MEDIUM DENSITY HOUSING

MINI-RESEARCH

A short research piece

FEBRUARY 2025

Tibbalds

Contents

Cover Page: Port Loop, Birmingham
Image Credit: Greg Holmes, courtesy of Glenn Howells Architects

Knight’s Park, Cambridge
Image Credit: Paul Riddle, courtesy of Pollard Thomas Edwards

1 Executive Summary

The UK government aims to address housing shortages and environmental concerns while promoting healthier lifestyles through compact, sustainable, and well-planned developments. This approach aligns housing delivery with climate goals and public health needs. Optimising housing densities across the UK will need to play a key role in creating more sustainable forms of development that support this responsible growth.

This research was commissioned by the Office for Place. It is intended as the first step to understanding the challenges and opportunities in delivering medium-density housing nationally. It brings together lessons learned from a range of case studies and stakeholders engaged in the topic, providing insight from the lens of delivery, viability, design and planning.

For this research, the definition for medium density addresses developments which are:

- **3-6 storeys in height** (with the upper limit of 18m informed by building control fire-safety guidance, Approved Document B)
- Including **flats, apartment blocks, townhouses and maisonettes** and other urban house types.
- Between **40-100dph**

These density measures are used in combination to inform an understanding of density through urban form, house types and numbers.

Marginal viability refers to where a project is just barely profitable, with small margins between costs and revenues, i.e. a low residual profit. If additional costs or a reduction in revenue occur, the project may no longer be financially feasible. This lens has been applied to identify the challenges of delivering medium-density development in this context.

Key findings

Six key findings have been identified through the research.

1. A cycle of limited evidence restricting atypical development types

A lack of precedents for successful medium-density developments impacts commercial decisions, restricting the finances available to enable medium-density development

However, several SME developers across the UK are delivering medium-density developments through innovative housing models, contributing to the evidence and precedents available. This is happening despite the market being dominated by lower-density and suburban housing, which sets value and viability benchmarks that can constrain medium-density development.

2. A challenging planning context

Where medium densities have been successfully delivered, it is often due to developers, planners and design teams having successfully justified a departure from local policy and guidance. The interpretation of national regulation and legislation and local planning policies and processes are not set out to support medium densities in many areas. They provide additional challenges in areas of marginal viability.

Policies are required to be based on robust evidence. This is often based on the existing development patterns, creating a backward-looking policy position that ingrains the existing development types and does not necessarily support innovation and change.

3. Variation in housing types, market audience and future communities

The market for medium-density development is diverse, with people open to alternative living models that offer sustainability, community, and convenience. However, innovation in the housebuilding industry is limited, with SME developers often leading the way in design and construction, though their approaches are challenging to scale up.

4. Overlapping commercial challenges

Developers are making medium-density work commercially through long term investment in neighbourhoods, implementing a regeneration and placemaking approach. However, upfront costs, investment, and financing challenges can make medium-density development difficult, regardless of the site context.

5. Infrastructure as enabler

The potential for introducing medium densities is largely informed by proximity to key infrastructure – supporting compact, convenient and sustainable lifestyles.

Delivering new medium-density developments or optimising the density in established neighbourhoods is primarily contingent on access to transport and local amenity enabling compact development.

Recommendations

Evidence shows that medium-density development, as defined in this study, is occurring nationwide, even in areas with challenging viability. However, these projects are typically led by SME developers and remain exceptions. The research identifies several barriers to expanding the market share of medium-density developments. The recommendations aim to gather more information and address these challenges to make medium density a standard development option.

Research

- Collate a data base / library of shared knowledge of medium-density housing types, with comparable construction costs, benchmark values and a commentary on their wider benefits (including post-occupancy surveys).
- Review and collate policies, local plans and their evidence that are supportive of medium densities in the appropriate locations to share knowledge and provide guidance (see below)
- Further investigate the viability and funding challenges and investigate levers to overcome these.

Education and knowledge sharing

- Share knowledge (and database) of existing medium-density case-studies with planning officers and members, encouraging them to contribute with local precedents.
- Demystify density: explain how density relates to existing places, such as historic market towns, and how they relate to different scales and house types. Support officers and members to make informed decisions on the wider benefits of medium-density development.

Policy and planning

- Undertake peer reviews of Local Plans and policies to ensure they are supportive of medium-density development in appropriate locations.
- Provide guidance on how to prepare evidence for forward looking policy supportive of medium-density and share existing evidence and policies for others to learn from.
- Highlight opportunity created by devolution for funding and housing to integrate housing delivery with transport and other infrastructure as well as opportunities created through delivery of new towns.

Partnerships

- Bring together different professional organisations and ministries around the topic of medium-density to address barriers and challenges, including RICS, RIBA, RTPI, Homes England, DFT and New Towns Task Force.
- Promote and encourage partnerships / collaboration between SME and National Housebuilders (e.g. through Housing Delivery Frameworks).

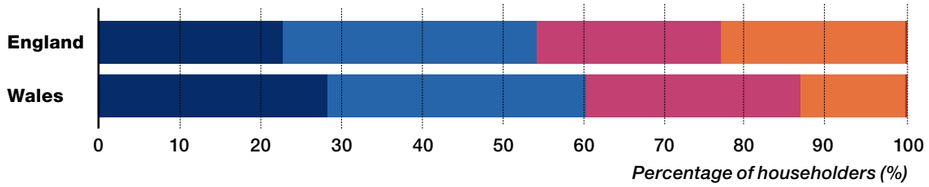
Barton Park, Oxford
Image Credit: John Hooper, courtesy of Tor&Co

2 Introduction

Context

The UK has one of the lowest population densities in Europe[1], with 54% of people living in detached or semi-detached houses[2]. In comparison to the European average of 48% of people living in apartments [3], the 2021 Census highlights that only 22% of the UK population lives in 'medium-density' house types such as flats, maisonettes or apartments.

Accommodation type, 2021, England and Wales, All Households



Key

- Whole house or bungalow: detached
- Whole house or bungalow: semi-detached
- Whole house or bungalow: terraced
- Flat, maisonette or apartment
- Caravan or other mobile or temporary structure

Source: Office for National Statistics - Census 2021

1 Jen Siebrits and Scott Cabot, Should we increase housing density? CBRE, 13 September 2024
2 Office for National Statistics – Census 2021
3 Jen Siebrits and Scott Cabot, Should we increase housing density? CBRE, 13 September 2024

Housing

Amid a national housing shortage[4], the government has committed to building 1.5 million homes over this parliament[5], emphasising the need for efficient land use while avoiding urban sprawl and ecological harm.

Following the 2024 General Election, plans were unveiled to tackle the crisis through mandatory housing targets[6]; reforming the planning system[7]; taking a brownfield first approach to delivering housing supplemented by strategic release of 'grey belt'[8], and developing new towns, supported by a dedicated task force [9].

Climate

As the UK works towards Net Zero by 2050[10], housing development must align with sustainability goals. Low-density suburban development is insufficient to meet these goals. Developments that enable a more sustainable lifestyle, that are less dependent on cars and that make best use of existing infrastructure and embodied carbon are urgently required.

Health

In 2022, 35% of the UK's adult population were overweight and 29% was obese, with insufficient physical activity being a key factor—only 34% of adults walked or cycled five times a week.[11] Medium-density developments, being more compact, can encourage walking and cycling by making them more attractive and convenient.[12] This can be supported through the provision of social infrastructure, cultural amenities, sports facilities, and employment or retail hubs in walkable neighbourhoods.[13] Reduced car ownership, combined with accessible public transport, can also lead to significant financial savings for individuals and households.

In addition to reducing levels of stress and anxiety, active neighbourhoods also create a space for people to interact as they go about their daily lives.[14]

4 Cassie Barton, Wendy Wilson, Felixia Rankl, Abbas Paniwani, Tackling the under-supply of housing in the UK, Research Briefing, commonslibrary.parliament.uk, Published 19 May 2023
5 Press Release, Ministry of Housing, Communities and Local Government, The Rt Hon Angela Rayner MP and The Rt Hon Sir Keir Starmer KCB KC MP, https://www.gov.uk/, Published 12 December 2024
6 Statement made by Angela Rayner, Building the homes we need, Statement UIN HCWS48, 31 July 2024
7 *ibid.*
8 *ibid.*
9 *ibid.*
10 Nuala Burnett, Iona Stewart, Suzanna Hinson, Roger Tyers, Georgina Hutton, Xameerah Malik, The UK's Plan and Progress to reach Net Zero by 2050, Research Briefing, commonslibrary.parliament.uk, Published 26 September 2024
11 Nuffield Trust, Obesity, Quality Watch, Last updated: 31/10/2024
12 Medium-density Research – Stakeholder Workshops, November 2024
13 *ibid.*
14 Tim Emery and Julia Thrift, 20-Minute Neighbourhoods – Creating Healthier, Active, Prosperous Communities An Introduction for Council Planners in England, Town and Country Planning Association, March 2021

2 Introduction

Making best use of land

Paragraph 125 of the NPPF promotes efficient land use, especially brownfield sites, with medium-density developments seen as an effective way to achieve this. While medium-density development may not be suitable in all locations, Paragraph 129 of the NPPF outlines a strategic approach to inform densities across all types of development:

Planning policies and decisions should support development that makes efficient use of land, considering:

a) *the **identified need for different types of housing** and other forms of development, and **the availability of land suitable for accommodating** it.*

b) ***local market conditions and viability.***

c) *the **availability and capacity of infrastructure and services** – both **existing and proposed** – as well as **their potential for further improvement** and the scope to promote sustainable travel modes that limit future car use.*

d) *the **desirability of maintaining an area's prevailing character** and setting (including residential gardens), or of **promoting regeneration and change**; and*

e) *the importance of **securing well-designed, attractive and healthy places**.*

- NPPF, Paragraph 129

Delivering 'optimised' housing densities offers a clear opportunity to address housing pressures through a coordinated strategy. Medium-density developments can balance efficient land use with personal space, including access to private or shared gardens and terraces. However, significant challenges remain. In 2021-22 the estimated average density of new residential development was 31 homes per hectare, a decrease of 11 compared to 2020-21.[15]

Purpose of Research

This research was commissioned by the Office for Place. It serves as an initial step to better understand the challenges and opportunities of delivering medium-density housing across the UK. By drawing on case studies and insights from a range of stakeholders, it highlights key aspects of delivery, viability, design, and planning.

The study focuses on two main questions:

1. What are the challenges of delivering medium-density housing in lower land value areas, where the viability of new developments is marginal?
2. How can these challenges be addressed to create sustainable, popular neighbourhoods that benefit developers, residents, and the broader community?

