OTTERPOOL PARK

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DOCUMENTS SUBMITTED IN SUPPORT

OP13 **– ACCESS AND MOVEMENT MODE SHARE TARGETS**

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March 2022

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OP5 Appendix 4.3 Strategic Design Principles

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OP11 **Mobility Vision Report**

OP12 **User-centric travel document**

OP13 **Access and Movement Mode Share Targets**

OP14 **Cultural and Creative Strategy**

OP15 **Statement of Community Involvement**

OP16 **Supplemental Statement of Community Involvement**

Otterpool Park – Phase 1

Access and Movement Strategy

Otterpool Park LLP

70070672

Quality Control

Issue/revision	Draft Report	Updated Draft	Final Report
Date	November 2020	December 2020	March 2022
Prepared by	LS	SAM	SAM
Checked by	RJW	DEQ	CH
Authorised by	TG	TG	CH

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Introduction

Report purpose

The report intends to inform Phase 1 design development and provides a review of relevant transport studies undertaken to support the Outline Planning Application.

The report seeks to support ongoing discussions around design development and provide an initial review of the accesses strategy proposed within Phase 1 of the Otterpool Masterplan.

The remainder of this report is structured as follows:

- Context – Otterpool Movement Strategy – February 2020 DAS
- Phase 1 Overview
- Key design principles
- Trip generation
- Traffic flow analysis
- Vehicular route hierarchy
- Cycle movement strategy

User-centric scenario testing:

- Trip distribution
- Updated mode share
- Parking and car clubs
- Deliveries
- Mobility hubs.

Table of contents

Using the traditional approach

Otterpool Movement Strategy	Phase 1 overview	Key design principles	Trip generation
Traffic flow analysis	Vehicular route hierarchy	Cycle movement strategy	

User-centric scenario testing

Trip distribution	Updated mode share	Parking and car clubs	Deliveries
Mobility hubs			

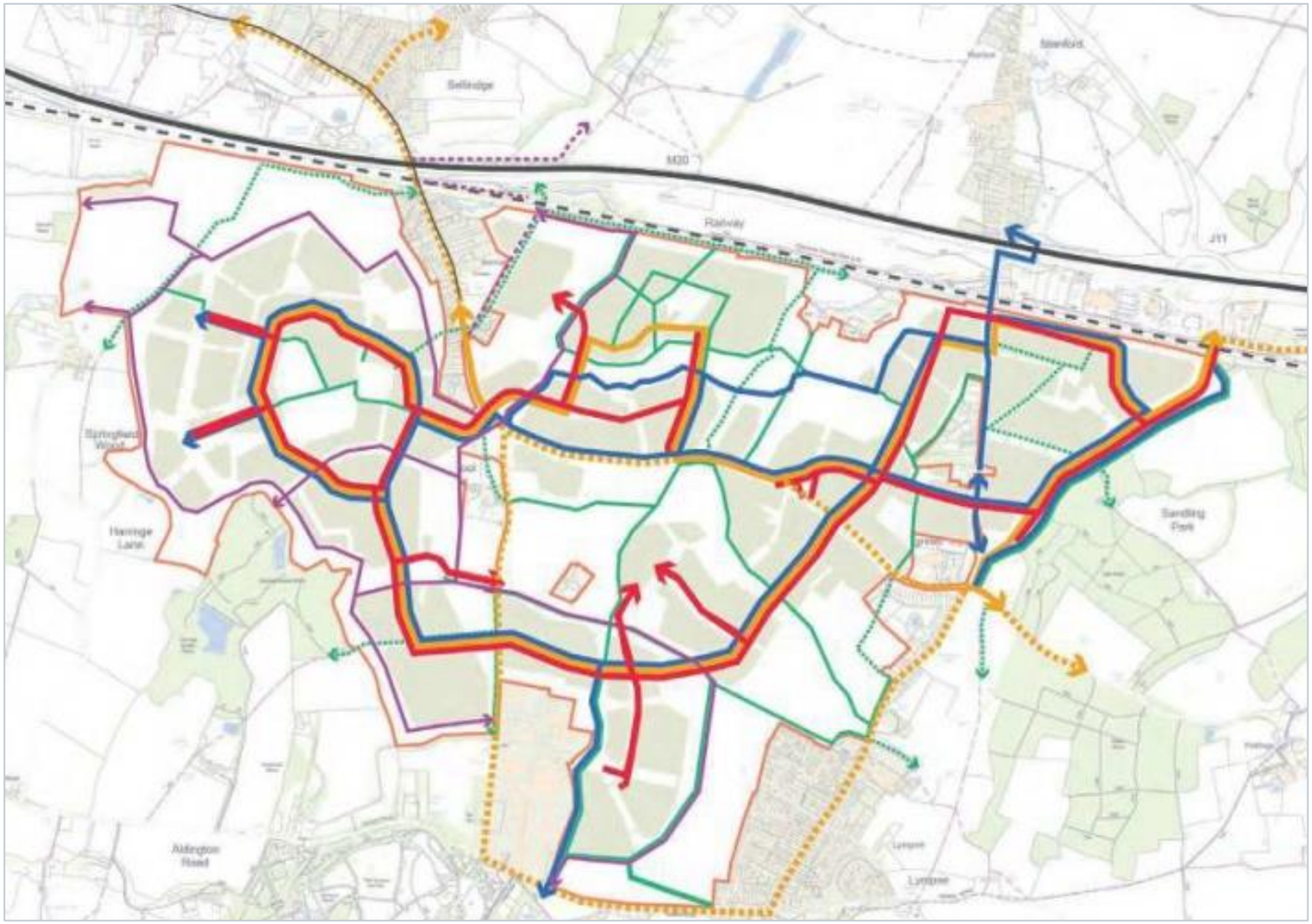
Otterpool Park

Otterpool Movement Strategy

Otterpool Park

OPA Movement Strategy

Figure 1: Otterpool Movement Strategy – February 2019 DAS



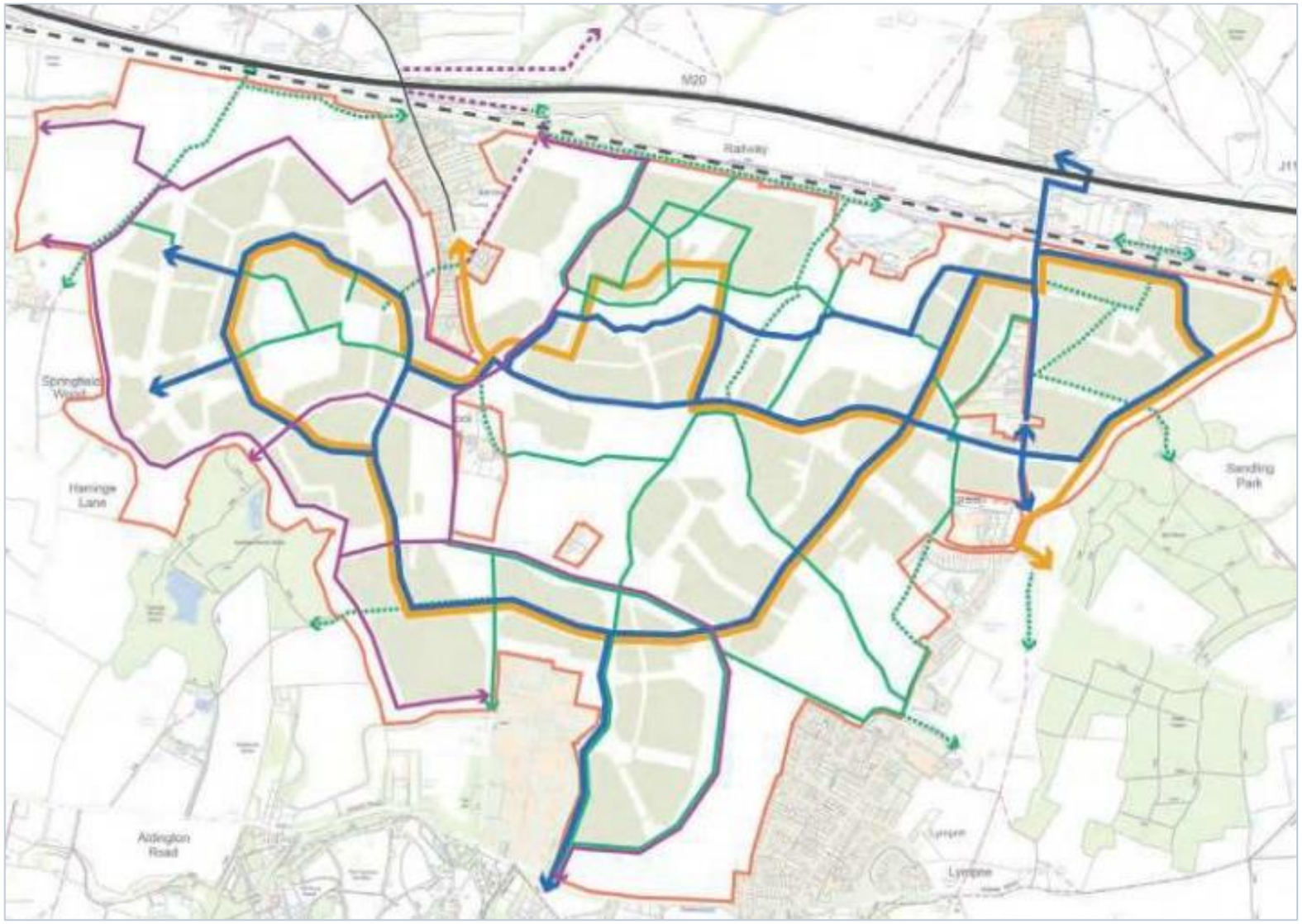
The key principles for strategic access and travel as defined in the OPA include:

- ✓ Create **walkable neighbourhoods** and a high street highly accessible by walking and cycling;
- ✓ Provide **strong walking, cycling and bus connections** to the rail station, employment, high street, local centres and schools from the residential areas;
- ✓ Provide **connectivity by walking, cycling and bridleways** into the surrounding countryside and existing communities;
- ✓ Ensure a **high level of connectivity to and from Otterpool Park** within the sub-region by frequent and high-quality public transport;
- ✓ Integrate the access and travel network into the existing strategic and local networks and upgrade the network where necessary;
- ✓ **Minimise and manage the impacts of traffic** on the existing road network particularly through existing communities and other sensitive areas;
- ✓ Provide for **parking** requirements for cars and bicycles;
- ✓ Implement a **range of sustainable travel behavioural**

Otterpool Park

OPA Movement Strategy

Figure 2: Pedestrian and Cycle Routes – February 2020



The design principles of the OPA are to provide walkable neighbourhoods, with the majority of homes being located within close proximity of facilities:

- ✓ **400m** of a LEAP (local play area);
- ✓ **700m** of a MUGA (multi use games area);
- ✓ **800m** of a primary school and local centre;
- ✓ **1,000m** of allotments and community orchards, sports pitches and a NEAP (neighbourhood play area

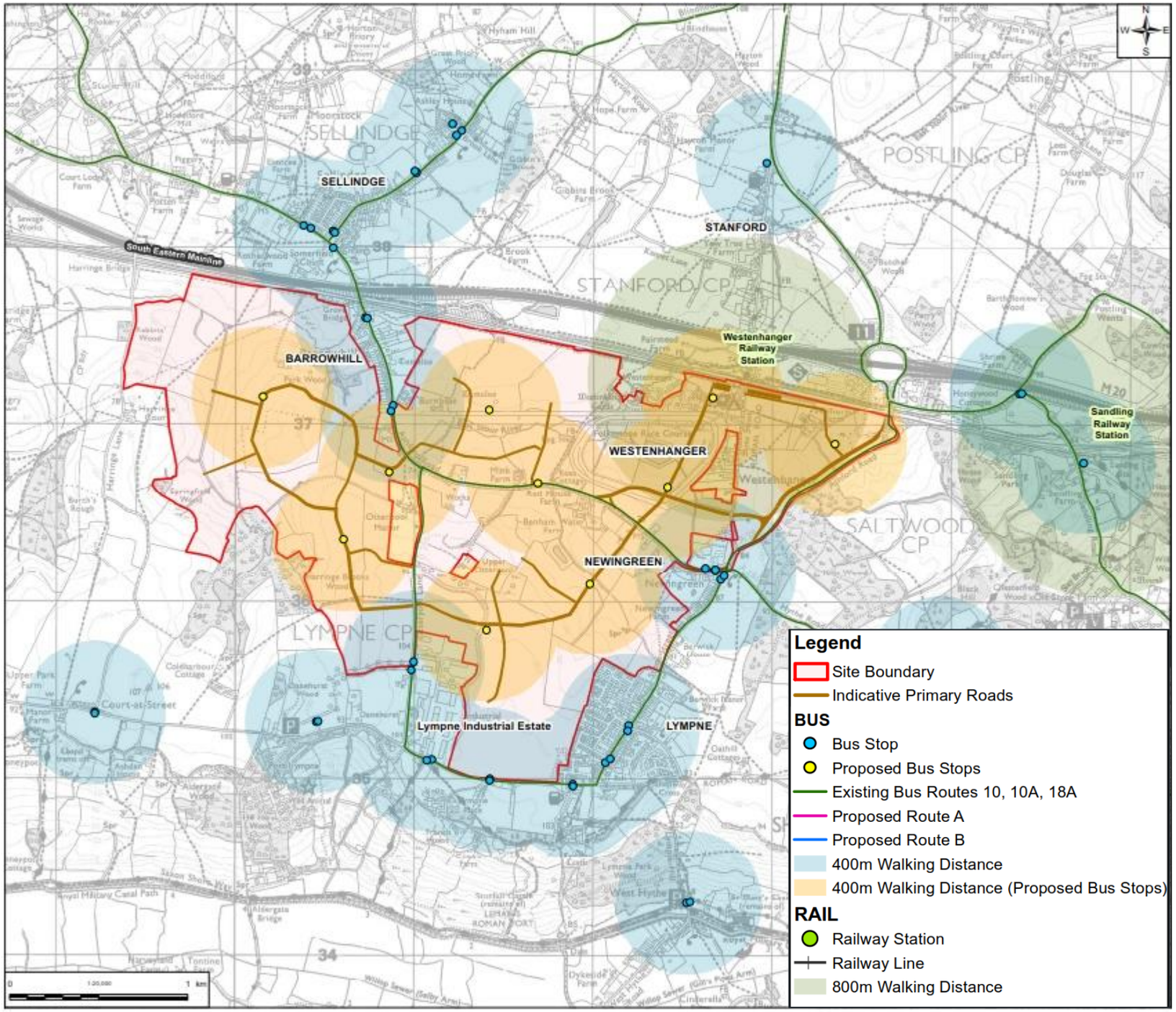
The Walking and Cycling Strategy of the OPA seeks to improve connectivity between Otterpool Park and the wider network. The priorities for improvement, as identified in the FHDC Walking and Cycling Study (April 2018) are as follows:

- ✓ Improvements in cycle linkages to the Hythe area;
- ✓ Improvements in cycle linkages to the Folkestone area;
- ✓ **Improvements to Westenhanger Station access** and destinations to the north of HS1 and the M20; and
- ✓ Connections between the internal network and existing PRoW.

Otterpool Park

OPA Movement Strategy

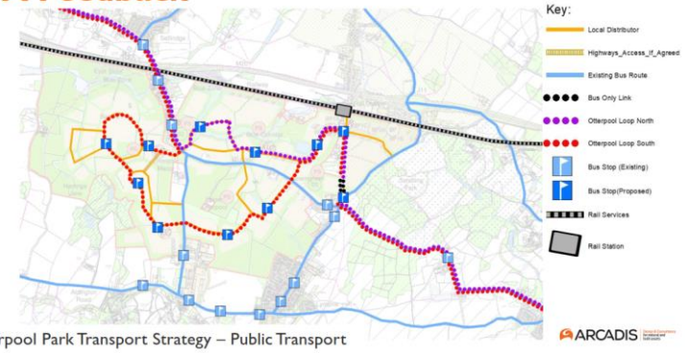
Figure 2: OPA Public Transport Strategy – February 2019



The bus services strategy is to provide an accessible, frequent and reliable service for residents to
connect within the site to key destinations including local centres, schools, employment sites and
Westenhanger Station and to key destinations, notably Ashford and Hythe.

- ✓ Stop within **400m** of the majority of homes;
- ✓ **30** minute frequency from early occupation; and

LPA Feedback

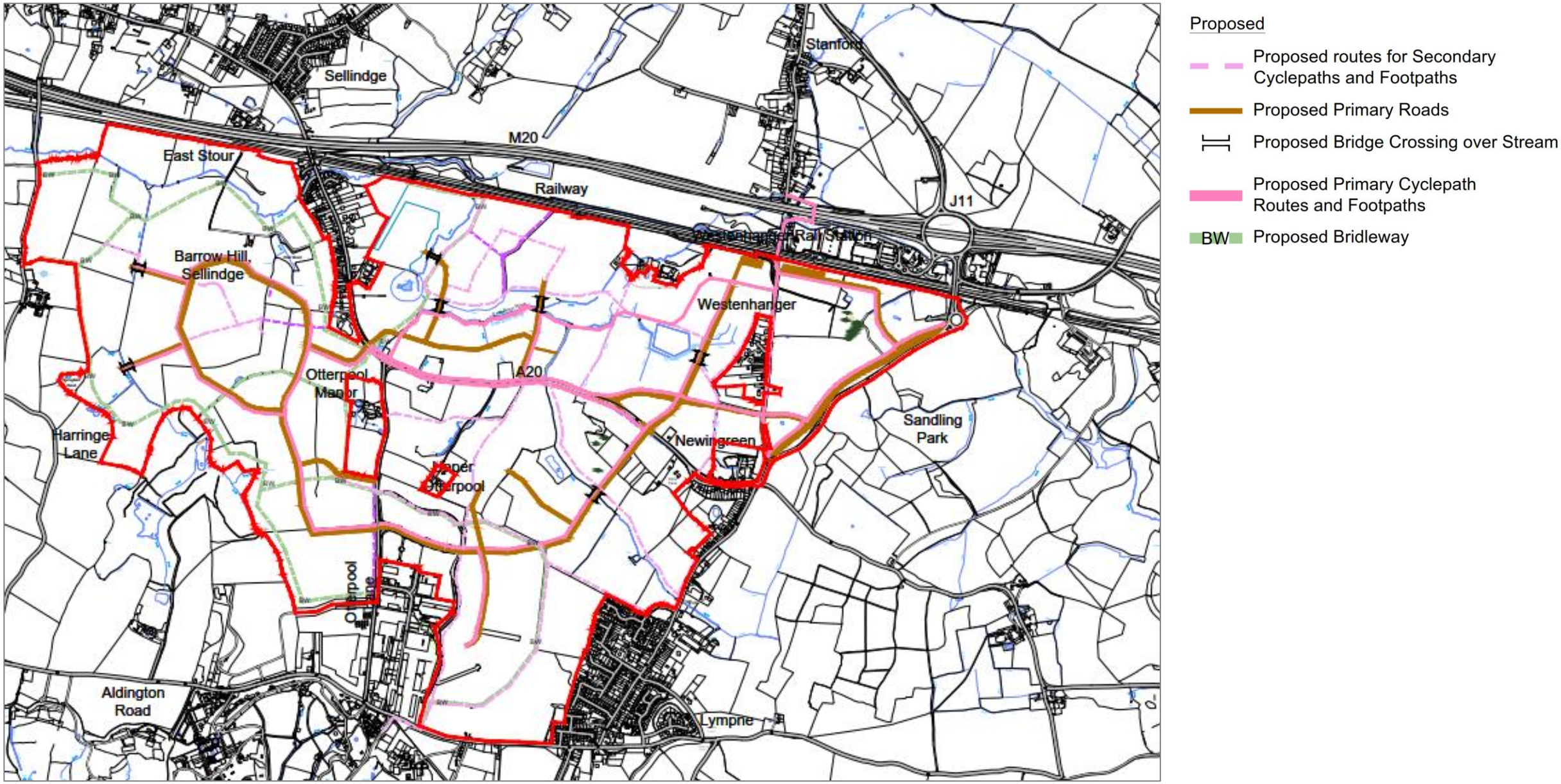


Otterpool Park Transport Strategy – Public Transport

Otterpool Park

OPA Movement Strategy

Figure 3: Otterpool Park Movement and Access Parameter Plans - Farrells 2019



Otterpool Park

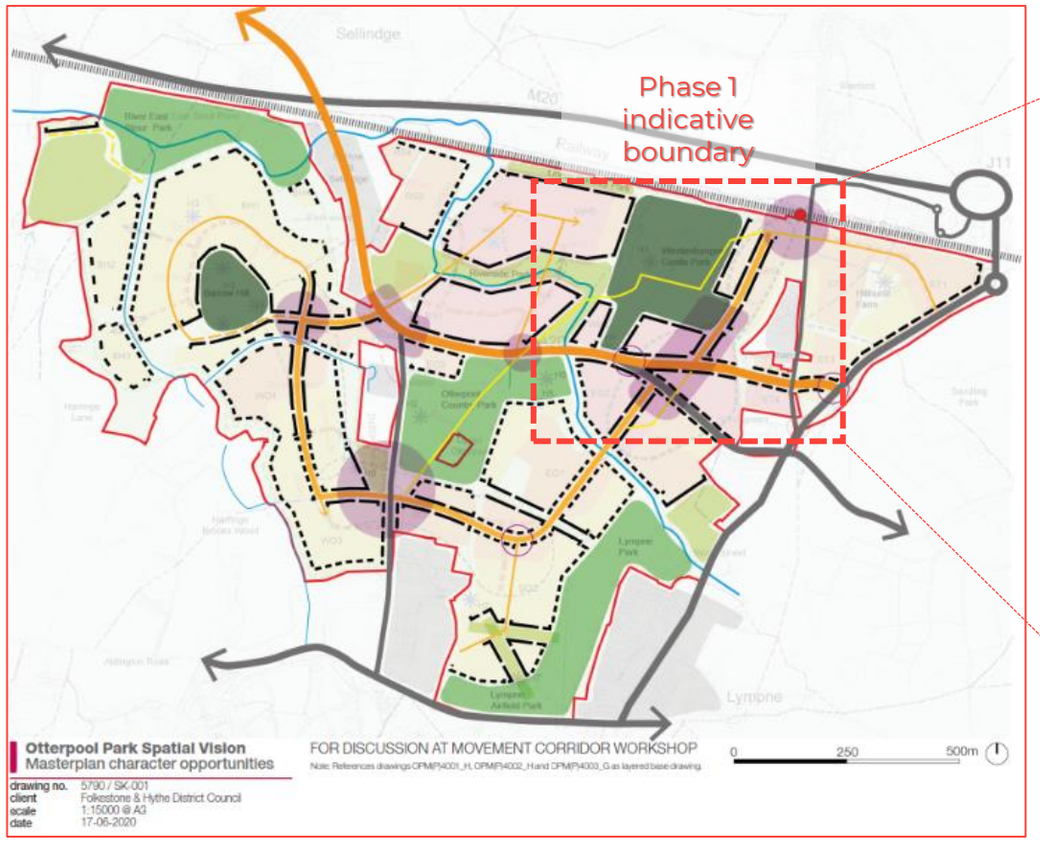
Phase 1 overview

Phase 1 Overview

The study area

Figure 4: Full Masterplan and Phase 1 Study Area

Full Masterplan



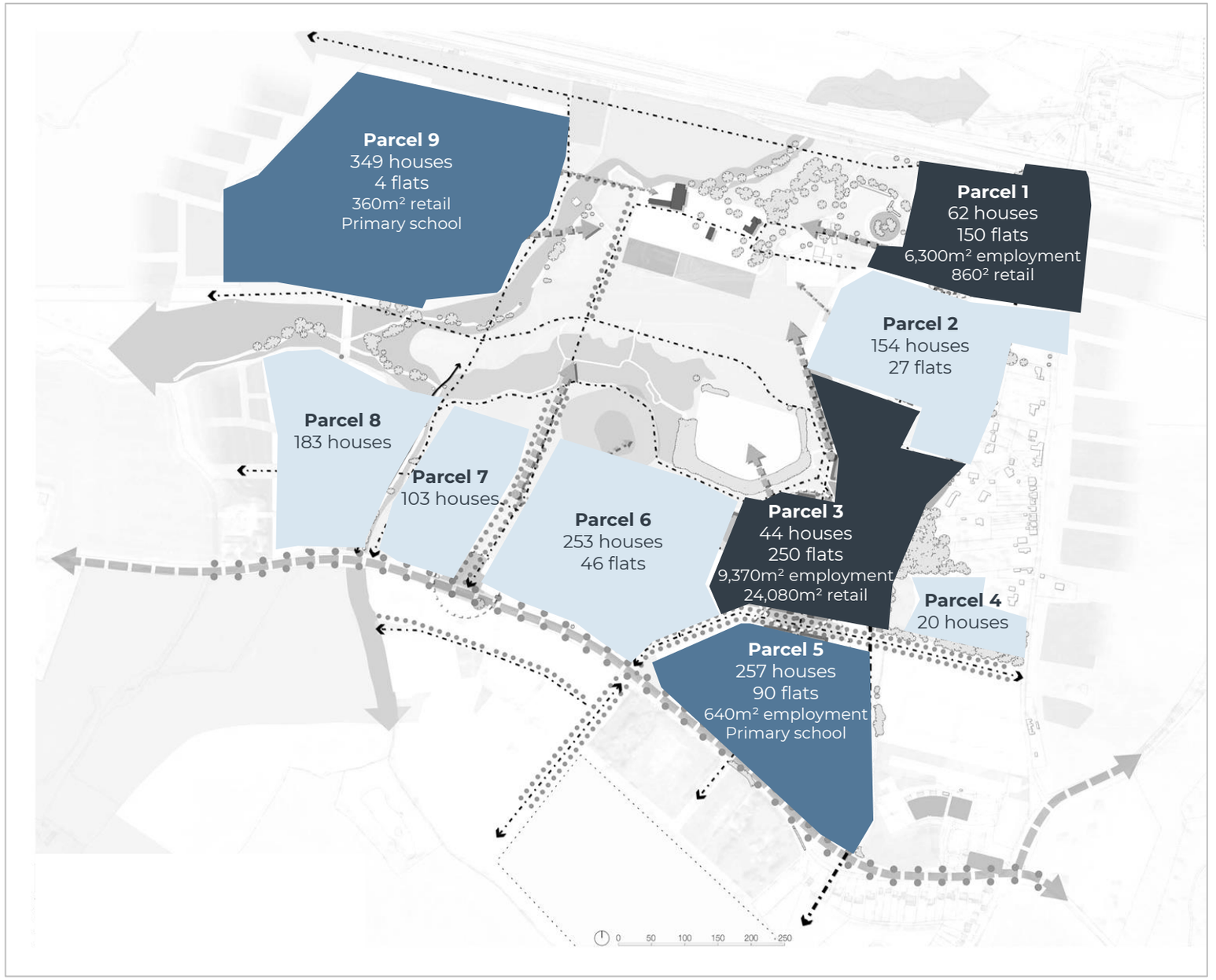
Phase 1 Study Area

**The indicative layout for phase 1 will be confirmed at the next planning stage (tier 2 masterplan stage)*

Phase 1 Overview

Development Quantum

Figure 5: Phase I Development Quantum



Otterpool Park

Key design principles

Otterpool Park - Phase 1

Design Principles and Objectives

The Phase 1 access strategy is to be developed in line with Otterpool's strategic access and movement principles to ensure sustainable travel is embedded within the Masterplan, and the transport vision is realised.

