be electric by 2025, and 100% by 2030.

Fastrack has long served as a shining example for public transport innovation within and outside of Kent. It is looked to for best practices and learning by example. It is entirely natural that Fastrack is the necessary first step towards Kent's electrification goals.

As a KCC service, with the authority as a common denominator, a halo effect will be created.

We fully expect a successful electrification of Fastrack to lead to more electrification projects in and outside of Kent, which is a significant non-monetised benefit.



Risks/uncertainties, sensitivity testing

The risk matrix below summarises key project risks and their mitigations. Sensitivity modelling is shown overleaf.

Risk matrix

Risk	Mitigation
Costs increase	The costs of the vehicle and infrastructure upgrades proposed to be delivered by KCC have been compiled using third party quotations and existing frameworks. Contingencies have been factored, such as 'unforeseen' costs arising from the power supply upgrades. Competition is a key element of Kent's Fastrack ZEBRA Strategy, driving best value on capital expenditure and stability with ongoing revenue costs.
As KCC is the accountable body for the grant, there may be a risk that DfT claw back funds in the event of non-delivery of outputs.	KCC will secure delivery though use of legal agreements and contracts with evaluated delivery partners and suppliers. As Fastrack is a contracted service, non-compliance would result in termination and a change of operators. Our EOI demonstrated the high volumes of bus operators keen to operate Fastrack.
Risk of KCC/DfT exposure to cost escalation.	Agreements with operators and suppliers will be to a capped financial value, negating exposure to KCC. As per the terms of ZEBRA, KCC commits to not returning to the DfT for more funds.
Operators do not deliver the intended service outputs	KCC legal agreements and contracts will ensure operational payments are appropriately aligned to delivery.
Risk to not being able to achieve the full match funding requirement from providers	Such a scenario may only occur where there is a lack of operator interest. Numerous letters of intent have been provided for all aspects. Furthermore, the operation of Fastrack will subject to a gross cost contract, ultimately resulting in KCC 'underwriting' the additional funding.
Contravention of state aid and subsidy control regulations.	KCC's programme has undergone an assessment by Invicta Law. Consideration has been given of the legislative implications in arriving at the chosen delivery model which is not considered to expose Kent to legal implications.
ZEBRA funding programme does not realise the intended benefits.	The main benefit of ZEBRA is unlocking Government and Private Sector investment in Zero Emission technologies. The measures detailed in our business case Explain how KCC be accountable for the sharing of data. Whilst our modelling forecasts a successful scheme, failures will be apparent to learn from.
Longevity of vehicles and obsolescence. Can a bus last 30 years, even with regular battery and component replacements?	This ambition is, of course, pioneering, and unprecedented (excluding the famous 1960s Routemasters of London). Nonetheless, the mitigation is quite simple. The Fastrack operating contracts would be let in two 15-year lots. At the point the new contract tender, prices would be mandated for either restoration and upgrade of the fleet or full replacement and disposal. Time relevant factors such as financial affordability and environmental costs would be evaluated.
Vehicles are not delivered on time	

Sensitivity Modelling

The figures throughout this bid are based on a "base case" of assumptions and outcomes, as detailed in the Greener Bus Models tool (GBT). However, we have conducted sensitivity modelling on several key assumptions to see how their variance may impact the project's Benefit-Cost Ratio (BCR).

The assumption we understand to be of most interest in this modelling is the lifespan of 20 years we are targeting for our electric buses. Whilst KCC understands this to be entirely realistic and achievable, it is noteworthy in how different it is to the ZEBRA baseline assumption of 17 years. For that reason, to aid comparability with other potential schemes, we have split our sensitivity modelling into four sub-cases, varying this lifespan assumption to show how it impacts the economics of the project:

- Base case: 20 years
- ZEBRA default: 17 years
- Prudent: 15 years
- Stretch: 30 years

The BCR under these cases (and modelled against all lifespans in between the cases) is as follows:

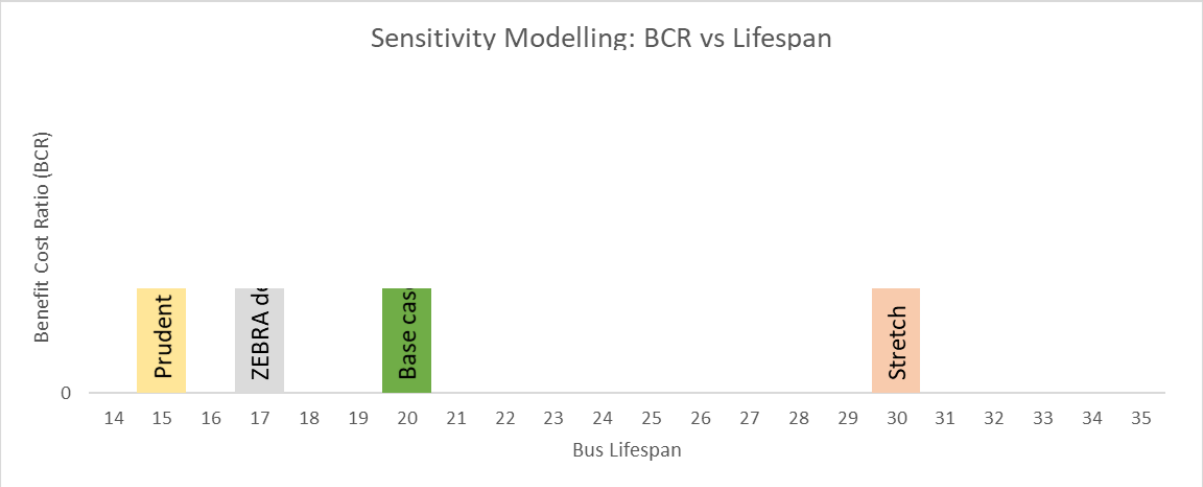


Fig 52: BCR sensitivity to bus lifespan assumption. Source: Greener Buses Model

Within each of the four cases above, we have then examined the impact on BCR of altering other core assumptions of our bid:

- **Cost of carbon –** impact of using a high cost (real non-traded) versus our central assumption
- **Energy costs** – impact of using ZEBRA defaults rather than our quoted rates
- **BSOG rates** – impact of the uplift in BSOG rate from 6p to 22p per km
- **Cost per ZEB** – our base case uses the lowest quote (for buses meeting our minimum specifications) we received from manufacturers. We have alternatively modelled the highest quote, to show the impact on BCR from the range of costs.
- **Infrastructure maintenance cost** – our quote from of £ pa is significantly higher than the ZEBRA baseline assumption of £50,000pa, so we have modelled this too.
- **Number of vehicles:** this models the BCR of a bid for 23 vehicles, rather than the 33 in our base case. If fewer vehicles are available, then each must undertake a higher annual mileage to meet the demands of the services. The higher mileage results in a higher per-bus

warranty cost as it significantly exceeds the (already generous) commercial warranty terms we have quotes for (maximum annual kilometres per bus).

- **Annual mileage:** given the ZEBRA baseline assumption is much lower than the Fastrack service demands (50,000 annu lometres versus our service mileage of around km), we have modelled this to show the difference in BCR. However, a lower annual mileage per bus requires a much larger number of buses to meet the service demands: 62 buses would be required rather than the 33 in our bid to reach the 50,000 annual kilometres assumption. We have also modelled a +10% mileage scenario (requiring 30 buses) and a -10% mileage scenario (requiring 36 buses).
- **Battery replacement costs**: Given that battery repair and replacement is included in the warranties we are looking to purchase, this is not a relevant scenario. However, we understand it is of interest to the DfT, and have therefore set up a dummy "zero warranty costs, battery replacement cost at 10 years" scenario instead to show sensitivities to +/-10% variance in a £ per bus battery replacement cost.

The impact on the project's BCR under these varying assumptions (cross-modelled against each of the four lifespan cases) is as follows:

			Total scheme cost £	Funding sought £	Funding %	BCR 20y	BCR 17y	BCR 15y	BCR 30y
	Base case as above (model A)			**9,525,229**					
Assumption	**Base case**	**Alternative case**							
Cost of carbon	Real Non-Traded (Central)	Real Non-Traded (High)		9,525,229					
Energy costs		ZEBRA default		9,525,229					
BSOG rate	22p (current ZEB rate)	6p (previous rate)		9,525,229					
Infrastructure maintenance costs		£50k (ZEBRA baseline)		9,525,229					
Cost per bus				10,651,354					
	lowest and highest quotes (meeting spec) to show range								
Fewer buses *needing higher mileage to fulfil service* *5y warranty per bus*	33 (28+5)	23 (18+5)		9,363,954					
ZEBRA baseline mileage 50k *more buses required* *5y warranty per bus*	33 (28+5)	50,210 62 (55+7)		15,513,204					
Mileage +10% *fewer buses required* *5y warranty per bus*	33 (28+5)	30 (25+5)		9,476,824					
Mileage -10% *more buses required* *5y warranty per bus*	33 (28+5)	36 (30+6)		10,049,904					

	Total scheme cost	Funding sought	Funding %	BCR 20y	17y	15y	30y
"Dummy" base case as below (model 6)		7,173,954					
Batt cost +10%		7,173,954					
Batt cost -10%							

Warranty / funding profile modelling

In addition to this sensitivity modelling, we have also summarised the total cost of the scheme, funding sought, and BCR (under our 4x lifespan cases) under the following changes of circumstance:

Fastrack as a revenue generator

Over the years, Fastrack has proved itself to be commercially very viable. It requires no operating subsidy. It is, however, contracted by the local authority in the deregulated environment of Kent, owing to its upmost strategic importance.

Fig 53: Fastrack revenue statistics. Source: Kent Thameside 2019

KCC will be retaining the farebox from Fastrack and paying the successful tendering operators a performance-based annual fee for operation.

Fastrack is a revenue generator for KCC. All revenue made is reinvested in maintaining and improving the Fastrack service, and complementary sustainability schemes such as walking/cycling.

The patronage for Fastrack's current network Kent Thameside is shown below. We anticipate that prior to full delivery of the planned network of Fastrack Kent Thameside (with increased routes and frequencies and the opening of Ebbsfleet Garden City), in the next year alone patronage will grow by around annual trips, largely generated by the emergence of the warehouse on the network.