While initially focussing on areas with marginal viability, the research reveals that many of its lessons are applicable across a wider range of locations, especially in the context of rapidly changing viability factors.

This report provides a snapshot of both challenges and opportunities to inform decision making within planning authorities and government bodies – indicating areas of focus for future discussion and interrogation as part of wider planning reform and programmes for housing delivery.

15 Density, Land use change statistics – new residential addresses 2021 to 2022 statistical release, www.gov.uk/government/statistics, Published 27 October 2022

3 Research Methodology

Overview

This research, conducted between October and November 2024, serves as the first step in understanding how medium-density development can create well-designed, sustainable homes and communities in areas of marginal viability. It also explores the mechanisms needed to enable and support this type of development.

The research outlines findings and recommendations identified through 3 key strands:

i. **Literature and Data Review:** This involved reviewing publications, articles, and discussions from various organisations, along with a high-level data review to understand marginal viability and low land value areas. This helped select relevant case studies.

ii. **Case Studies:** A call for case studies was made in October 2024, resulting in a longlist of examples across the UK. After filtering out those from higher land value areas like London and the South-East, a shortlist was selected to reflect diverse geographical locations, delivery models, and key lessons. Some case studies were further explored through developer interviews.

iii. **Workshops:** Three workshops were held with developers, architects, and viability consultants to explore the challenges and opportunities of medium-density housing.

Nile + Villiers, Sunderland
CGI Image Credit: Xsite Architecture (model)/PB Imaging (CGI), courtesy of TOWN

3 Research Methodology

a. Defining medium-density

"In the context of housing and planning policy, [housing] density generally refers to the quantity of people or buildings in an area. It is useful to understand and measure density both as a way of gauging how land is used and to help make informed decisions about new development and what physical and social infrastructure is required to support it". [16]

Ministry of Housing, Communities and Local Government (MHCLG) guidance on 'Effective Use of Land' sets out instructions for determining appropriate densities for development sets out a range of measures, including:

- **Plot ratio measures** can help to indicate how a development will relate to its surroundings and the provision of open space within the site.[17]
- **Bedspaces per hectare** indicates the density of potential residential occupation.[18]
- **Dwellings per hectare (dph)** measures the number of homes within a given area.[19]

These can be measured on either a gross or net basis.

- **Net density** is a measure that includes everything that is developed [as part of proposed development] excluding major roads, open and public realm, schools and their grounds, and commercial and community buildings. It is calculated using the net development area.[20]
- **Gross density** is a measure that includes all aspects of a site of any size including housing, commercial space, roads, open and public realm, schools and their grounds, and other uses. It is calculated using the site area.[21]

These measures are often used interchangeably and vary across different policy documents and contexts.

When considered alone, typical density measures offer a limited understanding of a development's character, form, and population. For example, an apartment building with mostly one-person studios may yield more dwellings per hectare but fewer bedspaces than a terrace of family-sized townhouses on the same plot. Therefore, it's crucial to align density measures with housing needs, local character, and the most suitable building types.[22]

Spectrum of housing densities

Beechwood Village, Basildon *Pollard Thomas Edwards*	**Abode at Great Kneighton, Cambridge** *Proctor & Matthews*	**Fruit Market, Nottingham** *Letts Wheeler*	**The Mailings, Newcastle** *Ash Sakula Architects*	**Egham West Gateway, Egham** *Allford Hall Monaghan Morris*
36dph (net)	**49dph** (net)	**65dph** (net)	**138dph** (net)	**213 dph** (net)
2-3 storeys	2-3 storeys	3-4 storeys	2-6 storeys	4-7 storeys
Semi-detached houses	Mixed apartments, terraced housed and stacked maisonettes	Terraces houses and duplexes	Townhouses and apartments	Apartments

Lower density **Higher density**

16 Jim Ward, Defining Density, Savills, 16 September 2015
17 MHCLG, gov.uk, Paragraph: 005 Reference ID: 66-005-20190722, Revision date: 22 07 2019
18 *ibid.*
19 *ibid.*
20 RICS, Land measurement for planning and development purposes, 1st edition, May 2021
21 *ibid.*
22 MHCLG, gov.uk, Paragraph: 005 Reference ID: 66-005-20190722, Revision date: 22 07 2019

3 Research Methodology

Low density developments mostly consist of **2-3 storey detached and semi-detached housing**. These generally provide lower dph values (< 40dph), creating neighbourhoods often associated with suburban, rural and some new town developments.

Higher density developments largely consist of **7+ storey apartment blocks**, often provided in urban or town centre locations. These provide much higher dph values (> 100 dph), creating recognisably more 'urban' developments.

These development types represent opposite ends of the density spectrum, leaving a significant gap—referred to as the "missing middle".[23] This gap encompasses a range of development types, including varying heights, house types, and dwellings per hectare (DPH) values, that don't fit into the extremes of low or high-density models.

The definition of medium-density for this research actively addresses this 'middle' ground, considering developments which are:

- **3-6 storeys in height** (with the upper limit of 18m informed by building control fire-safety guidance, Approved Document B)
- Including **flats, apartment blocks, townhouses and maisonettes** and other urban house types
- Between **40-100dph** (approximate)

These measures are used in combination as much as possible.

Vaux, Home of 2030: A HM Government backed initiative created to drive innovation in the provision of affordable, efficient and healthy green homes for all.
Image Credit: Mawson Kerr and Igloo Regeneration

23 Christopher Warrall, Labour must lead on the 'Missing Middle', 27 March 2022

b. Defining ‘low value’ and areas of ‘marginal viability’

In residential development, “viability” refers to whether a project is financially and practically feasible. It assesses whether the development can be completed successfully and generate enough returns. A project is considered viable if the revenue exceeds development costs, allowing for a profit.[24] Viability is typically assessed through a viability assessment or development appraisal.

Gross development value (GDV)

This is the total income from the scheme, including private sales, affordable housing, and any commercial space’s investment value (less purchaser’s costs).

Total development costs (TDC)

This is a combination of all the costs that the developer will incur relating to this scheme, such as:

- land acquisition
- base build costs (construction materials)
- abnormal build costs (extra over foundations)
- contamination remediation
- the cost of infrastructure (roads, paths, utility upgrades, public open space)
- professional fees (both pre- and post-planning)
- s.106 and CIL
- marketing and finance

Source: Homes England, Dec 2021

Standard formula for calculating Residual Value:

GDV – TDC (including price paid for land) = Residual Profit[25]

(to calculate when land has already been purchased)

To calculate residual land value.

GDV - TDC (including profit) = Residual Land Value

(i.e. the amount the developer can afford to pay for land for the project to be viable).

Source: Homes England, Dec 2021

Marginal Viability

Marginal viability refers to situations where a project is barely profitable, with narrow margins between costs and revenues. If costs rise or revenue drops, the project may no longer be financially viable. In land development, it often applies to projects where additional costs (e.g., taxes or infrastructure expenses) could make the difference between projects proceeding or being cancelled.[26]

Identifying areas of marginal viability

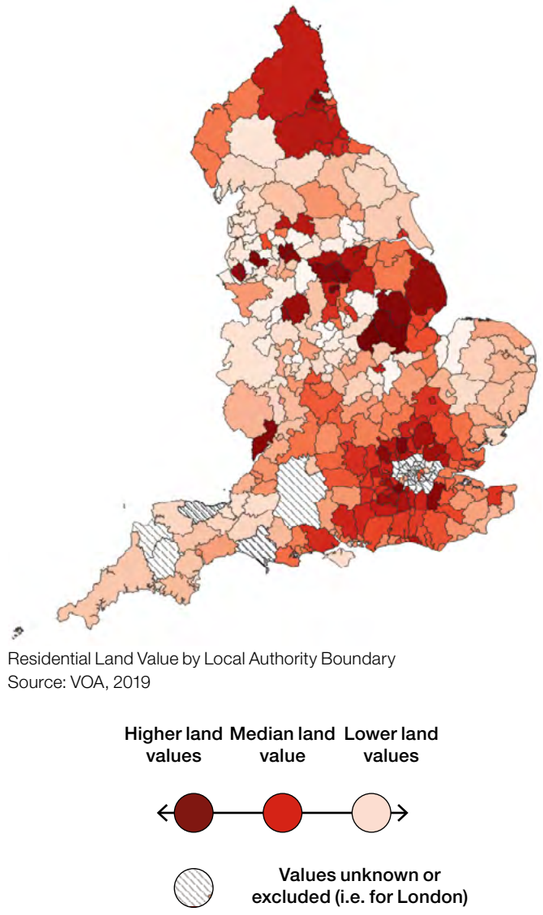
Two publicly available datasets have been used to appraise and identify where areas of ‘marginal viability’ may provide a particular challenge to delivering medium-density.

Residential Land Value data, Valuation Office Agency, 2019

The residential land value data from the Valuation Office Agency (VOA) provides values for land across England based on 35 residential units (3,150 sqm of floorspace) per hectare. The metrics for London are different.[27] However, London has substantially higher values and has been excluded from the dataset as it skews the data considerably. It is therefore not being considered as part of the case study research.

The median residential land value outside London has been identified as £2,130,000/ha.[28] All areas that are above this value have been excluded for appraisal from the longlist.

The 2019 VOA data is the latest available government dataset on land values in England, though it does not account for factors like the Covid-19 pandemic, inflation, or other recent financial impacts. It serves as an indicative baseline for comparison.



Residential Land Value by Local Authority Boundary
Source: VOA, 2019

24 Homes England, Financial viability for housing-led projects, Published 10 December 2021, last updated 10 December 2021
25 *ibid.*
26 Department for Communities and Local Government, Housing Infrastructure Fund: Supporting Document for Marginal Viability, July 2017

27 Land value estimates for policy appraisal 2019, VOA, 2019
28 *ibid.*

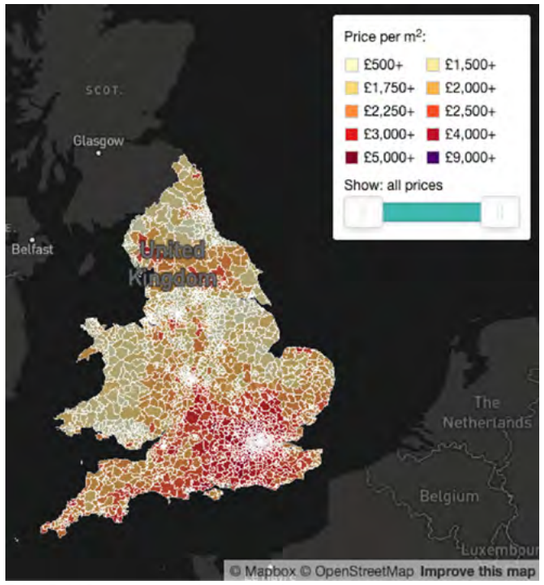
3 Research Methodology

Price Paid Data (2008-2018), per sqm, Anna-Powell Smith

The Price Paid Data (2008-2017), compiled by Anna-Powell Smith at the London School of Economics, offers more localised insights on housing prices per square meter, broken down by postcode. This data captures the final value of developments when sold. However, it is only current up to 2017 and doesn't reflect recent changes, especially in non-urban areas after the pandemic.

