ARUP

An evidence-led approach

Delivering Sustainably Walkable Neighbourhoods

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Delivering Sustainably Walkable Neighbourhoods

New settlements and urban extensions need to be better designed, be more sustainable and deliver more liveable outcomes – truly 'Walkable Neighbourhoods', focused on local living and sustainable travel.

This report seeks to define what is needed to help deliver this vision, presents new empirical research and describes Arup's WalkFar tool for assessing walkability of new settlements.

The Town and Country Planning Association's 'Garden City Standards for the 21st Century' practical guides aspire to enable at least 50% of journeys to be made by foot, cycle or public transport. Active Travel England goes even further by aiming for at least 50% of journeys to be made by foot or cycle alone. A walkable neighbourhood will, in most cases, be the most important part of creating a community in which more than half of journeys are made sustainably.

Creating sustainably walkable neighbourhoods for everyone in society depends upon creating an equilibrium between a local population and locally provided amenities. That equilibrium is best achieved at scale within a compact space. The Building Better, Building Beautiful Commission's 'Living with Beauty' report advises that walkable neighbourhoods cannot be achieved at current average densities of 31 dwellings per hectare and that more homes need to be developed at what it describes as 'gentle density'.

Current and future plans for new urban expansions and settlements should be reviewed to ensure that opportunities to enhance scale are grasped, and that walking distance between the population and a diverse range of amenities are minimised.

Walkability is the foundation upon which a sustainable future should be built. To realise a world in which more than half of journeys are made by active or sustainable modes requires a paradigm shift. Creating the scale necessary to deliver this vision requires ambition, long-term planning and political will.

The aim of this research is to stimulate an informed discussion amongst leaders, policymakers, planners, developers and designers. Through visionary leadership and practical application, we can tackle the environmental, social and economic challenges facing our world.

Introduction

Much of the existing literature on 15-minute neighbourhoods lacks quantitative analysis.

This new research presents quantitative evidence to inform and challenge the existing qualitative literature and rhetoric. The research seeks to define what is needed to help deliver the walkable neighbourhood vision, presents new empirical research and describes Arup's WalkFar tool for assessing walkability of new settlements. This report, in short, provides a toolkit of meaningful and substantiated evidence to inform planning and decision making with the aim of delivering sustainable walkable neighbourhoods.

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Introduction

Walking is the most environmentally sustainable way to travel. It removes the barriers to communication which come from the body of a car or from the speed of a bicycle.

When we are walking, we are all equal; a stepping stone on the path to social sustainability. Transforming the built environment to enable walking as an economically sustainable way to travel is an essential foundation of a truly sustainable community. Cycling is also a sustainable, active and healthy travel mode and an important part of the sustainable travel hierarchy, particularly for longer-distance journeys.
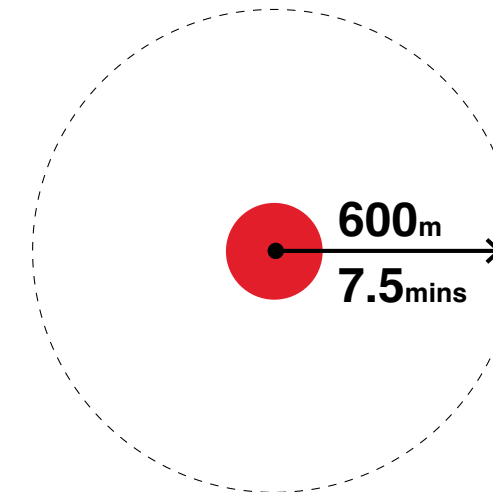
However, at any scale, cycling comes with some additional barriers, particularly for some individuals and groups. The most sustainable approach is therefore to start with the most equitable mode of transport–walking–and then consider how cycling and indeed public transport can complement this.

The Town and Country Planning Association's 'Garden City Standards for the 21st Century' (a collection of practical guides for creating new settlements) sets an aspiration for at least 50% of journeys originating in a Garden City to be made by non-car means, with a goal to increase this to at least 60% over time. These targets are often utilised and adopted for new settlements or urban extensions, many of which are marketed as Garden Communities, 15-minute neighbourhoods or 15-minute cities.
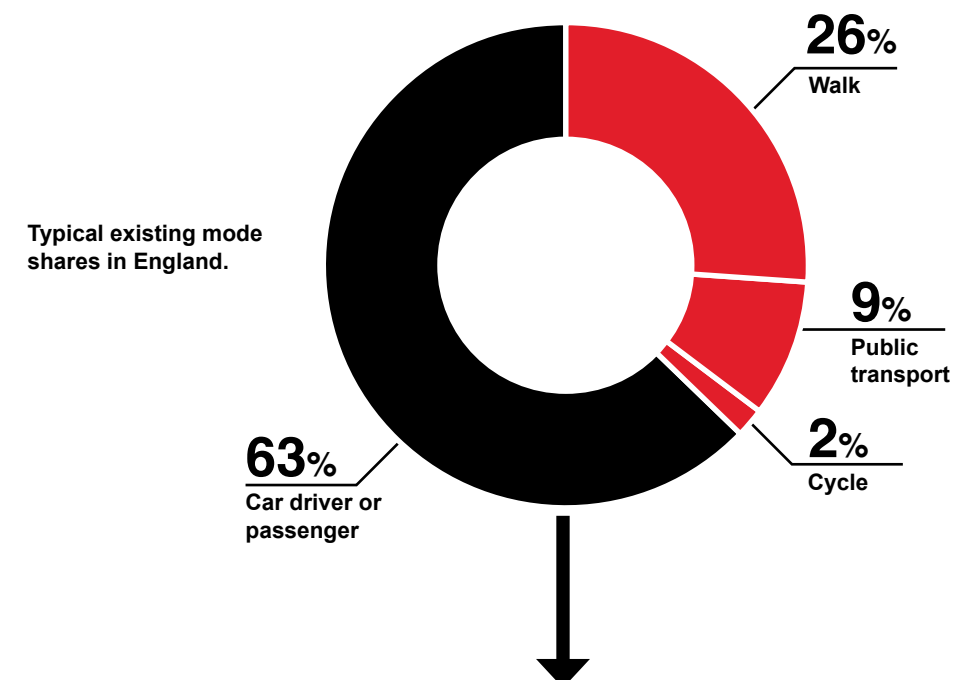
There is no agreed or defined limit to a walkable distance, but it is reasonable to say that the attractiveness of travelling by foot (or by wheel, for those unable to travel by foot) reduces by distance and by time. Minimising journey distance and time is therefore key to maximising the potential for people to walk.

The concept of a '15-minute walkable neighbourhood' is commonly (but not exclusively) described as a 15-minute round trip (or c.7.5-minute journey in each direction) and may be a key opportunity to increase the sustainability of our travel choices.
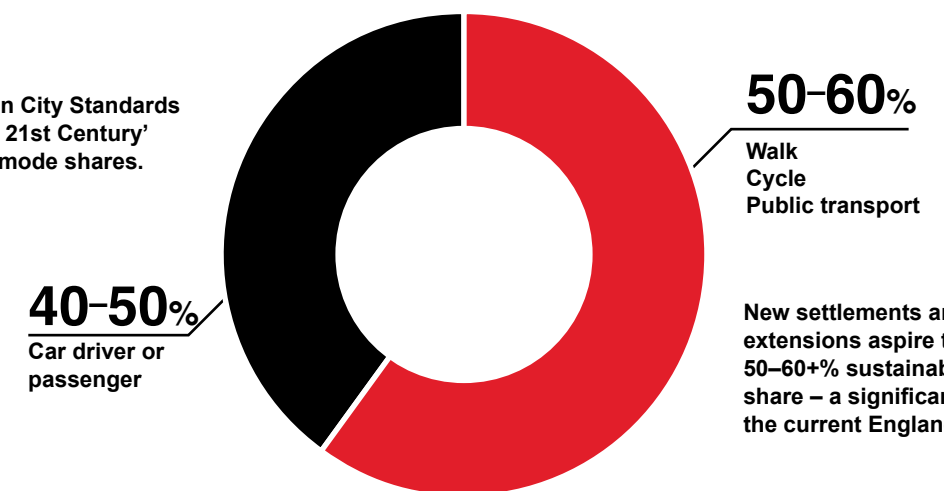
'15-minute neighbourhood' aspires to achieve 15-minute round trips – 600m walk to a destination and 600m walk back.

