MAYOR OF LONDON

The Optimisation Framework: Methodology Report

Draft London Plan

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The report is broken down into the following two sections which explains the need for a revised approach to site optimisation and the technical methodology that sits behind this new approach.

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Executive summary

LONDONASSEMBLY

EXECUTIVE SUMMARY

- The Optimisation Framework was developed following a review of the London Plan's previous density and optimisation policies. This review evaluated previous methodologies, notably the Density Matrix and subsequent design-led approach. It concluded that the Density Matrix provided a degree of clarity through quantifiable benchmarks but was constrained by overly broad spatial categories and an excessive focus on numerical outputs. Conversely, the design-led approach introduced greater flexibility and encouraged site-specific responses; however, it lacked a clear strategic framework, resulting in uncertainty and variability in how optimisation was interpreted across different boroughs. As a result, the Optimisation Framework puts in place a more nuanced approach which sets a more strategic framework, providing clearer parameters for site-specific design responses to be carried out as part of the process.

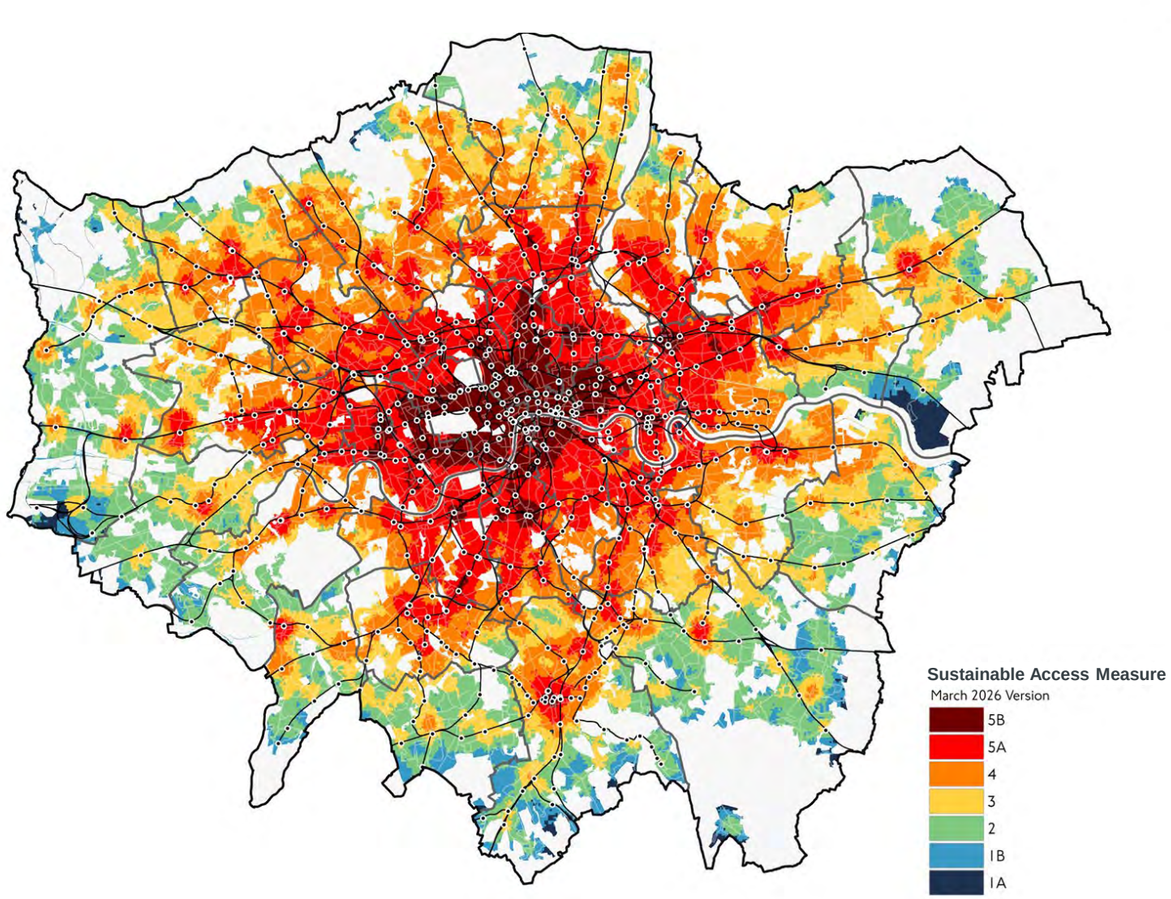
- This report sets out the technical methodology underpinning the new Optimisation Framework in the Draft London Plan. This Framework links the relationship between residential density and transport connectivity, using a new Sustainable Access Measure (SAM) and London Context Map. In doing so, it provides a baseline for what site optimisation means across different parts of London. It does this by providing a density and building height range for different areas across London – depending on their public transport connectivity and context. It forms part of Policy MBUL2 and its evidence base and has informed Strategic Housing Land Availability Assessment (SHLAA) assumptions.

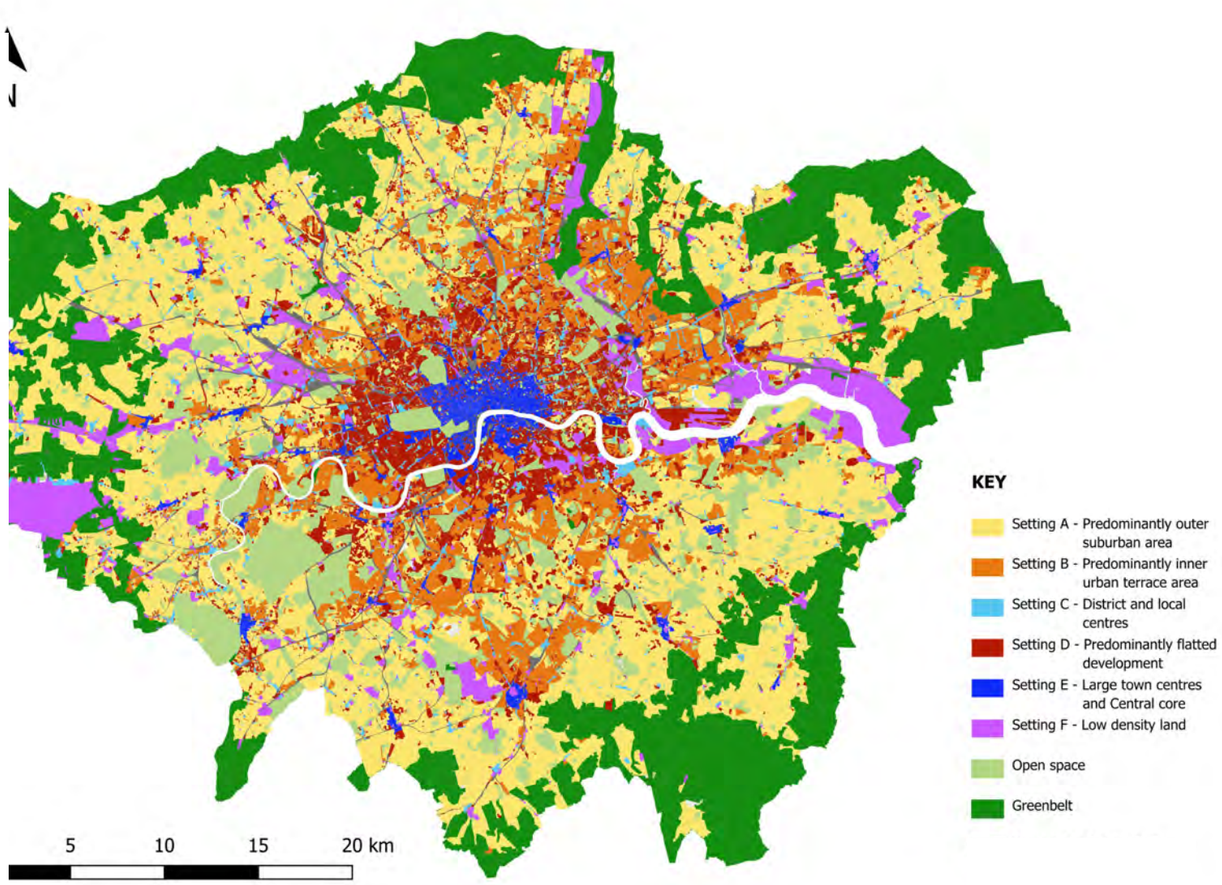
- The Framework will sit alongside a revised tall building and greenbelt policy in the draft London Plan as well as the new London-wide Small Site Design Code. The Optimisation Framework provides a baseline for the height and density of new development on sites larger than 0.25ha across London. The density and height ranges do not apply to sites in the Greenbelt, tall building locations, and it also recognises a more detailed approach to be taken via OAPFs or masterplan areas and design codes (as long as the scale of ambition is commensurate with the policy).

- This approach has been informed by feedback that was received as part of the Towards a new London Plan consultation document which set out a proposition in which the next London Plan should be clearer about what building heights could be acceptable in locations across London that share certain characteristics. This proposition received broad support with consultees expressing a desire for such an approach.

SUSTAINABLE ACCESS MEASURE AND LONDON CONTEXT MAP

- Underpinning this Framework is the Sustainable Accessible Measure (SAM) and the London Context Map. Both maps have been developed specifically for the London Plan as a basis for this new approach to site optimisation and density. Further information on how these tools/maps have been developed is available in the relevant evidence base documents which relate to each map.





WHAT THE OPTIMISATION FRAMEWORK IS

- The Optimisation Framework forms part of Policy MBUL2 (Optimising the use of land and site capacity) within the draft London Plan.

- It provides a defined set of development parameters (height and density ranges) across different parts of London, thereby establishing a consistent basis for assessing development capacity.

- This tool is not a return to the previous Density Matrix. While it clearly embeds the important linkage between public transport connectivity and density, it takes a more nuanced approach which provides clear strategic parameters while allowing for site-specific design responses to be carried out as part of the process. It does this by incorporating design inputs into the process as well as providing a density output. The key aim is to ensure that new development makes the best use of land across London.

- This approach provides greater clarity and certainty to developers on the scale and form of development that is acceptable in different locations, aiming to simplify the planning process for new development.

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Section One: Previous approaches to density and site optimisation

LONDONASSEMBLY

THE NEED FOR A REVISED APPROACH TO SITE OPTIMISATION

- A review of previous approaches to density and site optimisation identified a number of methodological limitations. The findings of this review are summarised within this section. A revised approach to site optimisation and density in the next London Plan is therefore proposed.

- The aim of the revised approach is to ensure that sites and new development are sufficiently optimised. It does this by setting minimum densities which should be met in different areas across London – depending on their public transport connectivity and the local context. This is important to support a significant increase in housing delivery across London in a sustainable and plan-led way, with areas all across London playing a role.

- As outlined in the London Plan, the Optimisation Framework does not apply to London's Green Belt, locations identified as appropriate for tall buildings and areas/sites with a design code/masterplan or design parameters within a site allocation.

- The following pages summarise the review of the previous approaches to density and site optimisation.

PREVIOUS LONDON PLAN APPROACHES TO DENSITY

- The most significant approach to density in previous London Plans has been the Density Matrix. This was first developed/based upon a Sustainable Residential Quality Exploring the Housing Potential of Large Sites study by Llewelyn-Davies in 2000.

- The study defined 9 generic housing types (tiles) which were based on common housing typologies that could come forward on sites for redevelopment.

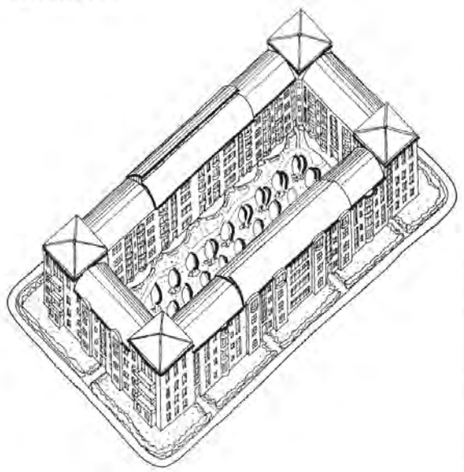
- These tiles were then used to illustrate the appropriate form of development for different contexts.

- 24 Case Study examples were then used/developed as part of the first iteration of the Density Matrix

		Option 1	Option 2	Option 3
	Car Parking Provision	High 2 – 1.5 spaces per unit	Moderate 1.5 – 1 space per unit	Low Less than 1 space per unit
	Predominant Housing Type	Detached & linked houses	Terraced houses & flats	Mostly flats
Location	Accessibility Index	**Setting**		
Sites within Town Centre "Ped-Shed"	6	**Central**		**650 – 1100**
		Case Study Examples		2 3 10
		Urban	**200 – 450**	**450 – 700**
		Case Study Examples	8 9 11 16 21 22	8 9 11 16 21 22
		Suburban	**150 – 250**	**250 – 350**
	4	Case Study Examples	19	19
Sites along Transport Corridors & Sites close to a Town Centre "Ped-Shed"	3	**Urban**	**200 – 300**	**300 – 450**
		Case Study Examples	1 5 6 14 15 18	1 5* 6* 14 15 18
		Suburban	**150 – 200**	**200 – 250**
	2	Case Study Examples	7 13 20 23 24	7 13 20 23 24
Currently Remote Sites	2	**Suburban**	**150 –200**	
	1	Case Study Examples	4 12 17	

Tile C1: Grouped flats perimeter block layout

Illustrative View

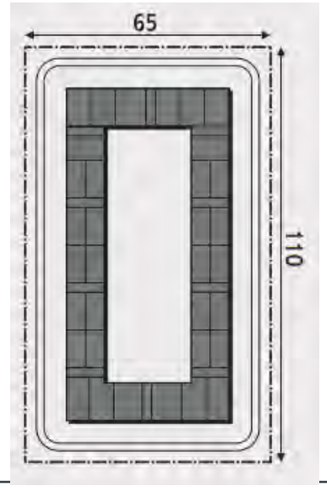


London Examples

Recent

Historic

Historic



INTEGRATION OF DENSITY MATRIX INTO 2004 LONDON PLAN

- **The Llewelyn-Davies report led to the Density Matrix being used as a planning policy tool for maximising the potential of sites in the 2004 London Plan**
- **It referred to central, urban and suburban setting types which were defined in the Plan and a high-level map in the methodology paper of the approach**
- **The table in the 2004 London Plan provided clarity on what the most predominant housing type should be**
- **24 Case Study examples were then used as the evidence base for the density numbers which were in the table.**

2004 London Plan – Setting definitions

- Central – very dense development, large building footprints and buildings of four to six storeys and above, such as larger town centres all over London and much of central London.
- Urban – dense development, with a mix of different uses and buildings of three to four storeys, such as town centres, along main arterial routes and substantial parts of inner London.
- Suburban – lower density development, predominantly residential, of two to three storeys, as in some parts of inner London and much of outer London.