These two datasets were combined to identify sites with "marginal viability," where land values were high, but the price paid for land was low. This method offers a limited means of pinpointing areas with slim margins based on publicly available data. It is important to note that this approach doesn't account for many variables affecting Gross Development Value (GDV) or Total Development Costs (TDC).

Although the research focused on marginal areas, discussions with stakeholders revealed that the challenges identified are relevant across most parts of the country.



Price Paid Data, per sqm (2008-2017)
Source: Anna Powell-Smith, https://houseprices.anna.ps/

Horsted Park, Kent
Image Credit: Proctor Matthews Architects

4 Key Findings

1

A cycle of limited evidence restricting atypical development types

A lack of precedents for successful medium-density developments impacts commercial decisions, restricting the finances available to enable medium-density development

However, several SME developers across the UK are delivering medium-density developments through innovative housing models, contributing to the evidence and precedents available. This is happening despite the market being dominated by lower-density and suburban housing, which sets value and viability benchmarks that can constrain medium-density development.

In the UK, medium-density housing faces challenges due to the dominance of low-density housing types, such as detached and semi-detached houses, which are used as benchmarks by agents and surveyors informing decisions on new developments. Advice is often based on the market success and sales values of prevalent types. This limits the financing available for medium-density developments, as they are seen as higher risk due to the lack of precedent and market evidence.

‘Most UK housing is built through the “speculative model” (over 60% in 2021/22), where developers purchase land without knowing the final sale price. These models are reliant on an evidence-base of proven market success, reflected through the prevalent types. Consequently, the largest 11 housebuilders provide a significant proportion of homes in the UK (around 40% in 2021-22). This reliance on proven market success keeps large developers focused on low-density homes.[29] As a result, medium-density housing struggles to secure investment, with appraisers and lenders hesitant to support non-standard house types with lesser-known values. [30]

This challenge persists throughout the development process, affecting potential buyers as well. Mortgage lenders offer fewer options for those purchasing medium-density homes compared to standard house types. This limits the rate of sales and creates uncertainty for developers, reinforcing a cycle of high-risk decision-making and uncertain investments.[31]

Sky-House developers are known for delivering medium-density projects on small, challenging sites using innovative designs, like contemporary versions of back-to-back terraced housing. For their first project, they referenced a permitted scheme in Manchester that proposed a similar back-to-back house type to set a precedent for a new development in Rotherham.[32] This approach was supported by research and a strong narrative linking the development to Sheffield’s historic back-to-back tenements.[33] Although the Manchester scheme was never built, it provided enough evidence to secure funding for back-to-back terraces on a complex site in Waverley, which saw strong market demand.

These efforts show that medium-density developments can work, but more successful examples are needed to shift market perceptions and support financing. Ultimately, more case studies and evidence are needed to convince agents, valuers, and lenders that medium-density housing can be both viable and desirable, helping to break the cycle of low-density as the default.

29 Medium-density Research – Stakeholder Workshops, November 2024
30 *ibid.*
31 *ibid.*
32 *ibid.*
33 *ibid.*

2

A challenging planning context

Medium-density developments have often succeeded when developers, planners, and design teams effectively justify deviations from local policies and guidelines. Many local planning policies and national regulations aren't designed to support medium densities, especially in areas with marginal viability, creating additional challenges.

Planning policies typically rely on robust evidence, which is often based on existing development patterns. This can result in a backward-looking approach that reinforces existing housing types and doesn't encourage innovation or change.

Local interpretations of national legislation and existing local policies often conflict, especially around issues like car parking, privacy, and density, creating additional challenges for designers and developers. Many local policies and design guides have been developed with standard housing models in mind. They are typically reactive, relying on historic data of low-density, suburban development patterns. This makes it more difficult for non-standard housing types to navigate the planning process, which can become more complex and uncertain for such developments.

Stakeholders pointed out that many new housing developments can only achieve an average of 40 dwellings per hectare (dph) on brownfield sites or exceptional, well-connected greenfield sites. This is largely due to local policies concerning parking, roads, privacy, and amenity space. The density is often much lower on greenfield sites.[34]

The application of local policy or guidance is reliant on expertise within planning authorities to support a constructive process of design resolution. It is often not possible for developments to meet every criterion within local planning requirements and reflect national policy, particularly when these may be in conflict or out of date. The challenges described below highlight key local policy constraints that can become 'barriers to development when applied without exception'.[35]

34 Medium-density Research – Stakeholder Workshops, November 2024
35 *ibid.*

4 Key Findings

Local interpretation of national legislation

The key issues highlighted below ensure safer and more inclusive homes. However, collectively they can pose challenges for smaller sites trying to achieve higher densities in marginal viability contexts.

i. Approved Document M of the Building Regulations

"Part M is a national building regulation in England to ensure that people can access and use buildings and their facilities"[36].

The document categorises accessible dwellings as:

M4(1) Visitable Dwelling:[37]

Reasonable provision must be made for people to -

a. gain access to; and

b. use, the building and its facilities.

M4(2) Accessible and Adaptable Dwelling:[38]

1. Reasonable provision must be made for people to –

   a. Gain access to; and

   b. Use the dwelling and its facilities

2. The provision must be made sufficient to –

   a. Meet the needs of occupants with differing needs, including some older and disabled people; and

   b. To allow adaptation of the dwelling to meet the changing needs of occupants over time.

M4(3) Wheelchair User Dwelling:[39]

1. Reasonable provision must be made for people to –

   a. Gain access to; and

   b. Use the dwelling and its facilities

2. The provision must be made sufficient to –

   a. Allow simple adaptation of the dwelling to meet the needs of occupants who use wheelchairs; or

   b. Meet the needs of occupants who use wheelchairs.

Stakeholders note that many areas outside London require around 10% M4(2) compliant units that are accessible and adaptable.[40] House types such as walk-up flats or stacked maisonettes are not generally compliant with these requirements.[41] These targets are often met through larger apartment-blocks, which has cost implications on the overall viability of a development and can be challenging to deliver on smaller sites.

ii. Fire safety

New Fire Safety legislation (Approved Document B) doesn't apply to medium-density developments up to 6 storeys due to the requirement for a second staircase for buildings over 18m.[42] This can become a significant cost factor for these buildings.[43] Developments above 6 storeys often need to make efficiencies through the scale of the blocks, often through height or footprint, to make developments viable. This approach is better suited to larger sites and areas that can accommodate higher densities.

The statutory guidance also requires "sprinkler systems in accordance with BS 9251 (or BS EN 12845 for residential blocks of flats outside of the scope of BS 9251) to be fitted throughout blocks of flats with a top storey more than 11m (4 storeys or higher) above ground level".[44] This has some cost implications for medium-density developments of 4+ storeys, particularly where separate sprinkler systems are required for individual units.[45] It may also create some confusion around policy compliance for atypical house types like walk-up flats, maisonettes, and back-to-back terraces.

iii. Roads and highways

The local application of Highways Design Standards often creates a conflict between the extensive road infrastructure required by local policies, and the national policy for securing the efficient use of land.[46]

Stakeholders expressed frustration with the approach to road design as required by highway standards. NPPF Paragraph 117 seeks to give priority to pedestrian and cycle movements, and the Manual for Streets has provided guidance to this effect since 2007. Local adoption standards don't always align with these priorities.[47] Stakeholders argue that "highway design is not always people-centric, requiring streets to be designed around the use of bin lorries and articulated vehicles"[48] – leading to wider carriageways and more grey infrastructure than necessary for occasional vehicle use.[49]

Medium-density developments offer opportunities for compact, car free models of delivering housing. Examples of this can be ***seen in Marmalade Lane, Cambridge*** *connected by a guided bus route, and in* ***Vauban in Freiburg*** *which benefits from a tram link. The benefits of this, in terms of space savings can only be utilised if highway authorities are supportive.*

36 Ministry of Housing, Communities and Local Government, Ministry of Housing, Communities & Local Government (2018 to 2021) and Department for Levelling Up, Housing and Communities, Published 1 March 2015, Ref: ISBN 978 1 85946 747 3
37 Approved Document M, Access to and use of buildings, Volume 1: Dwellings, 2015 edition incorporating 2016 amendments for use in England
38 *ibid.*
39 *ibid.*
40 Medium-density Research – Stakeholder Workshops, November 2024
41 *ibid.*
42 Fire safety: Approved Document B, 2019 edition incorporating 2020 and 2022 amendments and forthcoming 2025, 2026 and 2029 changes – for use in England
43 Medium-density Research – Stakeholder Workshops, November 2024
44 Fire safety: Approved Document B, 2019 edition incorporating 2020 and 2022 amendments and forthcoming 2025, 2026 and 2029 changes – for use in England
45 Medium-density Research – Stakeholder Workshops, November 2024
46 *ibid.*
47 *ibid.*
48 *ibid.*
49 Jas Bhalla Works, A new development model for Essex, July 2023

4 Key Findings

Local policy requirements

i. Parking ratios

Car parking standards are set based on NPPF paragraph 112, often reflecting local car ownership, which is influenced by low-density housing models in many areas. Stakeholders argue that these standards are applied uniformly without considering local needs or public transport access.[50] They also point out that traditional parking ratios, which can take up 8-9% of a development site, restrict densities. For example, “exceeding 1.5 spaces per unit limits density to 40-50 dwellings per hectare (dph), and 2 spaces per unit reduces density to around 32 dph”.[51]

Parking requirements often favour door-front or on-plot parking, which works best for detached or semi-detached homes. This limits options for more efficient, consolidated parking areas like car barns or mobility hubs. Flexible parking solutions are better suited to medium-density developments, while planning for reduced future car ownership.[52]

The Malings *in Newcastle reduced parking ratios through negotiations with planning officers, freeing up land for public space and enhancing pedestrian and cyclist access to the waterfront.*

In Bristol’s ***Brabazon*** *development, parking was integrated into the ground floor of units, allowing residents the option to convert this space into habitable areas as car dependency decreases in the future.*

ii. Low density targets

Many planning authorities set low minimum density targets with little incentive to exceed them.[53] These targets, based on past densities and concerns about overdevelopment, are often set during site allocation. Low-density assumptions can hinder investment in and planning for social infrastructure and public transport, reinforcing a cycle of insufficient infrastructure capacity to support a higher population, and vice-versa.

iii. Back-to-back distances

Minimum back-to-back distances to prevent overlooking often requires a minimum of 21m between rear windows as defined by Raymond Unwin in the 1918 Tudor Walters Report.[54] Design policies set standards for privacy and light, such as through minimum distance requirements. However, rigid application of these standards can exclude house types that achieve compact development with reduced back-to-back distances, while still maintaining privacy.[55]

Case studies like the ***Malings*** *in Newcastle demonstrate the detailed, iterative design process required to address overlooking. The design achieves privacy through careful placement of windows and fenestration between homes.*

iv. Private Amenity

Minimum requirements for private outdoor amenity are often based on traditional housing models with private gardens, which may also influence planning officers’ expectations.