600m
7.5mins

15-minute walkable neighbourhood

Typical existing mode shares in England.

26% Walk

9% Public transport

2% Cycle

63% Car driver or passenger

'Garden City Standards for the 21st Century' target mode shares.

50–60% Walk Cycle Public transport

40–50% Car driver or passenger

New settlements and urban extensions aspire to achieve a 50–60+% sustainable travel mode share – a significant shift from the current England average.

Scale of the prize

Before considering how to increase sustainable travel mode choice, it is important to understand why and where people travel. The National Travel Survey provides data which can help to define how many journeys might be able to be made by foot – the potential 'scale of the prize'.

The National Travel Survey shows a long-term trend of reducing travel demand, with questions now arising about where travel demand will settle in the context of increased work flexibility and improved communications technology, as well as the cost-of-living crisis. This study does not focus on quantifying the scale of this potential future reduction in travel demand, but instead focuses on the mode choice of the journeys made.

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Scale of the prize

Table 1 summarises journey purpose data for England together with an indication of the potential for internalising journeys (or shifting these journeys to travel by foot in a compact community).

In this case, internalisation means making trips locally within a settlement or neighbourhood without having to travel further afield. For simplicity, this report considers three scales of 'centre'. These can broadly be defined as follows: local centre (able to support a convenience store and a primary school); district centre (additionally able to support a secondary school); and town centre (additionally able to support a supermarket).

Table 2 shows that a larger district centre typology has potential to meet the TCPA target of 50+% sustainable travel once making an allowance for some longer journeys to neighbouring communities

and destinations being made sustainably (e.g. by cycling, bus or rail). A town centre has the potential to meet the 50%+ target within a model community itself, with potential to also meet the aspirational 60+% TCPA target.

Considering the decarbonisation benefits of modal shift, each 1% shift towards travelling by foot (from a car journey) would equate to planting 250 to 500 trees per 1,000 dwellings. If walkability were to shift from the England average of 26% to 50%, this would be equivalent to planting 20,000 to 40,000 trees for a 3,500-home development. Hyde Park contains around 4,000 trees, making this illustrative 24% walkability shift for a 3,500-home scheme equivalent to five to ten Hyde Parks' worth of carbon sequestration.

250–500 trees
per 1,000 dwellings

50+% non-car
non-car potential of a District Centre scale development

50+% foot
Potential of a Town Centre scale development

Table 1
Journey purpose and internalisation potential for optimum centre

Journey purpose	2015-2019 (%)	2021 (%)	Internalisation potential
Commuting	15%	13%	🟠
Business	3%	2%	🟢
Education	7%	7%	🔴
Escort education	6%	6%	🔴
Shopping	19%	18%	🔴
Other escort	9%	9%	🔴
Personal business	9%	8%	🔴
Visit friends at private home	9%	9%	🟠
Visit friends elsewhere	5%	3%	🟠
Sport / entertainment	7%	5%	🟠
Holiday / day trip	4%	6%	🟢
Other including just walk	7%	14%	🔴
All purposes	100%	100%	-

🟢 Low
🟠 Medium
🔴 High

Table 2
Indicative trip internalisation by centre type

Centre / settlement type	Internalisation potential
Local centre	20%–30%
District centre	30%–45%
Town centre	45%–65%

Influence of distance

To understand propensity to walk by distance, it is important to understand how mode choice varies by distance.

From the National Travel Survey, it is possible to infer a walk mode share profile vs distance (Figure 1).

For journeys under 600–700m, walk is the only mode choice implied by the data. Around 80% of journeys of 1km are likely to be made by foot. For a journey of around 1.5–1.6km, a person is around 50% likely to travel by foot. Journeys of 2.5–2.6km are still around 20% likely to be made by foot. Above 5km, the propensity to travel by foot is negligible.

This overall relationship does not reflect how fitness, age, health and perceptions of personal safety may influence choice of mode or destination for individuals. In practice, some members of society may find walking any distance a barrier to travel in some contexts. Also, the urban environment (such as the presence of active frontages) will influence perceptions of safety and attractiveness of walking.

Planning and design of new settlements should consider the needs of different user groups as described in Arup's Cities Alive research, together with collaborative research with Sustrans and Living Streets.

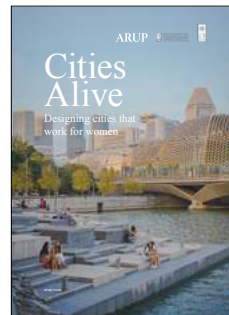**Figure 1**
Walk share by distance band

Walk node share / Distance (m)
500 1,000 1,500 2,000 2,500 3,000 3,500 4,000 4,500 5,000 5,500 6,000
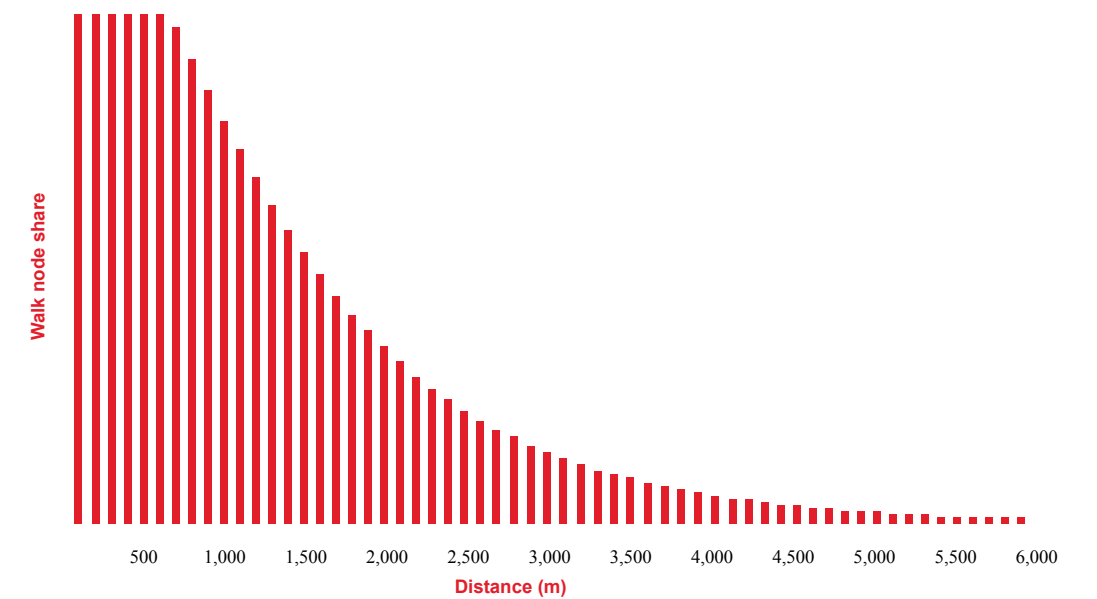
Click to view
Click to view
Click to view
Click to view
Click to view

Conclusion

Below 600–700m walk is the only mode choice implied; but, in practice, fitness, age, health and perceptions of safety affect individual propensity to walk. Minimising walk distance is still important and delivers better social value.

© Paul Tanner

Influence of distance

Figure 2 shows the walkability of a neighbourhood or settlement with a given 'radius' (assuming a concentric settlement model for simplicity).

This is formed from the data in Figure 1, plus an additional deterrence weighting (drawn from professional judgement) to account for destination shift, as some journeys may not only change mode but may also change destination and, therefore, also change to a longer-distance journey.

