APPENDIX TA - P

TECHNICAL NOTE 4 (TN4) – FUTURE MOBILITY

The London Resort

Technical Note 4 – Future Mobility

London Resort Company Holdings

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Quality Control

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Date	23/11/20	11/12/20
Prepared by	Suzanna Massingue Adam Molyneux Oisin Hamilton	Suzanna Massingue
Checked by	Daniel Quan	Daniel Quan
Authorised by	David Dixon	David Dixon

WSP House
70 Chancery Lane
London
WC2A 1AF
wsp.com

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Introduction

Context - Reframing Mobility

The digitisation of society is having significant implications for the transportation sector with connected and automated technologies, zero emission vehicles, shared service models and new forms of payment disrupting how people, goods and services move. Many of these key trends have been augmented further as a societal response to the Covid-19 pandemic.

An integrated approach to land use, digital infrastructure, energy generation and storage and the move to a battery / hydrogen future, is needed. In addition, agile and more human-centred modes could play a major role in supplementing mass transit (rail, tram, coach and bus) providing viable alternatives to the car. The decisions we make now, in dealing with the urgent climate challenge, are key not only in terms of a shift to truly sustainable, minimal impact modes, but also in terms of how we ensure both infrastructure and services are fit for unplanned external shocks.

London Resort

London Resort is a proposed world class entertainment resort in the Swanscombe Peninsula on the banks of the River Thames in Kent. Currently under consultation, the resort will comprise:

- A Leisure Core, comprising a range of events spaces, themed rides and attractions, entertainment venues, theatres and cinemas, developed in landscaped settings in two phases.
- Four hotels providing family, upmarket, luxury and themed accommodation totalling up to 3,550 suites.
- A 'Conferention' Centre (i.e. a combined conference and convention centre) with a floor area of up to 11,000 m2.
- A linked building hosting a range of eSports, video and computer gaming events, with a total floor space of up to 16,500 m2.
- A Back of House area accommodating many of the necessary supporting technical and logistical operations to enable the London Resort to function.
- Up to 500 apartments for London Resort workers, typically consisting of 4-6 bedrooms and shared kitchen and lounge facilities.

The proposed scheme is expected to bring the following benefits to the area:

- Creation of jobs;
- Catalyst for regeneration;
- Increase in local spend;
- New infrastructure;
- Regeneration of a brownfield site;
- Unlocking the potential of the River Thames;
- Green networks;
- Transformational provision of entertainment; and
- Supply chain opportunities.

The resort is expected to attract domestic and international visitors throughout the year.

Background

The initial version of this report set out the mode shift opportunity (which is included as Appendix C). This identified the maximum mode share that could be achieved by different modes based on coverage within in reasonable time limits.

Stakeholder feedback requested additional analysis to include travel costs and times to develop a more robust mode estimation of mode share.

WSP has developed a bespoke mode share model which takes into account a range of factors. The outputs of the tool are summarised in Part C – Mode share scenario testing, while a description of the methodology and input assumptions are included in Appendix A.

This mode share estimation tool provides a baseline scenario of the mode shares that could be expected at the London Resort, based on:

- Attendance
- Available modes
- Mode choice factors
- Journey times
- Network coverage
- Propensities.

This was then used to determine person trips, vehicles trips and daily profiles. The outputs of this tool informed the development of the public transport and active travel strategies.

Introduction

Report structure

This report is split into the following parts:

- Part A – Megatrends analysis and technology timeline
- Part B – Mosaic analysis and the Transport Classification of Londoners
- Part C – Mode share scenario testing
- Part D – Car parking and interchange design
- Part E – First mile/ last mile mode summary
- Part F – Incentives
- Part G – Soft market testing

The main report is supported by the following appendices:

- Appendix A – Mode share estimation – methodology & assumptions
- Appendix B – All visitors' and staff's trip origin: Day of travel
- Appendix C – Mode shift opportunity
- Appendix D – Domestic visitors' trip origin: Day of travel
- Appendix E – International visitors' trip origin: Day of travel

Figure 1 **Future Mobility Methodology**

Task	Description
Task A Megatrends analysis, and a Technology Timeline	A **megatrends analysis** outlining the 'future mobility climate' at the national, regional and local (i.e. in Swanscombe/ Ebbsfleet). This includes a **technology timeline** showcasing the potential availability of new transport technologies, mapped against the development build-out programme, as a means of seeing what will be available and when.
Task B MOSAIC profiling/ Transport Classification of Londoners and early engagement	A **user-centric approach** to understanding customer segments in terms of who they are, where they will be travelling from and how. This will enable more informed recommendations to be made, most appropriate for the types of visitors expected.
Task C Mode shift potential	Understanding the **mode shift potential** to seek where interventions can be most effective in encouraging people onto new/shared modes. This entails creating different catchment areas from the site, namely, walking, cycling, public transport and driving catchments. The analysis also extends to understanding 'willingness to change' to see where interventions may be most effective.
Task D Public Transport Analysis	A similar catchment analysis focused on **public transport** accessibility and journey times, to identify where there is potential to maximise public transport ridership. This considers rail, Fast track bus and the Thames Clipper.
Task E Driving analysis	A similar catchment analysis focused on **private vehicles**, particularly where they are travelling from, whether they are driving single occupancy vehicles, travelling in a group or being dropped off, and to identify visitors in this category who may be most easily encouraged to shift mode to more sustainable means of travel.
Task F Car Parking design and Interchange hub	Future mobility design advice on **future proofing the scheme design** to ensure it can adapt to future uses and ways of travelling.
Task G First/ last mile mode options summary	A summary of **potential first mile/ last mile mode** options.
Task H Incentives	**Soft measures recommended** as incentives to **change behaviour**. This draws from the visitor personas deduced from the MOSAIC data analysis to ensure that effective measures are recommended for the types of potential visitors
Task I Soft Market Testing	Identification of suitable **operators to engage** with and support early engagement with the client on their tailored proposals.

Future Mobility Principles

The Future Mobility Vision

Considering the changes expected in terms of the mega trends that influence mobility, new developments need to be dynamic and resilient such that they are both able to achieve an appropriate planning consent and provide flexibility to support future on-site changes in levels and nature of mobility needs. The increasing digitisation of society, with connected and autonomous technologies, zero emission vehicles, shared service models and new forms of electronic payment, are changing the use of traditional transport modes.

As such, it is important to ensure development proposals are flexible in design to accommodate the changing demographic, social, environmental, political and economic environments. The London Resort development build out timeline means new and future mobility interventions embedded within the scheme design are critical.

Against this backdrop, and inspired by the emerging national and local policy context and best-practice guidance, future mobility considerations for London Resort will be guided by the following principles:

Figure 2 **Future Mobility Principles**

All mobility interventions must be guided by **net zero carbon** considerations	**Smart infrastructure** designed to ensure a **dynamic, inclusive** and **efficient function**	**Data** from new mobility services must be **shared** where appropriate to **improve choice** and the **operation of the transport system.**
New mobility services must be **safe, sustainable, convenient** and **widely accessible** to all, in support of promoting **active, public and shared transport over** arrival by private car	Where feasible, **future mobility interventions** will be **aligned with the ticketing strategy** to ensure attractiveness for visitors	**Walking, cycling** and **active travel** must remain the best options for **short urban journeys**.
Mobility options that functions for **all visitors to London Resort** and accommodates **their needs**	**Sustainable staff travel** will be made more convenient that travel by private car	**Mobility infrastructure**, particularly that related to car parking, will be **flexible and future ready** to accommodate changing mega trends

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Part A

Megatrends analysis and technology timeline

Megatrends Analysis

Setting the scene

National Policy Context

Launched in March 2019 by the Department for Transport, the 'Future of Mobility: Urban Strategy' outlines the government's approach to maximising the benefits from transport innovation in cities and towns. The document summarises the six high-level 'key changes' that are fuelling the evolution of transport. These are:

Automation - Improved sensing technology, computing power and software engineering are leading to increasing levels of automation in transport.

Cleaner transport - Rapidly falling battery prices, improvements in energy density and electric motors and alternative fuels developments have the potential to significantly reduce emissions.

New modes - Technology is enabling new ways of transporting people and goods.

Data & connectivity - Increasing availability of data and improved connectivity are allowing travellers to make more informed journey choices, providing real-time information to operators and fuelling machine learning advances.

Changing attitudes - Rising customer expectations are driving passenger transport and delivery services that are increasingly affordable, convenient and personalised.

New business models - The emergence of new digitally enabled models of transport provision.

The document also sets out the nine principles that will guide government's response to emerging technologies and business models:

> New modes of transport and new mobility services must be **safe and secure** by design.

> The benefits of innovation in mobility must be available to all parts of the UK and **all segments of society**.

> The **marketplace for mobility** must be **open** to **stimulate innovation** and give the best deal to consumers.

> **Mass transit** must remain fundamental to an efficient transport system.

> **Walking, cycling and active travel** must remain the best options for short urban journeys.

> Mobility innovation must help **to reduce congestion** through more efficient use of limited road space, for example through sharing rides, or consolidating freight.

> New mobility services must lead the transition to **zero emissions**.

> New mobility services must be designed to operate as part of an **integrated transport system** combining public, private and multiple modes for transport users.

> **Data** from new mobility services must be **shared** where appropriate to improve **choice** and the operation of the transport system.

Local Policy Context

At the regional level, the TfSE **Draft Transport Strategy** similarly supports a sustainable future, with a mission to provide clean, safe, seamless transport while protecting the environment. Whilst the future is uncertain, the TfSE policy context encompasses future mobility and planning for low carbon community, by encouraging the thinking towards designing for people and places. The strategy stresses that Transport Technology should not be 'one size fits all', instead requiring tailoring to serve regional and local needs, challenges and assist in realising opportunities.

Within Kent, the **Local Transport Plan 4: Delivering Growth without Gridlock 2016-2031** identifies the transport priorities for the borough, and sets out the key policies and funding streams for delivering strategic outcomes. This places particular importance on improved strategic transport networks in the county as an enabler of economic growth, in addition to promoting sustainable growth and securing the required transport infrastructure to support it. The Plan identifies target outcomes for the county as:

> Economic growth and minimised congestion,

> Affordable and accessible door-to-door journeys,

> Safer travel,

> Enhanced environment, and

> Better health and wellbeing.

Against this backdrop, the supportive policy context lends itself to ambitious developments, which seek to embed future mobility thinking into their offering where it aligns with the outlined target outcomes.

Megatrends Analysis

Future Mobility in practice

Figure A1 **Precedents of Future Mobility with relevant examples in the local region**

Gridserve are developing, constructing and will operate the UK's first network of Electric Forecourts® which will be powered by clean, zero carbon solar energy and battery storage projects. This network will comprise more than 100 forecourt sites on busy routes and near powerful grid connections close to towns, cities and major transport hubs, including one in Braintree, Essex.

Local Star

In efforts to drive modal shift away from car ownership to shared zero emissions transport, Kent County Council is leading a consortium with Southeastern Rail, Fastrack BRT, Arriva, Better Points, Via Van and the University of Kent in support of a MaaS Framework. It will commence with the Fastrack BRT & the local rail services in 2022 as a pilot in Ebbsfleet, with ambitions to roll out across Kent from 2023 to 2025. The Kent MaaS strategy will include rail, demand responsive transit (DRT), Fastrack autonomous electric bus services, local bus services, bike & ebike hire; electric car club hire and other mobility options suitable to the county.

New Business Models

Cleaner Transport

Automation

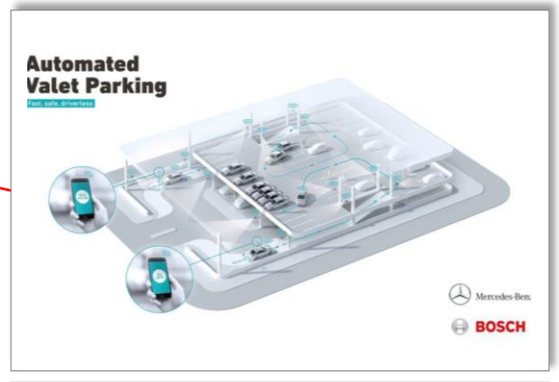
e.g. Digital kerbside management

Examples and Potential Interventions

Data & Connectivity

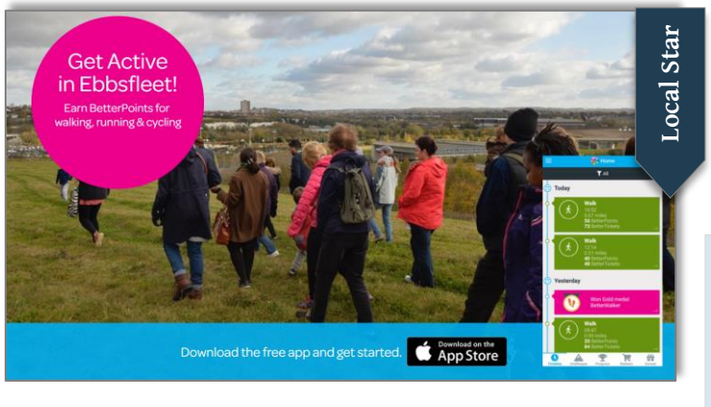
New Modes

Changing Attitudes



e.g. Automated Valet Parking Infrastructure - Mercedes-Benz Museum in Stuttgart.

e.g. New micromobility – Escooter trials in Birmingham



The Ebbsfleet Development Corporation has partnered with BetterPoints to develop a mobile app to prompt behaviour change towards active travel in the Ebbsfleet area. The main incentive of the scheme is the digital currency, BetterPoints, which enables people to redeem reward vouchers from major high street brands or donate to national or local charities. During the Covid-19 Pandemic, the app has shifted to encourage home-cased activities for staying active.

Megatrends Analysis

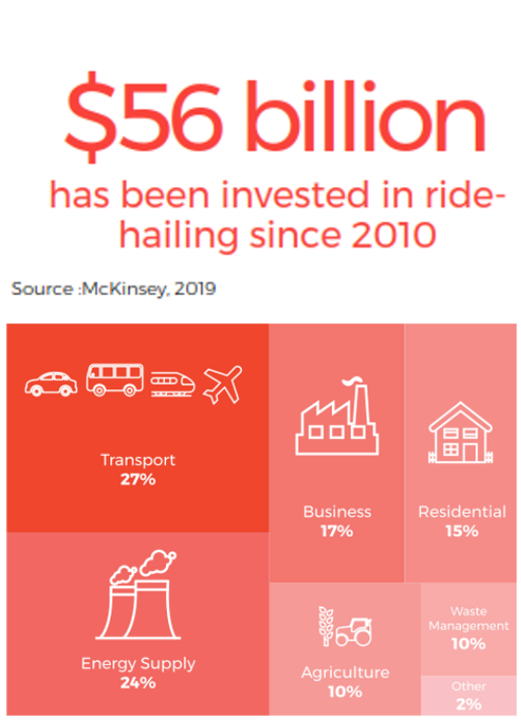
The access and mobility needs of our society are increasingly influenced by several mega trends that shape many other aspects of society. These in turn influence how, when, and where people will need to travel. The megatrends have the potential to influence how future visitors of London Resort navigate and experience the Development. These megatrends can be broadly categorised as follows:

- Demographic challenges
- Social change
- Environmental focus
- Economic shift
- Political landscape

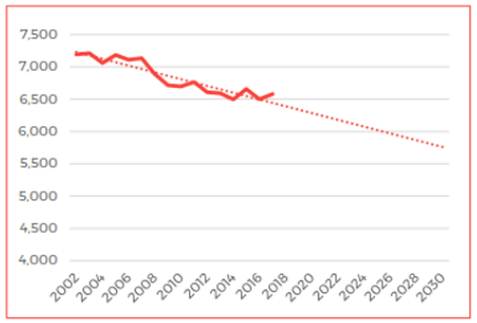
The rate of change of some of these trends will vary enormously from place to place and whilst some may induce significant change others will not. Many, if not all of the trends either directly or indirectly influence the mobility agenda and decisions made by businesses, communications providers, vehicle manufacturers, network operators and service providers.

The longer-term impacts of Covid-19 on the trends is still unknown, but there is the potential that some may be accelerated going forward.

Figure A2 **Megatrends Headline Figures**



Others include Public, Industrial Processes and the Land Use, Land Use Change and Forestry (LULUCF) sectors (note that LULUCF acts as a net sink of emissions). Percentages may not sum to 100% due to rounding.



Total distance travelled per person per year (miles)
Source: Department for Transport's National Travel Survey, 2018

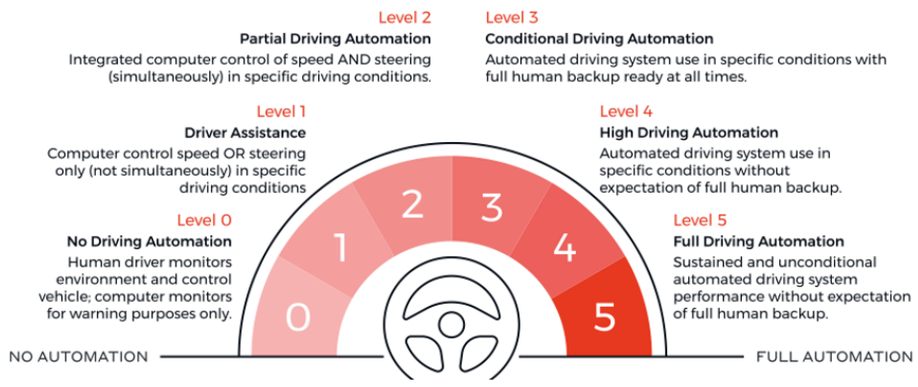
15%
of online shoppers have signed up for **one or more subscriptions**
Source: Forbes, 2018

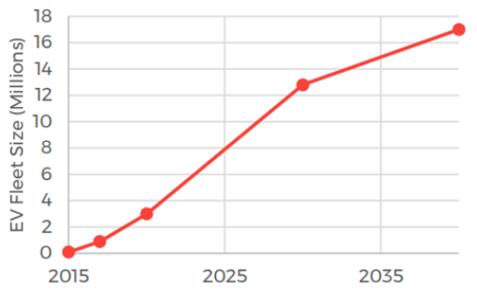
In May 2019 online sales accounted for
19.3%
of all retail sales
(8% increase compared to 2018)

Reason for Travel	Miles per Person per Year (2017)	2002-2017 Absolute Distance Change
Leisure (day trips, sport, entertainment)	910	+3%
Commuting	1309	-7%
Shopping	738	-19%
Escorting others	569	-7%
Business	510	-27%
Visiting friends	1212	-15%
Holiday	559	+13%
Personal business	493	-4%
Education	224	+8%
Other including just walk	56	+32%

Average trip distance by purpose per person (miles)
Source: Department for Transport's National Travel Survey, 2017

The spectrum of automation for road vehicles (defined by SAE International)





Forecast of number of electric vehicles in UK by 2040
Source: National Grid Future Energy Scenario 2017 (Two Degrees)

Megatrends Analysis

Demographic Challenges

Table A1 **Demographic Megatrends relevant to London Resort**

Megatrend	Potential Access and Mobility Impact
Ageing Population *An increasingly ageing population will have different transport needs and expectations*	An ageing population will have different expectations and needs of all modes of transport and we will have to consider their vulnerability in design and other assumptions. For instance: • It could change when where and how people travel • It could increase pressure on public transport; older people may be more reluctant to drive or own a car • An increasingly financially burdened ageing population who still need to commute to work, will have different expectations and needs of all modes of transport and we will have to consider their vulnerability in design and other assumptions • It could change the way mobility caters for older members of society, with age appropriate engagement and purchasing options
Health and Wellbeing *Fewer people are undertaking physical activity and many are suffering ill effects of an unhealthy, inactive lifestyle*	• Poor levels of walking and cycling, coupled with concerns over obesity levels, which has increased from 15% of the UK population to 26% since 1993, has led to an increased focus on growing sustainable travel • An increasing reliance on motorised modes • Increased likelihood of experiencing loneliness • Require a more diverse transportation mix to cater for differing physical ability needs and those with hidden challenges
Urbanisation *Cities are growing at a rapid pace*	• Residential populations are growing with knock on positive impacts for both daytime and night-time economies but put pressures upon healthcare and education needs. Generally this expansion has been driven by younger people. Growing resident populations place particular internal pressures on networks however.
Social Inequality *Social inequality still exists within and between areas*	• The investment in, and expansion of cities centres, has put pressure on smaller conurbations as well as less desirable areas within city centres and city regions. Any social inequalities impact transport choices with a dependency on traditional public transport modes even though costs may represent a large portion or expenditure.
Changing Family Composition *Motherhood is increasingly occurring later or not at all and competing with employment which is having impacts on family compositions, roles and intergenerational mixing*	• In 2017, the average age of mothers in UK was 30.5 years compared to 26.4 years in 1975. A number of reasons for this increase in age have been cited, however an antiquated world of work and cost of childcare are reoccurring themes. • The trend has the potential to have a range of knock on effects if it continues across generations, altering the natural chronology of life and making extended families more fragile. Childcare requirements for example could increase if grandparents are too elderly to help with childcare; at present 40% (5 million) of grandparents in the UK are estimated to provide regular childcare for their grandchildren. This in turns risks reducing intergenerational mixing which itself has huge benefits for society, from helping to tackle the like of poor health, loneliness and ageism and could place more pressure on mothers/fathers who may have to look after young children and elderly parents concurrently. • In addition to the increasing age of mothers, the proportion of couples with children with only one adult in employment has halved from 47% to 27% between 1985 and 2015 in the UK, meaning is a decreasing proportion of stay-at-home parents and increasing the reliance of families on childcare services furthermore. Future mobility offerings need to cater for these changing family configurations and norms.
Net Migration *Net migration will continue to fluctuate, region by region, conurbation to conurbation*	In recent years, the population of the South East of England has been shaped by net in-migration from within the UK as well as from abroad. ONS data predicts this net migration to the TfSE region to continue, with populations increasing by 385,700 between 2020 and 2030 due to positive net migration.

This information is based on research available to date in May 2020

Megatrends Analysis

Social Change

Table A2 **Social Megatrends relevant to London Resort**

Megatrend	Potential Access and Mobility Impact
The Covid-19 shift *Consumers have become more hygiene and safety conscious, participating in social distancing practices, accepting working from home and undertaking activities locally*	• The Covid-19 Pandemic has changed the way we live, work and enjoy our leisure time, with anticipated lasting effects. For instance, working from home is expected to become more commonplace, with some companies such as Twitter already announcing that staff will work from home permanently. Additionally, people have steered away from public transport and are undertaking more active travel trips locally due to concerns of hygiene and safety. As an example, in keeping in line with the national requirement to maintain 2m social distancing, Transport for London will only be able to carry around 13-15 per cent of normal passenger numbers on bus and tube even when 100 per cent of services are operating again. • It is expected that the Pandemic will have lasting effects on the hospitality sector, • Changes in consumer behaviour have highlighted how modern society is underpinned by freight. For example, the UK has grown to be one of the world's largest e-commerce markets. According to the University of Westminster this has generated 1.26bn UK deliveries annually across grocery, non-food retail, takeaway and home delivery. This change has contributed to van fleet numbers growing by 71% in the last 20 years to 3.2m with an increased focus on serving urban residential and commercial premises. Whilst it is impossible to know what the new normal will be, it is unlikely we will go back to operating how we operated before. This will require new developments to adjust accordingly.
Acceptance of 'sharing' *Many people are increasingly happy to share assets and services if it is convenient and the price is right – although this may be subdued due the immediate impacts of Covid-19*	• The rise of shared, on demand transportation services such as bike hire, car hire, lift sharing and 'UberPool' type services have tapped into a willingness for people to share assets and services for financial benefit. There is evidence that there is a willingness to experiment with a number of these shared mobility services in the South East region. For example, the ArrivaClick flexible minibus service that takes multiple passengers heading in the same direction which initially launched in 2017 in Sittingbourne Kent, reported that 43% adopted service for their daily commute and 52% of customers switched from private motor transport (inclusive of own car, taxi and passenger in car) to the service, showcasing the business model potential. • At a wider geographical scale, a global survey carried out by Dalia Research in 2017 documented that 30% of the UK population have used a mobility app to hail, rent or share a ride in some form. Whilst some business models are in their infancy this willingness to 'access' rather than 'own' has the potential to dramatically reduce car dependency in certain conurbations in some use cases.
'Customer' centricity *The customer is always right*	• Transportation has been late in recognising users of networks as customers but with the rise of feedback and sentiment analysis via social media (Twitter and Facebook) and other channels (such as the GrumpNow app), customers now have near real time relationships with network and service operators across all modes. The Department for Transport has realised the great benefits of real-time mapping at times of major incidents and disruption and has announced it is investing £10 million to create a real-time map of traffic jams, however they will have to overcome the challenge of providing consistent information and messaging. The Highways England Customer Strategy in turn aims to develop their relationship with customers through building strong dialogues with users and improving the quality of information reaching the customer through the provision of real-time traffic updates through channels such as the Variable Message Signs (VMS).

This information is based on research available to date in May 2020

Megatrends Analysis

Social Change

Table A3 **Social Megatrends relevant to London Resort**

Megatrend	Potential Access and Mobility Impact
Trends to simplicity *Real demand for cutting out the complexity and making it easy as possible to carry out the essentials*	• New technologies are making it possible to reduce the complexity in products, services, procedures and communications. Consumers in turn are no longer willing to accept complexity, instead demanding transparency, simplicity and availability in everything. In the context of transport, new mobility business models, enabled by innovative digital technology, have challenged long-established transport players and are increasingly offering personal simplified user experiences. • However, despite technology being able to offer access and simplification to many aspects of life, it has also been the source of a barrage of notifications and content that many people have deemed to clutter their daily existence. There is an increasing awareness of personal technology usage, fake news and privacy concerns amongst other issues that has led to growing numbers of people disconnecting and unsubscribing from the digital world. Recent digital wellbeing updates to popular smartphone software reportedly surprised many by putting a numerical figure on the amount of time they spend on their phone, with the average British person checking their phone every 12 minutes. Emerging mobility companies and organisations must in turn put human value at the forefront of their innovation so to develop 'technology with respect for users' time, attention and privacy'. Digital wellbeing need to be central in thinking around the future of mobility to make sure technology improves lives rather than distracting from, so to not inhibit the digital mobility revolution and the opportunities for society that come with it.
Rise of 'experience' economy *People are buying less 'stuff' but spending more doing things*	• A number of retailers have described a shift from customers consuming products to more disposable income being spent on 'experiences'. This is resulting in a shift within our retail centres, towns and cities with a focus on leisure rather than shopping activities with an associated rise in food, drink and leisure activities. The 2018, PwC analysis of high street composition in turn revealed that the South East suffered a net loss of 197 retail stores on the high street between January and June of 2018. The report highlights that retail closures vary geographically, with the likes of Bracknell actually seeing significant growth but with Reading experiencing a significant decline. Booksellers and coffee shops were the type of units which saw the most uplift in the time period, bucking the overall downward trend. • As customers choose to spend their money on experiences, retailers have started to react. Some stores have started offering more immersive retail experiences, branded 'retailtainment' a mix of retail and entertainment, which aims to entice customers back into stores. At Bluewater shopping centre in Kent for example, customers to the Virgin Holidays store can try premium class seats, use virtual reality to research holidays destinations and make use of the free 'Taste Your Holiday Bar'. Virgin executives maintain that people do not want to do everything online and by offering customers fun and unique in-store experiences, they do not only leave a store with a product or service but also a memory. A new trend called 'reverse showrooming' has also been cited to be benefiting stores, where customers research products and services online first before going into the shop to try products or receive tailored advice, challenging 'death of the high street' testimonies. • The evolution of retail trends like those mentioned above, have the potential to disrupt transport networks if not monitored, whether that be through person trips or logistics, posing questions as to the extent to which people are content with buying online.
Expectation of 'immediacy' and always being 'on' *People want everything on-demand*	• With the rise of the internet and increasing levels of almost real-time consumption of everything from information to food, there is an increasing expectation for immediate access to products and services. Online sales for example, accounted for 21.5% of all UK retailing sales in November 2018, increasing from 19.9% in November 2017. With 'Just Eat' and 'Deliveroo' type fast food deliveries and 'Amazon Prime' type 1-hour deliveries, there are a myriad of extra transportation trips meeting demand. • Although technology has brought about many workplace benefits such as physically freeing employees from desks, it has also brought with it the expectation of immediacy and always being 'on' to the workplace, and has been reported to eliminate the natural breaks employees would previously have taken during the workday and has led to the merging of work and leisure time and more working hours.

This information is based on research available to date in May 2020

Megatrends Analysis

Environmental Focus

Table A4 **Environmental Megatrends relevant to London Resort**

Megatrend	Potential Access and Mobility Impact
Climate Change *Climate change and air quality concerns will increase demand for alternative forms of electricity generation, storage and consumption.*	• Major weather events such as extreme heat waves and flooding, impact the reliability and resilience of our energy and transport networks and services. • The relationship between weather and road, rail and air network operations is well established but designing-in additional cross-modal resilience may be required to avoid disruptions and closures of key links in vulnerable areas. • Low emission zones will drive fleet uptake of cleaner propulsion systems which in turn will impact energy needs for electric vehicle charging, with immediate implications for fleet management operations.
Air Quality *Air quality is impacting urban areas and at locations on the network*	• Road based transport is one of the biggest contributors to poor air quality, the recent opening of smart motorways demonstrates how increasing capacity and air quality demands currently compete. Emerging trends away from diesel and petrol propulsion (as seen through policy initiatives in places like Paris and London, the consideration of Low and Ultra Low Emission Zones, the phasing out of diesel rail vehicles and increasing levels of research into greener fuels and technologies for ships) coupled with commercially viable environmentally alternatives could see reductions start to occur as the fleet changes. • Between August 2017-2018 there was a 32.6% increase in the number of electric vehicle registrations in the UK, indicating an increasing preference for alternative propulsion vehicles. Particulate emissions from non-exhaust sources resulting from the friction required for braking are also harmful to the environment and human health, and the UK is working with international partners to develop regulation for particulate emissions from tyres and brakes.
Role of Renewables *Wind, wave and solar power will reduce reliance on carbon derived fuels*	• Alternative forms of electricity generation, storage and consumption are undoubtedly having an impact on the energy market and whilst electric propulsion is commercially viable for cars and vans, small goods vehicle technology is in its infancy and HGVs even less developed. On the railways hybrid, battery and hydrogen technologies are being tested to supplement areas of electrification. Policy interventions such as planned bans on petrol and diesel road and rail vehicles will potentially accelerate renewable alternatives but growth will result in challenges to energy generation, storage and distribution networks.
Low Carbon Energy *Adoption of low carbon energy sources reduce reliance on other geographies*	• Since 2008, reducing the carbon emissions from electricity generation has been the focus of Government, picking up much of the burden for decarbonisation in the UK. The UK Committee on Climate Change in turn reports that progress in cutting emission in the transport, industry and buildings sectors however has effectively stalled. A variety of low carbon energy sources for transportation are being developed, electric vehicles are described above, and hydrogen propulsion is also gaining interest and investment. Small Modular Reactors for example, similar in form to the nuclear reactors used to power submarines could power local communities and the technology is expected to be commercially available for construction within 10 years. Decentralisation of power generation through the deployment of energy technologies for generation and storage has the potential to give public bodies, businesses and industry the opportunity to take control of their own energy use, possibly offering new revenue streams and boosting competitiveness. The Gyle Premier in Edinburgh for example has a five-tonne lithium ion battery that is charged from the national grid in off-peak periods and powers the hotels for several hours during the day and is predicted to save the hotel £20,000 annually in bills. These alternative energy sources require changes to distribution infrastructure and delivery models which will impact mobility take-up and efficiencies.
Scarcity of Resources *There won't be enough rare earth metals to sustain technological need*	• With the rise of smartphone and battery propulsion a number of commentators have speculated about the availability and cost of the constituent materials that are needed in new technology. A single tesla for example, requires about 15lbs of lithium and cheap, thin solar panels require tellurium which is one of the rarest elements on Earth. Many companies are examining their supply chains to allow for the repurposing of batteries and other items from heavy duty to lighter duties over their lifespans as well as the recycling and reclaiming of materials. Whilst such concerns aren't unique to the South East they will influence supply and demand for new solutions

This information is based on research available to date in May 2020

Table A5 **Economic Megatrends relevant to London Resort**

Megatrend	Potential Access and Mobility Impact
Rise of the 'gig' economy *People may have multiple jobs paid for the tasks they undertake*	• Over recent years there has been a rise in the 'gig' economy where individuals are paid for the tasks they undertake rather than being traditionally 'salaried'. It is estimated that 2.8 million people in the UK currently work within it, 24% of which are in the Greater London region. This shift, which is the subject of political challenge at the moment, may result in increased trip making depending upon the location and type of 'gigs' undertaken. An obvious example is the rise in home shopping deliveries which are undertaken by white and 'grey' vans ('grey' being cars being used as vans) with drivers paid by the item. These single item short trips are impacting local areas, shifting what might have been walk, cycle or short car trips to commercial trips.
'New' business models *Disruptive business models will change the way businesses are markets work*	• The rise in digital technologies has seen numerous disruptive business models emerge in everything from fast food, to holidays and hotels, to the taxi trade. For example, since February 2016 aggregator delivery companies such as Deliveroo, Just Eat and UberEats, have increased the number of takeaway orders by more than 20% in the UK. Whilst impacts in the mobility space have been limited thus far, it is reasonable to expect further new entrants with different offers and ideas as to how mobility can be provided. Some business model solutions may be only applicable for a short period of time or adapt to provide additional functionality or services.
The rise of Automation *Automation has the potential to significantly disrupt who travels, and why, as well as displacing jobs for life.*	• The potential (and in some cases significant) changes in the jobs market will inevitably change when, how and where people travel. Whilst the overall quantum of jobs may not change, as new opportunities arise, the locations inevitably will. Similarly impacts of supply chains could also change altering where goods are assembled and manufactured and in some cases moving production much closer to the customer. • Considering social care and health needs in particular, as highlighted earlier with the ageing population discussion, there could be a shift in needs and provision which could also impact wider trip making. • Larger numbers of job changes may result in changes in how, when (time of life and within lifestyle) and where learning and upskilling is undertaken with subsequent impacts upon digital and physical access.

This information is based on research available to date in May 2020

Table A6 **Political Megatrends relevant to London Resort**

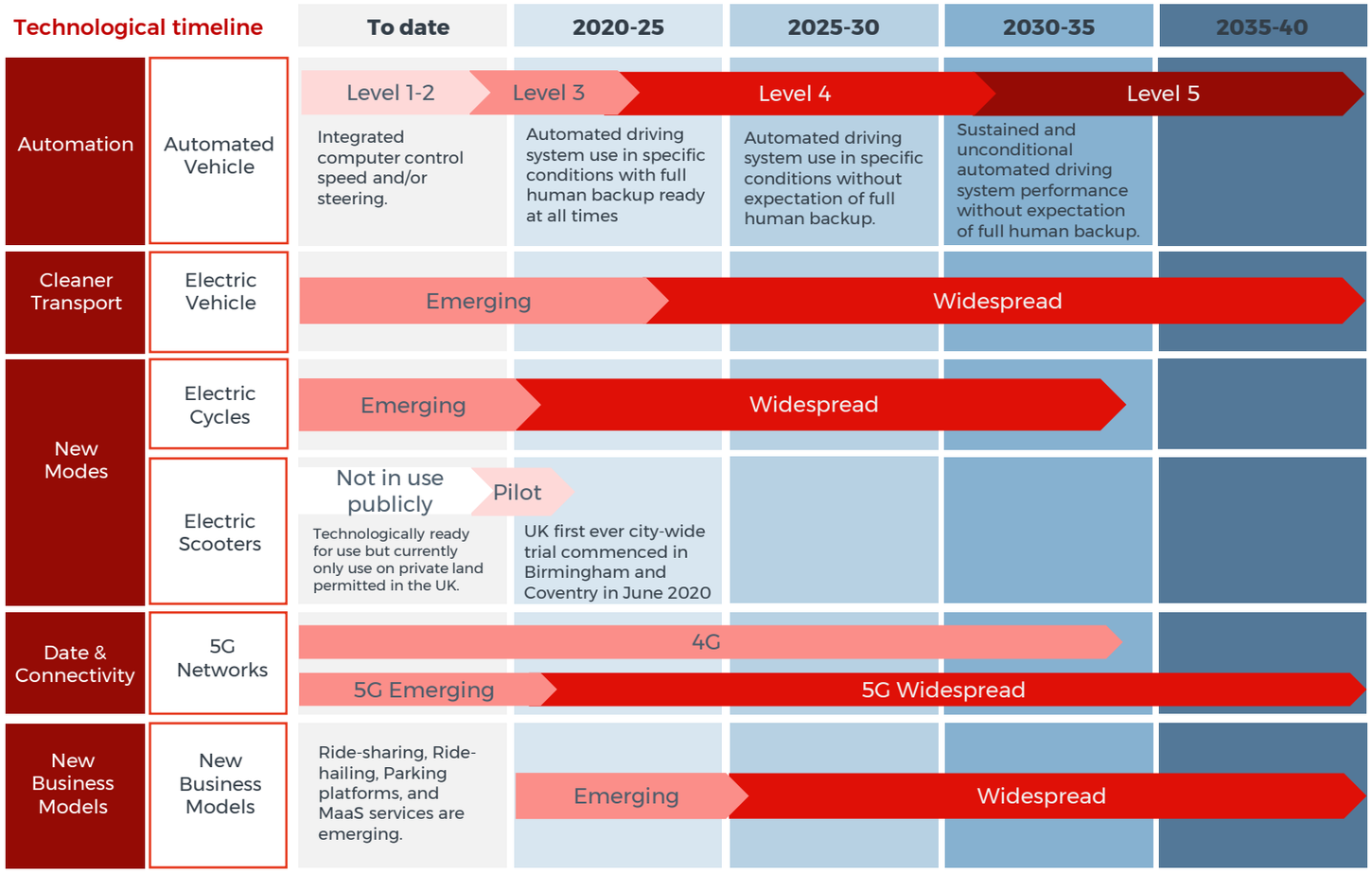
Megatrend	Potential Access and Mobility Impact
Devolution of decision making *More decisions will be made at the regional or city level*	• Devolution could have positive impacts where powers are granted. The Government is increasingly supportive of Sub-national Transport Bodies (STBs) such as Transport for the South East as outlined in the Transport Investment Strategy and aims to 'open up government decision making to ensure that infrastructure investment takes account of regional transport strategies'.63 It should be noted however that no STB exists in isolation and each has relationships and dependencies which need to be acknowledged and integrated in the decision making process. For the TfSE region, there are strong existing links with England's Economic Heartland and Greater London which need to be at the forefront of decision making. Transport also must be considered in concert with energy, healthcare, education and other primary needs as the mobility will become facilitators (or inhibitors) to economic and social prosperity.
Protectionism of markets *An increase desire to shop and trade locally*	• There is a growing movement relating to production and consumption of products and services at a local level as part of a desire to consume 'artisanal' or 'different' products from those supplied within an increasingly global market place. These local supply chains may be small and diverse with variable supplier and customer trip making needs. It should be noted however that the British Independent Retailers Association reported that although more independent shops opened in the first 6 months of 2018, compared to the same period in 2017, that a record number of stores were also closed over the same period. Most of these were located on high streets across the country.
Globalisation of markets *Market will become increasingly global*	• With an increasingly global marketplace and consumer desire to have near instant access to products (including food), fast, reliable and resilient connectivity to ports and airports will be crucial. The South East provides key access points to international markets including the UK's second busiest airport (Gatwick), the Port of Southampton deep-sea port on the main international shipping line, the Port of Dover (Europe's busiest ferry port and where 7th of all UK trade passes through) and also the Channel Tunnel high speed rail link. In 2017, less than half of the food consumed in the UK was supplied domestically, revealing the deep routed nature of the global marketplace. As conurbations expand it will be essential that those flows are kept moving, particularly in relation to food and critical heath related consumables, will be essential.

Technology timeline

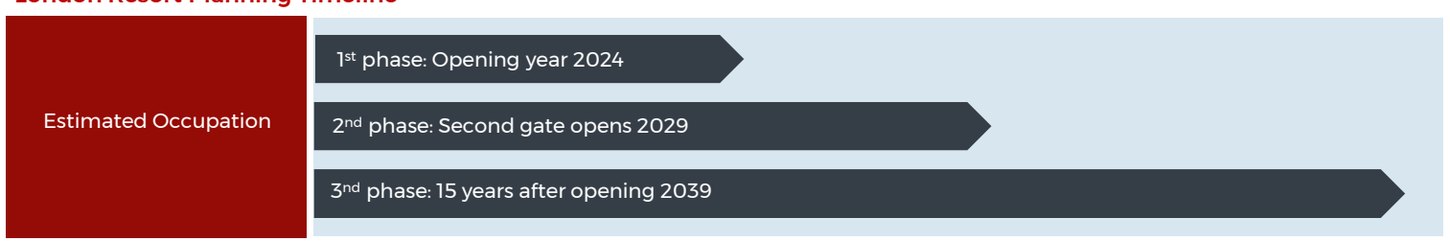
As alluded to, the rapid advances in technology are changing the way we travel. How these changes are reflected within the planning of new development is paramount, particularly as the build-out timeline will be realised as these changes come to fruition.