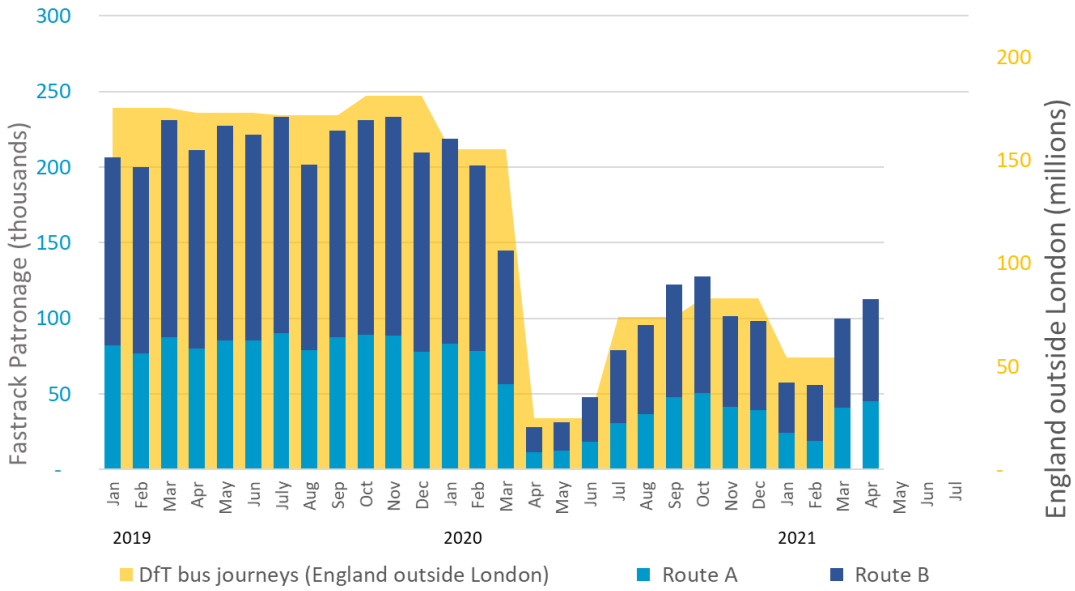


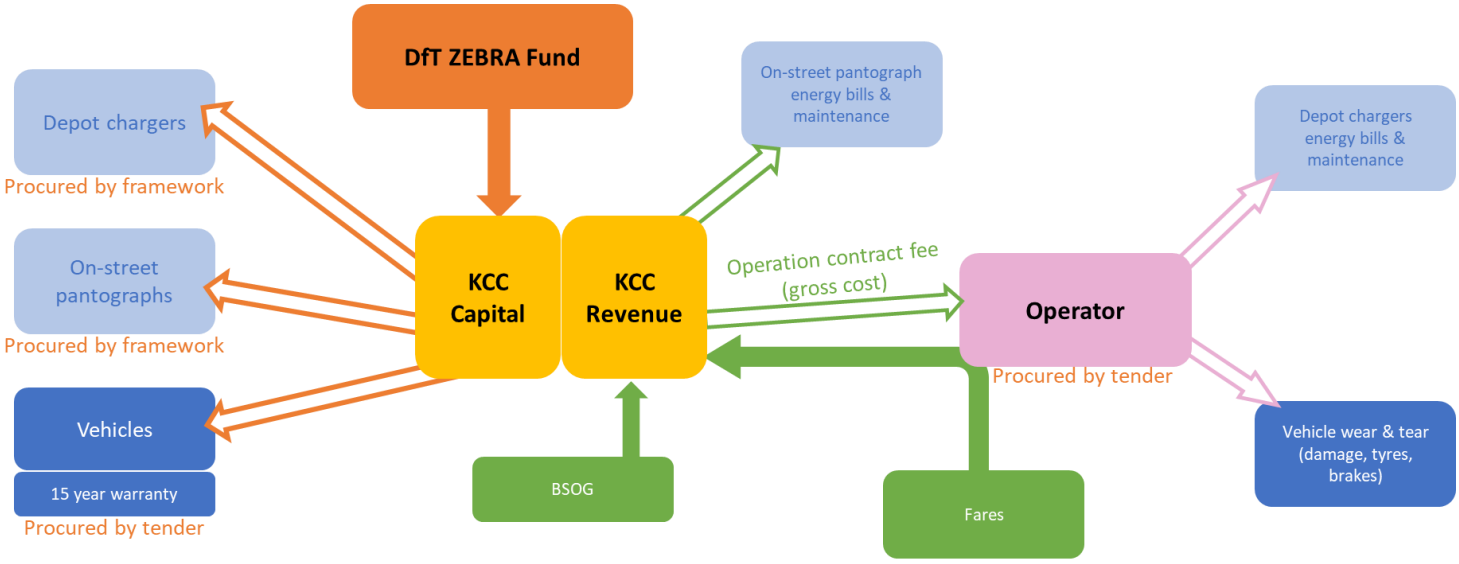
Fig 54: Fastrack patronage and national trend. Sources: Fastrack DfT

Payment Responsibilities

The diagram below lays out the cashflows related to this project, showing which party is responsible for various one-off capital expenditure costs and ongoing maintenance/charging costs.

The extended warranty will cover all major mechanical elements of the vehicles for 15 years, including battery repair and replacement. Details are below. Other vehicle maintenance (damage repair, tyre rotation, cleaning) will be the responsibility of the operator.

Charging "refuelling" costs will be covered by KCC for the on-street pantographs and by the operator for the depot chargers. Similarly, maintenance of the on-street pantographs will be covered by KCC whilst maintenance of the depot chargers will be the operator's responsibility. It is the expectation that operators will therefore use the on-street (KCC funded) chargers by preference, but the depot chargers will be available for emergency situations, top-ups, and for when vehicles have been off the road for long periods of time (e.g. for major repairs). Telematics will demonstrate that operators have charged the batteries in a manner that keeps operation optimal and within warranty terms. Whilst levels vary across manufacturers, a healthy opportunity-charged battery should be maintained at 75% and above.



15 year warranty*

Repair & replace:
- Batteries
- Transmission
- Drive unit
- Electronics
- Braking system
- Wheel suspension
- Steering
- Chassis, springs, shock absorbers, wheels (not tyres), body

Preventive maintenance
- Lubrications / fluids
- System checks
- External function checks
- Battery / drive chain checks
- Suspension checks
- Steering checks
- Under-vehicle checks
- Road test

*The above diagram illustrates the base case of paying for a 15y warranty upfront. Alternatively, the warranty can be paid for periodically from the Fastrack reserve account.

Current services

There are no agreed plans for **Dover Fastrack** to take over any existing services. However, if were to be awarded the contract, due to some commonality.

Kent Thameside Fastrack is a long established closed BRT network. However, the service does interact with other services at key interchanges. Three of these are Dartford Home Gardens (rail station), Greenhithe (for Bluewater) Rail Station, Gravesend Garrick Street Bus Hub. All three of which are the current proposed sites for the service Pantographs and associated infrastructure.

Super deduction

The super deduction that the Government announced in March 2021 has been considered.

The Commercial Case

Headline figures and summary

As discussed in the Strategic Case earlier in this bid, KCC has trialled and modelled several options for Zero Emissions Buses, including hydrogen and battery charge. The clear winner was opportunity-charging.

If KCC succeeds in this bid for ZEBRA funding, we will be procuring **33 electric opportunity-charging single-decker buses**. Each bus will have a minimum passenger capacity of 80 and will meet enhanced PSVAR standards for safety and inclusivity. Please see appendix C for the modelling behind the vehicle requirement of 33 buses.

For the associated infrastructure, we will be procuring eight on-street 450kw **opportunity chargers** and six secondary150kw **depot chargers**.

There are no interdependencies between infrastructure and vehicle procurement. These elements will be procured separately. Operators tendering for the operating contract will be informed of the on-street charging infrastructure and depot charging being made available.

Procurement arrangements:

- With the support of the ZEBRA funding, KCC will purchase the electric buses. KCC will own the vehicles and let them as part of the operating contracts. As detailed more below, the choice of bus will be through a competitive process.
- The infrastructure elements would be procured through the existing framework for opportunity charge infrastructure, where and have been identified as preferred partners.
- KCC will be responsible for the maintenance of the on-street charging components (pantographs) as well as the on-street pantograph running costs.
- Operating contracts will be separate for Fastrack Kent Thameside (from 2022) and Fastrack Dover (from 2023), and both fulfilled through competitive tender. The bus manufacturer/model (chosen by KCC as above) will be included as part of the tender specification.
- The successful operator would be responsible for the maintenance and running costs / power drawn for the charging units at their depot or operating base, and these units must be returned to KCC at the end of their contract.

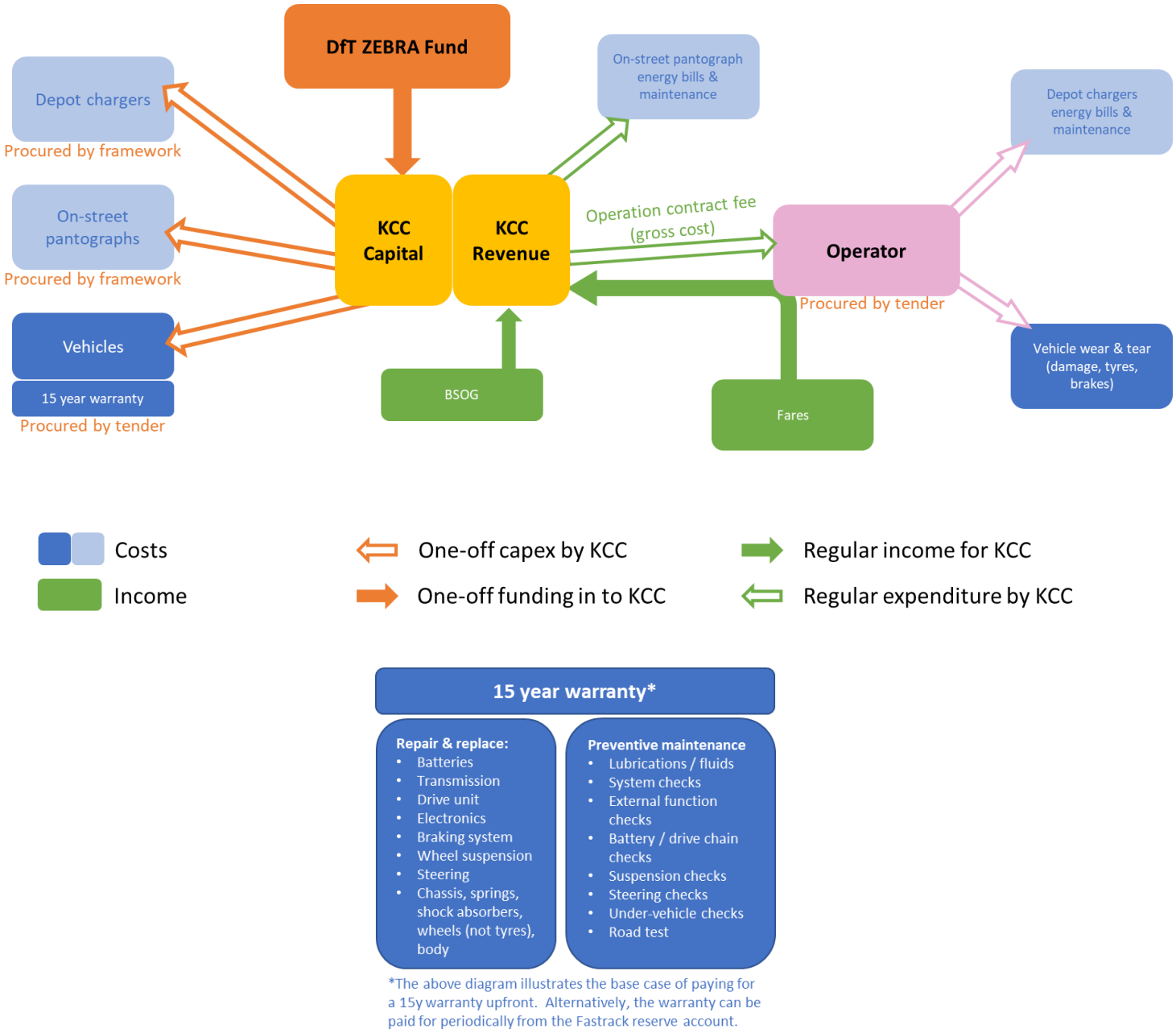
All components of this bid to be purchased have either been decided upon via KCC's competitive frameworks, or will be tendered for as part of a competitive process. KCC will run a tender for a preferred bus manufacturer, setting out a minimum specification. Through market research, we are confident that there will be a competitive pool of bidders. No bus manufacturer will be decided upon without going through a competitive tender process, compliant with the regulations as referred to in the Legal Statement. Once KCC has selected a preferred bus manufacturer, we will then tender for the operation of the Fastrack services, with KCC specifying which vehicle model will be let with the contract alongside relevant terms and conditions. It is KCC's ambition to have a consistent electric fleet across both Fastrack Kent Thameside and Fastrack Dover networks, which will have separate contracts and potentially different operators.

KCC has used the Procurement Framework for the infrastructure elements of this project. has provided the following statement:

" have already vetted the chosen suppliers for Fastrack Pantographs and associated works through a Tender evaluation process, making sure that the terms and conditions were appropriately designed to protect Kent County Council. The direct award chosen by Fastrack will save them time as well as money as they do not need to go through any lengthy tendering process as have already done the hard work."

are currently working with KCC on a framework for the Fastrack vehicles, including the creation of a new platform and linking to existing frameworks elsewhere.

The diagram below is an overview of the procurement and cashflow components of this project.



15 year warranty*

Repair & replace:
- Batteries
- Transmission
- Drive unit
- Electronics
- Braking system
- Wheel suspension
- Steering
- Chassis, springs, shock absorbers, wheels (not tyres), body

Preventive maintenance
- Lubrications / fluids
- System checks
- External function checks
- Battery / drive chain checks
- Suspension checks
- Steering checks
- Under-vehicle checks
- Road test

*The above diagram illustrates the base case of paying for a 15y warranty upfront. Alternatively, the warranty can be paid for periodically from the Fastrack reserve account.

Summary of engagement

Companies we have engaged with (in alphabetical order):

- **11 bus operators:**

- **5 bus manufacturers:**
- **3 energy providers**:
- **4 infrastructure providers:**

Procurement strategy for electric buses

Should KCC be successful in obtaining ZEBRA funding, in 2021 KCC will go out to tender (FTS) for the 33 electric opportunity-charging single-decker buses indicated in this bid. We will set out a minimum specification and requirements, for example each bus will have a minimum passenger capacity of 80 and will meet enhanced PSVAR standards for safety and inclusivity. We will base award on both price and quality.

A Prior Information Notice (PIN) went out in February 2021 indicating KCC's ambitions for a potential zero-emission operation as well as the new operating contracts for Fastrack.

Partners

In 2018, KCC formed a Fastrack Advisory Board with a range of partners (see "Governance Arrangements" within the Management Case for more details on FAB). This has created productive working relationships both at a senior level and officer level with the supporting cooperative Fastrack Working Group.