Once a person has decided to travel by car, for example, they may then decide to travel slightly further, given the higher speed of driving compared to walking.

This data suggests that increasing from a 15-minute (600m each way) neighbourhood to a 20-minute (800m each way) neighbourhood would be unlikely to materially reduce overall walkability.

Minimising walking distance remains important at an individual level in the context of creating an equitable community delivering better social value. For simplicity, Figure 2 assumes that development is spread evenly across the settlement area at a consistent density.
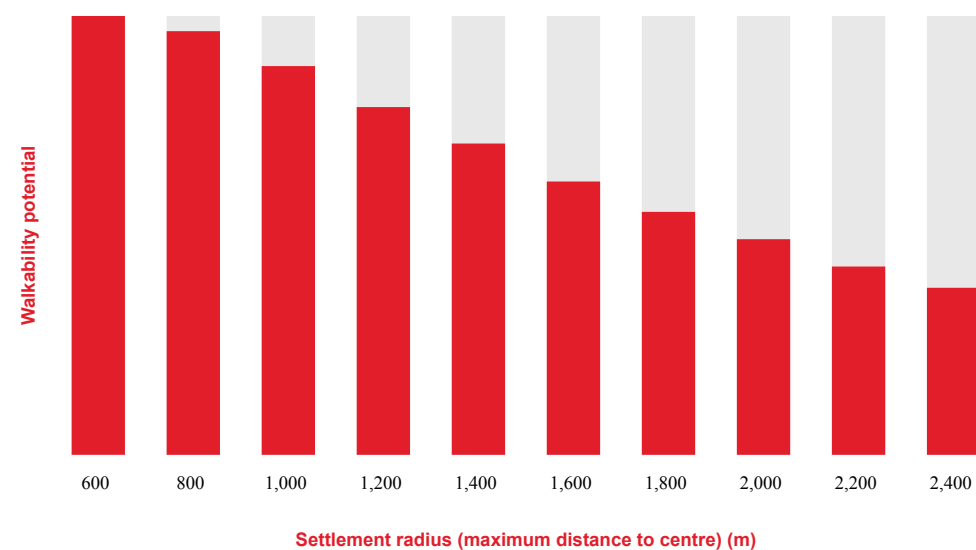
Figure 2
Neighbourhood walkability

☐ Other mode or destination

■ Walkability

Walkability potential (y-axis)

Settlement radius (maximum distance to centre) (m): 600, 800, 1,000, 1,200, 1,400, 1,600, 1,800, 2,000, 2,200, 2,400

Conclusion

On average, walkability does not change much between 15- and 20-minute neighbourhoods for the same number of homes/jobs.

© Jon Bewley

Observed behaviour

The TRICS database includes travel demand surveys of a great number of operational sites and communities.

The observed walk mode share of these existing residential communities (outside of London) varies greatly, from 3% to 36%. The communities with the highest (>27%) and lowest (<7%) walk shares have been interrogated to understand how this relates to the distance to the nearest centre. Figure 3 shows that sites with the greatest walk mode share are typically in the region of 500–1,200m distance from the centre while those with the lowest walk mode shares are 1,500m or more from the centre. This supports

the conclusion that it is possible to achieve a similar level of walkability at a settlement of c.1,000m and perhaps up to 1,200m radius as it is at a settlement of 400m to 600m radius (given a sufficiently attractive centre).

Similar data from TRICS for sites in London shows the highest walk modes shares across the day being in the region of 40–45% (in central areas of Wembley, Acton and Greenwich) and the lowest walk mode shares being in the region of c.15–20%. This implies that, even in existing locations with a high density of amenities, jobs and other destinations, walk mode share does not tend to exceed 50%.
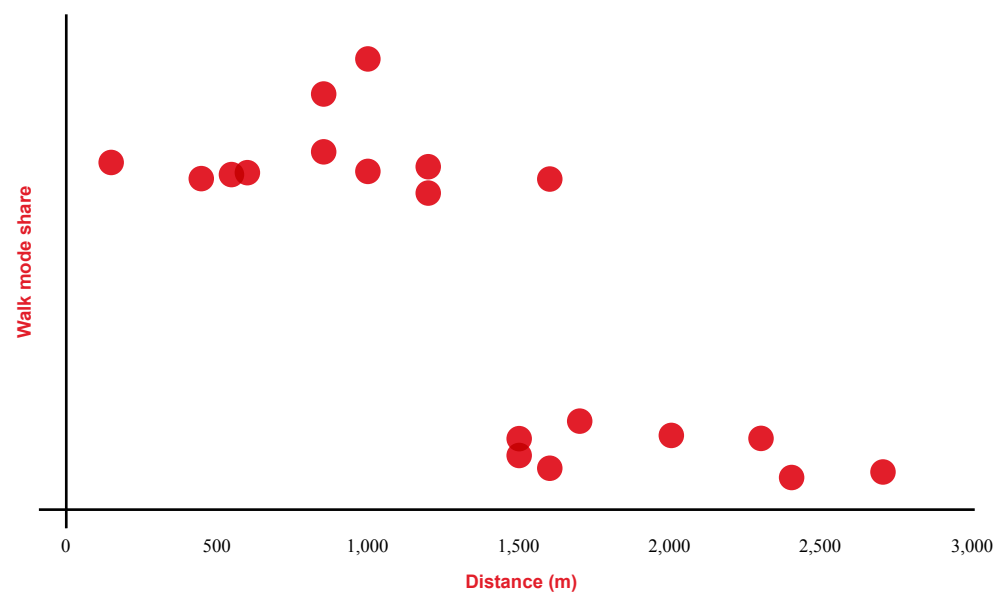
Figure 3
Distance to centre for highest and lowest observed TRICS walk mode shares

Conclusion

Observed behaviour suggests the highest walk mode shares are achieved where distance to centre is below 1,000–1,200m.

Influence of scale and density

To understand how to create a successful and sustainably walkable mixed-use community, it is helpful to define some parameters:
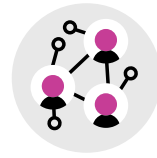
Scale or mass

This is the population (perhaps most easily expressed as the total number of homes or businesses) that provides spending power to support a local and potentially circular economy.

Density

This is often described as a function of the number of dwellings and the area within which they sit. The smaller the area, the shorter the length of a journey and the greater the likelihood that a journey will be undertaken by walking.
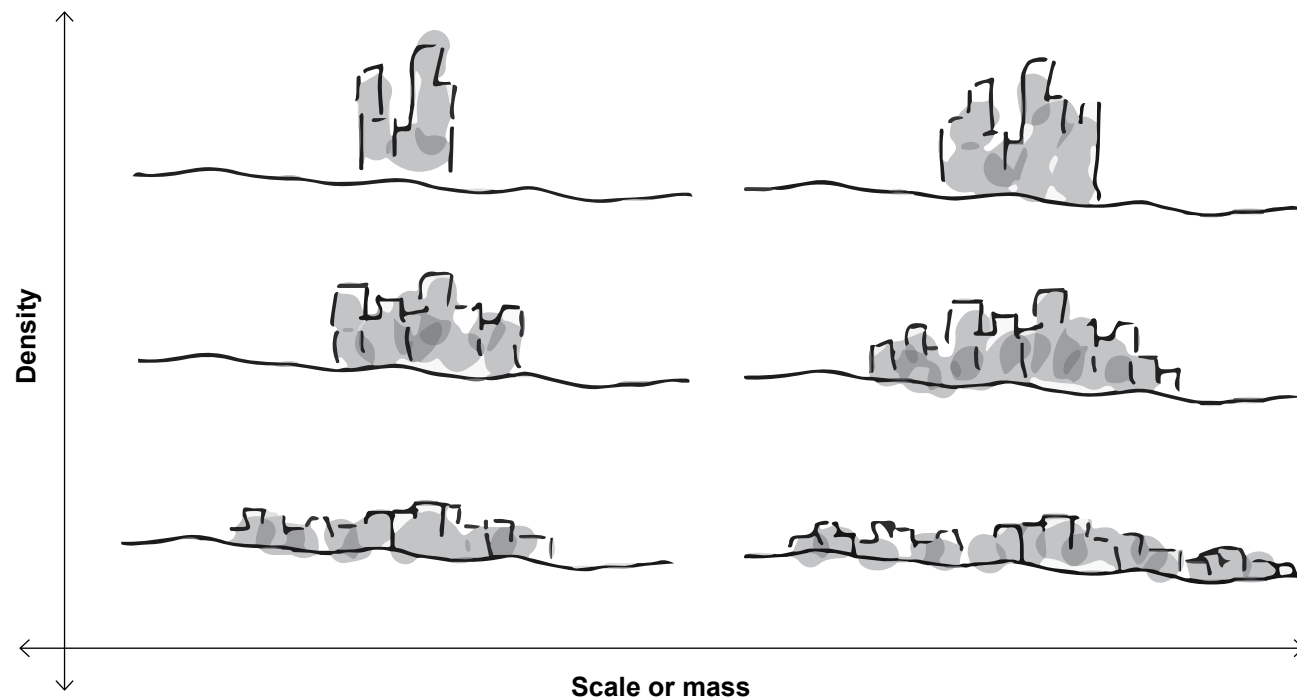
Factors of Influence