In order to inform the Phase 1 design development and access strategy the following design guides have been referenced (inter-alia):

- ✓ DfT Manual for Streets
- ✓ TCPA Sustainable Transport
- ✓ DfT LTN 1/20 – Cycle Infrastructure Design Guide
- ✓ KCC Kent Design Guide

It is noted that the Town & Country Planning Association (TCPA) recently published 'Garden City Standards for the 21st Century – Sustainable Transport (Guide 13)' guidance.

TCPA's New Garden Cities Sustainable Transport Guide sets out key overarching principles for design as follows:

- ✓ Location and connectivity should be the starting point
- ✓ Set an overarching vision, focused on delivering sustainable transport
- ✓ Collaboration is crucial
- ✓ Sustainable transport systems must be inclusive
- ✓ Transport must be future-proofed
- ✓ Local Plans should establish mode share targets and networks
- ✓ Apply a user hierarchy
- ✓ Integrate green infrastructure and climate resilience within transport design

Otterpool Park

Trip generation

Otterpool Park - Phase 1

Trip Generation

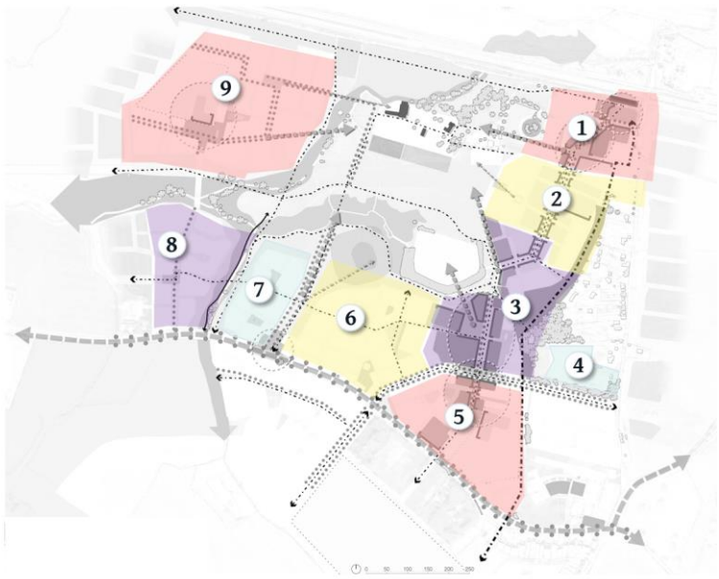
Summary of Trip Generation by Development Parcel based on Arcadis Material (Base Case)

P9	Mode	AM Peak			PM Peak		
		IN	OUT	TOTAL	IN	OUT	TOTAL
	Car Driver	456	221	675	94	125	225
	Bicycle	75	29	109	11	16	28
	On foot	1260	531	1791	157	193	353
	Total Person	2046	898	2942	306	392	712

P8	Mode	AM Peak			PM Peak		
		IN	OUT	TOTAL	IN	OUT	TOTAL
	Car Driver	9	47	56	43	18	61
	Bicycle	1	5	6	4	2	5
	On foot	20	65	83	40	25	67
	Total Person	35	135	168	106	57	165

P7	Mode	AM Peak			PM Peak		
		IN	OUT	TOTAL	IN	OUT	TOTAL
	Car Driver	5	26	31	24	10	34
	Bicycle	1	3	4	2	1	3
	On foot	11	37	47	23	14	37
	Total Person	20	76	95	60	32	93

P6	Mode	AM Peak			PM Peak		
		IN	OUT	TOTAL	IN	OUT	TOTAL
	Car Driver	14	76	91	70	30	99
	Bicycle	2	8	10	6	3	9
	On foot	33	106	135	66	41	109
	Total Person	57	221	275	173	93	269



P5	Mode	AM Peak			PM Peak		
		IN	OUT	TOTAL	IN	OUT	TOTAL
	Car Driver	486	225	711	107	158	270
	Bicycle	80	30	115	14	22	37
	On foot	1311	548	1860	223	283	509
	Total Person	2145	923	3067	397	538	948

P1	Mode	AM Peak			PM Peak		
		IN	OUT	TOTAL	IN	OUT	TOTAL
	Car Driver	133	63	191	60	121	181
	Bicycle	8	6	14	6	8	13
	On foot	57	81	135	74	77	153
	Total Person	226	174	398	167	246	416

P2	Mode	AM Peak			PM Peak		
		IN	OUT	TOTAL	IN	OUT	TOTAL
	Car Driver	9	46	55	42	18	60
	Bicycle	1	5	6	4	2	5
	On foot	20	64	82	40	25	66
	Total Person	34	134	167	105	56	163

P3	Mode	AM Peak			PM Peak		
		IN	OUT	TOTAL	IN	OUT	TOTAL
	Car Driver	415	139	556	228	452	676
	Bicycle	65	21	92	39	84	118
	On foot	664	323	991	873	1143	2025
	Total Person	1304	550	1856	1294	1908	3206

P4	Mode	AM Peak			PM Peak		
		IN	OUT	TOTAL	IN	OUT	TOTAL
	Car Driver	1	5	6	5	2	7
	Bicycle	0	1	1	0	0	1
	On foot	2	7	9	4	3	7
	Total Person	4	15	18	12	6	18

Derived using Arcadis trip rates extracted from 'Otterpool Park Trip Rates by Mode by Land Use June 2020' **(subject to change)**.

Otterpool Park

Traffic flow analysis

Otterpool Phase 1

Traffic Flow Analysis

The traffic flows presented herein are indicative based on the trip generation assumptions presented in the OPA transport assessment documentation, and are subject to review following completion of the on-going updated transport assessment being undertaken by Arcadis.

Key assumptions to note include:

- It is assumed that all vehicle trips route to / from Phase 1 with an east-west traffic distribution of 70%(E) / 30% (W) as per Arcadis transport assessment.
- Daily traffic flows have been established using peak hour to daily factors derived from Arcadis transport assessment (based TA Table 27, A20 traffic flows,)
- For the purposes of this exercise, Phase 1 development traffic (to Parcels 1-3) has been distributed 65% to/from A20, and 35% to/from the Newingreen Link.
- The indicative traffic flows below include Phase 1 development traffic and background traffic on A20 (future year of 2046 as per Arcadis transport assessment).

Figure 6: Summary of Phase 1 Traffic Flows (Two-Way)

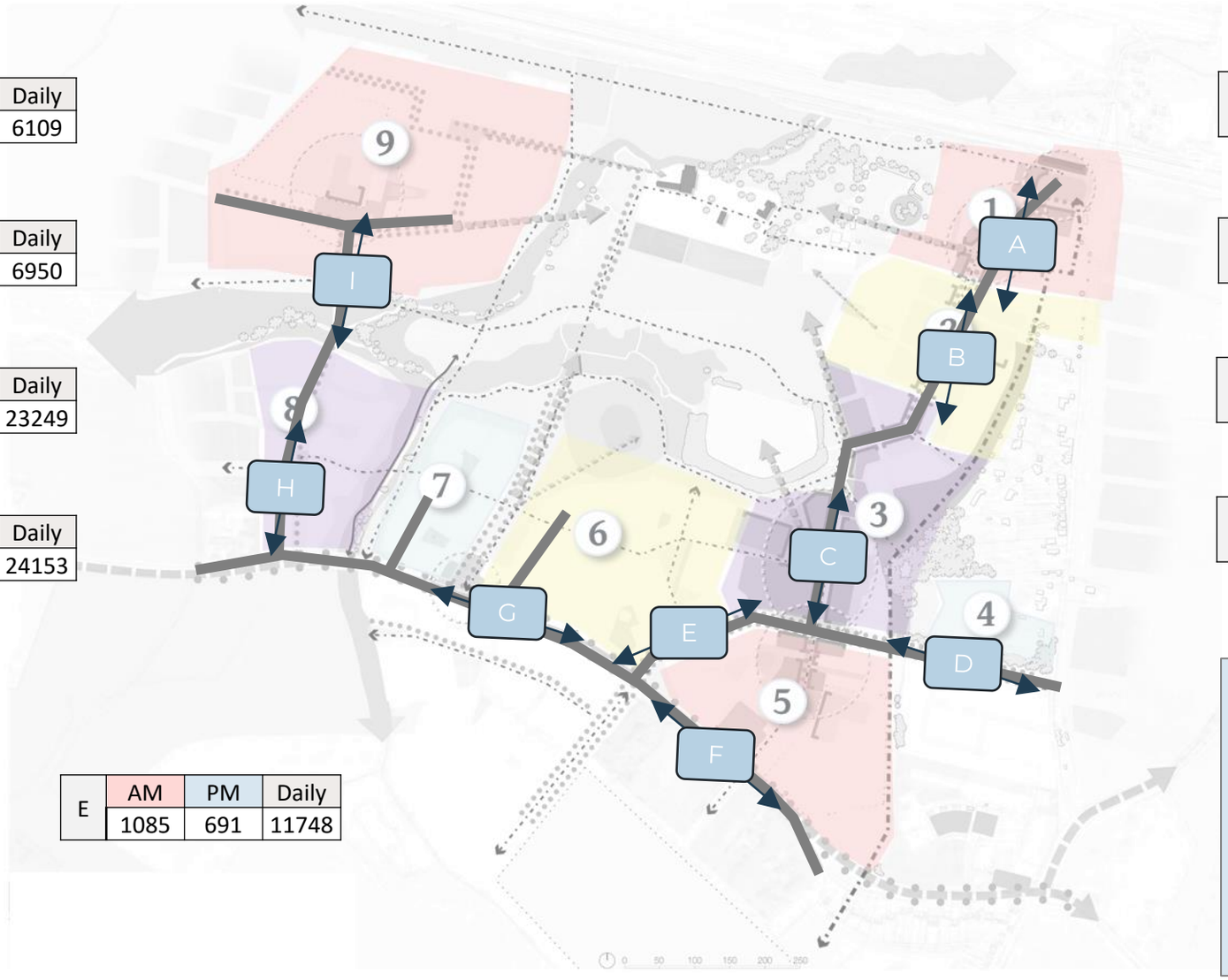
I	AM	PM	Daily
	690	233	6109

H	AM	PM	Daily
	751	299	6950

G	AM	PM	Daily
	1949	1565	23249

F	AM	PM	Daily
	2032	1619	24153

E	AM	PM	Daily
	1085	691	11748



A	AM	PM	Daily
	209	195	2669

B	AM	PM	Daily
	269	260	3500

C	AM	PM	Daily
	935	1052	13146

D	AM	PM	Daily
	1131	1113	7271

- 2046 future baseline flows on A20 (i.e. links F & G) extracted from Arcadis transport assessment dated Feb 2019. Trip assignment and flows on A20 and Newingreen Link subject to review following completion of the updated transport assessment being undertaken by Arcadis.
- Traffic flows exclude vehicle trips to Westerhanger Station are currently excluded, with these dependent on the station's parking strategy (tbc).

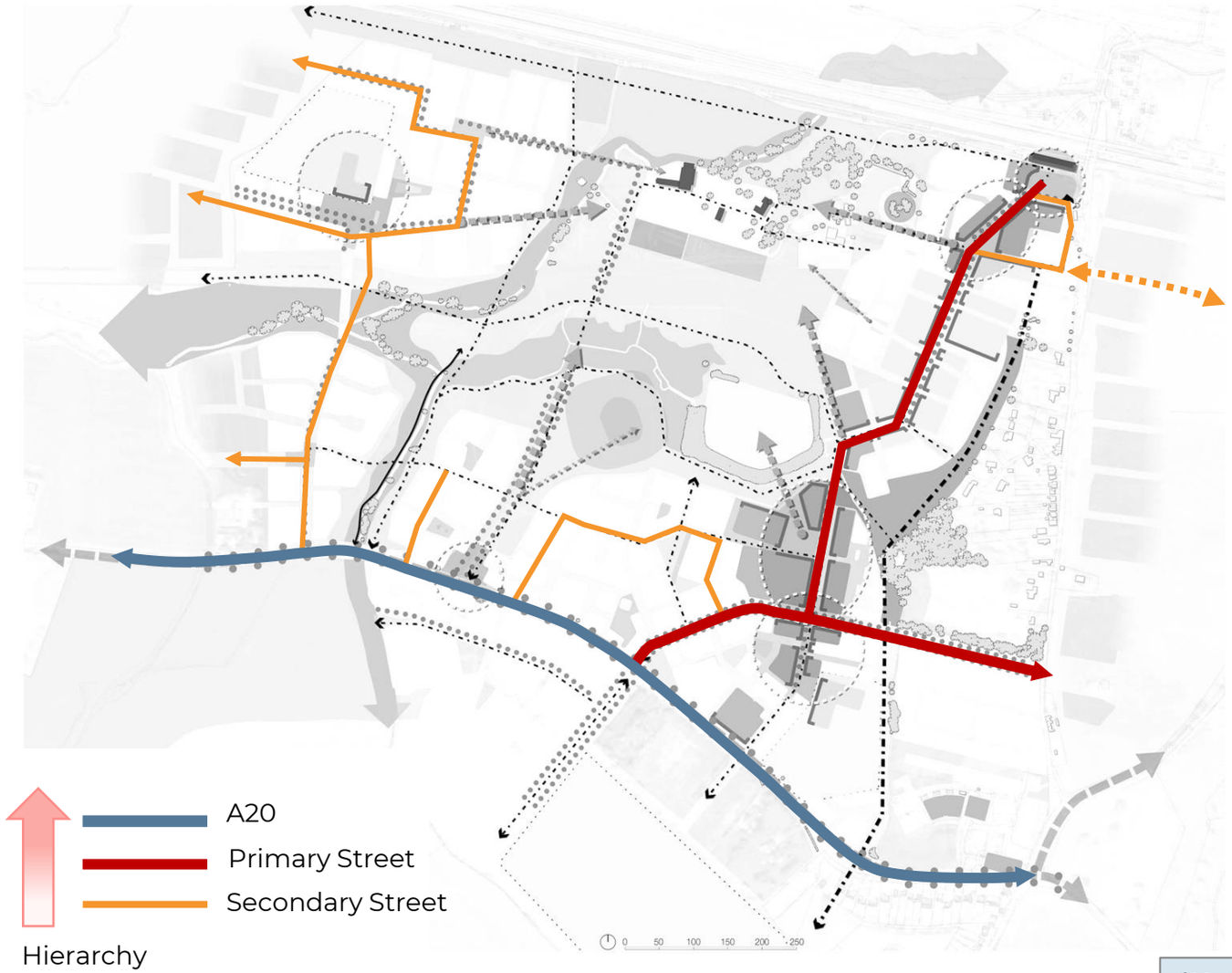
Otterpool Park

Vehicular route hierarchy

Otterpool Phase 1

Route Hierarchy

Figure 7: Full Masterplan and Phase 1 Study Area



***Network of tertiary / local residential streets to be discussed and explored with Tibbalds.**

Discussion points:

- *Masterplan drives all traffic onto the A20*
- *Explore east west link for internal vehicles – balance between increased permeability and promotion of car use*
- *Stone Street connection to the north east of the site to be explored – reduces pressure on High Street*

Otterpool Park

Cycle movement strategy

Otterpool Phase 1

Pedestrian & Cyclist Design Principles

DfT Gear Change – Stepping it up a Gear

Cycles must be treated as vehicles, not as pedestrians.

On urban streets, cyclists must be physically separated from pedestrians and should not share space with pedestrians.

Where cycle routes cross pavements, a physically segregated track should always be provided.

At crossings and junctions, cyclists should not share the space used by pedestrians but should be provided with a separate parallel route.

The routes must be direct. They must be continuous, not giving up at the difficult places. Cycle routes must flow, feeling direct and logical.

Linking direct routes to out-of-centre car parks would encourage opportunities for ‘park and pedal’ and ‘park and walk’ travel options..

Cycles and trains should be ideal partners, complementing each other and extending the range of both. Cycling can make public transport journeys door-to-door, matching the convenience of the car.

DfT Cycle Infrastructure Design – July 2020

Otterpool Phase 1

Cycle Movement Strategy

KEY POINT - All routes within the masterplan should be appropriate for cycles.

Figure 8: Key On and Off Road Cycle Routes

DfT Cycle Infrastructure Design – July 2020

Figure 4.1 summarises the traffic conditions when protected space for cycling (fully kerbed cycle tracks, stepped cycle tracks and light segregation), marked cycle lanes without physical features and cycling in mixed traffic are appropriate.

Speed Limit[1]	Motor Traffic Flow (pcu/24 hour)[2]	Protected Space for Cycling			Cycle Lane (mandatory/ advisory)	Mixed Traffic
		Fully Kerbed Cycle Track	Stepped Cycle Track	Light Segregation		
20 mph[3]	0					
	2000					
	4000					
	6000+					
30 mph	0					
	2000					
	4000					
	6000+					
40 mph	Any					
50+ mph	Any					

Based on initial vehicle flows it would be expected that all cycle routes on key links within the masterplan would have a form of segregation from vehicular and pedestrian traffic.

Need to consider:

Constraints associated with central east/west connection;
Mix of cycle facilities on main routes and 'leisure routes';
Connection to the wider masterplan; and
How cyclists cross the A20.

Brompton bike hire Pedal bike hire e-Bike hire Cargo trike hire

User-centric scenario testing

Trip distribution

Trip distribution (external)

Work trips

Key outgoing work trip destinations

Key opportunities to promote rail

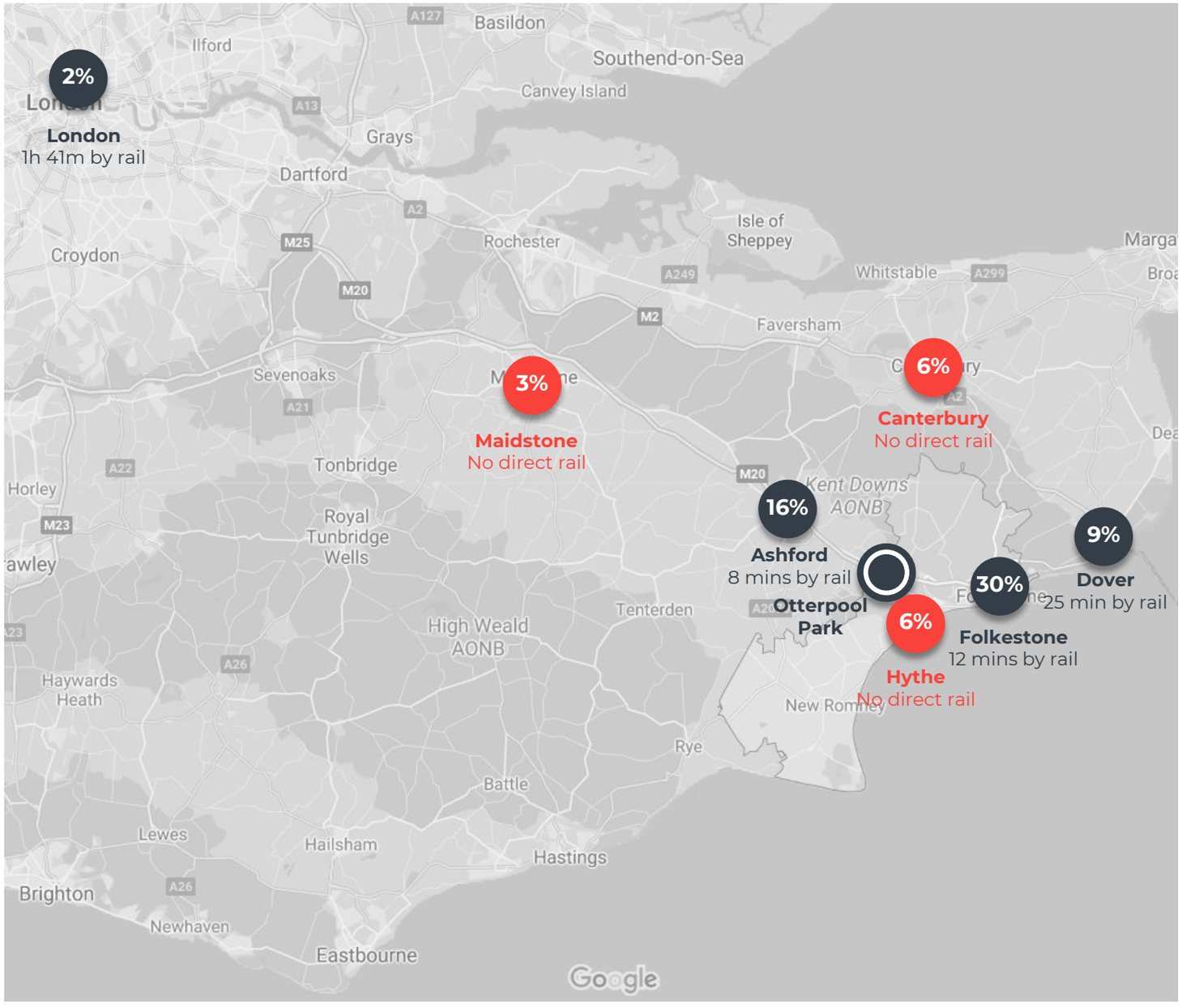
- Folkestone – 7,652 people (30%)
- Ashford – 4,058 people (16%)
- Dover – 2,172 people (9%)
- London – 625 people (2%)

Key opportunities to promote bus

- Canterbury – 1,582 people (6%)
- Maidstone – 714 people (3%)
- Hythe – 1,614 people (6%)

Note: This data is based on the Transport Assessment (February 2019) undertaken by Arcadis.

Figure 8 **Key outgoing work trip destinations**



Source: Google Earth

Trip distribution (external)

Work trips

Key incoming work trip origins

Key opportunities to promote rail

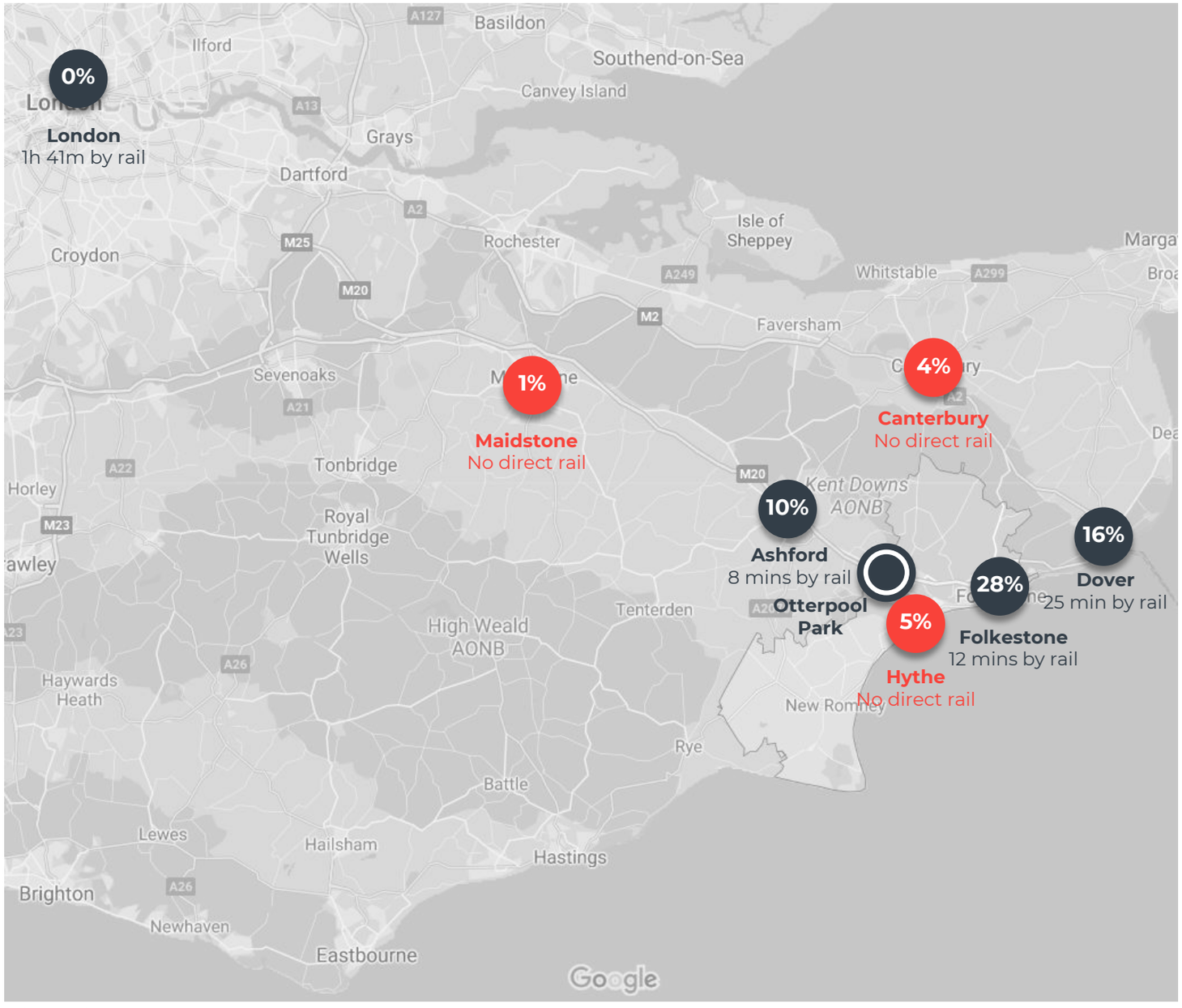
> Folkestone – 6,437 people (28%)
> Ashford – 2,338 people (10%)
> Dover – 3,764 people (16%)
> London – 113 people (<1%)

Key opportunities to promote bus

> Canterbury – 927 people (4%)
> Maidstone – 231 people (1%)
> Hythe – 1,212 people (5%).

Note: This data is based on the Transport Assessment (February 2019) undertaken by Arcadis.