Policy 4B.3 in the 2004 London Plan

Policy 4B.3 Maximising the potential of sites
The Mayor will, and boroughs should, ensure that development proposals achieve the highest possible intensity of use compatible with local context, the design principles in Policy 4B.1 and with public transport capacity. Boroughs should develop residential and commercial density policies in their UDPs in line with this policy and adopt the residential density ranges set out in Table 4B.1. The Mayor will refuse permission for strategic referrals that, taking into account context and potential transport capacity, under-use the potential of the site.

table 4B.1 Density location and parking matrix (habitable rooms and dwellings per hectare)

		Car parking provision	High 2 – 1.5 spaces per unit	Moderate 1.5 – 1 space per unit	Low Less than 1 space per unit
		Predominant housing type	Detached and linked houses	Terraced houses & flats	Mostly flats
Location	**Accessibility Index**	**Setting**			
Sites within 10 mins walking distance of a town centre	6 to 4	**Central**			**650 – 1100 hr/ha** **240 – 435 u/ha** Ave. 2.7hr/u
		Urban		**200 – 450 hr/ha** **55 – 175 u/ha** Ave. 3.1hr/u	**450 – 700 hr/h** **165 – 275 u/ha** Ave. 3.0hr/u
		Suburban		**200 – 300 hr/ha** **50 – 110 u/ha** Ave. 3.7hr/u	**250 – 350 hr/ha** **80 – 120 u/ha** Ave. 3.0hr/u
Sites along transport corridors & sites close to a town centre	3 to 2	**Urban**		**200 – 300 hr/ha** **50 – 110 u/ha** Ave. 3.7hr/u	**300 – 450 hr/ha** **100 – 150 u/ha** Ave. 3.0hr/u
		Suburban	**150 – 200 hr/ha** **30 – 65 u/ha** Ave. 4.4hr/u	**200 – 250hr/ha** **50 – 80 u/ha** Ave. 3.8hr/u	
Currently remote sites	2 to 1	**Suburban**	**150 – 200 hr/ha** **30 – 50 u/ha** Ave. 4.6hr/u		

DENSITY MATRIX IN THE 2016 LONDON PLAN

The Density Matrix was amended and included within the 2016 London Plan. Similar to previous London Plans, PTAL was used as a measure of public transport connectivity, and a set of setting definitions were used to define which setting a site was within. Seeking to categorise the whole of London into these three settings caused a number of challenges and uncertainties.

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Policy 3.4 in the 2016 London Plan

POLICY 3.4 OPTIMISING HOUSING POTENTIAL

Strategic, LDF preparation and planning decisions

A Taking into account local context and character, the design principles in Chapter 7 and public transport capacity, development should optimise housing output for different types of location within the relevant density range shown in Table 3.2. Development proposals which compromise this policy should be resisted.

Table 3.2 Sustainable residential quality (SRQ) density matrix (habitable rooms and dwellings per hectare)

Setting	Public Transport Accessibility Level (PTAL)		
	0 to 1	2 to 3	4 to 6
Suburban	150–200 hr/ha	150–250 hr/ha	200–350 hr/ha
3.8–4.6 hr/unit	35–55 u/ha	35–65 u/ha	45–90 u/ha
3.1–3.7 hr/unit	40–65 u/ha	40–80 u/ha	55–115 u/ha
2.7–3.0 hr/unit	50–75 u/ha	50–95 u/ha	70–130 u/ha
Urban	150–250 hr/ha	200–450 hr/ha	200–700 hr/ha
3.8 –4.6 hr/unit	35–65 u/ha	45–120 u/ha	45–185 u/ha
3.1–3.7 hr/unit	40–80 u/ha	55–145 u/ha	55–225 u/ha
2.7–3.0 hr/unit	50–95 u/ha	70–170 u/ha	70–260 u/ha
Central	150-300 hr/ha	300–650 hr/ha	650–1100 hr/ha
3.8–4.6 hr/unit	35–80 u/ha	65–170 u/ha	140–290 u/ha
3.1–3.7 hr/unit	40–100 u/ha	80–210 u/ha	175–355 u/ha
2.7–3.0 hr/unit	50–110 u/hr	100–240 u/ha	215–405 u/ha

Notes to Table 3.2

Appropriate density ranges are related to setting in terms of location, existing building form and massing, and the index of public transport accessibility (PTAL). The setting can be defined as:

Central – areas with very dense development, a mix of different uses, large building footprints and typically buildings of four to six storeys, located within 800 metres walking distance of an International, Metropolitan or Major town centre.

Urban – areas with predominantly dense development such as, for example, terraced houses, mansion blocks, a mix of different uses, medium building footprints and typically buildings of two to four storeys, located within 800 metres walking distance of a District centre or, along main arterial routes

Suburban – areas with predominantly lower density development such as, for example, detached and semi-detached houses, predominantly residential, small building footprints and typically buildings of two to three storeys.

DENSITY MATRIX - SUMMARY REVIEW

Several studies and reports were produced on the effectiveness and the Density Matrix. These concluded the following:

Strengths

- It provided clarity on appropriate densities in different areas across London. This provided a 'level playing field' as it was objective and quantifiable.
- The approach provided strategic direction on appropriate densities.
- It embedded the important link between public transport and density across London

Limitations

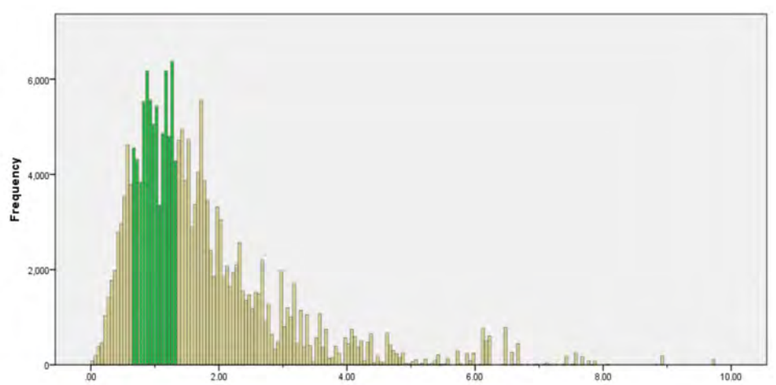
- Having just three setting types for the whole of London meant that these settings were very broad.
- The sole use of a density output as a measure meant that there was a lack of clarity/alignment on what the appropriate design inputs should be. This caused uncertainty when a scheme's density was within a prescribed density range, but key design inputs were considered unacceptable.
- The use of a density-only measure meant that it was difficult to apply the density range to non-residential proposals or sites which were very large in scale (given a lack of clarity on how to accurately convert between gross and net developable area (which often did not happen). This led to implementation issues.
- PTAL had limitations as a London-wide comparator of connectivity, creating the need for more local interpretation to implement effectively.
- Gross vs net density metric caused confusion when used interchangeably.
- As was observed in the evidence base prepared to support the 2021 London Plan, the density matrix had increasingly become an unreliable benchmark against which to judge expected scheme density.

Analysis carried out in 2017 highlighted that:

"50% of development is above the matrix maximum ... 25% is double the maximum and 15% is below the minimum, i.e. only 35% of development is within the appropriate density matrix range".

London Plan Density – Research Project 1: Definitions and Measurement of Density (LSE 2016)

Project 4 – Exploring character and development density (Arup 2016)



SUMMARY REVIEW - ILLUSTRATIVE EXAMPLE

The following example illustrates a weakness of the Density Matrix when applied to a typical low-density site which has the potential to be transformed.

- The area around Staples Corner / Brent Cross is identified as suburban in character (using the context map) with low PTAL even though its context has significant potential for change.

- The Density Matrix identifies an appropriate density range of between 40 – 130 dph for the area which is significantly below what should reasonably be expected for a site like this.

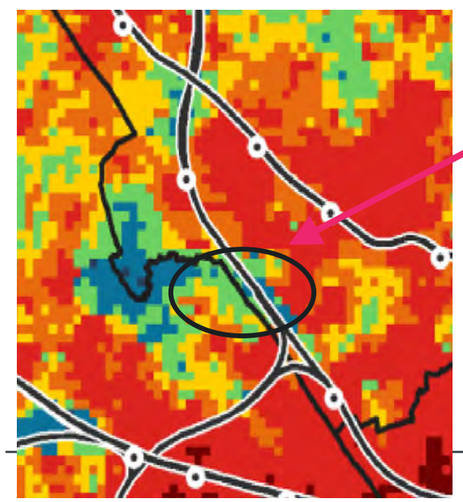
- This is evidenced via the Brent Cross masterplan which identified a density that far exceeds the range in the previous density matrix.

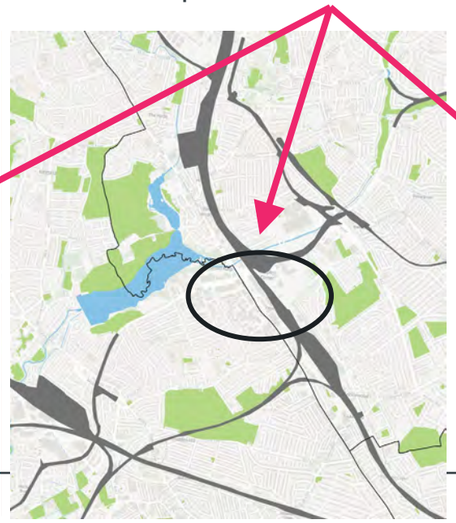
- There is an opportunity for the revised Framework to take a more nuanced approach, in terms of context/setting and public transport connectivity. This is particularly relevant for existing low-density land.

Setting	Public Transport Accessibility Level (PTAL) 0 to 1	2 to 3	4 to 6
Suburban	**150 – 200 hr/ha**	**150 – 250 hr/ha**	**200 – 350 hr/ha**
3.8 – 4.6 hr/unit	35 – 55 u/ha	35 – 65 u/ha	45 – 90 u/ha
3.1 – 3.7 hr/unit	40 – 65 u/ha	40 – 80 u/ha	55 – 115 u/ha
2.7 – 3.0 hr/unit	50 – 75 u/ha	50 – 95 u/ha	70 – 130 u/ha
Urban	**150 – 250 hr/ha**	**200 – 450 hr/ha**	**200 – 700 hr/ha**
3.8 – 4.6 hr/unit	35 – 65 u/ha	45 – 120 u/ha	45 – 185 u/ha
3.1 – 3.7 hr/unit	40 – 80 u/ha	55 – 145 u/ha	55 – 225 u/ha
2.7 – 3.0 hr/unit	50 – 95 u/ha	70 – 170 u/ha	70 – 260 u/ha
Central	**150 – 300 hr/ha**	**300 – 650 hr/ha**	**650 – 1100 hr/ha**
3.8 – 4.6 hr/unit	35 – 80 u/ha	65 – 170 u/ha	140 – 290 u/ha
3.1 – 3.7 hr/unit	40 – 100 u/ha	80 – 210 u/ha	175 – 355 u/ha
2.7 – 3.0 hr/unit	50 – 110 u/ha	100 – 240 u/ha	215 – 405 u/ha

Existing and proposed development on the site

Staples Corner/Brent Cross





DESIGN-LED APPROACH - SUMMARY REVIEW

The 2021 London Plan removed the Density Matrix and replaced it with the Design-led Approach. This approach stated that:

> "*All development must make the best use of land by following a design-led approach that optimises the capacity of sites, including site allocations. Optimising site capacity means ensuring that development is of the most appropriate form and land use for the site. The design-led approach requires consideration of design options to determine the most appropriate form of development that responds to a site's context and capacity for growth, and existing and planned supporting infrastructure capacity*"

A summary of the review findings have been set out below:

<u>Strengths</u>

- It allows for a design response and subsequent capacity studies to take account of local circumstances and site-specific constraints and opportunities.
- It encouraged the use of 2D and 3D modelling software at the early design/planning stages to determine the most appropriate form of development/layout/orientation.
- It reiterates that the design of sites should be considered as early as possible in the planning process.
- Approach can be applied to the redevelopment of sites into any land-use (not just residential use)

<u>Limitations</u>

- The design-led approach does not provide a clear or strategic steer about what optimisation means for different areas across London. This risks under-utilisation of many sites.
- The approach leads to a significant level of uncertainty for applicants as there is a high degree of subjectivity over what site optimisation means for a site, even in similar areas and contexts.
- This approach can lead to disagreements about whether a site is over or under optimised given the lack of any broader parameters.
- Approach does not provide an opportunity for the London Plan to set out a level of ambition for different areas.

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Section two: Optimisation Framework – Technical methodological approach

LONDONASSEMBLY

METHODOLOGICAL APPROACH - SUMMARY

The Optimisation Framework was developed through a multi-stage analytical process combining empirical evidence, spatial analysis, and scenario testing in order to ensure that the density and height ranges in the Framework are robust and set at an appropriate and realistic level. It combines urban context and transport accessibility to establish clear, locational development benchmarks. The methodology follows the following key stages:

1. **Establish an evidence base**
   A set of 36 development case studies was analysed to review relationships between building height, site coverage, floor area ratio and density.

2. **Define development typologies**
   The case studies were grouped into 11 typologies based on average height, site coverage and parking provision.

3. **London-wide spatial analysis**
   Each setting / SAM band was analysed to understand the typical associated characteristics and context.

4. **Define spatial inputs**
   The framework applies these typologies across combinations of Sustainable Access Measure (SAM) bands and London-wide context settings to determine an appropriate response for each setting / SAM band.

5. **Test development scenarios**
   Typologies were tested using 3D modelling, alongside viability, design, parking and contextual considerations.

6. **Generate density and height ranges**
   Height and site coverage assumptions were translated into density ranges, including standard assumptions and a flexibility margin to allow for site-specific variation.

7. **Finalise output and resulting height/density table**
   The Optimisation Framework table was created, which included a height and density range for the different SAM bands/context settings.

This process generated the table for the Optimisation Framework, used in Policy MBUL2 (Optimising the use of land and site capacity). The following section provides a summary of each of these stages.

STAGE ONE: ESTABLISH AN EVIDENCE BASE

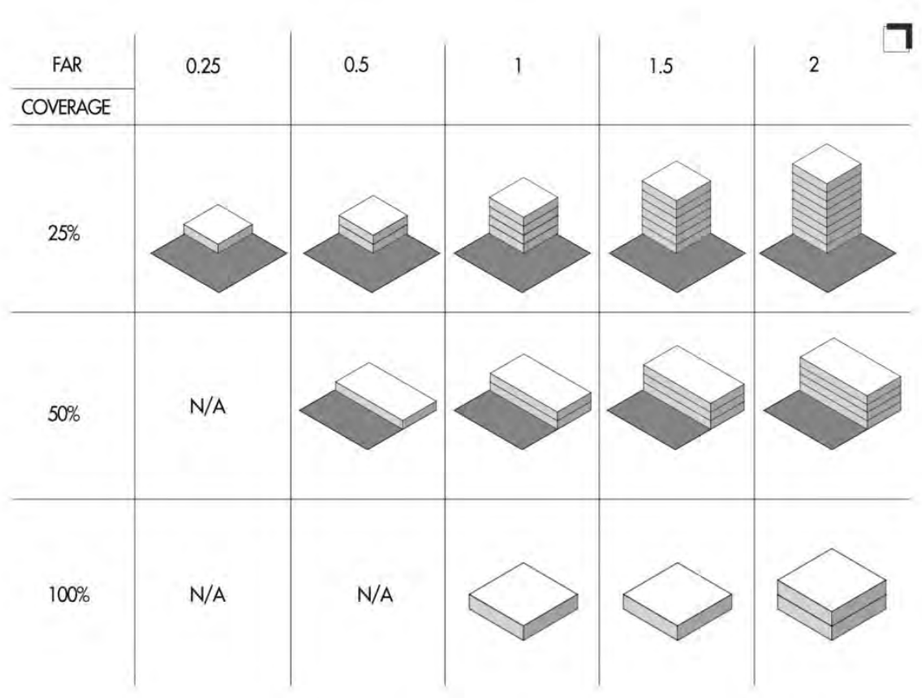
- A dataset of 36 case studies was used to derive empirical relationships between building height, site coverage, and residential density. These reflect existing and proposed schemes that meet the latest building regulations and planning policies.