The balance between the number of homes and the number, range and quality of other uses which a community can support will be influenced by a number of other factors beyond scale and density, including (amongst other things):

– Affluence and spending power of the residents
– Number of employees working in the settlement
– Competition from other destinations

Affluence and spending power of the residents

Factors of influence beyond scale and density

Competition from other destinations

Number of employees working in the settlement

Density

Scale or mass
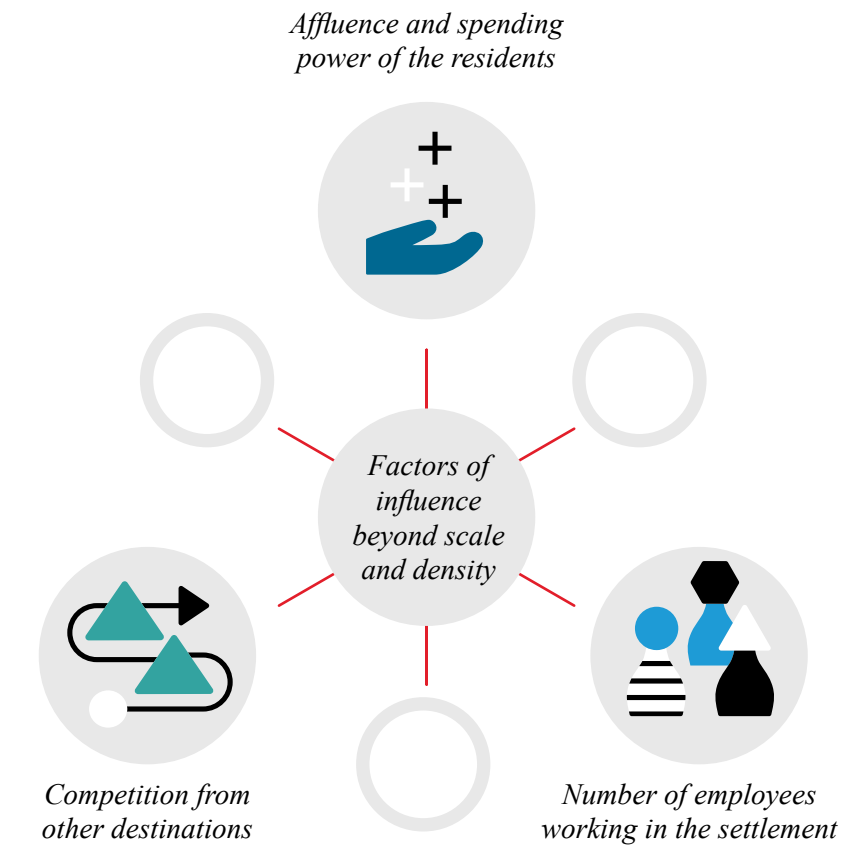
Economic sustainability

Each of a series of 28 case study towns and villages has been analysed to understand population characteristics (or scale), as well as the available amenities and facilities (and how these may relate to the local, district and town centre definitions used in this study).

These settlements are generally well contained and well established, with the local shops and services supported by residents and employees of both the local area and the surrounding rural hinterland. Being self-contained, the case study towns and villages replicate new settlements in many ways.

● Case studies

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Economic sustainability

Figure 4 summarises the relationship between resident population, employee population and size of centre from the case study towns and villages.

The analysis shows that a combined resident and employment population of c.7,800–10,000 supports a district centre scale of facilities, with smaller populations supporting local centres and larger populations supporting town centres. This is consistent with 'Towards an Urban Renaissance' published by the UK's Urban Task Force in 1999, which

suggested that around 7,500 people might support a viable local hub of facilities.

Across the case studies, jobs tended to fall within the range of 0.25 to 0.65 jobs per resident population, or (based on an average 2.37 people per household which varied very little between case studies) a rate of 0.65 to 1.55 jobs per household. Across all the case studies, this equated to approximately one job per household on average. This data implies that a district centre scale of facilities would require c.2,500 to c.3,500 homes, plus an equal number of jobs.

Jobs
Approximately one job per household

8–10k
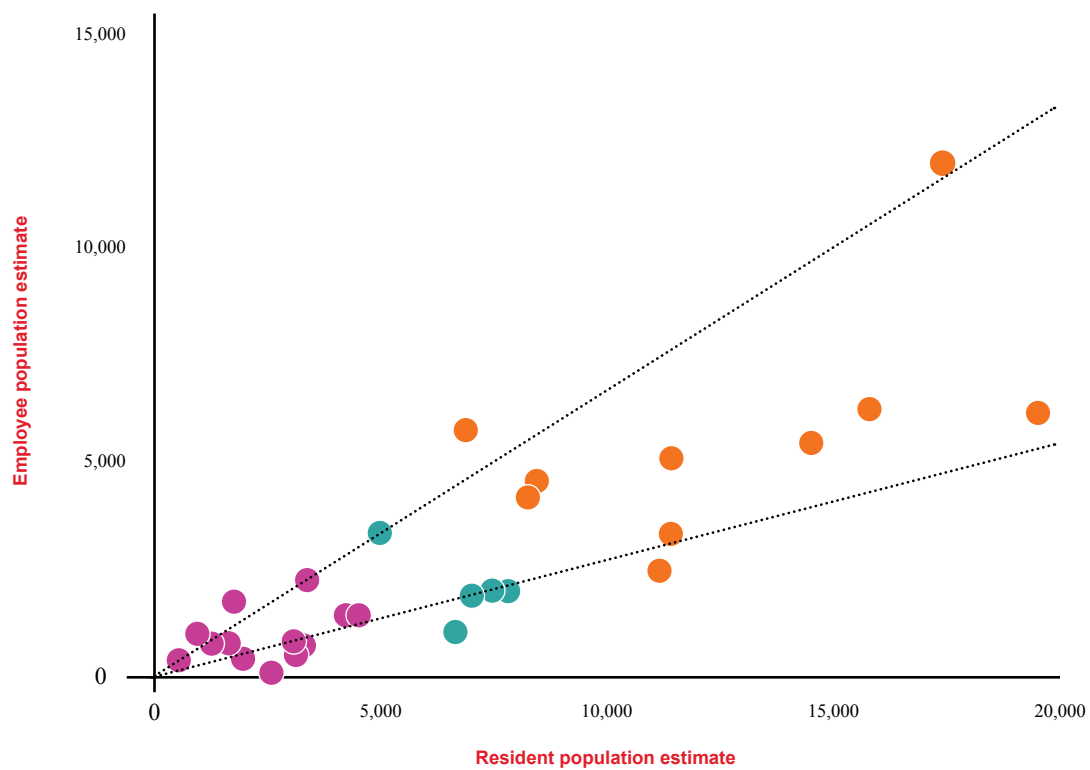Resident and employment population supporting a district centre (estimated max.)