In this light, Figure 5 looks to map technological advancements against the planned scheme build out

Figure A3 **Technology Timeline against London Resort Scheduled Build-out Programme**



London Resort Planning Timeline



** Based on research available in May 2020*

THE LONDON RESORT

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Part B

Mosaic Analysis and the Transport Classification of Londoners

Visitor Personas

Overview

This task aimed to identify and understand the likely customer segments of the resort, in terms of who they are and where they will be coming from. This can then form the basis of informed and targeted interventions to encourage people onto new and shared modes.

The use of user personas in design is associated with enabling a greater understanding of user needs. It allows us to better view the users, their behaviours and to open our eyes to new opportunities. It helps us to generate meaningful solutions that are human-centred rather than technology focused.

		Kent %	UK %
A	City Prosperity	0%	4%
B	Prestige Positions	8%	7%
C	Country Living	7%	7%
D	Rural Reality	7%	7%
E	**Senior Security**	**11%**	**7%**
F	Suburban Stability	7%	5%
G	**Domestic Success**	**10%**	**9%**
H	**Aspiring Homemakers**	**14%**	**10%**
I	**Family Basics**	**10%**	**8%**
J	Transient Renters	7%	6%
K	Municipal Challenge	1%	6%
L	Vintage Value	5%	5%
M	Modest Traditions	4%	5%
N	Urban Cohesion	2%	5%
O	Rental Hubs	8%	8%

Experian Mosaic

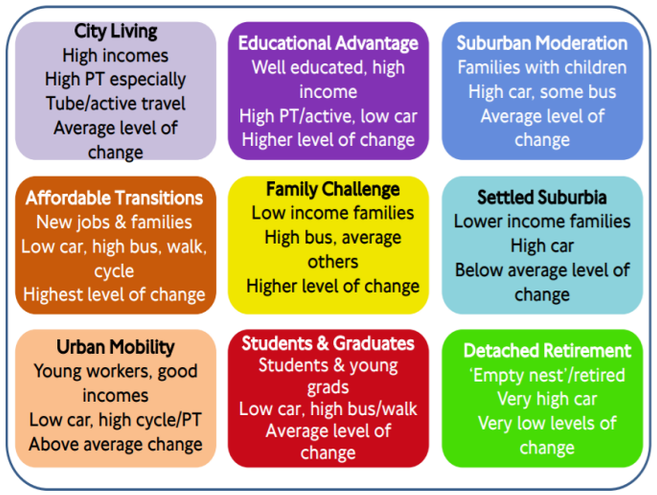
Experian Mosaic data can be used to understand the different demographic groups that make up localities in the UK.

Experian's consumer classification data provides an understanding of the demographics, lifestyles and behaviour of all different communities across the UK. It divides the UK population into 15 different groups, with information about the dominant characteristics of each group. It can therefore be used to understand the potential interactions of different segments of the population with different methods of transportation and be used as a basis from which hypothesises can be made about future mobility uptake. This provides a highly granular evidence base for which to build mobility insights upon.

As way of indication, the table below showcases the persona type in Kent, highlighting the most dominant groups (which also exceed to UK average).

Transport Classification of Londoners

Transport for London have in recent years used their Transport Classification of Londoners (TCoL) tool which allows a multi-modal customer segmentation and a high-level understanding of travel choices and motivations for making those decisions. Seven key variables are used to help determine the TCoL segmentation, which ultimately group Londoners into nine high level segments (as outlined below), with 32 lower level segmentations.



THE LONDON RESORT

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Part C

Mode share scenario testing

Mode share scenario testing

Mode share estimation

Introduction

Using the mode share estimation tool, we have estimated mode shares for Scenario 1 – Base case. The methodology and assumptions used within the mode share estimation tool are outlined in Appendix A.

Based on our assessment, London Resort could achieve the following mode shares, as shown in Figure C1 which is based on the minimum travel time from each local authority and Figure C2 which is based on the maximum travel time.

Table C1 outlines the attendance numbers by group and mode, while the mode share calculations are shown in Table C2 for the minimum travel times from local authorities.

Meanwhile, the maximum travel times from local authorities is outlined in Table C3 for attendance numbers, and Table C4 shows the mode share.

The modes shares take into account the maximum car parking that is provided by London Resort, which includes:

> 10,000 visitor spaces (accommodating 25,000 visitors at an average occupancy of 2.5)

> 500 staff spaces (1,000 people at an average occupancy of 2), and

> 200 coach spaces (6,000 people at an average occupancy of 30.

Mode share estimation

The estimated mode shares are:

> Private vehicle – 41 to 44%

> Coach – 3 to 6%

> Private hire – 5 to 11%

> Car clubs – 4 to 6%

> Rail / tube – 24 to 28%

> Public bus – 6 to 7%

> Ferry – 1%

> Shuttle – less than 1%

> Walk – 1%

> Bike / scooter – 4%.

Figure C1 **Potential mode share**
Minimum travel time

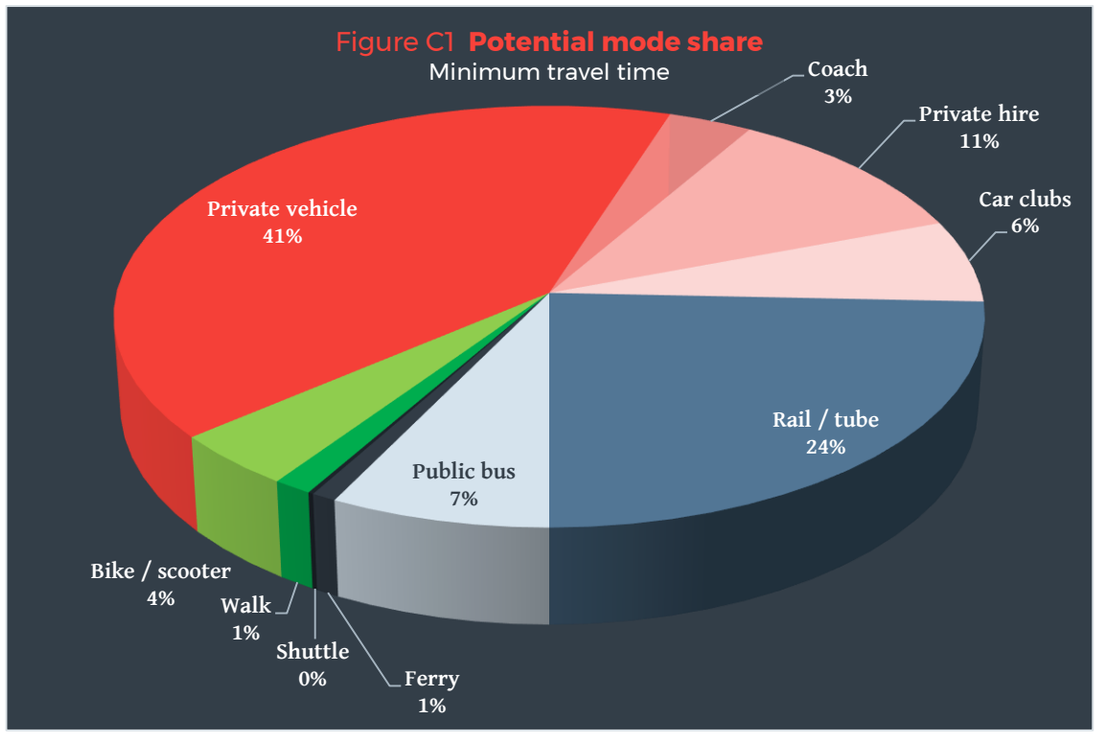
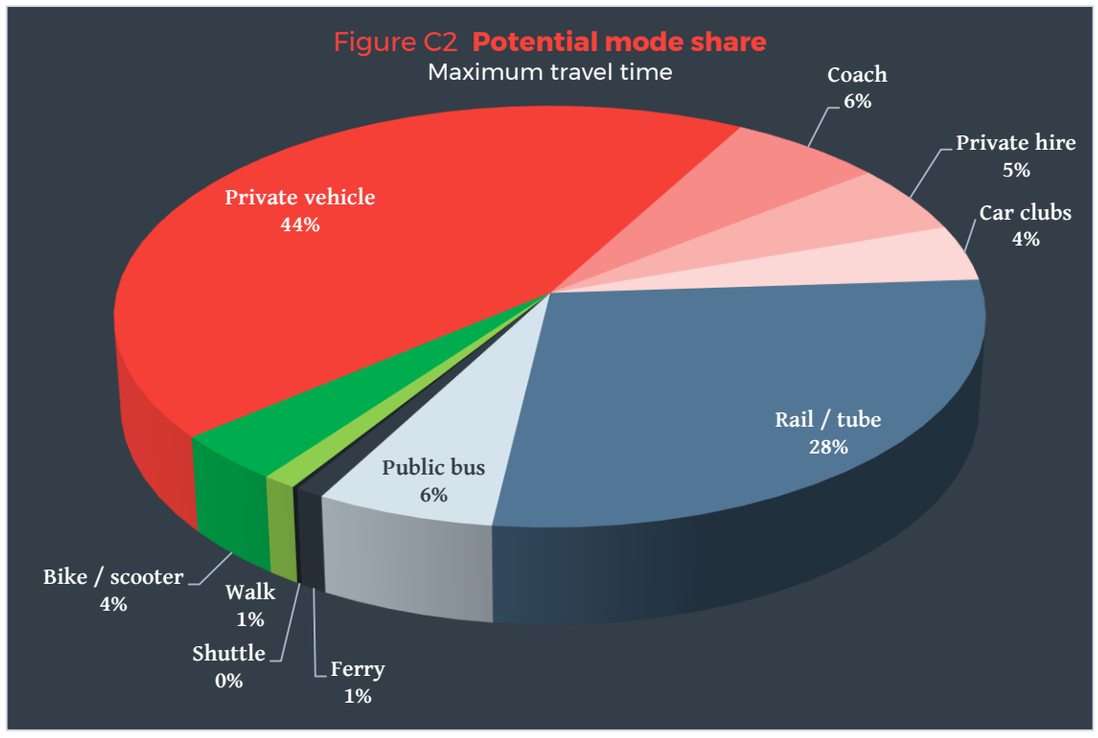


Figure C2 **Potential mode share**
Maximum travel time



Mode share scenario testing

Scenario 1 – Base case

Table C1 **Attendance numbers by group and mode (based on minimum travel time)**

Mode	Staff	UK Home Origin	Nearby Daytrip	From Off-Site Hotel (Domestic)	To On-Site Hotel (Domestic)	From Off-Site Hotel (International)	To On-Site Hotel (International)	Visitor totals	Visitor and Staff Total
Private vehicle	**1,000**	9,915	1,023	1,265	965	2,536	2,120	**17,824**	**18,824**
Coach	**0**	1,591	0	0	0	0	0	**1,591**	**1,591**
Private hire	**1,901**	1,666	266	281	2	564	289	**3,068**	**4,969**
Car clubs	**0**	2,891	0	0	0	0	0	**2,891**	**2,891**
Rail / tube	**2,151**	4,766	548	773	175	1,551	1,177	**8,991**	**11,142**
Public bus	**2,926**	352	18	23	0	47	0	**440**	**3,366**
Ferry	**54**	124	23	59	0	119	1	**326**	**381**
Shuttle	**0**	0	0	27	0	55	0	**82**	**82**
Walk	**432**	142	4	6	0	11	0	**163**	**594**
Bike / scooter	**1,279**	556	17	28	0	56	0	**656**	**1,935**
Total	**9,743**	22,002	1,898	2,462	1,143	4,939	3,586	**36,031**	**45,774**

Table C2 **Attendance numbers by group and mode (based on maximum travel time)**

Mode	Staff	UK Home Origin	Nearby Daytrip	From Off-Site Hotel (Domestic)	To On-Site Hotel (Domestic)	From Off-Site Hotel (International)	To On-Site Hotel (International)	Visitor totals	Visitor and Staff Total
Private vehicle	**10%**	45%	54%	51%	84%	51%	59%	**49%**	**41%**
Coach	**0%**	7%	0%	0%	0%	0%	0%	**4%**	**3%**
Private hire	**20%**	8%	14%	11%	0%	11%	8%	**9%**	**11%**
Car clubs	**0%**	13%	0%	0%	0%	0%	0%	**8%**	**6%**
Rail / tube	**22%**	22%	29%	31%	15%	31%	33%	**25%**	**24%**
Public bus	**30%**	2%	1%	1%	0%	1%	0%	**1%**	**7%**
Ferry	**1%**	1%	1%	2%	0%	2%	0%	**1%**	**1%**
Shuttle	**0%**	0%	0%	1%	0%	1%	0%	**0%**	**0%**
Walk	**4%**	1%	0%	0%	0%	0%	0%	**0%**	**1%**
Bike / scooter	**13%**	3%	1%	1%	0%	1%	0%	**2%**	**4%**

Mode share scenario testing

Scenario 1 – Base case

Table C3 **Attendance mode share by group and mode (based on minimum travel time)**

Mode	Staff	UK Home Origin	Nearby Daytrip	From Off-Site Hotel (Domestic)	To On-Site Hotel (Domestic)	From Off-Site Hotel (International)	To On-Site Hotel (International)	Visitor totals	Visitor and Staff Total
Private vehicle	**1,000**	10,449	1,073	1,438	953	2,884	2,412	**19,209**	**20,209**
Coach	**0**	2,754	165	0	0	0	0	**2,918**	**2,918**
Private hire	**1,289**	732	81	98	0	196	18	**1,126**	**2,415**
Car clubs	**0**	1,962	0	0	0	0	0	**1,962**	**1,962**
Rail / tube	**3,630**	4,966	519	774	190	1,552	1,155	**9,155**	**12,785**
Public bus	**2,318**	338	15	20	0	41	0	**413**	**2,731**
Ferry	**58**	137	25	73	0	146	1	**382**	**440**
Shuttle	**0**	0	0	28	0	55	0	**83**	**83**
Walk	**366**	135	3	5	0	11	0	**155**	**521**
Bike / scooter	**1,082**	532	16	27	0	53	0	**628**	**1,710**
Total	**9,743**	22,002	1,898	2,462	1,143	4,939	3,586	**36,031**	**45,774**

Table C4 **Attendance mode share by group and mode (based on maximum travel time)**

Mode	Staff	UK Home Origin	Nearby Daytrip	From Off-Site Hotel (Domestic)	To On-Site Hotel (Domestic)	From Off-Site Hotel (International)	To On-Site Hotel (International)	Visitor totals	Visitor and Staff Total
Private vehicle	**10%**	47%	57%	58%	83%	58%	67%	**53%**	**44%**
Coach	**0%**	13%	9%	0%	0%	0%	0%	**8%**	**6%**
Private hire	**13%**	3%	4%	4%	0%	4%	1%	**3%**	**5%**
Car clubs	**0%**	9%	0%	0%	0%	0%	0%	**5%**	**4%**
Rail / tube	**37%**	23%	27%	31%	17%	31%	32%	**25%**	**28%**
Public bus	**24%**	2%	1%	1%	0%	1%	0%	**1%**	**6%**
Ferry	**1%**	1%	1%	3%	0%	3%	0%	**1%**	**1%**
Shuttle	**0%**	0%	0%	1%	0%	1%	0%	**0%**	**0%**
Walk	**4%**	1%	0%	0%	0%	0%	0%	**0%**	**1%**
Bike / scooter	**11%**	2%	1%	1%	0%	1%	0%	**2%**	**4%**

Mode share scenario testing

Mode share estimation

Private vehicles

The total number of staff and visitors estimated to use private vehicles is between 18,800 and 20,200, with the catchment focussed on the South East of England.

The number of staff has been capped at 1,000 to reflect the proposed on-site car parking capacity (500 spaces with an average occupancy of 2 people, while visitor numbers are capped at 25,000 (10,000 spaces with an average occupancy of 2.5 people). The distribution of trips is shown in Figure C3.

Mode share

The average mode share for all staff and visitor groups is between 41 to 44%. The variation reflects the minimum and maximum travel time from each of the local authorities. The variation in mode share across the UK is shown in Figure C4. For staff, the mode share is 10%. For visitors, the average mode share is between 49 to 53%. Mode share varies within the visitor groups. ranging from 45% for UK Home Origin to 84% for From Off-Site Hotel (Domestic).

KEY ESTIMATE FINDINGS

Mode share – **41 to 44%**

Number of visitors – **17,800 to 19,200**

Number of staff – **1,000**

Vehicles (visitors) – **7,100 to 7,700**

Vehicles (staff) – **500**

Potential EV penetration – **18 to 28%**

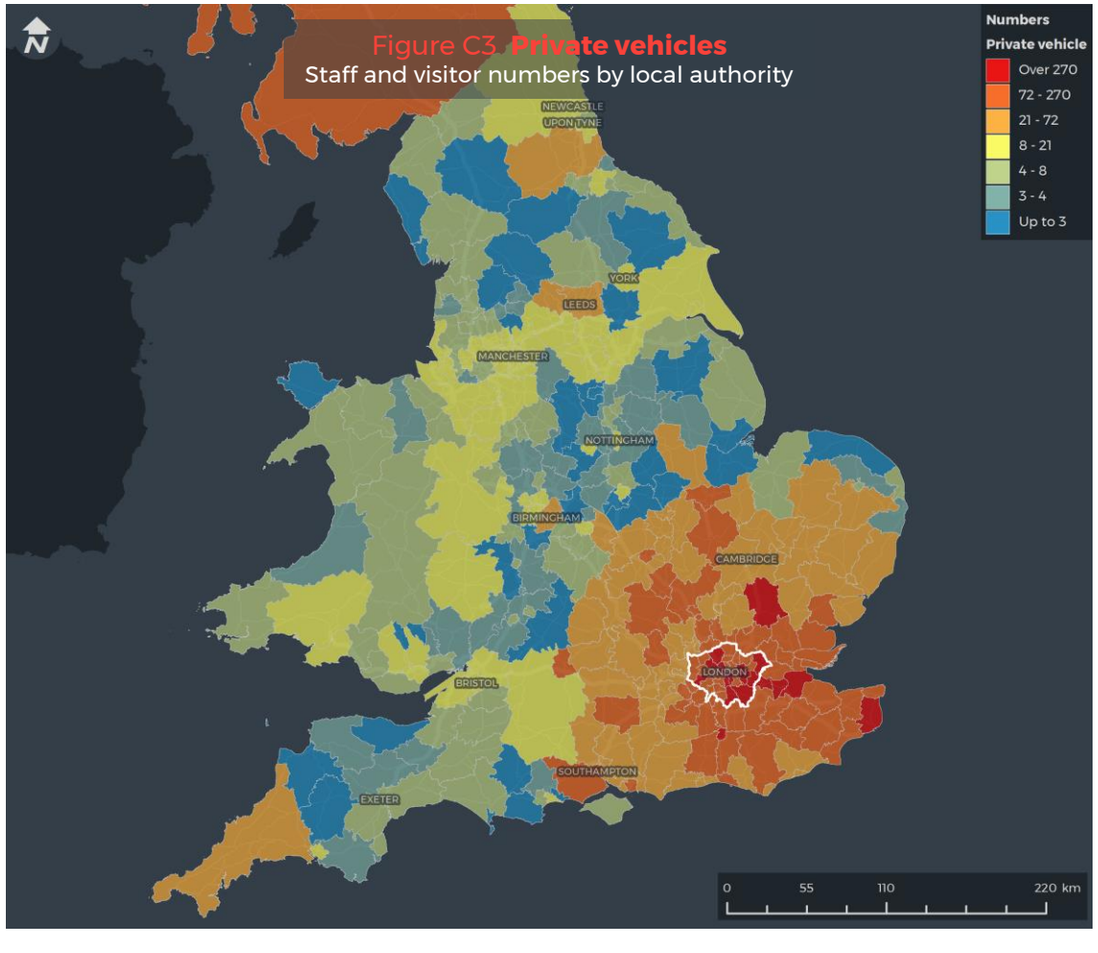


Figure C3 **Private vehicles**
Staff and visitor numbers by local authority

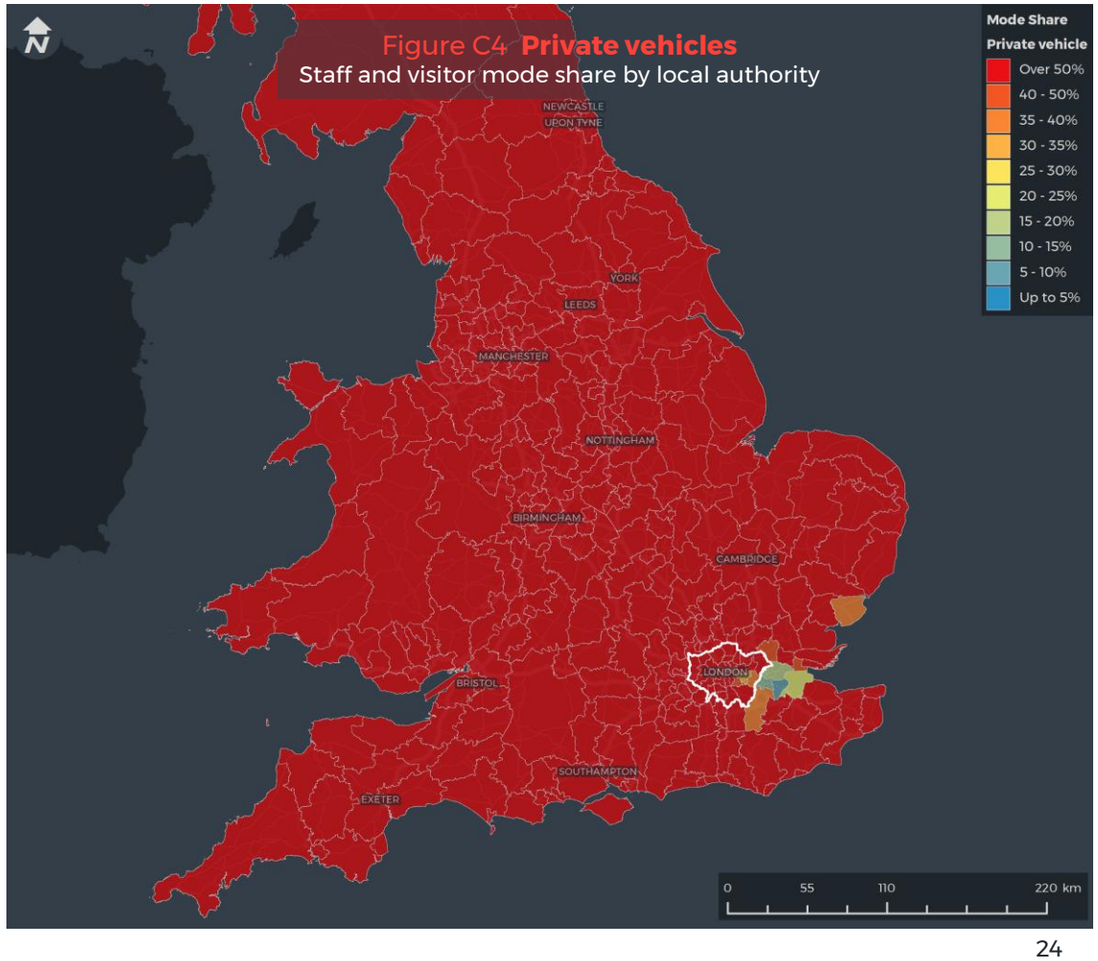


Figure C4 **Private vehicles**
Staff and visitor mode share by local authority

Mode share scenario testing

Mode share estimation

Coach

Coach travel has been limited to the UK Home Origin and Nearby Daytrip groups, and for trips greater than 60 minutes. These assumptions account for longer-distance trips which would be undertaken by coach.

The total number of visitors estimated to use coach is between 1,600 and 2,900. The distribution of trips is shown in Figure C5.

Mode share

The average mode share for coach is between 3 to 6% for both staff and visitors. The variation reflects the minimum and maximum travel time from each of the local authorities. The variation in mode share across the UK is shown in Figure C6.

For UK Home Origin the mode share is 7 to 13%, while it is between 0 to 9% for the Nearby Daytrip group.

KEY ESTIMATE FINDINGS

Mode share – **3 to 6%**

Number of visitors – **1,600 to 2,900**

Number of staff – **N/A**

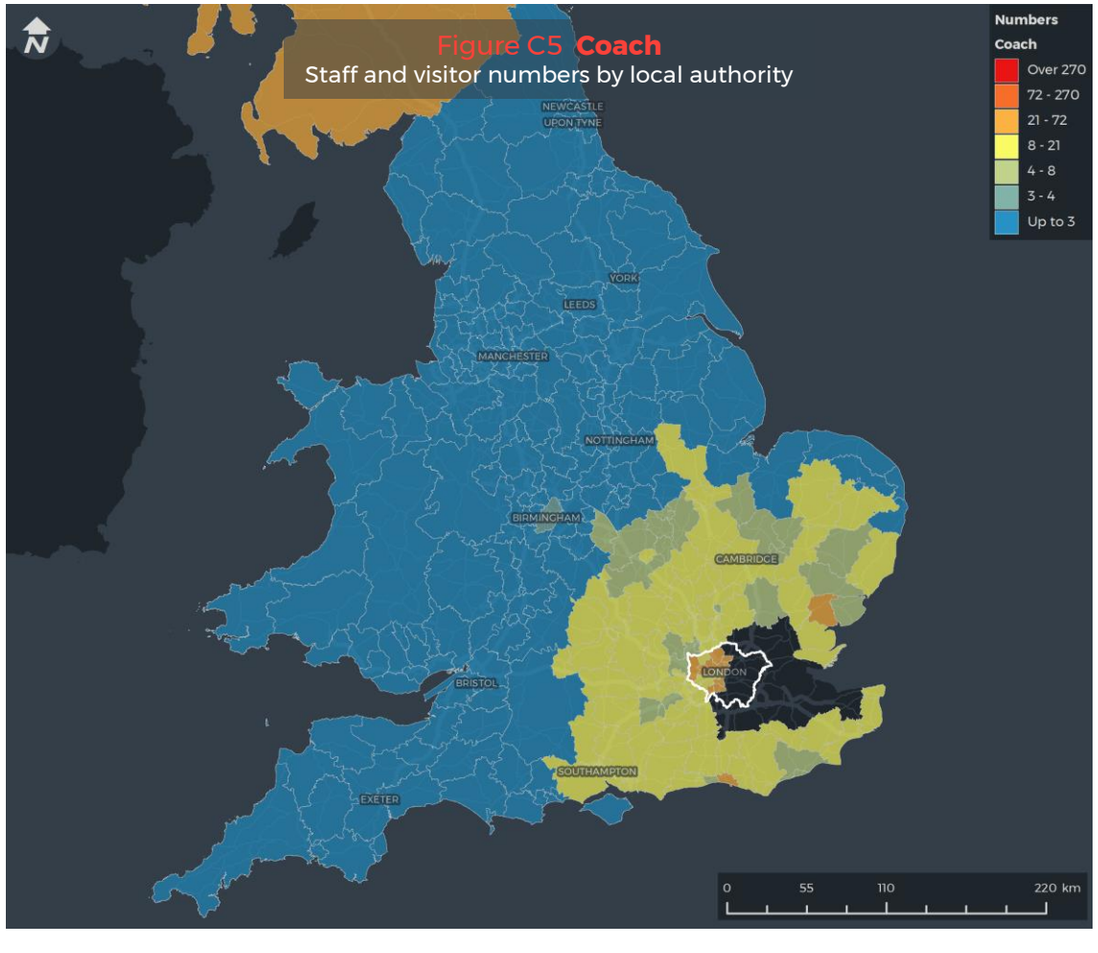


Figure C5 **Coach**
Staff and visitor numbers by local authority

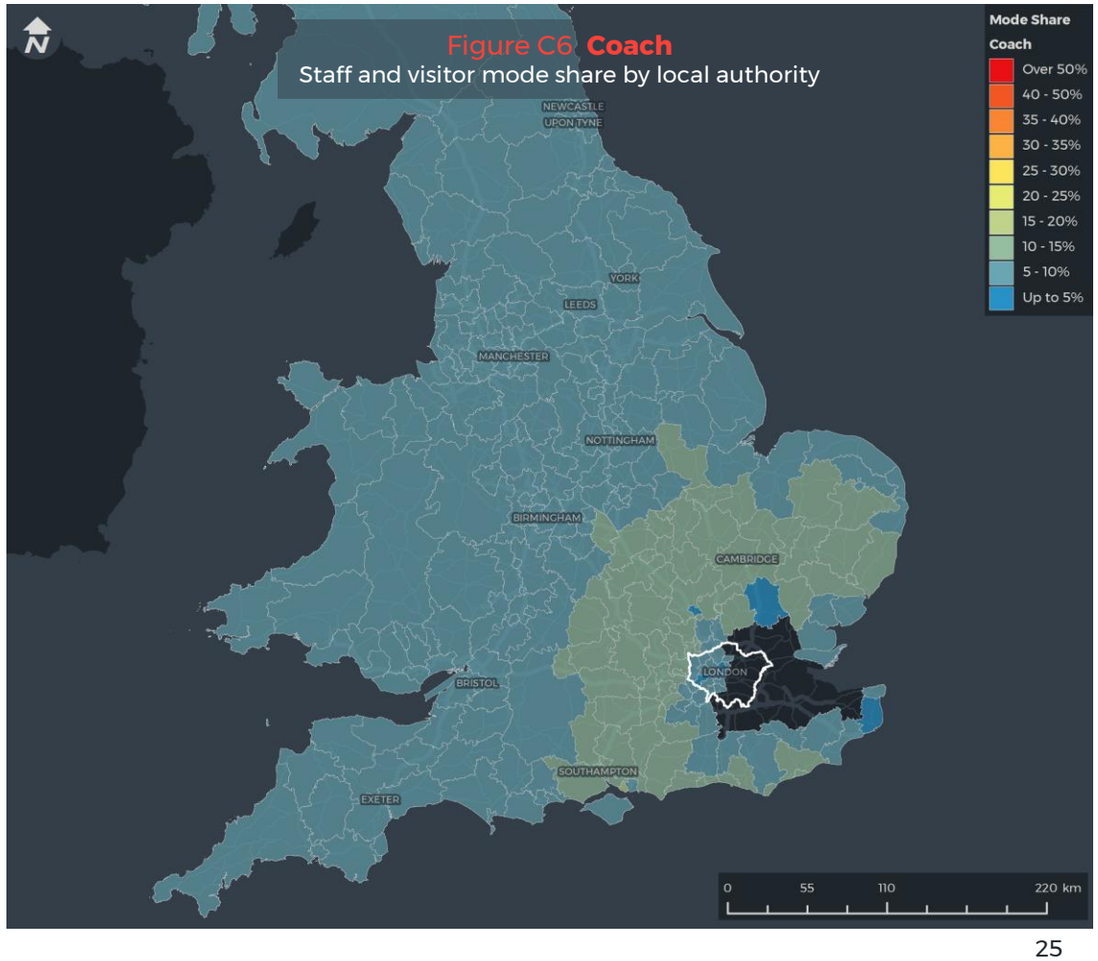


Figure C6 **Coach**
Staff and visitor mode share by local authority

Mode share scenario testing

Mode share estimation

Rail / tube

The mode share tool based the rail / tube assessment on both direct and in-direct trips to either Ebbsfleet International, Swanscombe, Greenhithe for Bluewater, or Tilbury Town (to account for ferry connections across the River Thames). Rail / tube trips were included in the model if the total travel time was less than three hours. The total number of staff and visitors estimated to use rail / tube is between 11,100 and 12,800. The distribution of trips is shown in Figure C7.

Mode share

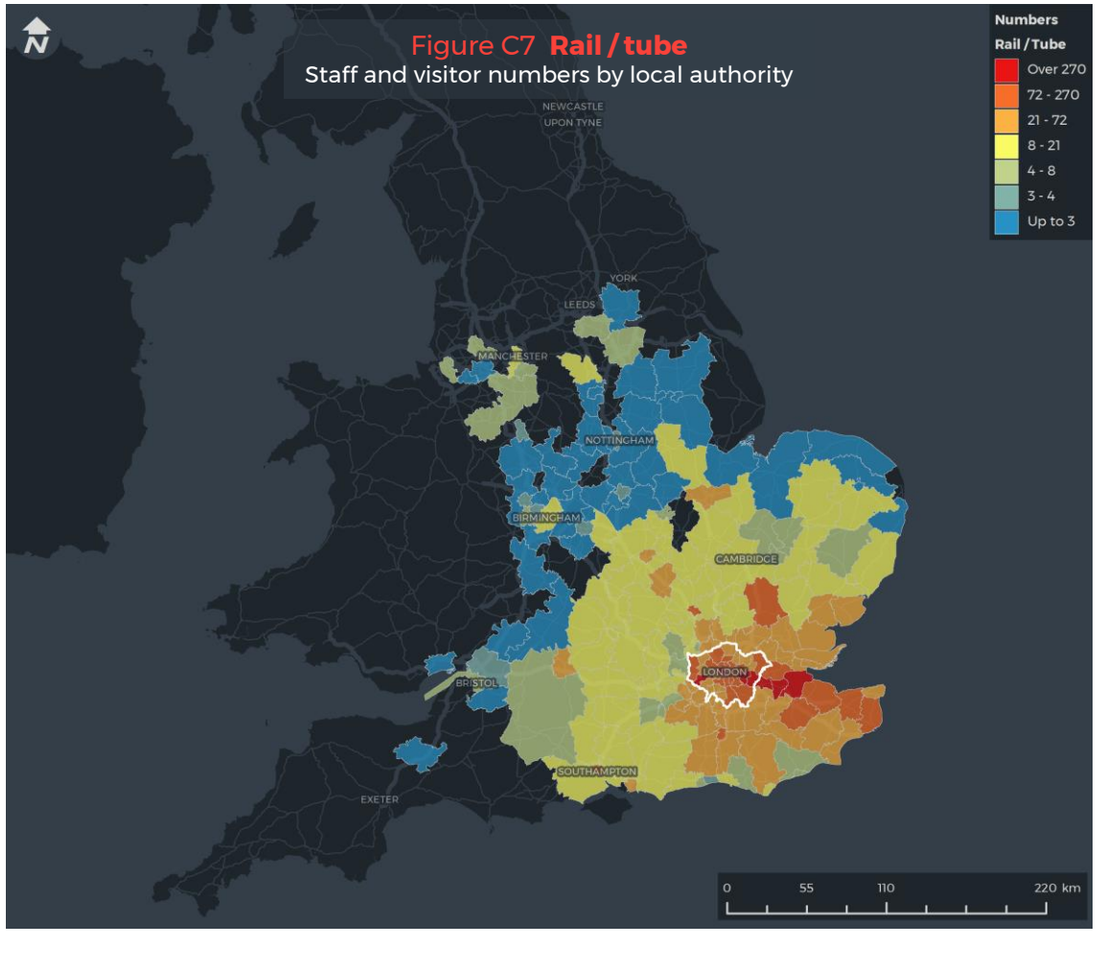
The average mode share for all staff and visitor groups is between 24 to 28%. The variation reflects the minimum and maximum travel time from each of the local authorities. The variation in mode share across the UK is shown in Figure C8. For staff, the mode share is 22 to 37%. For visitors, the average mode share is about 25%. Mode share varies within the visitor groups. ranging from 15% for To Off-Site Hotel (Domestic) to 33% for To On-Site Hotel (International).

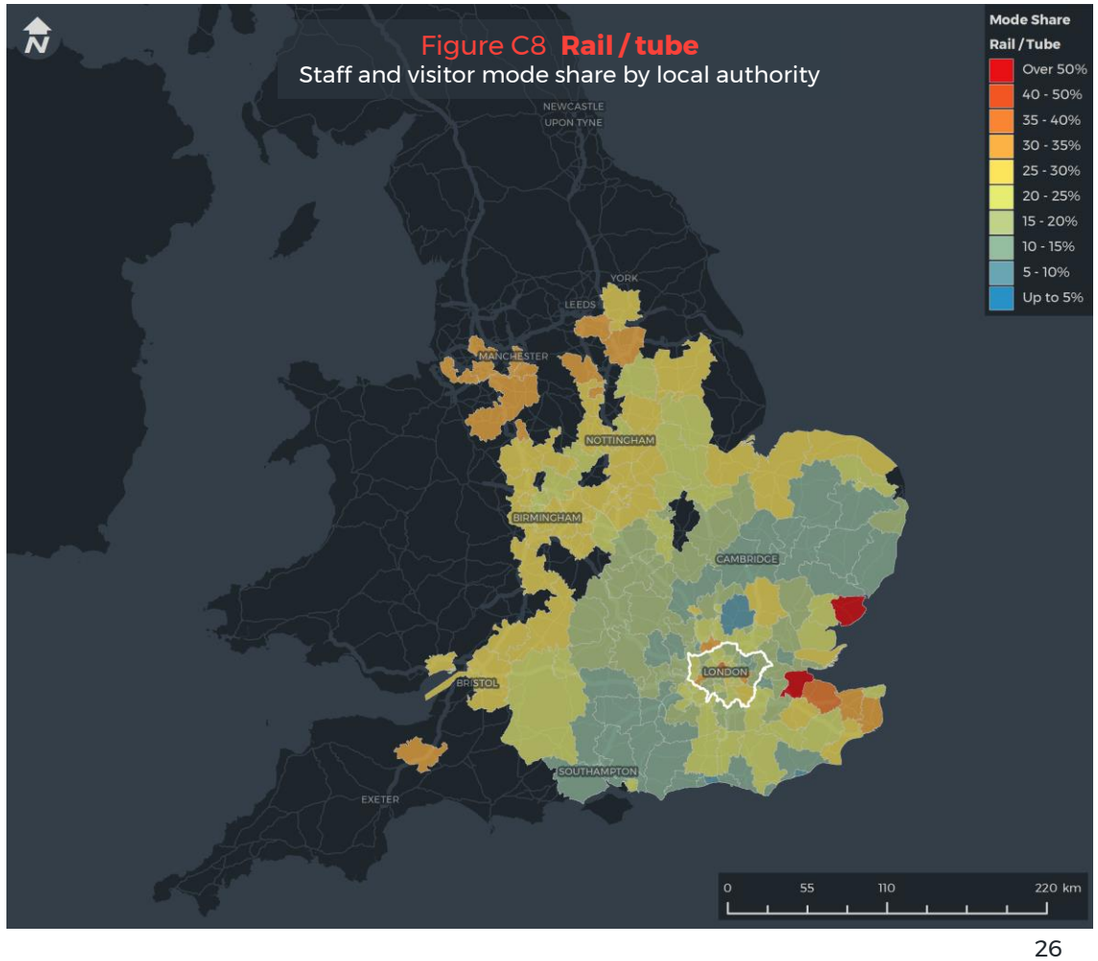
KEY ESTIMATE FINDINGS

Mode share – **24 to 28%**

Number of visitors – **9,000 to 9,200**

Number of staff – **2,300 to 2,900**





Mode share scenario testing

Mode share estimation

Private hire

Within the mode share tool, private hire (which includes taxi trips) was allowed for all groups, and limited to driving trips within 45 minutes of London Resort. The total number of staff and visitors estimated to use private hire is between 2,400 and 5,000, with the catchment focussed on local authorities around the resort. The distribution of trips is shown in Figure C9.

Mode share

The average mode share for all staff and visitor groups is between 5 to 11%. The variation reflects the minimum and maximum travel time from each of the local authorities. The variation in mode share is shown in Figure C10. For staff, the mode share is 13 to 20%. This appears to be a relatively high proportion, and is reflective of the capping of on-site car parking, and staff to be drawn from the local catchment. There is an opportunity to shift staff to other modes through the demand management interventions.