ZEBRA CORE OBJECTIVE

To support partnership working between LTAs, bus operators and other local stakeholders as set out in the national bus strategy

Numerous manufacturers, including and have actively shown an interest in being the preferred vehicle supplier for Fastrack. In partnership with bidding operators, they can tailor the service level provided so that KCC and the Fastrack operator can get the most value from the operation. For example, a full maintenance and battery package could be taken by KCC for the first 15 years during which the manufacturers would assist in the upskilling of the local maintenance staff, after this period KCC or the operator could then move to a parts and battery contract only.

A lot of our modelling work has been based on the opportunity-charge model, and their unnamed upcoming for which we are exclusively trialling at the end of 2021. KCC have affectionately named the prototype the We have also done a lot of modelling work with in relation to their However, there is no obligation or commitment from KCC to either or A full options appraisal will be carried out upon bids being received for the vehicles supply, considering both price and quality assessments. Our funding request is based on the best price KCC has received thus far which meets our minimum criteria. Should the price increase, it's understood that KCC would make up the difference.

Fig 55: hydrogen bus on trial on the Fastrack network in Kent Thameside, 2021

Vehicle range

The range of opportunity-charge buses is virtually unlimited. The superior efficiency is shown as follows:

Fig 56: energy efficiency

Battery life

Our tender requirement will be for the vehicle's batteries to have extended warranties of 15 years, to meet the length of the contract. Because BRT systems are less congested, more free-flowing environments, there is less per-mile wear on other components such as braking systems, and vehicles operating in BRT environments generally have longer lifespans. Our modelling gives us comfort that the batteries can cope with our operating model/frequency, having been based on the harshest winter conditions in which battery-powered vehicles perform significantly less favourably.

To make the most of the warranty of an electric bus's battery, it is important to understand the battery warranty contract. While every contract is a bit different, most battery warranty terms and conditions will refer to parameters such as battery temperature, State of Charge, energy used and full cycles. Onboard telematics will ensure that the preferred operator is operating the vehicles as efficiently as possible, with an eye on their longevity, and so as not to fall foul of the terms of the warranty.

Maintenance and contractual model

As laid out in the Strategic Case, we intend to operate a 20 year lifespan for our electric buses. This operating life will be split into a 15-year contract, then a further 5 or 15 if we think we can get to 30. Each contract start will be accompanied by a battery replacement and any other relevant vehicle upgrades.

The initial Fastrack operating contracts will run for 15 years in line with the warrant product.

Due to the intensity of the Fastrack operation, we will seek to conduct a partial refurbishment of the fleet every 5 years, and a full refurbishment at the 15 year break point. We will have 15-year extended warranties to match the high-mileage demands of the Fastrack operation on the vehicles.

From our market engagement, we understand that manufacturers are mostly factoring one battery change within 10 years for their warranty pricing based on our forecast mileage. However, it seems the expectancy is a change at around 10 years and therefore annual costs for this warranty aren't affected by going to fifteen. One manufacturer has claimed that 15 years rather than 10 creates a discount, as there is value in recycling the batteries replaced.

For the above reason, this is why we have confidence in a 20 year lifespan. The warranties keep the battery life to over 80% efficiency guaranteed every year. Therefore, in the worst case scenario for years 15-20 we accept degradation from 80% down to end of battery life.

However, at year 15 we will first evaluate whether refurbishing the vehicles is more cost effective than a replacement fleet. As per our 30-year stretch target.

In the event that an operator ceases operations or defaults on the contract, the vehicles will be returned to KCC.

Kent Thameside and Dover

We will be procuring the 33 buses as one exercise for Kent Thameside and Dover, rather than separately. Since these will be Kent assets, pooling between the networks is likely to become necessary to regulate mileage between the vehicles (Dover services having a lower intensity) to remain within warranty mileage limits.

"We will support the market to scale up by … ensuring that we support new funding and financing models needed to deliver our ambition, including new types of vehicle leasing and maintenance arrangements, as part of a vibrant financing strategy."

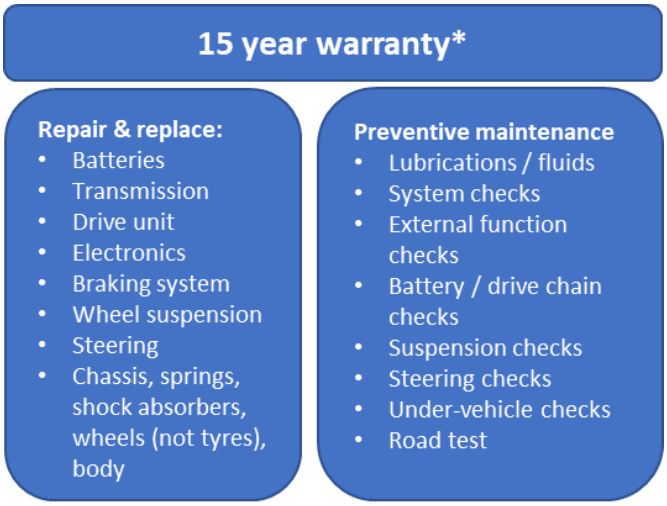
Bus Back Better (2021), p73

Warranty

Because of the intensity of the Fastrack operations, and resulting high mileage, we will be requiring extended warranties on the vehicles and their batteries to protect the high investment.

As part of our sensitivity modelling (see Economic Case) we have examined the impact on the scheme's Benefit Cost Ratio if we have an even more extensive warranty programme as required by a higher intensity operation for fewer buses, compared to the core base case of 33 buses. Fewer buses would give a much higher warranty cost per bus, albeit for a smaller number of buses.

The following warranty components have been discussed with multiple manufacturers and a consistent package is available. The 15-year warranty can either be purchased upfront, or paid for periodically from the Fastrack reserve account.



Fleet management

Fleet management would be covered by on behalf of KCC. The dedicated vehicle maintenance team maintains a fleet of over 400 vehicles for a range of public sector clients, including blue light services, local authorities, and county councils. The team ensures the safe, compliant and cost-effective maintenance of a wide range of vehicles, from cars to buses and road sweepers.

If Kent County Council directly obtained buses through ZEBRA, services would include:

- fleet management / rotation
- MOT services (overseeing warranted exercises)
- obsolescence management
- safety recalls

With over 50 years' experience in the industry and a long-standing supplier to emergency service fleets have built a strong reputation of trust and flexibility.

Procurement strategy for related infrastructure

Procurement

We will not be going out to tender for the associated infrastructure. We have already identified preferred suppliers through Kent's value tested framework. The requirement we put out under this was as follows:

"There is a requirement for an EVCP infrastructure that accommodates the power requirements and charging profile of Fastrack services. Infrastructure will need to be future proofed, taking into account service expansion as well as ensuring charge point hardware supports open protocol standards to allow flexibility of access and shared infrastructure opportunities to support increased electric bus future transition and wider community uptake. The opportunities will need to link and support the wider regeneration plans for the area allowing local communities to benefit from sustainable transport modes, access to charging infrastructure, local energy generation, support Zero Carbon plans and local air quality."

and were chosen through the framework.

The following additional components were identified for procurement:

- Installation:
  - Surveys
  - Pantographs CAT6 data/communication cable supply to power cabinet
  - Civils work
  - Electrical works – low voltage infrastructure
  - Electrical works – high voltage infrastructure
  - Project management / overheads
- 450 kW pantograph chargers:
  - Pantograph charger with integrated power modules
  - Commissioning (concrete bases, GRPs of substations and transformers)
  - Delivery
  - Maintenance
  - Warranty
  - Back Office
  - SIM card
  - LV Panels
  - LV tails to HV
  - LV supply distribution (including trenching and/or containment cabling runs)
  - On site facilities e.g. welfare, storage

Fig 57: technical drawing of proposed pantograph locations at Greenhithe Train Station

Installation

The eight charging infrastructure sites at Gravesend, Dartford and Dover are proposed to be installed by using their engineering team based in Kent. have extensive experience in delivering critical electrical infrastructure across the UK, which includes vehicle electrification projects (e.g. Bus Depots, Logistics Depots, Airports, Rail) and will coordinate with the following stakeholders to ensure timely delivery:

- Charge Point Hardware: Procurement, supply, installation, and commissioning of the opportunity charging equipment
- Civils sub-contractors – design, construction, reinstatement, permissions, traffic management

The final interface would be provided by

Chargers and location

No public consultation is required for the highway charging locations, however KCC will consult on the installation of charging infrastructure as good practice. Planning consent would be required for installation of charging infrastructure at the operating depots, and we will engage early with our borough partners via the Fastrack Advisory Boards to ensure a smooth and timely applications.

It is envisaged that the operators will seek the majority of the vehicle charging from the on-street chargers. It will be the operator's responsibility to pay associated electricity tariffs.

Six of the eight on-street chargers have planning consent and will be located at the ends of each route (example planning diagram below). The location of the other two are subject to understanding where the preferred operator for the Kent Thameside network will be based. The chargers would then be placed on the highway at an appropriate location relative to depots and route.

The six 150kw in-depot chargers will be used as additional top-up utilities, and for occasions such as when vehicles have been off the road for a length of time for maintenance and repairs.

We will be allocated specific wind turbines which will supply the electricity for all chargers. This enables us to demonstrate renewable supply.

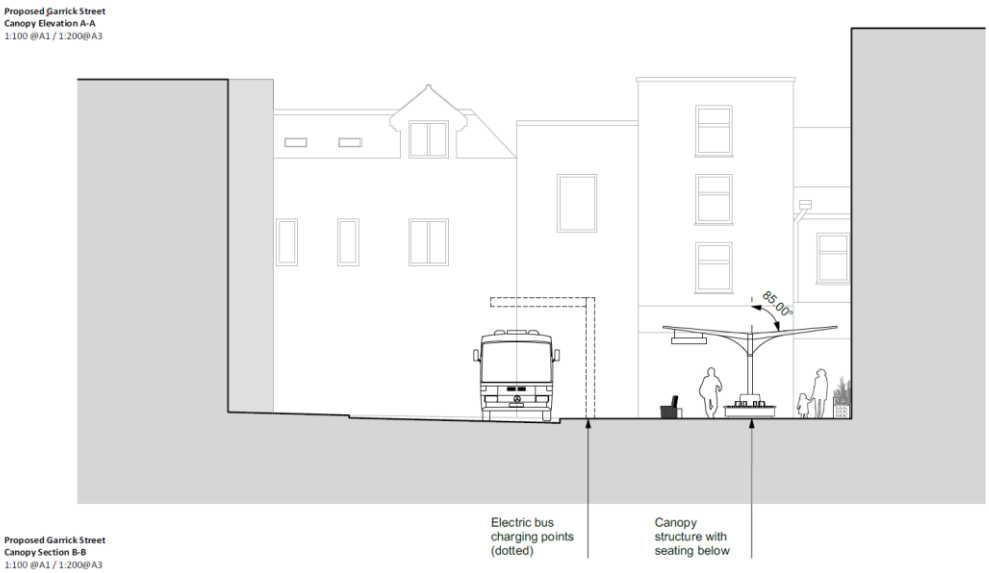


Fig 58: proposed pantograph location, Garrick Street

Renewable Energy Supply

We received the following "Renewable Energy Promise" from :

Fig 59: offshore wind farm, Kentish Flats

"All of contracts offer renewable energy as standard. Kent County Council can report zero carbon emissions produced while powering their electric buses in service, therefore saving nearly a tonne of CO2 emissions annually."

Delivery partners

Below is a summary of each of the partners, and that have so far been selected.

: overview

Chosen through the framework, electricity provider in the UK, currently supplying around half a million meter points UK wide. Electricity Infrastructure is core business, with the firm able to offer partnerships with Private Electricity Networks and Local Authorities to help design, build, invest and operate their electricity infrastructure. specialises in managing private electricity networks away for their owner, to ensure the efficient operation and reliance of the network in question. The company has delivered electricity networks for new developments across all construction industries, with the expertise gathered in this regard bringing efficiency savings to the development, installation, and operation of the associated electricity infrastructure.

key value identified

All of s fixed contracts offer **renewable energy** as standard.

Kent County Council and Fastrack can report zero carbon emissions produced while powering their electric buses in service, therefore saving nearly a tonne of CO_2 emissions annually.

: overview

Chosen through Framework, is one of the world's leading Intelligent Traffic Solution providers. The brand is a prominent supplier of electric vehicle charging solutions, ranging from through to ultra-rapid high use charging solutions. is a leading brand in opportunity charge pantograph technology and is able to offer pantographs from 150kW to 450kW through either a "pantograph up" or "pantograph down" solution. has a team of charger technicians which allows the firm to undertake charger maintenance over the infrastructure's operational life, as well as the physical infrastructure itself. has a partnership with for the cabling and installation work for the pantograph charging infrastructure. is an engineering firm specialising in the installation and project management of electric vehicle charging projects.