Figure 4
People per centre

- ● Town centre
- ● District centre
- ● Local centre

© Paolo Paradiso
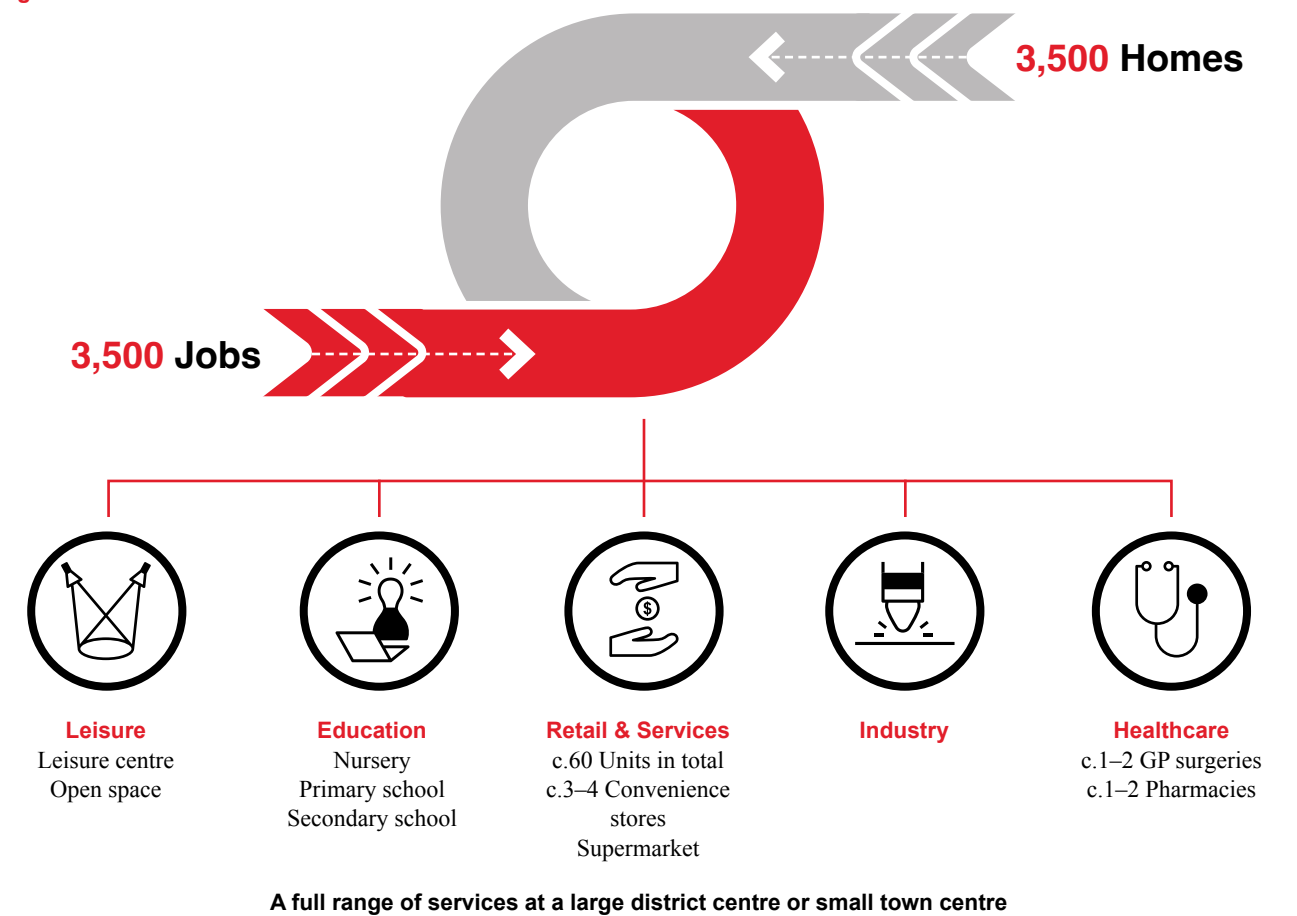
Social sustainability

The case studies have helped to define a greater granularity in what different scales of development could, and perhaps should, include.

Figure 5 shows the average number of households per 'local amenity' across the case studies, together with the range in the averages for local centres, district centres and town centres.

On average, the case study analysis shows:

– c.55 dwellings per 'class E' unit (such as shops, cafes, restaurants, food takeaway, hairdressers, solicitors, estate agents, etc), though a minimum critical mass is necessary to support meaningful facilities in these units;

– c.800 dwellings will typically support a convenience store;

– c.3,500 homes is required to support a supermarket, with one supermarket per c.2,500 homes on average in larger settlements;

– c.1,500 homes will support one or more pharmacies, with larger settlements typically supporting one per c.1,800 homes;

– c.1,500 homes will support a medical centre, and then at a rate of one per c.1,700 homes;

– Nurseries and primary schools were each found at a rate of one per c.1,400 homes;

– Secondary schools were typically found in settlements larger than c.2,500 homes, and then at a rate of c.3,500 homes per school;

– c.2,000 dwellings will support a fully equipped gym;

– c.3,000 homes will support a full leisure centre with a range of facilities including a swimming pool;

– Community halls do not necessarily have either a lower threshold or a relationship to settlement size and are generally present in all settlements; and

– c.2,000 dwellings will support a library.

Figure 5

3,500 Homes

3,500 Jobs

Leisure	**Education**	**Retail & Services**	**Industry**	**Healthcare**
Leisure centre	Nursery	c.60 Units in total		c.1–2 GP surgeries
Open space	Primary school	c.3–4 Convenience stores		c.1–2 Pharmacies
	Secondary school	Supermarket		

A full range of services at a large district centre or small town centre

Conclusion

– *Around 1,500 homes (and jobs) would support a good sized Local Centre, below that the range of facilities would be reduced.*

– *2,500–3,500 homes (and jobs) would support a district centre.*

– *6,500 homes (and jobs) would support a good-sized town centre.*

Social sustainability

All the case study settlements had access to some form of bus service, forming part of longer 'inter town' routes.

Typically, settlements below c.1,500 dwellings were served by routes combining two or fewer bus services per hour, while larger settlements were served by routes combining three or more bus services per hour. Where planning new or enhanced bus services, it can be important to design for a simple, direct and efficient bus route through a compact settlement, and to minimise the journey time and distance to one or more higher order (larger) towns or cities.

1–2 buses per hour
<1,500 dwellings +1,500 jobs

3+ buses per hour
>1,500 dwellings +1,500 jobs

© simonkr

Environmental sustainability

Arup's WalkFar tool has been developed to model the relationship between the scale or mass of development and the radius of a development, as well as a host of other variable factors such as provision of employment, green space, and availability of car parking.

Figure 6 shows the average development density of each of a series of modelled scenarios (limited to between 30 and 90 dwellings per hectare (dph) for the purposes of this study). A c.3,500-home settlement might have a large district centre or small town centre. Smaller settlements typically have local centres, while larger settlements typically have larger town centres.