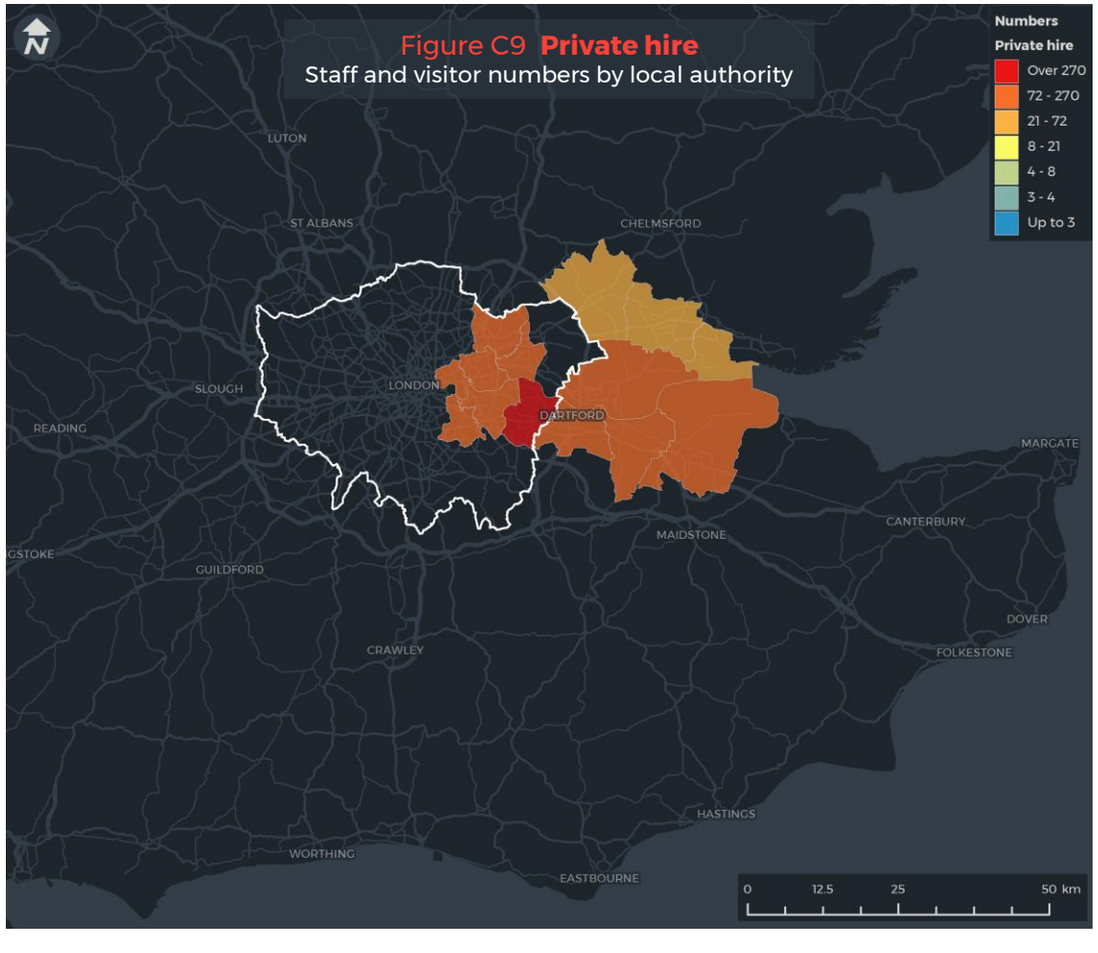
KEY ESTIMATE FINDINGS

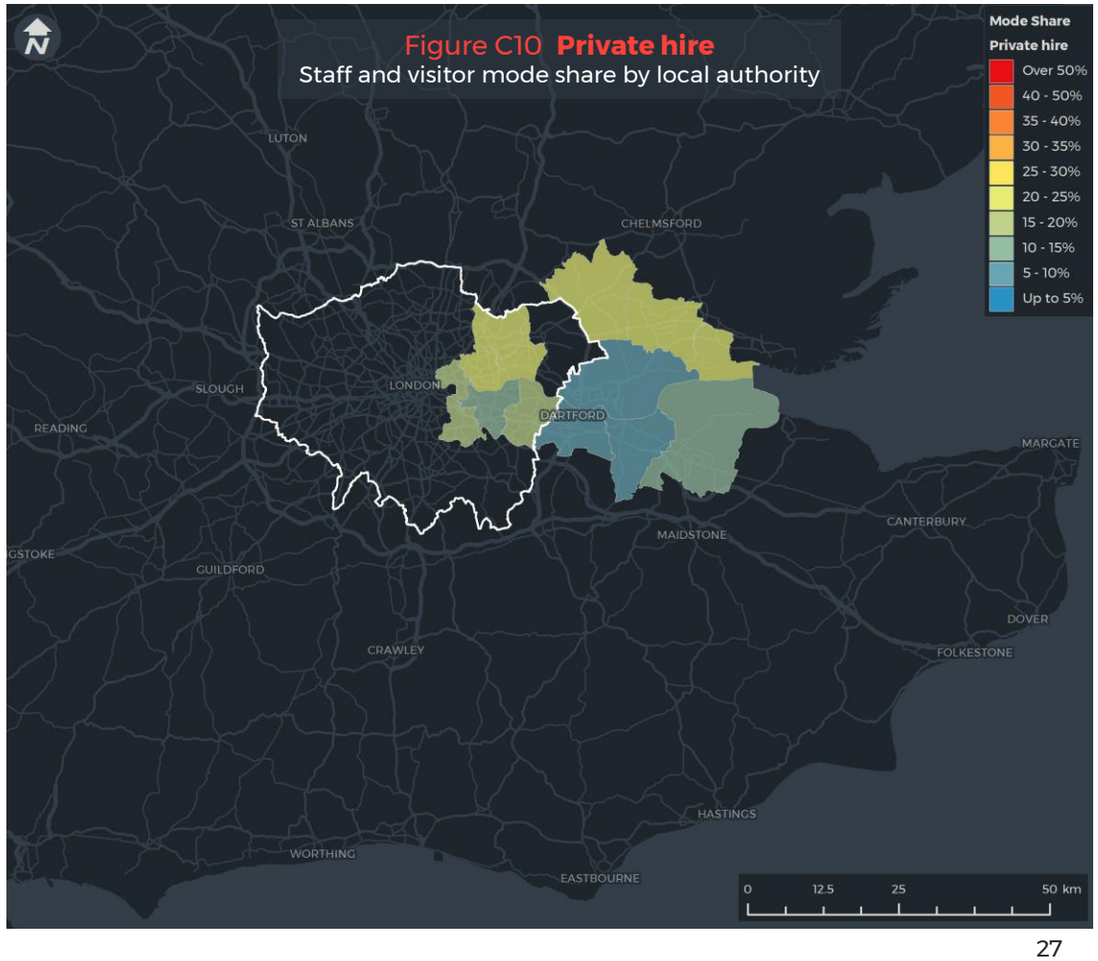
Mode share – **5 to 11%**

Number of visitors – **2,400 to 5,000**

Number of staff – **1,300 to 1,900**

High staff numbers reflective of on-site parking restrictions – opportunity to provide improved bus and rail alternatives through demand management.





Mode share scenario testing

Mode share estimation

Car clubs

Within the mode share tool, car clubs catered for UK Home Origin trips only, and limited to driving trips within 60 minutes of London Resort. The total number visitors estimated to use car clubs is between 2,000 and 2,900. The distribution of trips is shown in Figure C11.

The calculations assume that a range of car club options and operators are available for use by 2029. If car clubs are not available, then these trips would be made assumed to be made by private vehicle.

Mode share

The average mode share for car clubs is between 3 to 5%. The variation reflects the minimum and maximum travel time from each of the local authorities, and is shown in Figure C12.

For UK Home Origin, the visitors, the average mode share is between 9 and 13%.

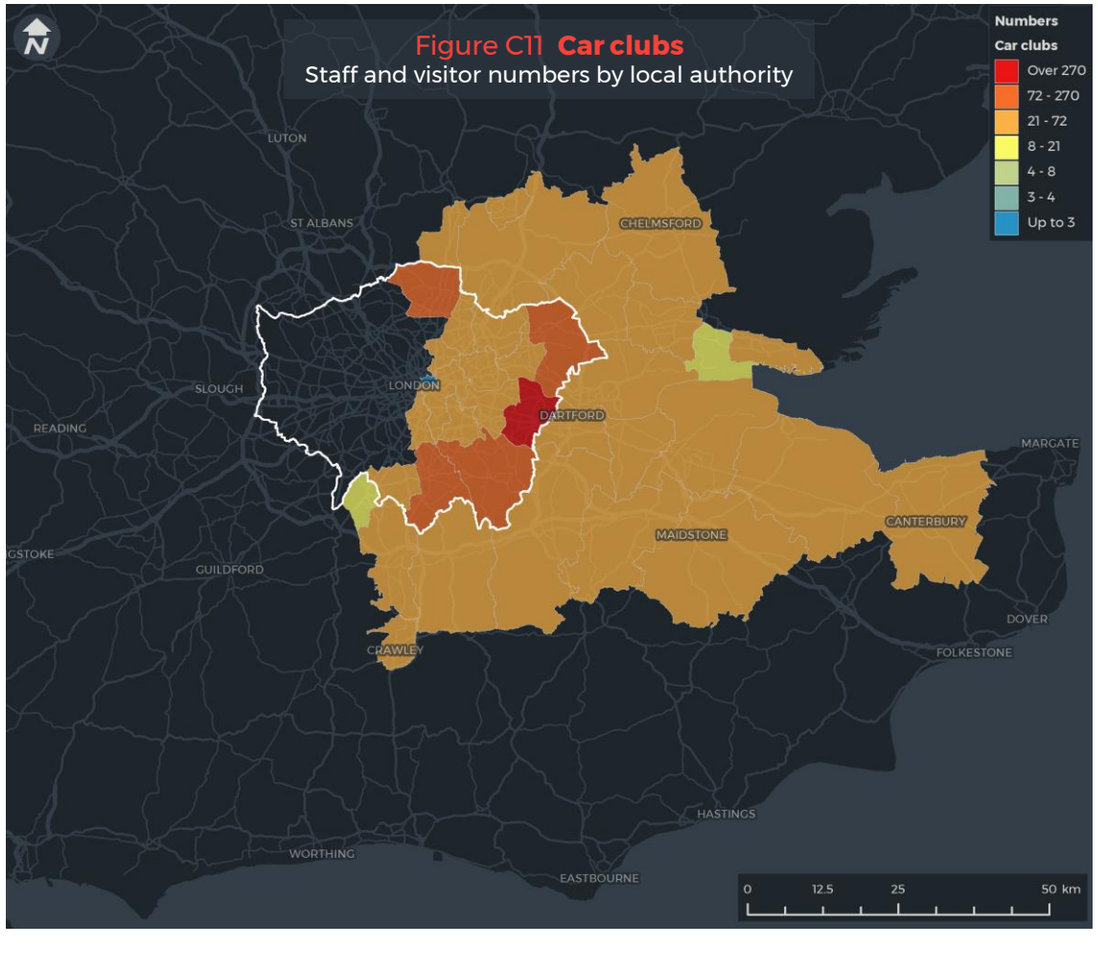
KEY ESTIMATE FINDINGS

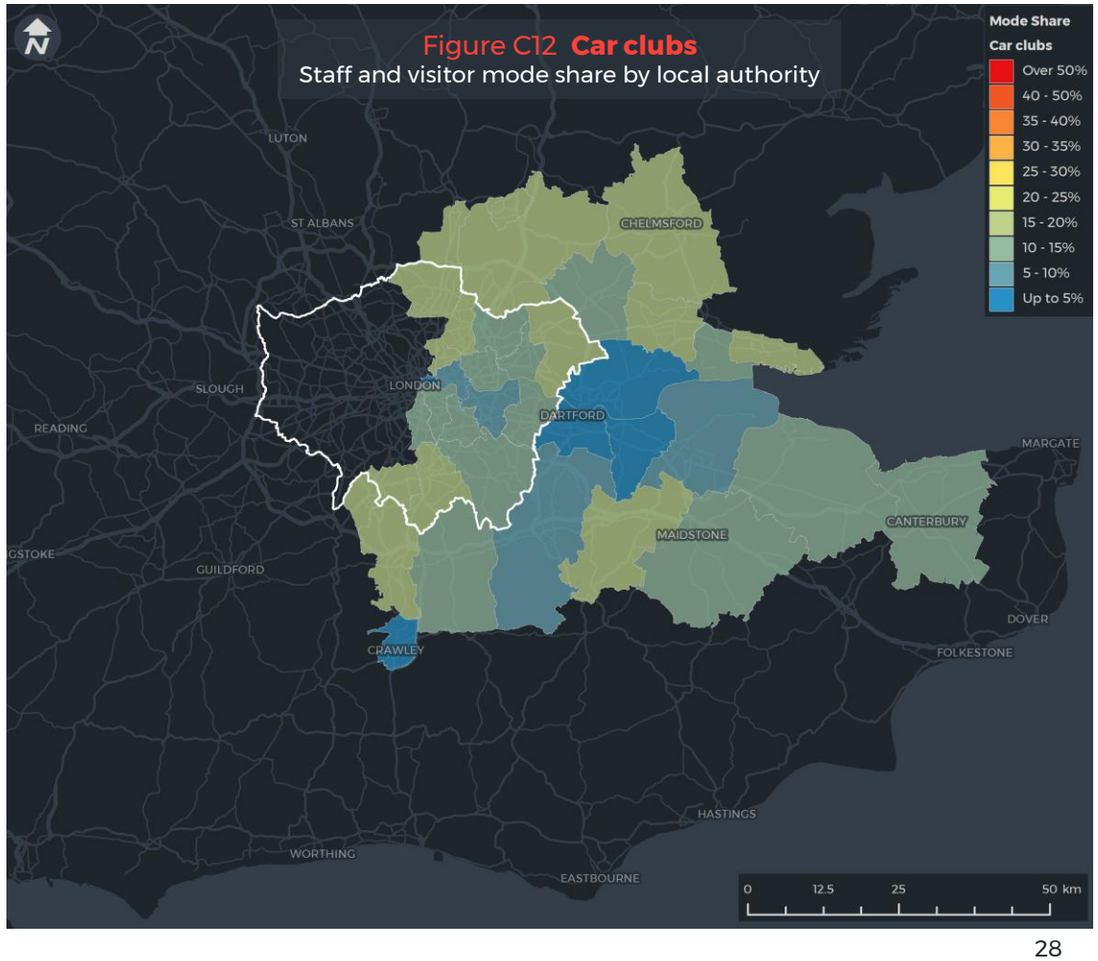
Mode share – **3 to 5%**

Number of visitors – **2,000 to 2,900**

Potential EV uptake – **28.7%**

High mode share in local area based on assumption that car club availability will increase by 2029. Where car club availability low – assumed that trips would switch to private vehicles





Mode share scenario testing

Mode share estimation

Ferry

Within the mode share tool, ferry trips were open to all staff and visitor groups but limited to people within 15 minutes rail / bus / tube connection of a ferry terminal. The total number visitors estimated to use ferry is between 380 to 440. The distribution of trips is shown in Figure C13 and is concentrated in the local authorities adjacent to the River Thames with ferry terminals. Note that this ferry mode share is for main mode only, and does not include river crossings from Tilbury.

Mode share

The average mode share for all staff and visitor groups is about 1%, concentrated on the Inner London Boroughs. The variation in mode share is shown in Figure C14.

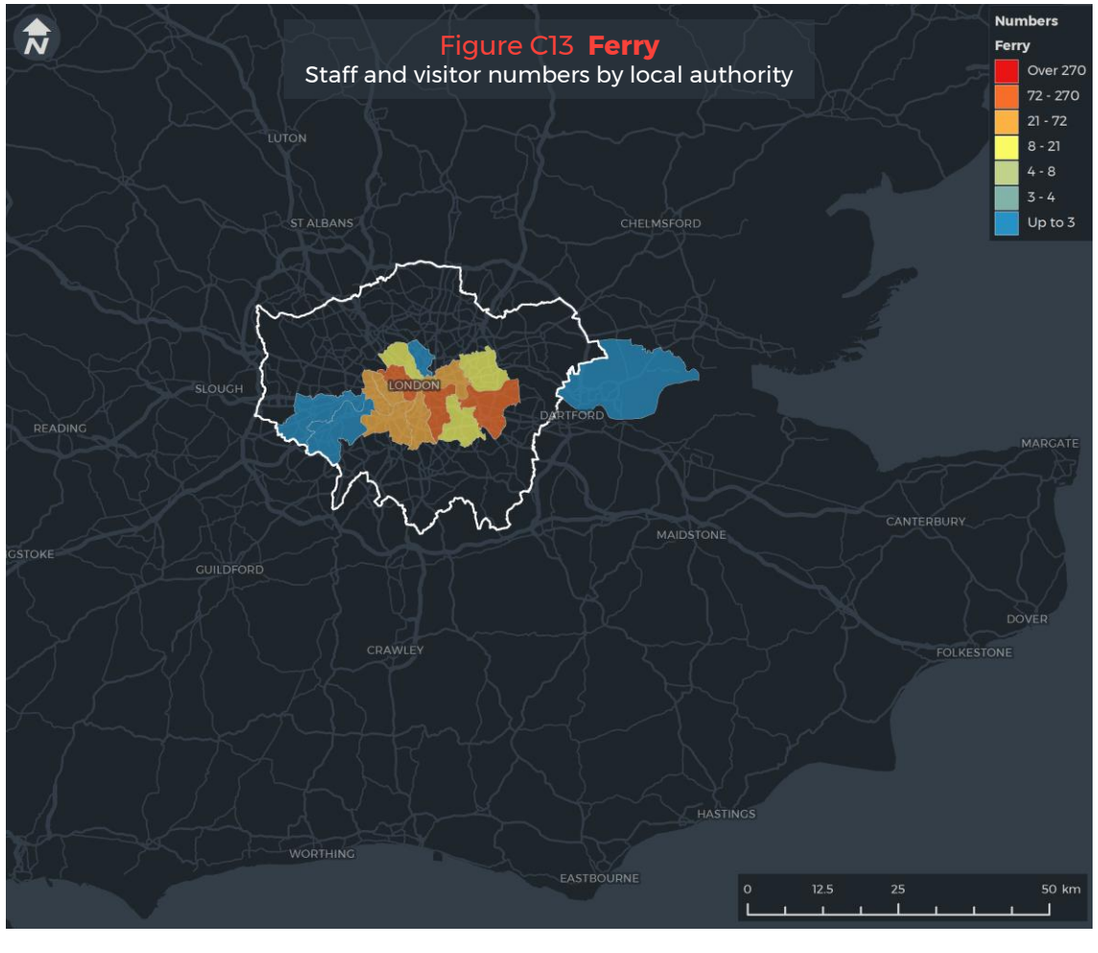
The low mode share reflects the potential travel times getting to the ferry terminals, as well as the travel time to London Resort. However, there may be opportunities to increase ridership and mode share through ticketing options and promoting the ferry as an enjoyable and fun way to access the resort.

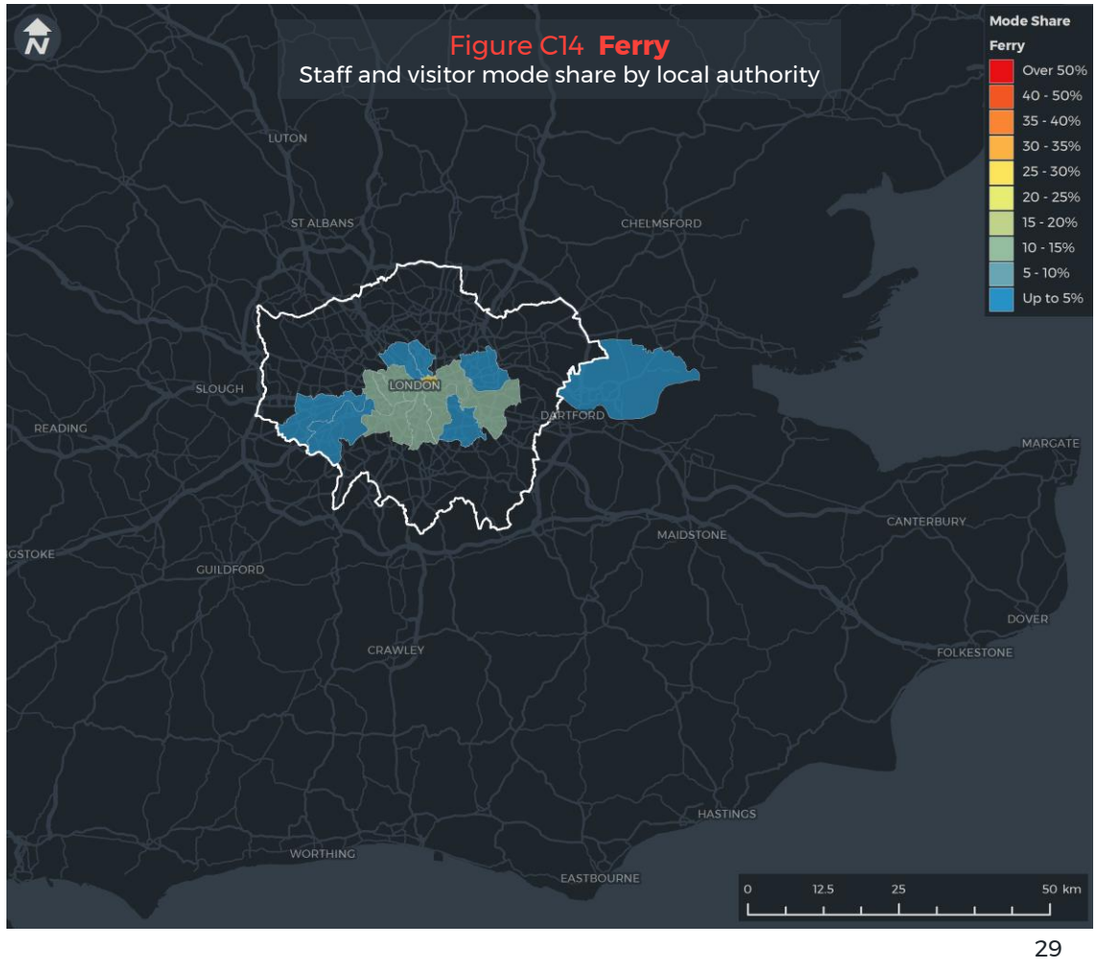
KEY ESTIMATE FINDINGS

Mode share – **1%**

Number of visitors – **320 to 380**

Number of staff – **50 to 60**





Mode share scenario testing

Mode share estimation

Public bus

Bus trips were open to all staff and visitor groups but limited to people within a 60 minute direct or indirect service of London Resort or Tilbury Town (where a connecting ferry crossing of the River Thames could be made). The total number visitors estimated to use the bus (including FastTrack services) is between 2,700 to 3,400. The distribution of trips is shown in Figure C15 and concentrated in the adjacent local authorities. These numbers are for bus as the main mode, and do not include last mile trips from rail stations.

Mode share

The average mode share for all staff and visitor groups is between 6 to 7%. The variation reflects the minimum and maximum travel time from each of the local authorities. The variation in mode share across is shown in Figure C16.

For staff, the mode share is between 24 to 30%. For visitors, the average mode share is about 1%, suggesting that the bus will be of most use to staff.

KEY ESTIMATE FINDINGS

Mode share – **6 to 7%**

Number of visitors – **400 to 440**

Number of staff – **2,300 to 2,900**

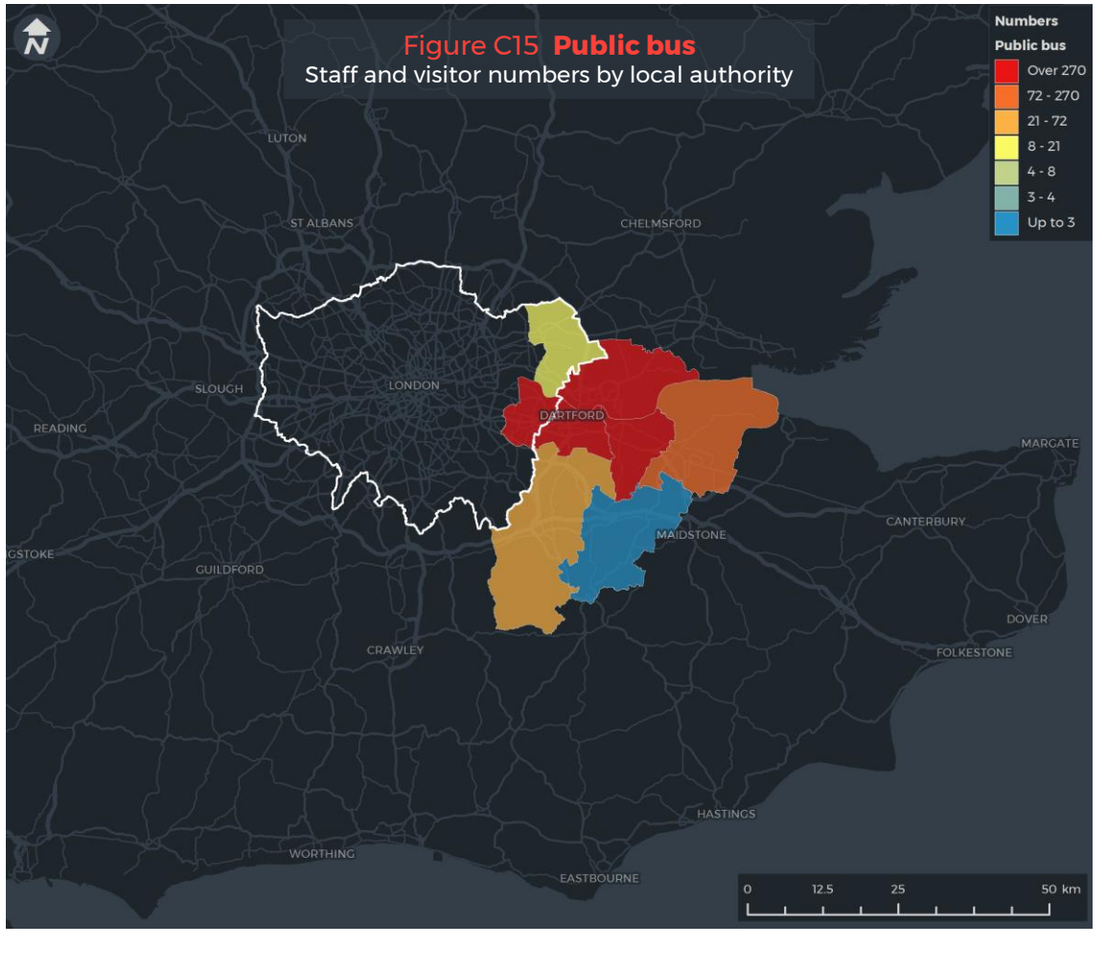


Figure C15 **Public bus**
Staff and visitor numbers by local authority

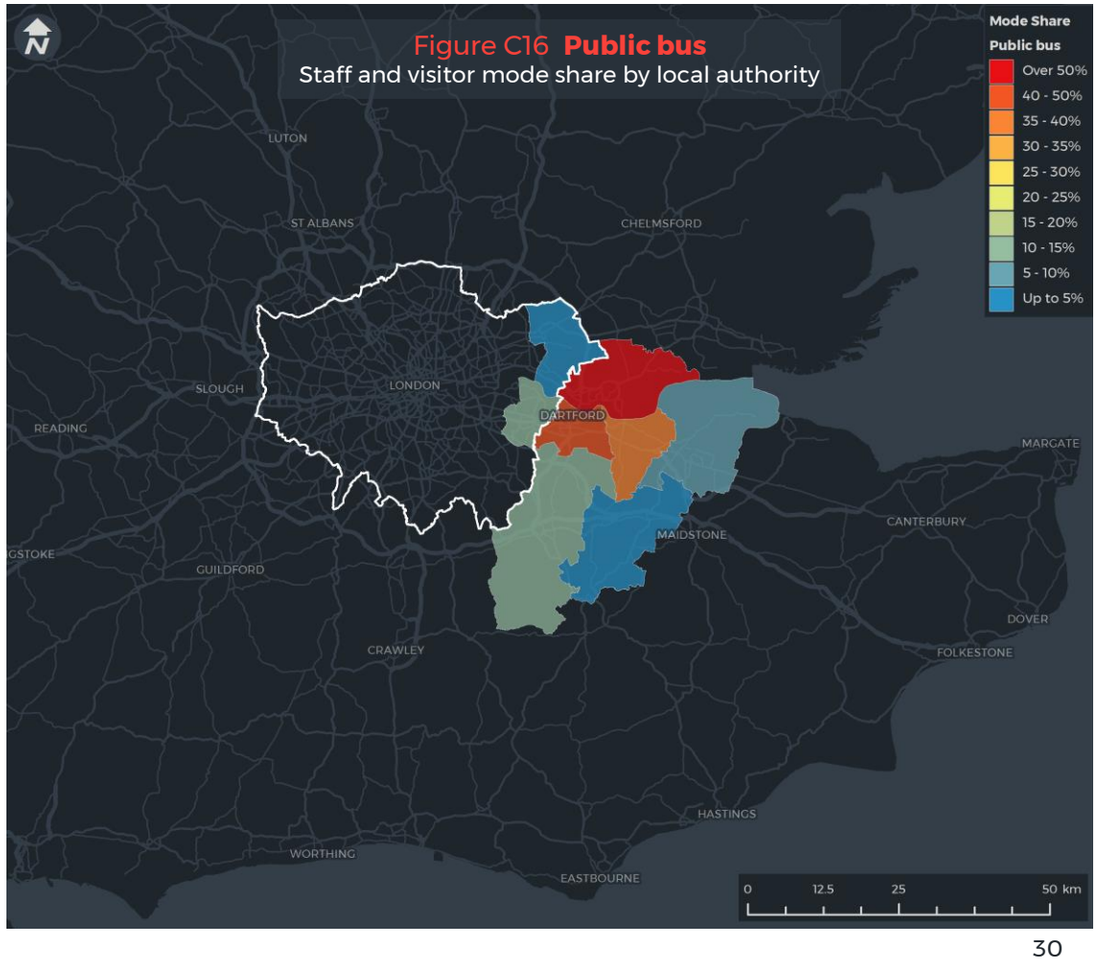


Figure C16 **Public bus**
Staff and visitor mode share by local authority

Mode share scenario testing

Mode share estimation

Shuttle

Within the mode share tool, shuttles catered for four groups – From Off-Site Hotel (Domestic and International) and To On-Site Hotel (Domestic and International only. The intention is to provide shuttle connections to and from London Resort from hotels within a 10 mile radius of the for visitors, potentially catering for 80 or so customers. As a result, Staff, UK Home Origin and Nearby Daytrip groups were not included. The distribution of trips is shown in Figure C17, focussed on the adjacent local authorities.

Mode share

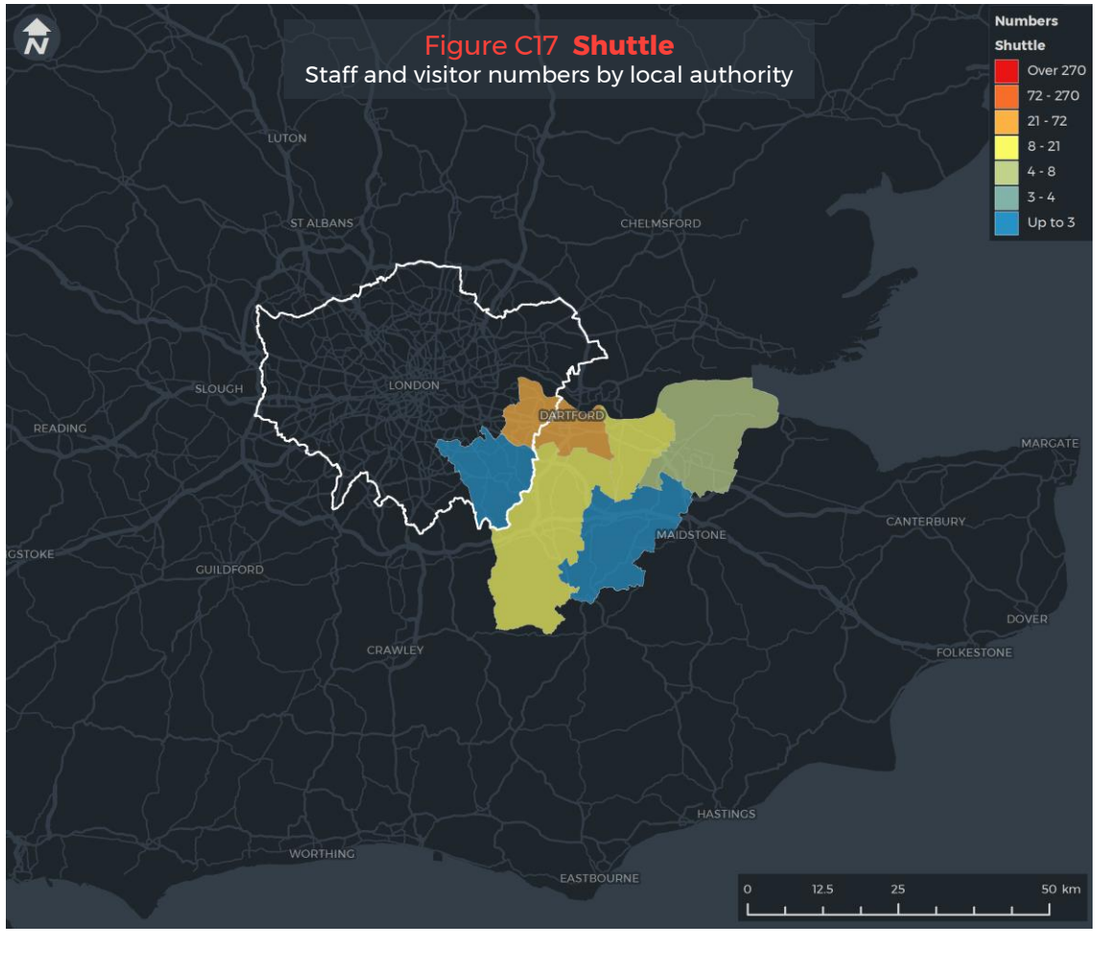
The average mode share is less than 1%. As shown in Figure C18 mode share is less than 5% in all local authorities where a shuttle could operate.

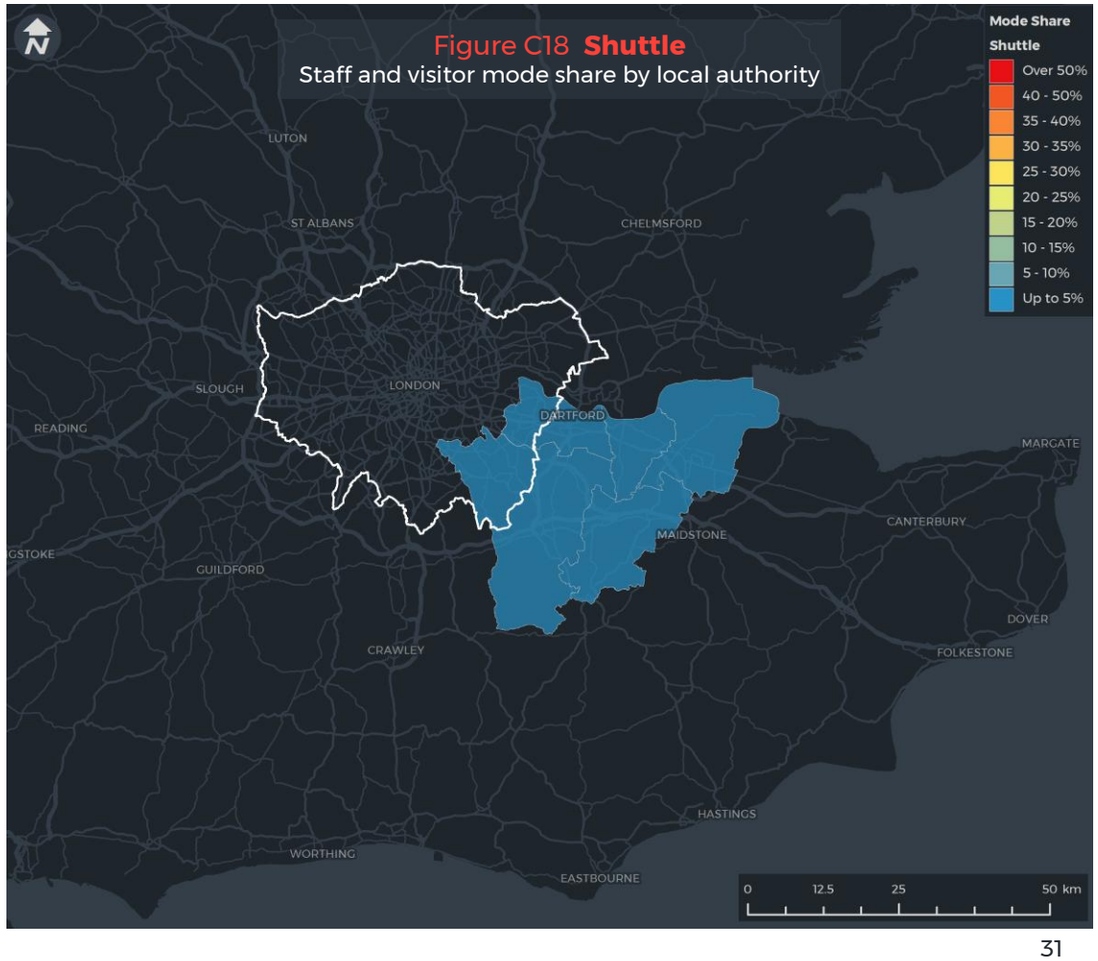
As a service just for some visitor groups, the shuttle mode share is relatively low. There may be opportunities to design the services in such a way to maximise and grow patronage – such as serving large concentrations of staff or combining a shuttle services with last-mile services.

KEY ESTIMATE FINDINGS

Mode share – **1%**

Number of visitors – **80**





Mode share scenario testing

Mode share estimation

Bike / scooter

The bike / scooter (which includes pedal and electric bicycles and scooters) mode share is based on the trips which could be made in 60 minutes or less, and cover Dartford, Gravesham, Thurrock, Bexley, Sevenoaks and Tonbridge and Malling. The total number of staff estimated to cycle to the work is between 1,700 and 1,900. The distribution of trips is shown in Figure C19, with the highest number coming from Dartford and Gravesham, followed by Bexley, Sevenoaks, Thurrock and Tonbridge and Malling respectively.

Mode share

The average mode share for all staff and visitor groups is between 4%. The variation in mode share across the relevant local authorities is shown in Figure C20.

For staff, the mode share is between 11 to 13%. For visitors, the average mode share is lower at 2%.