Furthermore, has worked with on a number of electrical infrastructure projects across the UK involving both buses and cars.

: key value identified

Whilst this would be the first deployment of high-power opportunity charging, their management team has demonstrated by far the greatest **understanding of Fastrack** requirements. has worked extensively with Fastrack with the 2018 trial, and has a deep understanding of the service itself. has comprehensive experience in bus engineering and was one of the prominent early commentators globally on opportunity charging.

clearly understands Fastrack's ability to yield best performance results for a global audience.

Software has been developed by that will fulfil the needs of KCC and the stakeholders to enable data to be provided to the Department for Transport through ZEBRA. The pantographs will be connected to their ' platform' that serves over 6000 chargers nationwide and will allow all stakeholders to readily access all relevant data.

Milestones and activities

- **2019 KEY APPROVAL:** Through KCC's Infrastructure Commissioning Board, it was agreed by KCC's Strategic Commissioner for Finance and Corporate Director for Growth, Environment and Transport that Fastrack would switch to a gross-cost mode

- **2020 KEY ASSURANCE:** Dover Fastrack public consultation.
- **February 2021:** Prior Information Notice was issued, indicating KCC's ambitions for a potential zero-emission operation as well as the new operating contracts for Fastrack
- **May 2021:** Following interest from the PIN, the Fastrack team engaged with 11 bus operators, 5 bus manufacturers, 3 energy providers and 4 infrastructure providers. These hour-long sessions both set out to the market Kent's intentions, and were an opportunity for KCC to learn best practices and practical considerations.
- **June 2021 KEY APPROVAL:** Fastrack Advisory Board and Dover Quality Bus Partnership both approved Fastrack's bid for ZEBRA funding for opportunity-charging electric vehicles and a gross cost contracting model.
- **July 2021:** it was announced that KCC had been successful in their Expression of Interest to ZEBRA scheme
- **July-August 2021**: Fastrack team ramped up the business case
- : If successful in the bid, infrastructure is commissioned.
- : If successful in the bid, KCC will tender for the 33 electric buses for Fastrack.
- : KCC will award the successful manufacturer with the contract to provide all 33 vehicles.
- : Tender will be issued for the operation of Fastrack Kent Thameside, as a gross cost contract.
- : Successful operation to be informed of their successful bid, and in partnership with KCC will begin mobilisation planning for the start of a 15-year operating contract for Kent Thameside.
- : Dover contractual arrangements are agreed.
- : Kent Thameside infrastructure delivery complete.
- : Vehicles delivered for Kent Thameside
- : Kent Thameside contract begins.
- : Remaining Dover vehicles are delivered. Dover infrastructure is completed.
- : Dover Fastrack contract begins.

25 . 01 . 08 . 15 . 22 . 29 . 06 . 13 . 20 . 27 . 03 . 10 . 17 . 24 . 31 . 07 . 14 . 21 . 28 . 07 . 14 . 21 . 28 . 04 . 11 . 18 . 25 . 02 . 09 . 16 . 23 . 30 . 06 . 13 . 20 . 27 . 04 . 11 . 18 . 25 . 01 . 08 . 15 . 22

Marketing plans for ZEB roll out

The Fastrack marketing strategy is fully funded by KCC.

Following collaboration with KCC's Marketing and Communications team, Fastrack's plan for the new electric fleet covers five areas:

1. Customer survey research
2. Behavioural change research
3. Communications and marketing strategy
4. Marketing and behavioural change campaign
5. Full launch event

Some of our current and planned marketing activities are below:

- We have developed a new Fastrack electric branding and livery, ready to go.
- We will issue free tickets to local residents to encourage them to try out the new buses.
- We will tour local schools to show school children the technology. There will be a competition for local primary schools, as shown opposite.
- We will engage local and national press as well as the trade press.
- We will use our new digital platform (on-board, on-street, and in app) to shout about the electrification.
- We will report on our screens the positive carbon impact each passenger is making by using electric Fastrack over private cars, and generally pursue a "feel good by doing good" strategy.
- The on-street pantographs will be visual aids to tell the electric story and signify to customers (and non-customers) that something new and different is in place. Our 2018 opportunity charging trial showed us that it was the presence of the charging units that stimulated the greatest awareness of an electric operation, not the "I'm electric" bus livery.

Fastrack Electric – schools competition
Who: Local primary school children
What: Children will write pledges to reduce their own carbon emissions alongside their new electric bus service's contribution.
Prize: The winners will be able to name a Fastrack bus, and they will receive a free year's Fastrack travel for themselves and a parent.

Fig 60: Fastrack Electric livery

Kent's bus operators

The table below summarises Kent's bus operators and fleet profiles:

Bus operators	Total buses	Min environmental standard	Highest environmental standard	Number at highest standard
	17	Euro 3	Euro 4	4
	76	Euro 3	Euro 6	26
	9	Euro 4	Euro 6	10
	17	Euro 3	Euro 4	8
	1	Euro 4	Euro 5	2
	5	Euro 4		
	17	Euro 3	Euro 6	152
	1	Euro 4	Euro 6	9
	1	Euro 4	Euro 6	11
	12	Euro 6		
	16	Euro 3	Euro 6	2
	17	Euro 5 or less	Euro 6	4
	10	Euro 4	Euro 6	8
	7	Euro 3	Euro 6	8
	13	Euro 5 or less	Euro 6	*
	21	Euro 5	Euro 6	14
	2	Euro 4	Euro 6	2
	1	Euro 0	Euro 6	7
	10	Euro 4	Euro 6	4
	2	Euro 3	Euro 6	1
	2	Euro 3	Euro 6	3
	6	Euro 3	Euro 5	3
	5	Euro 2	Euro 5	1
	54	Euro 6		
	1	Euro 2	Euro 6	1
	12	Euro 4	Euro 6	6
	83	Euro 3	Euro 6	78
	1	Euro		
	49	Euro 6		
	46	Euro 6	Euro 6	46
	1	Euro 4	Euro 6	6
	2	Euro 2	Euro 6	1
Euro 5,4,3,2, buses operating in Kent & Medway	**332**			**20**
Euro 6 buses	**161**			**399**
Total buses	**493**			**419**

Output Based Specification

The tender (more details below) will deliver a zero-emissions fleet with all the premium features that make Fastrack a cut above the rest, and answer the specific needs of our communities including items recognised through our Equality Impact Assessments and continuous customer surveying.

Each operating contract will be 15 years, to match the warranty offered on the electric buses. After 15 years, we will look to one of two options: (1) an additional 5 years for the vehicles to be put on other supported Kent contracts across the county, (2) a stretch target – an evaluation will be made to see if it is more cost effective to refurbish and restore the vehicles for another 15-year Fastrack contract or buy a replacement fleet. If option 1 is chosen, a local competition will be ran for local operators to bid for the vehicles, offsetting this benefit with improved subsidised contract costs (or equivalent at the time).

Both contracts for the vehicles and the operations will have clauses for recovery and transfer of operation. If the suppliers/operators fail or hand back contracts, KCC will have emergency provisions in place to reassign the assets and operations. As with KCC's existing contracts, it will be clear that conditions such as TUPE will apply.

Fastrack has conditional operator performance meetings every month. Through these, adherence to specifications and achievement of project objectives will be monitored. See the Management Case chapter for more details on governance and monitoring/evaluation.

Tendering

The tenders for the Fastrack Kent Thameside contract (to be renewed in 2022) and the Fastrack Dover contract (from 2023) will specify:

Operator:

- Route / mileage / schedules required
- Pantograph placements
- Data sharing requirements
- Warranty conditions and efficient/optimal use for reducing wear and tear
- Penalties for non-compliance
- Driver standards
- Fare conditions
- Contract length, mobilisation and closedown conditions
- Customer charter
- Project management resourcing
- Milestones and KPIs
- Operating base must be within 10 miles of the Fastrack network (key for pantograph placement)

Vehicle:

- Number of vehicles and type (single decker DC opportunity charging electric buses)
- Vehicle maintenance programmes (warranty terms)
- Vehicle capacity 80+
- Enhanced PSVAR standards, including: a second priority wheelchair space, marked space for assistance dogs, audible and visible route / next-stop announcements on board with loops, help/discreet panic buttons for passengers
- Electric ramp(s)

- Telematics and system specifications
- Branding requirements
- 15 year warranty

Localism and SMEs

localism is a crucial element of the Fastrack strategy, and we will use local SME businesses where possible for the civil works and have made a commitment to similarly use local businesses, for every other possible element. For example – producing and fitting the new livery vinyl. Likewise, have an extensive directly employed specialist consultancy, design and engineering delivery workforce employing a SME sub-contractor supply chain and will use local sub-contractors for the delivery of this project.

The Financial Case

Funding profile

The total cost of this scheme is £ m, of which KCC is seeking £9.5m under the ZEBRA scheme.

The total cost includes £ m for the purchase of **33** electric opportunity-charging single-decker buses and associated 15-year warranties.

The balance of £ m is for associated infrastructure, covering the supply and installation of **eight** on-street 450kw opportunity chargers and **six** secondary 150kw depot chargers.

Commitments for funding

KCC will ensure funding of the £ m not covered by this ZEBRA bid. Through KCC's Infrastructure Commissioning Board, it was agreed in 2019 by KCC's Strategic Commissioner for Finance and Corporate Director for Growth, Environment and Transport that Fastrack would switch to a gross-cost model, with KCC provisioning the service's required assets from 2022.

Our previous Expression of Interest, and the statements of support in this bid's Appendix B, show how a multitude of operators have shown interest in being involved with a ZEBRA-funded electric Fastrack. Under KCC's Fleet Management process, the successful operators of the Fastrack services will be committed to general maintenance and upkeep of the vehicles, brakes and tyres etc, but these elements do not form part of our bid.

For the infrastructure match funding, please see appendix B for investment commitments.

Please see the GBT attachment for a breakdown of cashflow by year.

Revenue

Currently KCC receives a £ departure fee per trip for Fastrack Kent Thameside. We expect to achieve a better return through a gross-cost contract and KCC directly taking over the farebox. However, based on the current contract where the operators submitted their vehicle depreciation costs, we are more than comfortable that electrification of the Fastrack fleet would be affordable with ZEBRA's contribution. This has been further enhanced by the recent announcement of a 22p/mile BSOG payment. See Appendix C for BSOG sensitivity modelling.

KCC has a ringfenced budget for Fastrack. This includes a reserve.

Operating costs

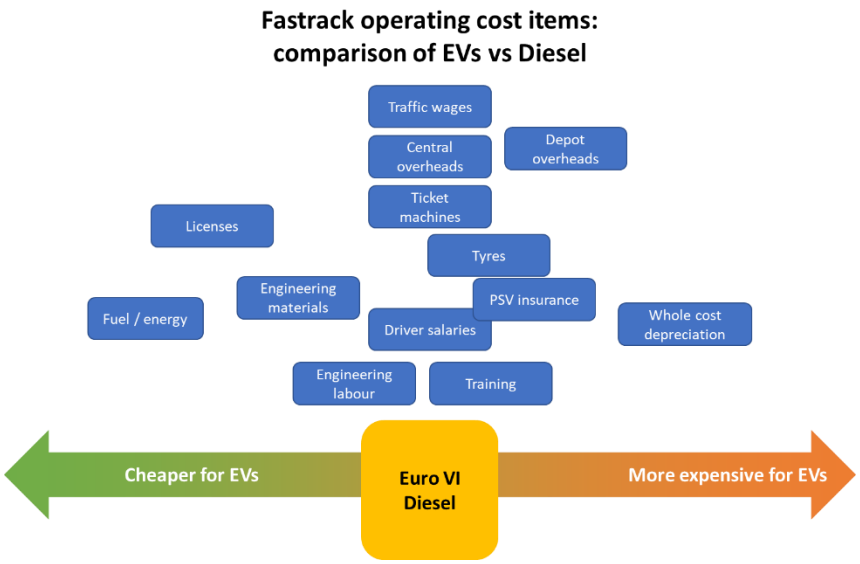


Fig 61: Operating costs are from Fastrack 2021 budget and average of five independent operator profiles.

'In addition to the wider co-benefits zero emission buses can bring, we would expect zero emission buses to achieve long term operating cost savings, which can be reinvested in more frequent services, lower fares, and other improvements for passengers.'

Decarbonising Transport: A Greener, Better Britain (2021), p 65

ZEBRA funding eases depreciation costs and could help Fastrack lower fares.

Long term financial viability

Fastrack has existed since 2006 and has performed very well continually throughout this period. Just by its pre-COVID patronage and high modal share figures, we have high confidence that the model works and is sustainable.