- They represent a cross section of development coming forward across London – most of which have been selected from the Housing Design Awards website and / or recent referable planning applications.

- Emerging findings from the London Plan Viability Study (2026) also helped inform the selection of case studies, such as building heights so that the data within this study reflects viability considerations.

- The following data has been collected for each case study:

  - Total number of homes
  - Site size
  - Gross density (in units and habitable rooms)
  - Building height range
  - Average building height*
  - GEA of development and building footprint
  - Floor Area Ratio (FAR)
  - Site coverage
  - Amount of non-residential uses



*Average building height has been determined using the Floor Area Ratio (FAR) and Building Cover for the site.

CASE STUDIES USED WITHIN THIS STUDY

- Full list of case studies is included in Appendix 1 of this document.
- Using their built form characteristics, the total amount of building (total GEA) has been used alongside the height and site coverage of each development.
- This has allowed these case studies to be grouped as per their average building height / site coverage – which quantifies the total amount of building assumed for a given site size.
- There is a range in car parking provision across the case studies (from 1.37 spaces per unit to car free) to enable adequate consideration of car parking provision, given the floorspace that it takes up.

RANGE OF DENSITIES

The following exemplars illustrate how net residential densities vary depending on the height and site coverage of a proposal. In general, the case studies used in this study range from 75 dph to 503 dph.

82 dph
Rowan Court
Haringey

102 dph
Chobham Manor
Phase 3, Newham

106 dph
Griffin Park,
Hounslow

124 dph
Maitland Park Estate,
Camden

130 dph
Acton Gardens Phase
3.2, Ealing

153 dph
Kidbrooke Park North,
Greenwich

98 dph
Ham Close
Richmond upon
Thames

104 dph
Selby Urban Village,
Haringey

115 dph
Sawyer's Close,
Windsor

127 dph
Brentford Lock West
Block G, Hounslow

151 dph
Barking Riverside Plots
206B + 207A,
Barking and Dagenham

158 dph
Harrow View East
Plot D7, Harrow

90 dph **120 dph** **150 dph**

RANGE OF DENSITIES

Exemplars and their associated densities

189 dph
High Barnet
Place, Barnet

236 dph
Holloway Prison,
Islington

264 dph
Fish Island,
Hackney

306 dph
Legacy Wharf,
Phase 2, Newham

350 dph
Land adjacent to
Woolwich Foot Tunnel,
Greenwich

495 dph
New Era Estate
London, Hackney

205 dph
Park View Mansions,
Newham

238 dph
Bream Street,
Tower Hamlets

292 dph
Stour Road,
Hackney

320 dph
Juniper Crescent,
Camden

396 dph
Bulrush Court,
Tower Hamlets

503 dph
Poets Corner
Phase 2 and 3,
Harrow

200 dph

300 dph

400 dph

STAGE TWO: DEFINE DEVELOPMENT TYPOLOGIES

The case studies have been grouped into 11 different building typologies

Using the data collected, relevant case studies have been grouped together into different building typologies based on average building height, site coverage, and car parking provision. These groups form 11 different building typologies which aim to represent the indicative case studies that were collected as part of this study. For each of the 11 typologies, a building height range, upper and lower building height averages and indicative site coverage have been determined using the data collected from the case studies. This has been determined using a combination of the GEA and building footprint data from the case studies.

These groupings have been used to understand what might be appropriate, in term of its form and massing, in different contexts / levels of public transport accessibility. Given that the Framework is focused on sites outside of identified tall building areas, the building height ranges for the case studies and typologies are mostly below the London Plan tall building definition of 30m.

Typologies 1 - 4 include some case studies that have a high car parking ratio so that the impact of car parking provision is fully accounted for.

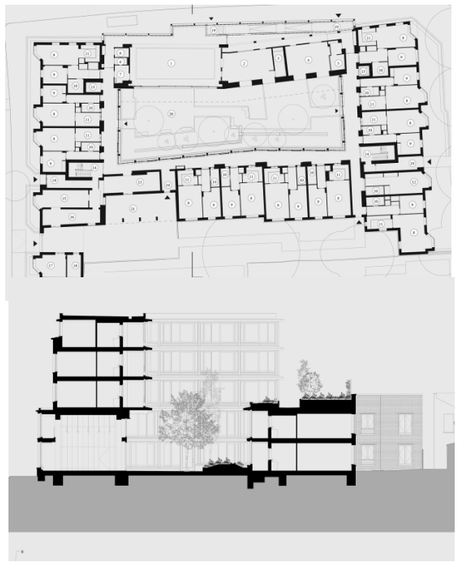
Typology	Case studies	Building height range	Difference in upper/lower range	Lower average building height	Upper average building height	Site coverage range
Indicative Typology 1	1	3 - 4 storeys	1 - 3 storey range: 0.5 storey difference between upper/lower average height *exception case: typology 5	3 storeys	3.5 storeys	35 - 45%
Indicative Typology 2	3, 9, 10, 11	3 - 4 storeys		3 storeys	3.5 storeys	35 – 47.5%
Indicative Typology 3	4, 5, 6, 12	3 - 5 storeys		3.5 storeys	4 storeys	37.5 – 50%
Indicative Typology 4	2, 7, 15, 16, 19 , 21	3 - 6 storeys		4 storeys	4.5 storeys	37.5 – 52.5%
Indicative Typology 5	8, 13, 14, 17, 23	3 - 7 storeys		4.5 storeys	5 storeys	40 – 57.5%
Indicative Typology 6	20, 22, 24	4 - 7 storeys		5 storeys	5.5 storeys	40 – 57.5%
Indicative Typology 7	18, 25	4 - 8 storeys	4 storey range: 1 storey difference between upper/lower average height	5 storeys	6 storeys	42.5 – 60%
Indicative Typology 8	28	5 - 9 storeys		5.5 storeys	6.5 storeys	45 - 60%
Indicative Typology 9	26, 27	5 - 10 storeys	5 - 6 storey range: 1.5 storey difference between upper/lower average height	5.5 storeys	7 storeys	47.5 – 60%
Indicative Typology 10	30, 31, 32, 35	5 - 11 storeys		6 storeys	7.5 storeys	50 - 60%
Indicative Typology 11	29, 33, 34, 36	5 - 12 storeys	7 storey range: 2 storey difference	6 storeys	8 storeys	50 - 60%

DETERMINING THE ‘AVERAGE HEIGHT’ OF A DEVELOPMENT

- Average height data has been collected for each case study. Along with a proposal’s site coverage and building footprint, this provides an understanding of how much building is possible at different combinations of site coverage/average building height.
- Average height has been calculated using the total GEA and building footprint for each case study which enables the average to be determined.
- The average height of a building or site is influenced by the variation in heights across a whole building or site, including any set-backs or lower shoulder elements.
- This results in the average building height for a development proposal often being lower than many parts of a proposal when judged at first glance.
- Example: Appleby Blue Almshouse average height is **3.8 storeys** rather than the 5 storeys that may have been assumed at first glance and New Era Estate is **7.4 storeys** even though building heights are up to 13 storeys.

Appleby Blue Almshouse proposal

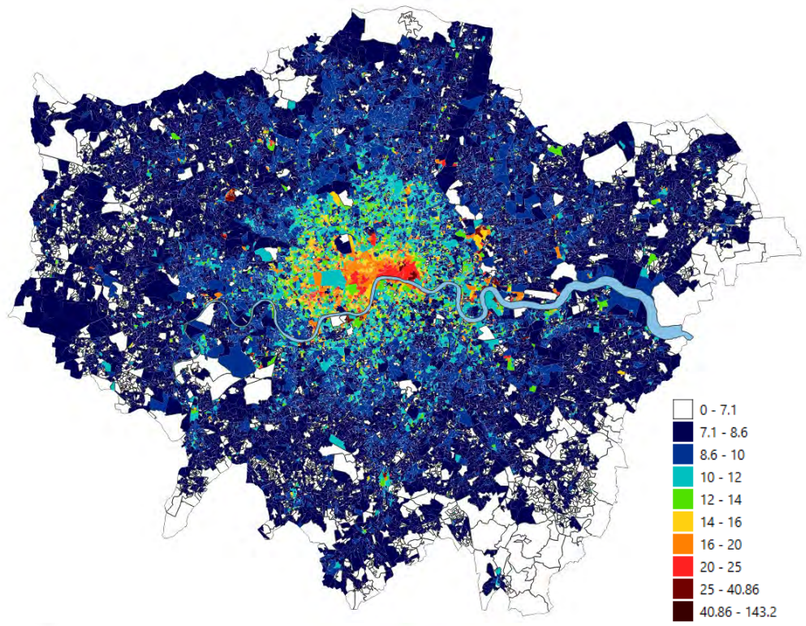
New Era Estate proposal

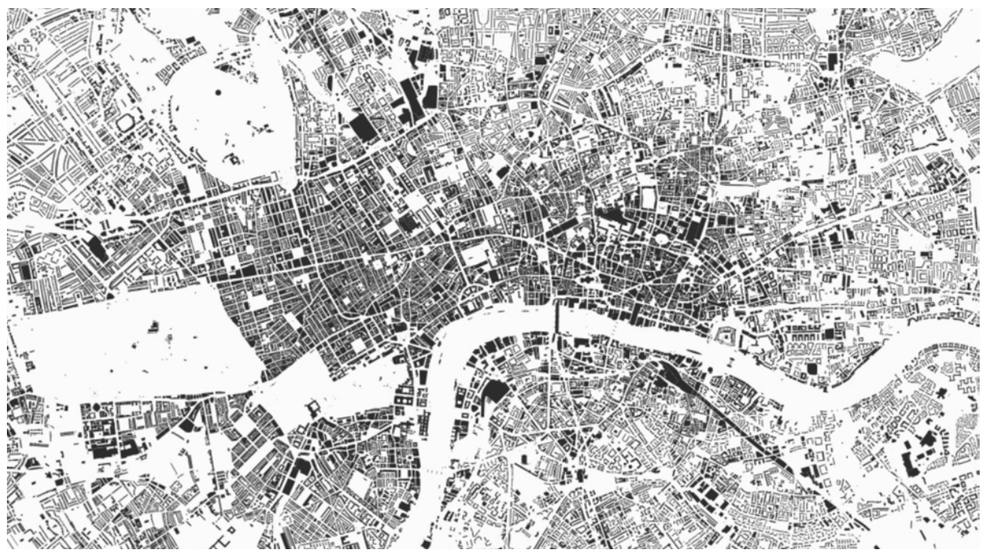


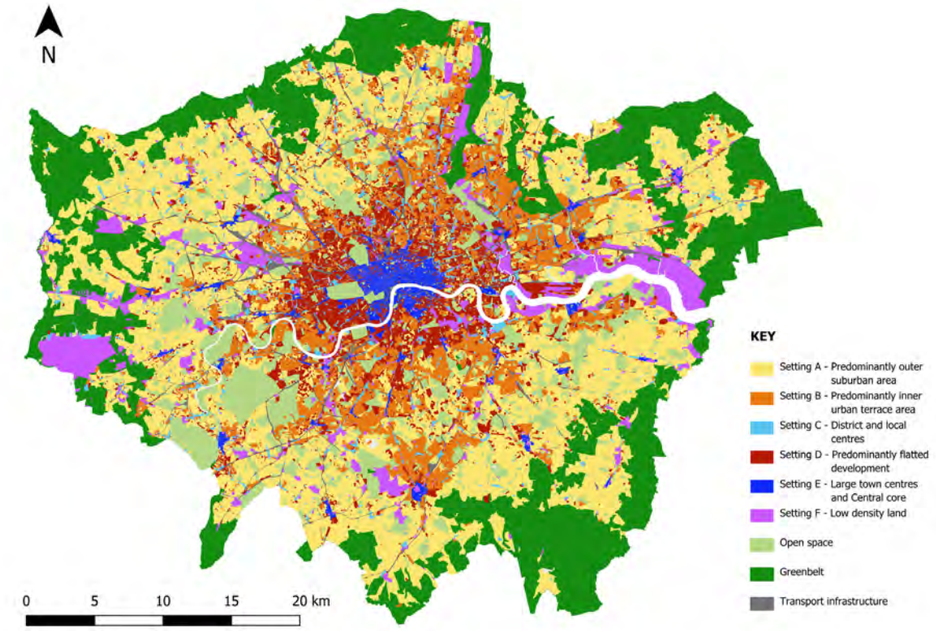
STAGE THREE: LONDON-WIDE SPATIAL ANALYSIS

- In advance of applying the overarching principles used to determine the height and site coverage ranges (stage four), a London-wide spatial analysis was carried out.

- This analysis reviewed the typical street scene in each SAM band/setting in order to understand the contexts of each of the different SAM bands/settings. The study found that even within the same context ‘settings’, building heights tended to increase with how close they were to central London. Similarly, site coverage of development also increased in line with proximity to central London.
- These trends have been factored in when setting the appropriate height and site coverage for different SAM bands/settings (stage four).

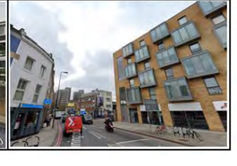






STAGE THREE: LONDON-WIDE SPATIAL ANALYSIS

As part of the London-wide spatial analysis, each setting / SAM band has been studied to understand what the typical characteristics are in each. This was an important stage as it provided an understanding of the different characteristics of different areas which has been used to set an appropriate design response (stage four). While the images below show a typical street scene for each SAM band/setting, it is acknowledged that London is diverse in character. These images show a representative street scene, not an exhaustive set of representations.

Context type	Optimisation Framework					
	SAM 1	SAM 2	SAM 3	SAM 4	SAM 5A	SAM 5B
Setting A: e.g Suburban areas such as detached and semi-detached housing						
Setting B: e.g Areas of predominantly urban/terraced dwellings						
Setting C: District and Local centres	N/A					
Setting D: e.g Areas of predominantly urban flatted development						
Setting E: Large centres and Central Core	N/A	N/A				
Setting F: e.g Areas of low density land such as car and retail parks, ex-industrial units.						