KEY ESTIMATE FINDINGS

Mode share – **4%**

Number of visitors – **630 to 660**

Number of staff – **1,000**

Vehicles (visitors) – **1,000 to 1,300**

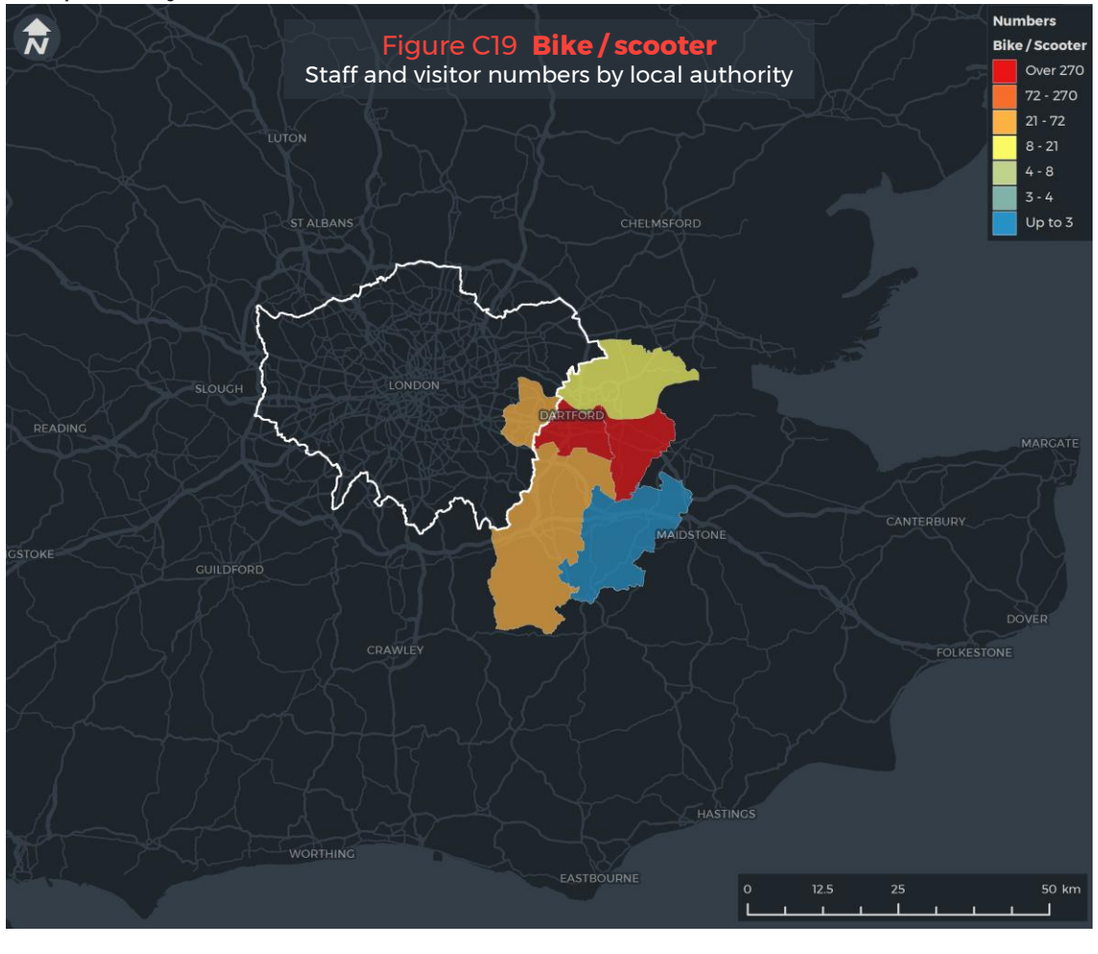


Figure C19 **Bike / scooter**
Staff and visitor numbers by local authority

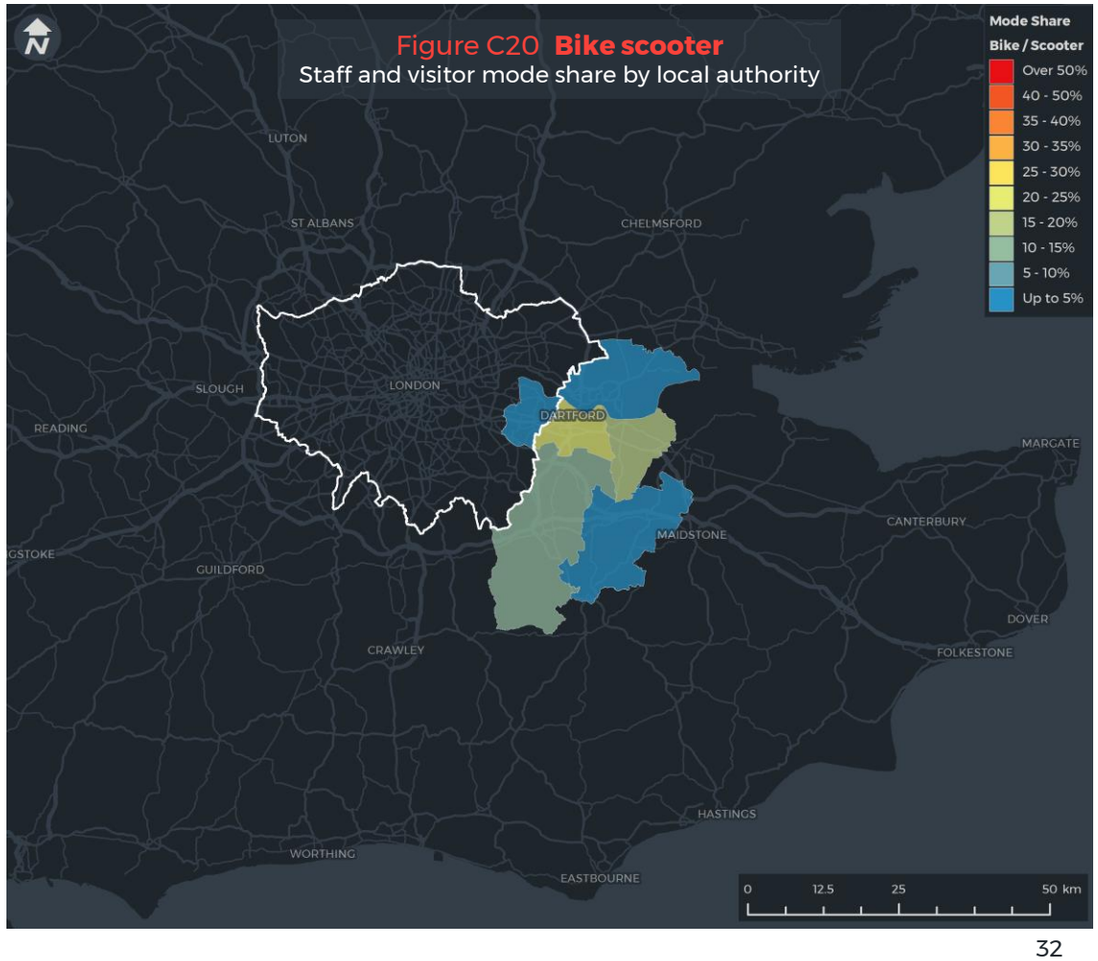


Figure C20 **Bike scooter**
Staff and visitor mode share by local authority

Mode share scenario testing

Mode share estimation

Walk

The walking mode share is based on the trips which could be made in 60 minutes or less, and cover Dartford and Gravesham. The total number of staff estimated to walk to the work is between 360 to 430.. For visitors, the numbers are between 155 to 165. The distribution of trips is shown in Figure C21, with between 390 to 450 staff and visitors travelling from Gravesham, and between 130 to 145 staff and visitors travelling from Dartford.

Mode share

The average mode share for all staff and visitor groups is about 1%. As shown in Figure C22, while the overall mode share for walking is 1%, it is between 5 to 6% for Dartford, and between 12 to 13% for Gravesham, with the majority of walking trips to be undertaken by staff.

KEY ESTIMATE FINDINGS

Mode share – **1%**

Number of visitors – **155 to 163**

Number of staff – **366 to 432**

Based on a maximum walking distance of 60 minutes

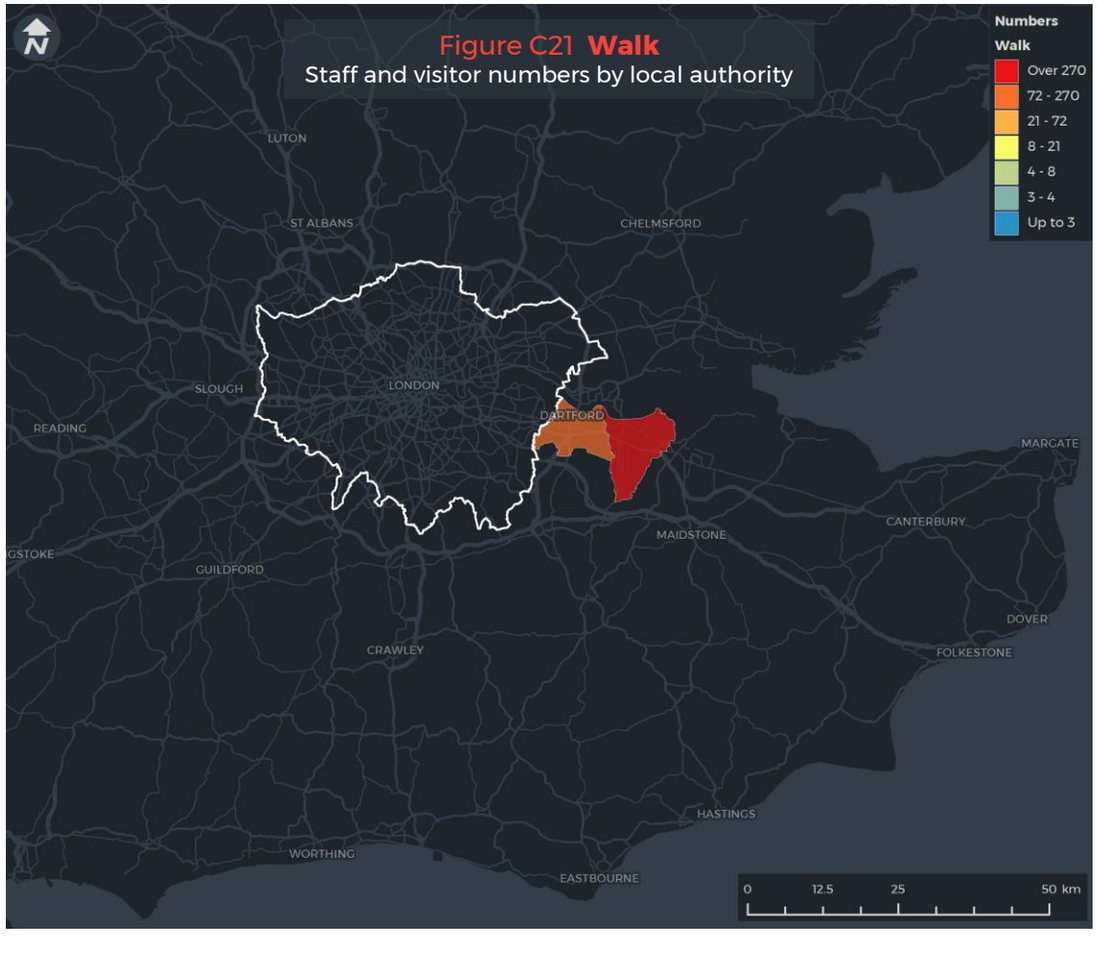


Figure C21 **Walk**
Staff and visitor numbers by local authority

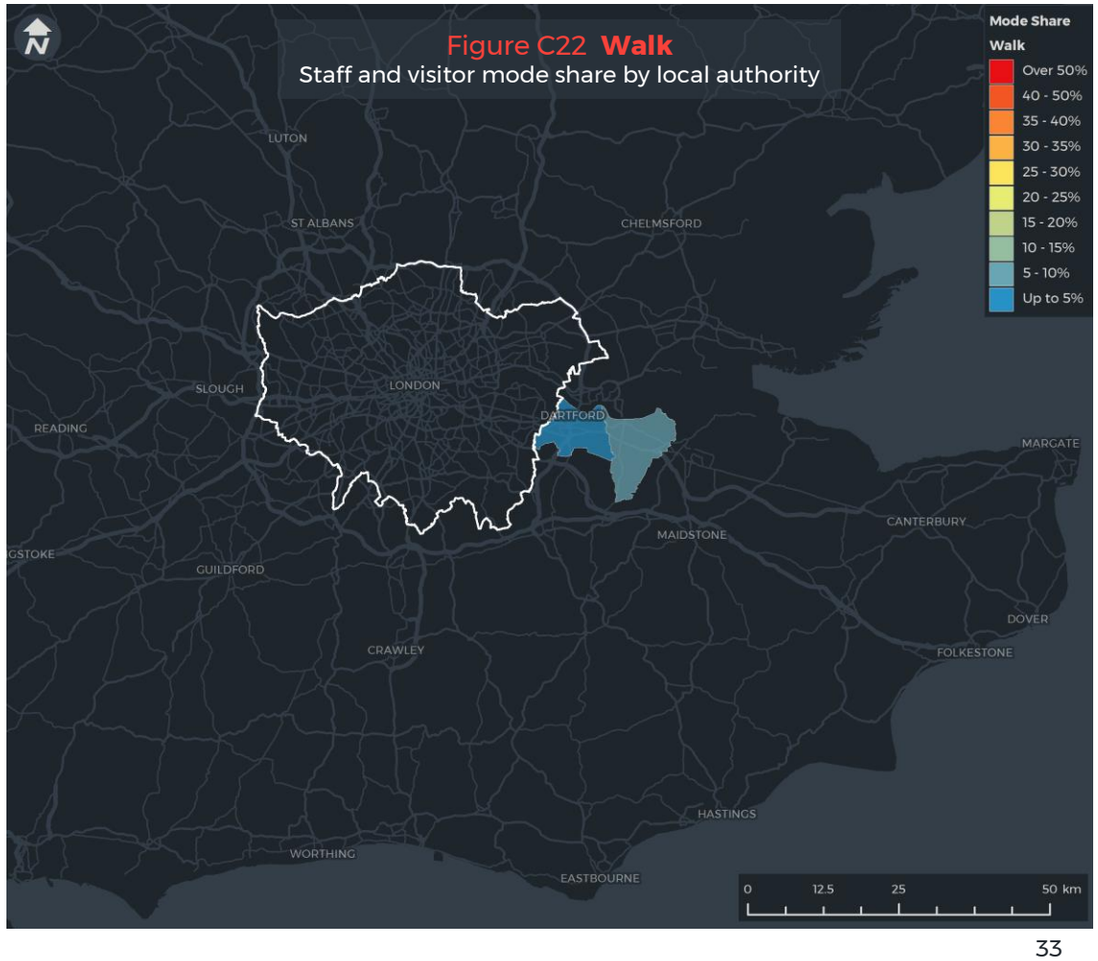


Figure C22 **Walk**
Staff and visitor mode share by local authority

Mode share scenario testing

Group travel scenario

To add in group travel scenario

Mode share scenario testing

Group travel scenario

Group travel scenario testing

On the understanding that many visitors will travel to the site as a group, we developed a group travel scenario. The thinking was that when travelling as a group, modes such as coach, rail / tube, public bus, ferry and shuttle increase the overall cost. On the flipside, the cost per individual decreases for private vehicle, private hire and car clubs when travelling as a group. To account for this, the following changes were mode in the model:

- Coach and rail / bus made relatively more expensive
- Private hire, car clubs, public bus and ferry made relatively cheaper
- Increase the cost / value for money weighting from 12% to 50% for all non-international visitor groups.

A comparison of the base and group travel scenarios are show in Table C5 which is based on the minimum travel time from each local authority and Table C6 which is based on the maximum travel time.

Table C7 outlines the attendance numbers by group and mode, while the mode share calculations are shown in Table C8 for the minimum travel times from local authorities. Meanwhile, the maximum travel times from local authorities is outlined in Table C9 for attendance numbers, and Table C4 shows the mode share.

As shown in the table to the right, when considering group travel, private vehicle mode share will rise by 6-8%, and private hire and car clubs by 1%. This will be offset by a 1% mode share decrease for public bus, a 2% loss for coach, and a 5-6% loss for rail/tube.

Mode share comparison

Mode	Mode share comparison	
	Minimum travel time	Maximum travel time
Private vehicle	6%	8%
Coach	-1%	-2%
Private hire	1%	1%
Car clubs	1%	1%
Rail / tube	-5%	-6%
Public bus	-1%	-1%
Ferry	0%	0%
Shuttle	0%	0%
Walk	0%	0%
Bike / scooter	1%	0%

Table C5 **Number of trips and mode share comparison** (Minimum travel time)

Mode	Number of people		Mode share	
	Base scenario	Group travel scenario	Base scenario	Group travel scenario
Private vehicle	**18,824**	**21,442**	**41%**	**47%**
Coach	**1,591**	**894**	**3%**	**2%**
Private hire	**4,969**	**5,627**	**11%**	**12%**
Car clubs	**2,891**	**3,238**	**6%**	**7%**
Rail / tube	**11,142**	**8,504**	**24%**	**19%**
Public bus	**3,366**	**2,765**	**7%**	**6%**
Ferry	**381**	**491**	**1%**	**1%**
Shuttle	**82**	**82**	**0%**	**0%**
Walk	**594**	**645**	**1%**	**1%**
Bike / scooter	**1,935**	**2,086**	**4%**	**5%**
Total	**45,774**	**45,774**		

Table C6 **Number of trips and mode share comparison** (Maximum travel time)

Mode	Number of people		Mode share	
	Base scenario	Group travel scenario	Base scenario	Group travel scenario
Private vehicle	**20,209**	**23,690**	**44%**	**52%**
Coach	**2,918**	**1,657**	**6%**	**4%**
Private hire	**2,415**	**2,633**	**5%**	**6%**
Car clubs	**1,962**	**2,167**	**4%**	**5%**
Rail / tube	**12,785**	**10,290**	**28%**	**22%**
Public bus	**2,731**	**2,300**	**6%**	**5%**
Ferry	**440**	**572**	**1%**	**1%**
Shuttle	**83**	**84**	**0%**	**0%**
Walk	**521**	**559**	**1%**	**1%**
Bike / scooter	**1,710**	**1,822**	**4%**	**4%**
Total	**45,774**	**45,774**		

Mode share scenario testing

Group travel scenario

Table C7 **Group travel scenario: Attendance numbers by group and mode (based on minimum travel time)**

Mode	Staff	UK Home Origin	Nearby Daytrip	From Off-Site Hotel (Domestic)	To On-Site Hotel (Domestic)	From Off-Site Hotel (International)	To On-Site Hotel (International)	Visitor totals	Visitor and Staff Total
Private vehicle	**1,000**	12,431	1,084	1,344	990	2,498	2,096	**20,442**	**21,442**
Coach	**0**	894	0	0	0	0	0	**894**	**894**
Private hire	**2,121**	1,961	286	301	2	634	321	**3,506**	**5,627**
Car clubs	**0**	3,238	0	0	0	0	0	**3,238**	**3,238**
Rail / tube	**2,300**	2,236	464	658	151	1,526	1,169	**6,204**	**8,504**
Public bus	**2,435**	277	10	15	0	28	0	**330**	**2,765**
Ferry	**58**	191	31	79	0	131	1	**434**	**491**
Shuttle	**0**	0	0	28	0	54	0	**82**	**82**
Walk	**459**	164	4	7	0	11	0	**186**	**645**
Bike / scooter	**1,371**	610	19	31	0	55	0	**716**	**2,086**
Total	**9,743**	22,002	1,898	2,462	1,143	4,939	3,586	**36,031**	**45,774**

Table C8 **Group travel scenario: Attendance numbers by group and mode (based on maximum travel time)**

Mode	Staff	UK Home Origin	Nearby Daytrip	From Off-Site Hotel (Domestic)	To On-Site Hotel (Domestic)	From Off-Site Hotel (International)	To On-Site Hotel (International)	Visitor totals	Visitor and Staff Total
Private vehicle	**10%**	56%	57%	55%	87%	51%	58%	**57%**	**47%**
Coach	**0%**	4%	0%	0%	0%	0%	0%	**2%**	**2%**
Private hire	**22%**	9%	15%	12%	0%	13%	9%	**10%**	**12%**
Car clubs	**0%**	15%	0%	0%	0%	0%	0%	**9%**	**7%**
Rail / tube	**24%**	10%	24%	27%	13%	31%	33%	**17%**	**19%**
Public bus	**25%**	1%	1%	1%	0%	1%	0%	**1%**	**6%**
Ferry	**1%**	1%	2%	3%	0%	3%	0%	**1%**	**1%**
Shuttle	**0%**	0%	0%	1%	0%	1%	0%	**0%**	**0%**
Walk	**5%**	1%	0%	0%	0%	0%	0%	**1%**	**1%**
Bike / scooter	**14%**	3%	1%	1%	0%	1%	0%	**2%**	**5%**

Mode share scenario testing

Group travel scenario

Table C9 **Group travel scenario: Attendance mode share by group and mode (based on minimum travel time)**

Mode	Staff	UK Home Origin	Nearby Daytrip	From Off-Site Hotel (Domestic)	To On-Site Hotel (Domestic)	From Off-Site Hotel (International)	To On-Site Hotel (International)	Visitor totals	Visitor and Staff Total
Private vehicle	**1,000**	13,708	1,199	1,529	978	2,866	2,411	**22,690**	**23,690**
Coach	**0**	1,575	82	0	0	0	0	**1,657**	**1,657**
Private hire	**1,351**	849	87	104	0	221	21	**1,282**	**2,633**
Car clubs	**0**	2,167	0	0	0	0	0	**2,167**	**2,167**
Rail / tube	**3,865**	2,445	464	654	165	1,544	1,154	**6,425**	**10,290**
Public bus	**1,975**	275	10	14	0	27	0	**325**	**2,300**
Ferry	**59**	218	35	96	0	162	1	**512**	**572**
Shuttle	**0**	0	0	28	0	56	0	**84**	**84**
Walk	**376**	161	4	6	0	11	0	**182**	**559**
Bike / scooter	**1,116**	604	18	30	0	53	0	**705**	**1,822**
Total	**9,743**	22,002	1,898	2,462	1,143	4,939	3,586	**36,031**	**45,774**

Table C10 **Group travel scenario: Attendance mode share by group and mode (based on maximum travel time)**

Mode	Staff	UK Home Origin	Nearby Daytrip	From Off-Site Hotel (Domestic)	To On-Site Hotel (Domestic)	From Off-Site Hotel (International)	To On-Site Hotel (International)	Visitor totals	Visitor and Staff Total
Private vehicle	**10%**	62%	54%	52%	74%	53%	57%	**59%**	**49%**
Coach	**0%**	7%	4%	5%	13%	9%	15%	**8%**	**6%**
Private hire	**11%**	4%	4%	3%	0%	4%	1%	**3%**	**5%**
Car clubs	**0%**	9%	13%	11%	0%	0%	0%	**7%**	**6%**
Rail / tube	**34%**	11%	21%	23%	13%	28%	27%	**16%**	**20%**
Public bus	**15%**	1%	0%	1%	0%	1%	0%	**1%**	**4%**
Ferry	**1%**	1%	2%	3%	0%	3%	0%	**1%**	**1%**
Shuttle	**19%**	2%	1%	1%	0%	1%	0%	**2%**	**5%**
Walk	**3%**	1%	0%	0%	0%	0%	0%	**0%**	**1%**
Bike / scooter	**8%**	2%	1%	1%	0%	1%	0%	**2%**	**3%**

THE LONDON RESORT

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Part D

Car Parking and Interchange Design

Car Parking and Interchange Design

Guiding Principles

Overview

On the backdrop of the anticipated changes associated with the mega trends and the key changes underpinning the future of mobility, car parking facilities must be inclusive and flexible in design. It is envisaged that, with the increased openness to sharing mobility and emergence of connected and autonomous technologies, car parking infrastructure over time will increasingly be used as an interchange – accommodating arrivals and departures by different modes and mobility services and requiring less private car parking bays.

Implementing a flexible approach for parking design will help mitigate the need for future conversion and retrofitting, and will accommodate evolving community needs as transportation modes and patterns continue to change. That is, future proofing the infrastructure at the design stage can ultimate come to reduce future disruptions, additional costs and supports sustainable travel habits from the start. In this light, the adjacent figure outlines the proposed guiding principles for car parking facilities at London Resorts.

This section of the report details the future mobility considerations relating to the parking and interchange elements of the development. Figure D2 overleaf provides the overview of the site, including the locations of Gate 1 and Gate 2, which are intended to offer ancillary retail, dining and entertainment facilities. The planned opening dates of the gate are proposed to be 2024 and 2029, respectively.

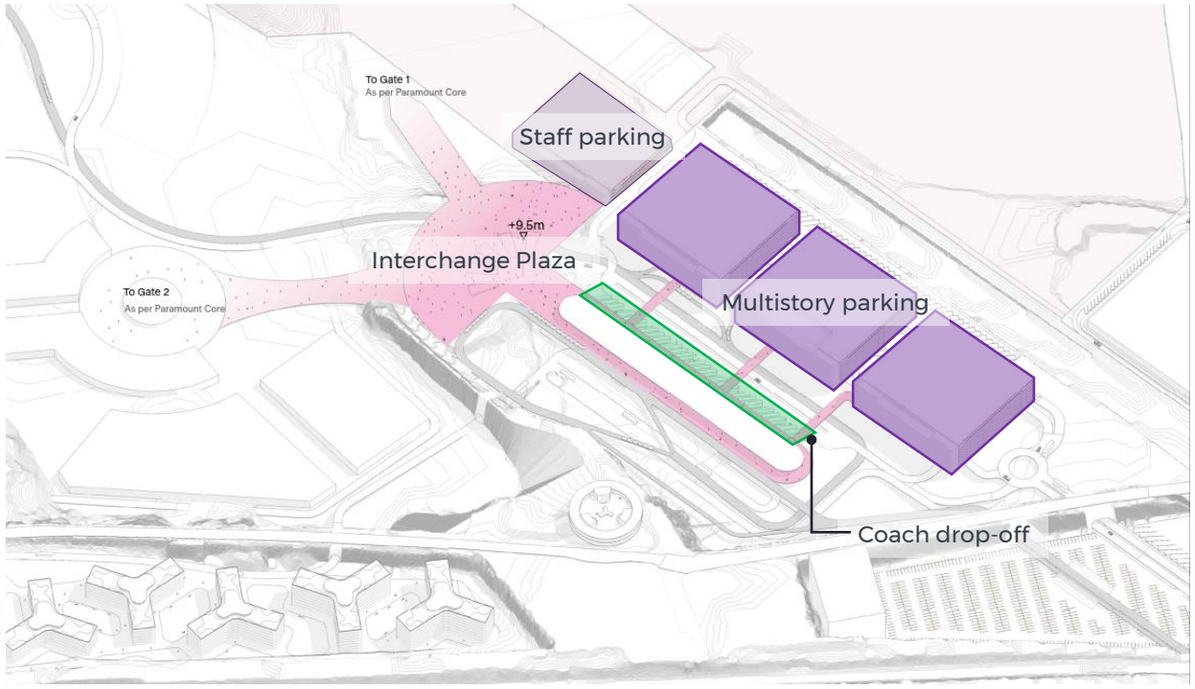
Figure D1 **London Resorts car parking principles**

Support the use of **net zero carbon** mobility options, such as **electric vehicles**, in line with government aspirations to **decarbonise transport**	Include **Smart infrastructure** designed to ensure a **dynamic, inclusive** and **efficient function**	Seek opportunity to **phase out private car parking** over the years, to be replaced with **more sustainable uses** such as an extension of pedestrian space
Remain safe for **vulnerable road users** like **pedestrians** and **cyclists**	Incorporate **mobility hub elements** in support of more sustainable mobility options and ensuring a **future ready design**	Encompass **green infrastructure** to improve **air quality** and to **create pleasant environments**
Accessible to all users and accommodates **their needs**	Focus on providing **flexibility** within assets to **accommodate future changes** to benefit consumers and staff	**Kerbside facilities** must accommodate the **increasing pick-up and drop-off activity** associated with **shared mobility**

Car Parking and Interchange Design

Plans

Figure D2 **Key transport facilities**



Car Parking Design

Future Ready

Traditional Approach

Parking structures have often been seen to take substantial amounts of land in highly valued, central locations. Generally, they will be in close proximity to the site entrance to minimize walking times, particularly in the case of disabled bays. For a development of the magnitude of London Resorts, with expected daily visitors reaching approximately 36,000.

Often described as the pain point of driving, parking is commonly shown to be the most inefficient part of journeys.

Future Ready Considerations

A future ready design will be required to consider the impacts of larger vehicle sizes, access points and pick-up and drop-off locations, as well as access to and the distribution of electric vehicle charging points, autonomous vehicle infrastructure and access locations for new modes such as drones.

Additionally, with an increase in e-tickets, online 'check in' to events and of the digital alternatives to conventional on-day ticket purchases which seek to ensure a more seamless process, entrance points must be able to accommodate a high capacity of visitors at any given time. These are discussed further in the following section.

It is acknowledged that for some people, travel by private car will continue to be the most viable option. In this light, we recommend a user hierarchy system, which prescribes who should qualify for more favourable parking. Such groups may include disabled visitors, the elderly, and visitors with young children. With less convenient parking for other visitors to help encourage less car use to the site. Long-stay and short-stay parking will also need to be considered, given the mixture of activities provided.

A future mobility approach to parking and interchange should take a user-centric approach and be flexible by design. Flexibility will allow the car park to adapt to mega trends impacting parking requirements which in turn will create a better transport and wider experience of the resort for visitors and staff.

Future Trends

To future proof car parking design, the following emerging technologies must be considered:

- **EV Charging facilities –** There is a rise in EV ownership and with the Governments recent announcement to ban the sale of traditional ICE vehicles from 2030, EV charging infrastructure is going to become more important when attracting visitors to a destination.
- **Car club bays –** Increasing number of car clubs in operation could benefit from designated parking bays in a car park.
- **CAVs –** If CAVs are transporting guests to the resort and are constantly in use then parking could become redundant.
- **Robot Valet Parking Solution –** Gatwick Airport trialled automated valet parking allowing users to drop off their vehicle close in a more convenient location and an autonomous robot then parked the car. This allows for guest time savings and better utilisation of parking spaces.
- **Automated Valet Parking (AVP) –** AVP is an in-built system various manufacturers are implementing in new vehicles, which enables them to complete the final 40m of a journey and park without the need of a driver. The system operates through synergies with a network of sensors in the car park, thus requiring the accompanying infrastructure to accommodate the technology as it is rolled out.

Car Parking Design

Capacity and mode share

Future Trends (cont.)

Each of the aforementioned trends are at different levels of maturity with EV charging facilities becoming more commonplace and car clubs already in operation in the UK. Additionally, these trends will have different effects on parking provisions, with the assisted parking technologies, for example, enabling more compact vehicle parking increasing capacity.

Along with technology, the following trend in behavior must also be considered:

Increased sharing – ownership of private vehicles could decrease as various new business models are brought to market. Therefore, a car park will need to be dynamic and flexible to other uses if there is less parking requirements in the future.

Capacity and Mode Share

Table D1 shows the projected capacity at each of the car parking locations along with the approximate daily visitor figures.

Although there is a much greater projected daily visitors compared to the capacity, this is because it is assumed that the average occupancy of each vehicle is more than one. Detailed information on the average occupancy of each vehicle can be found in the separate mode share report.

The cark park and interchange designs will need to consider the projected daily visitors to ensure that each are well served by their mode of choice.

Table D1 **Expected capacity and daily visitors**

Facility	Capacity	Projected daily visitors (approximate figures)
Visitor car park	10,000 vehicles	25,000
Visitor car park (Coach)	200 coaches	6,000
Staff car park	500 vehicles	1,000
Interchange plaza	N/A	13,000
Coach drop-off	c. 72 coach bays	3,000*

**Numbers are reflective of data available in November 2020 and is subject to changes*

Interchange Design

Mobility Hub

Overview

The interchange plaza will be a key transport feature of the development – logistically hosting arrivals from various modes, as well as from a customer journey perspective posing as the initial point of entry to the park. Operationally, it will need to accommodate movements from various modes, including pick up and drop off by private hire vehicles, local buses, demand-responsive transit (DRT) services, as well as those arriving at the Resort on foot or by cycle (including those alighting from nearby rail stations and bus stops). Non-private vehicle arrivals accounts for up to approximately 25,000 daily visitors across the different modes.

Borrowing from the mobility hub concept, it is proposed that the interchange is equipped with a mixture of transport service, supporting infrastructure and placemaking and public realm features.

Image source: Mobihubs.eu

Mobility Hub Concept

Mobility is strengthened through the aggregation of modes with a wider range of traveller facilities and key economic or utility activities; this fast developing approach to improving interchange is termed a 'mobility hub'. This approach increases integration between modes providing more options for users and catering for a greater range of onward journey needs. Hubs integrate traditional and new modes as well as a range of user facilities. Mobility hubs further enhance integration and accessibility by incorporating or being located close to a range of land uses. This approach simplifies and reduces journeys in terms of frequency and length by enabling more purposes to be catered for in each journey within a single location.

Mobility hubs can be understood as a 'place' or interchange providing different and connected transport modes supplemented with enhanced facilities to both attract and benefit the traveller. These hubs are not, however, 'one size fits all' – tailor-made solutions need to be created for each location, considering type of components, scale and levels of service. As such, elements of the hub could be embedded within the interchange plaza, and in other relevant locations, creating a seamless mobility interchange supporting sustainable travel.

Typically, mobility hubs are modular in nature, making them easy to deploy in a phased manner. At London Resorts World, this would support changing patterns in travel, with an initial hub proposed at the interchange plaza being scaled wider across the masterplan, like in parking facilities, as required.

An example mobility hub concept can be found overleaf in Figure D3.

Mobility Hub Example

Cambridge Railway Station provides a good example of a location that follows mobility hub principles. It incorporates a major railway interchange with bus services, taxis and a three-storey cycle facility with 2,850 cycle spaces and a ground floor cycle shop. The station also incorporates a convenience retail store and café, as well as a range of usual major station user facilities.

In London, British Petroleum (BP) have announced the launch of a new mobility hub at the O2 Arena, the city's first multi-transport hub of it's kind. It offers electric vehicle (EV) charging, car clubs and bicycles accessible through a digital platform, as well as parcel deliveries and a café. Operating partners include Brompton Bike Hire, Enterprise Car Club, and InPost, with a café due to resume operations post-Covid-19 social distancing restrictions.

The Dutch Mobihub (Mobipunt in Dutch) is leading much of the thinking around mobility hubs across Europe. Mobihubs are a transport hub on a neighbourhood level, where different sustainable and shared transport modes are linked with each other. Mobihubs have five essential basic criteria:

- Parking spaces for car sharing
- High-quality cycle parking
- Close proximity to a public transport stop or shared transport
- Safety and security
- Easy access for all users

In addition, there are a number of conditions for the development of successful and high-quality hubs, including proximity to neighbourhood functions, high quality facilities, integrate with wider plans for shared mobility in the authority area, and unique and visible name/ branding.

Interchange design considerations

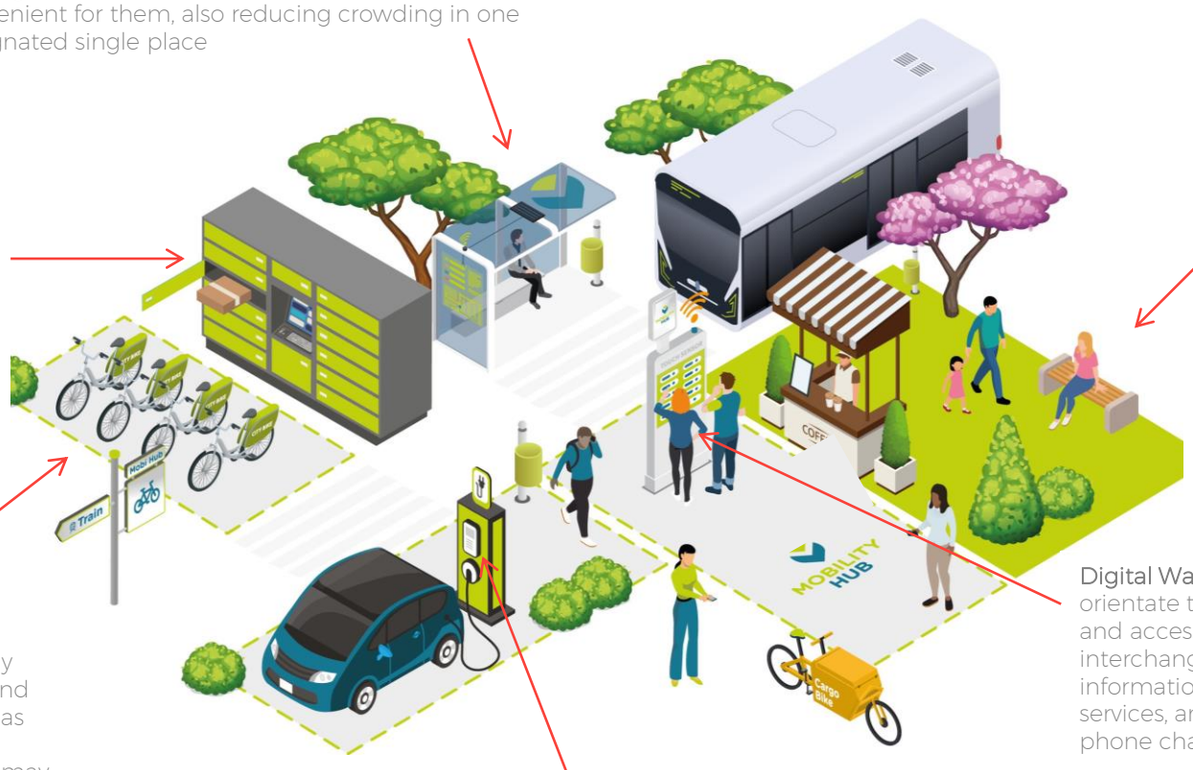
Mobility Hub

Figure D3 **Long-term potential interventions**

Multiple pick-up and drop-off points for ride-hailing/ sharing services so customers can choose which is most convenient for them, also reducing crowding in one designated single place

Open access lockers for storage of personal items to improve 'hands-free' customer experience

Sufficient resting areas and **public green spaces** to accommodate different ages and level of physical ability to ensure the creation of **inclusive places**



Shared mobility services, which may include **micromobility** (cycle hire, and more recently, scooter hire) as well as **car club/ car hire** opportunities. Micromobility services in particular may used as a last mile travel option for certain groups, whilst the provision and strategic placement of car hire bays may be used to incentivize the use of shared mobility

Digital Wayfinding to help visitors orientate themselves within the site and access the various aspects of the interchange. This will also provide information on rail, bus and ferry services, and could also include Wi-Fi/ phone charging.

EV charging facilities to support the increasing levels of electric vehicle ownership. Additionally, **pantograph charging** could be implemented in shuttle stops, which provides rapid charging to buses while operating on a route.

Image source: CoMoUK Mobility Hub Guidance, 2019

Interchange design considerations

Exemplary interventions

Potential Mobility Hub Components

A mobility Hub at the London Resort could include the following components (some considerations match those of car parking):

Main Modes

- Local bus and rail
- Traditional taxis / private hire
- Dynamic Demand Responsive Transport
- Micromobility hire opportunities
- CAVs
- EVs
- Car club

Supporting Infrastructure

- Automated Valet Parking
- Digital wayfinding
- Mobility as a Service
- Open access lockers
- Smart Kerbsides
- Green infrastructure

A mobility hub can promote inclusive accessibility by offering affordable and accessible options that are attractive to a large proportion of demographics, particularly those that do not have access to a private vehicle.

An indicative car park/interchange design with potential locations for these components can be found on the next page.

Main Modes

Local bus and rail – Around 13,000 visitors and staff are expected to arrive at the site via traditional public transport means. Therefore it will be a key consideration for a mobility hub, with potential onward journeys to the park entrance and to other services on the site.

Traditional taxis / private hire – Around 4,000 visitors and staff are expected to arrive to the resort via private hire vehicles. A mobility hub would support these arrivals by having a dedicated taxi drop-off / pick-up location and waiting facilities.

Dynamic Demand Responsive Transport (DDRT) - DDRT considerations are discussed in Task D. A mobility hub could support DDRT by offering a drop-off / pick-up location.

Micromobility - Micromobility considerations are discussed in Task D. A mobility hub could offer multiple micromobility options.

CAVs - CAV considerations are discussed in Task D. A mobility hub could have a drop-off / pick-up location for CAV shuttles.

EVs – EV ownership is on the rise and the Government has recently announced a ban on the sale of petrol and diesel vehicles from 2030 which has the potential to accelerate EV uptake further. A mobility hub has the potential to support the transition to EVs by providing EV charging facilities.

Car club – Car club considerations are discussed in Task D. A mobility hub could have designated parking bays for Car Club vehicles.

Supporting infrastructure

Automated Valet Parking (AVP) – As alluded to, to accompany the rollout of emerging APV systems in new private vehicles, a complementary network of sensors can be embedded in the scheme infrastructure to future proof the design. In the short term, this will accommodate those vehicles which already feature the technology, and will support maximising car parking capacity as vehicles can parked closer together with wider-roll out in the future.

Digital wayfinding - Digital wayfinding considerations are discussed in Task D. A mobility hub could provide digital information to visitors and staff about the various transport options using the facility and any other resort information.

Mobility as a Service (MaaS) - MaaS considerations are discussed in Task D. A MaaS platform can support a mobility hub at the London Resort by integrating all mobility options and services located at the hub.