Figure 9 **Key incoming work trip origins**



Source: Google Earth

Trip distribution (external)

Non-work trips

Key non-work trip origin-destinations

Key opportunities to promote rail

> Ashford – 40%
> Folkestone – 31%
> Dover – 4.3%

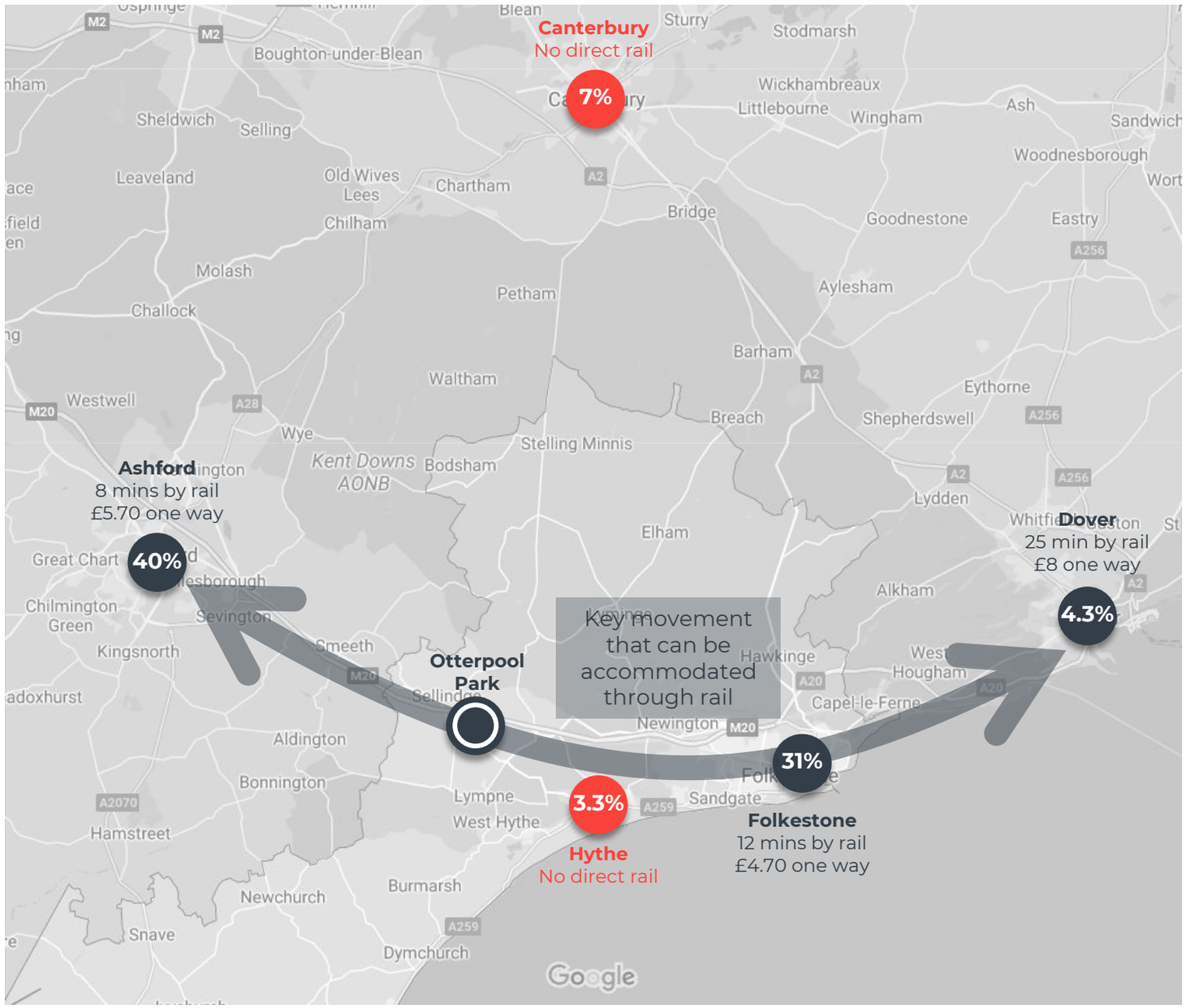
Key opportunities to promote bus

> Canterbury – 7%
> Hythe – 3.3%

Findings

> External trips (work and non-work) are primarily to six destinations
> Folkestone, Ashford and Dover can be easily reached by rail (account for up to 75% of trips)
> Hythe and Canterbury do not have direct rail services (account for up to 10%) – and could include improved bus services
> **We propose alternative mode shares – based on these trip distributions and opportunity to shift modes**

Figure 10 **Key non-work trip origin-destinations**



Source: Google Earth

User-centric scenario testing

Updated mode share

Mode shares

Work trips

External mode shares

- ↑ **walk and bike to 5%**
- ↑ **bus to 15%** from 5%
- ↑ **rail to 55%** from 4%
- ↓ **car to 20%** from 84%

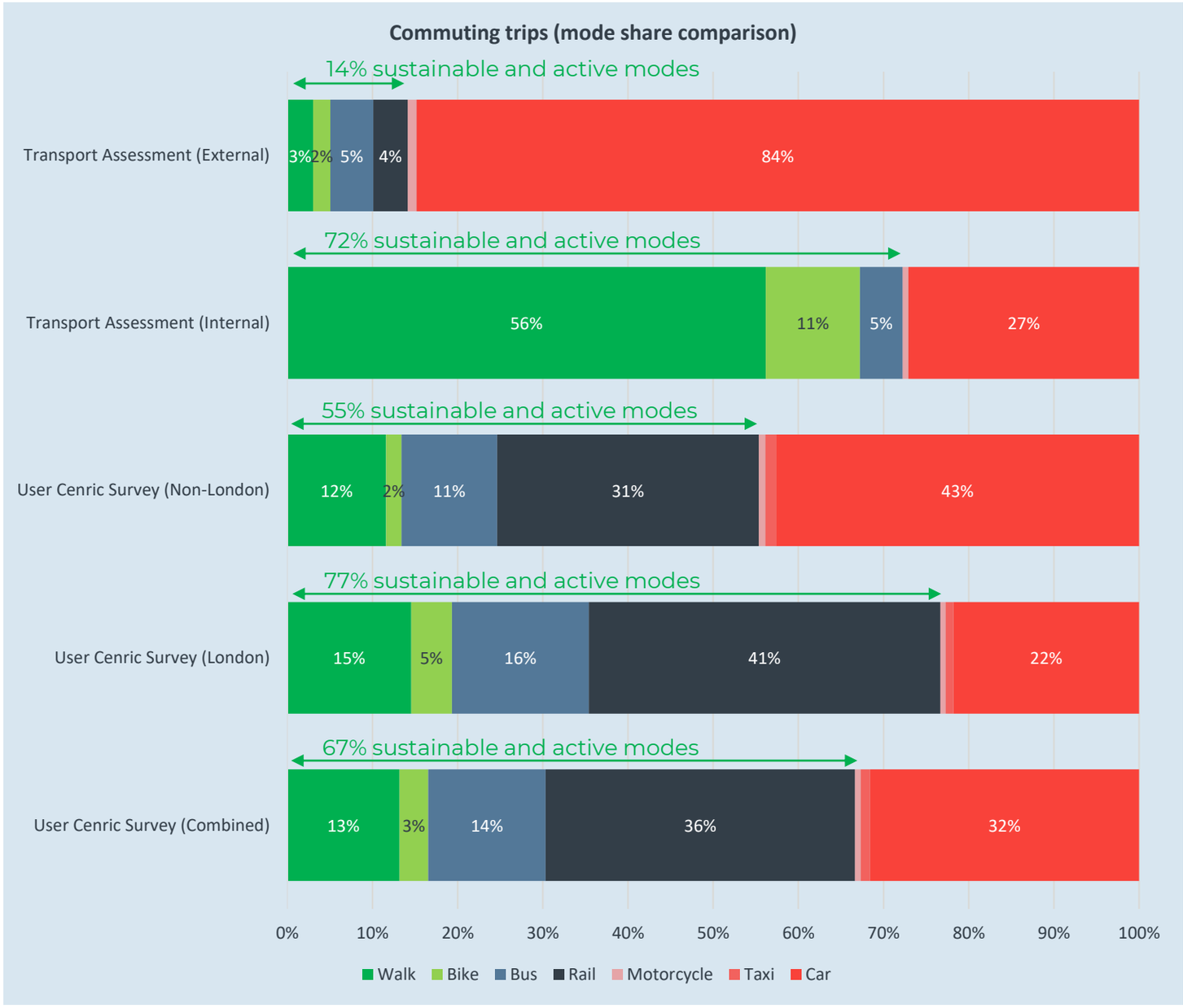
Internal mode shares

- ↑ **walk to 60%** from 56%
- ↑ **walk to 15%** from 11%
- ↑ **bus to 10%** from 5%
- ↑ **taxi to 5%** from 0%
- ↓ **car to 15%** from 27%

Proposed commuting mode shares

Mode	External trips	Internal trips
Walk	5%	60%
Bike	5%	15%
Bus	15%	5%
Rail	55%	0%
Motorcycle	0%	0%
Taxi	0%	5%
Car	20%	15%

Commuting trips (mode share comparison)



Mode shares

Education trips

External mode shares

- ↑ **walk to 20%** from 18%
- ↑ **cycle to 10%** from 3%
- ↑ **bus to 20%** from 10%
- ↑ **rail to 30%** from 3%
- ↓ **car to 20%** from 67%

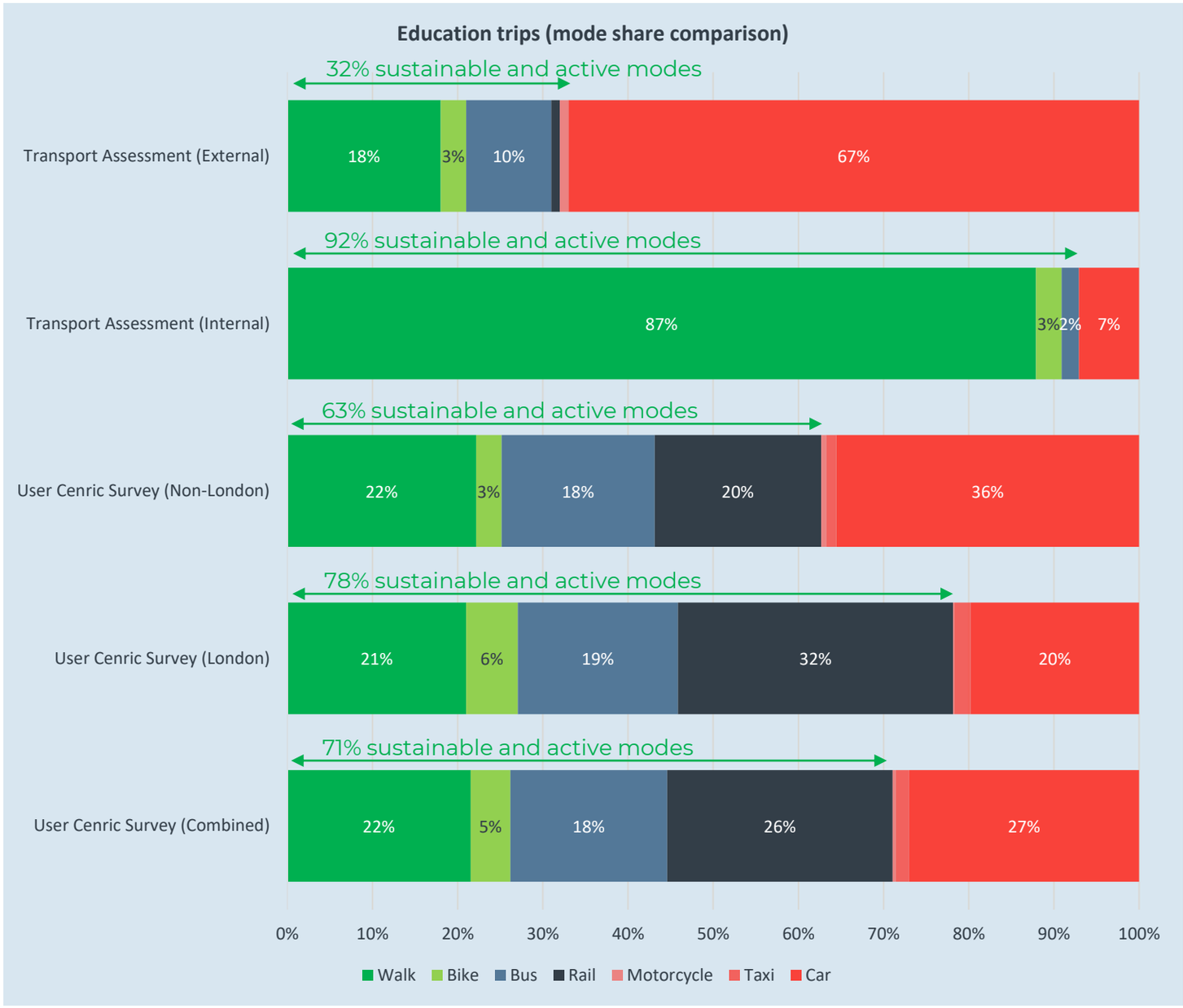
Internal mode shares

- ↔ **walk to 85%** from 87%
- ↑ **cycle to 5%** from 3%
- ↑ **bus to 5%** from 2%
- ↓ **car to 5%** from 7%

Proposed education mode shares

Mode	External trips	Internal trips
Walk	20%	85%
Bike	10%	5%
Bus	20%	5%
Rail	30%	0%
Motorcycle	0%	0%
Taxi	0%	0%
Car	20%	5%

Education trips (mode share comparison)



Mode shares

Shopping trips

External mode shares

- ↑ **walk to 5%** from 3%
- ↑ **cycle to 5%** from 0%
- ↑ **bus to 10%** from 2%
- ↑ **rail to 40%** from 0%
- ↓ **car to 20%** from 95%

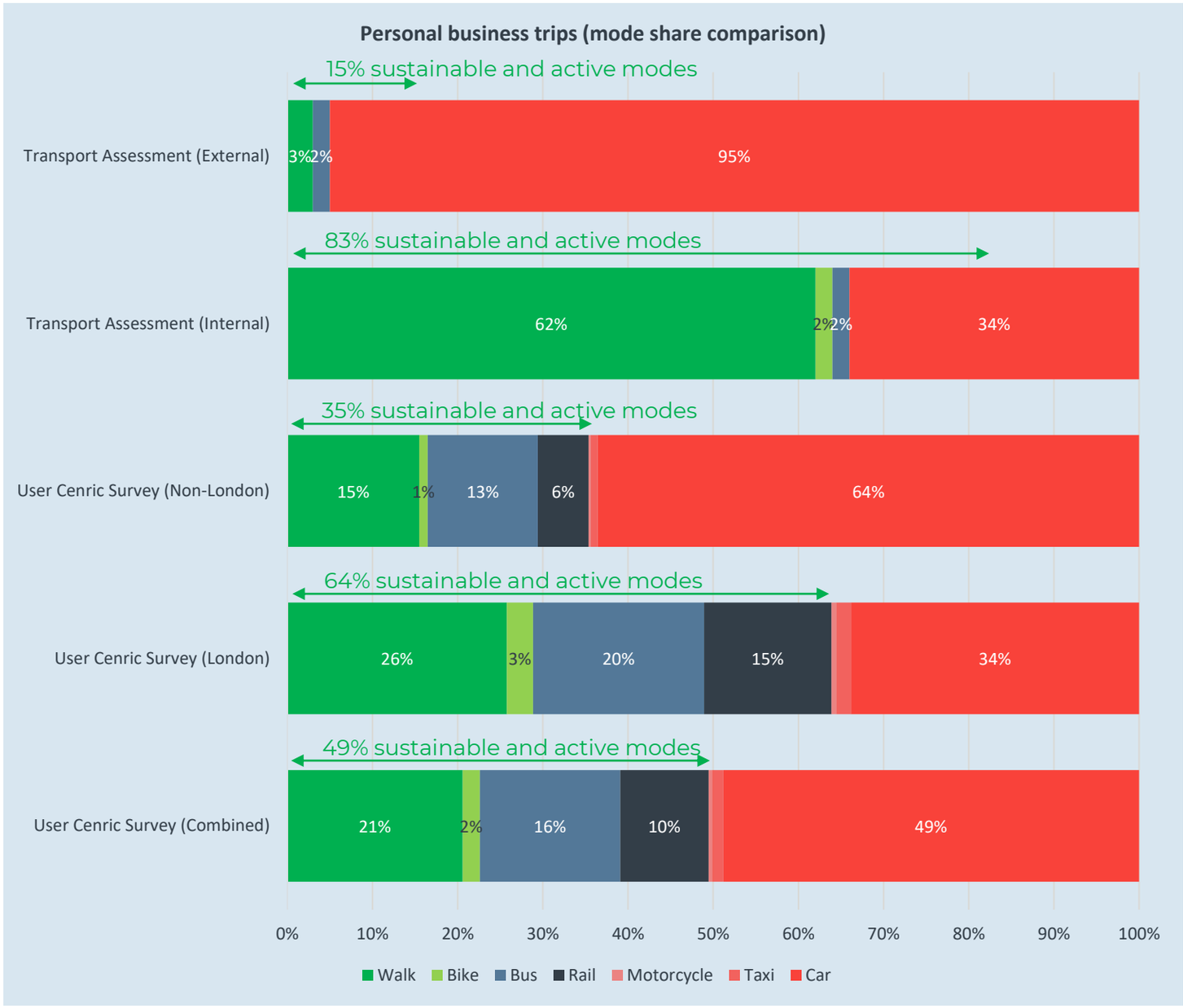
Internal mode shares

- ↑ **walk to 65%** from 62%
- ↑ **cycle to 15%** from 2%
- ↑ **bus to 5%** from 2%
- ↑ **taxi to 5%** from 0%
- ↓ **car to 15%** from 34%

Proposed shopping mode shares

Mode	External trips	Internal trips
Walk	5%	65%
Bike	5%	10%
Bus	10%	5%
Rail	40%	0%
Motorcycle	0%	0%
Taxi	0%	5%
Car	40%	15%

Shopping trips (mode share comparison)



Mode shares

Personal business trips

External mode shares

- ↑ **walk and cycle to 5%**
- ↑ **bus to 10%** from 2%
- ↑ **rail to 40%** from 0%
- ↓ **car to 20%** from 95%

Internal mode shares

- ↑ **walk to 65%** from 62%
- ↑ **cycle to 10%** from 2%
- ↑ **bus to 5%** from 2%
- ↑ **taxi to 5%** from 0%
- ↓ **car to 15%** from 34%

Proposed personal business mode shares

Mode	External trips	Internal trips
Walk	5%	65%
Bike	5%	10%
Bus	10%	5%
Rail	40%	0%
Motorcycle	0%	0%
Taxi	0%	5%
Car	30%	15%

Personal business trips (mode share comparison)

Mode shares

Leisure trips

External mode shares

- ↑ **walk and bike to 10%**
- ↑ **bus to 10%** from 5%
- ↑ **rail to 40%** from 4%
- ↓ **car to 30%** from 85%

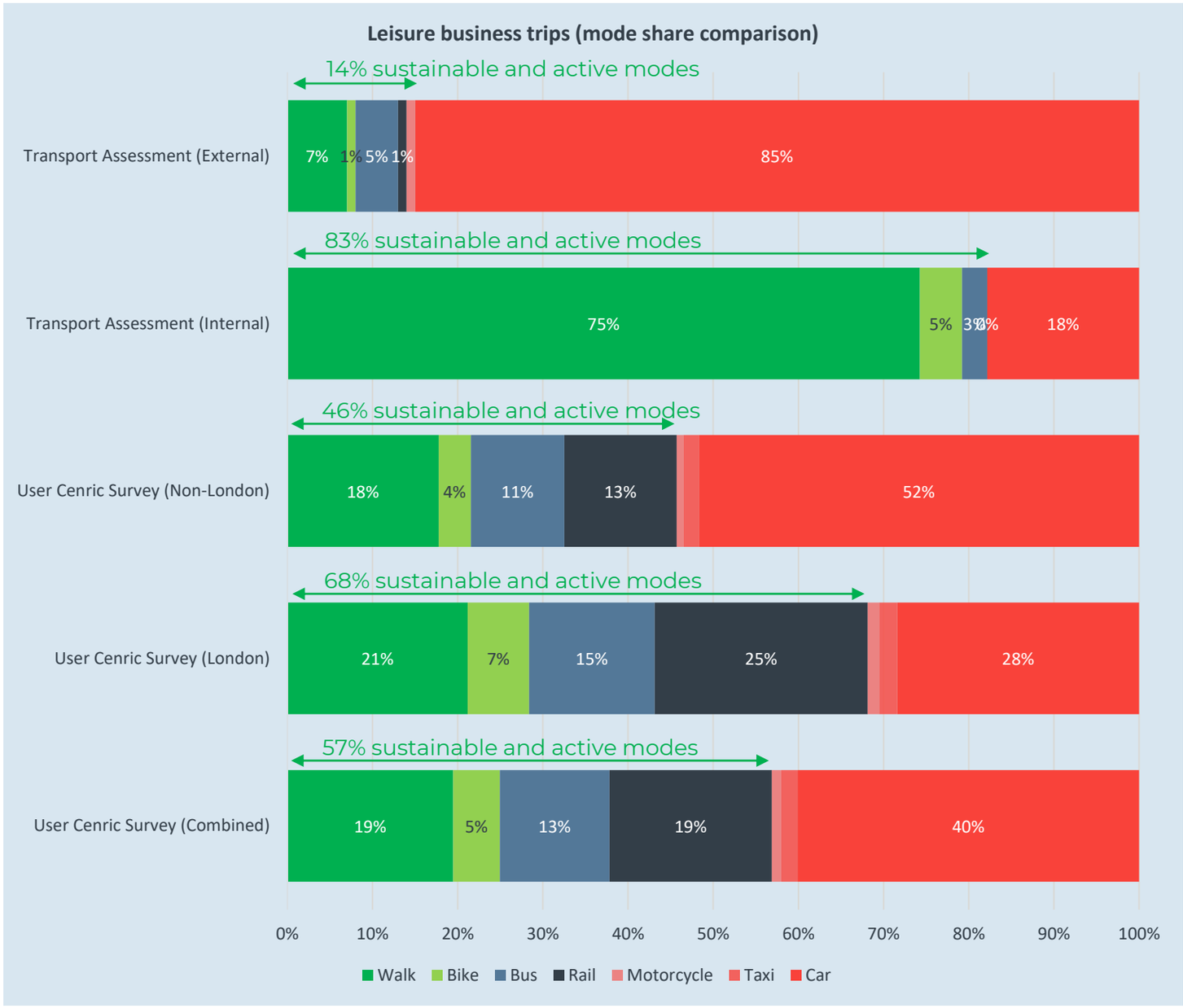
Internal mode shares

- ↑ **walk to 75%** from 75%
- ↑ **walk to 10%** from 5%
- ↑ **bus to 5%** from 3%
- ↓ **car to 10%** from 18%

Proposed leisure mode shares

Mode	External trips	Internal trips
Walk	10%	75%
Bike	10%	10%
Bus	10%	5%
Rail	40%	0%
Motorcycle	0%	0%
Taxi	0%	0%
Car	30%	10%

Leisure trips (mode share comparison)



Mode shares

Proposed mode share targets

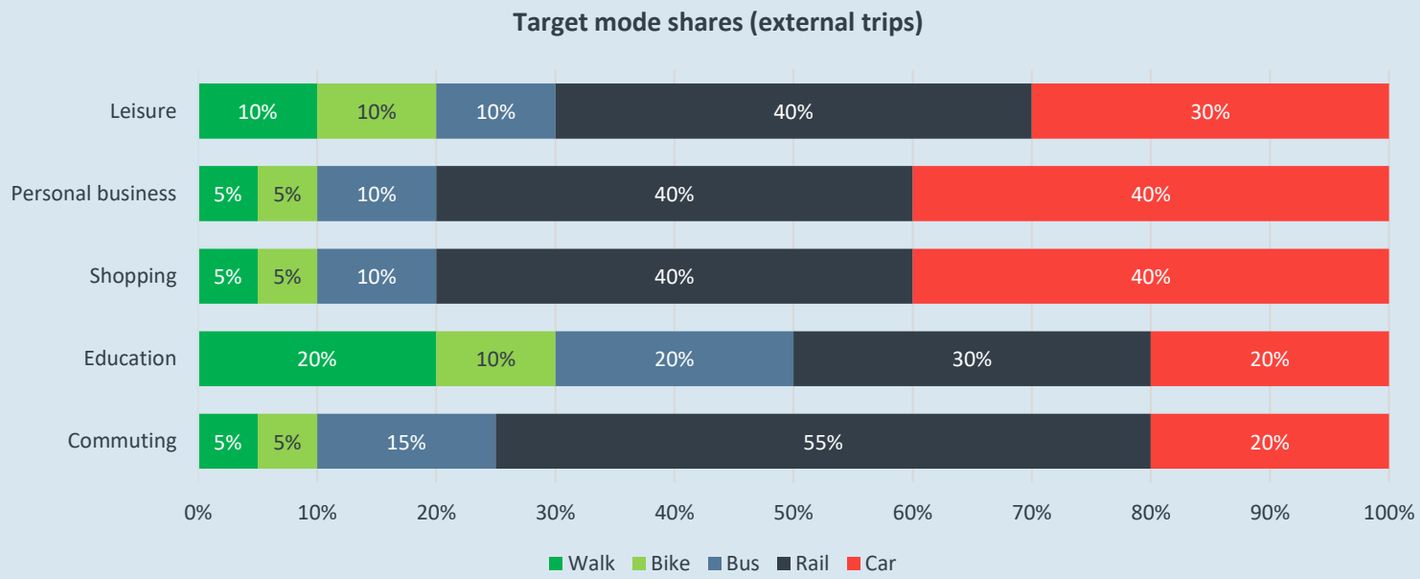
External mode shares

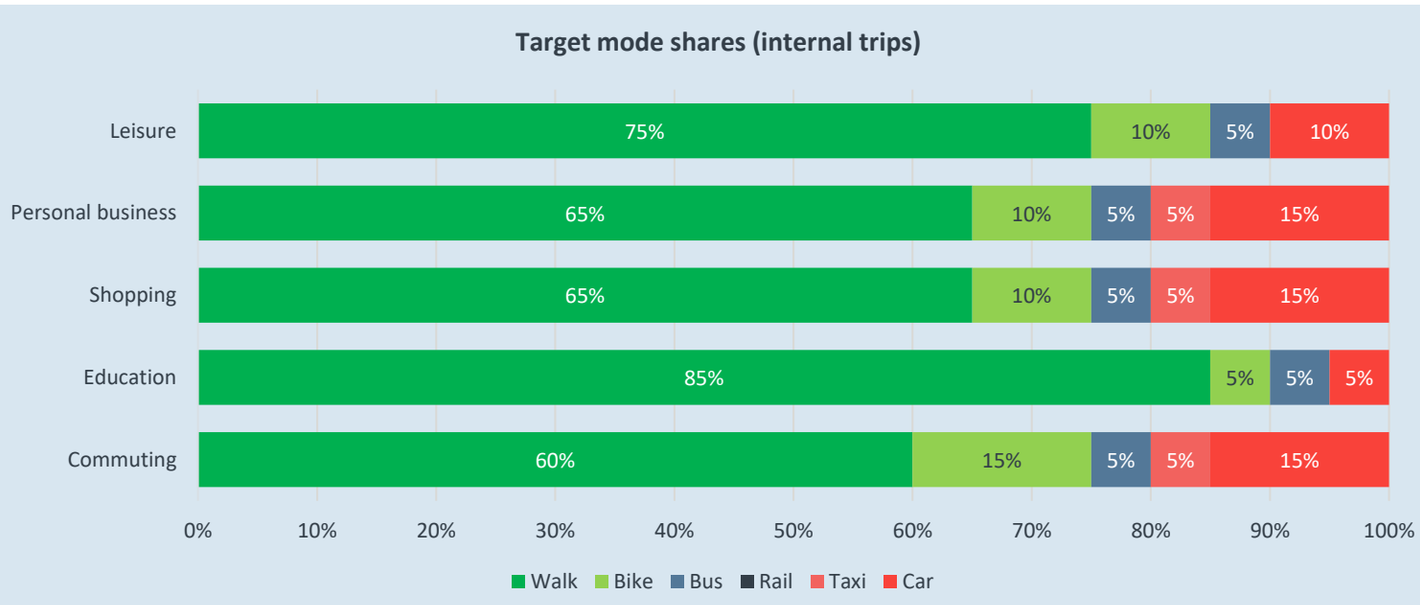
- Increased rail mode share – reflecting that the three largest external origin/destinations can be access by train
- Car travel between 20 to 45% mode share