STAGE FOUR: DEFINING SPATIAL INPUTS

For each combination of SAM and context setting, an appropriate height/site coverage range was determined by:

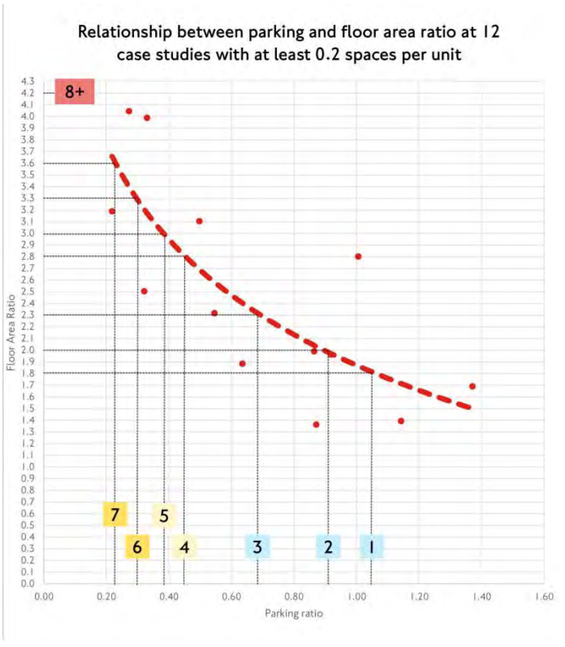
- Testing each of the 11 typologies against each of the settings/SAM bands identified in stage three.
- Using a set of overarching principles which are listed below:

i. A presumption that density needs to increase across the whole of London to deliver more housing with an expectation that all areas of London are expected to grow and change. At its core is the relationship between residential density and public transport connectivity in which densities are higher in better connected areas. Collectively, these factors give rise to a non-linear relationship between Floor Area Ratio (FAR) and parking provision as shown in the graph below. Greater increases in density have been applied to areas which have potential for the greatest level of change as these areas have the fewest sensitivities/greatest opportunity for growth and change.

ii. Higher densities have been attributed to areas with higher SAM levels for the following reasons:
   1. Less space needed for car parking in higher SAM/more central areas
   2. Greater average site coverage in higher SAM/more central areas
   3. Greater potential for height in high SAM areas

iii. The design response for each SAM band/setting has factored in car parking, viability, and contextual considerations. A list of these considerations is detailed on the next page.

iv. The spatial inputs and parameters assume an unconstrained site context and therefore do not factor in site-specific considerations, such as the presence of heritage assets. These constraints are addressed separately within the wider policy framework.



SPATIAL INPUT CONSIDERATIONS

The following factors/considerations have been used to determine the appropriate height/site coverage range for each SAM band/setting:

1. **Prevailing average building height**
   Analysis has indicated that even within the same setting, building heights increase in line with its proximity to central London

2. **Prevailing average site coverage and morphology of each setting type**
   Analysis has indicated that even within the same setting, site coverage increases in line with its proximity to central London

3. **The coherence of each setting within each SAM band and how this changes across London**
   The coherence of an area is measured by how much the building form, height and plot coverage vary. Areas that are less coherent have a greater potential for change.

4. **General assumption that all else being equal, higher densities are built in more accessible locations.**
   For the same setting, it is assumed that density increases with SAM and doesn't plateau.

5. **Age of buildings and proportion of each setting/SAM band which is within a conservation area/has listed buildings**
   Areas which have older buildings, are within a conservation area and have a greater presence of listed buildings tend to be more sensitive to change. This indicates the degree to which a setting is more/less sensitive to change which influences potential density.

6. **Identification of where there are opportunities for a setting to accommodate significantly greater scale of development than the current built form.**
   Areas and settings with a less coherent character and/or poor urban form, have a greater potential for residential intensification. As an example, 'Low-density land' has been identified as a setting that fits this criteria.

7. **Accommodating mix of uses on ground floor**
   Is it expected that most new residential development will provide a mix of uses within the site boundary. This should be accommodated for – such as space for commercial units and internal cycle parking at ground floor – with a greater proportion in central/town centre settings.

8. **Adequate provision of open space to accommodate playspace/green infrastructure (as well as space for car parking where this is necessary)**
   The proportion of open space is important for the provision of green infrastructure and playspace.

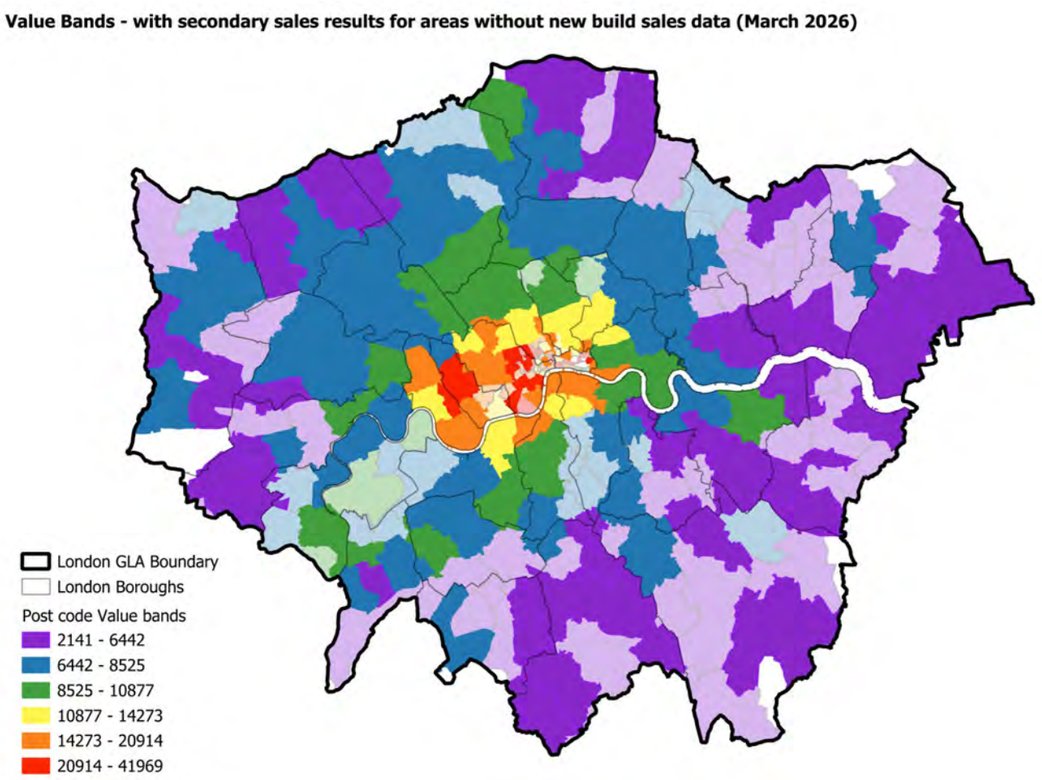
9 **Findings from the London Viability Study have been used to inform building height ranges**
   These findings have been factored in to reflect deliverability at different heights.

EMBEDDING VIABILITY, OPEN SPACE AND CAR PARKING CONSIDERATIONS

- Viability, car parking and open space/green infrastructure considerations have been embedded into the Optimisation Framework methodology. These include considerations around the existing land value, local sales values and the cost of construction as well as space needed for open space and potential car parking provision.

- Analysis of the site coverages used in each of the 11 building typologies set out in stage two, has confirmed that these provide sufficient space for open space, taking into account potential car parking provision.

- The London Plan Viability Study has found, for example, that building taller than six storeys in outer London areas is particularly challenging in terms of current viability.



PROPORTION OF GROUND FLOOR AS MIX OF USES

The density numbers in the Optimisation Framework have taken into account a mix of uses at the ground floor. This is to accommodate e.g. space for utility/servicing infrastructure, any non-residential retail units or community facilities and cycle storage.

- An allowance of 50% and 80% of the ground floor has been made. These percentages are reflected in the case studies that were collected as part of this study and do not take into account circulation space as this is already taken into account in the GIA/NIA conversion:

52 Plashet Road case study

Setting: Setting B (Urban terraced)

Cycle storage and servicing

Nursery

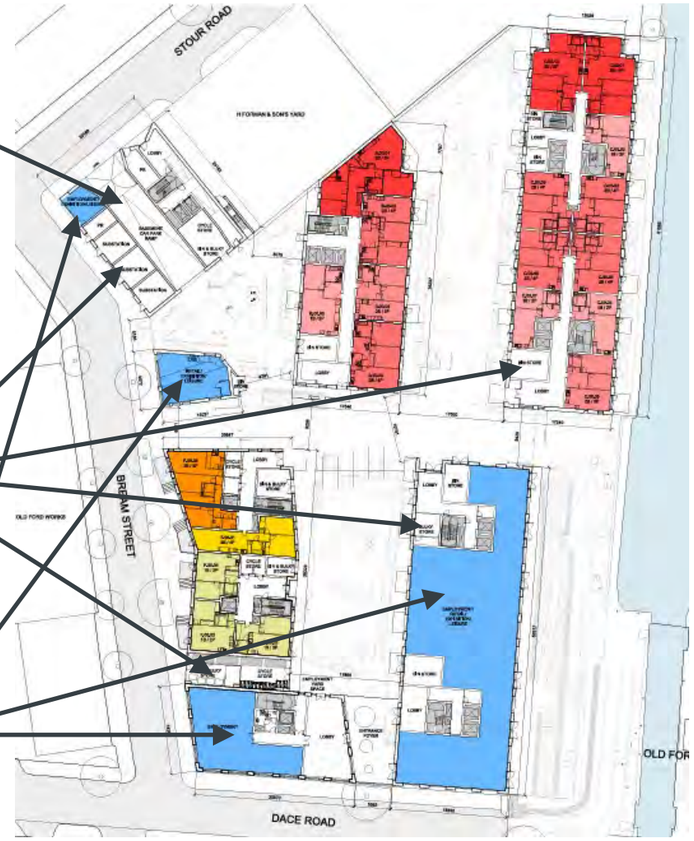
Bream Street case study

Setting: Setting D (flatted development)

Servicing ramp to basement

Bin/bulky storage and servicing and cycle storage

Employment /retail space



APPLYING THE 11 TYPOLOGIES TO EACH SAM BAND/SETTING

- Using the overarching principles and the spatial input considerations listed above, the following table was developed which shows where each of the 11 typologies have been applied across the SAM bands/settings. These have been applied to the table below in a step manner to avoid gaps in the resulting density range from one cell to another. This approach also avoids cliff edges in density between different SAM bands.

- For each typology, an upper and lower height average and site coverage has been determined using the data collected (see stage two). The site coverages differ by SAM band and setting to take into account the difference in existing context from one setting to another. This differences also provide an allowance for more car parking which is more likely in lower SAM areas. These two metrics (average building height and site coverage) provide an understanding of Gross external area (GEA) floorspace that can be accommodated on a site (and its resulting net residential density).

- The settings have been ordered in the matrix in relation to the level of change that is expected, with the greatest density uplifts towards the bottom.

		SAM 1	SAM 2	SAM 3	SAM 4	SAM 5A	SAM 5B
Setting A: e.g Suburban areas such as detached and semi-detached housing	Typology used in methodology	Typology 1	Typology 2	Typology 3	Typology 4	Typology 5	Typology 6
	Site coverage	35 - 45%	37.5 - 47.5%	40 - 50%	42.5 - 52.5%	47.5 - 57.5%	47.5 - 57.5%
Setting B: e.g Areas of predominantly urban/terraced dwellings	Typology used in methodology	Typology 2	Typology 3	Typology 4	Typology 5	Typology 6	Typology 7
	Site coverage	35 - 45%	37.5 - 47.5%	40 - 50%	42.5 - 52.5%	47.5 - 57.5%	47.5 - 57.5%
Setting C: District and Local centres	Typology used in methodology	Typology 3	Typology 4	Typology 5	Typology 6	Typology 7	Typology 8
	Site coverage	37.5 - 47.5%	40 - 50%	42.5 - 52.5%	45 - 55%	50 - 60%	50 - 60%
Setting D: e.g Areas of predominantly urban flatted development	Typology used in methodology	Typology 4	Typology 5	Typology 6	Typology 7	Typology 8	Typology 9
	Site coverage	37.5 - 47.5%	40 - 50%	42.5 - 52.5%	45 - 55%	50 - 60%	50 - 60%
Setting E: Large centres and Central Core	Typology used in methodology	Typology 5	Typology 6	Typology 7	Typology 8	Typology 9	Typology 10
	Site coverage	40 - 50%	42.5 - 52.5%	45 - 55%	47.5 - 57.5%	50 - 60%	50 - 60%
Setting F: e.g Areas of low density land such as car and retail parks, ex-industrial units	Typology used in methodology	Typology 6	Typology 7	Typology 8	Typology 9	Typology 10	Typology 11
	Site coverage	40 - 50%	42.5 - 52.5%	45 - 55%	47.5 - 57.5%	50 - 60%	50 - 60%

STAGE FIVE: TEST DEVELOPMENT SCENARIOS

3D modelling software was used to model the different building height/site coverage ranges to test that they provided an optimal design response

- The process involved testing the 11 typologies against each of the settings/SAM bands identified in stage three.

- A summary of the resulting massing scenarios is included in Appendix 2. This process involved checking the resulting massing against the overarching principles and the spatial input considerations listed above.

SETTING FOUR – ASSUMED DESIGN RESPONSE

Proposed design response in low SAM area (TW14 8BY)

SAM 2

SETTING SIX – ASSUMED DESIGN RESPONSE

Proposed design response in high SAM area (SW8 4UN)

SAM 6a

STAGE SIX: GENERATE RESULTING DENSITY RANGES

A bespoke housing capacity calculator has been used to calculate the density ranges in the Optimisation Framework table. The following assumptions were made:

- The need for different sized homes will vary over time, depending on future unknowable rates of delivery overall. The London Plan contains both a 10-year housing target and an aspiration to deliver a higher number of homes compared to that target to satisfy identified need in the longer term. As such, the following unit size mix of 50% (1 bed), 35% (2 bed) 15% (3 bed) was used to determine the density ranges assumed in the study. This is considered to be a reasonable assumption in the context of varying factors and the evidence of the Strategic Housing Market Assessment.

- The upper and lower site coverage and building height averages were used to calculate the density range. The density ranges also accommodated for a proportion of ground floor in non-residential use.

- Once an upper and lower density range was determined using the upper and lower building height and site coverage averages, an additional 10% to either end of the range was applied which allow for site specific constraints or opportunities. This calculation has been used to define the extent of the density range in each Optimisation Framework cell.

- Space for car parking has been accommodated for at the typology grouping stage so has not been double counted in the housing capacity calculator.