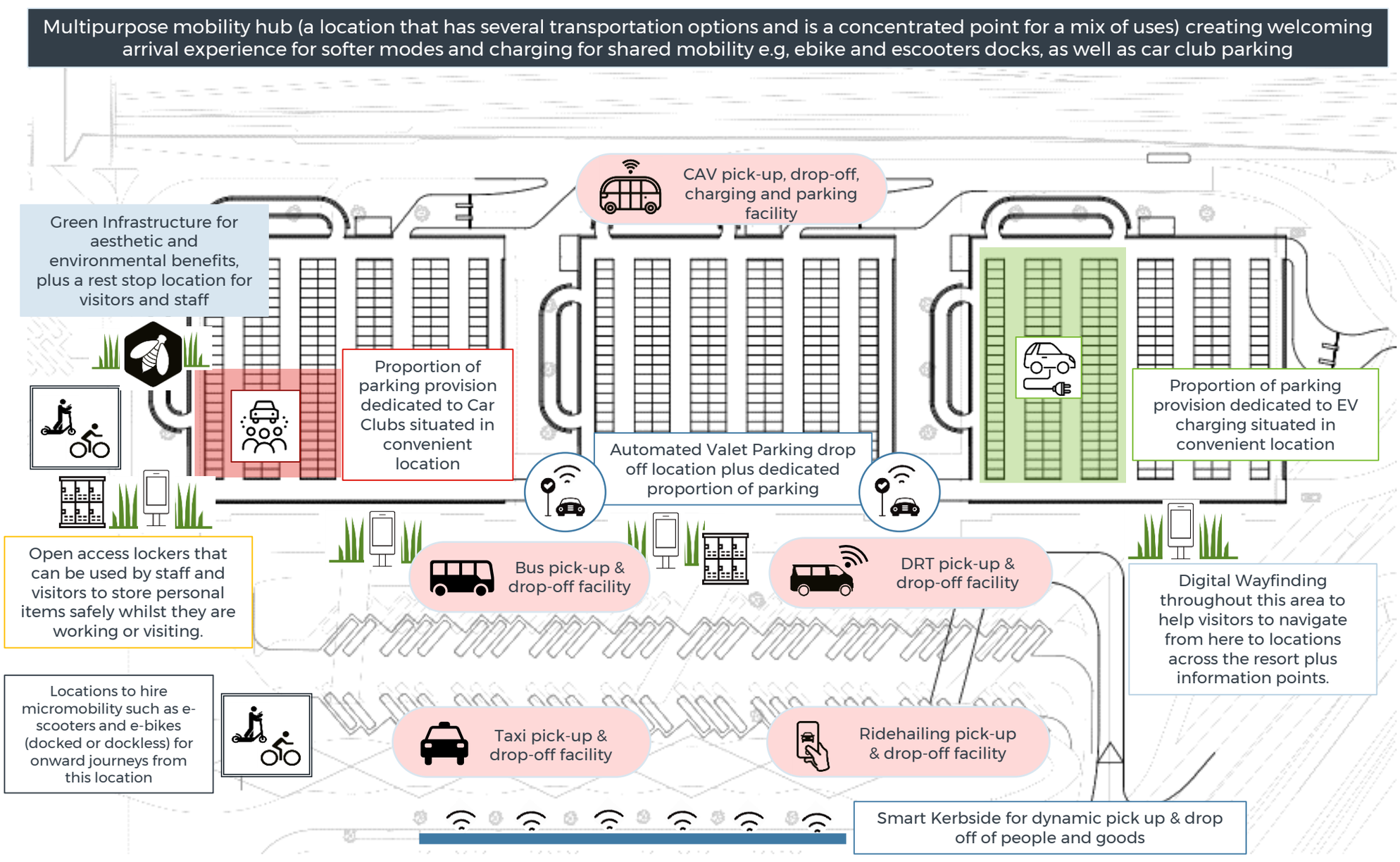
Open access lockers - Open access lockers at mobility hubs can be used for storage of personal items to improve 'hands-free' customer experience and a more seamless

Smart Kerbsides - Smart Kerbsides can be used to manage flexible use of the kerbside. This may include implementing on-street parking sensors and digitising parking bays. A mobility hub can be dynamic and allocate areas of the hub for different services digitally dependant on demand and availability.

Green infrastructure – Sufficient resting areas and public green spaces at a mobility hub can help to accommodate different ages and level of physical ability to ensure the creation of inclusive places within the resort.

Car Parking Design Considerations

Figure D4 **Indicative car parking plan**



THE LONDON RESORT

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Part E

First mile/ last mile mode summary

FMLM Overview

How FMLM can fit in to the London Resort development

Overview

The London Resort will attract a range of visitors arriving at varied times of the day. For those arriving by public transport, efficient FMLM interventions will be required to mitigate the effects of event day crowds on the local pedestrian network in the surrounding area. Moreover, potential audiences will range in age and mobility ability, some of whom may require additional measures to ensure that they can get to and from the venue space safely, conveniently and efficiently.

Ebbsfleet International Station, served by high speed rail to London and international destinations, is understood to be the main point of alighting for visitors arriving at London Resort by public transport, particularly by rail.

Given that the design proposals are still at an early stage of development, this section simply provides insights into new and emerging service models and technologies being developed and deployed around the world, as an indication what may be applicable, using real world case studies to identify good practice and potential market failures to avoid. It reviews possible mobility solutions which could serve as FMLM options to facilitate the movement of future visitors.

Similarly to the car parking guiding principles, the interchange hub will need to consider multiple mobility service options, which support net zero carbon and are accessible to all. First mile last mile transport options have the potential to both improve accessibility and support net zero carbon targets

The typologies of the mobility solutions identified may also be suitable for internal movements within the site.

What is FMLM?

First Mile/Last Mile or 'FMLM' defines the first or last sections of journeys between mass transit interchanges and the journey origin or destination points e.g. from a users home to an interchange at the beginning of a journey or from an interchange to a leisure establishment at the end of a journey. As such, modes that provide this FMLM role will be vital to delivering a completely integrated transport offering at the development, with the surrounding mobility eco-system, to support whole end-to-end journeys. Without the integration of mass transit with FMLM modes, the ability to compete with the private car for many journeys will be reduced and the overall success of the transport system to the development more limited.

FMLM journeys 'bookend' what are known as the middle mile sections of journeys, i.e. the usually longer mass transit sections. It should also be noted that many journeys are formed by one mode and therefore have no first, middle or last mile sections e.g. door-to-door walking, cycling or car trips (if parking is provided directly at the end destination).

Historically mass transit schemes have often only focussed on the middle mile sections of journeys that mass transit provides, in isolation from the FMLM. Whilst such schemes may have led to improvements to mass transit they may not have delivered to their full broader potential where FMLM considerations have not been taken into account. The consideration of 'whole' journeys, the first, middle and last miles interconnected as one, can bring additional benefits by ensuring each section of a journey is planned and provided for, delivering clear, simple, seamless multi-modal journeys that can better complete with, often door to door, private car journeys.

Mode Segmentation

The modes that can be applied to FMLM journeys are varied and, indeed, evolving rapidly. Whilst some modes have always been used or have been established in the wider mobility eco-system for a very long time, others are newer to the market and some are in the early stages of emerging.

The way that people obtain the use of these modes also varies and, again, is rapidly changing. The differentiation is largely between 'owning' a vehicle or 'sharing' one where they are hired or leased as a shared asset for specific periods of time, for single journeys or periodically (e.g. days, weeks, months, etc), including via subscription, so that multiple people can use an individual vehicle over time.

FMLM can fit in to an agglomerated model, such as a mobility hub as mentioned in the previous section, providing onward journey options from a hub.

FMLM Options

Overview of potential options for consideration

Current and emerging FMLM options

FMLM options are already available in the UK and across the world. There are existing FMLM options that can be considered as part of the London Resort development to connect Ebbsfleet International Station to the services available at the site. There are also emerging technologies that should also be considered to help to future proof the development and can help to support net zero targets, inclusive accessibility and have potential cost savings if retrofitting is avoided. Understanding emergency FMLM options and allowing for their provision could allow for the development to be a global exemplar and innovator.

The table is an overview of FMLM options, both existing and emerging, and this section goes into more detail on each and highlights an example of each.

Table E1 **FMLM options overview**

Mode	Sub-mode / Supporting services
On foot	▪ Digital wayfinding ▪ Augmented reality
Cycling	▪ Owned - parking ▪ E-bikes ▪ Sharing schemes ▪ Lockers ▪ Repair stands ▪ E-cargo bikes
Shared mobility	▪ Ride hailing ▪ Pooled services ▪ Dynamic Demand Responsive Transport (DDRT) ▪ Shuttle ▪ Autonomous pods
Micromobility	▪ E-scooter ▪ Drones ▪ Delivery robots
Digital	▪ Augmented reality ▪ Digital Wayfinding ▪ Mobility as a service (MaaS) ▪ Smart ticketing

Active Travel

Walking and cycling FMLM options

Traditional active travel modes

Walking and cycling offer low impact and reasonably easy accessible FMLM options. However, there are some dependencies that can impact the success of these modes and uptake. Walking requires less infrastructure intervention for those who are able bodied but the following can impact the likelihood of people choosing to walk for the first or last mile of their journey:

- **Footway and crossing facilities –** Safe crossing facilities, located where people want to walk. Wide enough footways for people with pushchairs and people in wheelchairs.
- **Lighting –** Well lit areas to improve perceived safety.
- **Seating –** Rest points, particularly for people who cannot walk for too long.
- **Shelter –** To encourage active travel in all weather.
- **Traveller information –** To help with wayfinding.

Cycling can require more infrastructure interventions such as changing facilities, safe storage and segregated cycle lanes.

There are also emerging digital services such as augmented reality and wayfinding that can support people choosing to walk or cycle to their destination. These are examined later in this section.

New approaches to cycling

When considering cycling for FMLM provision, there are a number of options that must be considered. Those who own their own bikes will need to have secure parking facilities and may use their cycle for the entirety of a short journey or as part of a longer multimodal journey. Cycle parking will need to be at transport hub locations and/or options to take cycles on to bus and rail. There is also a rise in e-bike ownership which could open up the site to longer distance cycle journeys.

There are shared cycle schemes where users do not own the asset and can rent/hire the cycle for short periods of time for a portion of their journey. These can be docked or un-docked and can usually be accessed via a mobile app. Some schemes offer e-bikes (powered) along with traditional cycles (self-powered). Powered shared bike schemes are becoming established in the UK but are not at the level of maturity of self-powered schemes.

An example of a docked bike scheme is **Santander Cycles** which currently operate in Milton Keynes and London. In London the Santander Cycles make up the largest cycle hire scheme in Europe with over 11,000 bikes and 800 docking stations. Cycles may be rented at any time and the first 30 minutes of each trip is free of charge. The London scheme achieved 10.5m hires in 2018 equivalent to almost 29,000 hires per day. The Santander scheme could be incorporated into the London Resort's FMLM offer.

In May 2019, **Uber** launched electric '**JUMP**' bikes in areas across London. The bikes feature an electric pedal-assist of up to 15mph, have adjustable seats and a basket for the users' belongings. Additionally, each bike is GPS tracked and has a built-in cable lock so that users can easily locate and park the bikes using Ubers app. Finally, each bike costs £1 to unlock and users can use the service free of charge for the first five minutes before being charged at a rate of £0.21 per minute.

Movement of goods

Cycles, both powered and self-powered, are increasingly being used for other purposes including for the last mile of freight journeys. E-cargo bikes are being used to transport goods which can help to remove vehicle traffic from areas, particularly LGVs, with the aim to create a safer, more pleasant environment, particularly for pedestrians.

DHL, and other companies such as UPS and Amazon, are piloting e-cargo bike delivery schemes across the world. DHL are piloting the use of four new low-power electric-assist e-cargo Cycles for deliveries across Miami. The three-wheeled cycles are equipped with accompanying cargo container and each e-cargo bike enables DHL to take one conventional delivery van off the road.

Cycles, powered, self powered and cargo, can be utilized within the London Resort to transport both people and goods.

Shared Mobility

Shared FMLM options

Overview

There has been a megatrend, globally, where there has been a shift in ownership patterns due to a rise in the acceptance of sharing. A survey carried out by Dalia Research in 2017 documented that 30% of the UK population have used a mobility app to hail, rent or share a ride in some form. Whilst some business models are in their infancy this willingness to 'access' rather than 'own' has the potential to dramatically reduce car dependency in some use cases.

With regards to transport there a various shared business models that can

Shared cycle and micromobility schemes have been analysed separately. This section is looking specifically at shared vehicular journeys from ride sharing to autonomous shuttles.

Autonomous Vehicles

Connected autonomous vehicles (CAVs) have become seemingly palpable with smart technologies, with vehicles now claiming to reach SAE J3016 Level 4 (no driver required in car) based on various definitions. Paired with shared mobility, several car manufacturers have developed technologies to integrate autonomous vehicles into existing transport networks to operate as first and last mile solutions.

The NAVYA autonomous shuttle was launched in 2017, since then it has given 10,000 riders a free lift around a 0.6-mile route in downtown Las Vegas. Closer to home, there is a NAVYA shuttle in operation at Salford University which provides staff, students and visitors the option to be transported around the university campus on a set route.

The London Resort could support CAVs by having dedicated drop off and pick up locations which could be incorporated into a mobility hub model.

Dynamic Demand Responsive Transport

Arriva Click is a flexible minibus service that takes multiple passengers heading in a similar direction. Users register their desired trips using an app and pay on account via pre-approved payment methods. The service, which initially launched in 2017 in Sittingbourne Kent, reported that 43% adopted service for their daily commute and 52% of customers switched from private motor transport (inclusive of own car, taxi and passenger in car) to the service, showcasing the business model potential. ArrivaClick at the time of writing also operates in south Leicester and Liverpool.

ViaVan provides on-demand carpooling service that bills itself as more affordable and environmentally friendly alternative to other ride-hailing services. In London, customers across fare zones 1 and 2 can use the app to find real-time matches with other riders heading their way and jump aboard to share the trip. Individual rides are not offered, which reduces costs, emissions and congestion. ViaVan operates in the UK in London and Milton Keynes.

The London Resort could encourage ride hailing to the site by having dedicated drop off and pick up locations which could be incorporated into a mobility hub model.

Shared Mobility

Shared FMLM options

Ride Hailing

Ride-hailing offers customers the opportunity to book, pay for and usually track a taxi/driver through a smartphone app.

Uber, which was launched in 2009 in the USA and in the UK in 2012, is arguably the most well known ride-hailing service which offers a variety of different services premised around the use of an app based platform that matches private vehicle drivers to riders. There are now approximately 14 million Uber trips completed each day in 63 countries and over 700 cities worldwide, including London. In London there are a number of ride hailing apps that are now competing with Uber and traditional black cabs.

The London resort could encourage or support people to use ride hailing services by allocating designated parking or pick-up/drop off areas for ride hailing companies. The London Resort could also integrate into a Mobility as a Service application, more information on this on this further into the section.

Pooling and sharing

Ride-pooling enables people to share a vehicle with others who are going in the same direction, offsetting the transportation cost with multiple passengers in the vehicle. Ride-pooling aims to reduce congestion by reducing the number of vehicles on the road which in turn can help to achieve net zero targets by reducing emissions.

UberPool is available in 36 cities worldwide including London. The platform matches private vehicle drivers to those requiring a ride and allows riders going in the same direction to share a ride for a lower price. In the cities in which it operates, UberPool accounts for around 20% of all rides but is heavily subsidised to attract users.

Car clubs allow individuals and businesses to have access to a private vehicle without being tied to ownership. Usually on a subscription basis, car club members can book a vehicle using an app on demand from as little as 15 minutes to days at a time. Car clubs can be a more affordable option compared to owning a car.

ZipCar is a car club with 250,000 members in London and almost 3,000 vehicles of varying sizes. Car-sharing is a fast-growing concept and ZipCar estimates that 800,000 Londoners (15% of those who drive) could be active car club members by 2025. ZipCar partnered with Volkswagen in 2018 to introduce 325 electric vehicles in to its fleet, and hopes this will help drive investment in London's rapid charging network. The company's vision is for its fleet to be fully electric across all vehicle types by 2025, helping keep Londoners moving while reducing the impact of cars on the urban environment.

Car sharing can be between two strangers, colleagues or friends and family. The premise is simple, to share a journey with somebody making the same trip. This works well in employment use cases as some employers have a number of employees from similar areas accessing a site that could share journeys and remove vehicles off the road, thereby reducing congestion and helping to achieve net zero targets.

Liftshare enables employers to encourage car sharing amongst employees by setting up a car sharing scheme. In 2015, Jaguar Land Rover recruited the services of Liftshare to embed car sharing as a sustainable mode of transport for employees traveling to work. Since then, car sharing has not only contributed to lowering the carbon footprint of Jaguar Land Rover's operations, but has also eased the demand for parking at its sites and reduced traffic in the local community. Over 10,000 staff members have registered on the Liftshare platform and 5,000 of these share on a daily basis.

The London Resort could have a car sharing scheme for staff on the site and encourage visitors to use car clubs by having car club vehicles located on the site, potentially at a mobility hub.

Micromobility

Emerging FMLM options

E-scooters

Public e-scooter hire has only recently become legal in the UK (on a trial-basis), so best practice examples are limited.

At the time of writing (November 2020), trials are currently in operation in the following local authorities:

- Tees Valley Combined Authority
- Milton Keynes Borough
- Northamptonshire
- West Midlands Combined Authority
- Greater Norwich
- Staffordshire
- Gloucestershire
- Liverpool
- Redditch
- Salford

Ginger has the biggest UK presence in terms of number of operating locations (Middlesbrough, Hartlepool, Redcar, Milton Keynes and Stafford), and is a shared micromobility service offering small, clean, low speed vehicles including bikes, e-bikes, e-scooters, e-microcars. Ginger prises itself on acting locally, with an approach rooted in building a shared transport service by working closely with councils.

Bird has been running an e-scooter trial on the London Olympic Park private land since 2018, with commercial operations in the USA and Europe since 2017. Through an app, users to unlock an electric scooter, then lock it back up again once the journey is complete. People in turn pay a small fee per minute of use. Bird is currently operating trials in Liverpool and Redditch.

The outcome of the e-scooter trials across the UK have the possibility to impact any future powered shared mobility schemes in the UK. The outcome of the regulatory review of the use of such devices in public spaces will have a major influence on their future in the UK.

London Resort has the opportunity to include e-scooters within the wider Ebbsfleet MaaS project.

Freight

Deliveries by low level automated air technologies, commonly referred to as drones, or wheeled devices operating on pavements are being deployed in the UK with some schemes/trials being brought forward due to the COVID-19 pandemic.

In Milton Keynes, residents can receive deliveries by autonomous pavement robots. The robots use sophisticated computer vision and software to identify objects such as cars, pedestrians, traffic lights and pavements allowing them to detect and avoid obstacles. The service is available through a mobile phone app which allows users to choose where and when the robots deliver their parcel, as well as enabling them to track the robot's journey in real time.

The Department for Transport (DfT) has fast tracked a drone delivery service in response to COVID-19 where drones have been used to transport medical supplies to hospitals on the Isle of Wight.

The London Resort could use drones and pavement robots to transport goods in and out of the site as a FMLM provision. This will reduce the need for larger vehicles within the site mixing with pedestrians and more vulnerable users of the space.

Digital FMLM

Supporting digital infrastructure for FMLM transport options

Mobility as a Service

Mobility as a Service (MaaS) is rooted in the notion that the overall journey is more important than the mode used. A MaaS system integrates multiple modes of transport to provide a single mobility solution that operates in a way to achieve certain societal goals such as net zero and reduced car use. Prerequisites for MaaS include open access to transport data, standards and real-time information.

Research has indicated that MaaS can have positive impacts transport networks by encouraging use of public transport services and active modes and consequently removing private vehicles from roads. For example, Whim in the Midlands and Citymapper Pass in London (multi-modal monthly subscription service in zones 1&2) are the most advanced MaaS offerings available in the UK.

At a more local scale, Kent County Council is leading a consortium in support of a MaaS Framework, with the intent to drive modal shift away from car ownership to shared zero emissions transport. Partners include Southeastern Rail, Fastrack BRT, Arriva, Better Points, Via Van and the University of Kent,

The objective is to introduce an environmentally responsible, people-centered & socially inclusive MaaS network to the country, made up of diverse multimodal integrated mobility schemes. It will commence with the Fastrack BRT & the local rail services in 2022 as a pilot in Ebbsfleet, with ambitions to roll out across Kent from 2023 to 2025 upon pilot success. In it's entirety, the Kent MaaS strategy will include train travel to and from London, a first mile/ last mile DRT service, Fastrack autonomous electric bus services, local bus services, bike & ebike hire; electric car club hire and other mobility options suitable to the county.

Digital Wayfinding

To complement this, smart wayfinding may be implemented as a way of introducing crowd control management.

PassageWay is an example of real-time Smart Mobility and Digital Wayfinding platform working across various uses including entertainment, health, retail and educational centres. The platform provides a supportive solution to stadiums and arenas in their crowd management and sustainability strategies by transforming existing internet-connected screens and digital totems into a dynamic wayfinding point

Augmented Reality (AR) has been applied across sectors as a way of improving user experience. For example, Google Maps has a Live View option which uses AR to display signposts and directions in the real world as an effective wayfinding tool. AR mode was initially exclusive to Google's Pixel phones, but it is now available for Android phone and iPhones that support the required software, and can work in areas with recently published Street View images. This tool helps to facilitate navigation in urban settings (both indoor and outdoor), particularly useful with the increased access to tourism and in settings where people are unfamiliar with an area.

London Resort could use digital wayfinding to improve customer experience on the last mile of their journey to the site.

Smart Ticketing

Paperless event ticketing has become increasingly mainstream, with many events offering this service. The latest ticketing tech is RFID bands, or Radio-frequency Identification, which has brought upon more significant benefits. These include

- Faster access for attendees
- Increased security
- Increased engagement
- Cashless sales
- Instant customer data insights

Ticketmaster could allow venues to ask people to prove they've had the coronavirus vaccine to get into sports events and concerts. The company says the plan would be based on their own ticket app, third party health information firms and vaccine distribution providers. This would be incorporated into a smart paperless ticket.

London Resort could use smart ticketing and integrate this with FMLM transport options on the site for improved customer experience and seamless journeys. Smart ticketing could be integrated with a MaaS system and a mobility hub.

FMLM Summary

Delivering FMLM options

FMLM mobility is provided by a combination of traditional, enhanced and new modes and through a range of delivery channels, both in the public and private sectors. Who continues to deliver these modes in the future very much depends on the location and the individual modes themselves, and whilst the delivery models for some traditional modes have been fixed over a period of time, much of the existing status quo is open for disruption from new entrants to the market.

As new FMLM modes come forward and much has still to be learned about their viability, operation, management and regulation, piloting projects is an appropriate approach to take, ensuring that lessons are learned before wide-scale commercial operations are commenced. The London Resort has the opportunity to be a testbed for FMLM mobility by piloting schemes on the site.

The potential market for different FMLM modes varies greatly and is dependent on a large number of considerations, not least the level of support each mode gives to customer needs and the different spatial setting in which modes operate.

This section has set out a number of options that could be considered for deployment at the London Resort as a package of FMLM options or as standalone services. FMLM at London Resort has the potential to link the development to Ebbsfleet station which is estimated to serve a large number of visitors. FMLM interventions can also be packaged in a Mobility hub as mentioned in the previous section.

Mode Share

A mode share tool has been developed to estimate the number of people arriving to the resort by different modes.

Each FMLM option set out in this section has not been incorporated as it is not yet clear what FMLM interventions will be deployed on the site. However, a number of modes that have been included could indicate potential uptake of FMLM services if deployed. These are displayed in Table D2.

The numbers in the table include daily numbers of both staff and visitors to the site. The mode share tool has capped and uncapped figures based on cark park occupancy and other factors, the figures in the table are uncapped to illustrate potential usage if users could travel how they wanted without restriction.

There is an estimated minimum 10,300 people arriving to the resort via rail or tube, equating to around 23% of daily visitors. This could be used as a proxy for the potential number of people requiring FMLM connections to the resort from Ebbsfleet rail station.

The number of people arriving using active travel, walking cycling or scooting is relatively low as it is not expected that many people will use these modes for the entirety of their journey. However if FMLM interventions are put into place, these modes may be more popular for the last portion of peoples journeys. This is the same for shuttles which at the moment have a very small portion of the mode split.

The percentage of people travelling to the resort using private hire or car clubs is relatively low, however if FMLM interventions promoting these services are put into place this could significantly increase these figures. Also, although the percentages are low, the figures are still fairly high with a total minimum projected users of over 7,000 so must still be considered in any FMLM interventions.

Table D2 **Mode share**

Mode	Projected minimum daily visitors including staff (approximate figures)	Projected minimum percentage mode share (approximate figures)	Projected maximum daily visitors including staff (approximate figures)	Projected maximum percentage mode share (approximate figures)
Rail/tube	10,300	23%	11,600	25%
Private Hire	4,300	9%	2,000	4%
Car Clubs	2,900	6%	2000	4%
Public Bus	1,700	4%	1,500	3%
Coach	1,600	3%	2,900	6%
Shuttle	100	0%	100	0%
Walk	400	1%	400	1%
Bike/scooter	1,500	3%	1,300	3%

THE LONDON RESORT

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Part F

Incentives

Incentives

Overview

Drawing from the analysis undertaken so far, this stage intends to identify and recommend 'softer' measures and incentives to change travel behaviours.

These incentives provide opportunities for the London Resort to consider its travel planning options as early as its development phases, and are perhaps best thought about in terms of 'The 4 R's of Travel Planning':

> Reduce: incentives that both reduce the number of trips to the site and reduce the length / distance of the trips made to the site.

> Re-mode: Incentives that encourage use of more sustainable modes such as public transport and active travel.

> Re-route: Incentives that encourage visitors to shift their routes to a less busy one, to reduce the impacts of congestion on roads and overcrowding on public transport.

> Re-time: Incentives to encourage travel that avoid peak times, reducing the impacts of congestion on roads and overcrowding on public transport.

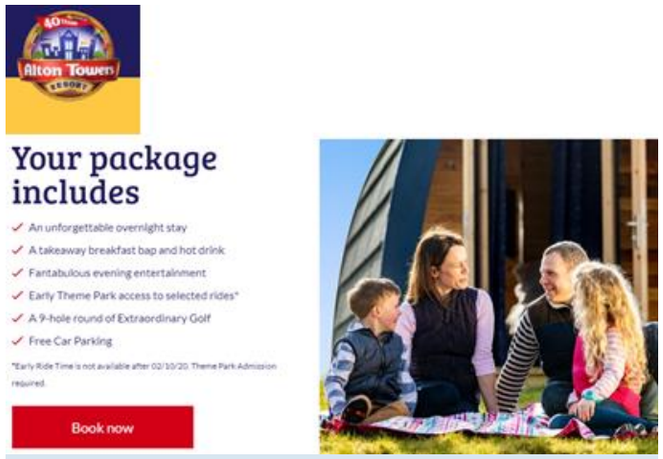
Reduce

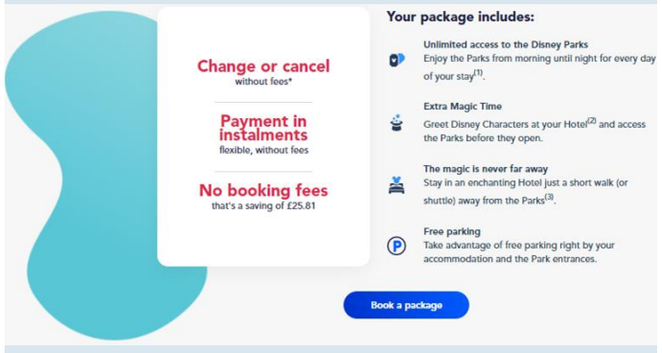
As the London Resort is an attraction, reducing trips, particularly by visitors and the general public, is at first glance counter-intuitive. With single day trips, there is little that can be done in this regard.

However, there is potential to reduce the number trips associated with multi-day visitors by providing accommodation on-site and creating incentives for visitors to stay in this accommodation rather than off-site. The London Resort proposals include four hotels providing 'family, upmarket, luxury' accommodation of up to 3,550 suites.

The Resort therefore may chose to create incentives that encourage visitors with multi-day tickets to stay within this accommodation, such as a reduced rates if bought in conjunction with the multi-day ticket, other perks such as meals included with stay, and a shuttle service between the accommodation and the resort attractions. These incentives are particularly suited to the 'night-time economy' that has been proposed, and may further encourage spend at attractors including bars, restaurants and cinemas.

Furthermore, there is scope to reduce in terms of staff trips as well. For staff required on-site, the Resort could choose to focus its recruitment to local towns, and particularly those with good pre-existing transport links, to reduce the length of the trips taken by these staff members and limit the burden these trips place on the network. For 'back-office' staff who are not necessarily required on-site each day, such as those involved in financing, HR, marketing etc., the option and the resources to work from home will reduce the number of trips made to the site each day. Working from home is increasingly becoming the 'norm' following the Covid-19 national lockdown, and presents significant opportunity for the resort to consider this possibility.





Incentives

Re-mode

Several interventions the Resort could consider to encourage mode shift include:

> Provision of travel planning services to promote and enable users to travel via sustainable modes. This could be accessed online or via an app and include further incentives within, such as points leading to rewards.

> Provision of secure cycle parking to allow staff and visitors to cycle to the Resort;

> Provision of showers and changing facilities for staff to enable them to travel actively to the Resort;

> Provision of 'last mile' services that often serve as the 'missing link' thereby enabling users to travel entirely by public transport

- Shuttle services to and from local public transport stations, for which autonomous passenger movement is gaining increasing attention
- Providing cycle hire facilities at local public transport hubs, allowing the last mile to be cycled to the resort. This could include electric-bikes to improve accessibility.

> Financial incentives such as car parking charges or the inclusion of public transport within ticket prices or public transport concessions.

> Working with coach services to provide transit from populations hubs further away from the Resort, such as Central London or the larger towns in Kent and Essex. This could again involve financial incentives such as inclusion of the service within ticket prices.

Autonomous Passenger Movement such as 'Olli' by Local Motors

Ollie is a self-driving vehicle equipped with IBM Watson cognitive system, as is the world's first 3D printed autonomous vehicle (printable in 9 hours).

Use Case: In Thuwai, Kingdom of Saudi Arabia, Local Motors have partnered with the King Abdullah University of Science and Technology (KAUST), to offer students, faculty and visitors multiple stops across the campus on an almost two-mile loop, making KAUST a leading smart city in the region. Olli also operates in the US, Italy and Australia.

Capacity: 12 people

Size: length 3.95m, width 2.05m, height 2.50m

Maximum speed: 40km/h

Charing specs: 1hr charge time to 100%

Coach Transfer

With a preferred operating partner, Warner Bros Studios in Hertfordshire offer hourly return transfer to the site from several central London and central Birmingham destinations. These are offered alongside a ticket package, or as transfer-only or those who have previously purchased tickets.

Particularly alongside possible financial incentives that can be included with ticket pricing, London Resort may decide that this is a viable option.

By specifically targeting coach travel, this approach may also help to reduce pressures on the rail network during peak hours.

Case Study: Thames Valley Business Park (Wokingham) 2016

WSP has been supporting large business organisations at Thames Valley business park to develop and implement both park-wide and company-specific travel planning measures. WSP undertook a survey to identify the employees travel patterns to and from work, in order to identify solutions to address commuter transport concerns around car parking availability and localised traffic congestion. The survey showed 76% of respondents drove to and from work.

Key measures used to instigate change include:

> Delivering cycle hire schemes

> Delivering shuttle bus service improvements

> Hosted public consultations to co-develop the best solutions

> Fostering long term public/private partnerships to create a legacy from the investment.

Key measured outcomes:

Since 2009, the business park has recorded a 6% reduction in employees driving to and from work, with a corresponding 11% uptake of public transport options. WSP's Travel Plan in 2016 received national industry recognition at the Smarter Travel Awards as 'Best Workplace Travel Plan' in the UK.

Incentives

Re-route

Firstly, the park can consider developing transport alternatives that allow users to avoid the most congested roads or public transport services. For example, the Resort could provide shuttle services, either from local population hubs that enable visitors to avoid the busiest public transport services altogether, or from public transport hubs to reduce pressures from 'last mile' travel. These services should be accessible to both visitors and staff.

Measures to reduce rat running on the local network could also be considered which could include digital solutions such as an app that takes people on specific routes.

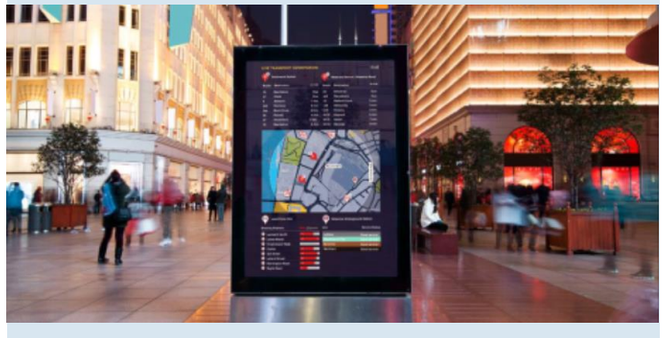
The London Resort can consider branding these provisions, at stops and stations, on the vehicles themselves, and even branded wayfinding routes on the ground. Often these branded services exist alongside others that service the same route, however the convenience offered by these routes, particularly to users who may not know the surrounding areas well, are considered worthwhile and often worth a slightly higher price.

Secondly, the Resort can provide users with information on the best routes to and from the resort, both on road and via public transport. This information may be particularly useful if incorporated into a travel planning service, accessible either online or via a mobile app. This service should be accessible for both visitors and staff.

There is increasing potential for these alternate provisions to be dynamic and responsive, meaning they update real-time updated routes according the current live traffic and capacity data. Branded alongside the alternate transport provisions, the provisions form an entirely rounded journey.

PassageWay

PassageWay is an example of a real-time Smart Mobility and Digital Wayfinding platform working across various uses including entertainment, health, retail and educational centres. The platform provides a supportive solution to stadiums and areas in their crowd management and sustainability strategies by transforming existing internet-connected screens and digital totems into a dynamic wayfinding point.



There could be further incentives to encourage users to take these routes. This could include, for example, a system awarding points for those who take the recommended routes. Points could be exchanged for food and drinks vouchers at the resort. This will be particularly effective among staff who travel to the site frequently.

Wayfinding for parking is a consideration to be made for users that do drive to this site, which can help to reduce 'parking stress' and reduce queues and congestion within car parking spaces. For example, the British Parking Association estimate that the average motorist in the UK spends nearly four days (91 hours) searching for car parking spaces each year. Again this wayfinding can be dynamic, using capacity data to direct users towards quieter sections with more spaces available, and to do so along the most strategic route.

Incentives

Re-time

Research suggests that users have different behavioral intentions for rush-hour avoidance; commuters value punctuality whereas holiday travelers value experience.

Visitor Travel:
To encourage visitors to travel to and from the Resort at times that avoid the peak, the Resort could implement several interventions:

- Consider its opening and closing hours, to allow people to reach the site before the AM peak and leave after the PM peak
- Price / stagger tickets based on time of entry to the park, or on hours spent at the park. Within this, considerations to promote the 'night-time economy' that is also proposed for the resort
- Provide information regarding the peak, including best times to travel and times to avoid. This could be included within the travel planning services previously mentioned, and targeted towards journey experience / enjoyment.

Staff Travel:
To encourage staff to travel to and from the Resort at times that avoid the peak, the Resort could implement several interventions:

- Staff shifts could be timed so that they avoid the morning and evening peaks.
- 'Back-office staff' could be provided with, and encouraged to use, flexible working patterns.
- Provide information regarding the peak, including best times to travel and times to avoid. This could be included within the travel planning services previously mentioned and should be targeted towards punctuality.

Ticket Staggering

As a result of Covid-19, attractions and venues are having to stagger entrance and exit duration of visit in line with social distancing requirements. Even venues who previously operated without admission and entrance fees, such as museums and galleries, are having to create tickets through vendors such as EventBrite as a means to action the requirement. It is likely that staggered entry such as this will become increasingly normal into the future.

THE LONDON RESORT

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Part G

Soft Market Testing

Soft Market Testing

Overview

The size and diverse nature of the masterplan, in addition to the expectation of visitors of varied age and physical ability, will require the identification of suitable suppliers to engage with and support early engagement with London Resorts Holding Company on their tailored proposals.

Soft Market Testing offers invaluable insight into the potential supplier appetite requirements and operations, and when undertaken at an early stage of the project lifecycle, can come to inform scheme design and be planned in a more coordinated manner with the local authority.

The WSP Future Mobility team undertake regular soft-market testing with suppliers shown to the right.

To support the development of the London Resort, it will be important to reach out to suppliers on the following:

- Micromobility such as electric bikes, electric scooters
- Car club operators
- Demand responsive transport operators
- Electric vehicle charge point providers, and
- Mobility as a Service providers.

Example Operators

Car club:

hiyacar

zipcar

TURO

Co-wheels carclub

enterprise rent-a-car

New mobility services:

moovit

zeelo

VIA VAN

Bolt

Micromobility:

beryl

BIRD

BROMPTON BIKE HIRE

Santander CYCLES

Lime

JUMP

Supporting Infrastructure and Digital Apps:

PassageWay

amazon hub Locker

pod POINT

InPost

Bringme

BetterPoints

GRIDSERVE sustainable energy

THE LONDON RESORT

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Appendix A

Mode share estimation

Methodology & assumptions

Mode share estimation

Methodology & assumptions

Overview

To support the transport assessment, the Future Mobility team developed a bespoke mode share estimation tool.

The mode share estimation tool has been used to support transport assessment, transport modelling, walking, cycling, rail, bus and ferry strategies.

The tool provides an indication of the potential mode shares at a local authority level across the UK.

Based on a range of factors such as mode choice, time efficiency, coverage and propensity an 'attractiveness' score is derived for each attendance group, mode, at a local authority resolution.

The tool takes into account the limited number of private car and coach parking spaces and distributes excess trips in these categories.

The tool has been used as a decision-making tool – to understand baseline and opportunities for change in mode shares.

This analysis was based on an 85th percentile day for 2029.

Mode share estimation tool

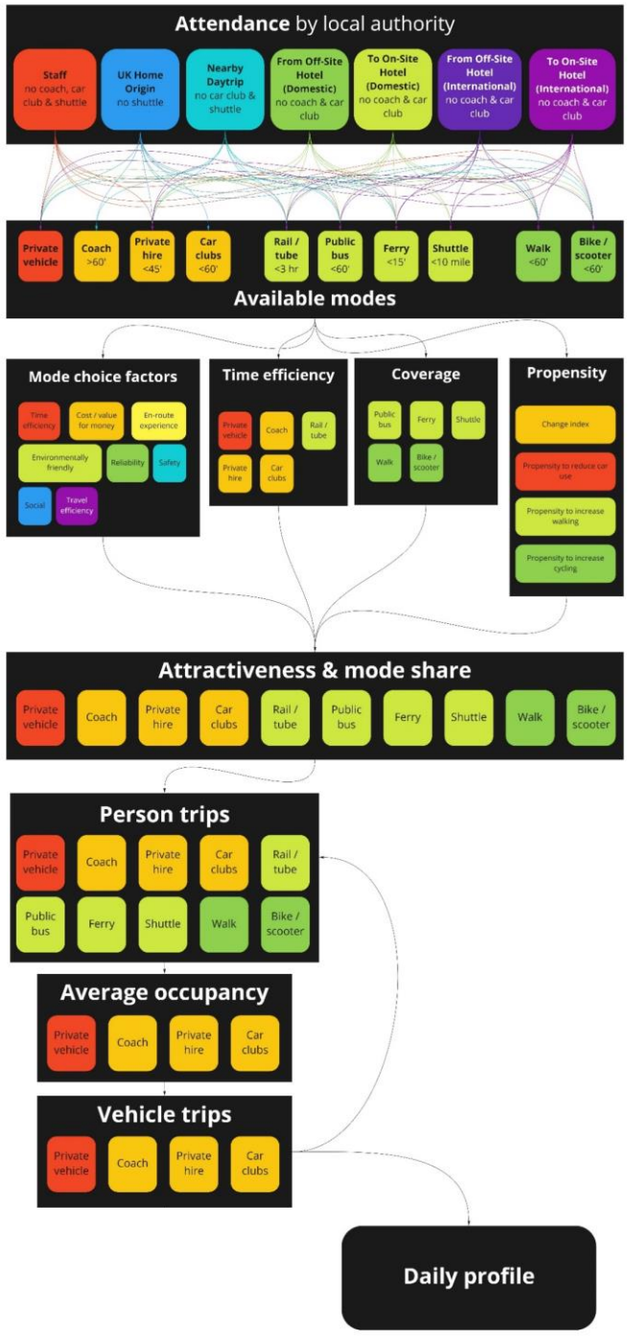
The mode share estimation tool includes the following inputs:

- Attendance (by person groups)
- Available modes
- Mode choice factors
- Journey Times
- Network Coverage
- Propensity for residents to use Active Travel (by LA)
- Average Vehicle Occupancy
- Daily Arrival/Departure Profile

These inputs allow the calculation of the following:

- Attractiveness & estimated mode share
- Person trips
- Vehicle trips.

The flow of the data is shown in the logic map.



Mode share estimation

Attendance by local authority

Where are people coming from?

Attendance data was provided at a local authority level from MRPF London Resort Attendance Distribution Model 2029.

In the analysis seven distinct person groups have been used. These groups cover all staff and visitor trips to and from the site per day. The seven groups are listed to the side.

The methodology for the distribution of trip numbers between person groups is set out in the Transport Assessment (Section 7).

The attendance numbers for each person group, from each LA, is an input in the mode share estimation tool.

The share of trips by each person group of the total trips made to the park are shown in figure below.

Staff trips make up 21% of total trips to the resort. Visitor trips comprise of 79% of the total trips, with UK home origin trips (day trips to the park originating from within the UK) make up 48% of total trips (61% of visitor trips).