Stakeholders noted that developers struggle to justify alternatives like balconies, roof gardens, and courtyards where the precedent for such spaces does not exist.[56] They highlighted that planning officers are often in opposition to the size, level of security and atypical configuration of balconies, roof gardens and courtyards – particularly where they are provided in combination to collectively meet minimum targets.[57]

Case studies such as the Sky-House in ***Waverley, Rotherham and Goldsmith Street in Norwich****[58] demonstrate the success of such amenity spaces and their attractiveness to a wide range of occupiers.*

v. Balancing housing targets and a mix of homes

Stakeholders highlighted the challenge of delivering unit mixes that support mixed communities while meeting housing targets and addressing local land value variations.[59] Local policies on affordable housing and unit mix are often applied uniformly, ignoring demographic and land value differences.[60] In higher land value areas, there may be capacity for more affordable housing to be delivered.[61] Variations in land value impact the viability and mix of house types in developments. Developers noted that medium-density projects, already facing viability challenges, face additional hurdles in achieving a diverse mix of homes.

Stakeholders noted that government subsidies and grant funding, often provided on a ‘per unit’ basis, can unintentionally prioritise smaller units like studios and 1-beds, as developers receive more funding for these.[62] The reliance on grants to address financial gaps can impact the viability of medium-density developments, particularly for SME developers.

50 Medium-density Research – Stakeholder Workshops, November 2024
51 *ibid.*
52 *ibid.*
53 *ibid.*
54 Julia Park, One Hundred Years of Housing Space Standards: What Now?
55 Medium-density Research – Stakeholder Workshops, November 2024
56 Medium-density Research – Stakeholder Workshops, November 2024
57 *ibid.*
58 *ibid.*
59 *ibid.*
60 *ibid.*
61 *ibid.*
62 *ibid.*

The Triangle, Swindon
Image Credit: Paul Miller, courtesy of Glenn Howells Architects

4 Key Findings

Planning processes and uncertainty

The length, complexity and uncertainty of the planning process has been raised as a factor impacting the delivery of all types of housing. The Competition and Markets Authority (CMA) reports three key concerns with the planning systems which is limiting their ability to support the level of new housing that policymakers believe is needed:

a. Lack of predictability;[63]

b. Length, cost, and complexity of the planning process;[64] and

c. Insufficient clarity, consistency and strength of LPA targets, objectives and incentives to meet housing need.[65]

"A pre-application meeting might give an indication as to the possibility of success, but the advice provided is not binding – officers are free to reach a different conclusion once an application is submitted and they have responses from other consultees and members of the public".[66] Stakeholders pointed out that pre-application advice is non-binding, leading to uncertainty as applications may be rejected even after initial support.[67] This could stem from a lack of understanding of 'medium density' and limited precedents among planning officers and committee members.[68]

The costs for preparing a planning application and its related timescales for medium-density schemes on smaller sites are similar to those of larger developments on simpler sites. However, these are compounded by higher risk and more intensive design processes. Developing bespoke house types and compact layouts requires skill to address challenges like parking, bin storage, privacy, and social interaction. "A more considered approach is also needed to support social interaction and cohesion required in response to different households living in much closer proximity to each other".[69] These complexities often require additional resources, especially when they conflict with local policy, to achieve design resolution for planning submission.

Some stakeholders expressed frustration with overly prescriptive planning guidance and design codes, which hinder constructive collaboration with planning officers.[70] While this issue is common across all developments, it is more pronounced in medium-density projects due to:

- Smaller scale of development
- More complex and constrained sites
- Need to challenge local policy and interpretation of legislation
- A more resource-intensive design process
- Greater challenges in accessing capital funding
- Greater challenges in balancing viability with housing targets and unit mixes to support sustainable communities

CMA's research highlights that "SME developers are disproportionally impacted by financial implications of planning constraints in delivering more medium-density housing".[71] "Negotiating the planning system is the most significant of these barriers, followed by access to land".[72]

Research from MHCLG and Cambridge City Council shows that a supportive planning policy context can enable medium-density development with certainty.[73] In Cambridge, many typical requirements have been overcome, with most developments achieving a 60% houses/terraces and 40% apartments split. The council has no minimum back-to-back distances and allows for private open space to be distributed as terraces and courtyards, and balconies. This frees up space for public use. These developments achieve a 25-30% density uplift, averaging 45dph+, with the added benefits of own-door entrances and private open space at upper levels.[74]

63 CMA, Housebuilding Market Study, 26 February 2024
64 *ibid.*
65 *ibid.*
66 Paul Smith, Design codes will help fill our cities with the missing middle, Strategic Land Group, 1 April 2023
67 Medium-density Research – Stakeholder Workshops, November 2024
68 *ibid.*
69 *ibid.*
70 *ibid.*

71 CMA, Housebuilding Market Study, 26 February 2024
72 *ibid.*
73 Stephen Platt, New Neighbourhoods in Cambridge, 1 June 2024
74 *ibid.*

Abode, Great Kneighton, Cambridge
Image Credits: Tim Crocker, courtesy of Proctor Matthews Architects

3

Variation in housing types, market audience and future communities

The market for medium-density development is diverse, with people open to alternative living models that offer sustainability, community, and convenience. However, innovation in the housebuilding industry is limited, with SME developers often leading the way in design and construction, though their approaches are challenging to scale.

Medium-density developments offer a mix of housing types that appeal to a broad range of residents seeking convenience, sustainability, and community. These developments present a viable alternative to traditional detached and semi-detached homes, as seen in successful UK case studies presented in the following chapters.

Stakeholders emphasised the need for diverse housing options to meet varying needs and lifestyles, noting that while some may still prefer detached homes, this model can't meet all housing demand. There is a need and opportunity for diversification. [75] The case studies showcase the variety of homes delivered through medium-density schemes, including back-to-back homes, compact family homes, apartments, maisonettes, and townhouses.

The CMA's study found that "larger builders produce identikit housing". [76] Medium-density developers noted that while consumers often prefer more diverse options, they have limited choices. [77] The CMA study reports "diversification" as one of the many necessary conditions to enable an "increased supply of new housing and in turn, a functioning market".[78] The market is diverse, but it's being served by a largely uniform product.

Catering to a Diverse Market

An appraisal of medium-density developments in Cambridge highlighted the popularity of innovative house types, such as 'one lacking a back garden but with 3 good-sized balconies which sold out in the first weekend of sale'.[79] Stakeholders noted that buyers are open to atypical house types, as long as they are affordable and well-designed. [80]

In examples such as Brabazon in Bristol and Trent Basin in Nottingham, these house types have also proved popular with a 'wide range of audiences including: younger first time buyers in their 20s or early 30s; individuals or couples purchasing in their mid-late 30s with a view to living there for a good few years; couples keen to start a family or with children in their early years; parents whose children have moved away from home; and older people who are seeking the sense of community and convenience that denser, compact housing provides them.' [81]

75 Medium-density Research – Stakeholder Workshops, November 2024
76 CMA, Housebuilding Market Study, 26 February 2024
77 Medium-density Research – Stakeholder Workshops, November 2024
78 CMA, Housebuilding Market Study, 26 February 2024
79 Stephen Platt, New Neighbourhoods in Cambridge, 1 June 2024
80 Medium-density Research – Stakeholder Workshops, November 2024
81 *ibid.*
82 *ibid.*

Later-living accommodation at Chapter House, Lichfield
Image Credits: Tim Crocker, courtesy of Proctor Matthews Architects

4 Key Findings

Creating Sustainable Communities

Medium-density developments often feature a mix of house types, such as walk-up apartments, townhouses, terraces, and mews. These cater to diverse household types and foster varied communities in developments like Trent Basin and Brabazon. This mix aligns with different resident needs.[82]

Many of the developments mentioned above marketed a more sustainable and environmentally friendly lifestyle. Stakeholders also noted that the sustainability and environmental benefits of these projects, including potential savings on bills, are key selling points for new residents.[83]

The layout of these neighbourhoods encourages social interaction across different groups. House types like stacked maisonettes or terraces require neighbours to cross paths regularly, while in apartment blocks like those at the Malings or Trent Basin, shared spaces like bin stores and communal gardens foster interaction.[84] 'Post-occupancy evaluations of the Mailings highlighted that the sense of community and connection with neighbours is one of the development's key strengths.'[85]

Developers are increasingly focusing on creating 'lifetime neighbourhoods,' like at Brabazon in Bristol, which offer a variety of housing types to allow residents to move as their needs change, while staying within the same community.[86] Stakeholders noted the importance of this approach in a fast-ageing society with increased emphasis on enabling independent mobility and lifestyles. [87]

Economic Resilience

In Cambridge, developers intentionally diversified house types to make long-term developments more resilient to economic fluctuations. This was reflected in the types of housing, as well as tenure mix and the use of different delivery models.[88] Stakeholders highlighted the value of this approach for larger sites and long-term development that needed to withstand fast-changing market pressures,[89] as seen at Brabazon.