Lower Site coverage	Lower Average building height (storeys)	Proportion of ground floor in non-residential use	Total GEA (m2)
0.4	3	0.5	12000

Total GEA (total developable space)	**12,000**	m2
Amount of ground floor in non-residential use	2000	m2
Residential GEA (minus ground floor uses)	10000	m2
Residential GIA	9,000	m2
Residential NIA	6,300	m2

NIA (m2)	Type	Type Mix	Indicative Unit Count	Indicative Habitable Room Count
6,300	1 bed	**50%**	63	126
	2 bed	**35%**	31	93
	3 bed	**15%**	10	40
	4 bed	**0%**	0	0
		100%	104	259

Lower density range	**Indicative Site Capacity (HrpH)**	**230**
	Low dph	
	Indicative Site Capacity (DpH)	**90**

Upper Site coverage	Upper Average building height (storeys)	Proportion of ground floor in non-residential use	Total GEA (m2)
0.5	3.5	0.5	17500

Total GEA (total developable space)	**17,500**	m2
Amount of ground floor in non-residential use	2500	m2
Residential GEA (minus ground floor uses)	15000	m2
Residential GIA	13,500	m2
Residential NIA	9,450	m2

NIA (m2)	Type	Type Mix	Indicative Unit Count	Indicative Habitable Room Count
9,450	1 bed	**50%**	94	188
	2 bed	**35%**	47	141
	3 bed	**15%**	16	64
	4 bed	**0%**	0	0
		100%	157	393

Notes
GIA calculated as 90% of GEA
NIA calculated as 70% of GIA

Upper density range	**Indicative Site Capacity (HrpH)**	**430**
	High dph	
	Indicative Site Capacity (DpH)	**170**

Density range in habitable rooms per hectare	230 - 430 hr/h
Density range in dwellings per hectare	90 - 170 dph

STAGE SIX: GENERATE RESULTING DENSITY RANGES

- The table opposite shows the design inputs for each SAM band/setting. Key to determining the density range for each cell, upper and lower building height averages were used alongside the site coverage range (determined at stage two). This was calculated using the bespoke housing capacity calculator which was outlined in the previous page.
- The height ranges are used for informing the design response in different areas/SAM bands and in the testing of these densities in stage five. These are subsequently an important design input and are therefore included in the Optimisation Framework table in London Plan policy.
- The densities in the table opposite also accommodate for a mix of uses on the ground floor as outlined in point 7. of the spatial input considerations. The following proportions were applied:
  - 50% of ground floor is taken up by non-residential uses for all development in Settings A, B, D and F (non-town centre settings)
  - 80% of ground floor is taken up by non-residential uses for all development in Settings C and E (town centre settings). These settings have a higher proportion of non-residential uses on the ground floor due to a higher assumed mix of uses in these locations.
- The densities in the dark brown cells were identified as needing amending as they overlapped with or did not align with nearby cells in a similar manner to the rest of the table - thereby creating unrealistic cliff edges

Context type	Metrics	SAM 1	SAM 2	SAM 3	SAM 4	SAM 5A	SAM 5B
Setting A: e.g Suburban areas such as detached and semi-detached housing	Density range (hrph) * accommodates 50% non residential on ground floor	200 - 390 hr/h	220 - 410 hr/h	280 - 510 hr/h	340 - 610 hr/h	440 - 750 hr/h	500 - 830 hr/h
	Density range (dph)	80 - 160 dph	80 - 160 dph	110 - 200 dph	130 - 240 dph	170 - 300 dph	200 - 330 dph
	Height range	3 - 4 storeys	3 - 4 storeys	3 - 5 storeys	3 - 6 storeys	3 - 7 storeys	4 - 7 storeys
	Lower building height average	3	3	3.5	4	4.5	5
	Upper building height average	3.5 storeys	3.5 storeys	4 storeys	4.5 storeys	5 storeys	5.5 storeys
	Site coverage	35 - 45%	37.5 - 47.5%	40 - 50%	42.5 - 52.5%	47.5 - 57.5%	47.5 - 57.5%
	Typology used in methodology	Typology 1	Typology 2	Typology 3	Typology 4	Typology 5	Typology 6
Setting B: e.g Areas of predominantly urban/terraced dwellings	Density range (hrph) * accommodates 50% non residential on ground floor	200 - 390 hr/h	260 - 480 hr/h	330 - 580 hr/h	400 - 680 hr/h	500 - 830 hr/h	500 - 910 hr/h
	Density range (dph)	80 - 160 dph	100 - 190 dph	130 - 230 dph	160 - 270 dph	200 - 330 dph	200 - 370 dph
	Height range	3 - 4 storeys	3 - 5 storeys	3 - 6 storeys	3 - 7 storeys	4 - 7 storeys	4 - 8 storeys
	Lower building height average	3	3.5	4	4.5	5	5
	Upper building height average	3.5 storeys	4 storeys	4.5 storeys	5 storeys	5.5 storeys	6 storeys
	Site coverage	35 - 45%	37.5 - 47.5%	40 - 50%	42.5 - 52.5%	47.5 - 57.5%	47.5 - 57.5%
	Typology used in methodology	Typology 2	Typology 3	Typology 4	Typology 5	Typology 6	Typology 7
Setting C: District and Local centres	Density range (hrph) accommodates 80% non residential on ground floor	230 - 430 hr/h	300 - 530 hr/h	370 - 640 hr/h	440 - 750 hr/h	490 - 900 hr/h	550 - 990 hr/h
	Density range (dph)	90 - 170 dph	120 - 210 dph	140 - 250 dph	170 - 300 dph	190 - 360 dph	220 - 390 dph
	Height range	3 - 5 storeys	3 - 6 storeys	3 - 7 storeys	4 - 7 storeys	4 - 8 storeys	5 - 9 storeys
	Lower building height average	3.5	4	4.5	5	5	5.5
	Upper building height average	4 storeys	4.5 storeys	5 storeys	5.5 storeys	6 storeys	6.5 storeys
	Site coverage	37.5 - 47.5%	40 - 50%	42.5 - 52.5%	45 - 55%	50 - 60%	50 - 60%
	% of ground floor as mixed use	80% of ground floor as mixed use	80% of ground floor as mixed use	80% of ground floor as mixed use	80% of ground floor as mixed use	80% of ground floor as mixed use	80% of ground floor as mixed use
	Typology used in methodology	Typology 3	Typology 4	Typology 5	Typology 6	Typology 7	Typology 8
Setting D: e.g Areas of predominantly urban flatted development	Density range (hrph) * accommodates 50% non residential on ground floor	300 - 540 hr/h	370 - 650 hr/h	450 - 760 hr/h	470 - 880 hr/h	590 - 1040 hr/h	590 - 1130 hr/h
	Density range (dph)	120 - 220 dph	150 - 260 dph	180 - 300 dph	190 - 350 dph	230 - 420 dph	230 - 450 dph
	Height range	3 - 6 storeys	3 - 7 storeys	4 - 7 storeys	4 - 8 storeys	5 - 9 storeys	5 - 10 storeys
	Lower building height average	4	4.5	5	5	5.5	5.5
	Upper building height average	4.5 storeys	5 storeys	5.5 storeys	6 storeys	6.5 storeys	7 storeys
	Site coverage	37.5 - 47.5%	40 - 50%	42.5 - 52.5%	45 - 55%	50 - 60%	50 - 60%
	Typology used in methodology	Typology 4	Typology 5	Typology 6	Typology 7	Typology 8	Typology 9
Setting E: Large centres and Central Core	Density range (hrph) accommodates 80% non residential on ground floor	340 - 610 hr/h	420 - 710 hr/h	440 - 830 hr/h	520 - 950 hr/h	550 - 1080 hr/h	610 - 1170 hr/h
	Density range (dph)	130 - 240 dph	160 - 280 dph	170 - 330 dph	210 - 380 dph	220 - 430 dph	240 - 470 dph
	Height range	3 - 7 storeys	4 - 7 storeys	4 - 8 storeys	5 - 9 storeys	5 - 10 storeys	5 - 11 storeys
	Lower building height average	4.5	5	5	5.5	5.5	6
	Upper building height average	5 storeys	5.5 storeys	6 storeys	6.5 storeys	7 storeys	7.5 storeys
	Site coverage	40 - 50%	42.5 - 52.5%	45 - 55%	47.5 - 57.5%	50 - 60%	50 - 60%
	% of ground floor as mixed use	80% of ground floor as mixed use	80% of ground floor as mixed use	80% of ground floor as mixed use	80% of ground floor as mixed use	80% of ground floor as mixed use	80% of ground floor as mixed use
	Typology used in methodology	Typology 5	Typology 6	Typology 7	Typology 8	Typology 9	Typology 10
Setting F: e.g Areas of low density land such as car and retail parks, ex-industrial units.	Density range (hrph) * accommodates 50% non residential on ground floor	420 - 720 hr/h	450 - 830 hr/h	520 - 950 hr/h	560 - 1080 hr/h	650 - 1220 hr/h	650 - 1300 hr/h
	Density range (dph)	160 - 290 dph	180 - 330 dph	210 - 380 dph	220 - 430 dph	260 - 490 dph	260 - 520 dph
	Height range	4 - 7 storeys	4 - 8 storeys	5 - 9 storeys	5 - 10 storeys	5 - 11 storeys	5 - 12 storeys
	Lower building height average	5	5	5.5	5.5	6	6
	Upper building height average	5.5 storeys	6 storeys	6.5 storeys	7 storeys	7.5 storeys	8 storeys
	Site coverage	40 - 50%	42.5 - 52.5%	45 - 55%	47.5 - 57.5%	50 - 60%	50 - 60%
	Typology used in methodology	Typology 6	Typology 7	Typology 8	Typology 9	Typology 10	Typology 11

STAGE SEVEN: FINALISED OUTPUT AND RESULTING HEIGHT/DENSITY TABLE

- The draft density ranges were scrutinised further paying particular regard to the three cells identified at stage six (see table in pages above).

- A small adjustment was made to these three cells to address the lack of overlap with nearby cells and/or the creation of unrealistic cliff edges. The revised density numbers (small changes to the bottom of the density range) are shown in the table opposite.

Context type	Metrics	SAM 1	SAM 2	SAM 3	SAM 4	SAM 5A	SAM 5B
Setting A: e.g Suburban areas such as detached and semi-detached housing	Density range (hrph) * accommodates 50% non residential on ground floor	200 - 390 hr/h	220 - 410 hr/h	280 - 510 hr/h	340 - 610 hr/h	440 - 750 hr/h	500 - 830 hr/h
	Density range (dph)	80 - 160 dph	80 - 160 dph	110 - 200 dph	130 - 240 dph	170 - 300 dph	200 - 330 dph
	Height range	3 - 4 storeys	3 - 4 storeys	3 - 5 storeys	3 - 6 storeys	3 - 7 storeys	4 - 7 storeys
	Lower building height average	3	3	3.5	4	4.5	5
	Upper building height average	3.5 storeys	3.5 storeys	4 storeys	4.5 storeys	5 storeys	5.5 storeys
	Site coverage	35 - 45%	37.5 - 47.5%	40 - 50%	42.5 - 52.5%	47.5 - 57.5%	47.5 - 57.5%
	Typology used in methodology	Typology 1	Typology 2	Typology 3	Typology 4	Typology 5	Typology 6
Setting B: e.g Areas of predominantly urban/terraced dwellings	Density range (hrph) * accommodates 50% non residential on ground floor	200 - 390 hr/h	260 - 480 hr/h	330 - 580 hr/h	400 - 680 hr/h	500 - 830 hr/h	510 - 910 hr/h
	Density range (dph)	80 - 160 dph	100 - 190 dph	130 - 230 dph	160 - 270 dph	200 - 330 dph	210 - 370 dph
	Height range	3 - 4 storeys	3 - 5 storeys	3 - 6 storeys	3 - 7 storeys	4 - 7 storeys	4 - 8 storeys
	Lower building height average	3	3.5	4	4.5	5	5
	Upper building height average	3.5 storeys	4 storeys	4.5 storeys	5 storeys	5.5 storeys	6 storeys
	Site coverage	35 - 45%	37.5 - 47.5%	40 - 50%	42.5 - 52.5%	47.5 - 57.5%	47.5 - 57.5%
	Typology used in methodology	Typology 2	Typology 3	Typology 4	Typology 5	Typology 6	Typology 7
Setting C: District and Local centres	Density range (hrph) accommodates 80% non residential on ground floor	230 - 430 hr/h	300 - 530 hr/h	370 - 640 hr/h	440 - 750 hr/h	490 - 900 hr/h	550 - 990 hr/h
	Density range (dph)	90 - 170 dph	120 - 210 dph	140 - 250 dph	170 - 300 dph	190 - 360 dph	220 - 390 dph
	Height range	3 - 5 storeys	3 - 6 storeys	3 - 7 storeys	4 - 7 storeys	4 - 8 storeys	5 - 9 storeys
	Lower building height average	3.5	4	4.5	5	5	5.5
	Upper building height average	4 storeys	4.5 storeys	5 storeys	5.5 storeys	6 storeys	6.5 storeys
	Site coverage	37.5 - 47.5%	40 - 50%	42.5 - 52.5%	45 - 55%	50 - 60%	50 - 60%
	% of ground floor as mixed use	80% of ground floor as mixed use	80% of ground floor as mixed use	80% of ground floor as mixed use	80% of ground floor as mixed use	80% of ground floor as mixed use	80% of ground floor as mixed use
	Typology used in methodology	Typology 3	Typology 4	Typology 5	Typology 6	Typology 7	Typology 8
Setting D: e.g Areas of predominantly urban flatted development	Density range (hrph) * accommodates 50% non residential on ground floor	300 - 540 hr/h	370 - 650 hr/h	450 - 760 hr/h	470 - 880 hr/h	590 - 1040 hr/h	600 - 1130 hr/h
	Density range (dph)	120 - 220 dph	150 - 260 dph	180 - 300 dph	190 - 350 dph	230 - 420 dph	235 - 450 dph
	Height range	3 - 6 storeys	3 - 7 storeys	4 - 7 storeys	4 - 8 storeys	5 - 9 storeys	5 - 10 storeys
	Lower building height average	4	4.5	5	5	5.5	5.5
	Upper building height average	4.5 storeys	5 storeys	5.5 storeys	6 storeys	6.5 storeys	7 storeys
	Site coverage	37.5 - 47.5%	40 - 50%	42.5 - 52.5%	45 - 55%	50 - 60%	50 - 60%
	Typology used in methodology	Typology 4	Typology 5	Typology 6	Typology 7	Typology 8	Typology 9
Setting E: Large centres and Central Core	Density range (hrph) accommodates 80% non residential on ground floor	340 - 610 hr/h	420 - 710 hr/h	440 - 830 hr/h	490 - 950 hr/h	550 - 1080 hr/h	610 - 1170 hr/h
	Density range (dph)	130 - 240 dph	160 - 280 dph	170 - 330 dph	200 - 380 dph	220 - 430 dph	240 - 470 dph
	Height range	3 - 7 storeys	4 - 7 storeys	4 - 8 storeys	5 - 9 storeys	5 - 10 storeys	5 - 11 storeys
	Lower building height average	4.5	5	5	5.5	5.5	6
	Upper building height average	5 storeys	5.5 storeys	6 storeys	6.5 storeys	7 storeys	7.5 storeys
	Site coverage	40 - 50%	42.5 - 52.5%	45 - 55%	47.5 - 57.5%	50 - 60%	50 - 60%
	% of ground floor as mixed use	80% of ground floor as mixed use	80% of ground floor as mixed use	80% of ground floor as mixed use	80% of ground floor as mixed use	80% of ground floor as mixed use	80% of ground floor as mixed use
	Typology used in methodology	Typology 5	Typology 6	Typology 7	Typology 8	Typology 9	Typology 10
Setting F: e.g Areas of low density land such as car and retail parks, ex- industrial units.	Density range (hrph) * accommodates 50% non residential on ground floor	420 - 720 hr/h	450 - 830 hr/h	520 - 950 hr/h	560 - 1080 hr/h	650 - 1220 hr/h	650 - 1300 hr/h
	Density range (dph)	160 - 290 dph	180 - 330 dph	210 - 380 dph	220 - 430 dph	260 - 490 dph	260 - 520 dph
	Height range	4 -7 storeys	4 - 8 storeys	5 - 9 storeys	5 - 10 storeys	5 - 11 storeys	5 - 12 storeys
	Lower building height average	5	5	5.5	5.5	6	6
	Upper building height average	5.5 storeys	6 storeys	6.5 storeys	7 storeys	7.5 storeys	8 storeys
	Site coverage	40 - 50%	42.5 - 52.5%	45 - 55%	47.5 - 57.5%	50 - 60%	50 - 60%
	Typology used in methodology	Typology 6	Typology 7	Typology 8	Typology 9	Typology 10	Typology 11

OPTIMISATION FRAMEWORK TABLE (POLICY MBUL2)

- The proposed Optimisation Framework table is shown below.
- This table only applies to SAM 2+ because areas in SAM 1 are not considered sufficiently well connected for minimum car parking standards and densities to be applied. As a result, the table below does not include SAM 1.