Figure 6
Density vs radius

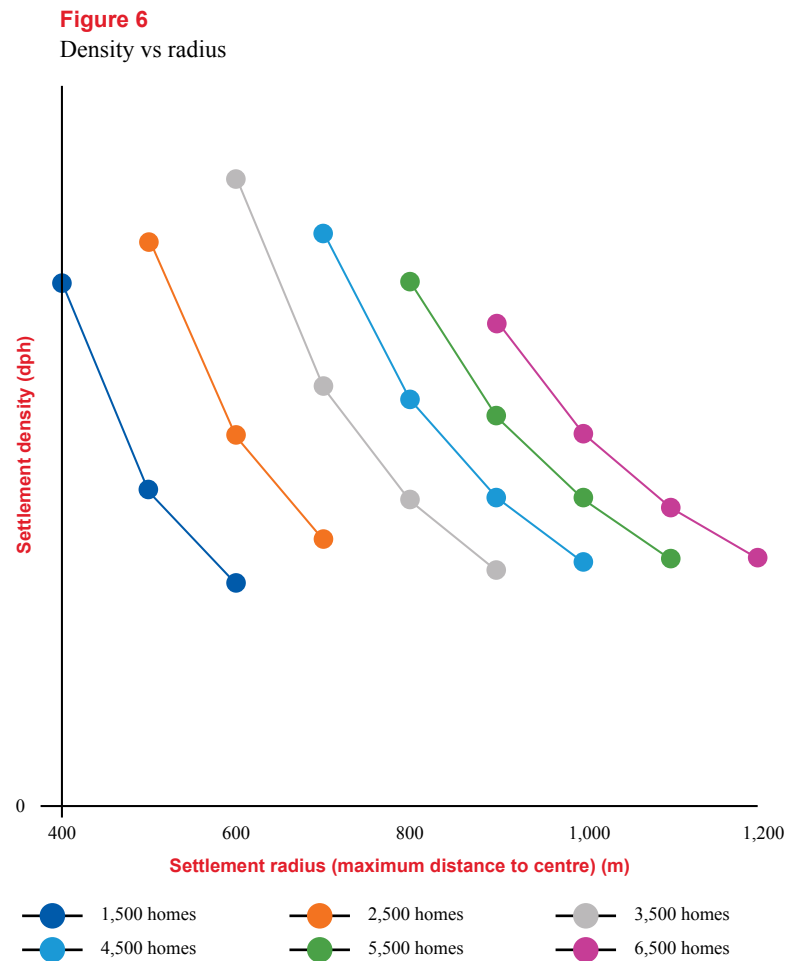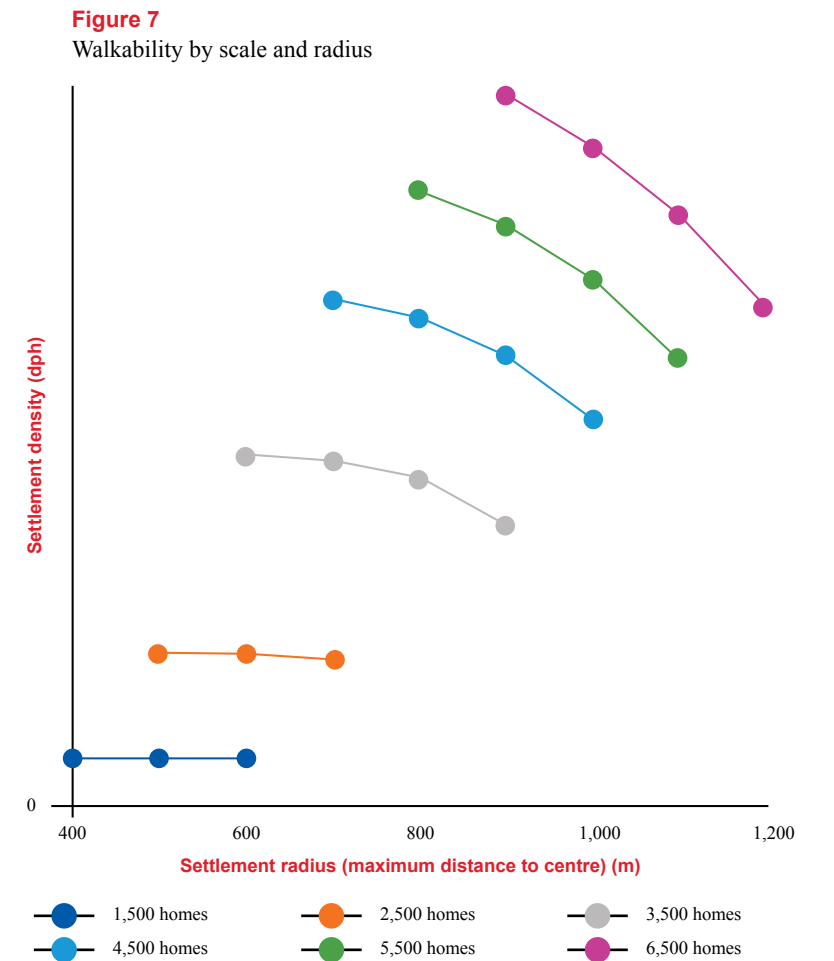|		
● 1,500 homes	● 2,500 homes	● 3,500 homes
● 4,500 homes	● 5,500 homes	● 6,500 homes

Figure 7 shows how the walkability of a settlement varies by scale and radius. This reveals that the scale of a settlement (and consequently the size of a centre) can have a dramatic influence on walkability. Naturally, building at higher density uses less land. This reduces land cost and land take, creating economic and environmental benefits.

Note that Figure 6 and 7 assume a contiguous circular settlement with a single centre and with walking routes which are safe and attractive. New settlements will rarely be so 'ideal' and site-specific assessment will be required to inform design decisions.

For example, a settlement with 800m radius at 30dph (2,750 dwellings) may achieve 30% walkability, but increasing density to 50dph (4,000 dwellings) may achieve 40% walkability. That's a 33% increase in walkability and delivers an extra 1,250 homes and an extra 1,250 jobs.

Overall, how much development is delivered, and therefore how many facilities and walkable destinations can be delivered, is far more important than the radius/outer walking distance.

The analysis assumes that, as the scale of the settlement increase, the facilities and scale of the centre also increase in proportion. If dwellings and jobs increase but the facilities in the centre do not increase proportionally, then the relationship falls down and increased walk distance reduces walkability.

Figure 7
Walkability by scale and radius

● 1,500 homes	● 2,500 homes	● 3,500 homes
● 4,500 homes	● 5,500 homes	● 6,500 homes

Conclusion

Fixed site area + Increased density = Increased facilities + Increased walkability

Scale, density and walking

To determine a site-specific walk mode share would require an analysis of a specific scheme in its context.

However, WalkFar is calibrated to reflect available observations and reflects both a walkability 'score' and also a model daily walk mode share forecast in general terms. Using the model and data for a well-proportioned contiguous settlement with a single main centre shows:

– a 1,500-home scheme in isolation (including a primary school, a meaningful local centre, and a total of 1,500 jobs, not including working from home) may achieve a walk mode share of c.27%;

– a 3,500-home scheme supporting a large district centre or small town centre including a secondary school may achieve a walk mode share of c.37%; and

– a 6,500-home scheme supporting a town centre and a secondary school may achieve a walk mode share of c.49%.

For context, WalkFar analysis of a stand-alone 500-dwelling scheme with a 300m radius and at 30dph without a local centre or school indicates just a 4% walk mode share.

A non-contiguous or 'stretched' settlement is unlikely to achieve these walk mode shares.