Illustrations for the approved new Jacob's Square development at the Phoenix in Lewes.
Image Credit: Ash Sakula

83 Medium-density Research – Stakeholder Workshops, November 2024
84 *ibid.*
85 *ibid.*
86 *ibid.*
87 *ibid.*
88 Stephen Platt, New Neighbourhoods in Cambridge, 1 June 2024
89 Medium-density Research – Stakeholder Workshops, November 2024

4 Key Findings

Opportunity for innovation

CMA's research found that SME housebuilders play a crucial role in diversifying housing types, using less standardised models than large house builders.[90]

Many medium-density developments occur on smaller brownfield or infill sites, where SMEs can afford to buy due to less competition from volume housebuilders. These sites often come with higher costs and constraints, requiring creative design solutions and innovative construction methods.[91]

SMEs are often leading on innovation through construction processes. However, stakeholders highlighted the challenges of implementing Modern Methods of Construction (MMC) in the open market. The delivery of medium-density housing often outpaces sales, creating considerable cash-flow issues[92] – "it takes 4 months [121 days] to build a house, and over 209 days to sell it".[93] To address this, stakeholders use semi-modular methods for pre-sold homes and traditional methods for open-market sales, slowing development to respond to market demand.[94] This slows down housing delivery, posing a barrier to meeting government planning priorities.

SMEs such as SkyHouse and CITU have utilised modular and semi-modular construction to deliver housing in Rotherham, Leeds and Sheffield. Stakeholders noted that while this method works well on simpler sites, it lacks the flexibility needed for complex, constrained sites. The real potential for MMC to impact housing delivery may lie within the volume housebuilding sector.'[95]

Opportunity for standardisation

Stakeholders stressed the need to integrate SME developers and medium-density development in larger sites for new settlements, urban extensions, and greenfield land. SME developers can't compete with volume builders on these sites, but they offer a unique product, catering to different market segments. This approach can bring diversity, innovation, and more medium-density options.[96]

Workshops highlighted potential synergies between SME developers and volume builders, combining innovation with standardisation. However, developers often invest heavily in their standard house types, making them reluctant to share or modify them.[97] Though standardisation of housing can be difficult across complex brownfield sites, it is possible on less constrained sites like urban extensions or new towns, as seen in international examples like Vathorst, Netherlands, where medium-density housing was successfully scaled up.

Kelham Central, Sheffield
Image Credit: Citu

90 CMA, Housebuilding Market Study, 26 February 2024
91 Medium-density Research – Stakeholder Workshops, November 2024
92 *ibid.*
93 *ibid.*
94 *ibid.*
95 *ibid.*
96 *ibid.*
97 *ibid.*

4

Overlapping commercial challenges

Developers are making medium-density work commercially through long term investment in neighbourhoods, implementing a regeneration and placemaking approach. However, upfront costs, investment, and financing challenges can make medium-density development difficult, regardless of the site context.

Medium-density developments face challenges in financing due to the complexity of combining different house types, each with its own risks, funding needs, and policy issues. These include higher upfront costs, cashflow issues, and greater risk from the atypical nature of the development.

'A range of variables inform the viability of a housing development, including: the cost of land, the cost of construction, build out rate, cash flow, cost of planning commitments (S106, CIL, affordable housing) and the eventual sale price and profit margins'.[98] These costs vary by location, making each development unique and difficult to generalise based solely on geography.

Stakeholders outlined 3 distinct types of risk relevant to medium-density housing development.

1. **Sales risk:** Selling directly to a wide range of consumers introduces greater risk relative to developments that are sold to a single institutional investor (such as student housing or build-to-rent apartment blocks). Multiple homes need to be sold to multiple buyers, so there is less certainty than when selling a single product.[99]
2. **Developer risk:** The development of blocks or terraces with multiple, joined up units presents a higher risk than detached or semi-detached housing. This is due to the need for all the units in a block to be built at once, including the necessary infrastructure and amenity. A whole block needs to be completed to sell a single home, and this presents a challenge for cash flow. By comparison, the rate of construction (and cashflow) for detached and semi-detached housing can be adjusted to align with market demand. Lower density housing provides more opportunities to stop development in response to external pressures or financial uncertainty.[100]
3. **Capital lock up:** Medium-density developments require greater upfront investment before any potential returns, thereby creating a less favourable investment and lending positions and a slower process of meeting profit margins.[101]

Stakeholders highlighted that "higher profit margins, contingencies or gap funding may be required to offset the impact of these risks to successfully increase the delivery of medium-density housing".[102] Site complexities, greater abnormal costs are often not reflected in addressing planning requirements, S106 and CIL payments'.[103] Stakeholders agreed that profit margins need to reflect the level of risk, unless other financial mitigations or interventions are provided to enable medium-density developments to become viable more widely.

98 Medium-density Research – Stakeholder Workshops, November 2024
99 *ibid.*
100 *ibid.*
101 *ibid.*
102 *ibid.*
103 *ibid.*

4 Key Findings

Case studies have shown that medium-density proposals and a careful selection of the development form can support viability positively. For example, the 'initial proposals for Brabazon Phase 1 were typical low-density houses as per its surroundings. These were deemed unviable at the time and replaced with a higher density development which was more viable'.[104]

In contrast, at the Malings in Newcastle, the 'previous proposals for a higher density tower block were replaced by a comparatively lower density and lower-rise development. The factors impacting the viability of medium-density development may vary to reflect market demands as much as its spatial or density context'.[105]

Medium-density proposals often focus on regeneration, developing sites in existing or emerging neighbourhoods where investment can drive broader renewal and land-value increases, supporting long-term financial returns. Case studies show that these developments are typically located in areas with higher local land values, driven by factors like established employment, transport, amenities, and retail.

Developments like Brabazon showcase a phased, long-term approach, where Phase 1 acts as a marketing tool for later phases. This strategy justifies higher upfront investment in key strategic sites by generating increased values over time. YTL Development's focus extends beyond housing, incorporating employment, social, and cultural infrastructure to build a sustainable, community-oriented neighbourhood.[106]

Similarly, developers like Igloo, responsible for Trent Basin and the Malings, are committed to the area's long-term regeneration. By acquiring additional sites as the neighbourhood evolves, they take a proactive role in development, guided by their "Footprint Process," which shapes their approach to building a cohesive, sustainable community.[107]

Cost and regulatory considerations

A high-level appraisal of standard building costs demonstrates that building apartments costs about 55% more per square foot than terraced houses, creating a higher financial threshold for their viability.[108]

Stakeholders note that medium-density apartment blocks often struggle to generate sufficient profit, especially in areas with low land value or high construction costs.[109] Unsellable communal spaces, like stairs and corridors, further reduce sales prices compared to houses or maisonettes.[110] Apartment blocks are also less space-efficient, with a net-to-gross ratio of 75-80%. In contrast, stepped-access apartments and stacked maisonettes are more efficient, offering a better floor-to-wall ratio and more saleable space.[111]

However, apartment blocks allow for a higher proportion of Approved Document M compliant units. It can be more challenging for house types such as flats with stepped-access or maisonettes to meet fire safety requirements (Fire Safety: Approved Document B) for sprinkler systems.

104 Medium-density Research – Stakeholder Workshops, November 2024
105 *ibid.*
106 *ibid.*
107 *ibid.*

108 *ibid.*
109 *ibid.*
110 *ibid.*
111 *ibid.*

Long-term masterplan for Brabazon, Bristol
CGI for illustrative purposes only. Image Credit: YTL Developments

5

Infrastructure as enabler

The potential for introducing medium densities is largely informed by proximity to key infrastructure – supporting compact, convenient and sustainable lifestyles.

Delivering new medium-density developments or optimising the density in established neighbourhoods is contingent on access to transport and local amenities enabling compact development.

Delivering medium-density developments is primarily contingent on access to transport and local amenities. Upgrades to public transport, community, and health facilities are crucial for justifying and promoting these developments. Most case studies reviewed benefit from [proposed and existing] strategic transport links, retail clusters, employment hubs, and social infrastructure. This aligns with MHCLG's guidance on housing density, emphasising the need for walkable neighbourhoods to reduce vehicle use and parking demand.[112] Stakeholders argued that proximity to infrastructure supports denser developments, which in turn are sustained by a critical population mass.[113]

Stakeholders highlighted the challenges for delivering medium-density housing in green belt or peripheral locations without good transport connections. Many of these sites are dependent on car use, at least in the early years, as well as lacking the critical mass to support neighbourhood-level infrastructure. Stakeholders suggest that proximity to transport infrastructure is a more influential consideration in the viability of a site for medium density, than whether it is 'green belt' or 'grey belt'.[114]

Stakeholders identified infrastructure constraints as a major barrier to medium-density development. Case studies show that these developments are often delivered in smaller parcels, relying on external infrastructure provided by the public sector or other organisations. The phasing and timely delivery of both strategic and local infrastructure are key to enabling larger medium-density projects.

The successful developments reviewed by MHCLG and Cambridge City Council highlighted the importance of delivering social and physical infrastructure in the early phases, such as healthcare and community facilities, before establishing the residential community. Consolidating parking early on also helps enable more compact, higher-density future development.[115]

112 MHCLG, Effective Use of Land, Paragraph: 004 Reference ID: 66-004-20190722, Revision date: 22 07 2019
113 Medium-density Research – Stakeholder Workshops, November 2024
114 *ibid.*
115 Stephen Platt, New Neighbourhoods in Cambridge, 1 June 2024

Brick House, Birmingham
Image Credit: Greg Holmes, courtesy of Glenn Howells Architects

5 Recommendations

Evidence shows that medium-density development, as defined in this study, is occurring nationwide, even in areas with challenging viability. However, these projects are typically led by SME developers and remain exceptions. The research identifies several barriers to expanding the market share of medium-density developments. The recommendations aim to gather more information and address these challenges to make medium density a standard development option.

Research

- Collate a data base / library of shared knowledge of medium-density housing types, with comparable construction costs, benchmark values and a commentary on their wider benefits (including post-occupancy surveys).
- Review and collate policies, local plans and their evidence that are supportive of medium densities in the appropriate locations to share knowledge and provide guidance (see below)
- Further investigate the viability and funding challenges and investigate levers to overcome these.

Education and knowledge sharing

- Share knowledge (and database) of existing medium-density case-studies with planning officers and members, encouraging them to contribute with local precedents.
- Demystify density: explain how density relates to existing places, such as historic market towns, and how they relate to different scales and house types. Support officers and members to make informed decisions on the wider benefits of medium-density development.

Policy and planning

- Undertake peer reviews of Local Plans and policies to ensure they are supportive of medium-density development in appropriate locations.
- Provide guidance on how to prepare evidence for forward looking policy supportive of medium-density and share existing evidence and policies for others to learn from.
- Highlight the opportunity created by devolution for funding and housing to integrate housing delivery alongside transport and other infrastructure as well as the opportunity created through delivery of new towns.