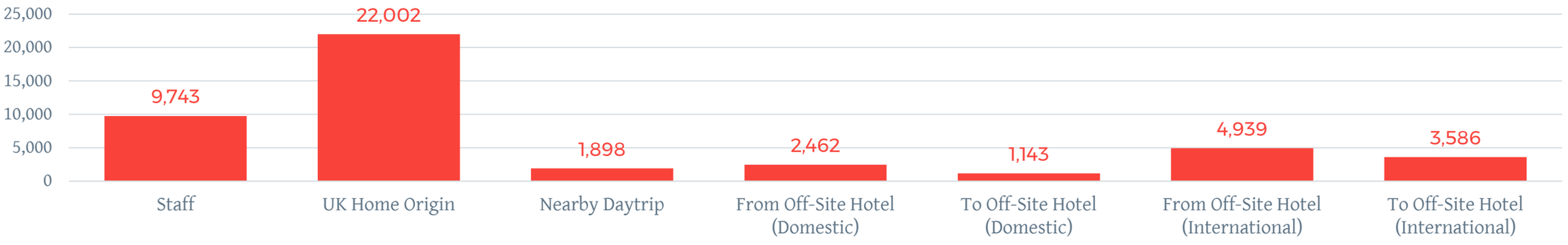
Person Groups Description

Of the seven person groups, one group designated staff, and the other six are visitors. The trip numbers input into the model for each person group, and each LA, are the total trip numbers, and include all modes.

A description of each group is given below:

- Staff – refers to workers at the resort who live off-site
- UK Home Origin - trips made from the place of residence within the UK.
- Nearby Daytrip - visitors to the South East visiting the resort for the day, as part of a longer trip
- From Off-Site Hotel (Domestic) – UK originating trips, visitors are travelling from/to hotel not at the park.
- To On-Site Hotel (Domestic) – UK originating trips, visitors are travelling from/to hotel at the park.
- From Off-Site Hotel (International) - international originating trips, visitors are travelling from/to hotel not at the park.
- To On-Site Hotel (International) - international originating trips, visitors are travelling from/to hotel at the park.

Trips by person group



Mode share estimation

Available modes

What modes can they use?

The mode estimation tool includes ten main modes. These mode categories include important sub modes, which are analysed after the mode estimation tool produces the final results. For example, the mode private vehicles includes electric vehicles.

The ten mode categories have been split into four main categories:

> Private vehicles (red)

> Road based transit that is not public transport (orange) – coach, private hire and car clubs

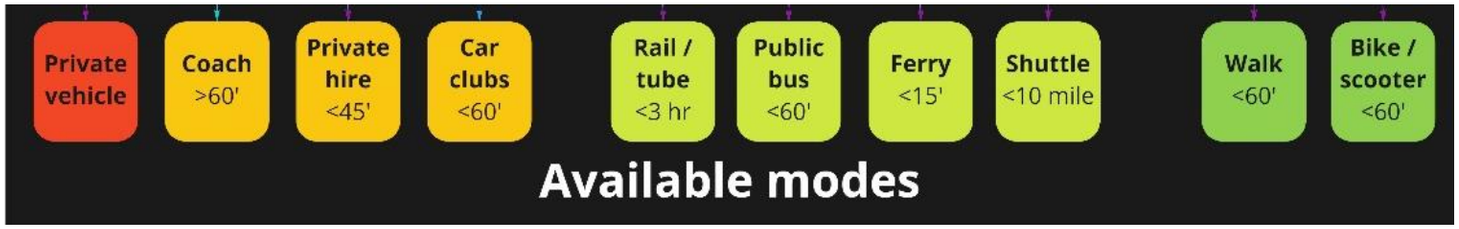
> Public transport (light green) – rail / tube, public bus, ferry and shuttle, and

> Active modes (green) – walking, bike / scooter.

Some of these modes are not suitable or available to certain person groups. For example, international travellers are not expected to have access to car club vehicles.

The availability of each mode to the given person groups is shown in the table, where coloured squares present possible mode choices for that person group.

In addition, there are time or distance limits for each mode. For example, the trip times for journeys by car club are expected to be 60 minutes. The time limits have been included to prevent the tool assigning trips to modes where there is a small likelihood of visitors actually using these modes. The limits used are displayed above the table.

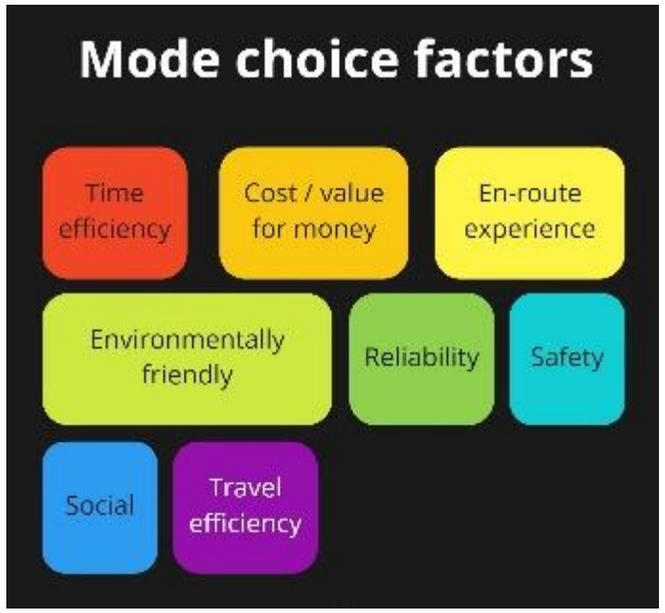


Modes Available to Person Groups

Mode	Staff	UK Home Origin	Nearby Daytrip	From Off-Site Hotel (Domestic)	To On-Site Hotel (Domestic)	From Off-Site Hotel (International)	To On-Site Hotel (International)
Private vehicles							
Coach							
Private hire							
Car clubs							
Rail / tube							
Public bus							
Ferry							
Shuttle							
Walk							
Bike / scooter							

Mode share estimation

Mode choice factors



The mode choice decision is based on a range of factors including time efficiency, cost / value for money, en-route experience, environmental considerations, reliability, safety, social opportunities and travel efficiency. The mode share estimation tool includes inputs presenting the relative attractiveness of a given mode compared with private vehicles.

This is based on two things, the first is a weighting of the mode choice factors for each of the person groups, and is shown to the right. This has been based on a survey of 2,500 people in Kent and London, asking them to rank the importance of the factors for commuting trips for staff and leisure trips for visitors. The second, is a qualitative comparison of each mode compared to private vehicles, scoring a positive if it is better than private vehicles and a negative if it is worse than private vehicles.

The result is a weighting that is to be applied by person group for each mode to factor it up or down within the attractiveness and mode share.

Mode choice factors and relative weighting

Mode choice factor	Staff	UK Home Origin	Nearby Daytrip	From Off-Site Hotel (Domestic)	To On-Site Hotel (Domestic)	From Off-Site Hotel (International)	To On-Site Hotel (International)
Time efficiency	6%	14%	14%	14%	14%	14%	14%
Cost / value for money	4%	12%	12%	12%	12%	12%	12%
En-route experience	11%	23%	23%	23%	23%	23%	23%
Environmentally friendly	1%	4%	4%	4%	4%	4%	4%
Reliability	4%	16%	16%	16%	16%	16%	16%
Safety	11%	16%	16%	16%	16%	16%	16%
Social	1%	6%	6%	6%	6%	6%	6%
Travel efficiency	6%	14%	14%	14%	14%	14%	14%

Weighting by mode and person group

Person Group	Private vehicle	Coach	Private hire	Car clubs	Rail / tube	Public bus	Ferry	Shuttle	Walk	Bike / scooter
Staff	100%	0%	28%	0%	83%	83%	33%	0%	51%	60%
UK Home Origin	100%	45%	39%	49%	68%	68%	61%	0%	174%	234%
Nearby Daytrip	100%	45%	39%	0%	68%	68%	61%	0%	174%	234%
From Off-Site Hotel (Domestic and International)	100%	0%	39%	0%	68%	68%	61%	91%	174%	234%
To On-Site Hotel (Domestic and International)	100%	0%	39%	0%	68%	68%	61%	91%	174%	234%

Mode share estimation

Time efficiency

The ratio of travel time for a given mode, compared to the travel time of private vehicles was calculated as a simple measure of attractiveness of a mode compared to private vehicles.

For simplicity in this model, we have assumed that different modes have the same time efficiency score if they have the same travel times. We also assume that there is an inverse relationship between the time efficiency of the mode and the travel time compared to private vehicles.

For example, if a mode has a travel time of half that of private vehicles, it would have a score of twice that of private vehicles.

Different modes required different calculations of travel times, the methods used are presented below:

- Private Vehicles, Coach, Private Hire, and Car Club travel time is calculated from drive time from the given LA to the resort.
- Rail/Tube travel time is calculated from origin station in LA to one of the five stations that serve the resort. Travel time includes any required interchanges.
- Travel times are provided as a minimum and maximum bound and therefore provide a minimum and maximum score for each mode, for each LA, relative to private vehicles.

Example travel time and resulting scoring

Local authority		Private vehicle	Coach	Private hire	Car clubs	Rail / tube
E06000034	Thurrock	29.4	29.4	29.4	29.4	11.0
E09000004	Bexley	26.0	26.0	26.0	26.0	33.0
E06000035	Medway	31.2	31.2	31.2	31.2	31.0
E07000107	Dartford	19.1	19.1	19.1	19.1	55.0

Local authority		Private vehicle	Coach	Private hire	Car clubs	Rail / tube
E06000034	Thurrock	1.0	0.0	1.0	1.0	2.7
E09000004	Bexley	1.0	0.0	1.0	1.0	0.8
E06000035	Medway	1.0	0.0	1.0	1.0	1.0
E07000107	Dartford	1.0	0.0	1.0	1.0	0.3

Mode share estimation

Coverage

The network coverage provides a proportion of each LA that has access given modes for travelling to the resort. The result shows the percentage of the population of the given LA which has access to the given mode.

A brief description of how the catchments for the different modes has been described below:

- Bus – All routes which serve key stops around the resort within 60 minutes have been identified. A 800m buffer has been created around each of these routes and the population within this buffer is compared to the total population of the surrounding LA. This includes allowance for bus services north of the River Thames connecting to Tilbury.
- Ferry: For ferry we calculated the proportion of the population at a local authority level within 800m of a public transport service which could access the ferry terminals in 15 minutes. This provides an estimate of the potential catchment for ferry services to the London Resort.
- Shuttle – This allows for shuttle services to and from local hotels within a 10 mile radius of the London Resort.
- Walk/Cycle: walking and cycling isochrones were created centred on the resort based on a 60 minute travel time. The proportion of the population within those isochrones compared to the local authority average was then used to develop a coverage

Population coverage by local authority for bus, shuttle, walk and bike / scooter

Area Code	Area Name	Public bus	Ferry	Shuttle	Walk	Bike / scooter
E06000034	Thurrock	85%	0%	0%	0%	4%
E09000007	Camden	0%	7%	0%	0%	0%
E09000001	City of London	0%	79%	0%	0%	0%
E09000013	Hammersmith and Fulham	0%	24%	0%	0%	0%
E09000019	Islington	0%	1%	0%	0%	0%
E09000020	Kensington and Chelsea	0%	28%	0%	0%	0%
E09000022	Lambeth	0%	23%	0%	0%	0%
E09000023	Lewisham	0%	4%	0%	0%	0%
E09000025	Newham	0%	4%	0%	0%	0%
E09000028	Southwark	0%	27%	0%	0%	0%
E09000030	Tower Hamlets	0%	29%	0%	0%	0%
E09000032	Wandsworth	0%	28%	0%	0%	0%
E09000033	Westminster	0%	38%	0%	0%	0%
E09000004	Bexley	30%	0%	43%	0%	3%
E09000006	Bromley	0%	0%	0%	0%	0%
E09000011	Greenwich	0%	21%	0%	0%	0%
E09000018	Hounslow	0%	0%	0%	0%	0%
E09000027	Richmond upon Thames	0%	2%	0%	0%	0%
E06000035	Medway	12%	0%	16%	0%	0%
E07000107	Dartford	96%	0%	100%	16%	94%
E07000109	Gravesham	97%	0%	100%	41%	95%
E07000111	Sevenoaks	23%	0%	40%	0%	14%

Mode share estimation

Propensity

How likely are people to use alternative modes?

To capture the likelihood of people using alternative modes, other than private vehicles, or to use active travel, we have included the following propensities in the mode attractiveness calculation:

- Change Index
- Propensity to reduce car use
- Propensity to increase walking
- Propensity to increase cycling.

These propensities are input at a local authority level, and provide a measure of how likely the population is to change mode from private vehicle, or use active modes, compared to the national mean.

The propensities are provided from the Experian Mosaic dataset, and are originally at postcode level. The postcode data has been averaged by population to provide the propensities at the local authority resolution that the rest of the data has been extracted at.

We have compared the Mosaic data to Transport for London's Transport Classification of Londoners data to develop propensities.

The assumption here, is that different Mosaic profiles have a higher or lower propensity to change travel behaviour, reduce car use, increase walking and cycling. Even if they had the opportunity to shift modes, based on their socio-demographics they may be more or less willing to drive less.

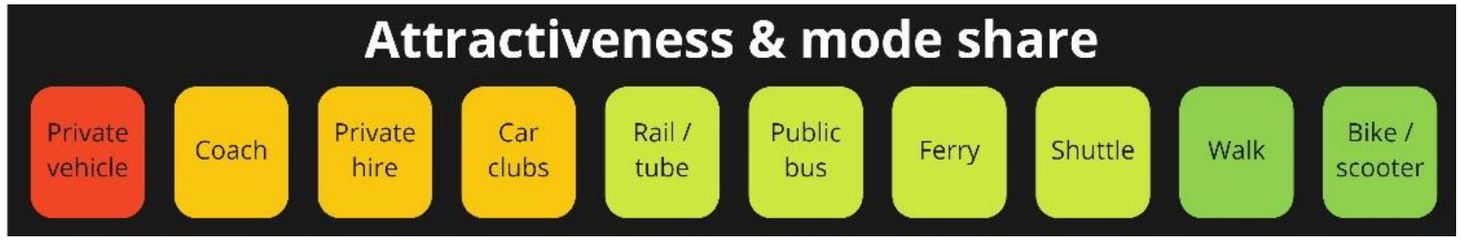
Mode share estimation

Attractiveness & mode share

Attractiveness

The relative attractiveness of each mode compared to private vehicles is calculated using the results of the Coverage, Time Efficiency, Propensity, and Mode Choice Factors, which have been described above. Each of these four components have been calculated to give a score for each mode relative to private vehicles. The product of these scores is used as the overall attractiveness of each mode.

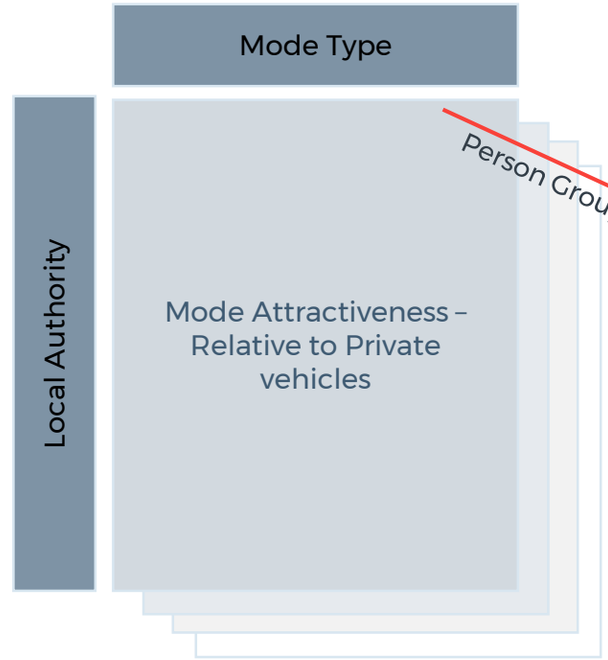
This resulting score for each mode is determined at a Local Authority resolution, and each person group has a unique mode share attractiveness scoring. A visualisation of these dimensions is presented on the right hand side of this page.



Mode share

The mode share is derived by scaling the attractiveness scores, for each local authority and person group, by the same factor so that the scores present the percentage mode share. It is assumed that there is a direct relationship between the attractiveness of a mode over private vehicles, and the ratio in mode share between the given mode and the mode share of private vehicles.

This provides a mode share for each local authority and each person group.



Mode share estimation

Coverage

The person trips by mode were calculated by multiplying the total trips by person group, at LA resolution, by the mode shares described on the previous page. This provides the number of trips per mode, for each person group, at a LA level.

As the attractiveness score is provided as a upper and lower bound, and the resulting mode share has an upper and lower bound, the resulting number of person trips taken by private vehicle has an upper and lower bound, and shown in the tables to the side.

Person trips by mode and person group

Minimum travel time	Staff	UK Home Origin	Nearby Daytrip	From Off-Site Hotel (Domestic)	To Off-Site Hotel (Domestic)	From Off-Site Hotel (International)	To Off-Site Hotel (International)	Total
Private vehicle	4,471	9,915	1,023	1,265	965	2,536	2,120	22,295
Coach	0	1,591	0	0	0	0	0	1,591
Private hire	1,147	1,666	266	281	2	564	289	4,214
Car clubs	0	2,891	0	0	0	0	0	2,891
Rail / tube	1,297	4,766	548	773	175	1,551	1,177	10,288
Public bus	1,764	352	18	23	0	47	0	2,204
Ferry	33	124	23	59	0	119	1	359
Shuttle	0	0	0	27	0	55	0	82
Walk	260	142	4	6	0	11	0	423
Bike / scooter	771	556	17	28	0	56	0	1,427
Totals	9,743	22,002	1,898	2,462	1,143	4,939	3,586	45,774

Maximum travel time	Staff	UK Home Origin	Nearby Daytrip	From Off-Site Hotel (Domestic)	To Off-Site Hotel (Domestic)	From Off-Site Hotel (International)	To Off-Site Hotel (International)	Total
Private vehicle	4,183	10,449	1,073	1,438	953	2,884	2,412	23,392
Coach	0	2,754	165	0	0	0	0	2,918
Private hire	819	732	81	98	0	196	18	1,945
Car clubs	0	1,962	0	0	0	0	0	1,962
Rail / tube	2,308	4,966	519	774	190	1,552	1,155	11,463
Public bus	1,474	338	15	20	0	41	0	1,887
Ferry	37	137	25	73	0	146	1	419
Shuttle	0	0	0	28	0	55	0	83
Walk	233	135	3	5	0	11	0	387
Bike / scooter	688	532	16	27	0	53	0	1,316
Totals	9,743	22,002	1,898	2,462	1,143	4,939	3,586	45,774

Mode share estimation

Average occupancy & Vehicle Trips

To calculate the number of vehicle trips, given the number of person trips, we have included the average vehicle occupancy in the model inputs. The average vehicle occupancy is shown in the top table.

To estimate the number of vehicles excepted to travel to the resort, we need to convert person trips into vehicle trips. This is done by dividing the number of trips for each mode by the corresponding vehicle capacity.

As we have a high and low bound on the number of person trips, we get a low and high bound on the number of vehicle trips.

Average vehicle occupancy

Mode	Private Vehicles - Staff	Private Vehicles - Visitors	Coach	Private Hire	Car Club
Vehicle Occupacy	2	3	30	3	3

Estimated vehicle trips

Minimum travel time	Staff	UK Home Origin	Nearby Daytrip	From Off-Site Hotel (Domestic)	To Off-Site Hotel (Domestic)	From Off-Site Hotel (International)	To Off-Site Hotel (International)	Total
Private vehicle	2,235	3,305	341	422	322	845	707	8,177
Coach	0	53	0	0	0	0	0	53
Private hire	573	555	89	94	1	188	96	1,596
Car clubs	0	964	0	0	0	0	0	964
Totals	2,809	4,877	430	515	323	1,034	803	10,789

Maximum travel time	Staff	UK Home Origin	Nearby Daytrip	From Off-Site Hotel (Domestic)	To Off-Site Hotel (Domestic)	From Off-Site Hotel (International)	To Off-Site Hotel (International)	Total
Private vehicle	2,092	3,483	358	479	318	961	804	8,495
Coach	0	92	5	0	0	0	0	97
Private hire	410	244	27	33	0	65	6	785
Car clubs	0	654	0	0	0	0	0	654
Totals	2,501	4,473	390	512	318	1,027	810	10,031

Mode share estimation

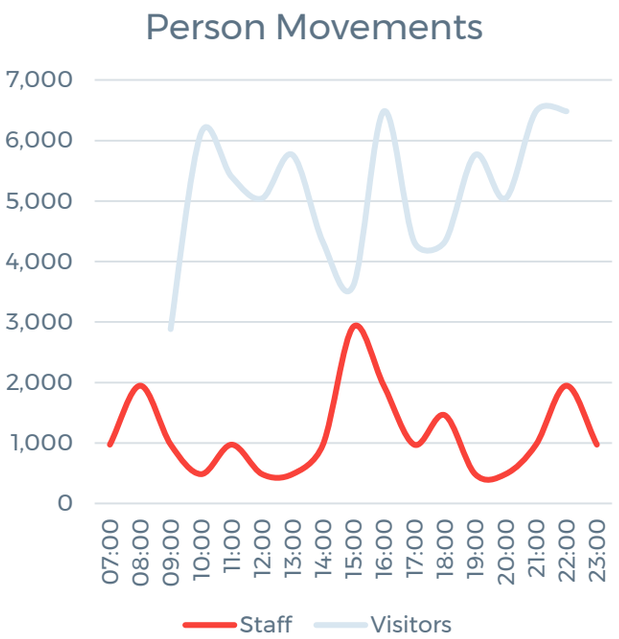
Daily profile

Person Movements

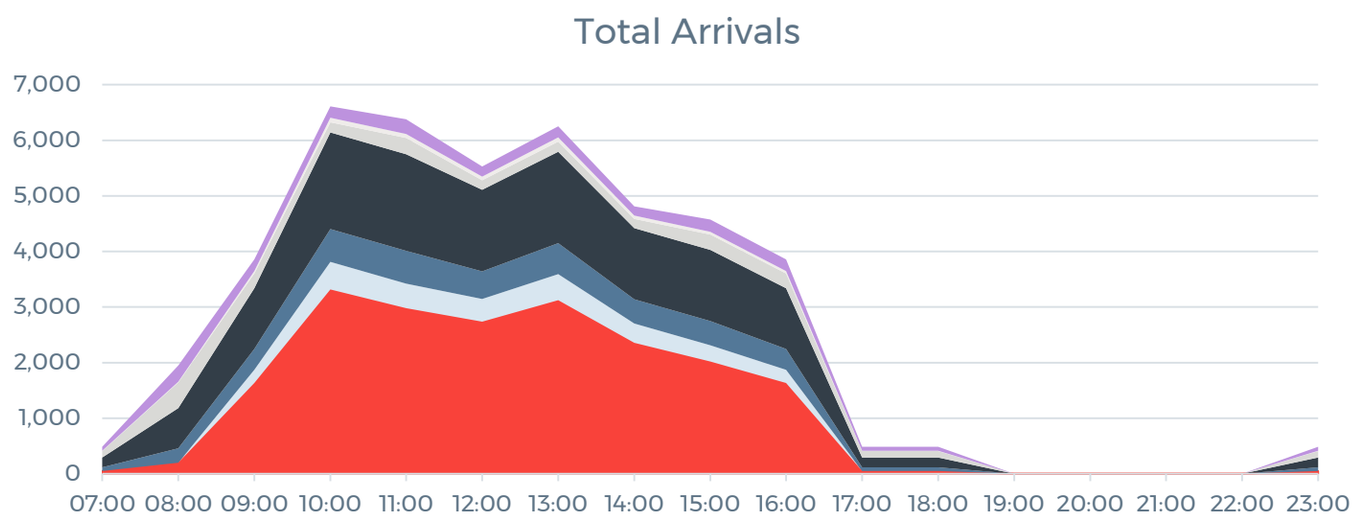
The arrival and departure profiles have been taken from the Stakeholder Advisor Technical Document (SATD). The arrival and departure profiles have been applied to person trip numbers for staff and visitors. The figure below shows the total number of people movements for each of the opening hours of the resort, as well as the arrival and departure trips by mode.

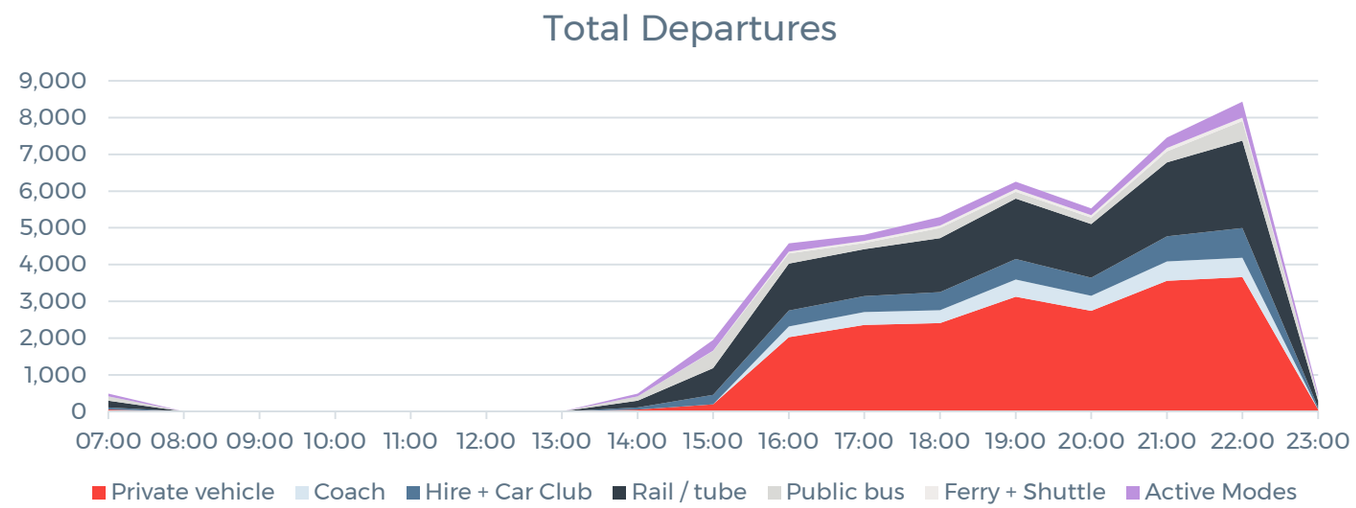
These were used to inform the hourly movements, particularly for rail / tube and public bus.

Combined Arrival and Departure profiles split by staff and visitors



Arrival and Departure profiles for Staff and Visitors by mode.





THE LONDON RESORT

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Appendix B

All visitors' and staff's trip origin: Day of travel

Visitors' trip origin

All visitors

All visitors trip origin (by local authority)

This section focuses on the origin of trips on the day of travel to London Resort, relating to the 2029 modelling scenario. This is the 85%ile day (which is a Monday in July).

A total of 36,031 visitors are expected to patronise London Resort, comprised of the following origin types:

Domestic visitors:

- UK home origin – 22,002 visitors
- Nearby day trip – 1,898 visitors
- From off-site hotel – 2,462 visitors
- To on-site hotel – 1,143 visitors
- Total domestic visitors – 27,506 visitors

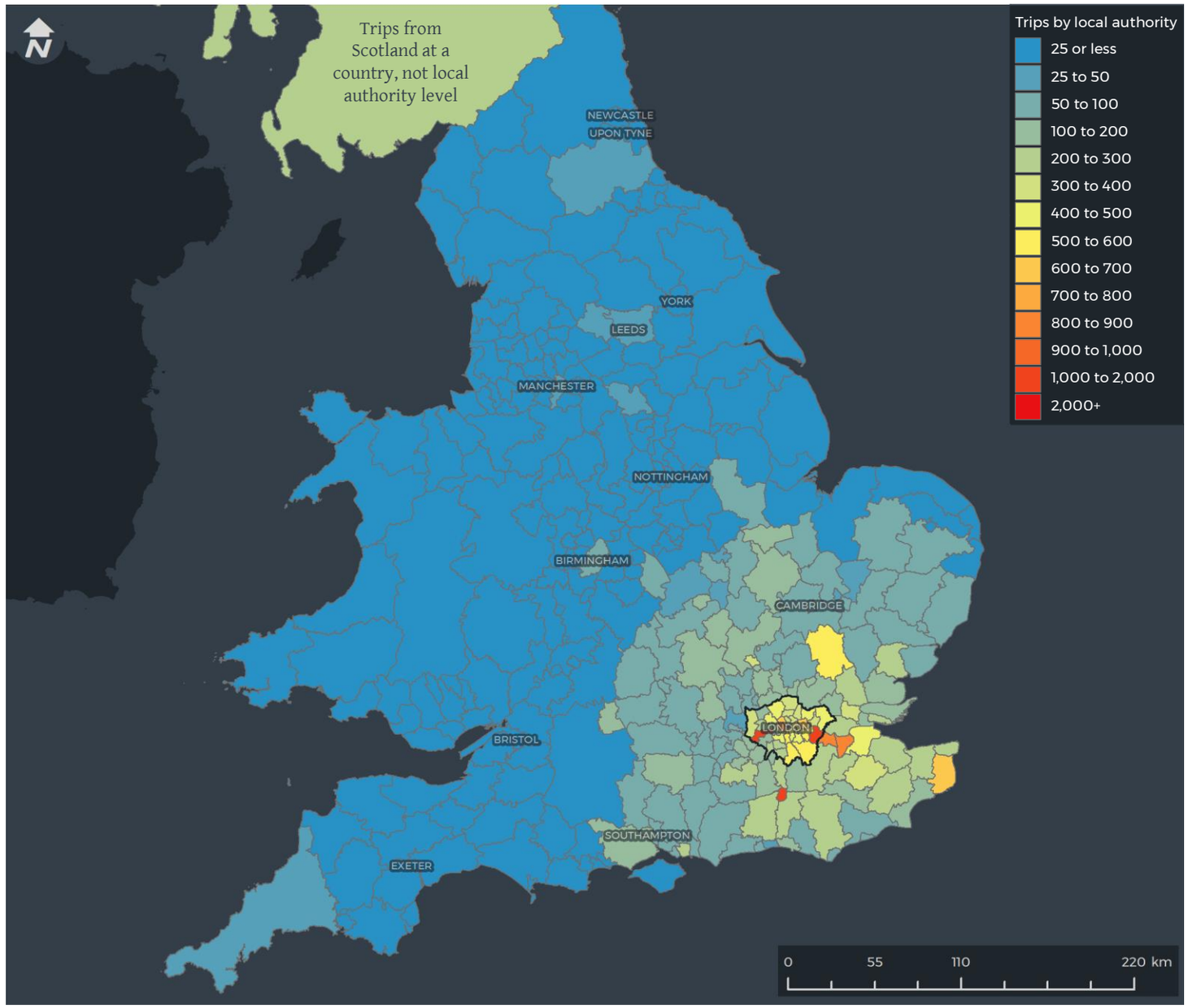
International visitors:

- From off-site hotel – 4,939 visitors
- To on-site hotel – 3,586 visitors
- Total international visitors – 8,525 visitors.

Figure B1 showcases the trip origin of total visitors, at local authority level across the UK. Additional analysis of the trip origin of domestic and international visitors is included in Appendix A and Appendix B respectively.

As can be seen from the figure, the majority of trips originate from the South East region of England.

Figure B1 All visitors trip origin – by local authority (UK-wide)



Visitors' trip origin

All visitors

South East

Figure B2 showcases the visitor trips originating in the South East region. Local authorities with high numbers of originating trips are seen to be those in close proximity to the site, such as Dartford, Gravesham and Bexley, as well as those hosting key transport terminals. The latter include:

Air Travel – London Borough of Hounslow for Heathrow Airport; and Crawley, West Sussex for Gatwick Airport.

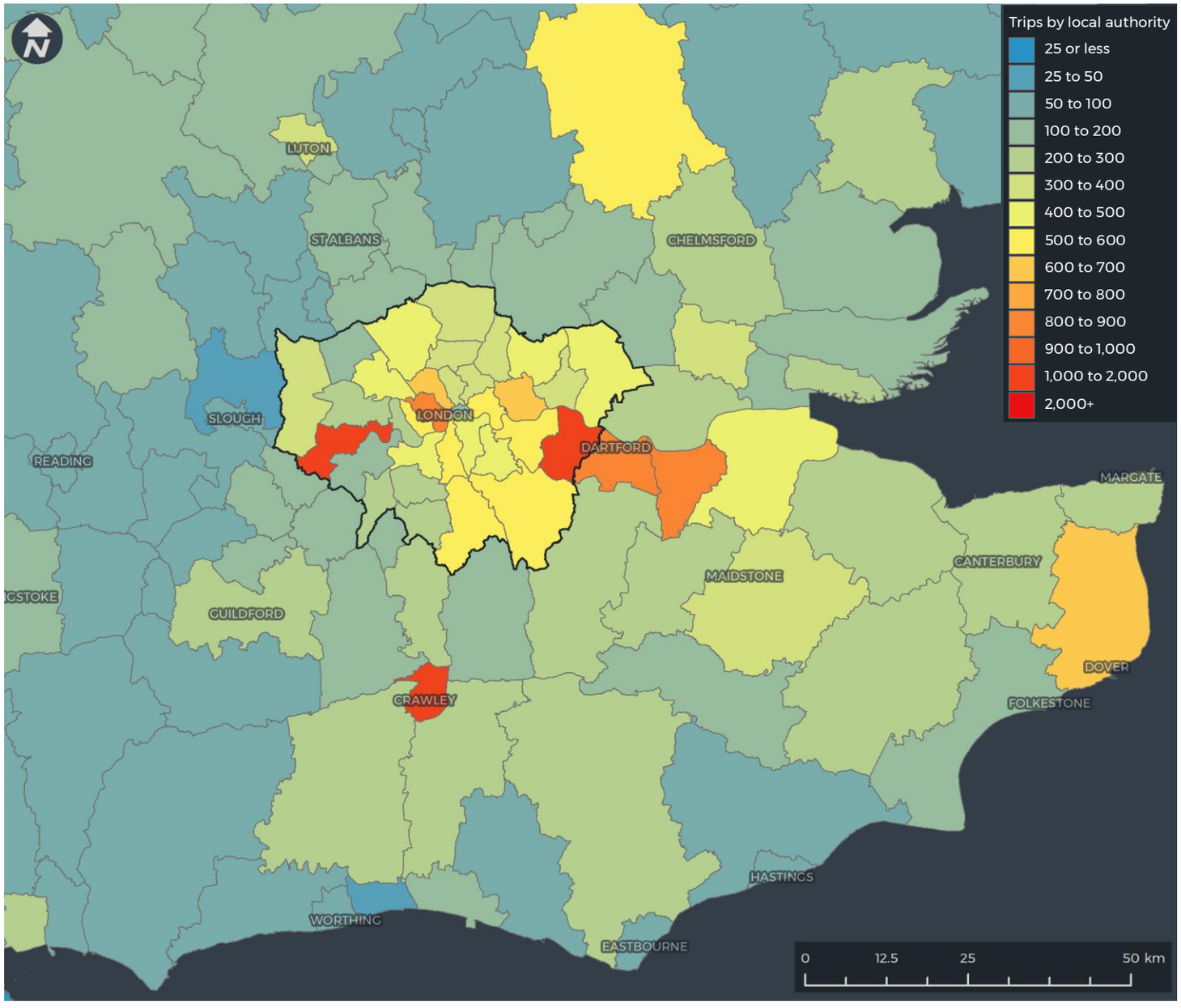
Rail Travel – London Borough of Camden for St Pancras International, London Borough of Newham for Stratford International, and Dartford for Ebbsfleet International, all serviced by the High Speed Rail service.

Water Travel – Dover, Kent for the Dover Ferry Port; and London Borough of Westminster for the Thames Clipper Pier with proposed direct service to Swanscombe Pier.

The table below showcases local authorities where more than 600 trips originate on the 85%ile day. A more extensive list can be found in Technical Note 3 Mode Share.

Local authority	London	Non London	Visitors	%
Bexley	1,906		1,906	5%
Hounslow	1,611		1,611	4%
Crawley		1,012	1,012	3%
Westminster	871		871	2%
Dartford		849	849	2%
Gravesham		824	824	2%
Dover		684	684	2%
Camden	638		638	2%
Newham	606		606	2%

Figure B2 All visitors trip origin – by local authority (South East)



Staff's trip origin

All off-site staff

All staff trip origin (by local authority)

This section focuses on the origin of trips on the day of travel to London Resort, relating to the 2029 modelling scenario. This is the 85%ile day (which is a Monday in July).

In the 2029 modelling scenario, it is estimated that there will be 11,543 weekday staff; with 1,800 staying on-site. A total of 9,743 staff are expected to commute to London Resort, from the following local authority origins:

Staff origin in London:

> 1,948 staff

Staff origin out of London:

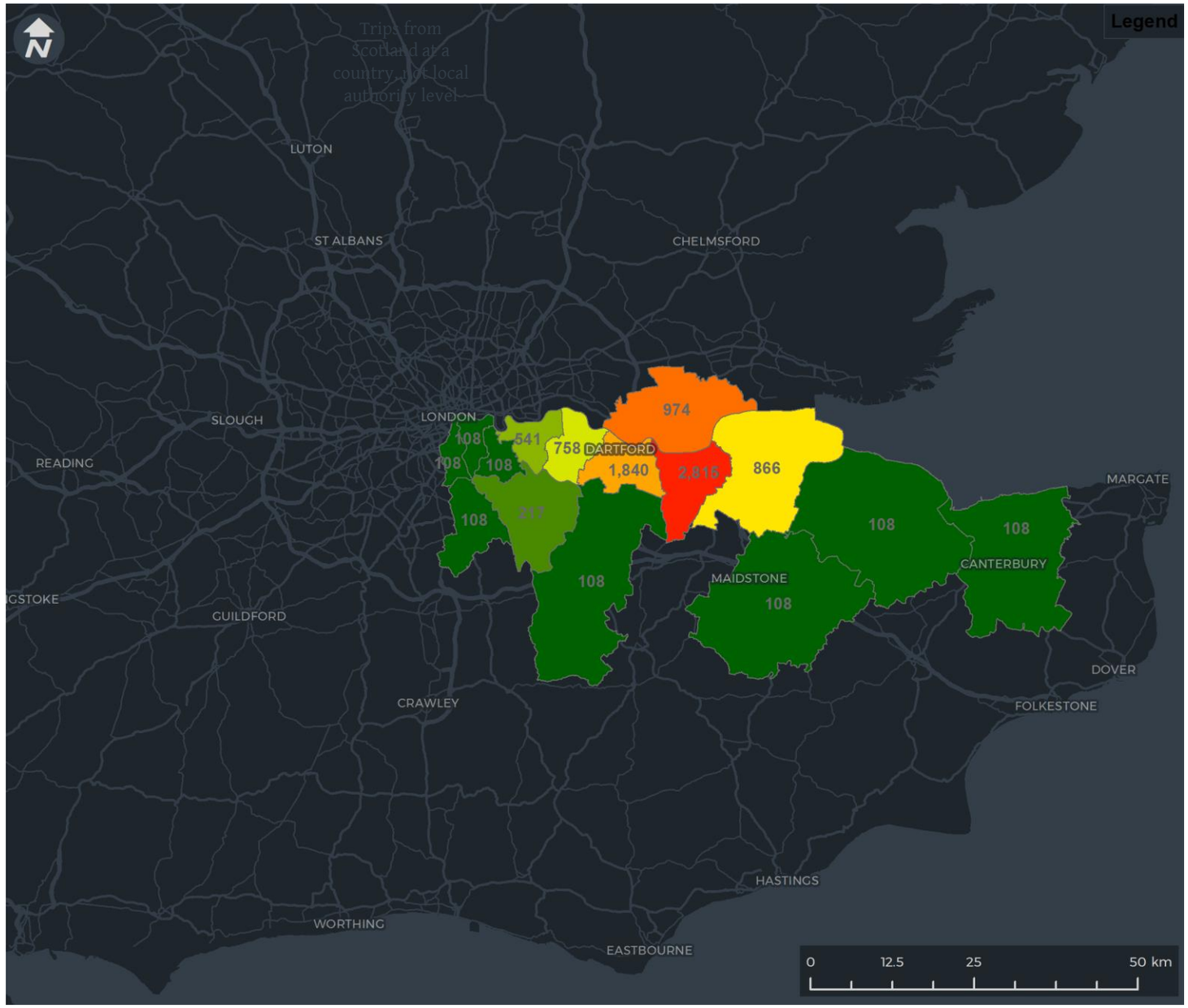
> 7,793 staff.