ZEBRA is a welcome boost to get over the initial capex hurdle for electrification. However, in opex terms the electrification makes Fastrack a *more* attractive proposition financially.

Kent's bid outlines how by putting ourselves at the centre, the programme would be delivered successfully, on time and without further monies required from the DfT. This governance approach has helped Fastrack succeed to date.

Procurement subsidy control and state aid regimes

For the buses let to operators, because the Fastrack service's operation would be subject to a competitive tender, all operators have an equal chance at securing the service. The supply of supporting infrastructure would be procured through our existing framework of supplied partners.

We can confirm that funding has not been sought for over 75% of the infrastructure cost, nor over 75% of the difference in cost between electric and diesel buses. Therefore, no operator or supplier will receive anything above these thresholds.

This bid is not subject to regulation 13 of the Public Contracts Regulation 2015.

Below is a statement from Invicta Law. KCC will maintain an open case with Invicta Law throughout the programme to ensure continued compliance.

Legal Statement

1. **Summary**

1. The subsidy (aid) to be granted to KCC in relation to the Zebra Fastrack Phase 2 project (**the "Project"**) meets and complies fully with the provisions of the Trade and Co-operation Agreement between the EU and UK – Chapter 3 of Title XI on 'Subsidy control' **(TCA).**

   The subsidy (aid) meets the definition of financial assistance set out under Article 1(b) of the TCA. The subsidy complies with the principles set out in Article 3.4 of TCA, as demonstrated in this report/application. Some of which are as follows; the subsidy (i) will enable the Project to pursue a specific public body objective to remedy identified market failure, (ii) the subsidy is proportionate and limited to what is required to achieve the delivery of Project, and (iii) the subsidy supports the delivery of the Project which is designed to bring about a change in economic behaviour of the beneficiary that is conducive to achieving the Project objective. Furthermore, the Project will meet and achieve public policy objectives under Article 3.3 TCA (evidenced under the Commercial Case of this application).

   Article 3.3 of the TCA allows subsidy to be granted if the Services are of public economic interest. As set out in this report/application, the Project is of public economic interest for the reasons set out in the Strategic, Economic and Financial Cases of this application. The subsidy also falls within the threshold set under Article 3.3 (2).

   In conclusion, the subsidy to be granted to KCC in relation to the Project meets the requirements set out under the TCA and is fully compliant with the provisions of the TCA. The subsidy does not in any way impinge on the EU State Aid rules by virtue of the Northern Ireland Protocol.

2. **Background and Applicable Law**

2.1 From 1 January 2021, the EU State Aid rules no longer apply to funding and other forms of support measures granted to business by UK public authorities. In place of the EU State Aid rules, new provisions are set out in Chapter 3 of Title XI of the new Trade and Cooperation Agreement (the 'TCA').

2.2 **Applicable law on Subsidy**

Trade and Co-operation Agreement between the EU and UK **("the TCA")** – Chapter 3 of Title XI on 'Subsidy control'

3. **The Principles of Subsidy (Article 3.4 of the TCA)**

Article 3.4 of the TCA provides 6 key principles that the granting of any subsidy must meet:

i. It must pursue a specific public body objective to remedy and identified market failure or to address an equity rationale such as social difficulties or distributional concerns.

ii. It must be proportionate and limited to what is necessary to achieve the objective.
iii. It must be designed to bring about a change in economic behaviour of the beneficiary that is conducive to achieving the objective and that would not be achieved in the absence of subsidies being provided.
iv. It must not normally compensate for the costs the beneficiary would have funded in absence of any subsidy.
v. It must be an appropriate policy instrument to achieve a public policy objective and that objective cannot be achieved through other less distortive means.
vi. Its positive contributions to achieving the objective must outweigh any negative effects in particular the negative effects on trade or investment between the parties.

4. **Justification for granting Subsidy (*Article 3.3: Services of public economic interest)***

4.1 Article 3.3 of the TCA allows Subsidy to be granted if the Services are of public economic interest. The Project is of public economic interest to the residents of Kent, visitors, businesses, environment interests etc.

Provisions of Article 3.3

4.2 *Subsidies granted to economic actors assigned with particular tasks in the public interest, including public service obligations, are subject to Article 3.4 [Principles] insofar as the application of the principles set out in that Article does not obstruct the performance in law or fact of the particular task assigned to the economic actor concerned. The task shall be assigned in advance in a transparent manner.*

4.3 The Parties shall ensure that the amount of compensation granted to an economic actor that is assigned with a task in the public interest is limited to what is necessary to cover all or part of the costs incurred in the discharge of that task, taking into account the relevant receipts and a reasonable profit for discharging that task. The Parties shall ensure that the compensation granted is not used to cross-subsidise activities falling outside the scope of the assigned task. Compensation below 15 million.

5. Unused

6. **Reporting**

The subsidy needs to be published in the manner set out below.

Article 3.7: Transparency
1. With respect to any subsidy granted or maintained within its territory, each Party shall within six months from the granting of the subsidy make publicly available, on an official website or a public database, the following information:
(a) the legal basis and policy objective or purpose of the subsidy;
(b) the name of the recipient of the subsidy when available;
(c) the date of the grant of the subsidy, the duration of the subsidy and any other time limits attached to the subsidy; and
(d) the amount of the subsidy or the amount budgeted for the subsidy

7. **Risk**

This is a new area of law and unfortunately, we do not have any case law to provide the strict interpretation of the TCA. As a result, I recommend we follow the technical guidance published by the Department for Business, Energy and Industrial Strategy (BEIS) on 24 June 2021, for public authorities on complying with the UK's international obligations on subsidy control. This includes publishing the subsidy in BEIS register. In relation to this project, the onus is more on the funder to satisfy itself that it meets the provisions of the TCA in general and the guidance set out by BEIS.

8. **Formality**

The Subsidy will be evidenced and backed by a funding agreement between KCC and the Funder. Article 3.11 makes provision for subsidy recovery (claw back) where subsidy is declared unlawful.

Article 3.11: Recovery

Each Party shall have in place an effective mechanism of recovery in respect of subsidies in accordance with the following provisions, without prejudice to other remedies that exist in that Party's law.

9. ***Definition of Subsidy under Article 1 TCA**:*

b) "subsidy" means financial assistance which:

(i) arises from the resources of the Parties, including:

(A) a direct or contingent transfer of funds such as direct grants, loans or loan guarantees;

(B) the forgoing of revenue that is otherwise due; or

(C) the provision of goods or services, or the purchase of goods or services;

(ii) confers an economic advantage on one or more economic actors;

(iii) is specific insofar as it benefits, as a matter of law or fact, certain economic actors over others in relation to the production of certain goods or services; and (iv) has, or could have, an effect on trade or investment between the Parties.

Senior Solicitor
06.08.2021

The Management Case

Project objectives

We hope and expect that the full electrification of the Fastrack fleet will achieve several key objectives:

- Air quality improvements
- Noise reduction
- Fastrack remains “cutting edge” and innovative
- Improved community relations
- Prototype scheme to lead by example for future electric bus schemes in Kent and nationally
- Improved optics for critics who say “buses are polluters”
- Increased modal share for buses

We can confirm that we will report back to the DfT quarterly, sharing all relevant monitoring and evaluation data.

Project timescale

KCC will go out tender for the Fastrack operating contracts during ready for service commencement of the new Kent Thameside contract starting in 2022 and Dover from 2023. Awarding in **we will have almost a year for mobilising Kent Thameside**.

We have strong assurances and project timelines from all suppliers currently or potentially involved that this is sufficient time to put everything in place. Across suppliers, a **consistency of timelines** gives us further confidence that this is realistic and achievable.

We acknowledge that the timeline may seem ambitious. However, we have **absolute confidence** that we can deliver successfully on schedule. As a mitigation, the existing fleet on Fastrack Kent Thameside could be used in a contract extension. Dover Fastrack is a new scheme and therefore no services would be lost if there were delays.

Further feeding our confidence in meeting the timeline is KCC's experience with recent large project deliveries. For example:

- **DRT:** Emergency short-notice introduction of a now internationally-renowned Demand Responsive Transport service in Sevenoaks. At the beginning of the COVID pandemic, the scheme was implemented on an emergency basis to provide critical hospital access. Working in partnership with bus operators, local councils and other KCC departments.
- **Rural electric minibus trial:** the award-winning electric minibus rural trial, in partnership with and local charity

Fig 62: June 2019 launch event for rural electric minibus trial

More details on the project timeline are below and overleaf.

25 01 08 15 22 29 06 13 20 27 03 10 17 24 31 07 14 21 28 07 14 21 28 04 11 18 25 02 09 16 23 30 06 13 20 27 04 11 18 25 01 08 15 22

Milestones and activities

- **2019 KEY APPROVAL:** Through KCC's Infrastructure Commissioning Board, it was agreed by KCC's Strategic Commissioner for Finance and Corporate Director for Growth, Environment and Transport that Fastrack would switch to a gross-cost model, with KCC provisioning the service's required assets from 2022
- **2020 KEY ASSURANCE:** Dover Fastrack public consultation.
- **February 2021:** Prior Information Notice was issued, indicating KCC's ambitions for a potential zero-emission operation as well as the new operating contracts for Fastrack
- **May 2021:** Following interest from the PIN, the Fastrack team engaged with 11 bus operators, 5 bus manufacturers, 3 energy providers and 4 infrastructure providers. These hour-long sessions both set out to the market Kent's intentions, and were an opportunity for KCC to learn best practices and practical considerations.
- **June 2021 KEY APPROVAL:** Fastrack Advisory Board and Dover Quality Bus Partnership both approved Fastrack's bid for ZEBRA funding for opportunity-charging electric vehicles and a gross cost contracting model.
- **July 2021:** it was announced that KCC had been successful in their Expression of Interest to ZEBRA scheme
- **July-August 2021**: Fastrack team ramped up the business case
- : If successful in the bid, infrastructure is commissioned.
- : If successful in the bid, KCC will tender for the 33 electric buses for Fastrack.
- : KCC will award the successful manufacturer with the contract to provide all 33 vehicles.
- : Tender will be issued for the operation of Fastrack Kent Thameside, as a gross cost contract.
- : Successful operation to be informed of their successful bid, and in partnership with KCC will begin mobilisation planning for the start of a 15-year operating contract for Kent Thameside.
- : Dover contractual arrangements are agreed.
- Kent Thameside infrastructure delivery complete.
- : Vehicles delivered for Kent Thameside
- **2022**: Kent Thameside contract begins.
- : Remaining Dover vehicles are delivered. Dover infrastructure is completed.
- **2023**: Dover Fastrack contract begins.

Governance arrangements

Shane Hymers, Fastrack Development Manager, will be the **Senior Responsible Owner** of this project.

The Expression of Interest included letters of **support** from an array of stakeholders and current/potential partner organisations.

It is agreed that the Fastrack networks will be contracted. This will be covered in Kent's BSIP and will be distinct from enhanced partnership arrangements.

In 2018, KCC formed a **Fastrack Advisory Board** with a range of partners. This has created productive working relationships both at a senior level and officer level with the supporting cooperative **Fastrack Working Group**. A diagram of the Fastrack Advisory Board and its Terms of Reference is shown below.

The electrification of the Fastrack fleet has already been approved by KCC's **Cabinet Member for Transport**, who supports the project as per this bid's foreword. **This Member chairs the Fastrack Advisory Board, providing continued senior level support and focus.** The Board is also attended by KCC's Head of Public Transport and Head of Transportation and Traffic Management.

A recent **success of cooperation and partnership working** was the agreement and funding strategy for the Fastrack dedicated tunnel linking Bluewater Shopping Centre with Ebbsfleet Garden City.