Context	Description	SAM 2	SAM 3	SAM 4	SAM 5A	SAM 5B
Setting A	**Predominantly outer suburban area**	3 - 4 storeys 220 - 410 hr/h	3 - 5 storeys 280 - 510 hr/h	3 - 6 storeys 340 - 610 hr/h	3 - 7 storeys 440 - 750 hr/h	4 - 7 storeys 500 - 830 hr/h
Setting B	**Predominantly inner urban terrace area**	3 - 5 storeys 260 - 480 hr/h	3 - 6 storeys 330 - 580 hr/h	3 - 7 storeys 400 - 680 hr/h	4 - 7 storeys 500 - 830 hr/h	4 - 8 storeys 510 - 910 hr/h
Setting C	**District and local centres**	3 - 5 storeys 300 - 530 hr/h	3 - 6 storeys 370 - 640 hr/h	3 - 7 storeys 440 - 750 hr/h	4 - 8 storeys 490 - 900 hr/h	5 - 9 storeys 550 - 990 hr/h
Setting D	**Predominantly flatted development**	3 - 6 storeys 370 - 650 hr/h	4 - 7 storeys 450 - 760 hr/h	4 - 8 storeys 470 - 880 hr/h	5 - 9 storeys 590 - 1040 hr/h	5 - 10 storeys 600 - 1130 hr/h
Setting E	**Large town centres and Central core**	4 - 7 storeys 420 - 710 hr/h	4 - 8 storeys 440 - 830 hr/h	5 - 9 storeys 490 - 950 hr/h	5 - 10 storeys 550 - 1080 hr/h	5 - 11 storeys 610 - 1170 hr/h
Setting F	**Low density land**	4 - 8 storeys 450 - 830 hr/h	5 - 9 storeys 520 - 950 hr/h	5 - 10 storeys 560 - 1080 hr/h	5 - 11 storeys 650 - 1220 hr/h	5 - 12 storeys 650 - 1300 hr/h

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Appendix 1: List of case studies

LONDONASSEMBLY

APPENDIX 1 : LIST OF CASE STUDIES

Case study number	Scheme name	Planning Authority
1	Marleigh Park, Phase two	Cambridge City Council
2	Hobson Square, Great Kneighton	Cambridge City Council
3	Greggs Bakery	Richmond upon Thames
4	Phase 1, Barton Park, Oxford (Land At Barton Northern By-pass Road)	Oxford City Council
5	Rubicon, Cambridge	Cambridge City Council
6	Ham Close	Richmond upon Thames
7	Lightbody Street, Liverpool	Liverpool
8	Chobham Manor	London Legacy Development Corporation
9	Clapham South Car Park	Lambeth
10	Highgate Newton Community Partners	Camden
11	Regent Place	Tower Hamlets
12	Rowan Court	Haringey
13	White City Central	Hammersmith & Fulham
14	Sawyers Close	Royal borough of Windsor and Maidenhead
15	Rotherhithe Gas Holder Site	Southwark
16	52E Plashet Rd	Newham
17	Rainbow Industrial estate Merton	Merton
18	Agar Grove, phase 1a and 1b	Camden
19	Catford Police Station	Lewisham
20	134 Kenton Road, Harrow	Harrow
21	Appleby Blue Almhouse	Southwark
22	Park View Mansions	London Legacy Development Corporation
23	Stage 2 North - Barking Riverside Area (206B and 207A)	Barking and Dagenham
24	Stour Road	London Legacy Development Corporation
25	Bream Street	London Legacy Development Corporation
26	Neptune Wharf, Fish Island Village	Tower Hamlets (previously LLDC)
27	Land at Legacy Wharf Phase 2	Newham/LLDC
28	Ferndale Park, Cyprus, Land at Cyprus, Beckton	Newham
29	Hereford House and Exeter Court	Brent
30	Hyde Park, Hayes	Hillingdon
31	High barnet Place	Barnet
32	Kidbrooke Park Road North	Greenwich
33	New Era Estate	Hackney
34	Poets Corner (detailed element - phase 1)	Harrow
35	Bulrush Court	Tower Hamlets / London Legacy Development Corporation
36	Chobham Farm North	Newham (LLDC)

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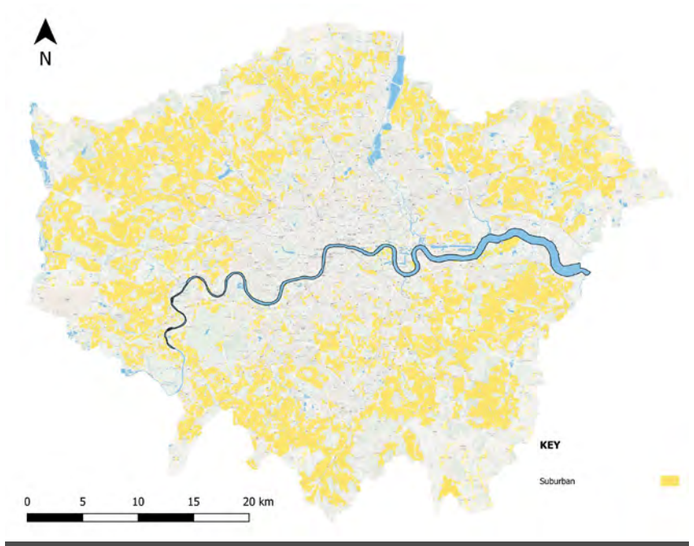
Appendix 2: 3D modelling scenarios of the height thresholds used in the Framework

LONDONASSEMBLY

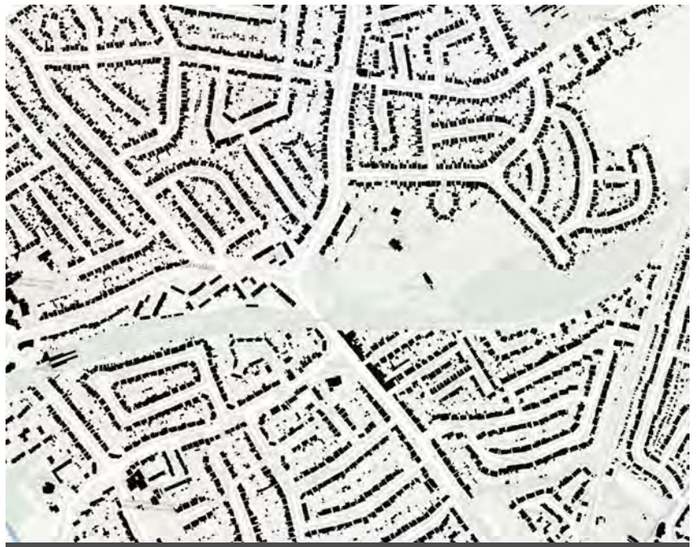
SETTING A – EXISTING CONTEXT

Predominant characteristic: Suburban areas with detached and semi-detached housing

Prevailing height: 2 – 3 storeys



Setting A accounts for a significant part outer London



Average building cover for a 1ha site: 25%

Built form

- Prevailing height: 2 – 3 storeys
- Age of buildings: 1920 – 1950s

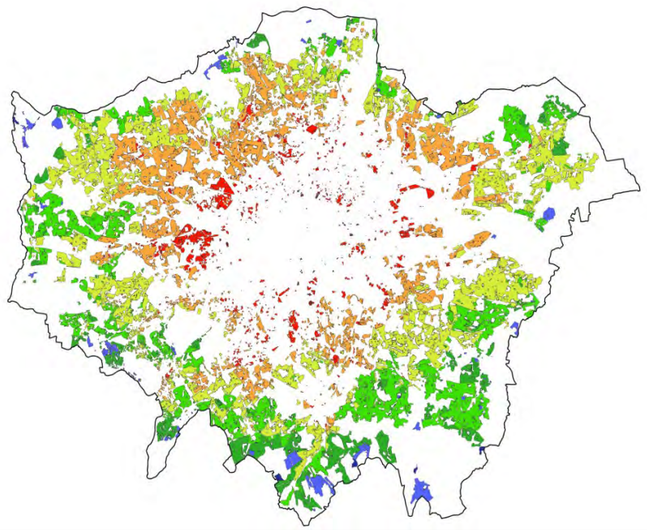
Opportunities and constraints

- **9%** of setting A is within a conservation area
- Mixture of architectural styles with some more sensitive than others.

Prevailing street/building pattern

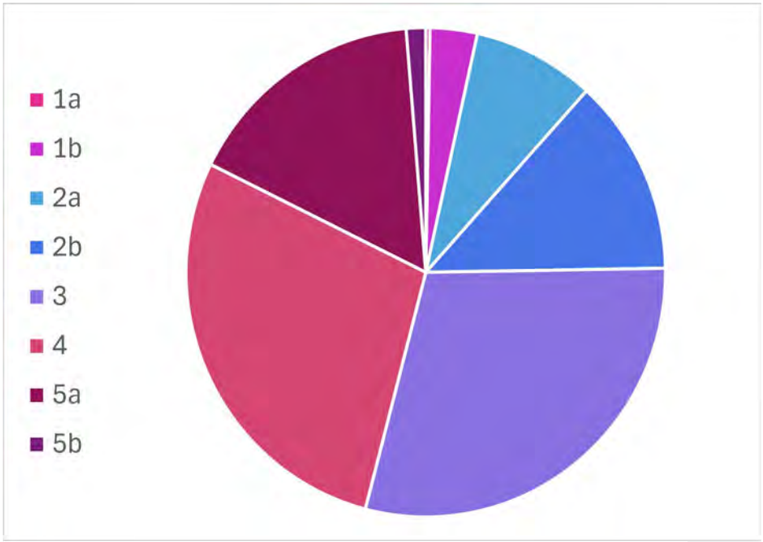
- Predominantly short and narrow freehold plots
- Street to width ratio = 1:5 to 1:2

SETTING A – KEY CONSIDERATIONS



Setting A categorised by SAM band

Plashet Road, Newham (4 – 5 storeys)



Proportion of Setting A within each SAM band

Housing potential - Key considerations

- This setting is not largely within conservation areas or near high concentrations of listed buildings.
- Building heights are currently predominantly limited to 2 – 3 storeys
- Predominant building typologies are currently semi-detached and detached homes.

Future typology assumptions

- Suitable for mid-rise flatted development between 3 – 6 storeys.
- Potential for higher plot coverage in better connected areas
- Increases in height have been assumed as potentially appropriate in better connected areas (up to 7 storeys)

Design metrics	SAM 1	SAM 2	SAM 3	SAM 4	SAM 5A	SAM 5B
Height range (storeys)	3 - 4	3 - 4	3 - 5	3 - 6	3 - 7	4 – 7
Average height (storeys)	3.5 storeys	3.5 storeys	4 storeys	4.5 storeys	5 storeys	5.5 storeys
Site coverage	35 - 45%	40 - 50%	40 - 50%	45 - 55%	50 - 60%	50 - 60%
Density (net hrph)	220 - 360 hr/h	240 - 400 hr/h	290 - 470 hr/h	330 - 600 hr/h	430 - 750 hr/h	490 - 830 hr/h

SETTING A – RESULTING MASSING SCENARIOS

Proposed design response in low SAM area (HA3 7DH)

SAM 2/3

Illustrative suburban setting in a low SAM context

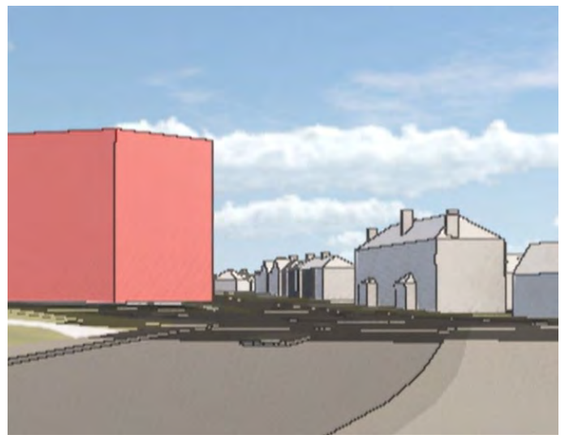
Indicative street scene

Indicative street scene

Indicative street scene

Indicative massing scenario (overview)

Indicative massing scenario 3 – 5 storeys



Indicative massing scenario

Illustrative proposed massing

SETTING A – RESULTING MASSING SCENARIOS

Proposed design response in high SAM area (E16 1LQ)

SAM 5A

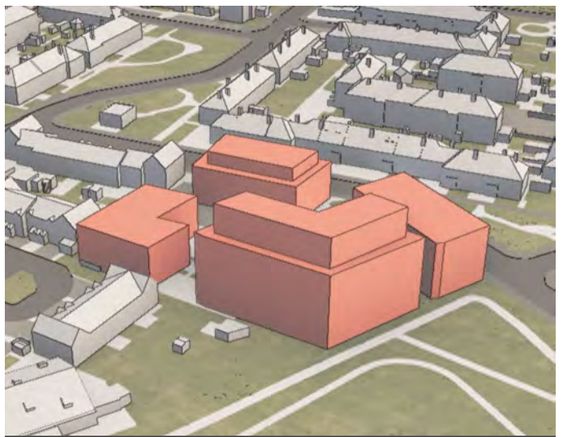
Illustrative suburban setting in a high SAM context