Partnerships

- Bring together different professional organisations departments and agencies around the topic of medium density to address barriers and challenges, including RICS, RIBA, RTPI, Homes England, DfT and New Towns Task Force.
- Promote and encourage partnerships / collaboration between SME developers and National Housebuilders (e.g. through Housing Delivery Frameworks).

6 Case Studies

Waverley, Rotherham

Location: **Waverley, Rotherham, UK**

Local Planning Authority: **Rotherham Metropolitan Borough Council**

Developer: **Harworth Group**

Architect / Design team: **CODA Architecture**

Year of completion: **2020**

Development type: **Brownfield**

Site context: **Former industrial site on the outskirts of Sheffield and Rotherham**

Size of site: **0.46ha**

No. of homes: **44**

Unit mix: **91% - 2B; 9% - 4B**

Tenure mix: **90% private; 10% affordable**

Car Parking: **48 spaces**

Density measures

Gross density: **96 dph**

Net density: **96 dph**

Plot Ratio: **1.04**

Site coverage: **0.35**

Heights and Typologies: **3 storey back-to-back terraced housing**

Note: Net density excludes significant areas of open space, landscape buffers, and main vehicle access routes

Image Credit: Sky House

Summary of Development

Over the last decade, Harworth Group has been developing a new neighbourhood at Waverley, on the outskirts of Sheffield and Rotherham. Once completed, it will feature 3,000 new homes, an Advanced Manufacturing Park, a school, and 300 acres of green space. Harworth invited Sky House to propose medium-density housing for challenging sites within the masterplan area.

Sky House's Phase 01 and 02 included 3-bed "Sky Houses" and 4-bed end-special townhouses with roof terraces. While most of the masterplan features detached and semi-detached homes, Coda Architects developed a strategy for medium-density housing at Highfield Commercial—a large, strategically located site between residential areas and the manufacturing park. This site faced significant constraints due to its topography, requiring a more innovative approach to achieve higher densities.

Part of this site became the 'Olive Lane' development, a primarily commercial, town-centre development with residential uses to the south. This was one of the final phases of the wider masterplan.

Strategic spatial configuration

A wider Master Plan Development Framework was approved for the entire site as part of the outline planning permission, with reserved matters applications required to align with this framework. The layout features four linear blocks arranged symmetrically, with parking courts between them. The site fronts Waverley Walk, a key east-west route connecting the mixed-use centre to the lakeside. A south-facing pocket park at the centre of the site offers amenity space for residents.

6 Case Studies

Architecture and building typologies

Two sizes of homes (two-bed and four-bed) are arranged in a back-to-back formation, allowing for higher density development and contributing a more contemporary design to the Waverley area. The two-bedroom homes, which make up most of the site, feature three floors of living space and a south-facing roof garden. The larger family homes have private gardens. This medium-density approach is supported by its proximity to commercial and town centre uses.

Previous projects in Manchester and Leeds, along with Sheffield's historic back-to-back tenement precedents, helped the developer advocate for this type. Despite support from the local authority and agents, the developers faced tough negotiations with the highway authority to reduce parking allocation to one space per unit.

The development used semi-modular construction, which allowed for fast building but slower sales (with construction outpacing purchase), impacting cash flow.

Delivery and management model

The primary housing type features three-storey homes with a single aspect, backing onto another and each having a roof terrace. The planning authority considered this design undesirable for elderly occupants and young families, and it was also deemed unattractive to social housing providers. As a result, a commuted sum for off-site affordable housing delivery was agreed at 40% of the open market value of each home.

The homes were sold on the open market, with a management company established to maintain shared spaces for up to two years. After that, residents could decide on the best operators for site upkeep. The homes were sold as freehold, which appealed to some buyers.

Although the housing was popular and sold well, the developer noted that construction costs were higher than expected, and the homes sold for less than anticipated. This was partly due to surveyors advising mortgage lenders to value the back-to-back units below the expected price, as there were no local precedents. Lenders also disapproved of the service charge for freehold properties, making it difficult for potential buyers to secure mortgages.

Image Credit: Sky House

Image Credit: Sky House

6 Case Studies

Climate Innovation District

Location: **Leeds, UK**

Local Planning Authority: **Leeds City Council**

Developer: **Citu Group Developments Ltd**

Architect / Design team: **White Arkitekter**

Year of completion: **April 2026**

Development type: **Brownfield**

Site context: **Former industrial site, adjacent to River Aire**

Size of site: **2.4ha**

No. of homes: **318**

Unit mix: **30% - 1B; 31% - 2B; 12% - 3B; and 28% - 4B (approx.)**

Tenure mix: **95% private, 5% affordable**

Car Parking: **242 spaces**

Density measures

Gross density: **132 dph**

Net density: **161 dph**

Plot Ratio: **1.39**

Site coverage: **0.31**

Heights and typologies: **3-4 storey houses; 5-10 storey apartment blocks**

Image Credit: Citu

Summary of Development

The Climate Innovation District (CID) in Leeds, located across two sites on the River Aire, is transforming a former industrial area into a sustainable, walkable neighbourhood. Using cutting-edge technology, it prioritises climate resilience. Homes at Phase I of the district were released for sale in November 2017 and the first residents moved in early 2019, with later phases adding more homes and commercial spaces, connected by a new pedestrian bridge.

Strategic spatial configuration

The development features medium-density housing, including terraces and flats, designed to maximise natural light and river views towards the south and west. Buildings are layered to fit the site's topography, with family homes by the river and taller apartment blocks behind, plus mews and townhouses in between. A generous public space along the riverside, with pedestrian and cycle routes, connects to the city centre, South Bank, and riverside walk. The car-free spaces between houses create a pedestrian-friendly environment, which wouldn't be possible with front-door parking or bins.

6 Case Studies

Architecture and building typologies

The development draws on Scandinavian design, with diverse materials and building types creating a distinctive character to this future-facing development. The mix of houses and apartments includes private amenities like balconies and roof gardens. Townhouses are arranged back-to-back for thermal efficiency and as a nod to Leeds' architectural heritage.

Using a Passive House Planning Package (PHPP), the homes meet near Passivhaus standards. Features like passive solar gain, rooftop PVs, and a resident app to manage heating and appliances boost energy efficiency and lower heating costs.

Delivery and management model

To ensure quality and speed, Citu built an on-site manufacturing plant to produce timber-frame housing systems for all the homes. For long-term management, Citu established a Community Interest Company (CIC), a non-profit that owns and oversees the development, with residents having decision-making power. While most homes are for private sale, Leeds Community Homes, a local community-ked housing group, has acquired some properties for shared ownership.

Image Credit: Citu

Image Credit: Citu

6 Case Studies

The Malings, Ouseburn Valley, Newcastle

Location: **Newcastle upon Tyne, UK**

Local Planning Authority: **Newcastle City Council**

Developer: **Carillion Igloo - Now PfP-Igloo**

Architect / Design team: **Ash Sakula**

Year of completion: **2017**

Development type: **Brownfield**

Site context: **Former factory site, adjacent to Ouseburn River.**

Size of site: **0.61ha**

No. of homes: **76**

Unit mix: **18% - 1B; 43% - 2B; 32% - 3B; and 7% - 4B (approx.)**

Tenure mix: **100% market sale**

Car Parking: **78 spaces**

Density measures

Gross density: **94 dph**

Net density: **123 dph**

Plot Ratio: **1.64**

Site coverage: **0.41**

Heights: **3-6 storeys**

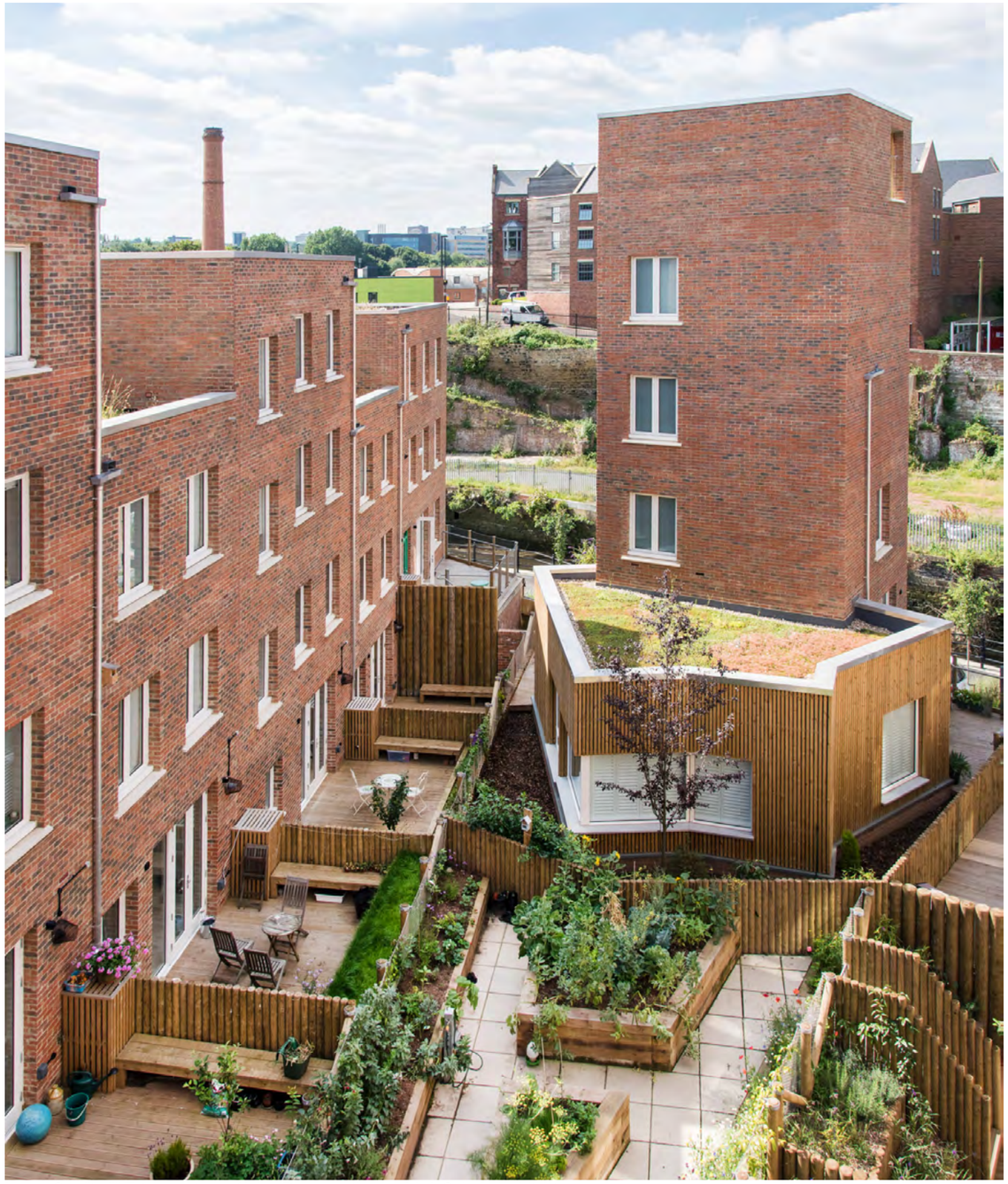


Image Credit: Jill Tate, courtesy of Igloo Regeneration and Ash Sakula Architects.