Figure B3 showcases the trip origin of staff, at local authority level.

As can be seen from the figure, the majority of trips originate from Gravesham and Dartford LAs. Other nearby LAs with high trip origins outside of London are Thurrock and Medway.

Within London a number of trips originate in the boroughs of Bexley, Greenwich and Bromley.

Figure B3 All staff trip origin – by local authority



THE LONDON RESORT

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Appendix C

Mode shift opportunity

(SUPERSEDED BY THE MODE SHARE TOOL – FOR REFERENCE)

Mode shift opportunity

How many visitors could access London Resort by not driving?

This section summarises the mode shift opportunity – which is a high level estimate of the number of visitors that could access London Resort by modes other than private vehicles.

The aim of this summary is to create an evidence base to support the mode shares that were adopted in Technical Note 3 – Mode Share.

The mode shift opportunity has been developed for the following modes or methods of travel:

- Active travel which relates to walking and cycling. For this analysis we have adopted a 5km and 10km buffer of the site. Five kilometres is a comfortable 30 minutes cycle for most people, while a 10 kilometre distance could be covered by e-bikes. This could be expanded to include new modes such as electric scooters (when legalised).
- Bus services which relates to direct bus services travelling to Ebbsfleet International station. We have set the threshold as 60 minutes and included direct services only.
- Ferry services which relates to the proposed Thames Clipper services. We have set the threshold as the number of visitors who travel from local authorities with ferry terminals.
- Rail services which includes National Rail services, as well as the Transport for London network (Underground, Overground, tram and Docklands Light Railway). We have allowed interchanges.

Up to **5%** of visitors (1,673 people) could access the site via **active travel** – which include walking and cycling.

Visitors would be drawn from Dartford and Gravesham – where the majority of the local authority boundaries are within 10km of the site.

Up to **13%** of visitors (4,520 people) could access the site via **bus services** in less than an hour.

Visitors would be primarily drawn from Dartford and Gravesham which are mostly covered by direct bus services. Direct bus services also extend to the local authorities of Bexley, Sevenoaks, Medway and Thurrock.

Up to **15%** of visitors (5,304 people) could access the site via **ferry services** and are travelling from local authorities with ferry terminals.

Visitors would be drawn from the London boroughs adjacent to ferry terminals. London boroughs north of the Thames include Hammersmith & Fulham, Kensington & Chelsea, Westminster, City of London, Tower Hamlets, and Newham.

London boroughs south of the Thames include Wandsworth, Lambeth, Southwark, Lewisham, and Greenwich.

Up to **64%** of visitors (22,995 people) could access the site via **rail** in less than an hour.

This has been calculated as the shortest travel time from each local authority, with interchanges allowed using National Rail, Underground, tram and Docklands Light Railway.

Mode shift opportunity

How many staff could access London Resort by not driving?

This section summarises the mode shift opportunity – which is a high level estimate of the number of staff that could access London Resort by modes other than private vehicles.

The aim of this summary is to create an evidence base to support the mode shares that were adopted in Technical Note 3 – Mode Share.

The mode shift opportunity has been developed for the following modes or methods of travel:

- Active travel which relates to walking and cycling. For this analysis we have adopted a 5km and 10km buffer of the site. Five kilometres is a comfortable 30 minutes cycle for most people, while a 10 kilometre distance could be covered by e-bikes. This could be expanded to include new modes such as electric scooters (when legalised).
- Bus services which relates to direct bus services travelling to Ebbsfleet International station. We have set the threshold as 60 minutes and included direct services only.
- Ferry services which relates to the proposed Thames Clipper services. We have set the threshold as the number of staff who travel from local authorities with ferry terminals.
- Rail services which includes National Rail services, as well as the Transport for London network (Underground, Overground, tram and Docklands Light Railway). We have allowed interchanges.

Up to **48%** of staff (4,655 people) could access the site via **active travel** – which include walking and cycling.

Staff would be drawn from Dartford and Gravesham – where the majority of the local authority boundaries are within 10km of the site.

Up to **76%** of staff (7,361 people) could access the site via **bus services** in less than an hour.

Staff would be primarily drawn from Dartford and Gravesham which are mostly covered by direct bus services. Direct bus services also extend to the local authorities of Bexley, Sevenoaks, Medway and Thurrock.

Up to **9%** of staff (865 people) could access the site via **ferry services** and are travelling from local authorities with ferry terminals.

Staff would be drawn from the London boroughs adjacent to ferry terminals including Lambeth, Southwark, Lewisham and Greenwich..

Up to **100%** of staff (9,743 people) could access the site via **rail** in less than an hour.

This has been calculated as the shortest travel time from each local authority, with interchanges allowed using National Rail, Underground, tram and Docklands Light Railway.

Mode shift opportunity

How many visitors and staff could walk or cycle to London Resort?

Active travel (walking & cycling)

Visitors

Figure C1 illustrates the 5km and 10 km catchment from site entrance, representing the attainable walking and cycling distances, respectively. This active travel catchment also lends itself to other micromobility options, such as electric scooters, which are currently on trial in designated areas in the UK.

Given the local geography, including barriers such as the Thames River and local highways, active travel to the site is deemed plausible from locations in Dartford and Gravesham. As such, 849 visitors from Dartford and 824 visitors from Gravesham are able to access the site on foot or on cycle.

It is estimated that up to 5% of visitors (1,673 people) could access the site via active travel

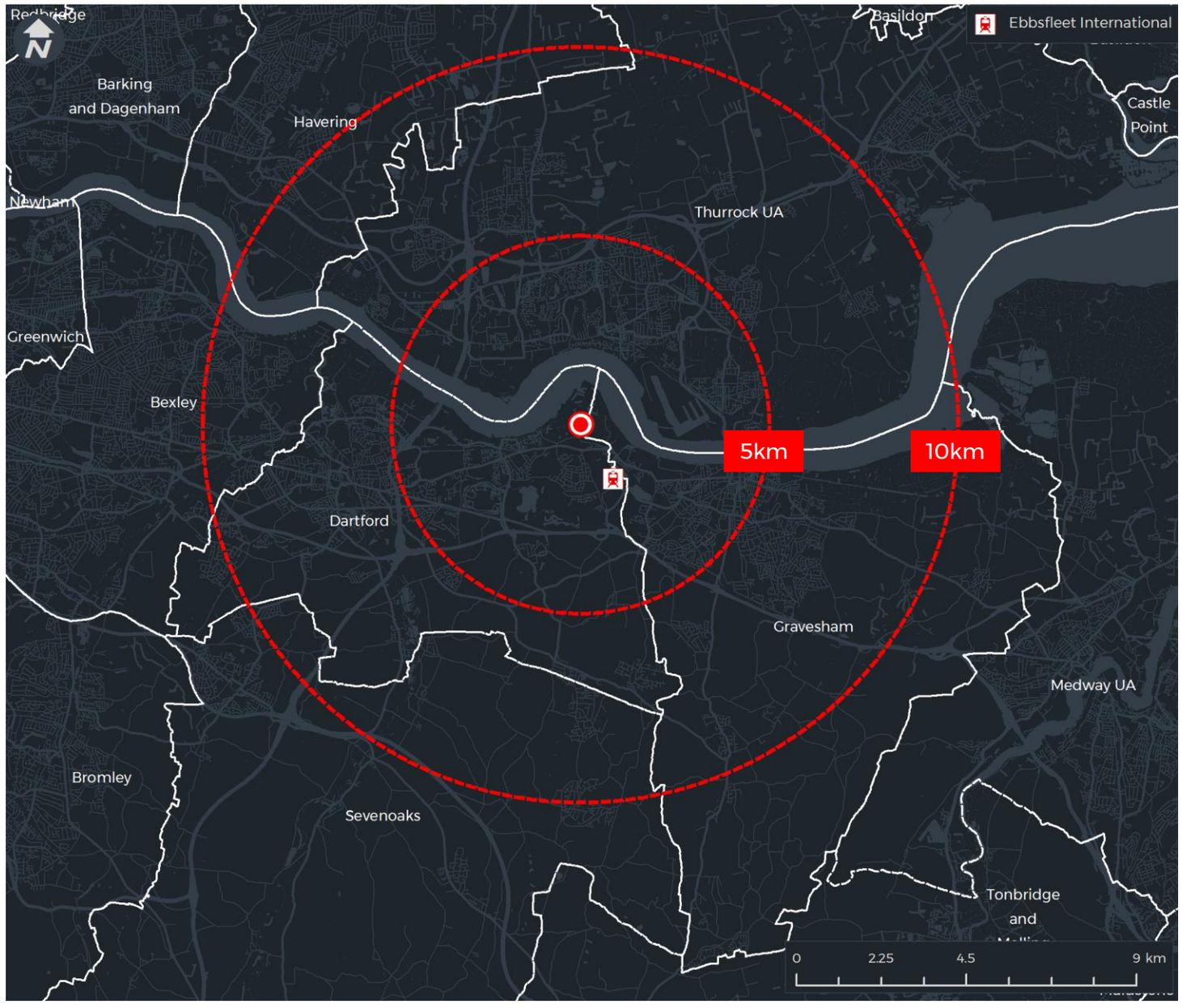
Staff

It is predicted that a high number of staff will be commuting to the site from the nearby local authorities of Dartford, Gravesham and Thurrock; all of which have large areas within the 5km and 10km catchment of the site.

As with visitors travel consideration of barriers such as the Thames River and local highways has been understood, and active travel to the site is deemed plausible from locations in Dartford and Gravesham. As such, 2,815 staff from Gravesham and 1,840 staff from Dartford are able to access the site on foot or cycle.

It is estimated that 48% of staff (4,655 people) could access the site via active travel

Figure C1 Active travel catchment (walking and cycling)



Mode shift opportunity

How many visitors and staff could catch a bus to London Resort?

Bus

Visitors

Figure C2 showcases the 60 minute bus catchment, indicating the direct bus services currently running to Ebbsfleet International station as a proxy for potential bus services to the London Resort site.

A total of 849 visitors from Dartford and 824 visitors from Gravesham are covered by this bus catchment. As shown in Figure 8, the majority of these local authorities are accessible to the site within 60 minutes, with nuances depending on proximity to the site.

Further afield, 1,906 visitors are covered by the bus catchment within The London Borough of Bexley, 236 visitors in Sevenoaks, 449 visitors in Medway and 256 visitors in Thurrock.

It is estimated that up to 13% of visitors (4,520 people) could access the site via bus services in less than an hour

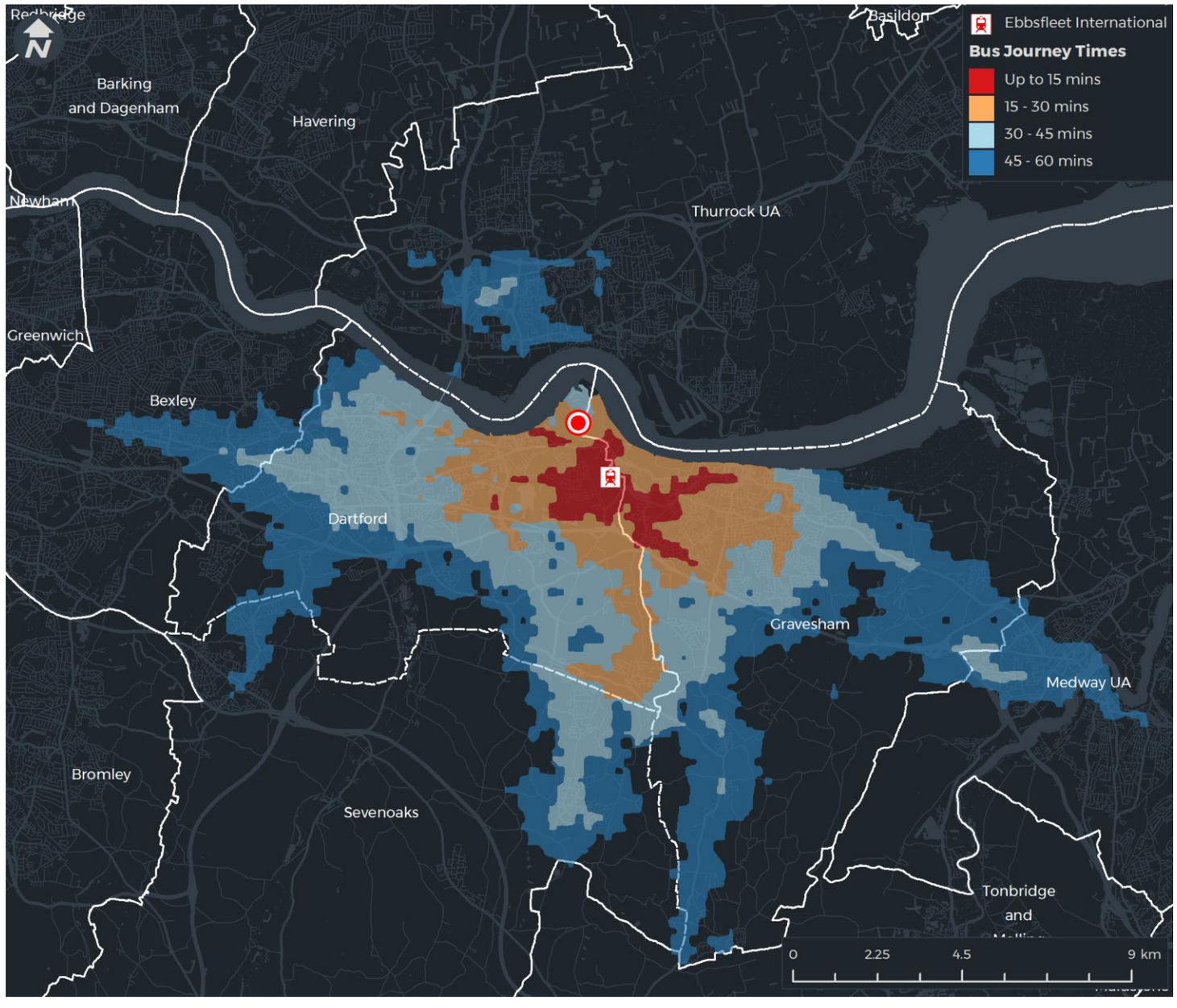
Staff

A total of 2,815 staff from Gravesham and 1,840 staff from Dartford are covered by the 60 minute bus catchment.

Further afield 974 staff are covered by the bus catchment in Thurrock, 866 staff in Medway, 758 staff in the London borough of Medway and 108 staff in Sevenoaks.

It is estimated that up to 76% of staff (7,361 people) could access the site via bus services in less than an hour

Figure C2 Bus catchment (direct bus services to and from Ebbsfleet International station)



Mode shift potential

How many visitors and staff could use the ferry to access to London Resort?

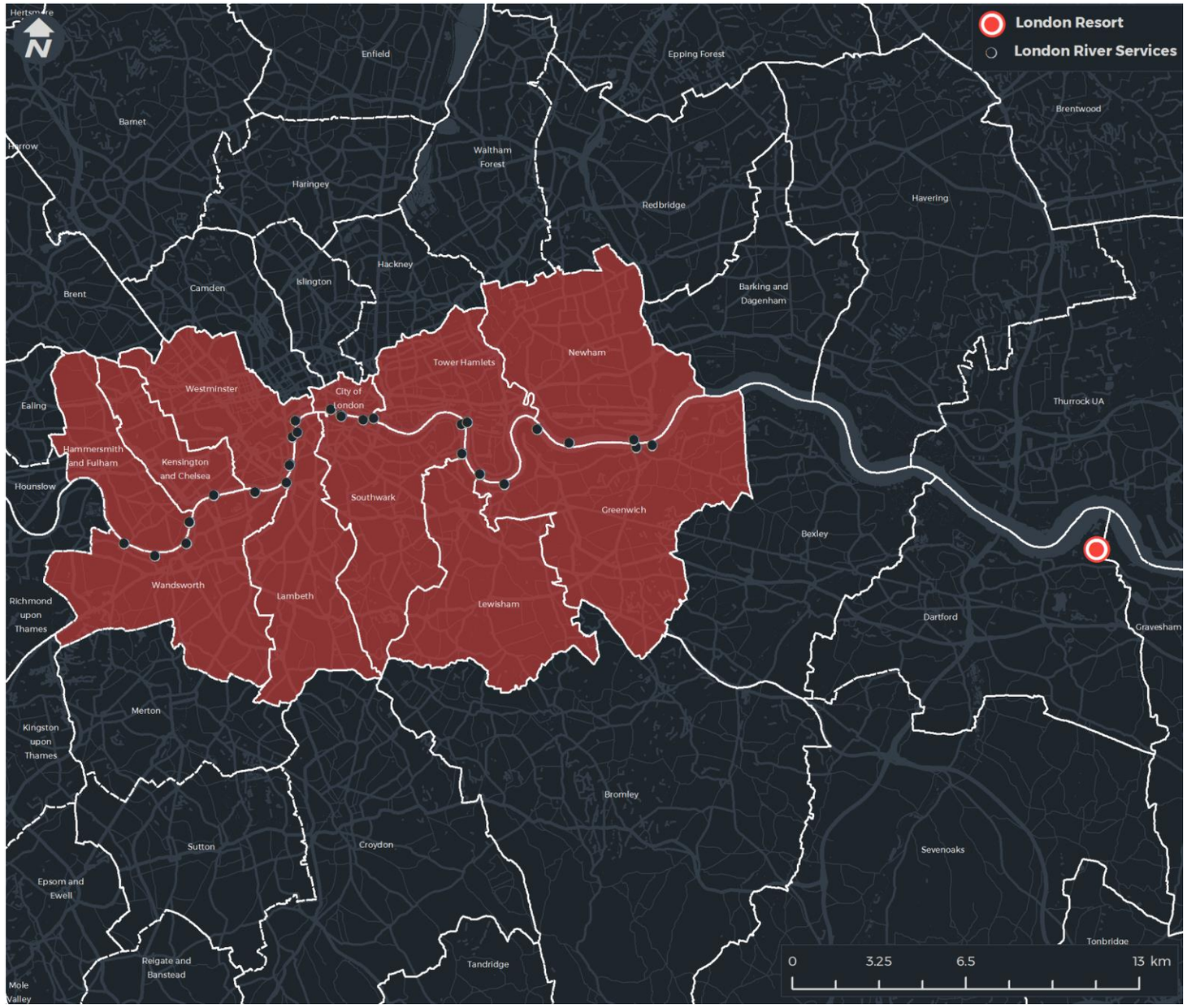
Ferry

The London Thames Water Clipper currently operates from piers in 11 local authorities. These are illustrated in Figure C3.

There are proposals to extend this service to the Swanscombe Peninsula, providing a direct service to the London Resort site. Subject to this going ahead, 15% of all visitors and 9% of all staff will be served by the Thames Water Clipper with services direct to the site. The table below showcases the distribution of access to Thames Water Clipper piers across all 11 local authorities.

Local authority	Total visitors	Total staff
Hammersmith and Fulham	226	0
Kensington and Chelsea	575	0
Westminster	871	0
City of London	144	0
Tower Hamlets	506	0
Newham	606	0
Wandsworth	404	0
Lambeth	504	108
Southwark	481	108
Lewisham	430	108
Greenwich	556	541
Total	**5,304**	**865**

Figure C3 Ferry catchment (proposed Thames Clipper service to London Resort)



Mode shift opportunity

How many visitors could use rail to access to London Resort?

Rail

Table C1 showcases the travel times to the site by rail, indicating the low estimate (worst case scenario) and high estimate (best case scenario). These scenarios are informed by the longest and shortest travel times from rail stations in each local authority to the site. Additionally, the table also shows estimated mode share by rail for each.

As shown, an estimated 10,957 (low estimate) and 22,995 (high estimate) visitors are able to access the site within 60 minutes, accounting for 30% or 64% of the mode share, respectively.

Accounting for all journeys within 180 minutes, a total of 34,654 (low estimate) or 34,654 (high estimate). For both scenarios, this accounts for 96% of mode share.

Table C1 Rail / Underground / light rail / tram / DLR (total)

Travel time	Low estimate (number of visitors)	High estimate (number of visitors)	Low estimate (mode share)	High estimate (mode share)
15 mins or less	0	2,728	0%	8%
15 to 30 mins	449	3,890	1%	11%
30 to 45 mins	2,875	8,415	8%	23%
45 to 60 mins	7,633	7,961	21%	22%
Total <60 mins	**10,957**	**22,995**	**30%**	**64%**
60 to 120 mins	20,142	10,032	56%	28%
120 to 180 mins	3,555	1,628	10%	5%
Total <180 mins	**34,654**	**34,654**	**96%**	**96%**

Mode shift opportunity

How many visitors could use rail to access to London Resort?

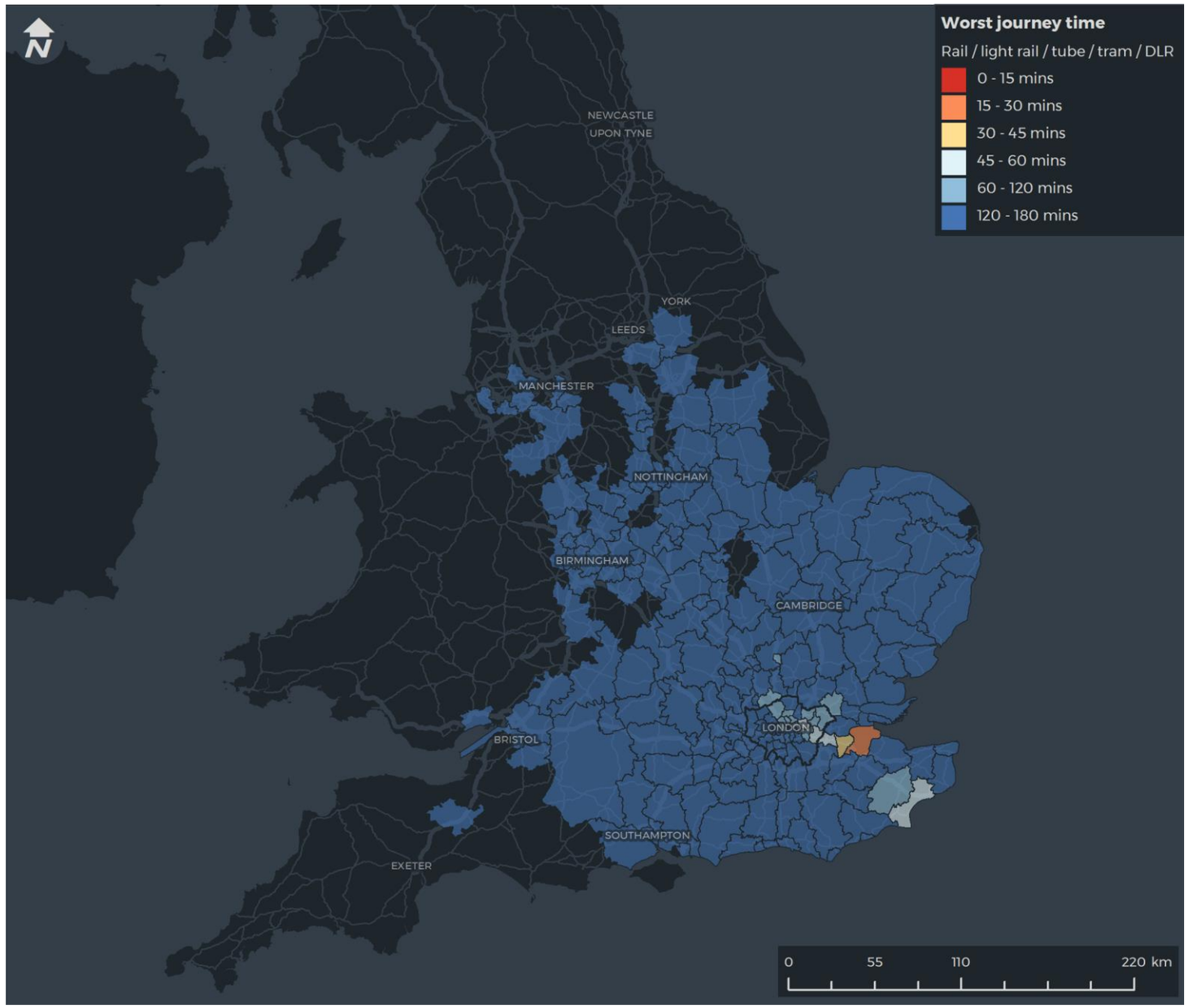
Longest journey time

Figure C4 illustrates the longest journey time (or worst case) rail catchment to the site. That is, the longest possible journey time from each local authority to the site, indicating local authorities within a 180 minute direct train service to London Resort. Rail services include National Rail and TfL services (Underground, Overground, DLR and tram).

The table below presents the number of visitors per local authority with rail access to the site within an hour.

Local authority	Visitors	Mode share
15 to 30 mins		
Medway	449	1%
30 to 45 mins		
Bexley	1,906	8%
City of London	144	
Gravesham	824	
45 to 60 mins		
Ashford	201	21%
Barking and Dagenham	395	
Barnet	467	
Brentwood	158	
Camden	638	
Dartford	849	
Greenwich	556	
Hackney	388	
Haringey	347	
Havering	468	
Hertsmere	149	
Islington	368	
Newham	606	
Redbridge	415	
Shepway	198	
Stevenage	53	
Tower Hamlets	506	
Westminster	871	

Figure C4 Rail catchment (National Rail / Underground / Overground / tram / DLR) – longest journey time



Mode shift opportunity

How many visitors and staff could use rail to access to London Resort?

Shortest journey time

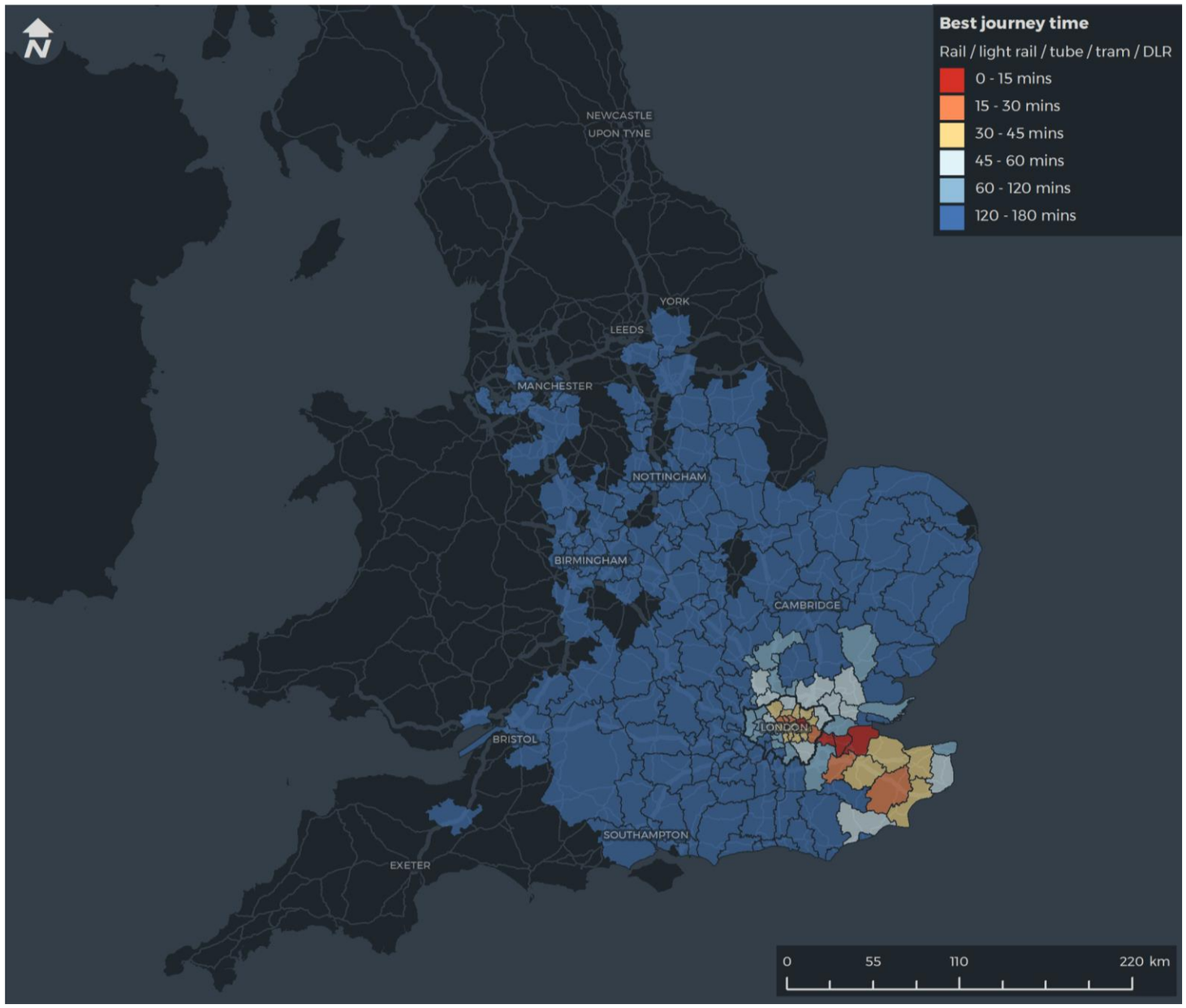
Figure C5 illustrates the shortest journey time (or best case) rail catchment to the site. That is, the shortest possible journey time from each local authority to the site, indicating local authorities within a 180 minute direct train service to London Resort. Rail services include National Rail and TfL services (Underground, Overground, DLR and tram).

As shown, the majority of Kent and London local authorities are within 60 minutes of the site.

All staff are located within a 60 minute rail catchment of the site. 57% of staff, those located in the local authorities of Gravesham, Dartford and Medway, have a shortest journey time of 15 minutes or less.

The table overleaf presents the number of visitors and staff per local authority with rail access to the site within an hour.

Figure C5 Rail catchment (National Rail / Underground / Overground / tram / DLR) – shortest journey time



Mode shift opportunity

How many visitors and staff could use rail to access to London Resort?

Visitor shortest journey time

15 mins or less		
Dartford	849	8%
Gravesham	824	
Medway	449	
Newham	606	
15 to 30 mins		
Ashford	201	11%
Bexley	1,906	
Camden	638	
City of London	144	
Hackney	388	
Islington	368	
Tonbridge and Malling	244	
30 to 45 mins		
Barking and Dagenham	395	23%
Barnet	467	
Brent	425	
Brentwood	158	
Canterbury	297	
Enfield	400	
Greenwich	556	
Haringey	347	
Havering	468	
Kensington and Chelsea	575	
Lambeth	504	
Lewisham	430	
Maidstone	312	
Redbridge	415	
Shepway	198	
Southwark	481	
Swale	228	
Tower Hamlets	506	
Waltham Forest	382	
Westminster	871	

45 to 60 mins		
Basildon	303	22%
Braintree	92	
Bromley	581	
Broxbourne	137	
Chelmsford	227	
Croydon	502	
Dover	684	
Ealing	266	
Epping Forest	180	
Hammersmith and Fulham	226	
Harrow	193	
Hertsmere	149	
Hillingdon	326	
Hounslow	1,611	
Luton	395	
Merton	271	
North Hertfordshire	80	
Rochford	122	
Rother	57	
Sevenoaks	236	
St Albans	184	
Stevenage	53	
Thanet	216	
Thurrock	256	
Wandsworth	404	
Watford	57	
Welwyn Hatfield	153	

Staff shortest journey time

15 mins or less		
Dartford	1,840	57%
Gravesham	2,815	
Medway	866	
15 to 30 mins		
Bexley	758	8%
30 to 45 mins		
Canterbury	108	12%
Greenwich	541	
Lambeth	108	
Lewisham	108	
Maidstone	108	
Southwark	108	
Swale	108	
45 to 60 mins		
Bromley	217	14%
Croydon	108	
Sevenoaks	108	
Thurrock	974	

Mode shift opportunity

Visitors

Summary of results

Based on our assessment, we estimate the following mode shift opportunities for visitors to London Resort.

- Between 0 and 1,673 visitors could arrive by active travel (walking and cycling), which represents up to 5% mode share. This would be subject to adequate infrastructure being provided to allow visitors to safely walk and cycle to the resort.
- Between 1,673 and 4,520 visitors will originate in local authorities with direct bus services to London Resort, which represents up to 13% mode share. This would be complemented by the coach network.
- Between 0 and 5,304 visitors will originate in local authorities with ferry terminals served by the Thames Clipper service to London Resort, which represents up to 15% mode share.
- Finally, between 10,957 and 22,995 visitors will originate in local authorities that can access Ebbsfleet International station within 60 minutes by rail, which represents up to 64% mode share.

As rail has the largest catchment, and includes the coverage area for active travel, bus and ferry services – it is estimated that up to 64% of visitors to London Resort can reasonably access the site by non-private vehicle.

It is estimated that the opportunity to shift modes would be between 30% and 64% of visitors, given the right incentives to use non-private vehicles to access the site.

Table C2 Mode shift opportunity results

Mode	Assumption / notes	Low estimate (number of visitors)	High estimate (number of visitors)	Low estimate (mode share)	High estimate (mode share)
Active travel	5km and 10km buffers of London Resort – local authorities south of the River Thames only	0	1,673	0%	5%
Bus	Can access Ebbsfleet International in 60 minutes or less via direct bus services	1,673	4,520	5%	13%
Ferry	Travelling from local authorities with ferry terminals serviced by the Thames Clipper	0	5,304	0%	15%
Rail	Can access Ebbsfleet International in 60 minutes or less with transfers	10,957	22,995	30%	64%

Mode shift opportunity

Staff

Summary of results

Based on our assessment, we estimate the following mode shift opportunities for staff to London Resort.

- Between 0 and 4,655 visitors could arrive by active travel (walking and cycling), which represents up to 48% mode share. This would be subject to adequate infrastructure being provided to allow staff to safely walk and cycle to the resort.
- Between 4,655 and 7,361 staff will originate in local authorities with direct bus services to London Resort, which represents up to 76% mode share. This would be complemented by the coach network.
- Between 0 and 865 staff will originate in local authorities with ferry terminals served by the Thames Clipper service to London Resort, which represents up to 9% mode share.
- Finally, between 6,820 and 9,743 of staff will originate in local authorities that can access Ebbsfleet International station within 60 minutes by rail, which represents up to 100% mode share.

As rail has the largest catchment, and includes the coverage area for active travel, bus and ferry services – it is estimated that up to 100% of London Resort staff can reasonably access the site by non-private vehicle.

It is estimated that the opportunity to shift modes would be between 70% and 100% of staff, given the right incentives to use non-private vehicles to access the site.

Table C3 Mode shift opportunity results

Mode	Assumption / notes	Low estimate (number of staff)	High estimate (number of staff)	Low estimate (mode share)	High estimate (mode share)
Active travel	5km and 10km buffers of London Resort – local authorities south of the River Thames only	0	4,655	0%	48%
Bus	Can access Ebbsfleet International in 60 minutes or less via direct bus services	4,655	7,361	48%	76%
Ferry	Travelling from local authorities with ferry terminals serviced by the Thames Clipper	0	865	0%	9%
Rail	Can access Ebbsfleet International in 60 minutes or less with transfers	6,820	9,743	70%	100%

Appendix D

Domestic visitors' trip origin: Day of travel

Visitors' trip origin

Domestic visitors

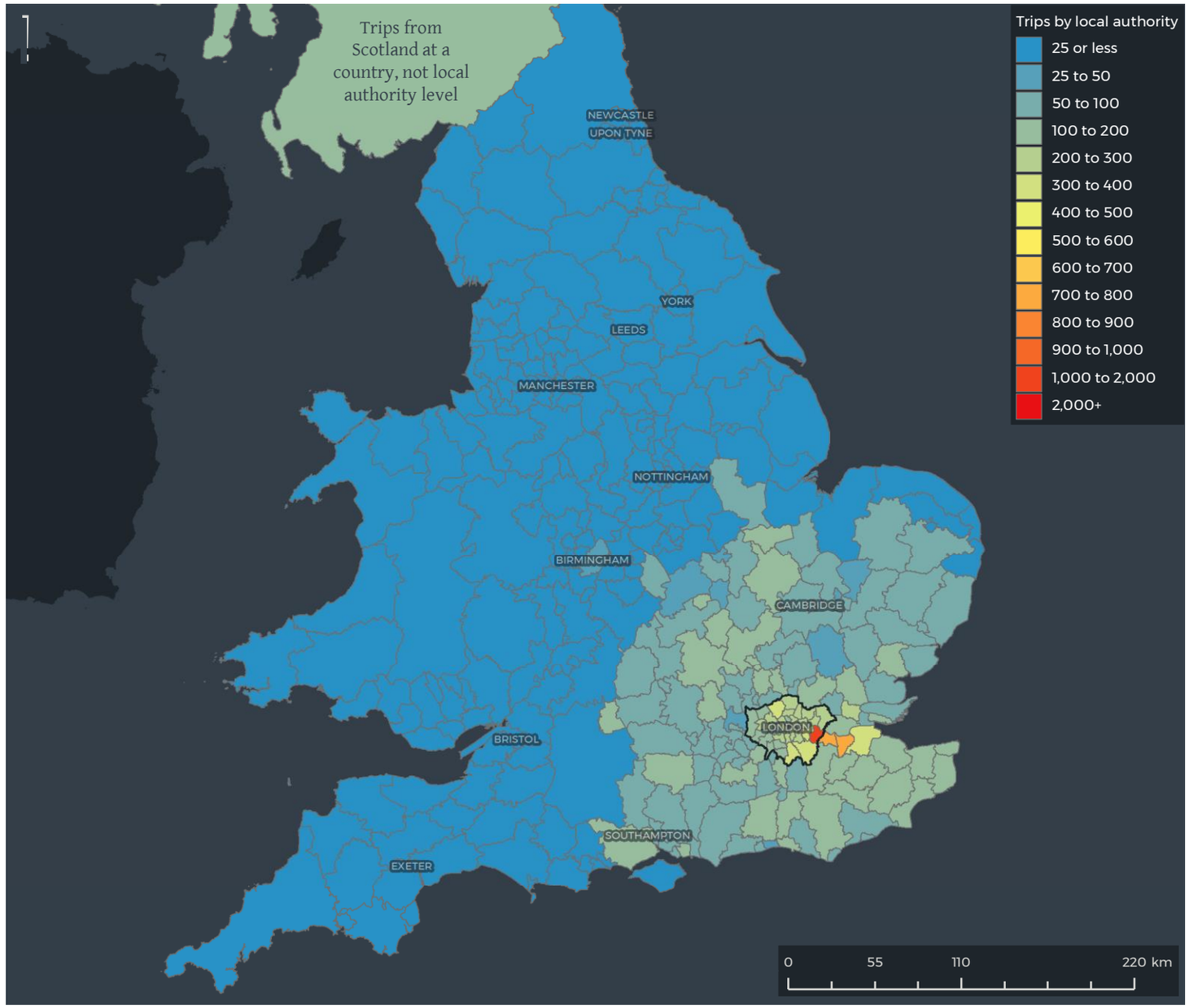
UK home origin (UK-wide)

This section details the location of trip origin on the day of travel to London Resort for visitors residing in the UK. This dataset refers to the 2029 modelling scenario included in Technical Note 3 – Mode Share.

As expected, day trips originate from locations in closest proximity to the site from across the South East and East regions of England, due to shorter travel times.

Further afield, a high number of trips are seen to originate in Scotland, although these are showcased at country, not local authority level.