Internal mode shares

- Sustainable and active travel at least 80%
- Walking at least 65%
- Cycling generally 10%

Proposed mode share targets





Mode shares

Traffic Flow Analysis (Adjusted)

The figure below presents the traffic flows using the updated mode shares (in grey) and are compared to the initial traffic flow (in italics)

Figure 11 Summary of Phase 1 Total Vehicle Flows Adjusted

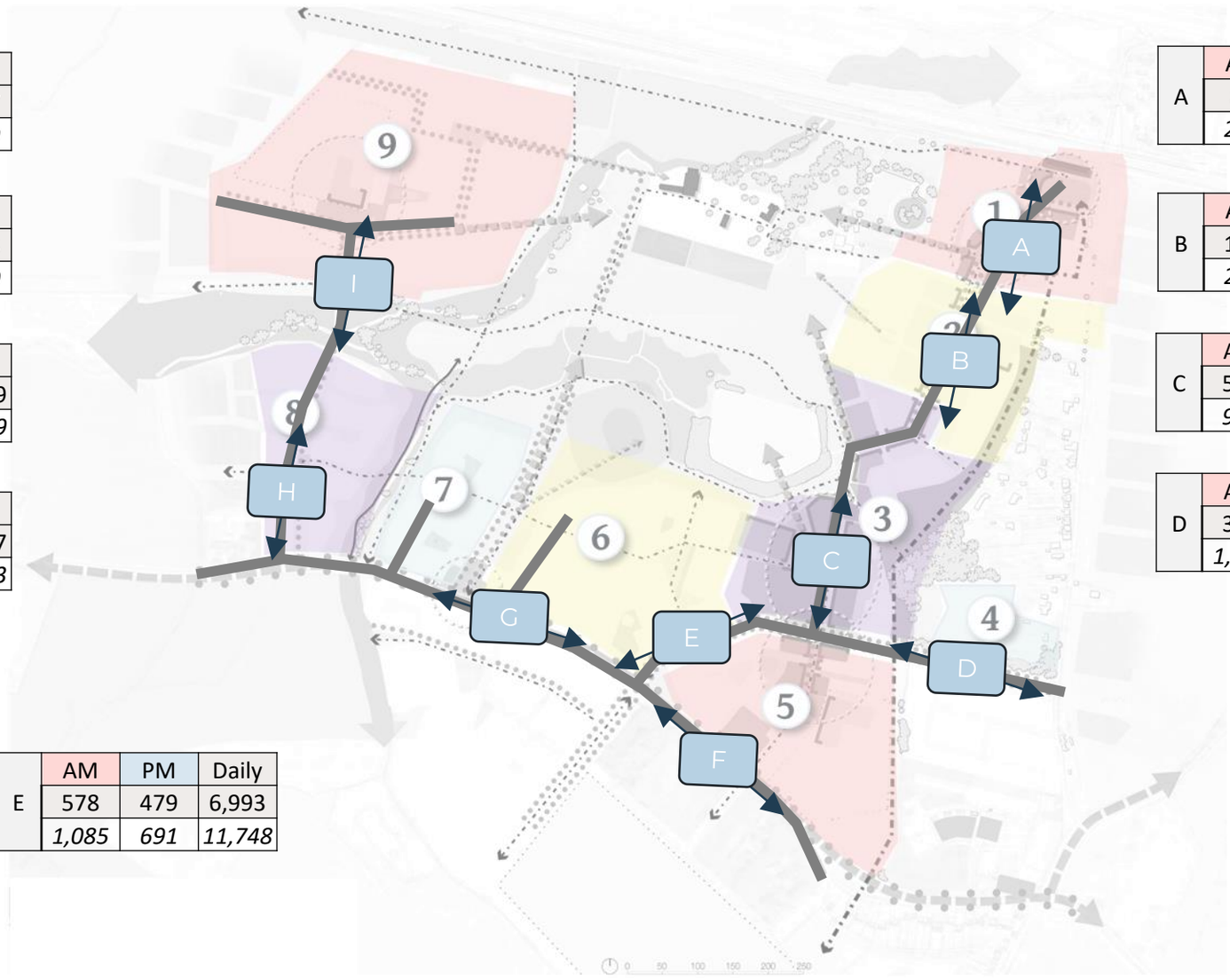
	AM	PM	Daily
I	339	116	3,007
	690	*233*	*6,109*

	AM	PM	Daily
H	377	154	3,515
	751	*299*	*6,950*

	AM	PM	Daily
G	1,418	1,324	18,139
	1,949	*1,565*	*23,249*

	AM	PM	Daily
F	1,463	1,360	18,677
	2,032	*1,619*	*24,153*

	AM	PM	Daily
E	578	479	6,993
	1,085	*691*	*11,748*



	AM	PM	Daily
A	89	90	1,184
	209	*195*	*2,669*

	AM	PM	Daily
B	126	129	1,687
	269	*260*	*3,500*

	AM	PM	Daily
C	524	726	8,267
	935	*1,052*	*13,146*

	AM	PM	Daily
D	315	311	4,141
	1,131	*1,113*	*7,271*

Interim Public Transport Study

Opportunity for Demand Responsive Transit

Otterpool Park Phase 1: Interim Public Transport

Purpose

As outlined in the Transport Assessment, the Otterpool Park bus network provision revolves around two main bus routes. These routes form two loops within the Otterpool Park boundary (referred to as the North and South loop), and will require a realignment of the existing bus services in the area (10, 10A, and 18A).

It is recognised that the establishment of bus routes and services will need to be developed in line with the development build-out, adjusting as demand changes across the masterplan.

This chapter presents the initial interim public transport options for Phase 1 of the masterplan. It explores options ranging from a fixed-schedule/ fixed-route traditional bus service, to more flexible demand responsive transit (DRT) options which provide users with a greater level of service.

DRT, or Digital Demand Responsive Transit (DDRT), is defined by the Department for Transport in the Future of Mobility Urban Strategy as,

"a flexible service that provides shared transport in response to requests from users specifying desired locations and times of pickup and delivery. Dial-a-ride services scheduled through next day or advance bookings are a traditional example".

DRT considerations

Demand responsive transport is often used to in situations where conventional public transport is not appropriate, and as such can assume variety of operating models. The type of operating model required is dependant on the several key considerations, which includes: drivers of demand; area typologies; resource considerations; and user personas. An analysis of these factors will determine the requirements of the area where the DRT service is proposed to be implemented, and will inform the decision of which operating model is most appropriate.

The DRT operating models which will be analysed in conjunction with the characteristics of Otterpool Park are:

> Fully flexible (no defined route or stops);

> Semi-flexible (flexible schedule, semi-flexible stops);

> Crowd sourced, pre-booked (flexible origin, fixed destinations);

> Hybrid service (fixed core route, semi-flexible deviations); and

> Shuttle loop (fixed route and stops).

In this chapter, different variations of these are presented to illustrate the suitability for Phase 1 of the Otterpool Park masterplan.

Existing Public Transport services

The existing bus services that operate in the vicinity of the Otterpool Park site include:

Stagecoach 10

- Route travels between Ashford and Folkestone
- Operates hourly, with extra services during the morning and evening peaks
- Monday to Sunday service

Stagecoach 10A

- Supplementary service that supports the route 10 during peak hours

Stagecoach 18

- Route travels between Canterbury and Hythe
- Operates approximately every 2 hours
- Monday to Saturday service

These routes currently travel along Otterpool Lane (B2067), connecting to Ashford Road (A20) in the north and Aldington Road (B2067) in the south.

To provide an effective service for the development occupiers of the Otterpool masterplan, these routes would need to undergo significant realignment.

Local Context and Opportunities

Kent MaaS Framework

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 Bus Rapid Transit (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 its 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, all of which will be integrated into a single application which allows users to plan and conduct journeys.

Existing Initiatives in Kent County

Within Kent, several existing DRT initiatives are currently in operation, with the main services being ArrivaClick and Go2.

ArrivaClick has recently been introduced in Ebbsfleet, making it the fourth location where the company operates in the UK. The service takes the form of three minuses, which can be booked and paid for through an accompanying app. Users are directed to the nearest virtual bus stop, with the price of the journey being dependent on the trip length (weekly / monthly passes are also available). The scheme was delivered in partnership with the developers of Ebbsfleet Garden City, a new 15,000 home residential development.

The DRT service Go2 currently operates in the Sevenoaks region, and has replaced all of Go Coach's fixed bus services. The service is bookable via a bespoke app developed by ViaVan, as well as over the phone. Initial usage metrics have been positive, indicating an increasing number of rides every week and a 99% success for meeting demand, with passenger satisfaction feedback being recorded as extremely positive.

In addition to the already implemented services, planned DRT style initiatives in Kent include the Dover Fastrack proposed bus rapid transit, the DRT Sheppey bid to the Rural Mobility Fund, and further expansion of the catchment area of the Go2 services.

Opportunity for Phase 1

Overleaf, a summary of DRT implementation considerations is provided, first as a general overview, and then in the context of Otterpool Park (Phase 1).

At a high level, key factors are presented which impact the demand for a DRT service, and can be used to ascertain whether DRT is the appropriate solution to the area in question. Potential operating models are also discussed, and the relative advantages and drawbacks associated with them.

Specific to Otterpool Park, a range of six potential service options are presented in **Table 1**. These options are spread across a spectrum which ranges from a conventional fixed route and schedule public transport service, to a fully flexible end-to-end service.

Each option has been qualitatively assessed on its suitability to Phase 1 of Otterpool Park, and has been classified as either:

- Highly suitable: provides a convenient service that can effectively serve all parcels, while remaining economically viable
- Suitable: provides an acceptable level of service for most users, but inherent risks may be present (either financially or technologically)
- Not suitable: does not provide an adequate level of service for the intended users

Options Summary

Applicability to Otterpool Park

Not Suitable
Suitable
Highly Suitable

Table 1 – Potential bus service options for Phase 1 Masterplan

	Typical PT	Shuttle loop	Hybrid DRT service	Crowd-sourced/ pre-booked	Semi flexible service	Fully flexible service
Service operation	Operates a predetermined route servicing agreed bus stops; adheres to published timetable; hail and ride possible	Autonomous shuttle operating a fixed route; Pre-booking required for shuttle pick-up	Fixed core route allowing pre-booked deviations; hail and ride on fixed route section	Pre-booking required; Asset-light model to enable flexible deployment (often partner with underutilised operators in the area)	Guaranteed fare; matches passengers going in similar direction; allows passengers to choose pick-up/ drop-off point, and reserve a seat	Fully flexible within service area; matches passengers going in similar direction; dynamic pricing
Scheduling options	Currently operating between 07:30 – 18:00	Peak hour service/ or 5am – 12am	Peak hour service/ or 5am – 12am	Peak hour service/ or 5am – 12am	All day	All day
Timetable	Scheduled	Scheduled	Combination of scheduled timetable with allowance for deviations	Scheduled	On-demand	On-demand
Parcels served	Parcels situated along A20 road (Parcels 5-8)	Physical stops across all Phase 1 parcels	Physical stops across all Phase 1 parcels / virtual stops	O: Virtual stops; D: key locations, employment, education, travel (rail)	Passengers picked-up/ dropped-off within 400m of location/final destination	End-to-end service
Routing	Fixed route	Fixed route	Combination of on-demand and fixed route	Crowd-sourced/ Flexible – creating routes where there is a growing demand	No fixed route; On-demand; Dynamic routing to accommodate all on board	No fixed route; On-demand; Dynamic routing to accommodate all on board
User interface	Ticket terminal; hail & ride	Dedicated mobile application	Ticket terminal; hail & ride; pre-book via app or online	Ticket terminal; pre-book via app, online or telephone	Ticket terminal; pre-book via app, online or telephone	Plug into white label app
Vehicle type	Traditional bus service	Shuttle service 15-seater	24 seater	15 seater	15 seater	15 seater
Personas/ trip purposes	Users who prefer ease over convenience; environmentally conscious individuals; mobility impaired; no car access	Users who are open to emerging technologies; IT literate;	Serves all user types; hybrid service encompasses typical PT users as well as those who favor personal convenience	• Travel to workplace • Travel to school • Travel to station	Serving all location to all user types; particularly the economical rider	Serving all location to all user types; particularly beneficial for the elderly, mobility impaired and families with your children
Likely funding opportunity	Section 106 contributions; public subsidies;	Delivery partnership; Direct cost to consumer	Delivery partnership; Section 106 contributions; direct cost to consumer;	Direct cost to consumer; potential agency contributions	Delivery partnership; direct cost to consumer; embedded in service charge	Delivery partnership; direct cost to consumer; embedded in service charge
Suitability						
Justification	Only serves limited parcels, doesn't provide a comprehensive service	Could serve all parcels, but autonomous shuttle technology is not widely used	Offers the flexibility of a DRT service, as well as economic consistency of a typical PT service	Limited employment land use included in Phase 1 of the masterplan	Dynamic routing and virtual bus stops provide an efficient service for all on board	Provides a convenient service, but may not be economically viable

Option 1: Highly Suitable

Hybrid DRT service

Operational description

A 'hybrid' DRT service acts as an intermediate service that bridges the gap between traditional public transport and a fully flexible dynamic service. The method of operation involves combining a fixed core route allowing pre-booked deviations, and hail and ride on the fixed route section. The pre-booked deviations can also vary in their flexibility, with the option of predefining a maximum deviation distance, or having a selection of virtual bus stops which can be booked as destinations.

By implementing a hybrid DRT service, some of the inherent risks that come with demand responsive travel can be minimised. For example, a common reason for the failure of DRT is offering an overly flexible service, which leads to high operation costs and may not necessarily suit the demands of the area. A hybrid DRT service can partially mitigate this, by offering a fixed route through areas of expected high demand, and flexible stops in areas of less certainty. There is then the possibility to add to the service incrementally, offering routes in more areas if the demand exceeds initial expectations.

It is also offers a socially inclusive form of travel, as some users may be unfamiliar and wary of DRT services, and therefore the fixed route is still able to cater for these users and potentially introduce them to the wider benefits of DRT.

Case study

Mountain Mobility, North Carolina (USA)

Mountain Mobility Community Transportation (MMCT) operate several 'Trailblazer' routes in Buncombe County, which represent a combination of fixed and on-demand transport services.

The route consists of a once hourly service that is catered for by a 14 to 18 seat vehicle, which also has room for bicycle storage. There are between 10-12 fixed stops (depending on the route), and the vehicle can be flagged down at any of these locations. The service will also deviate up to 0.25 miles (0.4 km) to pick up a passenger, provided the passenger has made the booking over the phone by 17:00 the previous day.

The routes are open to the general public and can be used by any county resident. Due to the success of the Trailblazer routes (30,000 annual patronage), the local governing body has made the service free for

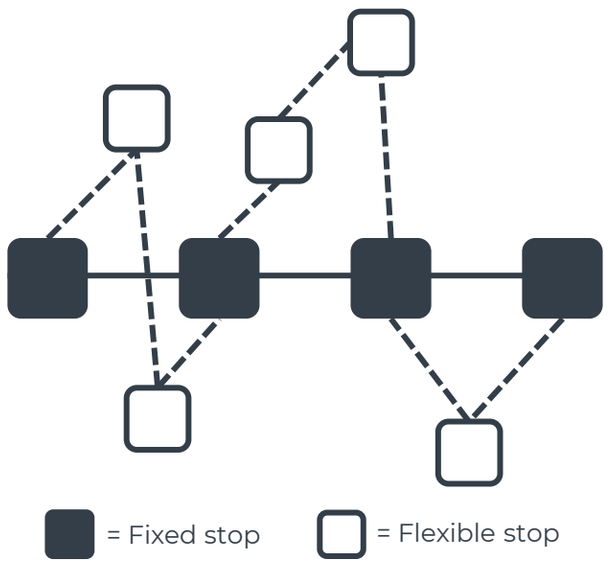
Potential Partners

TripMaster by CTS Software

Ecolane

flexiroute

Hybrid DRT service



Option 2: Highly Suitable

Semi flexible service

Operational description

As outlined in the options summary, a semi end-to-end DRT service offers flexible routing and flexible scheduling, although may have a predetermined origin and final destination point. The service allows passengers to choose a pick-up / drop-off point, reserve a seat, and would offer guaranteed fare.

The operational model matches passengers going in similar direction, and therefore the routes are created so as to only serve the required demand of each trip. The dynamic nature of the service requires technology that allows real time exchange of booking information and programmed route optimisation of the transit service, in order to remain efficient,

By employing a semi end-to-end service, rather than a fully flexible model, pick-up and drop-off stops can be restricted to a geofenced area, or a series of virtual bus stops can be established.

Flexible DRT services such as this have historically focused on elderly or mobility-impaired populations, however they can also be used as an effective solution to the first/last mile problem, and the implementation of an intuitive and convenient booking application can make the service accessible to a wide range of users.

Case study

ArrivaClick, Leicester (UK)

Primarily serving the new housing development of New Lubbesthorpe, Leicester, ArrivaClick operates a DRT service covering a 29,000 km^2 region and features thousands of virtual bus stops. The fleet consists of 15-seater vehicles, which can be booked via dedicated mobile application, which then optimizes the route to provide the most efficient service for all passengers onboard. Prices are dependent on distance traveled and time of day, although weekly and monthly passes are available.

This service represents the first time that funding from a Section 106 agreement has used to implement DRT in the UK, as historically funding has been put towards traditional fixed bus routes. The DRT service is operated in partnership by Arriva and the Drummond Estate, who are the developers of the New Lubbesthorpe development.

MK Connect, Milton Keynes (UK)

MK Connect is a further example of a flexible minibus service, which has replaced many of the fixed bus routes in Milton Keynes from March 2021. The service operates by users booking a journey from a phone, tablet, computer, or by calling the contact centre. A virtual bus stop is then provided, typically 150-200m from the user. Payments are made via a payment card or an MK Move smart card, which is a smart ticketing system offered by Milton Keynes Council for use on public transport.

Potential Partners

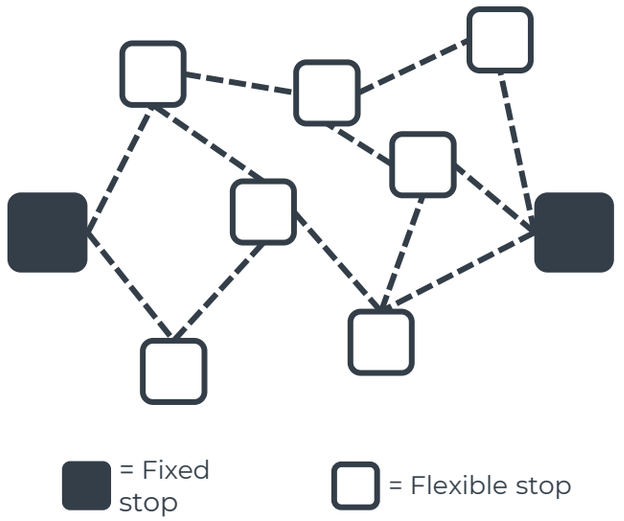
optibus

arriva click

spare

bestmile
optimizing mobility

Semi end-to-end DRT service



Option 2: Suitable

Fully flexible service

Operational description

This DRT service operates in a similar manner to a semi end-to-end service, but offers greater levels of flexibility and user convenience.

The service is still restricted by a defined operating zone, however is fully flexible within the service area. This means that a full door-to-door transport service is provided. Route optimisation technology matches passengers going in similar directions, with bookings typically be made via a bespoke application specific to the DRT service. The flexible nature of the service requires a driver-facing app which updates in real time, and back office capabilities which can handle dynamic booking, vehicle matching, and journey planning.

While a full end-to-end service provides high levels of user convenience, it may not necessarily be the most efficient option given a transportation network and the characteristics of its demand, and the economic viability of such services can be uncertain. Dynamic pricing is a potential option to help offset higher operating costs, rather than fixed fares which are offered by semi-flexible services.

Case study

GO2, Sevenoaks (UK)

Established in May 2020, Go2 DRT services have replaced seven of Go Coach's traditional bus services, due to declining patronage.

The service is fully flexible, operating through a mobile application developed by ViaVan, where users can make a booking and be picked up from their location of choice within 30 minutes by one of Go2's 8-seater vehicles. Real time vehicle tracking and travel updates are provided through the same application. Bookings can also be made by phone and at a physical ticket office.

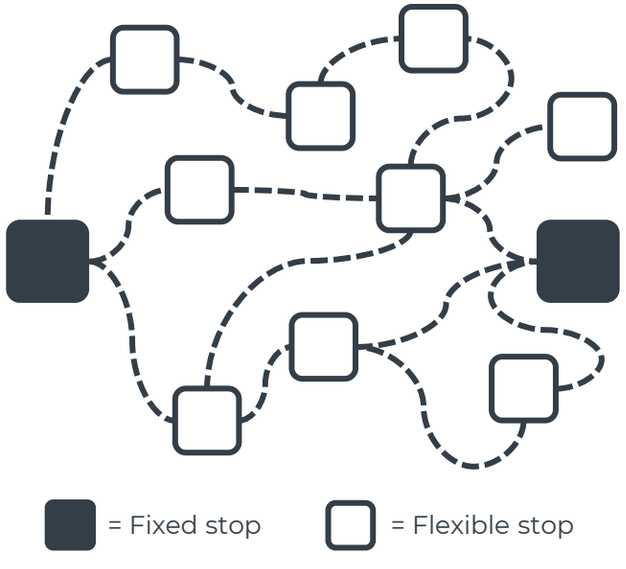
Fares are dynamically priced, increasing by a nominal amount for each extra mile travelled. The service has been financially supported by Kent County Council since its inception, and has is regarded as being successful so far, with a 99% success rate for meeting passenger demand.

Potential Partners

VIA VAN

moovit

Full end-to-end DRT service



Option 2: Suitable

Crowd-sourced/ pre-booked

Operational description

This DRT service operates on a destination specific model, where the route has one or several key destinations, such as employment zones, transport interchanges, or other trip attractors. The origin of the route operates on a semi-flexible basis, making use of virtual bus stops which are only incorporated into the route if a booking has been made.

There is flexibility around how the booking system for a destination-specific DRT service can be operated. Some models rely on bookings made well in advance, which may suit services catering for places of employment, where bookings can be made to match upcoming shift schedules. Advance booking systems require less dynamic route optimisation, but offer lower levels of user convenience than if a real time booking system is employed.

Destination-specific DRT services are suitable candidates for agency contributions, with the potential for private sector or other public sector agencies to contribute to the service running costs, such as employers, businesses, or local authorities.

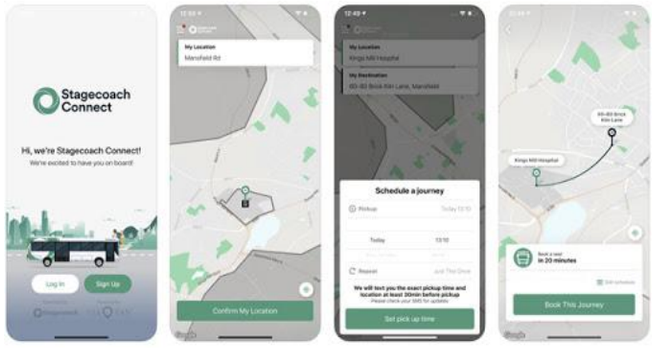
Case study

Klook, UK

A common form which destination-specific pre-booked DRT services take are transport interchange services, such as a shared airport transfer. Klook operates a series of 8-seater shuttle minibuses, which serve 5 major airports in London and can be booked to one of over 1,000 hotels. Bookings can be made online or over the phone, and a pre-agreed pick up time will be set. This type of DRT is less flexible in terms of schedule, but typically has a large service area.

Stagecoach Connect, UK

Launched in 2020 in response to the COVID-19 pandemic, Stagecoach Connect consists of a mobile application which is available for NHS workers. Users of the app can book a seat on a typical single or double decker bus up to one week in advance, are able to track their ride in real time, and are picked up from a virtual bus stop. SMS booking confirmations and reminders are also sent out by the app.



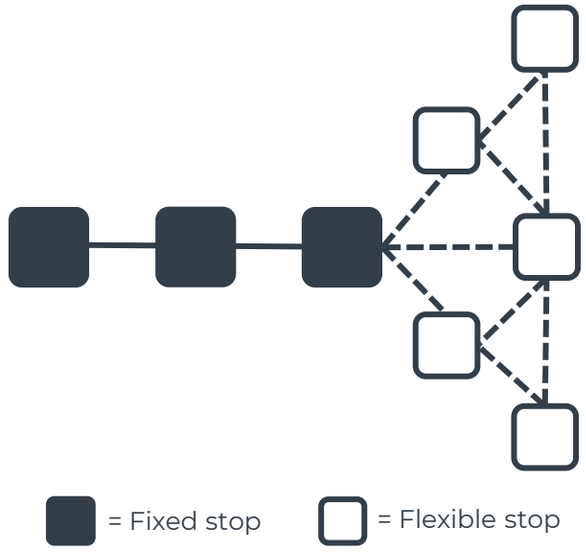
Potential Partners

BUSUP

COMMUTE with enterprise

PADAM MOBILITY

Crowd sourced, pre-booked service



Option 2: Suitable

Shuttle loop

Operational description

One prospective technological advancement that is expected to greatly impact DRT are autonomous vehicles (AVs). With the introduction of AVs, user fares and operating costs are anticipated to sharply decline, as driver costs typically make up approximately 50% of DRT operational expenditure.