Summary of Development

PfP Igloo has created a sensitive, balanced development on a sloped site by the River Ouseburn, with 76 new homes featuring private entrances, terraces, or small gardens. Three commercial units on the ground floor activate the street and serve as community hubs. Co-designed with residents, this award-winning project marks a successful first phase in the broader Ouseburn area regeneration.

Development History

The development lies west of the city centre, next to the Byker Estate. The Ouseburn area had long faced investment challenges, and the site was promoted by the council and agencies for years. A masterplan from 2006 envisioned the Malings as the first phase of broader redevelopment. Initially proposed as a tower block, the idea was deemed unviable, and the site was eventually taken over by Igloo Regeneration.

Footprint Process

The decision for a medium-density proposal stemmed from Igloo's 'Footprint' process, guiding all their projects from acquisition to delivery. This approach prioritises sustainability, regeneration, and community focus. It also involves selecting top designers through a competition to address the site's unique characteristics early on.

6 Case Studies

Strategic spatial configuration

The design was driven by a target of 70 homes, the minimum required to make the development viable, given site constraints and development abnormals due to its former industrial use. The five splayed blocks are oriented to maximise river views and create direct routes to the water. Careful consideration of separation distances ensures privacy despite the dense layout. The challenging topography allowed for a stepped roofline, adding to the development's character, with two taller six-storey elements breaking the skyline.

Architecture and building typologies

The site's topography led to a bespoke design with varied housing types, praised by residents for maximising natural light. Low walls and planters at boundaries encourage neighbourly interactions, supported by communal growing spaces and micro allotments. Private amenities include small gardens, balconies, roof terraces, and a central open space.

The development's high quality is attributed to the architectural team's persistence, addressing issues like mitigating overlooking through window placement and reducing parking while consolidating bin stores to foster community interaction. A thorough, evidence-based approach helped secure planning approval.

Delivery and management

The homes were sold on the open market to a diverse range of buyers, from young individuals and couples to 'empty nesters' seeking a more connected lifestyle. Key selling points included proximity to cultural and community amenities, along with lower operational and maintenance costs.

Post-occupancy evaluations revealed that a strong sense of community and knowing neighbours was a top benefit for residents. In collaboration with the Ouseburn Trust, residents established a community fund, which supports local initiatives and social events within the development.

Image Credit: Jill Tate, courtesy of Igloo Regeneration and Ash Sakula Architects.

Image Credit: Jill Tate, courtesy of Igloo Regeneration and Ash Sakula Architects.

6 Case Studies

Trent Basin, Nottingham

Location: **Nottingham, UK**

Local Planning Authority: **Nottingham City Council**

Developer: **Blueprint + Igloo Regeneration**

Architect / Design team: **Marsh Grochowski Architects and Sarah Wigglesworth Associates**

Year of completion: **2016; 2020**

Development type: **Brownfield**

Site context: **Former cargo factory serving the Trent Basin**

Size of site: **0.88ha**

No. of homes: **45; 31**

Unit mix: **18% - 1B; 43% - 2B; 32% - 3B; and 7% - 4B (approx.)**

Tenure mix: **100% market sale**

Car Parking: **61 spaces**

Density measures

Gross density: **57 dph**

Net density: **61 dph**

Plot Ratio: **1.29**

Site coverage: **0.42**

Heights and Typologies: **3-6 storeys including townhouses, mews, maisonettes and apartments**

Image Credit: Courtesy of Igloo Regeneration

Image Credit: Courtesy of Igloo Regeneration

Summary of Development

This development is the first phase of the larger Trent Basin regeneration, which will eventually include around 500 new homes in a sustainable riverside community. The outline planning and reserved matters for Phase 1 were approved in 2014, delivering 41 homes, while Phase 2 added 31 homes. Phase 3 received approval in 2023.

Development History

The site was originally the Nottingham Port, built in the 1920s and largely unused by the 1950s. Several regeneration attempts were made, but earlier proposals, which focused on higher-density flatted developments, proved financially unviable at the time.

6 Case Studies

Footprint Process

The decision to pursue a medium-density proposal came from Igloo's 'Footprint' process, which guides all their projects from acquisition to delivery. This approach emphasises high-quality design and a deep understanding of the site's opportunities from the outset.

Strategic spatial configuration

The design maximises the river location, with many homes featuring large windows and terraces offering water views. A green street follows the natural path to the river, providing a landscaped route for walking, cycling, and vehicles. Connections to nearby amenities, like Colwick Park, and cycling routes to the city centre (just 10 minutes away) have also been incorporated.

Architecture and building typologies

The development features a variety of housing types across different phases, including Amsterdam-inspired townhouses with roof terraces fronting the river, taller apartment blocks, and other house types like mews, flats, and maisonettes. Most homes offer private gardens, balconies, or terraces to maximise views. The popular 3-storey townhouses with roof terraces and the upside-down mews homes sold quickly, proving more viable than apartments, which allowed the latter to be included in the overall plan.

Energy efficiency has been central to the design, alongside exploring community energy schemes.

Delivery and management model

In the early 2000s, Igloo, the long-term development manager for Blueprint, proposed a medium-density development for the site to meet the demand for family housing near the city centre. Buyers purchased directly from Blueprint, and a residents' association was formed.

This development set a precedent for future projects, with Nottingham Community Housing's private sale arm, Pelham, acquiring sites nearby to deliver similar medium-density housing. The Trent Basin scheme also served as a model for the local authority to advocate for higher design quality and standards in future developments.

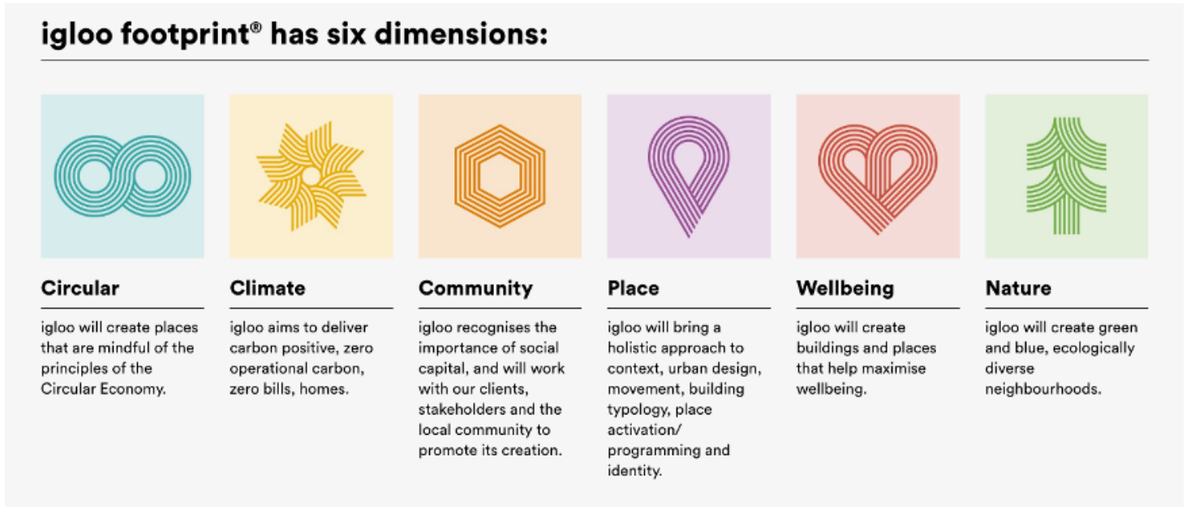


Image Credit: Courtesy of Igloo Regeneration

Image Credit: Courtesy of Igloo Regeneration

6 Case Studies

The Hangar District at Brabazon (Bristol, BS34)

Location: **Bristol, UK**

Local Planning Authority: **South Gloucestershire Council**

Developer: **YTL Developments**

Architect / Design team: **Feilden Clegg Bradley Studios**

Year of completion: **2024**

Development type: **Brownfield**

Site context: **Former airfield**

Size of site: **4.10ha**

No. of homes: **302**

Unit mix: **23% - 1B; 39% - 2B; 25% - 3B; and 13% - 4B**

Tenure mix: **84% private, 16% affordable**

Car Parking: **428 spaces**

Density measures

Gross density: **68 dph**

Net density: **Unknown**

Plot Ratio: **Unknown**

Site coverage: **Unknown**

Heights and Typologies: **2-6 storeys**

Image Credit: YTL Developments

Summary of Development

Located on the former Filton Airfield north of Bristol city centre, Brabazon will become one of the largest new neighbourhoods in the South West. Overall, the community will host up to 6,500 homes. The Hangar District – the first residential phase - has delivered 302 of them. Alongside the residential provision, the west of England's largest urban park will be built, as well as a new local centre with a range of amenities, and a new railway station.

The iconic Brabazon Hangars, where every UK Concorde was built, will be repurposed into a 19,000-capacity arena. Hangar 16U will become a community hub. The area's aviation heritage will be preserved through a heritage trail, signage, and design features, connecting to the Aerospace Bristol Museum and a local cluster of engineering, aviation, and technology companies.

Development History

The site was previously leased to Airbus but became redundant as the local aviation sector shifted focus from manufacturing to research and development. It was then brought forward for redevelopment.

Located 4.5 miles from Bristol city centre and near a major retail hub, the site is surrounded by suburban housing. Initial proposals suggested low-density housing, in keeping with the surrounding area. However, Bristol's Core Strategy, established around 2010, set a housing target of 2,700 homes for the site and highlighted the need for investment in transport and social infrastructure, including a new station.

YTL Developments acquired the site in 2015 with a vision for higher densities and a more mixed-use scheme, driven by planned transport upgrades and the growth of nearby employment clusters. As a long-term investor with a focus on placemaking, YTL aims to establish the area as a distinct, vibrant neighbourhood.