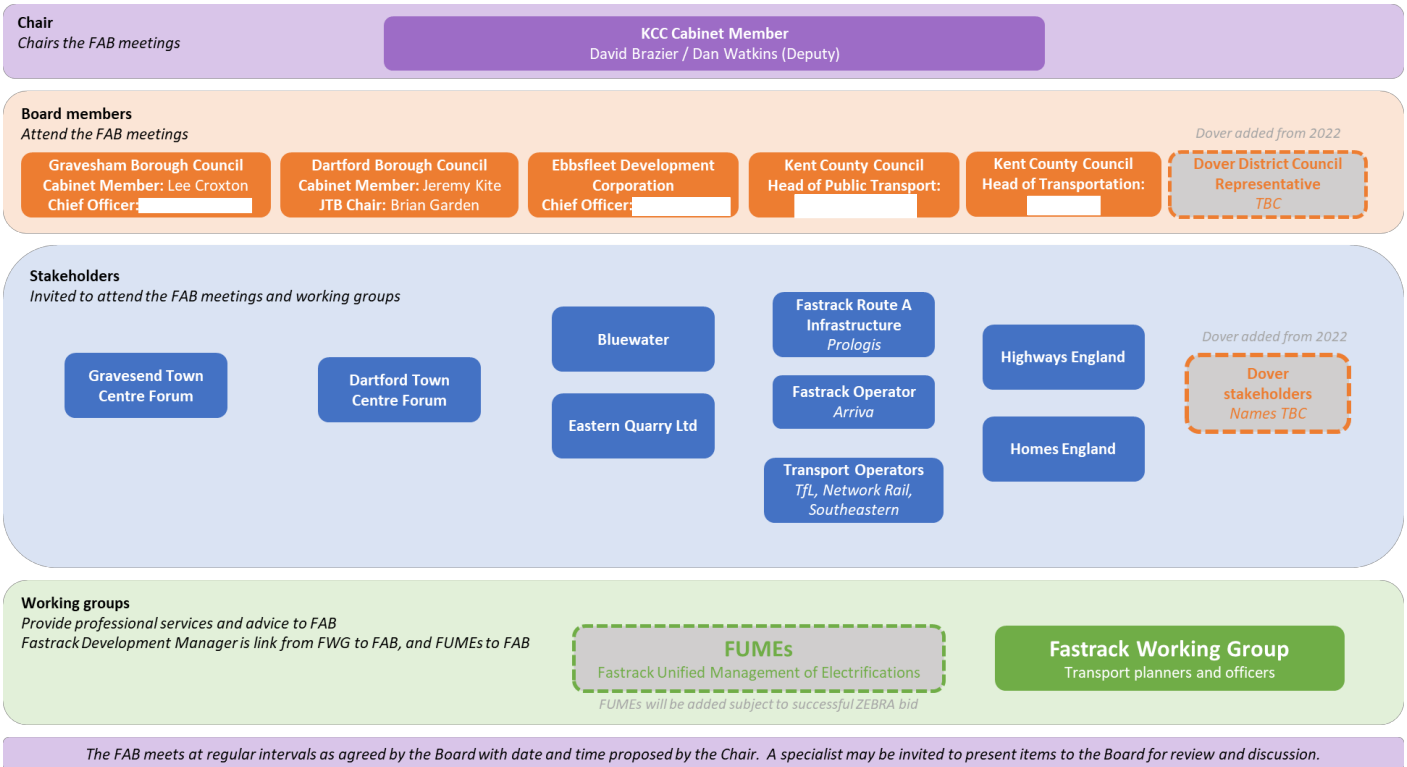


Fig 63: Fastrack Advisory Board governance structure

Monitoring and evaluation

Project objectives

- Improve customer experience
- Maintain service minimum
- Improve quality and reputation
- Improve community value
- Increase bus modal share
- Reduce emissions / cleaner operation
- Knowledge sharing and lesson learning

Data requirements

- Operated miles
- Operated on time
- Driver feedback
- Customer feedback
- Vehicle reliability
- Optimal vehicle performance for battery life etc
- Charging infrastructure reliability
- Battery levels
- Electricity cost
- Electricity usage
- Emissions
- Noise levels
- Customer satisfaction

Data collection methods

- Telematics (specification in the vehicle tender)
- Ticket machine data
- Customer surveys [*quarterly] – additional questions in routine Fastrack benchmarking
- Customer feedback through app
- Driver interviews [*quarterly]
- Pantograph data feeds
- Energy supplier bills and reports, live analysis portal
- KCC Sound Meter Noise Recordings [*quarterly]
- KCC air quality index [*quarterly]

Resourcing and governance

- FUMEs, Fastrack Unified Management of Electrifications (see overleaf)
- FAB, Fastrack Advisory Board (see above)

Expected milestones and frequencies

- The data collection methods above will have weekly reports compiled, except those indicated by a [*] which will be collected quarterly.
- **Quarterly reporting back to DfT**
- FUMEs – convene monthly or more frequently depending on project stage (more detail below)
- FUMEs report to FAB monthly

Data collection and monitoring

Our Fastrack Electric project and the collected data could be used as an international test bed for opportunity charging electric bus networks.

As an authority led Fastrack service, **KCC** is already equipped to host, provide and share data from Fastrack. KCC will welcome visitors and guests and we will be a centre of learning for other local authorities around the world. Fastrack already attracts interest internationally as a successful BRT scheme and would be keen to invite and host interested stakeholders from around the world to visit our two electrified networks when implemented and be seen as best practice for others to introduce opportunity charging electric bus technology to improve CO2 emissions and air quality in other UK towns and cities and indeed around the world.

We strongly believe in open data and as a contracted service, KCC would insist that all vehicle and charging telematics are shared, warts and all.

Dartford, Gravesham and Dover Borough Councils will commit to completing an **air quality** screening assessment on an annual basis producing a Local Air Quality Management Report with a specific Fastrack monitoring section. This will be introduced to demonstrate the improvements from the introduction of the electric fleet. The **carbon impact analysis** will be measured before/after to show the effectiveness of the scheme, along with a per-passenger carbon impact figure per miles travelled.

The chosen vehicle manufacturer will provide monthly vehicle reports which will be generated for each vehicle via the onboard telematics system, this will be supported by automatic metering of the electricity supply to each vehicle. An example is below:

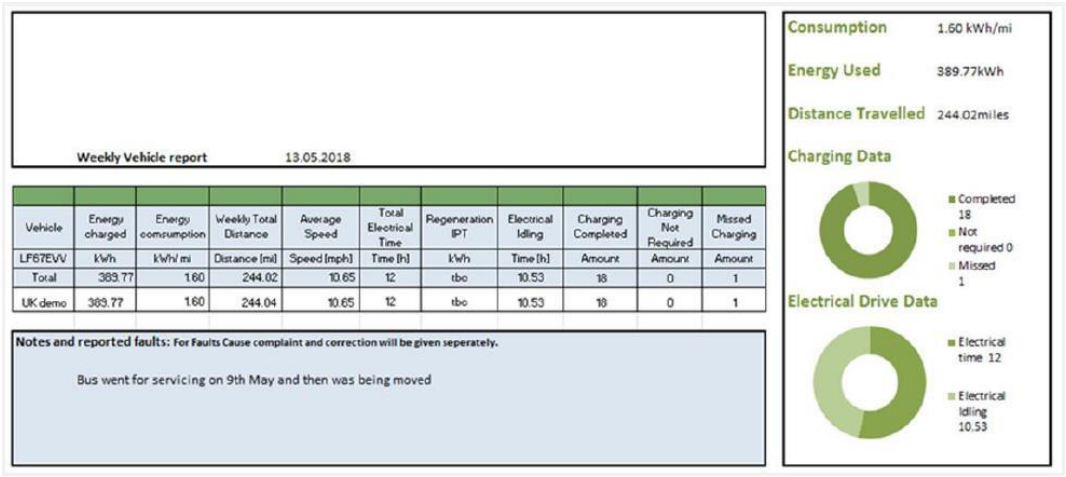


Fig 64: telematics example, source:

/ will co-develop and provide an infrastructure dashboard showing:

- Up-time and availability of chargers
- Charging session information including time and length of session, energy charged, power demand profiles, location of charging (in-depot or en route)
- Charger issues or faults and scheduled repair time

They will also provide a regular assessment of infrastructure utilisation highlighting spare capacity and opportunities for utilisation of this capacity.

For **operator performance**, we have monthly Fastrack Performance review meetings with the Fastrack operator where operational, vehicle and patronage data are provided. All performance figures will be published on the new and improved Fastrack website.

For **passenger satisfaction**, we will add specific questions about the electric buses and infrastructure to our existing annual customer satisfaction surveys. At least once every three months, we will sample-survey a subsection of the community for Fastrack feedback.

FUMEs

The FUMEs working group would be established to oversee the mobilisation, delivery and operation of Fastrack's electric fleet.

The group's members are summarised in the diagram below. Apprentices recruited as part of KCC's zero emissions strategy will be party to regular FUMEs activity.

The group will:

- Report into the Fastrack Advisory Board
- For phase 1, Kent Thameside:
  - Convene weekly in the months leading up to delivery
  - Convene daily in the week prior to introduction
  - Convene daily in the week of introduction
  - Convene weekly in the 3 months following introduction
  - Convene monthly thereafter
- Repeat process for 2nd phase Dover introduction and Kent Thameside partners will provide knowledge and support to Dover
- Collate data, both in alignment with DfT requirements and Fastrack Advisory Board
- Report progress against ZEBRA project objectives
- Cooperate with DfT research contractor for the ZEBRA programme
- Open door policy to Kent bus engineers and service planners
- Curate a knowledge bank and regularly invite interested external parties to presentations and participations in zero-emission technology/operations workshops
- Routinely review Equality Impacts Assessment, status and mitigations

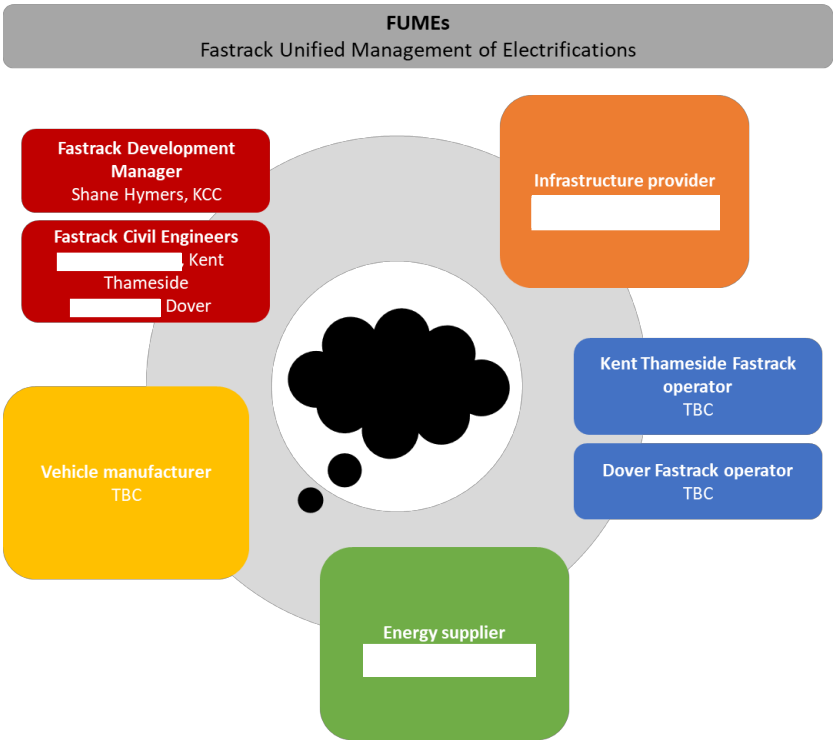


Fig 65: FUMEs working group composition

Advanced analytics

The opposite image is an example of passenger origin-destination pairing inference, laden weight averages. This data is collected by recording where passengers get on the bus, and then inferring where they got off based on where they get on Fastrack again for a return journey or onwards travel. Our ambition is to pair this with onboard telematics for energy consumption to provide figures for per-passenger carbon impact

Cost monitoring

Costs will be monitored each financial period, through a combination of contract price payments, patronage revenue received, KW used, and maintenance costs throughout the life of the contract.

Transparency and reporting to the customer

As mentioned above, we aim to measure the carbon impact each passenger has by using the electric Fastrack service over a private car. We will be transparent and share this with customers on our new digital platforms, alongside service performance data such as on-time performance statistics and mileage operated.

Monitoring and evaluation budget

Monitoring and evaluation costs will be covered by the Fastrack revenue budget. A separate line item in the budget will be created for meetings and data analysis. This will cover noise and air quality monitoring, in addition to existing Fastrack monitoring (e.g. customer surveys are already an ongoing cost in the Fastrack budget).

Telematics have been specified in the requirements for the charging equipment and will be specified in the vehicle tender specification.

Tendering

Repeated ensure consistent split vehicle and operator

The tender for the operating contracts will specify:

Operator:

- Route / mileage / schedules required
- Pantograph placements
- Data sharing requirements
- Warranty conditions and efficient/optimal use for reducing wear and tear
- Penalties for non-compliance
- Driver standards
- Fare conditions
- Contract length, mobilisation and closedown conditions
- Customer charter
- Project management resourcing
- Milestones and KPIs
- Operating base must be within 10 miles of the Fastrack network (key for pantograph placement)

Vehicle:

- Number of vehicles and type (single decker DC opportunity charging electric buses)
- Vehicle maintenance programmes (warranty terms)
- Vehicle capacity 80+
- Enhanced PSVAR standards, including: a second priority wheelchair space, marked space for assistance dogs, audible and visible route / next-stop announcements on board with loops, help/discreet panic buttons for passengers
- Electric ramp(s)
- Telematics and system specifications
- Branding requirements
- 15 year warranty

Current fleet

Under the current Fastrack contract for Kent Thameside, Arriva operates 21 buses. The entire fleet comprises single-decker, Euro V and Euro VI diesel buses. When the current contract expires in 2022, if electrification takes place or Arriva do not retain the contract,

Communications and Stakeholder Engagement Strategy

Governance structures around Fastrack, including FUMEs and FAB (see above), are set up to include a variety of stakeholders, including local councillors and politicians, operators and manufacturers, housing developers, other KCC highways colleagues and transport planners.