Indicative street scene

Indicative street scene

Indicative street scene

Illustrative suburban setting in a high SAM context



Indicative massing scenario
4 - 7 storeys

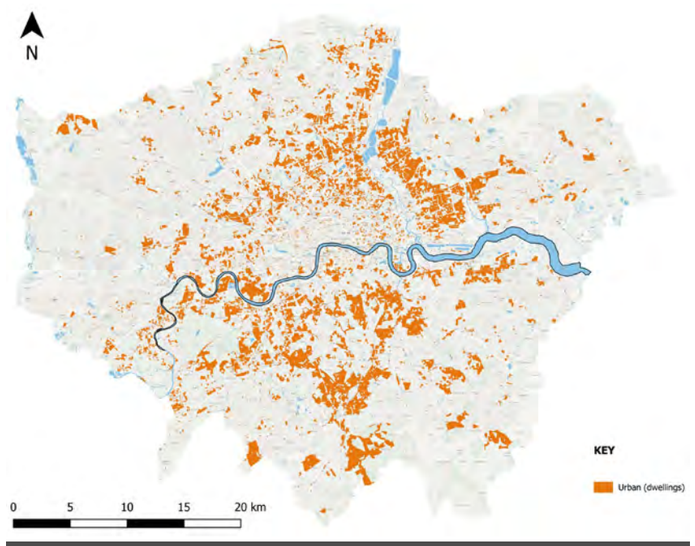
Indicative street scene

Illustrative proposed massing

SETTING B – EXISTING CONTEXT

Predominant characteristic: Urban dwellings characterised by two – four storey terraced streets

Prevailing height: 2 – 4 storeys



Setting B accounts for large areas of inner London and often lie just outside town centres

Average building cover for a 1ha site: 26%

Built form

- Prevailing height: 2 – 4 storeys
- Age of buildings: 1830 – 1905s

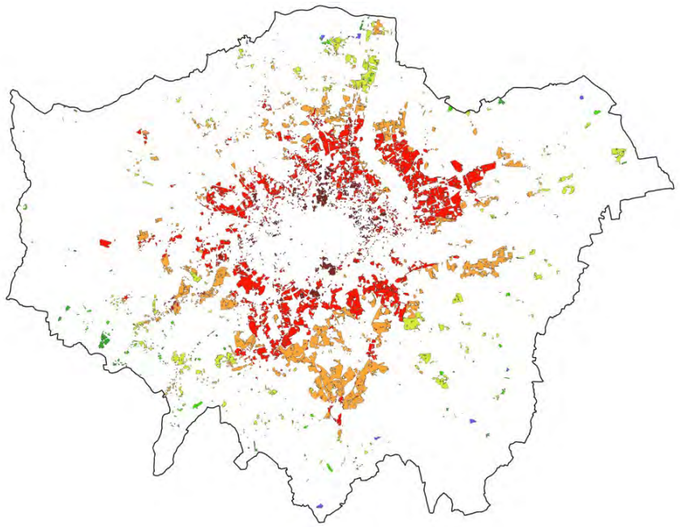
Opportunities and constraints

- **24%** of setting B is within a conservation area
- A higher proportion of buildings within Setting B are listed when compared to Setting A.

Prevailing street/building pattern

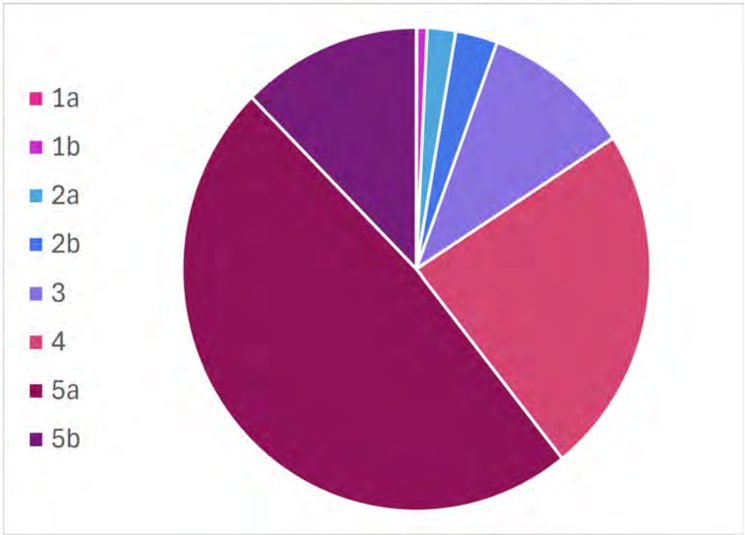
- Narrow freehold plots and common with a range of back garden lengths. Tighter plots in more central locations
- Street to width ratio = 1:3 to 1:1

SETTING B – KEY CONSIDERATIONS



Setting B categorised by SAM band

Legacy Wharf, Newham (5 – 8 storeys)



Proportion of Setting B within each SAM band

Housing potential - Key considerations

- The proportion of this setting within conservation areas or near high concentrations of listed buildings increases with SAM.
- Building heights are currently predominantly limited to 2 – 4 storeys
- Predominant building typologies are currently terraced and villa block typologies.

Future typology assumptions

- Suitable for mid-rise flatted development between 4 – 7 storeys.
- Potential for higher plot coverage in better connected areas
- Increases in height have been assumed as potentially appropriate in better connected areas (up to 8 storeys)

Design metrics	SAM 1	SAM 2	SAM 3	SAM 4	SAM 5A	SAM 5B
Height range (storeys)	3 – 4	3 – 5	3 - 6	3 - 7	4 - 7	4 - 8
Average height (storeys)	3.5 storeys	4 storeys	4.5 storeys	5 storeys	5.5 storeys	6 storeys
Site coverage	35 - 45%	40 - 50%	40 - 50%	45 - 55%	50 - 60%	50 - 60%
Density (net hrph)	220 - 360 hr/h	290 - 470 hr/h	290 - 540 hr/h	390 - 680 hr/h	490 - 830 hr/h	490 - 920 hr/h

SETTING B – RESULTING MASSING SCENARIOS

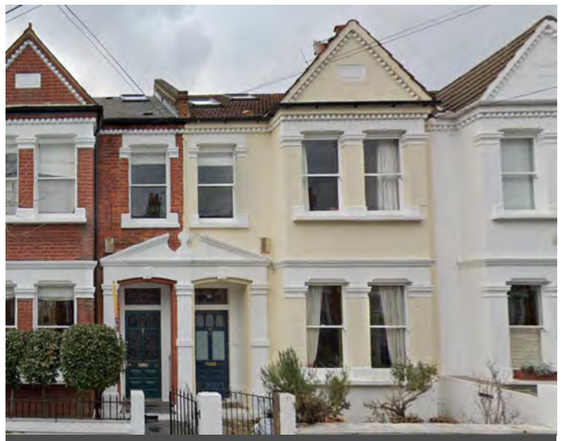
Proposed design response in low SAM area (EN2 8GH)

SAM 2

Illustrative Urban dwelling setting in a low SAM context

Indicative street scene

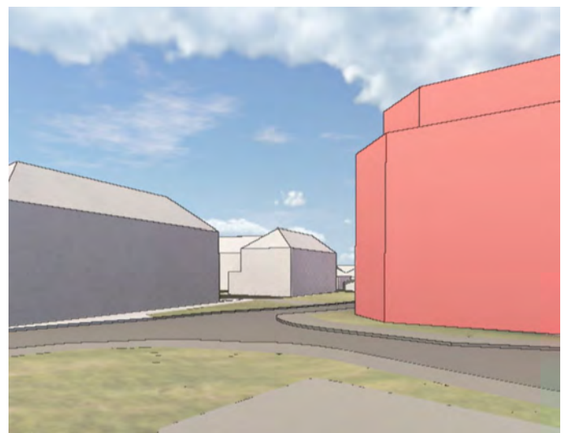
Indicative street scene



Indicative street scene

Illustrative Urban dwelling setting in a low SAM context

Indicative massing scenario
3 – 5 storeys



Indicative massing street scene

Illustrative proposed massing

SETTING B – RESULTING MASSING SCENARIOS

Proposed design response in high SAM area (SW9 9NU)

SAM 5A/5B

Illustrative Urban dwelling setting in a high SAM context

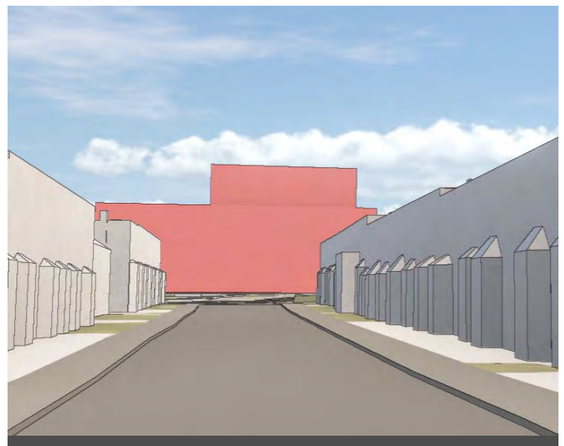
Indicative street scene

Indicative street scene

Indicative street scene

Illustrative Urban dwelling setting in a high SAM context

Indicative massing scenario
4 – 8 storeys



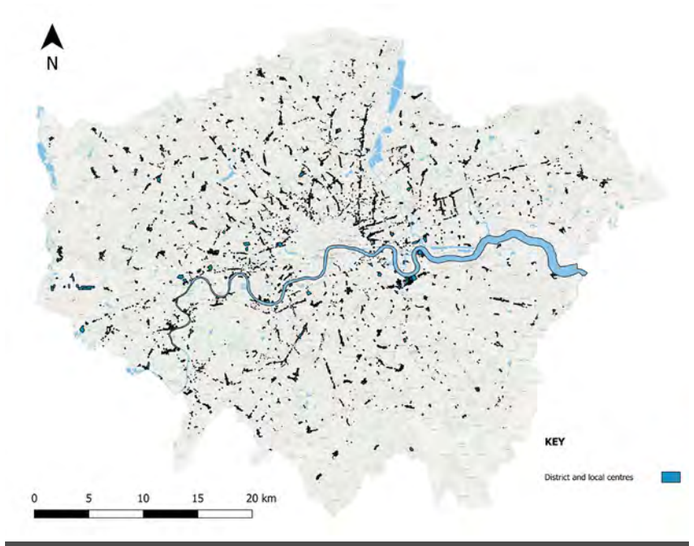
Indicative street scene

Illustrative proposed massing

SETTING C – EXISTING CONTEXT

Predominant characteristic: District and local centres

Prevailing height: 2 – 4 storeys



Setting C includes local and district centres but excludes the central London core.

Average building cover for a 1ha site: 38%

Built form

- Prevailing height: 2 – 4 storeys
- Age of buildings: 1830 – present day
- High proportion of ground floor taken up by mix of uses

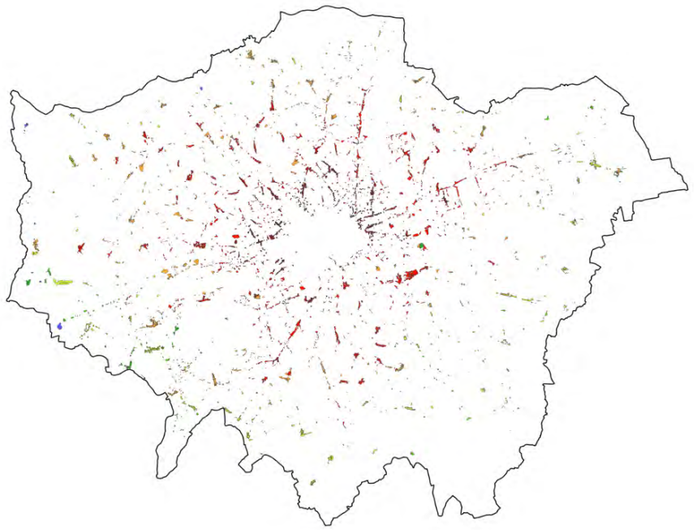
Opportunities and constraints

- **25%** of setting C is within a conservation area
- Fluctuating building heights provide opportunity for additional height

Prevailing street/building pattern

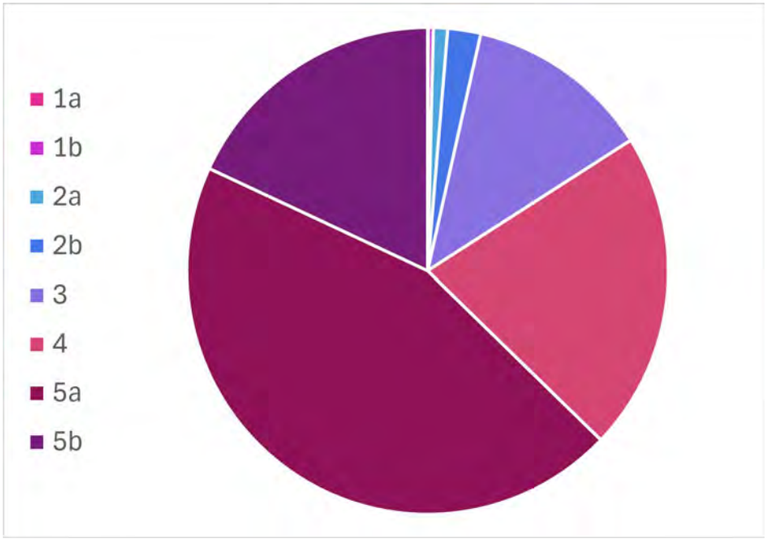
- Mixture of plot sizes and urban grain with older properties tending to have smaller narrower plots
- Street to width ratio = 1:2 to 1:2

SETTING C – KEY CONSIDERATIONS



Setting C categorised by SAM band

Proposal at Neptune Wharf, Hackney Wick (7 storeys)



Proportion of Setting C within each SAM band

Housing potential - Key considerations

- The proportion of this setting within conservation areas or near high concentrations of listed buildings increases with SAM.
- Buildings tend to have a strong building/frontage line with shop fronts on the ground floor.
- Predominant building typologies are currently terraced shop fronts as well as newer mid-rise flatted development.

Future typology assumptions

- Suitable for mid-rise flatted development between 3 – 8 storeys.
- Higher site coverage is assumed for higher SAM bands.
- Increases in height to 9 storeys have been assumed as suitable in top SAM band in less sensitive areas.