6 Case Studies

Strategic spatial configuration

The approved design code outlines principles for a diverse, picturesque urban setting, featuring a mix of buildings and homes. It aims to create intimate, human-scale streets not typically seen in suburban areas. Building height and density increase towards the south, where the future urban centre and train station will be located. The development will be arranged around a network of connected, legible streets, with a sweeping crescent of homes marking a bold arrival gateway. Perimeter blocks will create active street edges, with front doors and a mix of private and communal amenity spaces at the centre

Initially, the developer followed the original masterplan, maintaining the target of 2,700 homes. However, they revised the plan to allow for higher densities of up to 200 dwellings per hectare (dph) around the new urban centre and transport hub, closer to the employment cluster.

Phase 1, the Hangar District, achieved an average density of 70dph, serving as a proof of concept for higher density, mixed-use development. This phase demonstrated that Brabazon could support a large-scale mixed-use scheme, including a 19,000-capacity arena and conferencing facilities. As a result, YTL Developments have submitted and received approval for a revised masterplan that supports up to 6,500 homes. Full delivery of these additional homes will depend on collaboration with the public sector to enhance rail connections and improve public and active travel links.

Architecture and building typologies

In The Hangar District, larger apartment blocks define the edges of the site, while smaller two-storey homes line the quieter internal streets. Future phases plan to include larger Build-to-Rent (BTR) apartment blocks, as a mix of tenures will be crucial for quickly increasing the residential population and supporting the full range of proposed uses.

Some house types feature roof designs inspired by aviation, with tail fin-like angles that maximise solar exposure for PV panels. The family homes are designed to optimise daylight, with some offering double-height spaces.

Currently, the development provides 1 or 2 parking spaces per property, depending on the type of home, due to the area's limited public transport options. However, parking provision is expected to decrease in future phases once rail connections and public transport links are improved. Some of the terraces housing units provide parking garages as part of the built development, allowing residents to convert these into habitable space in the future.

Image Credit: Rebecca Noakes, courtesy of YTL Developments

Image Credit: Rebecca Noakes, courtesy of YTL Developments

6 Case Studies

Delivery and management model

When YTL Developments acquired the large former airfield, it was relatively low in value. The company, specifically set up for this project, was driven by both local housing needs and the YTL Group's extensive experience in large-scale urban regeneration in international markets.

YTL has taken a long-term, strategic approach to developing Brabazon, with a strong focus on placemaking at every stage of the project, ensuring the development creates lasting value and a vibrant community.

"People will be looking at Phase 1 to make a decision about buying in Phase 10 – it needs to uphold quality in the long term".

Image Credit: YTL Developments

6 Case Studies

Farnworth Green, Bolton

Location: **Bolton, UK**

Local Planning Authority: **Bolton Council**

Developer: **Capital and Centric**

Architect / Design team: **BDP**

Year of completion: **Under construction**

Development type: **Brownfield**

Site context: **Town centre site, occupying the former Market Precinct**

Size of site: **1.03ha**

No. of homes: **97**

Unit mix: **53% - 1B; 41% - 2B; and 6% - 3B (approx.)**

Tenure mix: **85% private, 15% affordable**

Car Parking: **66 spaces**

Density measures

Gross density: **93 dph**

Net density: **103 dph**

Plot Ratio: **1.09**

Site coverage: **0.33**

Heights and Typologies: **2-5 storeys including apartments and townhouses**

Summary of Development

Located at the heart of Farnworth town centre, this mixed-use development introduces 97 new homes alongside commercial and public spaces. Aiming to restore Farnworth's strong market and high street identity, the project seeks to contribute positively to the town's future.

Strategic spatial configuration

Spread across five blocks, the development creates a new market square and serves as a gateway into the town. Integration with the existing urban fabric is a priority, with new pedestrian links to key locations like the bus station. Active edges and flexible spaces will revive the town's market identity and support a modern, adaptable marketplace.

Architecture and building typologies

The development features a mix of apartments and townhouses framing the new public spaces. Varying building heights and angular roof designs, along with bold materials, will create a distinctive identity while responding to the area's historic character.

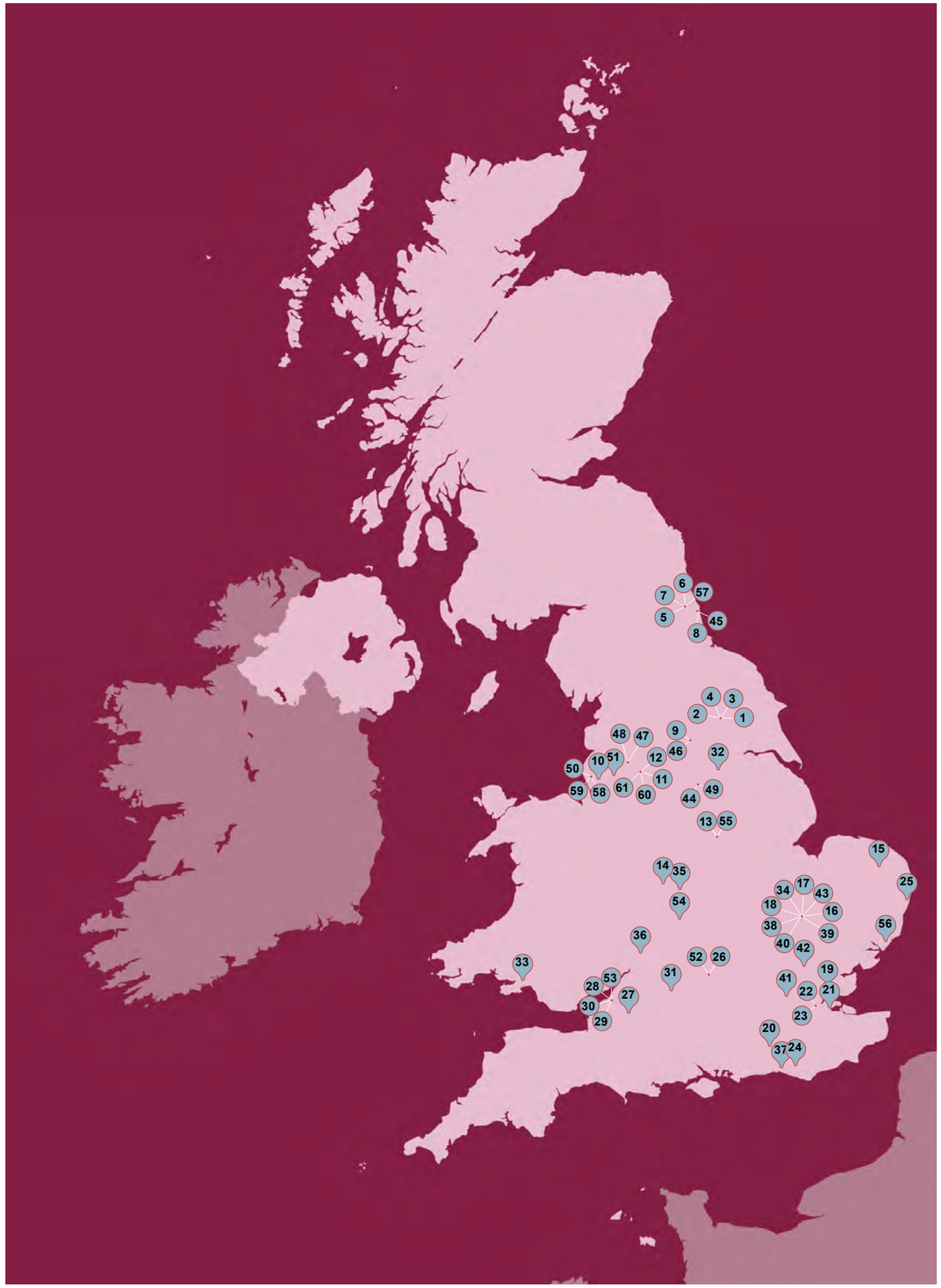
Delivery and management model

The project will be funded through a combination of public and private investments, with the goal of driving broader regeneration benefits for Farnworth.

Appendix

7 Longlist of examples

1. The Chocolate Works Phase One
2. Lowfield Green
3. New Lodge Community
4. Duncombe Barracks and Burnholme
5. Cohut
6. The Mailings
7. Lower Steenbergs Yard
8. Vaux
9. Ironworks
10. Watch Factory Phase 2
11. Town House @ Irwell Riverside
12. Manox
13. Boots Enterprise Zone
14. Port Loop Phase 1A
15. Goldsmith Street
16. Abode phase 2, Great Kneighton
17. Marmalade Lane
18. Knights Park
19. Beechwood Village
20. Highwood Mills (extra care)
21. Rochester Riverside Phase 1B
22. Alkerden Gateway
23. Ebbsfleet Harbour Village
24. Jacob's Square, Phoenix Housing
25. Tibby's Triangle
26. Barton Park
27. Mulberry Park
28. Bonnington Walk
29. Leinster Avenue
30. Paintworks Phase III
31. Oakfield
32. The Gables
33. Beacon hill
34. Darwin Green BDW5&6
35. Arden Cross
36. Friars Orchard/ Kiln Close
37. New England Quarter*
38. Trumpington Meadows
39. Great Kneighton
40. Seven Acres
41. Iroko, Coin Street
42. Newhall Be
43. Waterbeach
44. Little Kelham
45. Nile + Villers
46. Leeds Climate Innovation District
47. Farnworth Green
48. Neighbourhood Bolton
49. Waverley - Skyhouse
50. The Gables, Crosby (Sefton)
51. Heald Farm Court
52. The Curve, Between Towns Road
53. Brabazon Phase 1
54. Arden Quarter
55. Trent Basin
56. Garrison Lane (Deben fields)
57. Smiths Dock
58. Laurel and Laburnum
59. East Float Phase 1 (Redbridge Quay)
60. Valette Square
61. Timekeepers Square



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Ministry of Housing, Communities and Local Government

Joanne Preston

Sarah Allen

Thomas Barrett

External stakeholders and contributors

Amy Waite, Mikhail Riches

Andrew Matthews, Proctor & Matthews

Andy Smith, SQW

Atam Verdi, Aspinall Verdi

Beth Allen, Ash Sakula

Cany Ash, Ash Sakula

Chris Wilkinson, Homes England

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David Cross, Sky House

Ernst ter Horst, Fielden Clegg Bradley

Garry Hall, Homes England

Guy Rochez, TOWN

Jas Bhalla, Jas Bhalla Works

John McLean, Vistry

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