As the use of autonomous shuttles is a relatively new concept, most loop style services will typically adhere to a predetermined schedule and defined stops, although it is envisaged that eventually this will develop into an on-demand, door-to-door service.

An AV loop service will often provide interchange opportunities with other transport modes at one or more of the predefined stops, and is currently regarded as a supplement to conventional public transport, rather than a replacement.

The majority of autonomous shuttles that have been deployed into real-world driving conditions have been done so on a trial and research basis, and as such have operated under a fixed route, and fare free system. Some of these trials have also employed vehicle staff, however these have played the role of safety operators, rather than drivers.

Case study

Navya, Las Vegas (USA)

The NAVYA autonomous shuttle was launched in 2017, since then it has given 10,000 riders a free lift around in downtown Las Vegas. The route consist of 3 fixed stops, covering 0.6-miles in total. The shuttle is fitted with LIDAR, GPS, motion cameras, and V2I (vehicle-to-infrastructure) technology, that will eventually allow it to communicate with sensors embedded in Las Vegas' traffic signals to better manage the flow of traffic.

'Olli' by Local Motors, Turin (Italy)

Olli is an autonomous shuttle equipped with IBM Watson cognitive system, and is the world's first 3D printed autonomous vehicle (printable in 9hrs). In Turin, Italy, Local Motors have partnered with The International Training Centre of the International Labour Organization (ITCILO), to offer employees and guests 4 stops across the campus grounds. The vehicle can accommodate up to 12 passengers and travel at a speed of 25km/h, and plans are in place to expand the network that it covers after the trial has concluded.

Potential Partners

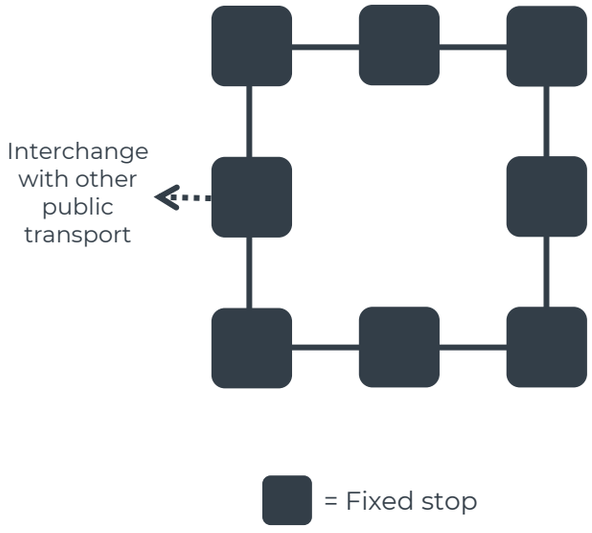
olli by local motors

EASY MILE

KEOLIS

navya

Shuttle Loop



Potential Phase 1 DRT Demand

Methodology

In order to further explore the application of DRT as part of the interim public transport solution at Otterpool Park, it is important to understand the potential demand across the phase 1 masterplan. This section seeks to outline the potential demand for DRT services, drawing from the Outline TA and the User-centric approach (stretch target).

The scope for DRT is understood to be internal bus trips, with the potential for expansion to external locations, subject to demand. The analysis focuses on the AM peak (08:00 – 09:00) as the most onerous hour for the local transport network, as detailed in the Outline TA.

As showcased in the case studies outlined, vehicle types vary depending on demand. For this analysis, 15- and 24-seaters are considered for internal trips, whilst for external trips the analysis is based on 24- and 60-seater buses. For both internal and external trips, the larger vehicle is deemed more appropriate. Examples of these vehicles are shown below.

60-seater vehicle

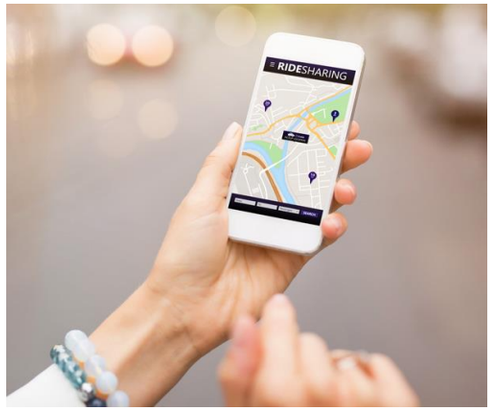
24-seater vehicle

15-seater vehicle

Exploring the **potential demand for DRT in the Phase 1 Masterplan** based on:

the **Outline TA** (conservative modeshare) and...

the **User-centric approach** (stretch sustainable modeshare target)



Analysis is based on **bus trips** during the **AM peak hour** to establish the potential demand for DRT services

Preferred options include **Hybrid DRT** and **Semi-flexible DRT services**:

We propose a **phased deployment of DRT services** to support growing demand in line with phase 1 build-out

Potential Phase 1 DRT Demand – AM peak

Outline Transport Assessment

Table 2 – Outline TA DRT Potential Demand (AM peak) – Internal and External trips (with recommended vehicle in dark blue columns)

Outline TA						
Parcel	Internal Bus Trips AM Peak	External Bus Trips AM Peak	No. of services required			
			Internal trips		External trips	
			15-seater	24-seater	24-seater	60-seater
1	6	12	0	0	1	0
2	3	4	0	0	0	0
3	54	25	4	2	1	0
4	0	0	0	0	0	0
5	62	87	4	3	4	1
6	5	7	0	0	0	0
7	2	2	0	0	0	0
8	3	4	0	0	0	0
9	58	86	4	2	4	1
Phase 1 total	**193**	**228**	**13**	**8**	**10**	4

**a value of zero ('0') indicates demand in that particular parcel is insufficient to fill an entire vehicle. It is acknowledged that this demand will still need to be accommodated for, which is reflected in the 'Phase 1 total' row*

Potential Phase 1 DRT Demand – AM peak

User-centric Approach (stretch target)

Table 3 – User-centric Approach DRT Potential Demand (AM peak) – Internal and External trips (with recommended vehicle in dark blue columns)

Outline TA						
Parcel	Internal Bus Trips AM Peak	External Bus Trips AM Peak	No. of services required			
			Internal trips		External trips	
			15-seater	24-seater	24-seater	60-seater
1	8	32	1	0	1	1
2	5	9	0	0	0	0
3	69	63	5	3	3	1
4	1	1	0	0	0	0
5	102	194	7	4	8	3
6	8	14	1	0	1	0
7	3	5	0	0	0	0
8	5	9	0	0	0	0
9	97	191	6	4	8	3
Phase 1 total	**298**	**518**	**20**	**12**	**22**	9

**a value of zero ('0') indicates demand in that particular parcel is insufficient to fill an entire vehicle. It is acknowledged that this demand will still need to be accommodated for, which is reflected in the 'Phase 1 total' row*

Potential Phase 1 Demand – AM peak

Table 4 – Total DRT Potential Demand (AM peak) – Internal and External trips (with recommended vehicle in dark blue columns)

Total DRT potential demand								
Parcel	Outline TA DRT potential demand		User-centric DRT potential demand		No. of services required			
					Internal trips		External trips	
	Internal	External	Internal	External	15-seater	24-seater	24-seater	60-seater
1	6	12	8	32	0 – 1	0 – 1	1	0 – 1
2	3	4	5	9	0	0	0	0
3	54	25	69	63	4 – 5	2 – 3	1 – 3	0 – 1
4	0	0	1	1	0	0	0	0
5	62	87	102	194	4 – 7	3 – 4	4 – 8	1 – 3
6	5	7	8	14	0 – 1	0	0 – 1	0
7	2	2	3	5	0	0	0	0
8	3	4	5	9	0 – 1	0	0	0
9	58	86	97	191	4 – 6	2 – 4	4 – 8	0 – 3
Phase 1 total	**193**	**228**	**298**	**518**	**13 – 20**	**8 - 12**	**10 – 22**	**4 – 9**

**Indicative range accommodates difference in potential demand between Outline TA and User-centric approach, where zero ('0') indicates that demand is insufficient to fill an entire vehicle. It is acknowledged that this demand will still need to be accommodated for, which is reflected in the 'Phase 1 total' row*

DRT Phasing

DRT Phasing

To accommodate the phased build-out of the masterplan, it is recommended that DRT services are provided and adjusted incrementally as demand is expected to increase. The adjacent figure showcases the indicative phasing of DRT services across the Phase 1 Masterplan, assuming build-out commences in parcel 1 and occurs in chronological order to conclude in parcel 9.

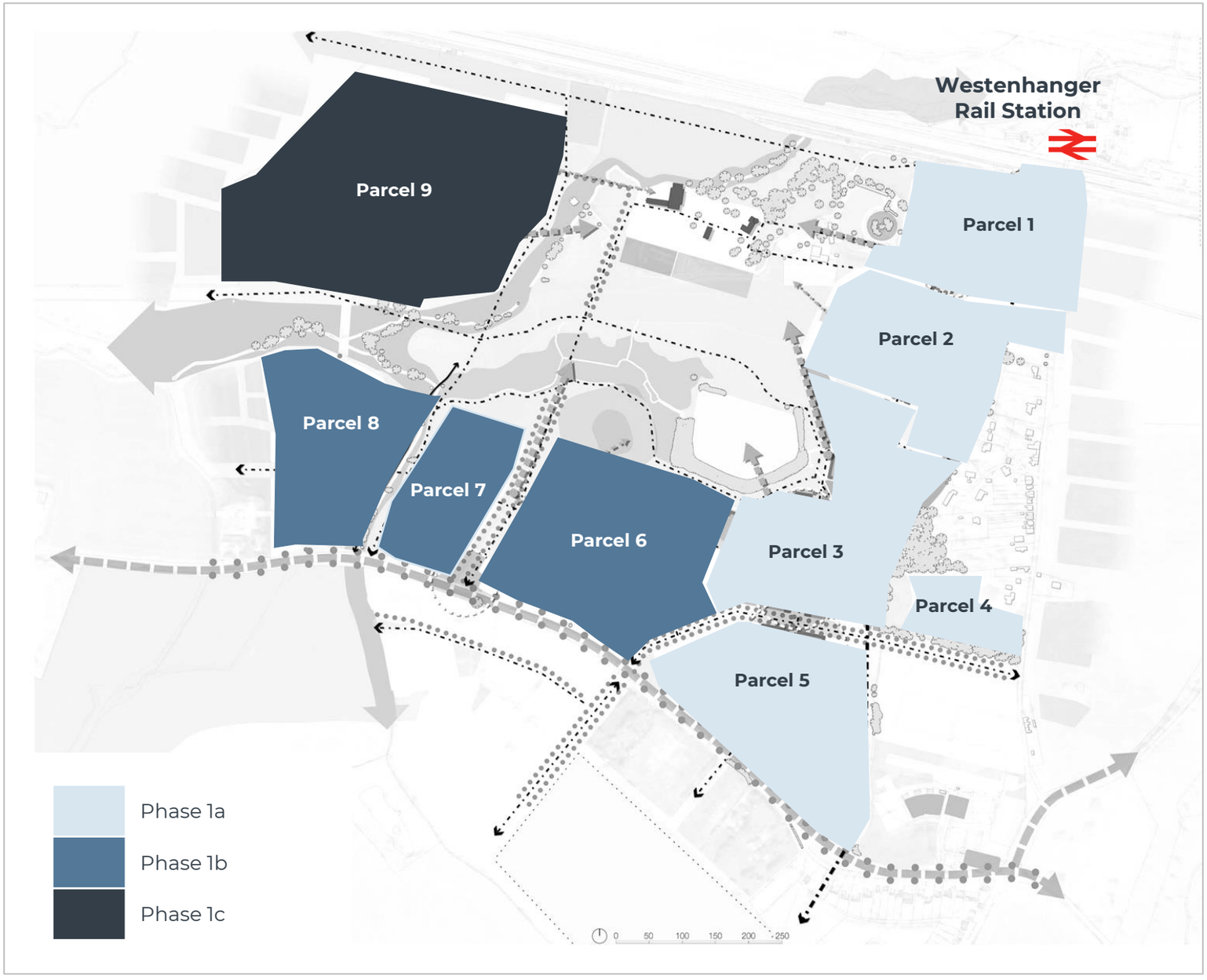
Under this premise, the table below provides the indicative demand and corresponding service provision required to accommodate a three-stage deployment of DRT - referred to as phase 1a, 1b and 1c.

The level of service required outlined in the table below is based on the recommended 24-seater for internal trips, and 60-seater for external trips.

DRT Phase	Potential DRT Demand (trips)	No. of services required	
		Internal trips (24- seater)	External trips (60- seater)
Phase 1a	254 – 484	5 – 8	2 – 5
Phase 1b	23 – 44	0 – 1	0
Phase 1c	145 – 288	2 – 4	1 – 3
Phase 1 total	**422 - 816**	**8 – 12**	**4 – 9**

Indicative range accommodates difference in potential demand between Outline TA and User-centric approach

Figure 2 Indicative DRT Phasing across Phase 1 Masterplan



Summary and Recommendations

Preferred options

As previously acknowledged, conventional public transport is unlikely to provide acceptable levels service and convenience for the case of the Phase 1 development, albeit it may be better suited in the future once the masterplan is more complete. In the interim, the following DRT services have been identified as being most appropriate:

Hybrid DRT service: as this service operates on both a fixed core route and semi-flexible pre-booked deviations, it is able to offer the functionality of both DRT and typical PT services, which has been deemed appropriate for Otterpool Phase 1. This model assists in partially mitigating the inherent financial risk of DRT, while also providing greater user convenience than a regular bus service.

Semi-flexible DRT service: operating without a fixed route or timetable, this model instead calculates the most efficient route in response to user requests, and therefore only serves the required demand. While the operating costs are likely to be higher than those of a typical bus route or a hybrid DRT, the increased user convenience tends to result in high patronage, as seen in the case studies.

While both of the options recommended provide some level of flexibility, there is the potential to incrementally add further flexibility in to the operating models, which can be led by the demand and patronage of the service once implemented.

This chapter has also outlined the potential demand for DRT across the Phase 1 Masterplan, drawing from the Outline TA and the User-centric approach.

At this early stage of planning, the recommended approach for DRT service deployment is seen to be three-fold:

> **Phase 1a –** serving parcels 1 – 5

> **Phase 1b –** service parcels 6 – 8

> **Phase 1c –** service parcel 9

It is also recognized that external trips may be in scope to be serviced by DRT. This will require further investigation and is expected to be delivered as a fourth deployment/ expansion of service.

Next Steps

Upon review from the client, and option agreement, it is recommended that soft market testing is undertaken with potential partners. This will provide an opportunity for:

> Exploring and shortlisting suitable business and delivery models,

> Scoping potential routes and stops

> Understanding indicative costs and vehicles required,

> Understanding potential infrastructure requirements (if any)

Following this, more detailed analysis and development of routing can be undertaken, also considering adjacent key locations.

User-centric scenario testing

Parking and car clubs

Car Parking Strategy

Evidence base

Introduction

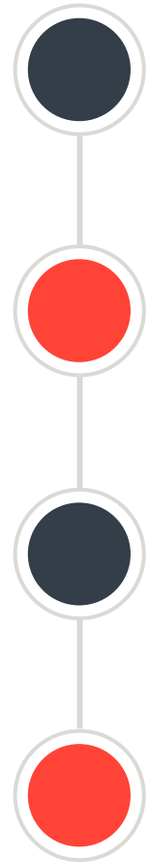
This document

This section focuses on the resulting parking recommendations derived from the user centric survey.

The study has also reviewed other benchmarking ‘garden city’ type examples to understand how parking ratios have been reduced across the country.

An accessibility index scoring system has been explored looking at the relationship between residents and their proximity to local facilities to determine proposed parking rations within Phase 1 of the masterplan.

This option is to be discussed with the design team before progressing onto the next stages of implantation.



Benchmarking

Review of parking standards for new and emerging garden town.

Evidence Base

Results and recommendations from the user centric survey.

Parking Approach

Approach and methodology for residential parking provision at Otterpool Park.

Parking Recommendations

Study findings and recommendations for residential parking ratios.

Benchmarking Examples – Parking Reductions

Evidence base

Benchmarking Examples

Ebbsfleet Garden City adopts a non-statutory design guidance to develop a travel strategy that promotes a choice of sustainable, affordable and convenient travel options, and a supporting parking approach.

This includes five key stages:

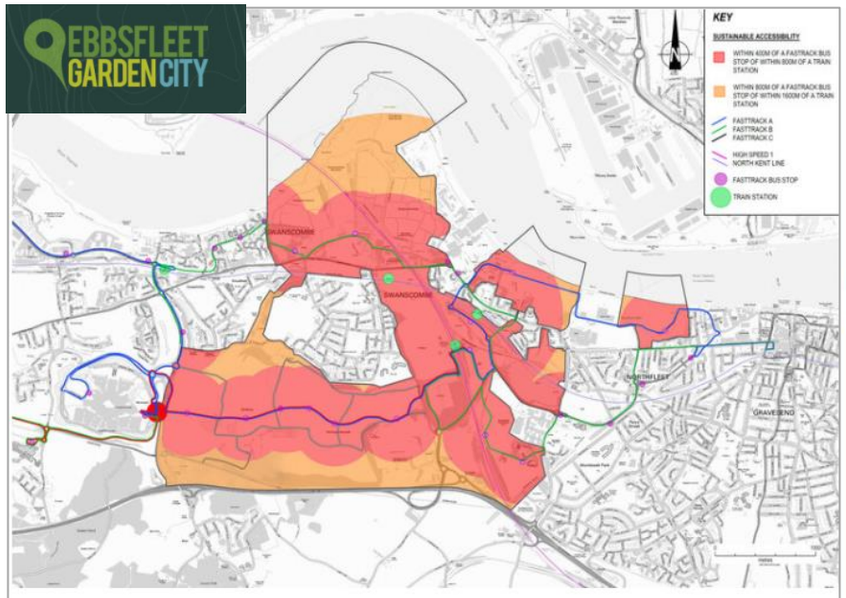
Step 1 : Provide sustainable travel facilities in your project

Step 2: Align parking provision with sustainable travel plan

Step 3: Locate parking discretely

Step 4 : Enable vehicle charging

Step 5 : Proactively manage parking



Ebbsfleet Accessibility Map : The map shown above has been developed to illustrate the level of sustainable travel accessibility of a site within the Ebbsfleet area. This has been generated from mapping a 5 minute walking radius around proposed Fastrack bus stops, and a 10 minute walk around train stations within the area.

The red areas are within 400m of a Fastrack bus stop, or 800m of a train station and represent the most accessible locations within EDC,

The exact parking provision would be reached through agreement between developer and EDC taking into account the accessibility map, the availability of sustainable transport systems and services, and other factors as appropriate.

1-2 Bed Apartments	0 - 0.8
2 Bed House	0 - 1.05
3 Bed House	0 - 1.2
4 Bed + House	0 - 1.3

Parking provision in well connected area

The orange areas are either 400- 800m from a Fastrack bus stop, or 800m - 1600m from a railway station and represent highly accessible locations within EDC.

Dwelling Type	No of parking spaces
1-2 Bed Apartments	0.8 - 1
2 Bed House	1.05- 1.5
3 Bed House	1.2 - 1.8
4 Bed + House	1.3 - 2.4

Oxfordshire Cotswolds Garden Village: Oxfordshire County Council is working with West Oxfordshire District Council to enable developers to deliver the housing and employment growth set out in the Local Plan, including the Oxfordshire Cotswolds Garden Village and West of Eynsham strategic development sites.

Like above the approach to design included a strategy to reduce the need to travel and encourage and support the use of sustainable transport, which focussed on initiatives such as a car club, parking controls, sustainable deliveries, public transport, and cycle route connectivity and cycle parking.

A study was undertaken to understand the 'current situation on the local transport network'. The 'Oxfordshire Cotswolds Garden Village Area Action Issues Paper' was published in June 2018 and a public consultation on the paper was undertaken to gather responses and recommendations.

Two key areas included: *Improved public transport linkages, transfers and services to reduce car dependency and congestion on the road network; and The need for integrated multi modal travel choice which is accessible, affordable, reliable, safe and aligned with people's travel needs.*

Parking Standards

The West Oxfordshire Local Plan sets out the 'optimal' parking levels across the District as a whole, to be further considered in detail by individual developments rather than seeking to impose a 'maximum' standard. Given that OCGV will be in a sustainably connected location, along with the need to minimise vehicles on the already congested local road network, it will be essential to include reduced private car parking standards as part of a wider package of demand management measures. In addition, car free housing will be a requirement of the development (minimum of 15%) and car free zones will be identified.

Proposed parking provision for residential and employment uses is set out in **Table 6.1**. Parking provision for education and retail uses will need to be reviewed.

Table 6.1 Parking Provision

Land Use	West Oxfordshire Car Parking Standard	Proposed Provision
Residential	1 bed dwelling - 1 space; 2-3 bed dwellings - 2 spaces; 4+ beds - 2+ spaces on merit	1 bed dwelling – 0.75 unallocated space 2 - 3 bed dwellings – 1 off-street space 4+ bed dwellings - 1 off-street space + 1 unallocated space Visitor bays - 0.2 visitor unallocated spaces per property
Employment (B1 & A2)	1 space per 30m² (500m² threshold)	1 space per 60m² (500m² threshold)

Source: OCC

User-Centric Survey Results

Drawing from the user-centric survey, the number of respondents living in car-free households were recorded from Kent, London and the total surveyed areas (table 1). This indicates that a significant number of households are car free, particularly those living in flats.

Similarly, the average number of vehicles per surveyed household are shown in table 2. This showcases that, on average, survey respondents require 1 vehicle per household, with those living in a flat requiring less than 1.

Using the Kent and London user survey results, the following parking levels are considered appropriate and ambitious to help promote active sustainable modes of travel :

- For Flats & 2-bed houses: 0 - 0.75 spaces per unit across the Otterpool Park Masterplan.
- For Houses 3-bed or more dwellings: 0.5 – 2 spaces per house across the Otterpool Park Masterplan.
- The rates will vary between parcels based on proximity to the rail station and town centre with more details overleaf.

Car-free households (based on user-centric survey results)

Car-free households	Kent	London	Kent & London
Flat	34%	57%	49%
House	12%	40%	20%
Total	16%	49%	30%

Average number of vehicles per dwelling (based on user-centric survey results)

Average vehicles	Kent	London	Kent & London
Flat	0.8	0.3	0.6
House	1.3	0.4	1.1
Total	1.2	0.3	1.0

Car Parking

Evidence base

User-Centric Survey Results

Drawing from the user-centric survey, the number of respondents living in car-free households were recorded from Kent, London and the total surveyed areas. This indicated that a significant number of households are car free, particularly those living in flats.

Similarly, the average number of vehicles per household were assessed. This showcased that, on average, survey respondents require 1 vehicle per household, with those living in a flat requiring less than 1.

Analysis of the user-centric survey has resulted in the following recommendations:

Parking Provision	Dwelling Type	Parking Spaces per Unit
Subject to accessibility	Flats & 2 bedroom houses	0 – 0.75
	Houses 3 bedroom or more	0.5 - 2

Score (see scoring criteria overleaf)	Dwelling Type	Parking Spaces per Unit
Parking Provision in areas of **'High Accessibility'**	Flats & 2 bed houses	0 – 0. 25
	Houses 3 bedroom or more	0.5 – 1

Score (see scoring criteria overleaf)	Dwelling Type	Parking Spaces per Unit
Parking Provision in areas of **'Good Accessibility'**	Flats & 2 bedroom houses	0.25 – 0. 5
	Houses 3 bedroom or more	0.75 – 1. 5

Score (see scoring criteria overleaf)	Dwelling Type	Parking Spaces per Unit
Parking Provision in areas of **'Moderate Accessibility'**	Flats & 2 bedroom houses	0.5 – 0. 75
	Houses 3 bedroom or more	1 – 2.0

Parking Approach

Accessibility Methodology

Accessibility & Parking Level

It is intended to score each parcel based on its proximity to local public transport services and town centre hubs.

The scoring criteria is set out as follows:

Categories	Distance	Score
Walking distance from Rail Station	0-400m	5
	400-800m	3
	800-1200m	1
	>1200m	0
Walking distance from bus stop	0-200m	5
	200-400m	3
	400-600m	1
	>600m	0
Walking distance from Local Town Centre	0-400m	5
	400-800m	3
	800-1200m	1
	>1200m	0
Walking distance Mobility Hub	0-200m	5
	200-400m	3
	400-600m	1
	>600m	0

Accessibility Score	Scoring	Recommended Parking Ratio	
		Flats & 2 bedroom houses	Houses 3 bedroom or more
High Accessiblility	16-20	0 - 0.25	0.5 – 1
Good Accessibility	10-15	0.25 - 0.5	0.75 - 1.5
Moderate Accessibility	0-9	0.5 - 0.75	1 – 2

Accessibility Index - Phase 1 Masterplan

Car Parking

Accessibility Score

Accessibility Scoring – Working Example for Illustrative Purposes

The adjacent figure illustrates the accessibility index scoring methodology for Parcel 8. The diagram includes high level isochrones showing the distances included in the scoring criteria.

Parcel 8 has been scored as follows:

Categories	Distance	Available Score	Score
Walking distance from Rail Station	0-400m	5	
	400-800m	3	
	800-1200m	1	✓
	>1200m	0	
Walking distance from bus stop	0-200m	5	✓
	200-400m	3	
	400-600m	1	
	>600m	0	
Walking distance from Local Town Centre	0-400m	5	
	400-800m	3	✓
	800-1200m	1	
	>1200m	0	
Walking distance Mobility Hub	0-200m	5	✓
	200-400m	3	
	400-600m	1	
	>600m	0	
Total	-	0 - 20	**14**

Accessibility Score	Scoring	Recommended Parking Ratio	
		Flats & 2 bedroom houses	Houses 3 bedroom or more
High Accessibility	16-20	0 - 0.25	0.5 – 1
Good Accessibility	10-15	0.25 - 0.5	0.75 - 1.5
Moderate Accessibility	0-9	0.5 - 0.75	1 – 2

Accessibility Index - Phase 1 Masterplan (Subject to detailed GIS modelling)

Car Parking

Indicative Parking Ratios

Car parking Recommendations

We have used the ambitious parking requirements determined by the User Centric survey along with expected accessibility levels to determine parking provision across Phase 1 of the masterplan.