Fastrack's customers are key stakeholders, and their views are regularly sought through routine customer surveys.

We have a schools liaison programme and a dedicated Fastrack Ambassador.

More details on the Marketing Strategy for the launch of Fastrack Electric can be found in the Commercial Case.

For outwards communications, we have Fastrack's digital platform, including:

- the Fastrack app (with push notifications),
- real-time information screens (including marketing/engagement messaging as well as operational information)
- the Fastrack website (which will include relevant meeting minutes e.g. FAB and FUMEs to promote transparency and encourage trust in the service.

Other stakeholders are across the country, and even internationally, as we lead by example and share knowledge from this electrification project.

The DfT would be a key stakeholder in this project and, as previously confirmed, we would report back each quarter with key updates and data.

Risk Management Plan

As mentioned above, if KCC is successful in this bid for ZEBRA funding, a FUMEs working group will be established. Part of this group's remit will be ongoing risk management and monitoring.

The current project risks are identified below. FUMEs will continuously add to this list, and cross-grade each item on **possibility** (from unlikely to very likely) and **impact** (low/moderate/high). A mitigation strategy for each risk will be developed and continuously appraised.

- Costs increase
- As KCC is the accountable body for the grant, there may be a risk that DfT claw back funds in the event of non-delivery of outputs.
- Risk of KCC/DfT exposure to cost escalation.
- Operators do not deliver the intended outputs for the grant provided
- Risk to not being able to achieve the full match funding requirement from providers
- Contravention of state aid and subsidy control regulations.
- ZEBRA funding programme does not realise the intended benefits.
- Longevity of vehicles and obsolescence. Can a bus last 30 years, even with regular battery and component replacements?
- Vehicles are not delivered on time

Procurement, State Aid and subsidy rules

Please see section under the Financial Case. KCC will maintain an open case with Invicta Law throughout the programme to ensure continued compliance.

For the buses let to operators, because the Fastrack service's operation would be subject to a competitive tender, all operators have an equal chance at securing the service. The supply of supporting infrastructure would be procured through our existing framework of supplied partners.

Summary of changes to bid since Expression of Interest

- Funding amount changed (lower per bus cost, but warranty included)
- replaced by for energy supply due to more favourable terms
- Night buses added to Fastrack Kent Thameside, thus changing the annual mileage
- Fewer pantographs required (6 not 14) since full depot charging is not deemed a requirement, following extensive modelling by
- Fewer depot charger packs demonstrated to be required (now 2 for each route for resilience)

Fig 66: a night service is being introduced on Fastrack Kent Thameside in August 2021

Appendix A: Equality Impact Assessment

Kent County Council

Equality Analysis/ Impact Assessment (EqIA)

Directorate/ Service: Public Transport, Highways, Transportation and Waste (HTW), Growth, Environment and Transport (GET)

Name of decision, policy, procedure, project or service: Kent County Council Electric Zero Emission Bus Regional Areas (ZEBRA) Funding Bid

Version: 2.5 August 2021 (Ongoing Process throughout life of proposed ZEBRA scheme)

Author: Daniel Gillen

Project Objectives

To secure Department for Transport ZEBRA (Zero Emission Bus Regional Areas) funding towards the cost of the opportunity charge electric vehicles and supporting infrastructure. This will allow Kent County Council to realise its ambition of Fastrack Kent Thameside going fully electric during 2022, while resulting in the new Fastrack Dover to launch as an all-electric service. The funding contribution will facilitate the expansion of the Fastrack network both through the new scheme in Dover, but also in Kent Thameside including the use of the Zero Emission Bean Road Tunnel.

Summary of equality impact

Overall the local consultation has evidenced that the positive impact of the proposed introduction of a zero emission fleet out-weighs the negative impacts related to the charging infrastructure and sound of the vehicle. Recommended actions to minimise the negative impacts where possible have been included in this report.

Adverse Equality Impact Rating: Low

Attestation

I have read and paid due regard to the Equality Analysis/Impact Assessment concerning the Fastrack Electric Zero Emission Bus Regional Areas (ZEBRA) Funding Bid**.** I agree with risk rating and the actions to mitigate any adverse impact(s) that has /have been identified.

Fastrack Development Manager

Signed: Shane Hymers Name: Shane Hymers

Job Title: Network Development Manager Date:20/08/2021

Head of Service

Signed: Name:

Job Title: Head of Public Transport Date: 20/08/2021

Part 1 EQIA Initial Screening

Could this policy, procedure, project or service, or any proposed changes to it, affect any Protected Group (listed below) less favourably (negatively) than others in Kent?

Protected Group	Please provide a brief commentary on your findings. Fuller analysis should be undertaken in Part 2.			
	High negative impact	Medium negative impact	Low negative impact	High/Medium/Low Positive Impact
Age				**High -** Improved air quality, reducing the risk of illness or breathing difficulties for youngest / oldest people living along the route. **Low -** New opportunities for young people to improve skill levels linked to new buses and charging infrastructure. **Medium -** Reduction in exterior noise pollution. Kent has particular challenges with an ageing population, and the potential for life-limiting health conditions/disabilities increases with age.
Disability		Vehicle quietness a safety risk for visually impaired/ deaf passengers. Sensory challenges for those with learning difficulties and the visually impaired, due to the change in sound experienced. On-street charging infrastructure increases pavement clutter. Collision risk/barrier to visually impaired and wheelchair users.		**High -** Fully accessible fleet improves ease of use of the Fastrack service for disabled users. **High -** Improving air quality may reduce the symptoms of some disabling health conditions. **Medium -** Reduced in-vehicle noise aids ability for conversation by deaf/hard of hearing users. **Medium** Reduction in exterior vehicle noise pollution.
Sex				Improved journey experience.

				51 percent of Kent Thameside Fastrack users identify as Female Lone parents are predominantly female and more frequently use public transport which can be related to socio economic circumstance. Females are more likely to be carers and Fastrack's enhanced accessibility PSVAR standards could support a positive impact. Females are also more likely than males to use prams/buggies, for which there will be space on the Fastrack buses.
Gender identity/ Transgender			It is not considered that alterations to the bus fleet have any greater impact on this group than it does on the general public.	
Race				**Low -** Minority ethnic groups benefit from improved journey experience. XX percent of Kent Thameside users identify as BAME
Religion and Belief				Intersectionality between race and religion/belief means the positive impact for "race" above (coming from a significant BAME population) can also transpose to "religion and belief" . in Kent, the largest religious groups after Christians are Muslims (13,932) and Sikhs (10,545).
Sexual Orientation			It is not considered that alterations to the bus fleet have any greater impact on this group than it does on the general public.	
Marriage and Civil Partnership			It is not considered that alterations to the bus fleet have any greater impact on this group than	

			it does on the general public.	
Pregnancy and Maternity				**High -** Poor air quality can impact foetal development and the development of young children. **Medium -** Reduction in exterior noise pollution. **Low** – space for prams/buggies on Fastrack bus
Carer's Responsibilities				**Medium -** Increased journey opportunities due to improved access to the vehicles for the users they care for. 51 percent of Kent Thameside Fastrack users identify as Female. Females are more likely to be carers and Fastrack's enhanced accessibility PSVAR standards could support a positive impact.

Part 2

Equality Impact Analysis

Protected Affected Groups

- Disability
- Age
- Maternity & Pregnancy
- Carers
- Sex
- Race
- Religion and Belief

Stakeholder Engagement

1. Fastrack Network Survey (2019) – 4 part survey consisting of a customer satisfaction survey, customer origin-destination survey, catchment area household survey and a Fastrack driver survey.
2. Fastrack The Bridge Residents Survey (2021)
3. Fastrack Springhead Park Residents Survey (2021)
4. Fastrack Working Group
5. Fastrack Advisory Board

At Kent County Council, we actively and regularly survey for Fastrack, both on and off the buses to capture the viewpoints of both users and non-users. This means that we are aware of the concerns of those who live along the network, and we use this data to make evidence-based decisions for the service and community impacting infrastructure. It is also considered that in customer satisfaction surveys, the most dissatisfied would no longer be using the service and we must therefore capture them off-bus.

Moving towards a Zero Emission fleet has been a long-term ambition for Fastrack, and this has been reflected in the questions asked in our surveys over the previous years. Through both the Fastrack Working Group and Fastrack Advisory Board, we are able to raise service proposals and understand the views and concerns of a plethora of Fastrack stakeholders. This includes the operators themselves, but also local developers and District Councillors who represent local residents and ensure a continual dialogue between the Fastrack team and the communities we serve.

Throughout the lifetime of the proposal, our regular surveying of our communities served, both on and off the vehicle, will provide an evidence base against which to monitor the impacts of the scheme on protected groups. Regular dialogue with Local Councillors through our Fastrack Boards, as well as user groups and community resident associations will give KCC a firm grasp of an issues affecting residents as they emerge. Both the operators of Fastrack Kent Thameside and of Fastrack Dover will be required to provide a 'customer visible' Fastrack supervisor role. This person will act as an ambassador for passengers, travelling the network and seeking to actively engage the public while also promoting service. This person will report any emerging issues to the Kent County Council Fastrack team and will work with protected groups to ensure they have the best experience of the service.

Fig xx Manual boarding of 50 years of London Country Heritage Liveried Fastrack Service

'I love the idea of electric buses…. but can they please have electric ramps too so that the driver doesn't have to get on and off the bus each time I board, making a spectacle of my journey. I'd love my bus ride to be as seamless as possible' *We listen: See our vehicle specification*

Additional Data Sources used to carry out the assessment

1. Kent County Council – 'Disability in Kent' – Analytics Statistical Review (September 2020)
2. Kent County Council – 'Life Expectancy in Kent' – Statistical Bulletin (January 2020)
3. Air pollution, mental health, and implications for urban design: a review (2018)
4. British Medical Journal – 'Impact of London's road traffic air and noise pollution on birth weight: retrospective population based cohort study'. (2017)
5. World Health Organisation – 'Air Pollution and Child Health' (2018)
6. DfT – Bus Back Better (2021)
7. DfT – Inclusive Transport Strategy (November 2020)
8. Transport Statistics – travel mode and purpose (2019)
9. World Health Organisation – 'Environmental Noise Guidelines for the European Region' (2018)
10. Kent Design Guidance
11. Kent County Council (Public Health Observatory) – Air Quality (April 2018)
12. Annual Bus Statistics: England 2019/20

Who have you involved, consulted and engaged?

- Our customers
- The existing and new communities served by Fastrack
- Bus Operators –

- Local Housing Developers
- Ebbsfleet Development Corporation
- District Councils + Councillors – Dartford Borough Council, Gravesham Borough Council, Dover District Council
- Kent County Councillors
- Kent (a charitable organisation which helps disabled, older and vulnerable people to live life to the full)
-
- Vehicle Manufacturers – including
- Charging /Infrastructure Suppliers – including
- Kent Police

Analysis

Positive Impacts:

Age

The 2019 Network Survey revealed that 38% of respondents were below the age of 34, compared to 31% 35-65 and 30% aged 65 and over. This suggests that changes to the Fastrack service disproportionately affects younger people. This is corroborated by the fact that in the same survey, 51% of those aged 16-24 used the service 5 or more times a week, compared to an average for all respondent groups of 36%.

2019 Network Survey Q15 'Which of the following age groups do you fall into?'	
Age Category	Percentage
16-24	3%
25-34	27%

35-44	41%
45-54	16%
55-64	8%
65 or over	3%
Prefer not to say	0%

Within the Fastrack operations tender to be released in late 2021, this will specify that the maintenance of the new fleet and charging infrastructure will be maintained within Kent close to the route. Investment in the new fleet and associated charging infrastructure will provide employment opportunities for young people within the County, including the opportunity to improve their skills and work towards qualifications. Based upon the consultation undertaken, 9 apprenticeships will be made directly from the scheme (3 per district), with the potential for further employment opportunities generated by the expansion of the network and increase in the fleet size.