Figure D1 UK home origin (UK-wide)



Visitors' trip origin

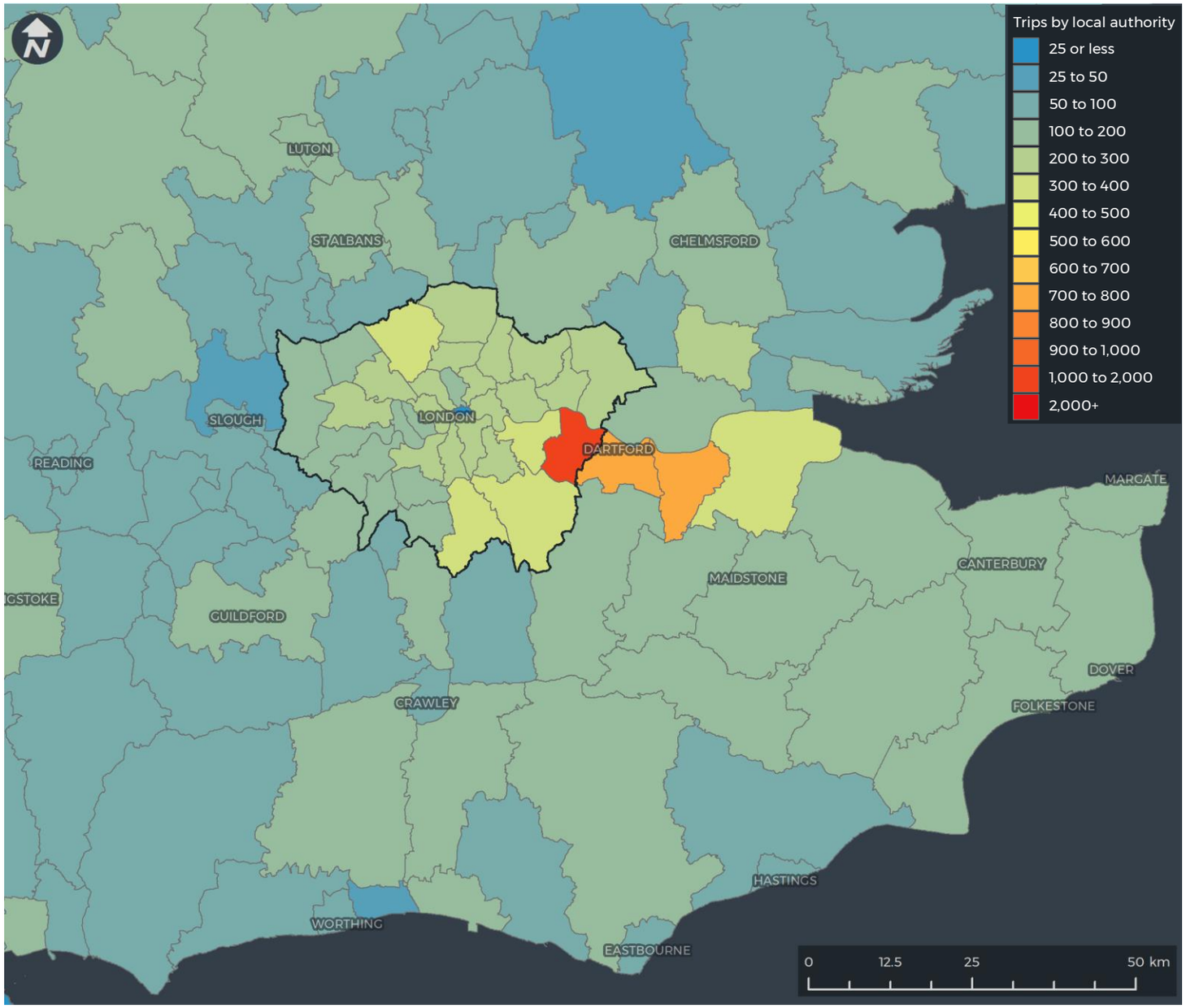
Domestic visitors

UK home origin (South East)

At a regional level, high trip origins are seen in local authorities in close proximity to the site. In particular the London Borough of Bexley, and Dartford and Gravesham in Kent are seen to draw the most trips. Local authorities with more than 200 trips originating on the 85th%ile day are shown in the table below.

Local authority	London	Non London	Total	%
Bexley	1,657		1,657	8%
Gravesham		731	731	3%
Dartford		702	702	3%
Bromley	384		384	2%
Croydon	338		338	2%
Barnet	332		332	2%
Medway		328	328	1%
Greenwich	316		316	1%
Havering	294		294	1%
Enfield	291		291	1%
Brent	290		290	1%
Newham	287		287	1%
Wandsworth	286		286	1%
Lambeth	283		283	1%
Southwark	269		269	1%
Redbridge	260		260	1%
Lewisham	257		257	1%
Waltham Forest		240	240	1%
Haringey	237		237	1%
Tower Hamlets	237		237	1%
Barking and Dagenham	231		231	1%
Hackney	229		229	1%
Basildon		217	217	1%
Westminster	207		207	1%
Camden	207		207	1%
Ealing	206		206	1%

Figure D2 UK home origin (South East)



Visitors' trip origin

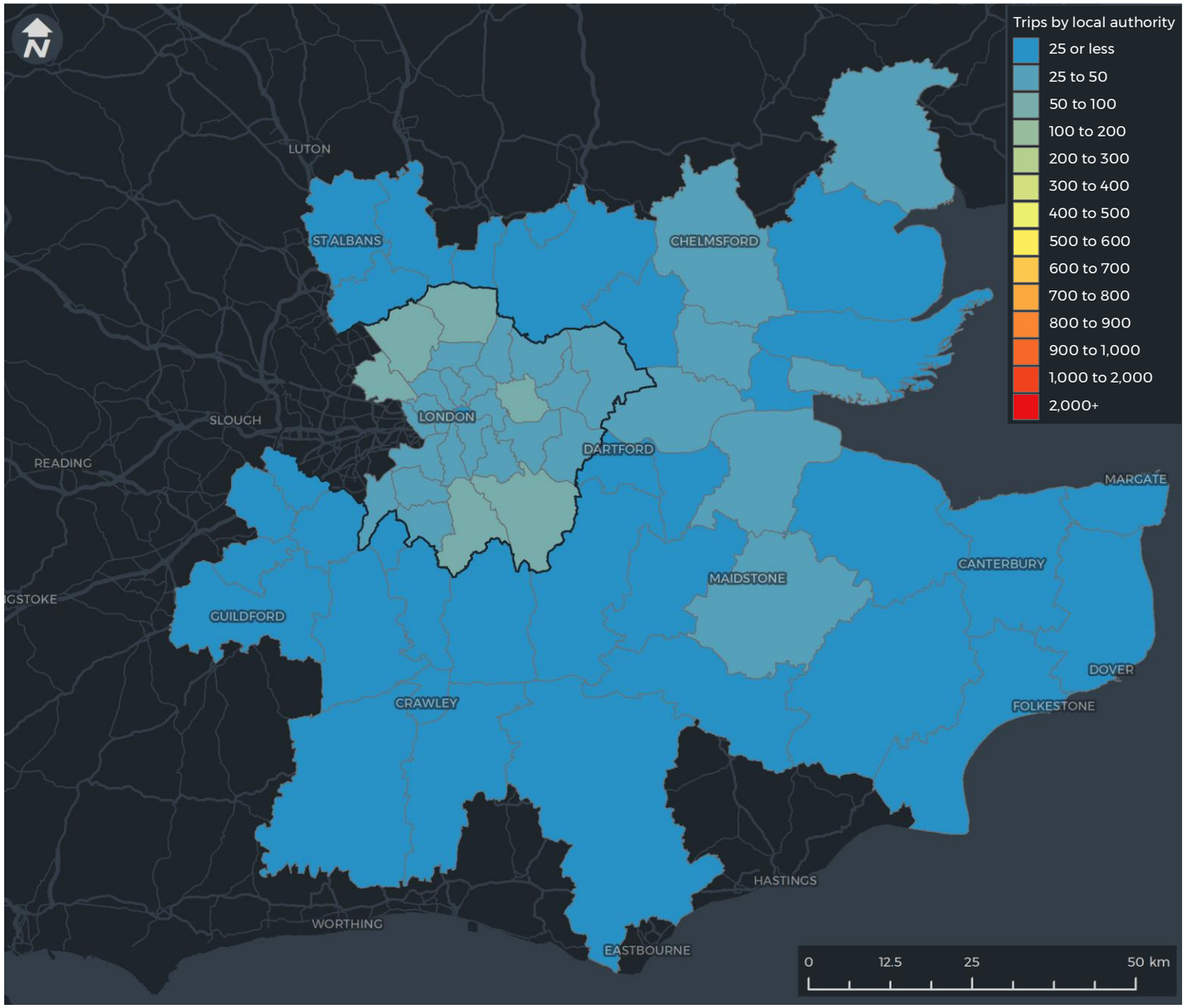
Domestic visitors

Nearby day trip

A portion of the visitors of the London Resort are expected to be visiting multiple attractions in the area. Figure D3 showcases where such visitors will travel to the site from, and the table below presents where more than 30 trips originate for day trips.

Local authority	London	Non London	Total	%
Croydon	59		59	3%
Barnet	58		58	3%
Enfield	51		51	3%
Brent	51		51	3%
Bromley	50		50	3%
Newham	50		50	3%
Wandsworth	50		50	3%
Lambeth	49		49	3%
Southwark	47		47	2%
Redbridge	45		45	2%
Lewisham	45		45	2%
Medway		43	43	2%
Waltham Forest		42	42	2%
Haringey	41		41	2%
Greenwich	41		41	2%
Tower Hamlets	41		41	2%
Hackney	40		40	2%
Havering	39		39	2%
Bexley	38		38	2%
Camden	36		36	2%
Westminster	36		36	2%
Islington	33		33	2%
Merton	32		32	2%
Sutton	31		31	2%
Barking and Dagenham	30		30	2%

Figure D3 Nearby day trip



Visitors' trip origin

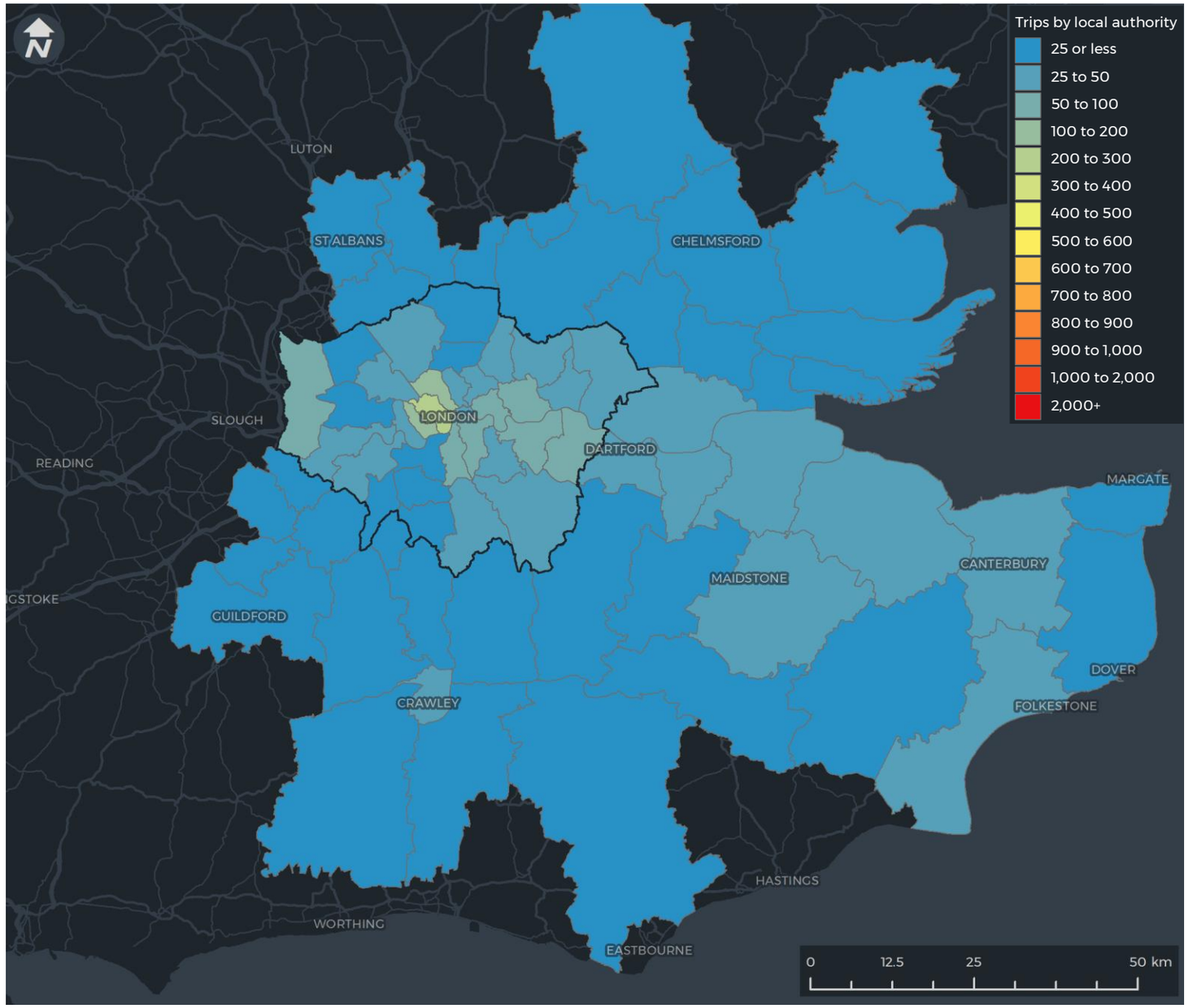
Domestic visitors

From off-site hotel

As alluded to, visitors from further afield can be expected to travel to the region days prior to their visit to the resort, with an overnight stay nearby. Figure D4 showcases those traveling to the resort from nearby off-site hotels, indicating that a majority are accommodated in Central London. The table below details local authorities where more than 40 trip originate on the 85th%ile day.

Local authority	London	Non London	Total	%
Westminster	209		209	8%
Kensington and Chelsea	133		133	5%
Camden	132		132	5%
Tower Hamlets	76		76	3%
Bexley	70		70	3%
Greenwich	66		66	3%
Newham	60		60	2%
Lambeth	57		57	2%
Southwark	55		55	2%
Hillingdon	51		51	2%
Bromley	49		49	2%
Islington	47		47	2%
City of London	45		45	2%
Havering	45		45	2%
Barking and Dagenham	45		45	2%
Canterbury		44	44	2%
Dartford		43	43	2%
Lewisham	43		43	2%
Crawley		41	41	2%
Hackney	40		40	2%

Figure D4 From off-site hotel



Visitors' trip origin

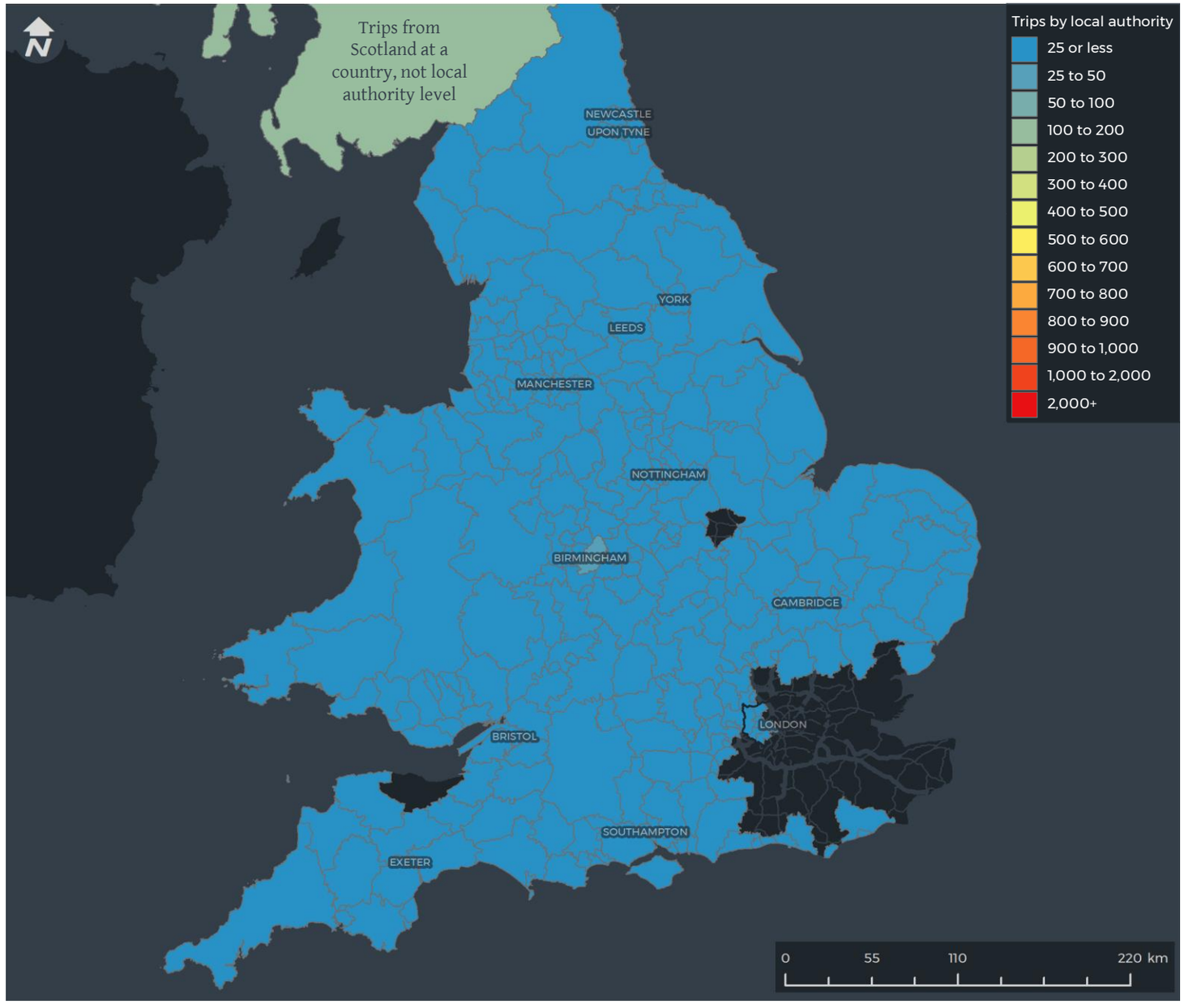
Domestic visitors

To on-site hotel

A number of on-site hotels are proposed for the London Resort development. Figure D5 illustrates where guests are expected to travel from, and the table below details those local authorities where more than 10 trips originate from.

Local authority	Non London	Total	%
Scotland	125	125	11%
Birmingham	25	25	2%
Leeds	18	18	2%
Sheffield	13	13	1%
Cornwall	13	13	1%
Bradford	12	12	1%
County Durham	12	12	1%
Manchester	12	12	1%
Wiltshire	11	11	1%
Liverpool	11	11	1%
Bristol, City of	10	10	1%
Kirklees	10	10	1%

Figure D5 To on-site hotel



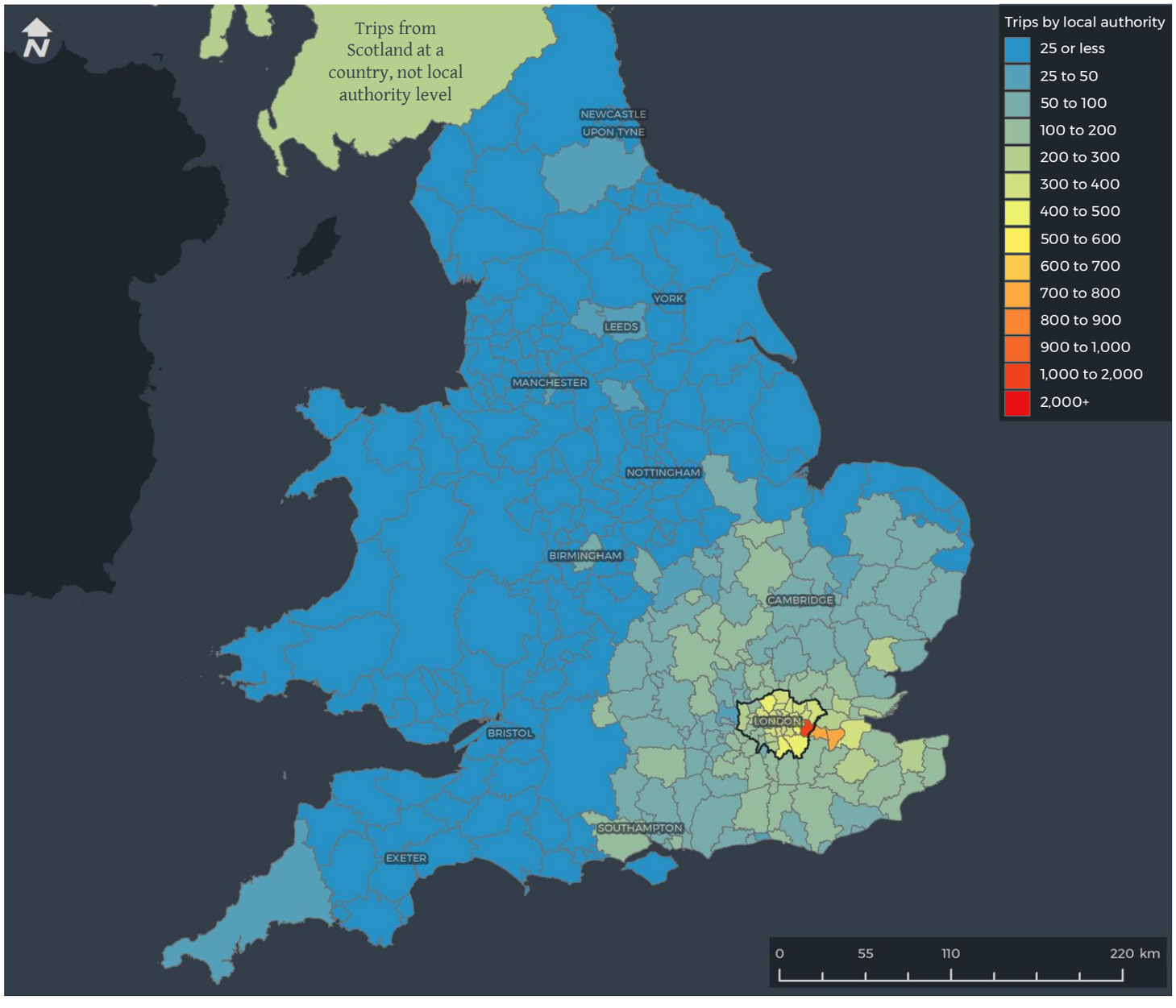
Visitors' trip origin

Domestic visitors

Total domestic visitors

Figure D6 illustrates the trip origins of all domestic visitors. As seen, domestic visitors tend to travel from nearby locations in and around the South East and East regions.

Figure D6 Total domestic visitors (UK-wide)



Visitors' trip origin

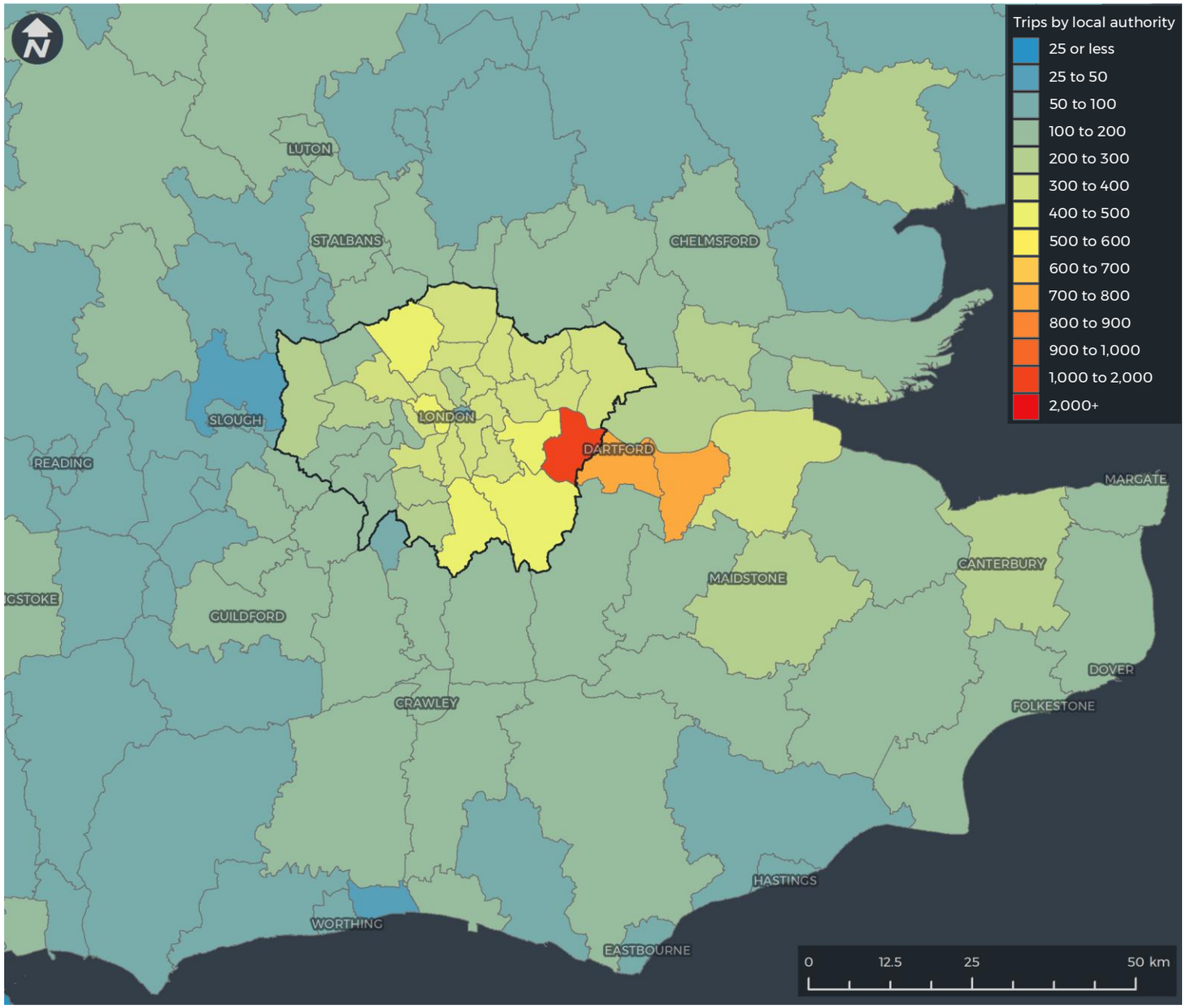
Domestic visitors

Total domestic visitors

At a regional level, all trip types considered, a large number of trips are seen to originate in Kent local authorities and London Boroughs. The table below presents this, showcasing local authorities where more than 300 trips originate.

Local authority	London	Non London	Total	%
Bexley	1,765		1,765	6%
Gravesham		773	773	3%
Dartford		761	761	3%
Bromley	483		483	2%
Westminster	452		452	2%
Croydon	432		432	2%
Greenwich	424		424	2%
Barnet	415		415	2%
Newham	397		397	1%
Medway		397	397	1%
Lambeth	389		389	1%
Havering	378		378	1%
Camden	374		374	1%
Southwark	370		370	1%
Brent	368		368	1%
Enfield	361		361	1%
Wandsworth	358		358	1%
Tower Hamlets	354		354	1%
Lewisham	344		344	1%
Redbridge	342		342	1%
Waltham Forest		316	316	1%
Hackney	309		309	1%
Kensington and Chelsea	308		308	1%
Barking and Dagenham	305		305	1%
Haringey	301		301	1%

Figure D7 Total domestic visitors (South East)



Appendix E

International visitors' trip origin: Day of travel

Visitors' trip origin

International visitors

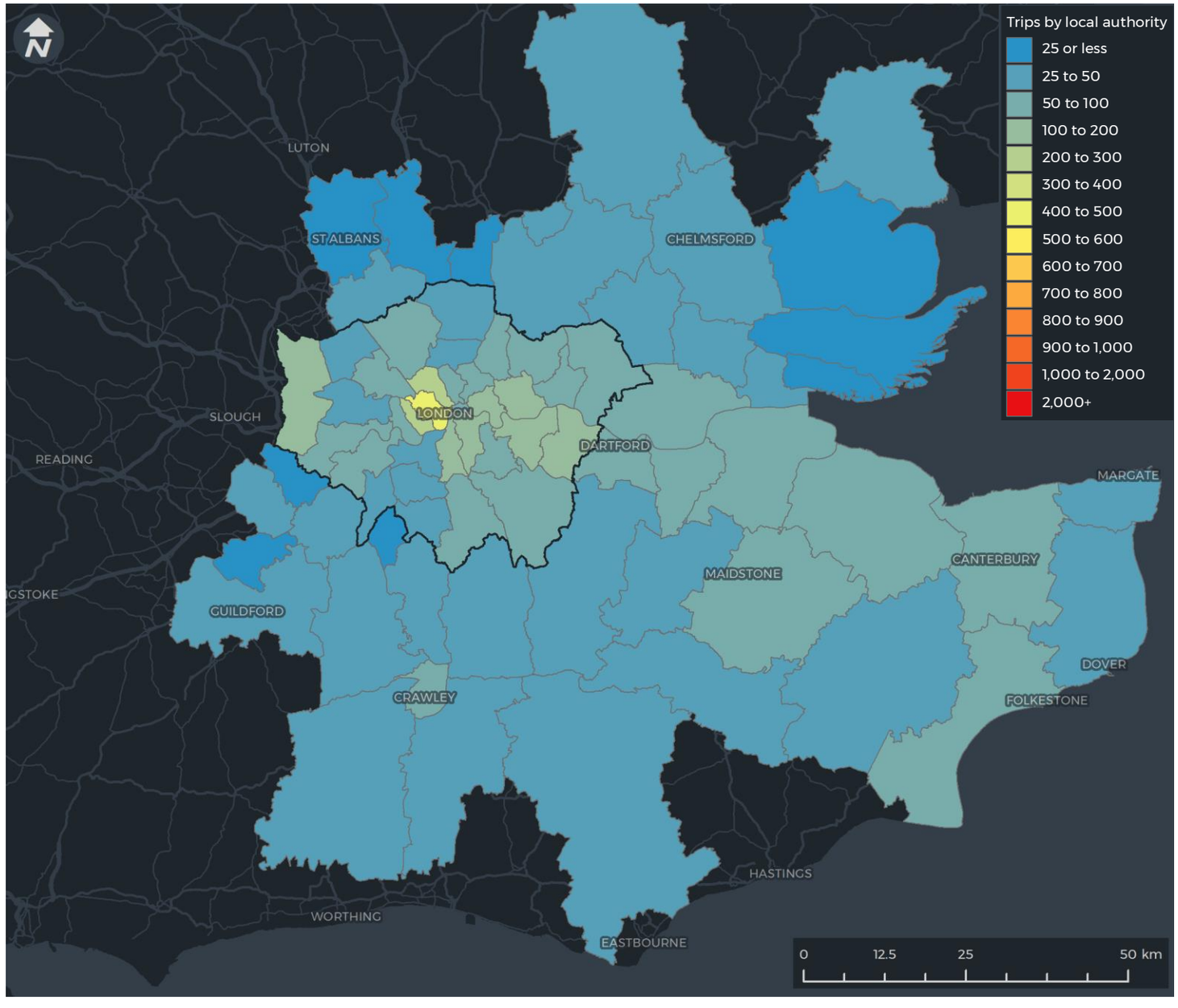
From-off-site hotel

This section details the location of stay of international visitors as modelled for the 2029 scenario. As shown in Figure E1, Central London, particularly Westminster sees a high level of trip origins of International visitors, due to it's favourable location for tourists.

The table below provides an indication of all local authorities where more than 70 trips originate.

Local authority	London	Non London	Total	%
Westminster	419		419	8%
Kensington and Chelsea	267		267	5%
Camden	264		264	5%
Tower Hamlets	152		152	3%
Bexley	141		141	3%
Greenwich	133		133	3%
Newham	120		120	2%
Lambeth	115		115	2%
Southwark	110		110	2%
Hillingdon	102		102	2%
Bromley	98		98	2%
Islington	95		95	2%
City of London	91		91	2%
Havering	90		90	2%
Barking and Dagenham	89		89	2%
Canterbury		88	88	2%
Dartford		87	87	2%
Lewisham	86		86	2%
Crawley		81	81	2%
Hackney	79		79	2%

Figure E1 From off-site hotel



Visitors' trip origin

International visitors

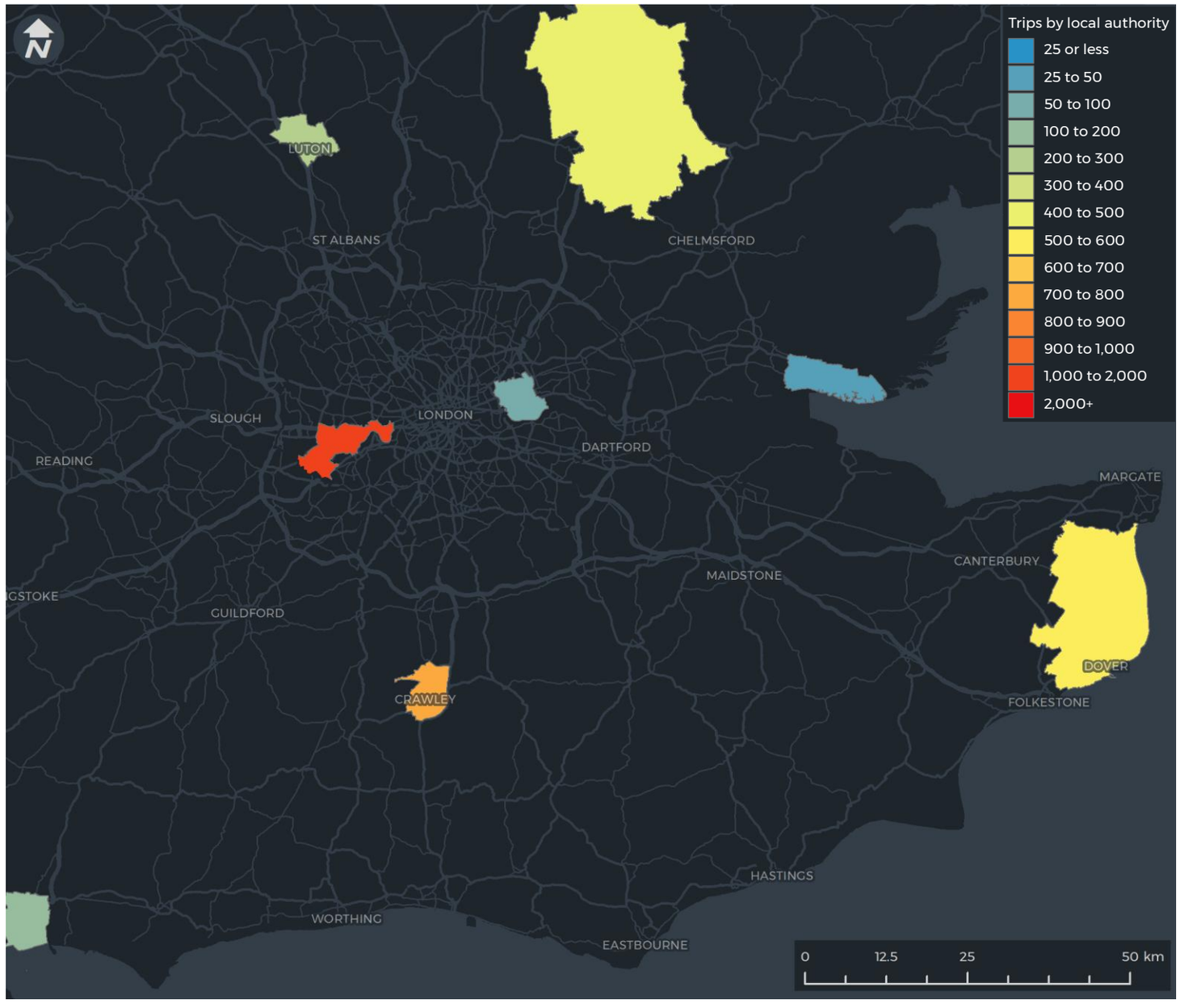
To on-site hotel

Figure B2 serves to illustrates ports of arrival of International visitors to the UK. Ports of arrival are characterised by key transport terminals, where visitors are expected to travel from to an on-site hotel, and detailed below by mode.

International visitors travelling to the UK by rail are expected to alight at Ebbsfleet International, located in Dartford, Kent. As such, there is no onward travel required for these passengers who enter the country at walking distance from the site, and so this is visitor segment (accounting for 7% of international visitors) is not shown in Figure E2.

Local authority	London	Non London	Total	%
Hounslow	1,368		1,368	38%
Heathrow Airport				
Crawley		773	773	22%
Gatwick Airport				
Dover		504	504	14%
Dover Ferry Port				
Uttlesford		446	446	12%
London Stansted Airport				
Luton		268	268	7%
London Luton Airport				
Portsmouth		108	108	3%
Portsmouth International Port				
Newham	89		89	2%
London City Airport				
Southend-on-Sea		30	30	1%
London Southend Airport				

Figure E2 To on-site hotel



Visitors' trip origin

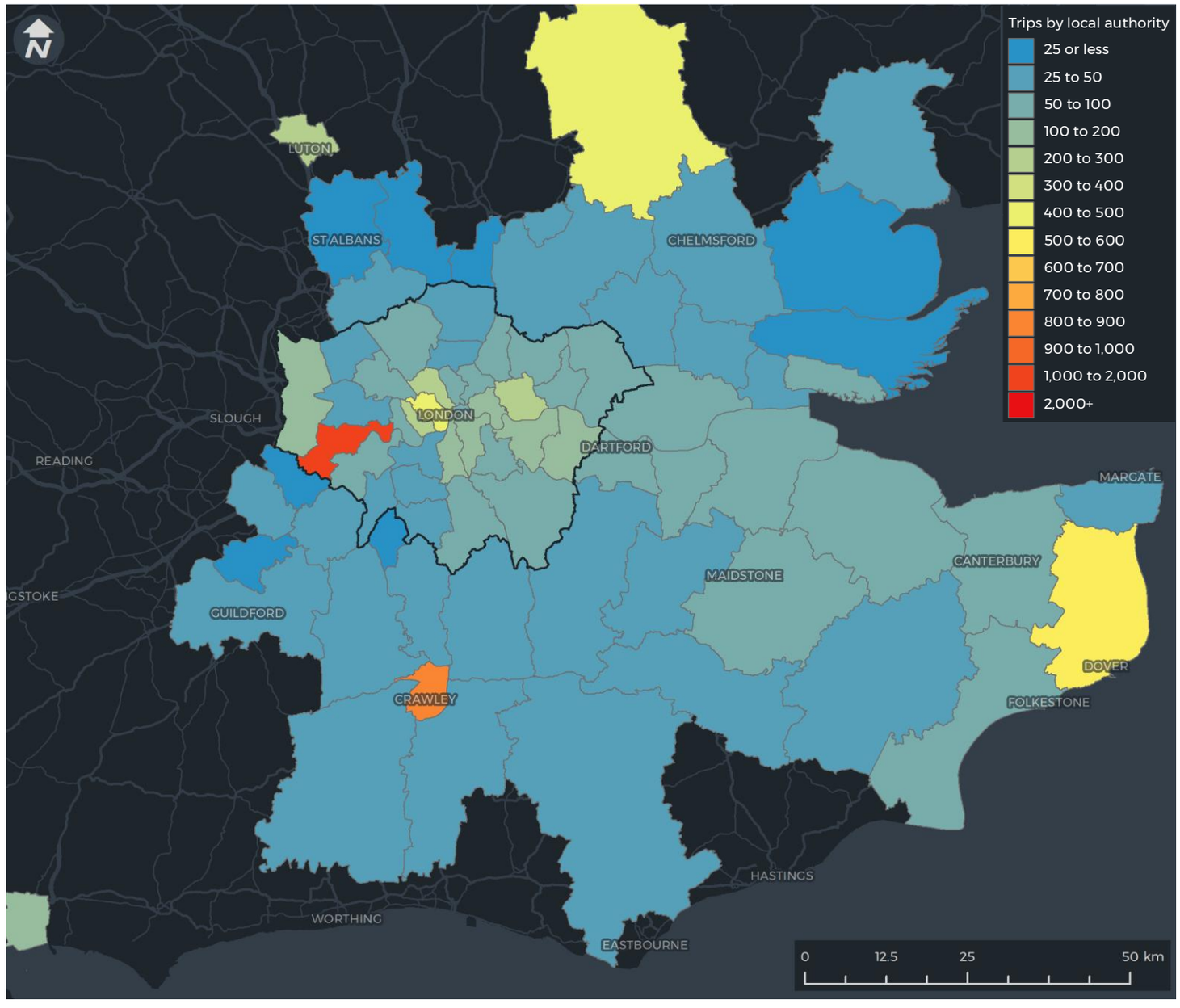
International visitors

Total international visitors

The total number of international visitors are presented in the table below, highlighting the local authorities where more than 130 trips originate from. These are also illustrated in Figure E3.

Local authority	London	Non London	Total	%
Hounslow	1,423		1,423	17%
Crawley		855	855	10%
Dover		543	543	6%
Uttlesford		477	477	6%
Westminster	419		419	5%
Luton		268	268	3%
Kensington and Chelsea	267		267	3%
Camden	264		264	3%
Newham	209		209	2%
Tower Hamlets	152		152	2%
Bexley	141		141	2%
Greenwich	133		133	2%

Figure E3 Total international visitors



Let's change the way we think. *Let's create change.*

WSP House
70 Chancery Lane
London
WC2A 1AF