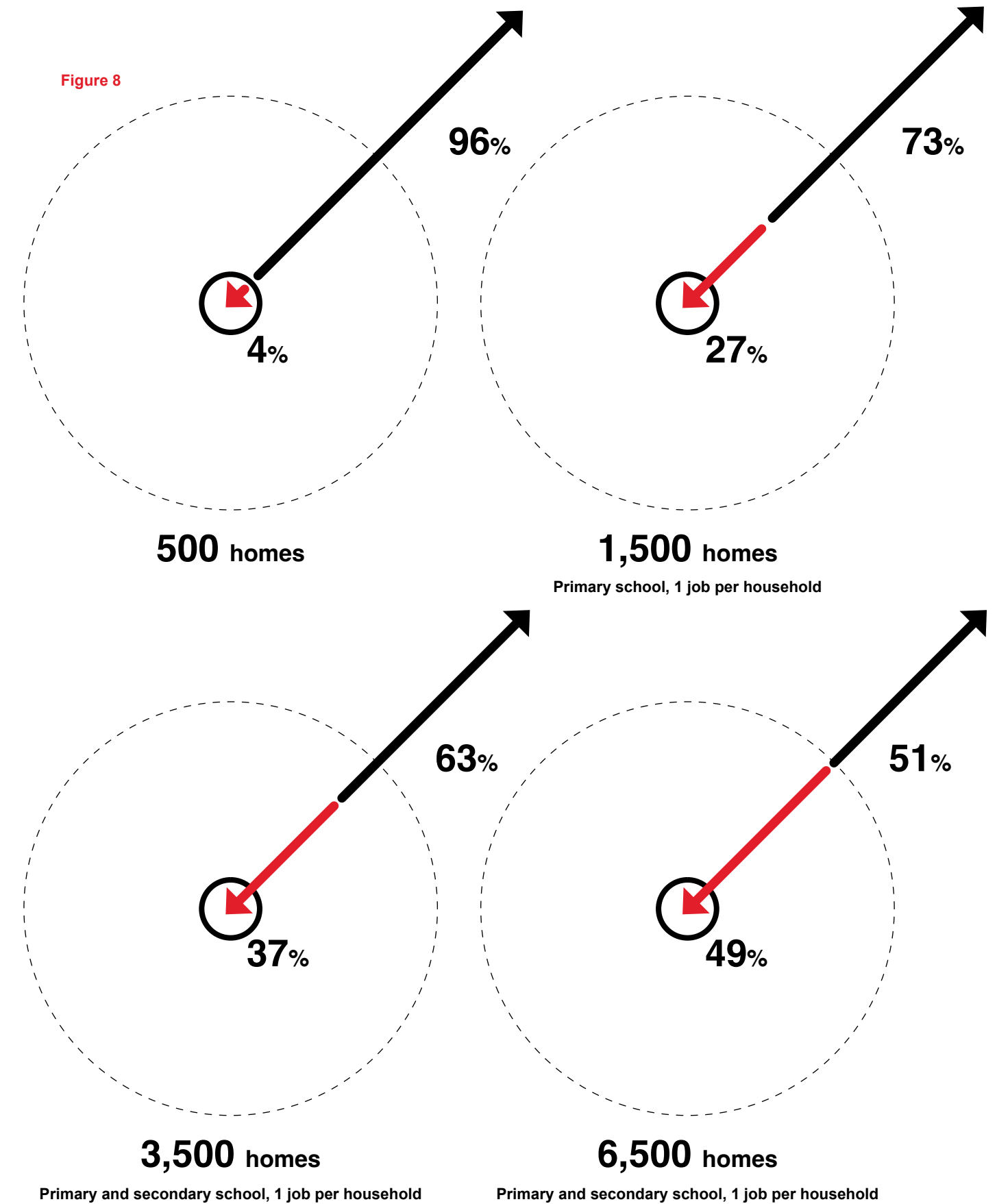## c.27%
Walk share mode based on 1,500 homes

c.37%
Walk share mode based on 3,500 homes

c.49%
Walk share mode based on 6,500 homes

Figure 8

96%

4%

500 homes

73%

27%

1,500 homes
Primary school, 1 job per household

63%

37%

3,500 homes
Primary and secondary school, 1 job per household

51%

49%

6,500 homes
Primary and secondary school, 1 job per household

Route to walkability

A walkable neighbourhood should seek to enable as much as 50–60% of journeys to be made by foot or other sustainable modes.

Only settlements of over c.7,000–12,000 homes have the potential to achieve this by foot alone (where density and design prioritises walking). If aiming for 50% of journeys to be made by foot or other sustainable modes, the question must then be asked: how can the gap between what is achievable and what is desirable be plugged?

We have described the likely walkability earlier, so the gap (to the lower 50% level) will vary by settlement size, as follows:

– c.1,500 homes is 27% walkable, gap is c.23%
– c.3,500 homes is 37% walkable, gap is c.13%
– c.6,500 homes is close to 50% walkable.

That gap needs to be filled by public transport together with cycling and emerging micromobility – and potentially other policy initiatives.

c.13%
gap in the case of 3,500- home settlements

c.23%
gap in the case of 1,500-home settlements

© deberarr

Plugging the gap

It is entirely reasonable in most scenarios to expect a commercially viable public transport network to attract c.5–15% of journeys, and a higher proportion in some cases (where trip end restraint is in place, or where a settlement is located within a commuter belt).

A viable public transport network is most likely to be achievable where it is associated with an existing nearby large town (with a strong bus network) or village (with a rail station).

For larger developments of 4,500 homes and above, this model is likely to achieve a walkable neighbourhood with as much as 50–60% of journeys being made by foot or other sustainable modes. Overall journey time, cost and reliability will all influence a choice to travel by public transport. In a social context, having access to some form of public transport can be important.

However, in a mode choice context, it is the quality of the service which is important. Micromobility and cycling have the potential to attract a significant proportion of journeys which could potentially fill the c.15–25% gap in the case of smaller settlements, if associated with the same non-residential trip-end restraint as is required for a successful public transport strategy. This will require continued legislative and policy changes, cultural shifts and infrastructure investment. This must target journeys which go beyond the local area out to the adjacent settlements and communities. Increasing the level of employment to above one job per household could affect walkability but would also lead to a greater import of employee trips from elsewhere, and has therefore not been considered further. The availability of a car will also influence the propensity to use non-car modes but is unlikely to be practical until sufficient mass of development is operational to support the delivery of other infrastructure and services, and again has therefore not been considered further in this study.
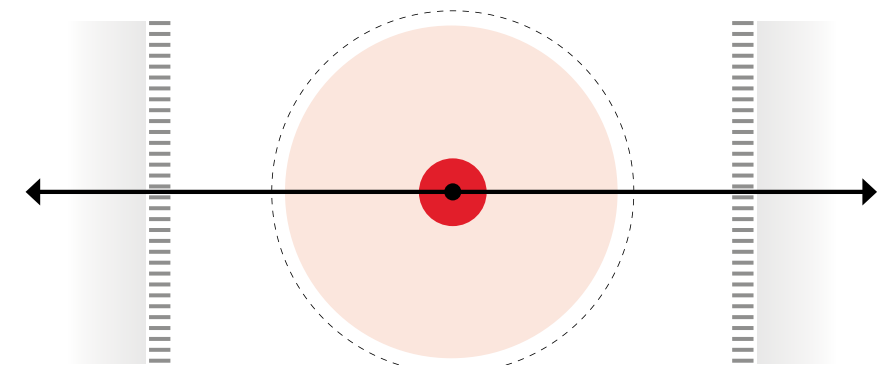
Figure 9
Settlement Scale and potential locations

1,500 homes

Employment
One job per household

Education
Primary school

Transport
Existing public transport
New walking routes
New cycle routes to adjacent town
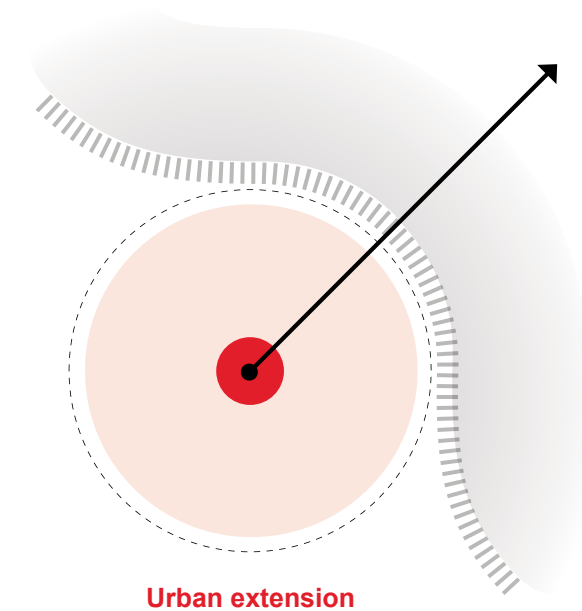
Urban extension