The numbers in the diagram indicate parking requirements at a parcel level – split between flats & 2 bedroom houses, and 3, 4 & 5 bedroom houses.

As shown, the recommended parking provision increases as proximity to local public transport services and local facilities widens.

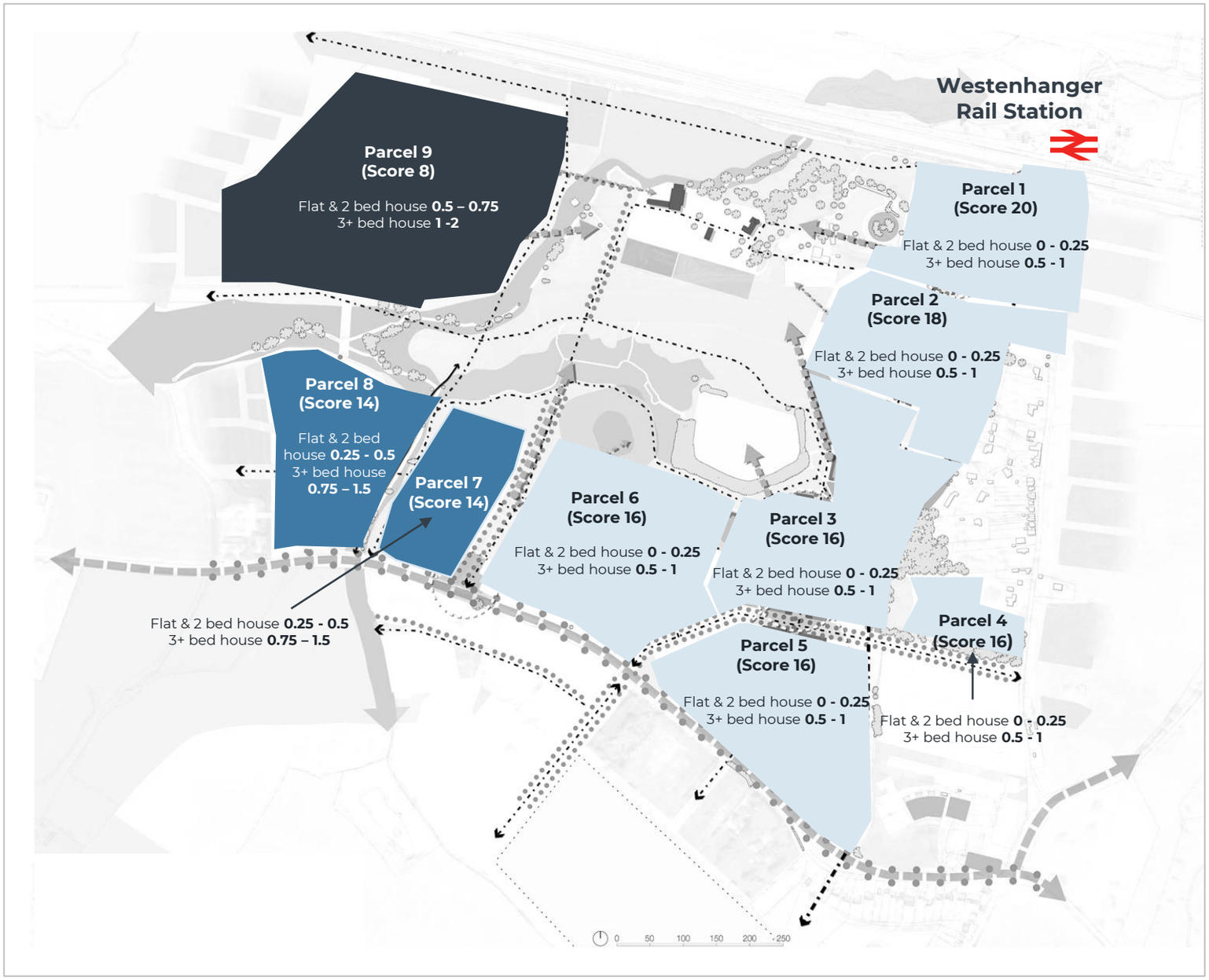
It is considered that the Phase 1 Masterplan area has a good level of connectivity to services throughout, with the maximum recommended parking requirements intended for use outside of the Phase 1 boundary.

Parking Provision	Dwelling Type	No of Parking Spaces
Subject to accessibility	Flats & 2 bedroom houses	0 – 0.75
	Houses 3 bedroom or [illegible]	0.5 - 2

Parking range by accessibility

Accessibility Score	Scoring	Recommended Parking Ratio	
		Flats & 2 bedroom houses	Houses 3 bedroom or more
Highly Accessible	16-20	0 - 0.25	0.5 – 1
Good Accessibility	10-15	0.25 - 0.5	0.75 - 1.5
Moderate Accessibility	0-9	0.5 - 0.75	1 - 2

Recommended car parking supply across Phase 1 Masterplan (Car parking per household)



Car Parking

Estimated car parking supply

Car parking supply

We have used the ambitious parking requirements determined by the User Centric survey

The numbers in the diagram indicate parking requirements at a parcel level – split between flats & 2 bedroom houses, and 3,4 & 5 bedroom houses.

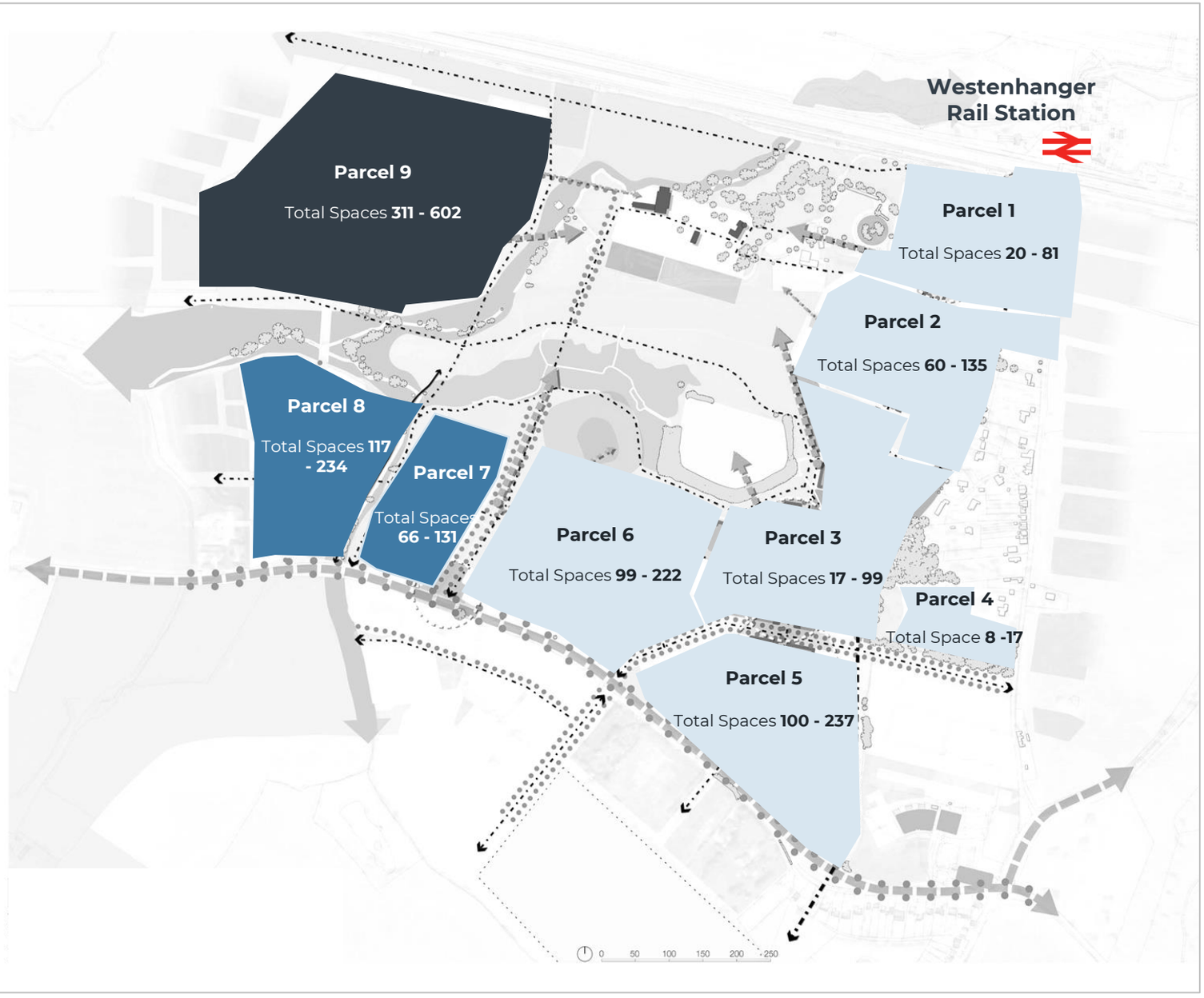
As shown, the size of the parcel proves to be determining factor in parking provision, with larger parcels requiring more parking spaces.

Final number of spaces will be decided on a parcel by parcel basis and proximity to local facilities.

Note: These numbers are subject to change based on the tenure mix for each of the parcels.

Parcel	Parking Ratio					
	Flat & 2 bed house		3, 4 & 5 bed house		Total	
	Low	High	Low	High	Low	High
Parcel 1	0	40	20	41	20	81
Parcel 2	0	15	60	120	60	135
Parcel 3	0	65	17	34	17	99
Parcel 4	0	1	8	16	8	17
Parcel 5	0	37	100	200	100	237
Parcel 6	0	25	99	197	99	222
Parcel 7	6	11	60	120	66	131
Parcel 8	10	20	107	214	117	234
Parcel 9	39	58	272	544	311	602
Total	55	272	743	1,486	798	1,758

Car parking supply across Phase 1 Masterplan



Cycle Parking

Cycle parking supply

The Traditional Transport Assessment outlines that cycling parking provision will follow the guidance of the *Kent County Council's Supplementary Policy Guidance SPG4*, equating to **1 space per bedroom** for all relevant tenure types.

This is seen to be an ambitious standard, fitting in with the vision for Otterpool Park

It is considered appropriate to propose 1.5 spaces per 1 bed property above the KCC guidance. These units are often home to more than one resident and therefore in keeping with the sustainable vision, appropriate cycle parking should be provided to promote a modal shift.

Recommendation:

The adjacent table showcases the proposed cycle parking per parcel and a supply of 1 space per bedroom, with the exception of 1.5 spaces per 1 bed units.

Cycle parking supply across phase 1 masterplan

	Flats			Houses				Total
Parcel	1 bed	2 bed	3 bed	2 bed	3 bed	4 bed	5+ bed	
Parcel 1	134	113	11	23	76	53	11	**376**
Parcel 2	24	20	2	68	224	156	32	**518**
Parcel 3	224	189	19	19	64	45	9	**494**
Parcel 4	0	0	0	9	29	20	4	**62**
Parcel 5	80	68	7	113	373	261	53	**929**
Parcel 6	41	35	4	112	368	257	52	**854**
Parcel 7	0	0	0	45	150	104	21	**321**
Parcel 8	0	0	0	81	266	186	38	**570**
Parcel 9	0	0	0	154	507	354	72	**1,087**
Total	504	**426**	**43**	**624**	**2,056**	**1,435**	**293**	**5,381**

Car Club

Evidence base

Car club provision

The traditional Transport Assessment states intent to '*provide future requirements for electric vehicles and give the flexibility to adapt to innovative transport solutions such as autonomous vehicles*'. Electric vehicle car clubs are listed as a suggested measure, with the potential to promote sustainable travel choices.

A survey undertaken by CoMo UK takes a look at the growth and statistics of car club usership, which was completed by almost 2,500 car club members of Co-wheels, E-Car and Enterprise Car Club.

Recommendation:

- 1 car club per 10 households for car-lite development (flats & 2 bedroom houses)
- 1 car club per 30 households where car parking provided (3+ bedroom houses)
- An average of 1 car club per 20 households across the development
- The car club provision could be phased as demand increases, however the above numbers provide an estimate of peak car club demand and the space that should be allocated in the longer-term.

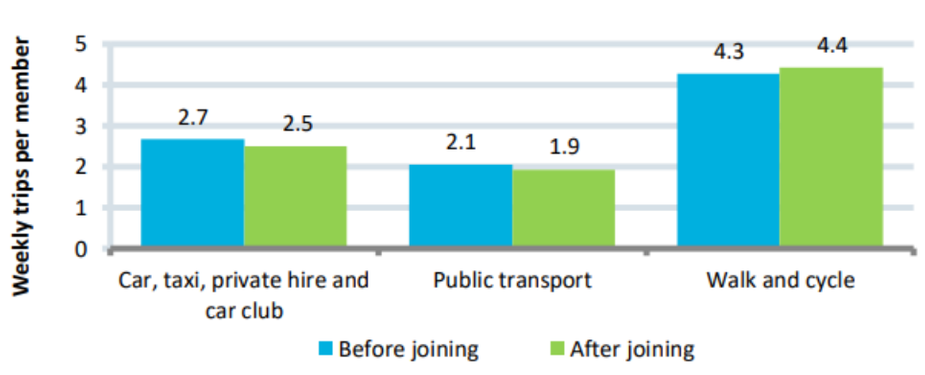
Car Club Annual Survey for England & Wales key findings

There are an **average of 33 members per car club car** in England and Wales

Car clubs use more environmentally friendly cars, **emitting 43% less carbon** from tailpipe emissions compared to the average UK car

36% of the car club fleet is either **hybrid or electric**

Each car club **displaces 6.1** private vehicles



Private car ownership amongst new members falls after joining, lowering from 63% to 54% after the first 12 months.

68% of members use **another shared mobility service** other than a car club.

After joining a car club, members completed 3,832 more walking and cycling trips.

CoMo UK (2018), https://como.org.uk/wp-content/uploads/2019/06/EW-report-v4.0.pdf

Car clubs

Proposed provision

Car club provision

For the provision of car club services at Otterpool Park, the following assumptions have been made:

- 50% traditional (back-to-base) – one designated parking bay per vehicle
- 50% floating – vehicles are allowed to park in any parking space (generally residents' or pay-and-display bays)

For each of these, the follow allocations have been made between parking at mobility hubs/ consolidated parking and across the parcel (on-street parking):

- 75% traditional at mobility hubs and/or consolidated parking
- 25% traditional across the parcel
- 25% floating at mobility hubs and/or consolidated parking
- 75% traditional across the parcel

Car club provision by parcel – split between type and location (mobility hub or on-street)

Parcel	Flats & 2 bed houses	3 bed+ houses	Total	Traditional		Floating	
				At mobility hub / consolidated parking	Across the parcel	At mobility hub / consolidated parking	Across the parcel
Parcel 1	16	1	17	7	2	2	7
Parcel 2	6	4	10	4	1	1	4
Parcel 3	26	1	27	10	3	3	10
Parcel 4	0	1	1	0	0	0	0
Parcel 5	15	7	21	8	3	3	8
Parcel 6	10	7	17	6	2	2	6
Parcel 7	2	3	5	2	1	1	2
Parcel 8	4	5	9	3	1	1	3
Parcel 9	8	9	17	6	2	2	6
Total	88	37	124	47	16	16	47

User-centric scenario testing

Deliveries

Deliveries

Pre-Covid delivery rates from the User-Centric Survey

Flat (average deliveries/day)	Kent	London	Kent & London
Shopping	0.28	0.16	0.20
Parcel deliveries	0.22	0.27	0.26
Subtotal (shopping and parcel deliveries)	**0.50**	**0.43**	**0.45**
Groceries	0.34	0.34	0.34
Takeaways	0.17	0.18	0.17
Total	**1.01**	**0.95**	**0.97**

House (average deliveries/day)	Kent	London	Kent & London
Shopping	0.35	0.50	0.34
Parcel deliveries	0.33	0.51	0.35
Subtotal (shopping and parcel deliveries)	**0.68**	**1.01**	**0.69**
Groceries	0.29	0.48	0.36
Takeaways	0.16	0.30	0.20
Total	**0.45**	**0.77**	**0.56**

Deliveries

Delivery implications for Phase 1 and parcel locker requirements

Parcel	Number of flats	Number of houses	Flat	House	Total	Locker requirement
			Deliveries/day	Deliveries/day	Deliveries/day	50 packages/day/locker
Parcel 1	150	52	75	36	**110**	2.2
Parcel 2	27	154	13	105	**119**	2.4
Parcel 3	250	44	124	30	**154**	3.1
Parcel 4	0	20	0	14	**14**	0.3
Parcel 5	90	257	45	176	**221**	4.4
Parcel 6	46	253	23	173	**196**	3.9
Parcel 7	0	103	0	71	**71**	1.4
Parcel 8	0	183	0	125	**125**	2.5
Parcel 9	0	349	0	239	**239**	4.8
Total	**563**	**1415**	**280**	**969**	**1249**	**25.0**

Recommendation:

- 1 locker per 50 deliveries/day
- Results in a maximum provision of 25 lockers across Phase 1
- Similar to car club provision could be phased as demand increases. The above numbers provide an estimate of peak locker demand and the space that should be allocated in the longer-term.

User-centric scenario testing

Mobility hubs

Mobility Hubs

A distributed network of mobility hubs to support local travel needs

We propose a
three-tier
mobility hub strategy comprised of...

2 x Primary Hubs to
support travel to and from the development connecting to the rail station and town centre

4 x Secondary Hubs to
accommodate internal travel within the site connecting to the primary school and parks

5 x Community Hubs to
serve local residents within their neighbourhoods

Mobility hubs are not '*one size fits all* – tailor-made solutions need to be created for each location, considering **type of components**, **scale** and **levels of service**

Mobility Hubs will also include
non-mobility components
to serve the community more efficiently

We undertook a survey of representative households to better understand the opportunity for mobility hubs and potential uptake...

Nearly
75%
of respondents are open to an **'all inclusive**' rental offer which could include mobility bundles

The most important factors when considering how to travel was
"value for money"
and
"time efficiency"
for all trip purposes

44%
of respondents selected
"accurate and real-time information"
as the main reason for using a digital mobility application

Mobility Hubs

What is a mobility hub?

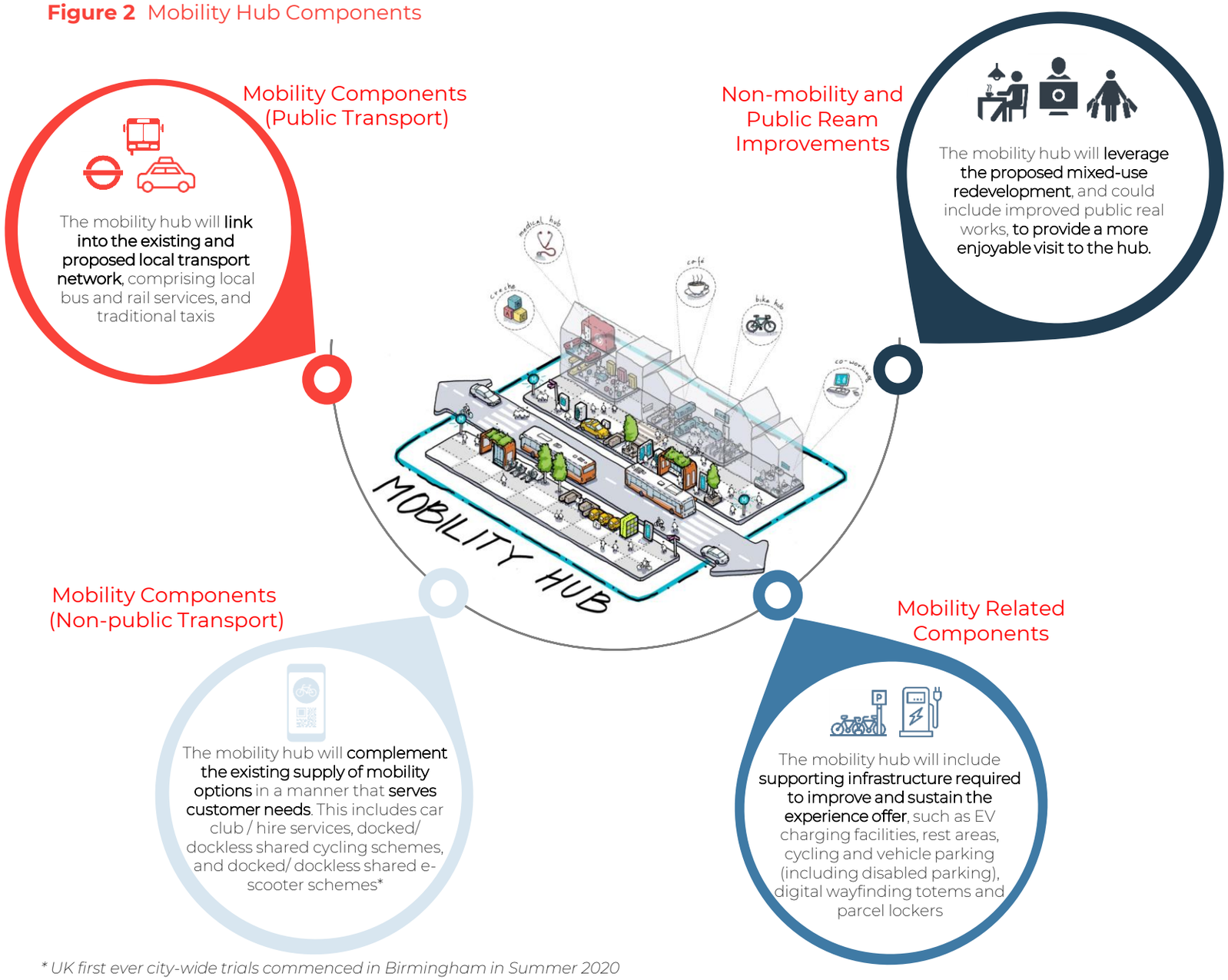
Mobility Hub

A mobility hub 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.

Figure 2 showcases some typical mobility hub components, categorised as mobility components (public and non-public), mobility related components, and non-mobility and urban realm improvements.

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.

Figure 2 Mobility Hub Components



** UK first ever city-wide trials commenced in Birmingham in Summer 2020*

Access strategy

Hub types and indicative locations

Mobility Hub Types

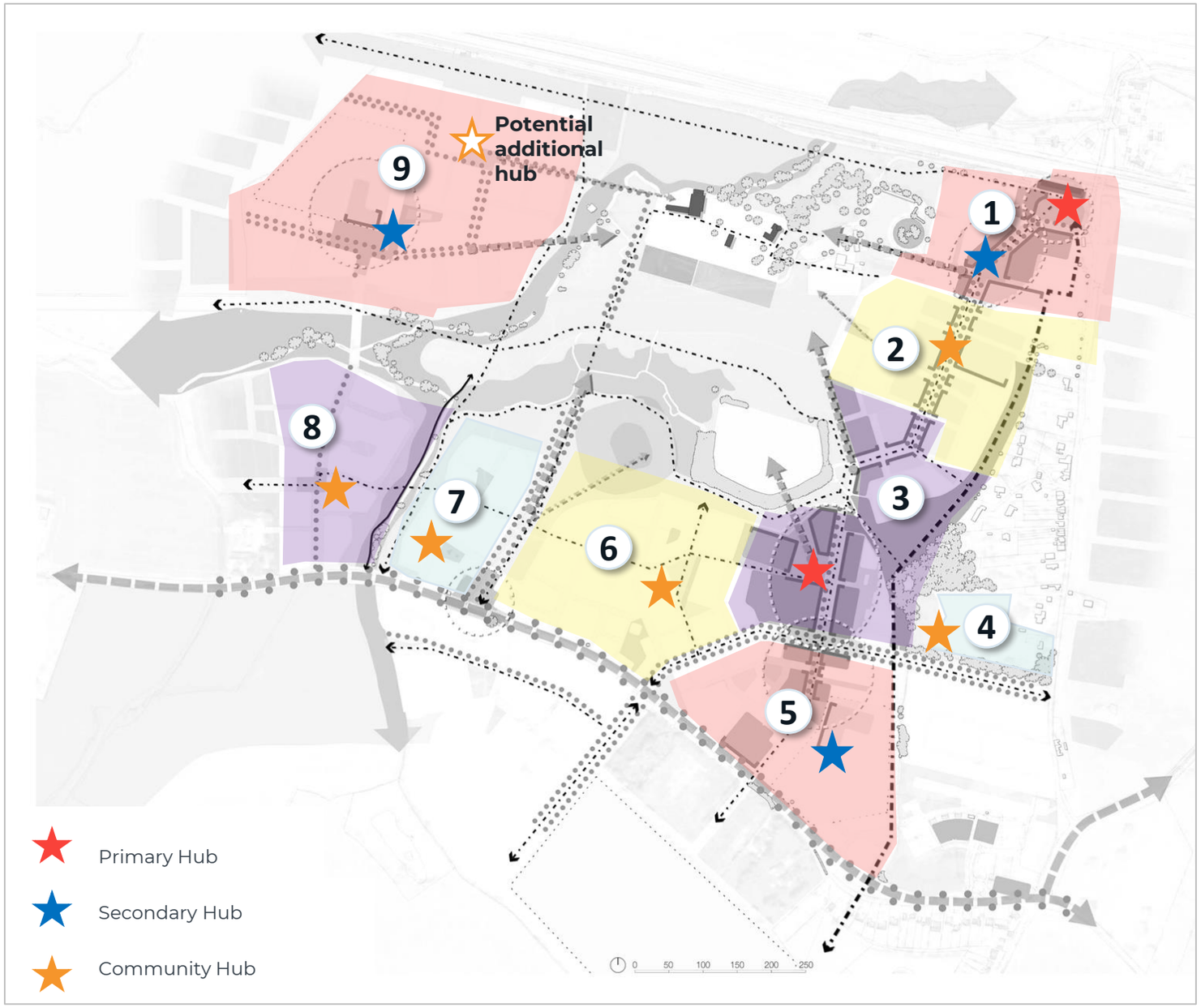
To accommodate the varying mobility and community needs across the development, a hierarchy of mobility hub typologies is proposed.

At this initial stage, the following mobility hub types are proposed for Otterpool Park, each serving a different function. These are:

- **Primary Hubs** will support travel to and from the site, and will include the provision of car barns (consolidated parking), car club hire opportunities, public transport and demand-responsive transit stops. Additionally, there will be ancillary functions including parcel lockers, co-working space and gyms in adjacent land uses;
- **Secondary Hubs**, accommodating internal functions, is proposed to include shared mobility hire opportunities, public transport and demand-responsive transit stops, as well as supporting wayfinding, cycle parking and seating facilities;
- **Community Hubs** will serve local residents in the neighbourhood, providing access to first mile/last mile micromobility services, parcel lockers and Click & Collect points. These hubs can also facilitate community activities by including parklets / bookable event space and convenient retail in adjacent land uses.