The analysis of the impact of the transition to zero-emission vehicles does identify that the pollution benefits will mostly benefit the oldest and youngest people living along the Fastrack Route; groups who have the weakest respiratory systems. Particulate matter can cause premature mortality, while also contributing towards preventable respiratory diseases. Dartford has the second highest mortality rate attributable to particulate matter in Kent, while Dover has the third highest mortality rate attributable to respiratory diseases. Reductions in air pollution resulting from Fastrack going zero-emission will reduce the risk of respiratory illnesses or breathing difficulties that can be traced directly to air quality. In Dartford and Gravesham, Fastrack going zero-emission is a strategic component of the air quality strategy to benefit the wellbeing of residents. Improvements to air quality will benefit children and young people, as studies by the World Health Organisation (2018) have provided evidence of the air quality impact on lung development (up to age 9) and long-term effect on health into adulthood.

Kent County Council 'Air Quality' (2018) P7/8		
	Mortality per 100,000	
District	Mortality attributable to Particulate Matter (aged <75)	Mortality attributable to preventable respiratory disease (aged <75)
Dartford	19.4	17.0
Dover	17.0	24.6
Gravesham	16.6	15.3

An additional impact to different age groups living along the Fastrack routes are the health benefits resulting from the reduction in noise pollution linked to the vehicle sound. 30% of Europe's population are disturbed by traffic noise exceeding 55 decibels at night (WHO 2018). Notably the target for children and the elderly is lower at 40db. This can be directly attributable to conditions including sleep deprivation and stress caused by environmental noise. This can affect the nervous system and increase the risk of high blood pressure, conditions which people of an older age are already at a higher risk of having. The reduction in noise from the vehicles will improve sleep for those living along the route, leading to a wellbeing improvement. This is a particularly important consideration and benefit for Fastrack due to long term ambition to move to a 24-hour service on Route A in line with the desires of our customers.

Kent has particular challenges with an ageing population, and the potential for life-limiting health conditions/disabilities increases with age.

Disability and Carers

It has been identified that disabled people, such as those with mobility or visual impairments, are potentially more reliant on the Fastrack service than other protected groups or members of the wider public because their disability may mean they cannot drive. From our engagement with disabled Fastrack users, we understood that accessing the vehicle has both a physical and mental toll on this user group; something their able-bodied counterparts do not experience. The 2019 Fastrack Survey revealed 9% of users have a disability which affects the ease with which they can access the vehicle.

Furthermore, people with a disability are more likely to face relative poverty which can affect how they travel.

With Fastrack going zero-emission, the modern and fully accessible vehicles will help provide disabled users and their carers with improved access to education, employment and other social opportunities in a more user friendly manner. Kent County Council will be specifying that the zero-emission fleet must have an electric ramp. This will allow this user group to access the vehicles in an easy and stress free manner akin to there able bodied counterparts. We expect that this will generate greater confidence and reduce anxieties among this protected group about using the Fastrack service, although consultation with disabled users will only reveal the extent of this once the new fleet is place. This benefit is particularly important as it aligns with the aims of the Department for Transport's upcoming strategy to boost accessibility for disabled passengers.

Induction Loops will also be installed to assist those with hearing impairments. Further analysis is required to understand the volume required.

The improvements which aid disabled users to access social and economic opportunities are particularly beneficial in Dover. This is because Dover is where the percentages of people with a long term health problem or disability that limits there activities is significantly higher than the averages for both Kent and the South East. Easing the access to the service will provide a wellbeing benefit for this protected group.

2019 Fastrack Survey – 'Q16 Do you consider yourself to have a disability that could make boarding or alighting a bus difficult'	
Answer	Percentage
Yes	9%
No	90%
Prefer not to answer	1%

Percentage of people with a long-term health problem or disability (Kent County Council "Disability in Kent" Statistical Bulletin, 2020 P3)					
	Dartford	Gravesham	Dover	Kent	South East
All People	100%	100%	100%	100%	100%

Day-to-day activities not limited	84.9%	83%	79.2%	82.4%	84.3%
Day-to-day activities limited in some way	15.1%	17%	20.8%	17.6%	15.7%

Improvements to the air quality local to the Fastrack routes generated by the use of the zero-emission fleet will benefit disabled users in a similar manner to that described in the age section. Those in this protected characteristic will particularly benefit if there disability is respiratory based, or results in them having a weak immune system. For these residents, improvements to local air quality resulting from Fastrack will reduce the occurrence and the extent of illness, while encouraging them to spend more time outdoors to the benefit of wellbeing.

For our hard of hearing Fastrack users, it was identified that reductions in the sound of the vehicle will improve their ability to converse with others while on board the vehicle. This forms a wellbeing benefit to this group, as these users are able to more easily socially engage with other users.

Disabled users who live along the route will also benefit from the reduction in exterior noise pollution linked to the vehicles in a similar manner to that described in the age characteristic. For those with cardiovascular or sleep related conditions, the reduction in noise pollution could contribute to a reduction in the risk of flair ups and the severity of their condition.

These aspects all support the assumption these changes represent an improvement for these groups. However, new electric technology can cause negative impacts which are detailed in the next section.

In line with Fastrack being a premium service, the tender for the new fleet will consider enhanced PSVAR standards and ensure the new buses include: a second priority wheelchair space, marked space for assistance dogs, audible and visible route / next-stop announcements on board with loops, help/panic buttons for passengers. As also mentioned in the Business Case, there is a new Fastrack mobile app in development, and we will seek to ensure it provides passengers with accessibility data about bus stations and stops so they can make informed travel choices regarding accessibility of services.

Sex

In undertaking our market engagement, analysis of each of the surveys revealed each had a higher percentage of female respondents compared to male. This may indicate that there is a greater impact depending on one's sex which is also defined as a protected group.

Maternity & Pregnancy

Poor air quality can impact upon foetal development in pregnant ladies, as per evidence from the British Medical Journal (2017). Due to the air quality benefits linked to the zero-emission fleet discussed previously, this group will benefit.

In a similar manner, poor noise pollution in during the child development phases (both before and after birth) can impact upon the hearing, speech and language, and learning capabilities of the baby. Due to the exterior noise reduction discussed previously, this group will benefit.

Race

Those from minority ethnic groups will benefit disproportionately from improvements made to the Fastrack fleet. In the 2019 Fastrack Network Survey, 39% of respondents defined themselves as groups other than 'White British'. For those users that stated they used the service 5x or more a week, this figure rose to 47%. This illustrates that those from minority ethnic groups have a higher reliance on the Fastrack service than the dominant ethnicity 'White British'. With the new zero-emission fleet facilitating improvements to the vehicles alongside network expansion, improvements to the Fastrack service will improve access to education, employment and other opportunities for these minority groups which rely on the service.

2019 Fastrack Network Survey Q18 'Ethnic Group'	
Race	**Percentage**
White - British	**60%**
White - Other	**5%**
Mixed	**8%**
Black	**11%**
Asian	**15%**
Prefer Not To Answer	**1%**

Religion and Belief

Intersectionality between race and religion/belief means the positive impact for "race" above (coming from a significant BAME population) can also transpose to "religion and belief" . in Kent, the largest religious groups after Christians are Muslims (13,932) and Sikhs (10,545).

Adverse Impact:

Disability

Based upon out consultation and review, disabled users are disproportionately negatively affected by the transition from diesel to opportunity charge electric vehicles compared to other groups. While the quietness of the electric vehicles from the outside compared to the diesel counterparts reduces noise pollution, this forms a challenge for those who are blind, partially sighted, or hard of hearing. This is particularly the case when the vehicle is moving at low speed, making it difficult to detect the vehicle. Those with this protected characteristic are consequently more likely to be more likely to be involved in an accident with the vehicle. Mitigations will be required prior to the electric fleet operating to ensure this group are aware of the differences in sounds between the two vehicle types.

For those with learning difficulties we understand that the significant change in the vehicle sounds could create sensory challenges, as the vehicle will not sound as expected. This could be overwhelming, and could impact on the frequency of usage of the Fastrack service, particularly in the short term, as they learn to adapt to the change.

For visually impaired passengers, while the quietness of the vehicle benefits the ease of conversation as discussed, this user group also can also lose out in there enjoyment of the journey. This is because

these users' hearing conditions enhances the reduction in noise produced by an electric vehicle compared to its diesel counterpart. From our engagement with the operator of the Kent zero-emission accessible minibus project, we understand that one of the key feedbacks from this project is that some visually impaired users felt unsettled from the loss of the sounds of the vehicle. The enhanced reduction in journey sounds resulted can result in a wellbeing loss for this user group as their experience of the journey is supressed due to the lack of noise compounding their visual impairment.

Finally, the assessment has recognised that on-street charging infrastructure for the opportunity charge vehicles will contribute towards increased pavement clutter. This could pose a disproportionate risk of collision for those suffering with a visual impairment. The need for mitigations is identified to ensure that the infrastructure is identifiable for those with limited or zero vision. For wheelchair users and those with reduced mobility, the charging infrastructure could reduce or prevent movement by thinning the pavement width available to pedestrians. It is identified that mitigations will be required within the design phase to consider the position of the charger and the means of making it apparent to people with reduced vision to protect the ease of navigation for this protected group.

Mitigations for each of the adverse impacts identified have been discussed in the next section.

JUDGEMENT

Adjust and continue - adjust to remove barriers or better promote equality
Mitigations Required Yes

Equality Impact Assessment Mitigation Strategy

Protected Characteristic	Issues identified	Action to be taken	Expected outcomes	Owner (Timescale)
Disability (visual impairment / hearing loss)	Challenge to detect the vehicle's presence for those who are blind, partially sighted or hard of hearing. Hearing on- bus announcements	Education campaign. Engagement with and other disability groups to create and rollout electric vehicle awareness programme for this protected group and their assistance tools. Induction Loops to be added to the vehicles – survey required to understand volumes and best practice	Improved awareness among visually impaired / those with a hearing loss about the vehicles and how to detect them. Engagement with Charitable Organisations may lead to additional mitigation ideas being developed.	Shane Hymers (August 21 onwards – education process will be continual).
Disability (learning difficulties /	Sensory challenges / change of experience of the journey linked to a	Fastrack Tender to specify Fastrack App must include options to play recordings of current Fastrack vehicle.	This will allow those who desire to easily access and listen to familiar journey sounds,	Shane Hymers (Oct 21 – Oct 22)

visually impaired)	significant reduction in in-vehicle sounds.		reducing the sensory changes which otherwise can be overwhelming.	
Disability (visual impairment)	Charging infrastructure increases pavement clutter, with higher chance of collision for visually impaired users.	Chargers to be installed to be compliant with the Equality Act 2010. Chargers to be located as close as possible to the curb boundary to reduce conflict with walking routes. Taking account heritage issues, chargers to have contrasting colour / luminance compared to the background against which they will be seen. Reflective strips / colour bands to be considered. Update 'Kent design Guidance' with any new findings/improvements.	This will reduce the risk of collision by visually impaired users with the charging infrastructure. Engagement with the may lead to further mitigations being adopted.	Kent Thameside – Dover –
Disability (wheelchair user)	Charging infrastructure increases pavement clutter, reducing the pavement width in that location.	Charger infrastructure design to incorporate Kent Design Guidance. As a minimum, the mandatory 1.8m footway width will be maintained next to the chargers.	This will ensure those with reduced mobility have enough space to pass the chargers at ease at all times.	Kent Thameside – Dover –

Monitoring Impact:

As per the Business Case's sections on Governance and Monitoring/Evaluation, a continuous reappraisal of this EQIA forms part of the remit of the Fastrack Unified Management of Electrification ("FUMEs") working group. This is embedded in the scheme's programme management.

Regular customer surveys, and complaints mechanisms (e.g. the app, and the dedicated Fastrack Passenger Ambassador), will be used to feed into the EQIA. There is a continuous engagement with stakeholders, including politicians representing their communities and a Disability User Group.

Data on passenger journeys by user groups and concessionary travel data will be routinely collected and continue to feed into the EQIA's ongoing development.

The protected characteristics outlined in this EQIA will be a key consideration in all recruitment associated with this scheme, including 9 new apprenticeships.

Appendix B: Index of Letters of Support

Enclosed with this submission is a .zip folder containing the following letters of support:

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- Adam Holloway, MP for Gravesham
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- Canterbury City Council
- Dover Quality Bus Partnership
- Ebbsfleet Development Corporation
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- Gareth Johnson, MP for Dartford
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- Kate Willard OBE for Thames Estuary
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Appendix B: Index of Supporting Analyses

Enclosed with this submission is a spreadsheet containing the following worksheets:

- BSOG calculations
- Route / timetable planning with Peak Vehicle Requirement – Fastrack A Kent Thameside
- Route / timetable planning with Peak Vehicle Requirement – Fastrack B Kent Thameside
- Route / timetable planning with Peak Vehicle Requirement – Fastrack Dover

Cost breakdowns etc for GBT inputs are shown within the “User Proforma” tab of that spreadsheet.