3,500 homes

Employment
One job per household

Education
Primary school
Secondary school

Transport
Existing public transport
New cycle routes to nearby town

Public transport piggyback

6,500 homes

Employment
One job per household

Education
Primary school
Secondary school

Transport
New public transport to nearby town
New cycle routes to nearby town
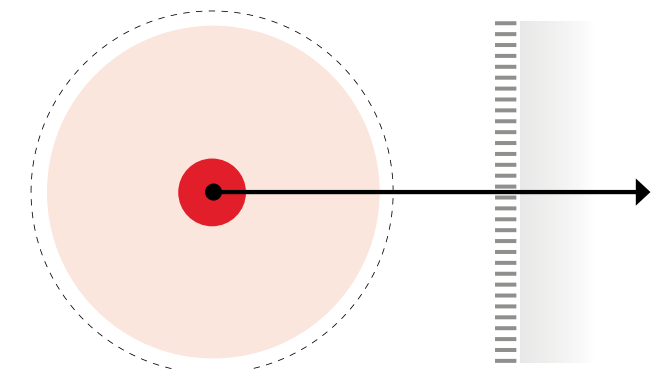
Stand-alone

Using what we have

A key benefit of increasing walkability and reducing the need to travel by car more generally is that any existing highway infrastructure can accommodate more development.

This will deliver more homes per pound spent on highway works and more homes per tonne of carbon generated to implement highway works. As well as reducing the need to deliver additional highway capacity by enabling sustainable travel, building compact communities around existing bus services has the added benefit of increasing the financial viability and economic sustainability of those services, protecting the social value which they provide. It is often travel in the weekday morning and evening peak hours which defines the performance of a highway network. The reasons for travelling in the peaks are different compared with across a day. The AM peak sees a greater proportion of education and commuting and the PM peak sees a greater

proportion of commuting. Typically, the AM peak may be 5–10% more walkable than an average day and the PM peak may be 0–5% less walkable than an average day (for example, if a settlement is 25% walkable across a day, it may be 30–35% walkable in the AM peak hour and 20–25% walkable in the PM peak hour).

Reconsidering the benefits of various scales and densities of settlements in this context, a 1,500-home scheme in isolation (including a primary school, a meaningful local centre), and a total of 1,500 jobs would reflect a current national average level of peak hour car travel demand.

A 3,500-home scheme supporting a large district centre or small town centre (including a secondary school) may generate 15–25% fewer car trips per dwelling in AM peak hour than the national average.

A 6,500-home scheme supporting a larger town centre and a secondary school may generate 25–45% fewer AM peak hour car trips per dwelling compared with the national average.

15–25%
Fewer car trips per dwelling in AM peak hour, 3,500-home scheme

25–45%
Fewer car trips per dwelling in AM peak hour, 6,500-home scheme

Future uncertainty

Mobility and social trends are changing rapidly. Forecasting such changes comes with significant uncertainty, but it is helpful to consider how these may affect walkability.

High streets and physical retail stores, generally, have been increasingly struggling to compete with online shopping. Society is increasingly socially conscious of the impacts of travel (and other behaviours) on climate change. Technology is likely to change how cars are owned and used, perhaps shifting to car access becoming more of a service through a fleet of connected autonomous vehicles. Working locally and working from home has been growing in popularity, which may continue into the future, and in turn may support greater 'localism' supporting local shops and facilities.

With an ageing population, many people are becoming more conscious of their health, which can affect travel choices. An ageing population may also have a greater share of mobility and health challenges. The rise of e-scooting and e-cycling has already been discussed in this study. These and other trends may change why people travel, how people choose to travel, where people travel to and how far people travel by different modes.

Assuming a reduction in car ownership, an increase in willingness to walk further and a shift in why people travel (reducing commuting and business travel and increasing walking for leisure) may increase walkability by an average shift of 2–7% for settlements between 800m and 1,200m radius (and in the range 4,500 to 6,500 homes).

Smaller settlements, due to their inherent walkability, may not see a material change in walk mode share, depending on how the future materialises. It is reasonable to expect the need to travel, particularly in peak times, to reduce in future (though this is not considered in detail in this study).

Future changes in travel behaviour may enable a 50% or greater walk mode share within settlements of 4,500 homes or larger, but smaller settlements will continue to need to rely upon other facilities such as travelling by e-scooter or e-cycle, or public transport (in whatever form that may take in the future).

Future uncertainty

Creating sustainably walkable neighbourhoods for everyone in society depends upon creating an equilibrium between a local population and locally provided amenities.

That equilibrium is best achieved at scale within a compact space. Creating scale requires ambition, long-term planning and political will. There is no one-size-fits-all solution. Every place is different and every community is unique.

Arup's WalkFar tool and the research presented in this study provide a toolkit to help decision makers to make informed decisions about how settlements are planned, working towards the aim of a world in which more than half of journeys are made by active or sustainable modes Where new urban expansions and settlements are being planned, these should be reviewed to ensure that opportunities to enhance scale are grasped, and that walking distance between the population and a diverse range of amenities are minimised. In some cases, this could mean increasing density; in others, it could mean increasing development area (within the confines of walkability), or, indeed, it could mean reconsidering where development is planned in relation to existing settlements.

The delivery of new centres requires great design but - perhaps even more importantly - it requires long-term custodianship. Economic sustainability and the financial viability of a centre

is critical, but the social sustainability of having a vibrant centre, and the environmental sustainability, which comes from enabling journeys to be made by foot are essential to the success of the community as a whole. A long-term custodian can curate and nurture new businesses, balancing competing priorities.

A sustainably walkable neighbourhood will, in most cases, be the most important part of creating a community in which more than half of journeys are made sustainably. Public transport, cycling and micromobility must enable longer-distance journeys to be made by sustainable modes to fully achieve this ambition. This can only be achieved holistically when associated with the largest of new settlements or when integrated into district and region level development plans.

Through visionary leadership and practical application, we can tackle the environmental, social and economic challenges facing us today. Together, we can shape a better world.

Arup is a global collective of designers, engineering and sustainability consultants advisors and experts dedicated to sustainable development, and to using imagination, technology and rigour to shape a better world.
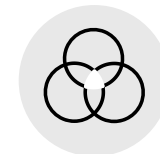
1.

A strong 'centre' providing a range of destinations within a walkable distance is critical.

– For most people, walk is the only mode choice for journeys under 600–700m.
– One job per household should be the 'model' approach for new settlements.
– Primary and secondary schools are an essential ingredient in a walkable neighbourhood.

2.

A 'critical mass' of homes and jobs is essential for a settlement to sustain a strong walkable centre.

– 1,500 homes (and jobs) would support a good sized local centre and sustain at least the current average England walk mode share.
– c.2,500– 3,500 homes would support a district centre wth a range of facilities and have potential to meet TCPA 50% non-car mode target.
– c.7,000–12,000 homes is the minimum scale for 50–60% of journeys to be made by foot.

3.

How much development is delivered is far more important than the settlement radius (up to a limit).

– An 800m radius site may be 30% walkable at 30dph, but could be 40% walkable at 50dph.
– The scale of local facilities must be proportionate with the scale of development to increase walkability.
– Settlements must be well proportioned and contiguous to achieve walkability.
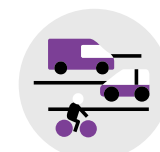
4.

Public transport and cycling remain key to achieving 50% sustainable mode share in most settlements.

– Public transport and cycling is essential for settlements below c.7,000–12,000 homes.
– Public transport, cycling and micromobility networks must connect to adjacent settlements.
– Non-residential trip end restraint could be key to mode shift.

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