The table overleaf details the indicative components present at each of the hub types. Please note, where the same component is present at multiple hub types, there will be varied level of service at each.

Indicative Mobility Hub Phase 1 Locations



Mobility Hubs

Key components

Components		Primary Hub	Secondary Hub	Community Hub
Mobility Components (Public Transport)	Connections to existing rail and bus services	✓	✓	
	Demand-responsive transit	✓	✓	
Mobility Components (Non-Public Transport)	Car club / hire services	✓	✓	✓
	Docked / dockless shared cycling schemes	✓	✓	✓
	Docked / dockless shared e-scooter schemes	✓	✓	✓
	Recreational bike hire	✓		
	E-cargo bikes hire	✓	✓	✓
Mobility Related Components	Consolidated vehicle parking	✓	✓	✓
	Cycle parking	✓	✓	✓
	EV charging facilities	✓	✓	✓
	Digital wayfinding totems	✓	✓	✓
Non-mobility and Public Realm Improvements	Parcel lockers	✓	✓	✓
	Click & Collect points / convenient retail	✓	✓	✓
	Resting areas / seating	✓	✓	✓
	Information station/ pillar	✓	✓	
	Public toilets	✓		
	Ancillary land uses (co-working space and gyms)	✓		
	Community parklets	✓	✓	✓
	Bookable event space	✓	✓	✓
	Street light	✓	✓	✓

Mobility hubs

Proposed hub typologies and locations

> 2 x primary hubs
> 4 x secondary hubs
> 5 x community hubs

Estimating hub micromobility requirements

> Looked at peak cycling and rail demand for each parcel (in and out) – assumed peak would represent highest demand across the day
> Rail included as mobility hubs provide first/last mile opportunity to access the station
> For Parcel 1 (rail station) also looked at rail trips to determine bike storage requirements (private bikes)
> For both cycle and rail trips:
  - 50% private mobility (own bike/scooter)
  - 22.5% docked bike
  - 5% dockless bike
  - 22.5% e-scooter

Proposed hub typologies and locations

Parcel	Primary hub	Secondary hub	Community hub
Parcel 1 – Rail station	✓	✓	
Parcel 2			✓
Parcel 3 – Town centre	✓	✓	
Parcel 4			✓
Parcel 5 – School		✓	
Parcel 6			✓
Parcel 7			✓
Parcel 8			✓
Parcel 9 - School		✓	

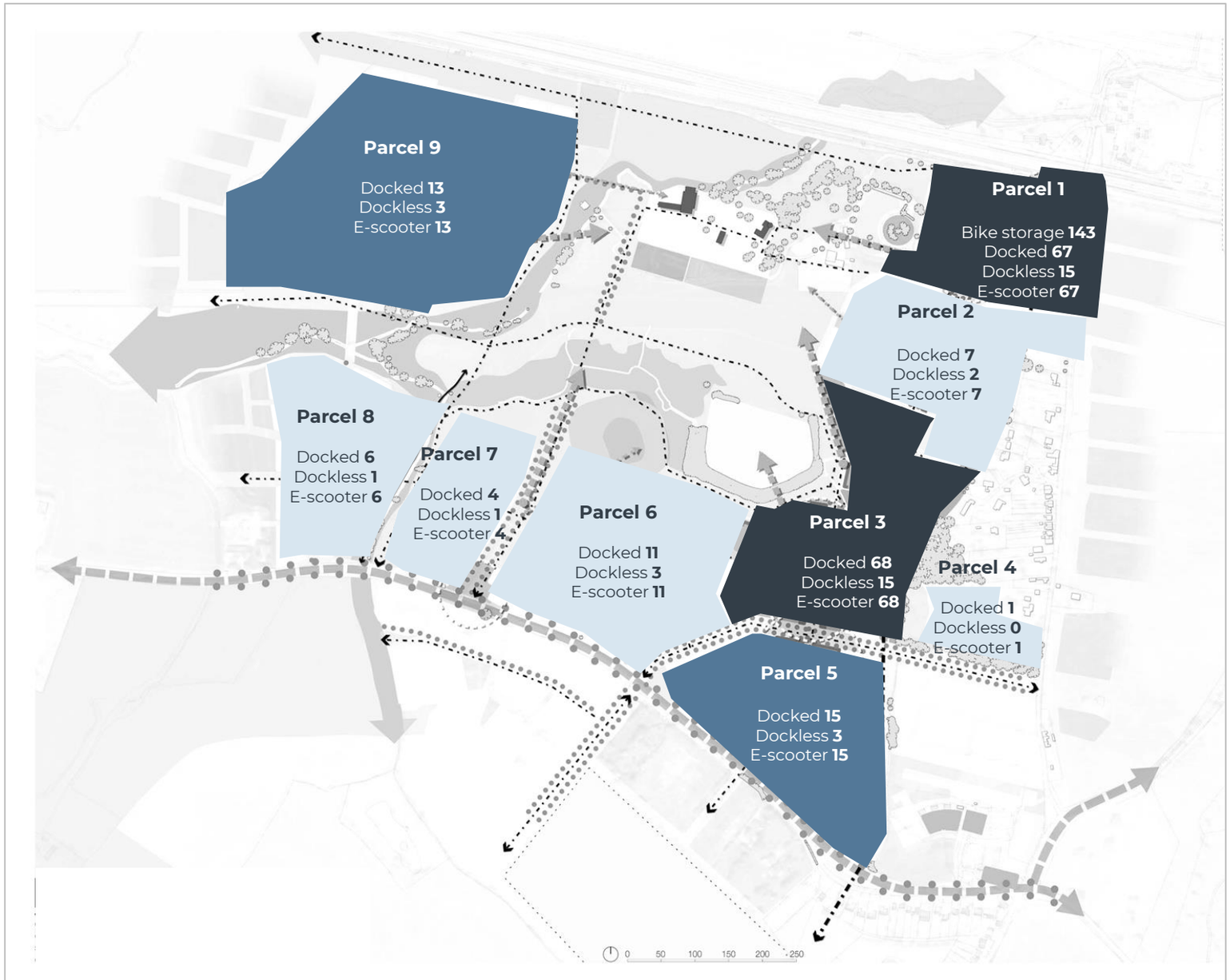
Methodology for estimating hub requirements

Trip type	Mobility	Residential	Commercial	Retail	Primary school
External	Private mobility	Provided as per cycle parking requirements	Provided as per cycle parking requirements OR to cater for peak hour demand (whichever is greater)		
Internal	Private mobility (50%)				
	Docked bike (22.5%)	Provided to cater for peak hour demand in mobility hubs			N/A
	Dockless bike (5%)				
	E-scooter (22.5%)				

Mobility hubs

- We have used the updated mode shares to determine mobility hub requirements
- The numbers in the diagram indicate peak demand at a parcel level – and will guide the micromobility provision at the hubs

Peak mobility hub requirements



Mobility hubs

Proposed mobility hub provision

Parcel	Hub type	Car club / hire services		Docked / dockless shared cycling schemes		E-scooter	Recreational bike hire	E-cargo bike hire	Cycle parking	Consolidated vehicle parking		EV charging points	Parcel lockers
		Traditional (back-t-base / fractional)	Floating	Docked	Dockless	Docked				Residential	Commercial / retail		
1	Primary	5	1	50	10	50	TBC	5	150	61	TBC	TBC	**2**
	Secondary	2	1	20	5	20	N/A	2	4	20	TBC	TBC	1
2	Community	4	1	10	5	10	N/A	1	4	30	TBC	TBC	2
3	Primary	7	2	50	10	50	TBC	5	TBC	80	TBC	TBC	2
	Secondary	3	1	20	5	20	N/A	2	4	50	TBC	TBC	1
4	Community	1	1	10	5	10	N/A	1	4	2	TBC	TBC	4
5	Secondary	8	3	20	5	20	N/A	2	4	73	TBC	TBC	3
6	Community	6	2	10	5	10	N/A	1	4	51	TBC	TBC	3
7	Community	2	1	10	5	10	N/A	1	4	11	TBC	TBC	1
8	Community	3	1	10	5	10	N/A	1	4	20	TBC	TBC	2
9	Secondary	4	1	10	5	10	N/A	1	4	25	TBC	TBC	2
	Community	2	1	10	5	10	N/A	1	4	14	TBC	TBC	2
Phase 1		**47**	**16**	**230**	**70**	**230**		**23**	**190**	**437**			**25**

Detailed Design

Mobility Hub and Car Barn Dashboards

Mobility Hub Dashboards

Dashboard Guidance

In support of a sustainable travel habits at Otterpool Park, a series of convenient, well located mobility hubs will be implemented across the masterplan. These will be provide both mobility and community services at varied levels in **primary**, **secondary** and **community** hubs.

Additionally, **car barns** – off-plot facilities for private unallocated parking provided outside of the property curtilage – could be provided as an annex to mobility hubs. These will comprise the primary parking spaces for unallocated privately-owned and shared car services, and may be collocated with hubs, or in a nearby location.

Dashboards have been devised to showcase the indicative spatial requirements of the proposed vehicles and supporting infrastructure, as an initial resource for informing detail design plans. Additionally, they showcase the applicability across mobility hub types, detailing key design considerations.

An example of the dashboard format is outlined here with an explanation of the key elements.

It is worth noting, additional parking and supporting infrastructure will be provided out-side of the mobility hub and car barn offer, in the form of on-street facilities across the masterplan.

Shared vehicular assets

Shared car services will be provided across the masterplan in the form of both traditional back-to-base services and fractional ownership options. Both service types require designated bays for each vehicle provided

Operating Models

Recommended:

- **Back-to-base –** traditional car club offer where by user picks up and drops off vehicle at same bay.
- **Fractional Ownership –** a vehicle owned and shared amongst various households, which is parked in a convenient, dedicated bay.

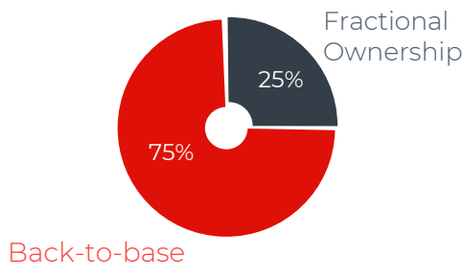
Suitable for later implementation

- **Peer-to-peer –** private vehicle owners list their vehicles on a platform for perspective renters in the area to use.

Not recommended

- **Floating –** car sharing service without fixed parking bay, i.e. users can pick-up and drop-off vehicles at different bays.

Indicative provision at Otterpool Park



Design standards and spatial requirement

As car club providers increasingly move towards all-electric and/or hybrid vehicles, charging infrastructure will be provided at all car club bays. In support of sustainable travel practices, this will be extended to fractional-ownership bays too. Seemingly, parking spaces for shared vehicles will be in line with robust parking dimensions outlined by TfL recommending a total bay width of 3,600mm x 7,000mm to accommodate the necessary infrastructure.

	Recommended (TfL rapids) (mm)
Height	-
Length	7,000
Width	3,600
Capacity	1

Exemplar Operators and/or Infrastructure Suppliers

drivy by getaround · TURO · enterprise rent-a-car · zipcar · hiyacar · VIRTUO · ubeeqo · Co-wheels carclub

P S C CB

Design Considerations

Shared vehicular assets will be provided in car barns associated with primary mobility hubs, and will be universally accessible and distinctly marked. Additionally, car club bays will also be provided on-street adjacent to secondary and community hubs.

Primary Hub

- Sheltered car barns within 2 mins walking distance from the primary hub.
- Dedicated fast charging infrastructure for all shared vehicles
- Provisions for CCTV to enhance security and safety in the parking spots
- Solar canopies to be included at sheltered car barns for renewable energy generation.


Source: Getty Images

Secondary Hub

- On-street, demarcated parking within a maximum of 2 mins walking distance from the Secondary hub.
- Dedicated fast charging infrastructure for all shared vehicles
- Strong pedestrian links to adjacent mobility hub

Source: iStock Photo

Community Hub

- On-street, demarcated parking within a maximum of 2 mins walking distance from the Community hub.
- Dedicated fast charging infrastructure for all shared vehicles
- Strong pedestrian links to adjacent mobility hub

Source: Wellington City Council

Supporting Smart Infrastructure

Wifi	Dynamic pavement lighting
Geo-fenced docking areas	Dynamic parking display
Online booking system	No-go and slow-go zones
5G	Masterplan MaaS platform

Click here for:

Provision summary

Spatial requirement summary

Docked e-scooter

P S C CB

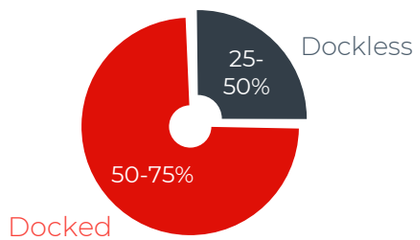
E-scooter services will be available in Otterpool in the form of docked or dockelss schemes and will be provided at all mobility hub types

Operating Models

Recommended:

- **Docked –** e-scooters are available to hire on a short term basis, with payment usually taken via a mobile app or nearby terminal. The scheme allows users to 'borrow' an e-scooter from the dock, provided they return it to another dock belonging to the same system. The dock also acts as a charging point for the e-scooter.
- **Dockless –** e-scooters do not have a fixed single location, but instead are collected and deposited in certain zones within the service area. The system typically relies on an app that indicates e-scooter availability, rather than a fixed information terminal.

Indicative provision at Otterpool Park



**A separate dashboard has been devised for dockless mircomobility*

Design standards and spatial requirement

Given the relatively novel deployment of docked e-scooter trials in the UK, best practice design standards remain limited. As such, manufacturer specifications have been used to inform spatial requirements. Design is informed by DuckTmobility recommending a standard size of 500x1000x800mm to accommodate three e-scooters.

	Single Module (mm)	Triple Module (mm)
Height	500	500
Length	500	1,000
Width	300	800
Capacity	1	3

Exemplar Operators and/or Infrastructure Suppliers

beryl · DUCKT™ · bikeep · DASH · koot

Design Considerations

All e-scooter docks will be located in safe, sheltered, well-lit, convenient locations, with sufficient clearance from vehicular path to offer conflict-free circulation with other modes. Docks should be universally accessible.

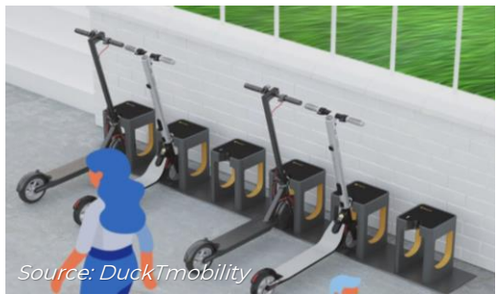
Primary Hub

- E-scooter docks to include charging within the dock, to be located within 2 mins of walking distance from train station.
- Signage to notify users that e-scooters are prohibited on trains and train platforms
- E-scooter dock capacity indicator in visible, convenient location.
- Provisions for CCTV to enhance security and safety in the parking spots

Source: DuckTmobility

Secondary Hub

- Docks should be universally accessible.
- Ensure there is at least 2.5m clear on the footway between the dock + scooter and edge of footway for conflict free circulation.



Source: DuckTmobility

Community Hub

- Parklet designs to enable multiple, convenient and safely parked e-scooters
- Community e-scooter docks should be located in community centers and at nearby places within 5 mins walking distance.
- Provisions for CCTV to enhance security and safety in the parking spots.

Source: Beryl

Supporting Smart Infrastructure

- Wifi
- Geo-fenced docking areas
- Online booking system
- 5G
- Dynamic pavement lighting
- Dynamic parking display
- No-go and slow-go zones
- Masterplan MaaS platform

Click here for:

Provision summary

Spatial requirement summary

Docked e-bike

P S C CB

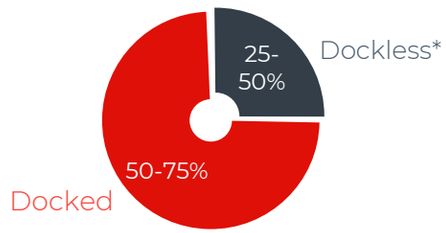
A network of docked e-bike services will be provided across the 3 levels of mobility hubs within the masterplan.

Operating Models

Recommended:

- **Docked –** e-bikes are available for rental from a docking station, which consists of a docking point and terminal. Hired e-bikes must then be returned to another dock belonging to the same system.
- **Dockless –** e-bikes are picked up and dropped off at certain zones within the service area, rather than at a fixed station, with an app providing availability information in place of a physical terminal.

Indicative provision at Otterpool Park

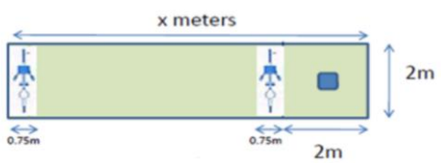


**A separate dashboard has been devised for dockless mircomobility*

Design standards and spatial requirement

Manufacturer specifications have been used to inform spatial requirements based on the report 'Developer Guidance for Santander Cycles' which recommends 2,000mm x 750mm per docking individual docking station per vehicle in a linear configuration, plus an additional 2,000mm x 2,000mm buffer zone for the information point.

	Recommended (mm)	Minimum (mm)
Height	1,200	1,200
Length	2,000	2,000
Width	1,500	750
Capacity	2	1



Exemplar Operators and/or Infrastructure Suppliers

swiftmile

VAIMOO

ZOOV

Smoove facilitates sustainable mobility

Design Considerations

E-bike docks should be located in well lit, highly accessible areas which do not infringe on pedestrian paths. The network should have high station density if users are to perceive it as a viable travel option, therefore stations should be in close proximity to each other in support of local trips.

Primary Hub

- Docks should be strategically located in close proximity to station entrances and in key locations around the town centre.
- Recommended station density for maximum usage and user convenience is 400m buffer between stations (5 minute walk).
- A greater number of docking spaces than bikes is crucial, with recommended ratios being 1.5 – 1.8 docking spaces to each bike.

Source: BuBi

Secondary Hub

- Docks to be located in close proximity to trip attractors and generators, such as places of work or recreation, ideally within 400m.
- Integration with the public realm must be balanced between not being visually dominant but also being easy to locate and self promoting.

Source: Semanticscholar

Community Hub

- Docks to be situated close to community parks, centres, and large residential complexes.
- CCTV should be provided as community hubs may feature less natural surveillance.


Source: Smoove

Supporting Smart Infrastructure

- Wifi
- Geo-fenced docking areas
- Online booking system
- 5G
- Dynamic pavement lighting
- Dynamic parking display
- No-go and slow-go zones
- Masterplan MaaS platform

Click here for:

Provision summary

Spatial requirement summary

Dockless Micromobility

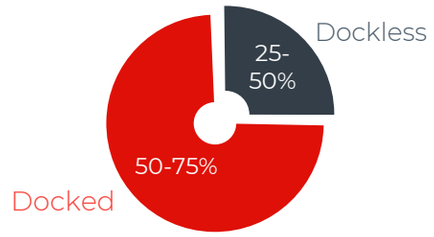
Dockless e-scooter and e-bike services will be provided across the masterplan, to offer greater flexibility for users over docked operating systems.

Operating Models

Recommended:

- **Docked –** available on a short term basis, with payment usually taken via a mobile app or nearby terminal. The scheme allows users to hire a micromobility vehicle from the dock, provided they return it to another dock belonging to the same system.
- **Dockless –** e-scooters and e-bikes are collected and deposited in certain zones within the service area. The system typically relies on an app that indicates e-scooter availability, rather than a foxed information terminal.

Indicative provision at Otterpool Park



Design standards and spatial requirement

At present, geofenced parking areas have typically be converted from former car parking spaces, allowing up to 6 e-scooters or e-bikes. There is scope to here to include purpose built demarcated parking bays rather than repurposed car spaces.

	Recommended (mm)
Height	-
Length	3,000
Width	1,800
Capacity	6

Exemplar Operators and/or Infrastructure Suppliers

JUMP · voi. · Lime · BIRD · GINGER

Design Considerations

To ensure dockless micromobility does not result in unsafe dumping practices, geofenced docking areas will be demarcated across the masterplan. These will be clearly signposted and will also be showcased on the relevant app.

Source: GeekWire

Source: Cycling Tips

operators request a photo of parked vehicles from end-users at the end of their journey.
- Street corrals are recommended as good design practice, especially in busy areas, as one of the main criticisms of dockless micromobility is the problems it can pose for visually or mobility impaired pavement users.
- Block corners can resolve conflict between pedestrian and micromobility users, by reserving the end space of on-street parking.

Supporting Smart Infrastructure

- Wifi
- Geo-fenced docking areas
- Online booking system
- 5G
- Dynamic pavement lighting
- Dynamic parking display
- No-go and slow-go zones
- Masterplan MaaS platform

Click here for:

Provision summary

Spatial requirement summary

E-cargo

Open access electric assisted cargo bike/ trikes will be available for hire to encourage sustainable movement of larger loads. This will be open for use by local residents and businesses for anticipated purposes such as short delivery and shopping trips

P S C CB

Operating Models

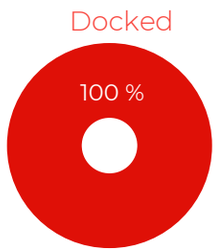
Recommended:

- **Docked –** e-cargo bikes are available for rental on a short term basis via a mobile app or nearby terminal. Bikes can be stored at any dock from the same system, allowing users to collect and drop-off vehicles in different areas.

Not recommended

- **Dockless –** e-cargo bikes are collected and deposited in certain zones within the service area. The system typically relies on an app that provides availability, instead of hiring vehicles from a specified terminal.

Indicative provision at Otterpool Park



Design standards and spatial requirement

For cargo bikes, design is informed by Turvec which recommends Sheffield Stand with a central tapping bar to accommodate locking lower to the ground if required. The recommended spatial requirement is 900mm x 2,200mm x 1,200mm as indicated below.

	Recommended (mm)	Minimum (mm)
Height	1,200	1,200
Length	2,200	2,000
Width	900	850
Capacity	1	1

Exemplar Operators and/or Infrastructure Suppliers

HEREFORD PEDICABS & CARGO · ZEDIFY · Carryme bikes · turvec · SARIS INFRASTRUCTURE

Design Considerations

E-cargo bike parking should be well located in well to ensure effortless transfer of goods. The general docking arrangement of the bikes can be linear, double rowed or angles as per the need of the design

Primary Hub

- Sheltered parking for loading and unloading of goods at all weather condition.
- Dedicated charging and locking facility for all the cargo bikes.
- Fast charging / battery swapping corner.
- Provisions for CCTV to enhance security and safety in the parking spots


Source: Bloomberg

Secondary Hub

- Dedicated charging and locking facility for all the cargo bikes
- Proper lighting facility within the parking zone to ensure safety and security of operations.
- Sufficient space surrounding basket for convenient loading and unloading.
- Potential to include locker facilities where docking stations are located near to destination locations.

Source: K4RGO

Community Hub

- Innovative cycle stands intended for easy cargo bike storage, such as the Copenhagenize Bar or other long-tail bike stand.
- Clearly demarcated parking area reserved for e-cargo bikes only.
- Appropriate charging infrastructure provided at all stands.


Source: Bigstreetbikers

Supporting Smart Infrastructure

- Wifi
- Geo-fenced docking areas
- Online booking system
- 5G
- Dynamic pavement lighting
- Dynamic parking display
- No-go and slow-go zones
- Masterplan MaaS platform

Click here for:

Provision summary

Spatial requirement summary

Electric Vehicle Charging Facilities

Electric vehicle charging facilities will be provided at primary hubs and at car barns, where a minimum of 20% of vehicle parking will be active charging and 80% will be passive, in line with policy for new developments

Operating Models

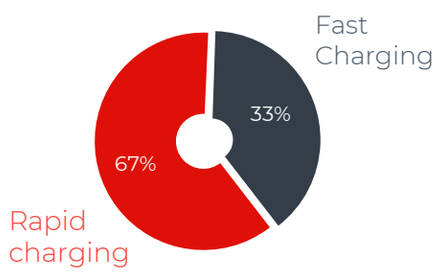
Recommended:

- **Ultra-rapid and rapid charging –** provided with a power rating of 43-350 kW, these chargers are capable of fully replenishing an EV battery in under 30 minutes for an ultra-rapid charger, and 30-60 minutes for a rapid charger.
- **Fast charging –** .with charging times of 4-6 hours for a 7 kW fast charger, and 1-2 hours for a 22 kW charger, this infrastructure is typically found in destination locations.

Not recommended

- **Slow/ lamp column charging –** typically rated between 3-6 kW, chargers are often untethered and require much longer charging times, needing between 6-12 hours for a full charge.

Indicative provision at Otterpool Park



Design standards and spatial requirement

Parking bays with EV infrastructure will be provided in line with TfL's rapid charging infrastructure recommended dimensions, which are a total bay width of 3,600mm x 7,000mm to accommodate the necessary infrastructure. Additional considerations include setting the charge point back 450mm from the kerb, and providing 2,500mm clearance between the charge point and feeder pillar.

	Recommended (mm)
Height	-
Length	7,000
Width	3,600
Capacity	1

** Provision of EV infrastructure based on 20% of top-end range of total parking provision*

Exemplar Operators and/or Infrastructure Suppliers

pod POINT · FREEWIRE · GRIDSERVE sustainable energy · bp pulse

Design Considerations

All EV charging facilities should be conveniently located and clearly signed as dedicated EV only parking bays. The implementation of renewable energy generation, such as installing solar canopies, is recommended across all hubs and car barns.

Primary Hub

- Rapid and ultra rapid electric vehicle charging infrastructure (43kW+) will be provided at primary hubs and corresponding car barns
- These are expected to be used as an intermediate stop as part of a longer journey, with typical user dwell times of 30 minutes.
- Located in close proximity facilities for driver use, such as local shops and cafes.


Source: Gridserve

Secondary Hub

- Rapid and ultra rapid (at least 43kw+), and fast (11-22 kW) EV charging infrastructure will be provided car barns associated with secondary hubs
- These are expected to be used by employees and visitors of commercial and retail land uses.
- Facility should ideally be located within 2 mins walking distance of the secondary hub, and 5 mins of key destinations.


Source: New Motion

Community Hub

- Fast EV charging infrastructure (11-22 kW) will be provided at community hubs and corresponding car barns
- These will predominantly be used by residents and visitors to residential areas.
- Due to the longer charging times, real time information on charger availability should be made available through smart signage or a booking system model.


Source: LarkEnergy

Supporting Smart Infrastructure

- Wifi
- Geo-fenced docking areas
- Online booking system
- 5G
- Dynamic pavement lighting
- Dynamic parking display
- No-go and slow-go zones
- Masterplan MaaS platform

Click here for:

Provision summary

Spatial requirement summary

Cycle

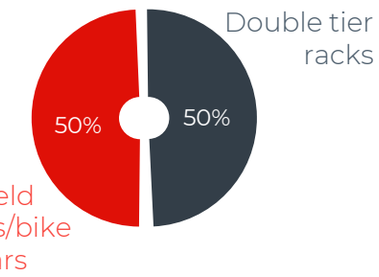
Cycle parking at Otterpool park will be provided in a range of different parking types, accommodating long-stay and short-stay trips. These include traditional Sheffield stands and double tier racks offered within the mobility hubs.

Operating Models

Recommended:

- **Sheffield stands –** traditional simple cycle racks that are used in urban areas as they can be placed along sidewalks without taking too much space away from pedestrians
- **Double tier racks –** an innovative cycle storage method that can be used to increase bicycle capacity in a fixed spaced, often incorporating hydraulic pistons that assist users in lifting the bike into position.

Indicative provision at Otterpool Park



Design standards and spatial requirement

London Cycle Design Standards (LDCS) recommends that at least 1.4 square metres should be allowed per cycle parking space if using Sheffield stands that accommodate two cycles per stand. For two-tiered stands, which are more space efficient, 0.7 square metres per parking space should be allowed.

	Recommended (mm)	Minimum (mm)
Height	2,600	2,600
Length	2,000	1,800
Width	1,200	1,000
Capacity	1	1

Exemplar Operators and/or Infrastructure Suppliers

turvec

Cyclepods Transforming bike storage

GIKEN GIKEN LTD.

broxap design | manufacture | installation

Design Considerations

Cycle parking should be easily accessible and located in well lit, sheltered and convenient locations near the mobility hubs.

Primary Hub

- Two-tier cycle parking is recommended for the primary hub ideal for optimal space utilization within the cycle parking hub.
- Cycling hub to be well sheltered and secured, ensuring proper safety and security of the rides.
- Cycle changing facilities to provided at transport interchanges.


Source: Urban Update

Secondary Hub

- Sheffield stands are recommended for cycle parking at secondary hubs
- Parking stands should be integrated with pedestrian walkways or cycle lanes so as to avoid conflict with vehicular modes during circulation.
- Cycle parking should be universally accessible and inclusive of mobility impaired cyclists, with step free access and specific bays reserved for larger models of bicycle.


Source: Langley Design

Community Hub

- Sheffield stands are recommended for some community hubs.
- At least 1.5 sq.m. area should be allowed for per space if using Sheffield stands that accommodate two cycles per stand.
- The addition of cycle storage hangars offer increased security, as access can be enabled by a fob or swipe card operated by a registered user


Source: Cycle Hoop

Supporting Smart Infrastructure

- Wifi
- Geo-fenced docking areas
- Online booking system
- 5G
- Dynamic pavement lighting
- Dynamic parking display
- No-go and slow-go zones
- Masterplan MaaS platform

Click here for:

Provision summary

Spatial requirement summary

Parcel Lockers

P S C CB

To support consolidated deliveries and reduce missed deliveries, a network of parcel delivery lockers will be provided across the masterplan

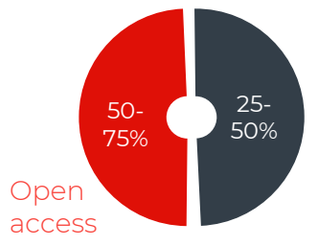
Operating Models

Recommended:

- **Open access –** contact free self-service parcel lockers which are available for use by range of suppliers and delivery services.

- **Privately operated –** self-service lockers supplied in partnership with private delivery companies, often allowing for users to return and send parcels, as well as just collect them. Some private suppliers will fund the entire cost of installation, business rates and maintenance

Indicative provision at Otterpool Park



- The majority of parcel lockers will be delivered as open access services, with some additional provision by private suppliers

Design standards and spatial requirement

Parcel lockers are modular units comprising a mixture of individual lockers of different sizes. Whilst spatial requirements vary across different manufacturers, a typical unit can include up to 50 individual lockers in different configurations. As such, spatial requirements are drawn from Safety Letterbox, as indicative dimensions.

	Per vertical unit (5 parcel lockers)	Per 50 locker unit (mm)
Height	1,500	1,500
Length	410	410
Width	550	5,500
Capacity	5	50

All measurements are provided in mm
** 50 parcels can be delivered to a locker in a single drop*

Exemplar Operators and/or Infrastructure Suppliers

InPost, parcelly, THE SAFETY LETTERBOX COMPANY LTD (PART OF THE RENZ GROUP), cubee, amazonlocker

Design Considerations

All lockers should be placed in convenient, sheltered, well-lit locations, complemented by easy and accessible loading areas, with a clearance space of 1,070mm between lockers and pedestrian walkways.

Primary Hub

- To be provided within and around Westenhanger Station, therefore may be restricted to station opening hours.
- Consideration for pedestrian routes within the station to reduce conflict, as busy lockers can handle between 50-100 parcels a day.
- In the town centre, parcel lockers will be available in locations which allow 24/7 access.

Source: The Safety Letterbox

Secondary Hub

- To be provided across secondary hubs in outdoor locations to ensure access 24/7.
- Positioning lockers next to certain destinations can be used as a method to encourage higher footfall (leisure centres, retail).
- Partial cover from inclement weather is recommended to provide users with shelter.

Source: Locktec

Community Hub

- To be provided across community hubs in outdoor locations to ensure access 24/7..
- Direct overhead lighting to be provided in more residential locations for increased security.


Source: Pinterest

Supporting Smart Infrastructure

- Wifi
- Geo-fenced docking areas
- Online booking system
- 5G
- Dynamic pavement lighting
- Dynamic parking display
- No-go and slow-go zones
- Masterplan MaaS platform

Click here for:

Provision summary

Spatial requirement summary

Recreational bike

In support of leisurely outdoor activities at Otterpool park, it is proposed that recreational bike hire is made available at key locations. The service will offer full-day and half-day rental opportunities for both residents and visitors

P S C CB

Operating Models

Recommended:

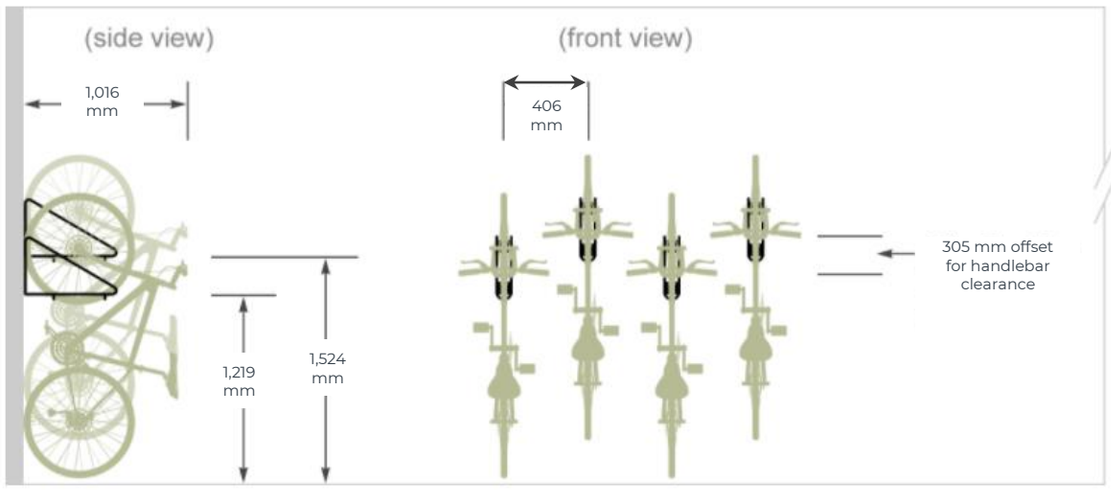
- **Operating from establishment –** traditional bike hire scheme where users have the option to rent a range of bicycle styles from an establishment, typically for leisure purposes on a longer term basis than other docked/dockless systems..

Indicative provision at Otterpool Park

Design standards and spatial requirement

This service may operate from an establishment with a staff member facilitating hiring procedures, also serving as a customer service point. A such, cycle parking is proposed to be in the form of a bike wall rack to minimize floor space requirement within the establishment. It is also expected that cycles will be on display during opening hours, but will require no parking infrastructure outdoors.

Potential indoor parking solution:



Exemplar Operators and/or Infrastructure Suppliers

Powered by bike·rent Manager

Kent Cycle Hire

BRM BIKE RENTAL MANAGER

british bike hire

Design Considerations

This will offer different types of cycles including bikes for those with mobility difficulties, tandems, children specific bikes, as well as child accessories like baby seats and trailers to welcome all types of users. As such, all hiring opportunities will be highly visible and easily accessible

Primary Hub – Westenhanger Station

- To be located in a sheltered facility directly outside the station entrance, in an unobtrusive, but highly visible location
- Online advanced booking service available with information on each bike model
- Potential for mobile application with real time bike availability and extension hire option
- Business opportunity for a cycle repair facility to be located at or near premises to service local area.

Source: Rutland Cycling

Primary Hub – Town Centre

- To operate from a café/ pavilion in a central location within the town centre
- Online advanced booking system with live bike model availability.
- Changing rooms, lockers and bike cleaning facilities to be provided on site.
- Information totem with local cycling routes, storage locations and destinations.
- Digital kiosk for registration and electronic waiver signing.


Source: Contemporist

Supporting Smart Infrastructure

- Wifi
- Geo-fenced docking areas
- Online booking system
- 5G
- Dynamic pavement lighting
- Dynamic parking display
- No-go and slow-go zones
- Masterplan MaaS platform

Click here for:

Provision summary

Spatial requirement summary

Mobility Hubs Summary

Proposed mobility hub provision

Parcel	Hub type	Car club / hire services		Docked / dockless shared cycling schemes		E-scooter	Recreational bike hire	E-cargo bike hire	Cycle parking	Consolidated vehicle parking		EV charging points	Parcel lockers
		Traditional (back-t-base / fractional)	Floating	Docked	Dockless	Docked				Residential	Commercial / retail		
1	Primary	5	1	50	10	50	TBC	5	150	61	TBC	17	**2**
	Secondary	2	1	20	5	20	N/A	2	4	20	TBC	N/A	1
2	Community	4	1	10	5	10	N/A	1	4	30	TBC	27	2
3	Primary	7	2	50	10	50	TBC	5	TBC	80	TBC	21	2
	Secondary	3	1	20	5	20	N/A	2	4	50	TBC	N/A	1
4	Community	1	1	10	5	10	N/A	1	4	2	TBC	3	4
5	Secondary	8	3	20	5	20	N/A	2	4	73	TBC	48	3
6	Community	6	2	10	5	10	N/A	1	4	51	TBC	45	3
7	Community	2	1	10	5	10	N/A	1	4	11	TBC	26	1
8	Community	3	1	10	5	10	N/A	1	4	20	TBC	47	2
9	Secondary	4	1	10	5	10	N/A	1	4	25	TBC	120	2
	Community	2	1	10	5	10	N/A	1	4	14	TBC	N/A	2
Phase 1		**47**	**16**	**230**	**70**	**230**		**23**	**190**	**437**		**354**	**25**

** This proposed level of provision is indicative and will subject to further analysis*

Mobility Hubs Summary

Indicative Floorspace Spatial Requirement (in sq.m.)

Parcel	Hub type	Car club / hire services		Docked / dockless shared cycling schemes		E-scooter	Recreational bike hire	E-cargo bike hire	Cycle parking	Consolidated vehicle parking		EV charging points	Parcel lockers
		Traditional (back-t-base / fractional)	Floating	Docked	Dockless	Docked				Residential	Commercial / retail		
1	Primary	126	25	75	15	13	N/A	10	360	763	TBC	428	0.45
	Secondary	50	25	30	7.5	3	N/A	4	10	250	TBC	N/A	0.22
2	Community	101	25	15	7.5	2	N/A	2	10	375	TBC	680	0.45
3	Primary	176	50	75	15	13	N/A	10	360	1000	TBC	529	0.45
	Secondary	76	25	30	7.5	3	N/A	4	10	625	TBC	N/A	0.22
4	Community	25	25	15	7.5	2	N/A	2	10	25	TBC	76	0.90
5	Secondary	202	76	30	7.5	3	N/A	4	10	913	TBC	1,210	0.67
6	Community	151	50	15	7.5	2	N/A	2	10	638	TBC	1,134	0.67
7	Community	50	25	15	7.5	2	N/A	2	10	138	TBC	655	0.22
8	Community	76	25	15	7.5	2	N/A	2	10	250	TBC	1,184	0.45
9	Secondary	101	25	15	7.5	2	N/A	2	10	313	TBC	3,024	0.45
	Community	50	25	15	7.5	2	N/A	2	10	175	TBC	N/A	0.45
Phase 1		**1,184**	**403**	**345**	**105**	**46**	**N/A**	**46**	**816**	**5,463**		**8,921**	**5.60**

** These spatial requirements are indicative and will subject to further analysis*

Car Barns Typologies

What might car barns look like?

Car barns

As alluded to, car barns are off-plot facilities for private unallocated parking provided outside of the property curtilage, which are proposed to be provided as an annex to mobility hubs. These will comprise the primary parking spaces for unallocated privately-owned and shared car services, and may be collocated with hubs, or in a nearby location.

The adjacent image showcases some indicative car barn typologies and landscaping elements which may be implemented at different scales and locations across the Phase 1 Masterplan.

Car barns may be
provided in various **typologies**,
ranging in size, capacity and anticipated user types.

These will be informed by the
surrounding land-uses and
associated mobility hub

User-centric scenario testing

Public transport

Public transport

Estimate of AM peak hour bus and rail trips (by parcel)

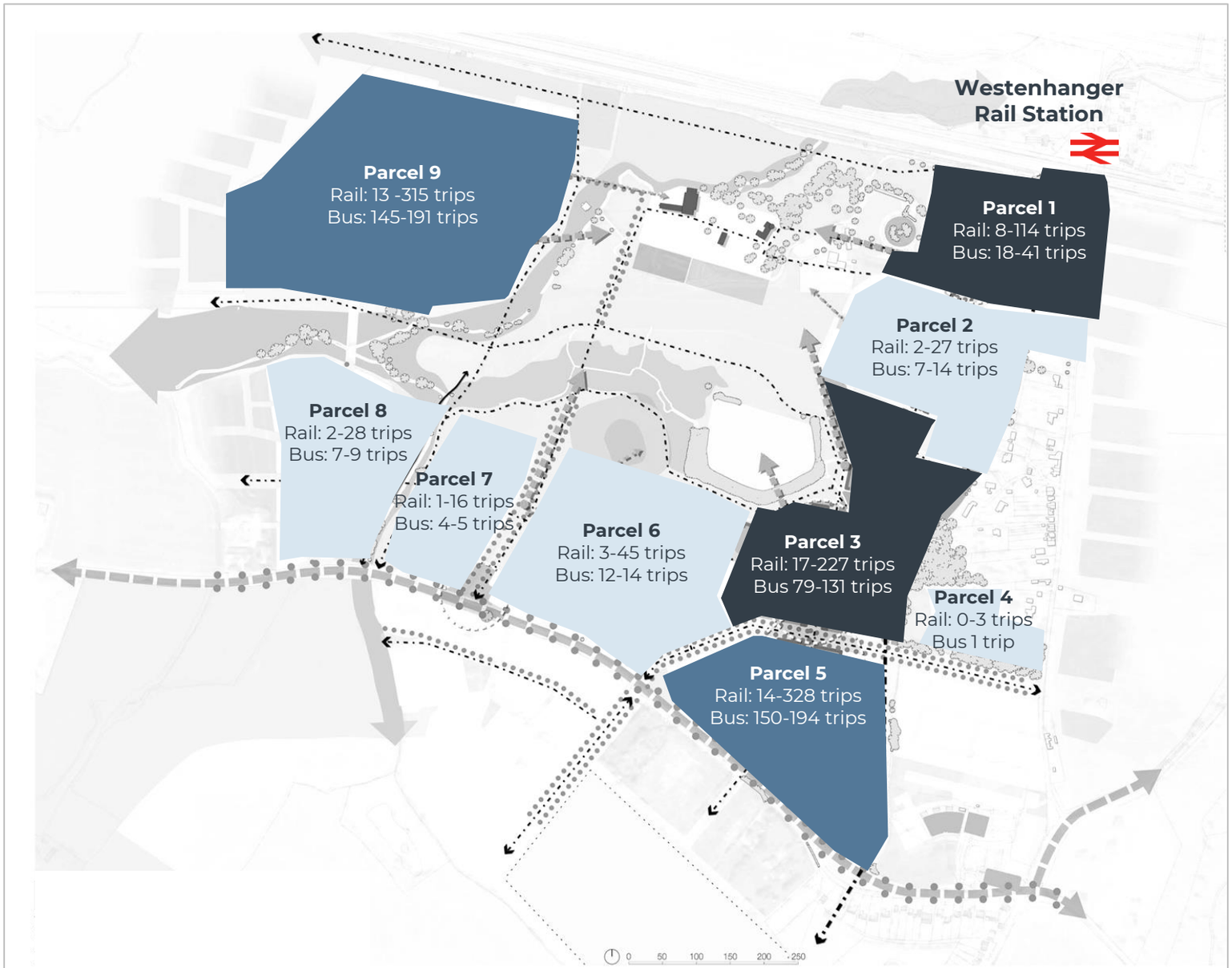
Comparison of estimated AM peak hour rail trips (Outline TA and User-centric approach)

Parcel	RAIL AM Peak (arrivals and departures)	
	Outline TA	User-centric (stretch target)
1	8	114
2	2	27
3	17	227
4	0	3
5	14	328
6	3	45
7	1	16
8	2	28
9	13	315
Phase 1 total	**60**	**1,103**
Mode share	1%	12%

Comparison of estimated AM peak hour bus trips (Outline TA and User-centric approach)

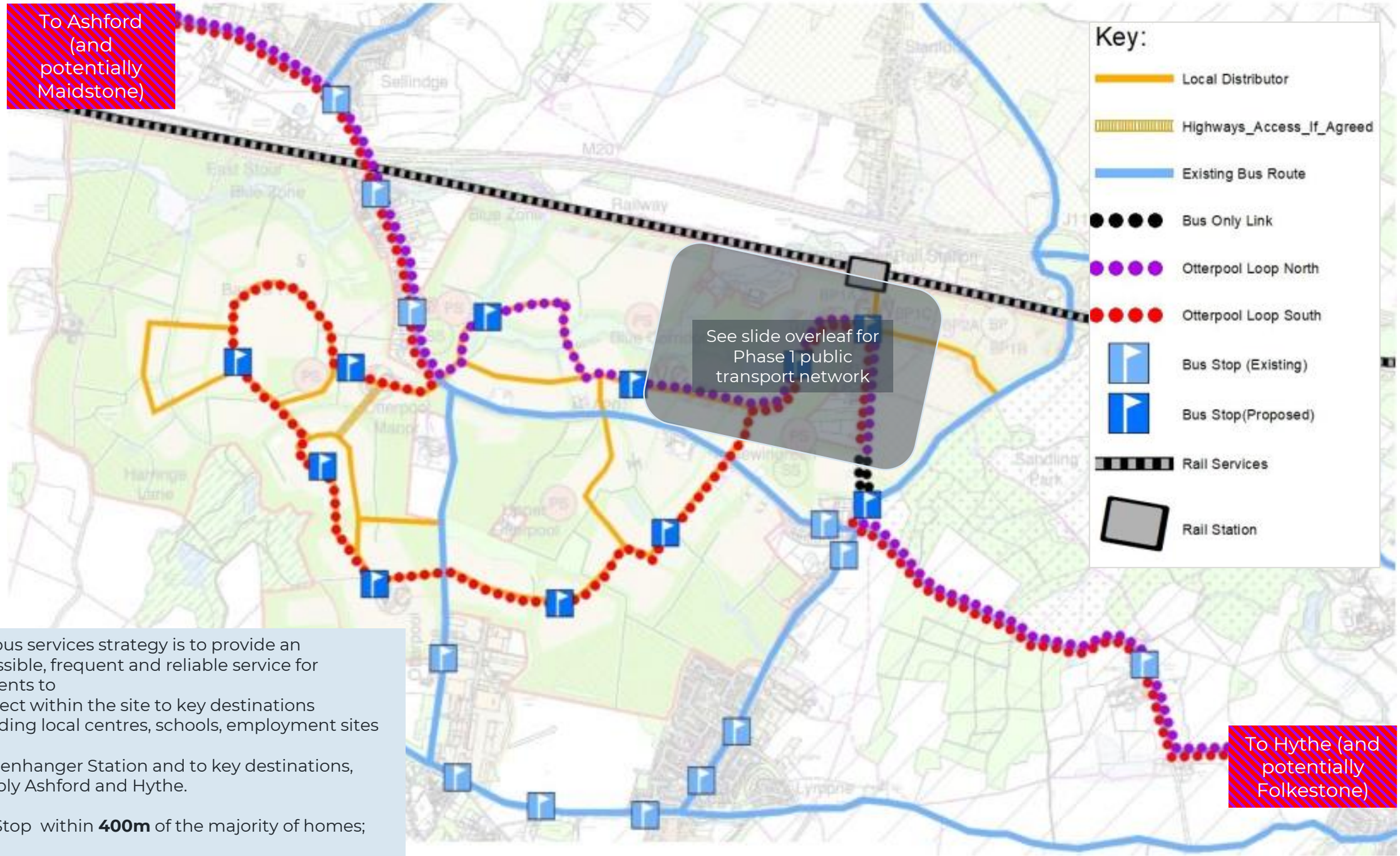
Parcel	BUS AM Peak (arrivals and departures)	
	Outline TA	User-centric (stretch target)
1	18	41
2	7	14
3	79	131
4	1	1
5	150	194
6	12	14
7	4	5
8	7	9
9	145	191
Phase 1 total	**422**	**600**
Mode share	5%	7%

Estimate of AM peak hour bus and rail trips (by parcel)



Public transport

Otterpool Park Transport Strategy – Public Transport (Arcadis)

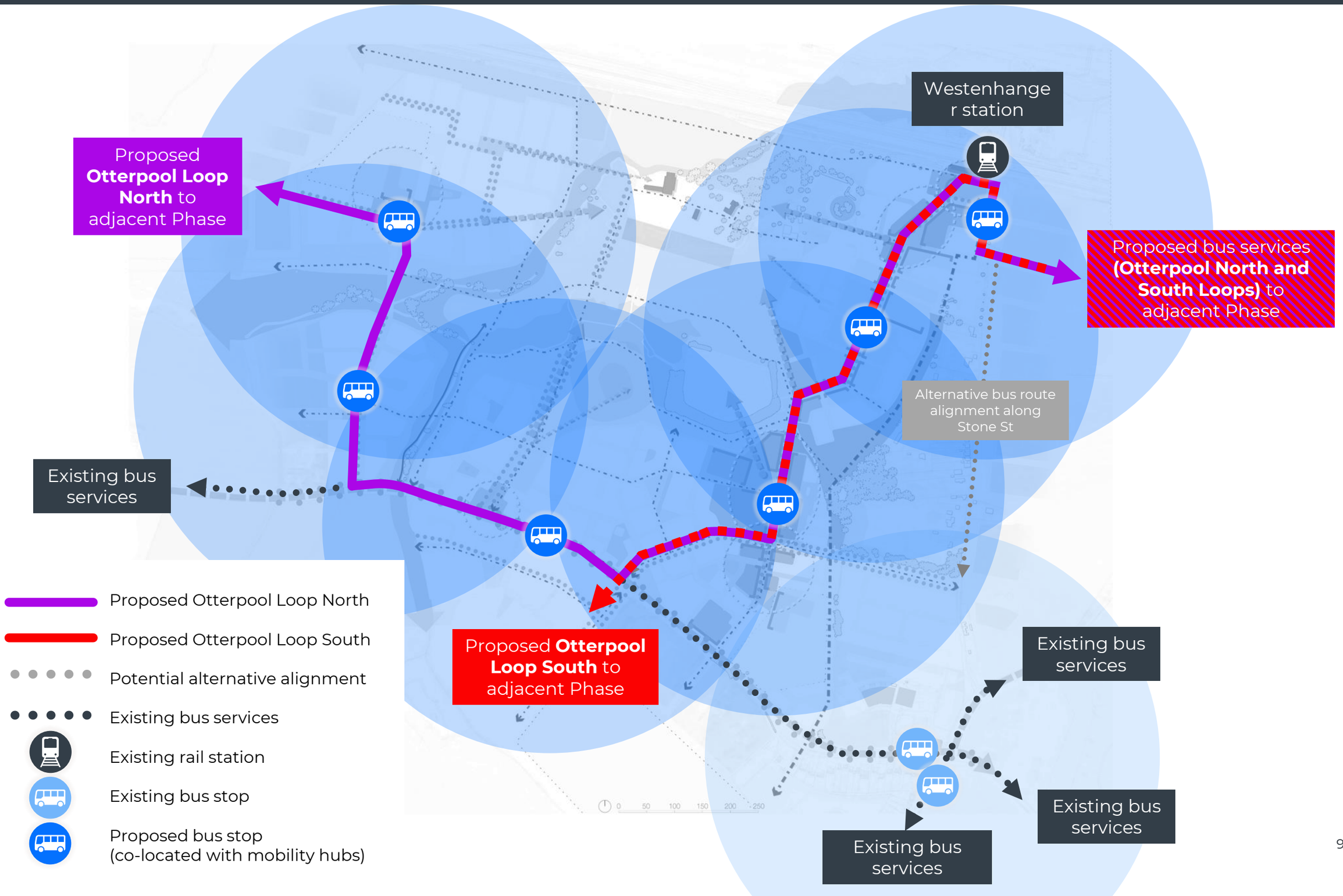


The bus services strategy is to provide an accessible, frequent and reliable service for residents to
connect within the site to key destinations including local centres, schools, employment sites and
Westenhanger Station and to key destinations, notably Ashford and Hythe.

- ✓ Stop within **400m** of the majority of homes;
- ✓ **30** minute frequency from early occupation; and
- ✓ **15/10** minute frequency service once fully

Public transport

Phase 1 public transport network (ultimate alignment)



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

Mobility hubs

Proposed mobility hub provision

Parcel	Hub type	Car club / hire services		Docked / dockless shared cycling schemes		E-scooter	Recreational bike hire	E-cargo bike hire	Cycle parking (visitor)	Cycle parking (consolidating private)	Consolidated vehicle parking		EV charging points	Parcel lockers
		Traditional (back-t-base / fractional)	Floating	Docked	Dockless	Docked					Residential	Commercial / retail		
5	**Secondary**	5	-	5	5	5	5*	1	10	~225	90	TBC		1