Design metrics	SAM 1	SAM 2	SAM 3	SAM 4	SAM 5A	SAM 5B
Height range (storeys)	N/A	3 – 5	3 – 6	3 - 7	4 - 8	5 - 9
Average height (storeys)	N/A	4 storeys	4.5 storeys	5 storeys	6 storeys	6.5 storeys
Site coverage	N/A	40 - 50%	40 - 50%	45 - 55%	50 - 60%	50 - 60%
Density (net hrph)	N/A	270 - 430 hr/h	270 - 500 hr/h	350 - 640 hr/h	450 - 870 hr/h	510 - 950 hr/h

SETTING C – RESULTING MASSING SCENARIOS

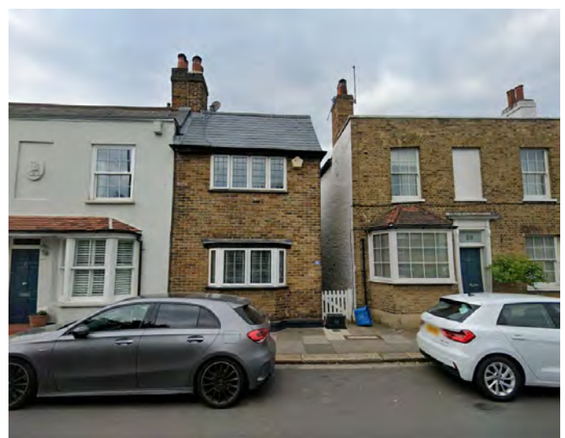
Proposed design response in low SAM area (TW12 1NY)

SAM 2/3

Illustrative local town centre setting in a low SAM context

Indicative street scene

Indicative street scene



Indicative street scene

Illustrative local town centre setting in a low SAM context

Indicative massing scenario
4 – 5 storeys

Indicative street scene

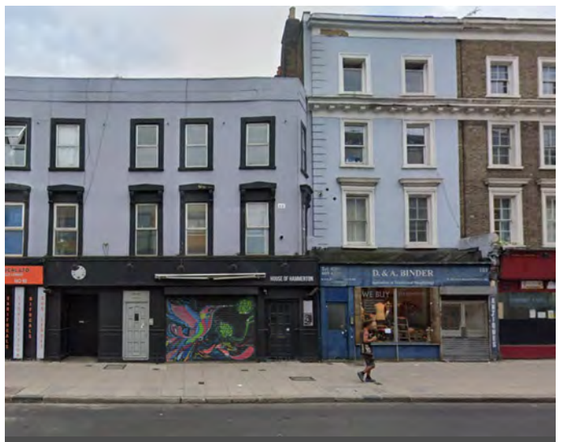
Illustrative proposed massing

SETTING C – RESULTING MASSING SCENARIOS

Proposed design response in high SAM area (N7 8JA)

SAM 5B

Illustrative local town centre setting in a high SAM context



Indicative street scene

Indicative street scene

Indicative street scene

Illustrative local town centre setting in a high SAM context

Indicative massing scenario
5 – 8 storeys

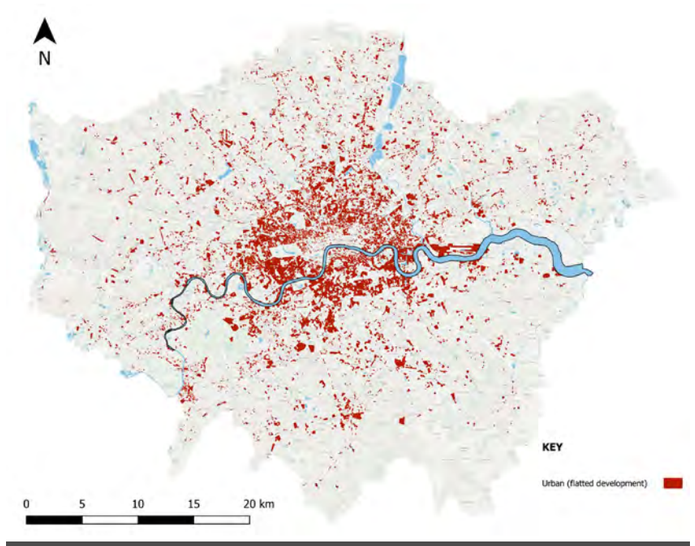
Indicative street scene

Illustrative proposed massing

SETTING D – EXISTING CONTEXT

Predominant characteristic: Urban flatted development

Prevailing height: 3 – 6 storeys



Setting D is predominantly located in inner London in areas of high SAM scores

Average building cover for a 1ha site: 46%

Built form

- Prevailing height: 3 – 6 storeys
- Age of buildings: 1830 – present day

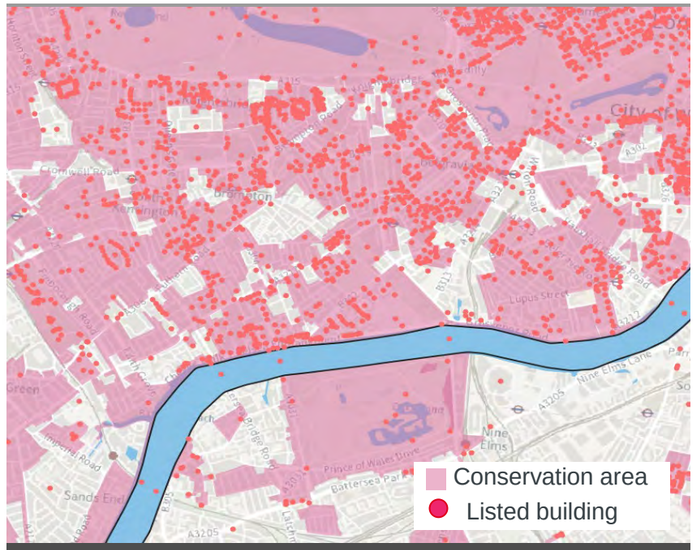
Opportunities and constraints

- **25%** of setting D is within a conservation area
- Mixture of architectural styles including mansion blocks, post war blocks and newer flatted development built more recently.

Prevailing street/building pattern

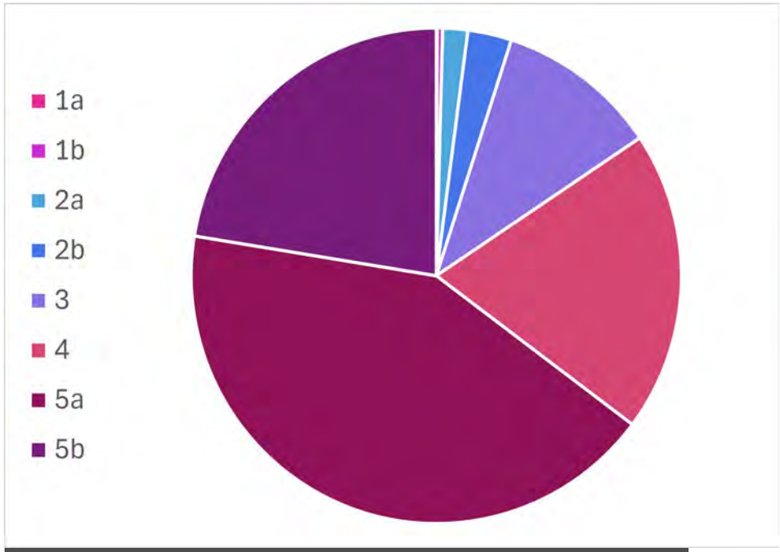
- Larger plot sizes with a coarser urban grain than local centres setting
- Street to width ratio = 1:2 to 1:1

SETTING D – KEY CONSIDERATIONS



High concentration of listed buildings and conservation areas in high SAM areas of setting D.

Proposal at Land at Cyprus, Beckton (5 – 9 storeys)



Proportion of Setting D within each SAM band

Housing potential - Key considerations

- The proportion of this setting within conservation areas or near high concentrations of listed buildings increases with SAM.
- Building heights are currently predominantly around 3 – 6 storeys with some taller elements.
- Predominant building typologies currently are mansion blocks and mid-rise flatted development.

Future typology assumptions

- Suitable for mid-rise flatted development between 3 – 10 storeys.
- Higher plot coverage is assumed for higher SAM areas.
- Increases in height up to 10 storeys have been assumed as suitable in high top SAM band in less sensitive areas

Design metrics	SAM 1	SAM 2	SAM 3	SAM 4	SAM 5A	SAM 5B
Height range (storeys)	3 – 5	3 – 6	4 – 7	4 - 8	5 - 9	5 - 10
Average height (storeys)	4 storeys	4.5 storeys	5.5 storeys	6 storeys	6.5 storeys	7 storeys
Site coverage	35 - 45%	40 - 50%	40 - 50%	45 - 55%	50 - 60%	50 - 60%
Density (net hrph)	260 - 420 hr/h	290 - 540 hr/h	390 - 680 hr/h	490 - 830 hr/h	610 - 1000 hr/h	610 - 1080 hr/h

SETTING D – RESULTING MASSING SCENARIOS

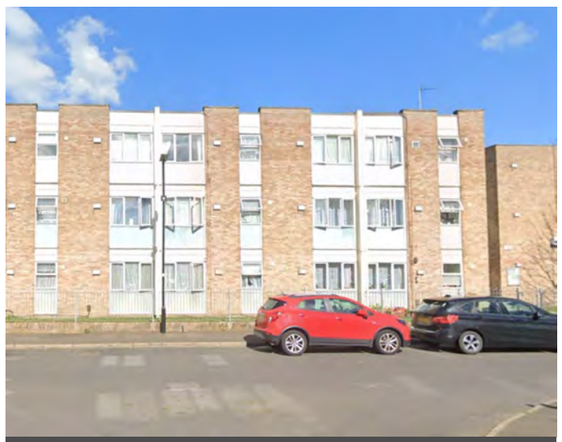
Proposed design response in low SAM area (TW14 8BY)

SAM 2

Illustrative Flatted Development setting in a low SAM context

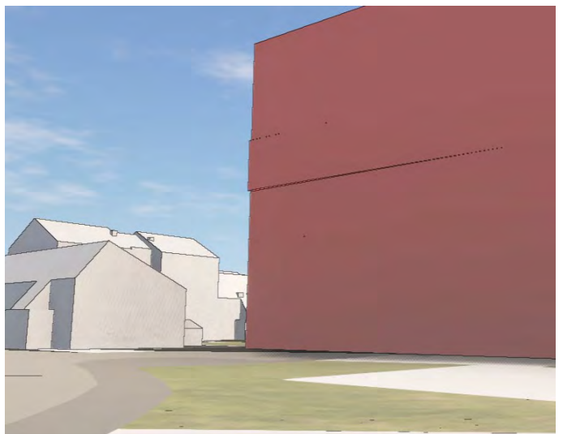
Indicative street scene

Indicative street scene



Indicative street scene

Indicative massing scenario (overview)



Indicative massing scenario 3 – 6 storeys

Indicative street scene

Illustrative proposed massing

SETTING D – RESULTING MASSING SCENARIOS

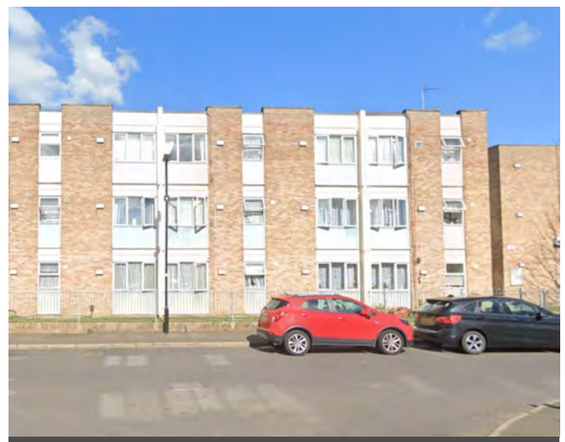
Proposed design response in low SAM area (TW14 8BY)

SAM 2

Illustrative Flatted Development setting in a low SAM context

Indicative street scene

Indicative street scene



Indicative street scene

Indicative massing scenario (overview)

Indicative massing scenario 3 – 6 storeys

Indicative street scene

Illustrative proposed massing

SETTING D – RESULTING MASSING SCENARIOS

Proposed design response in high SAM area (SW3 2NX)

SAM 5B

Illustrative Flatted Development setting in a high SAM context

Indicative street scene

Indicative street scene

Indicative street scene

Indicative massing scenario (overview)

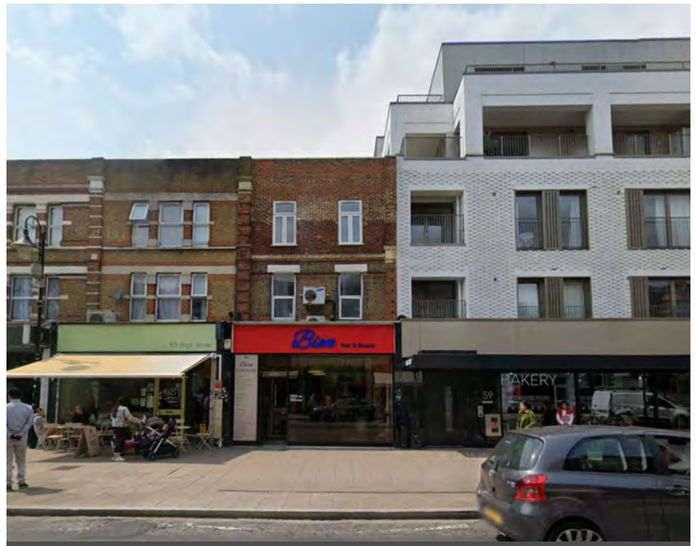
Indicative massing scenario 5 – 10 storeys

Indicative street scene

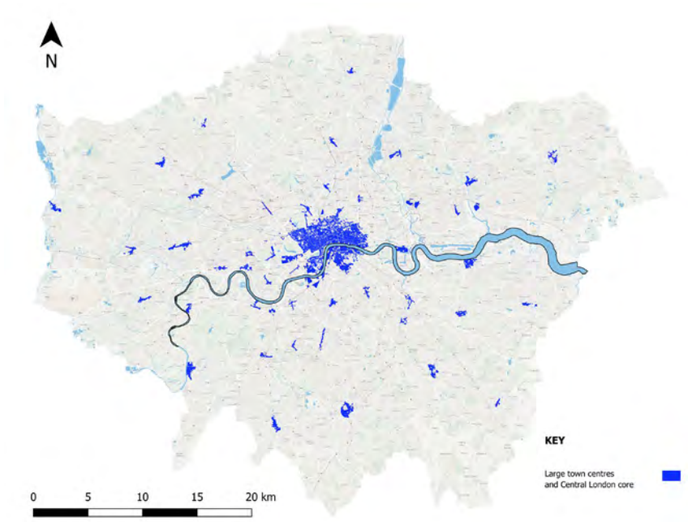
Illustrative proposed massing

SETTING E – EXISTING CONTEXT

Predominant characteristic: Large town centres and Central London core



Prevailing height: 3 – 7 storeys



Setting E accounts for London's central core and large town centres

Average building cover for a 1ha site: 63%

Built form

- Prevailing height: 3 – 7 storeys
- Age of buildings: 1750 – 2020s

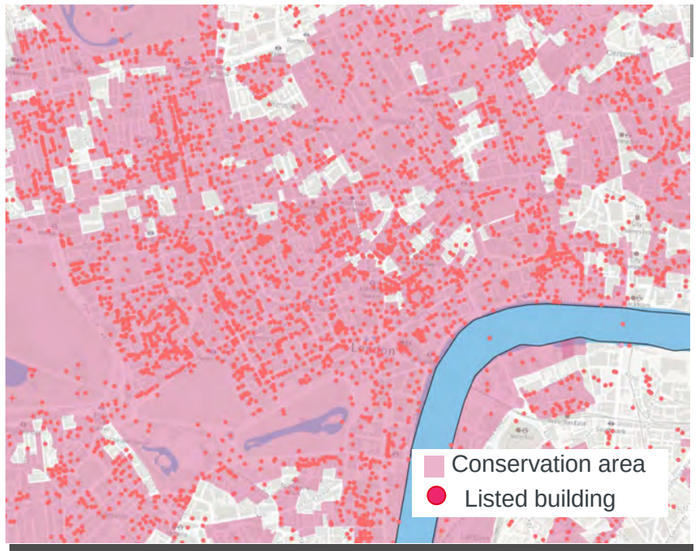
Opportunities and constraints

- **29%** of large town centres are within a conservation area
- **64%** of Central core is within a conservation area
- Highest proportion of listed buildings of all the settings

Prevailing street/building pattern

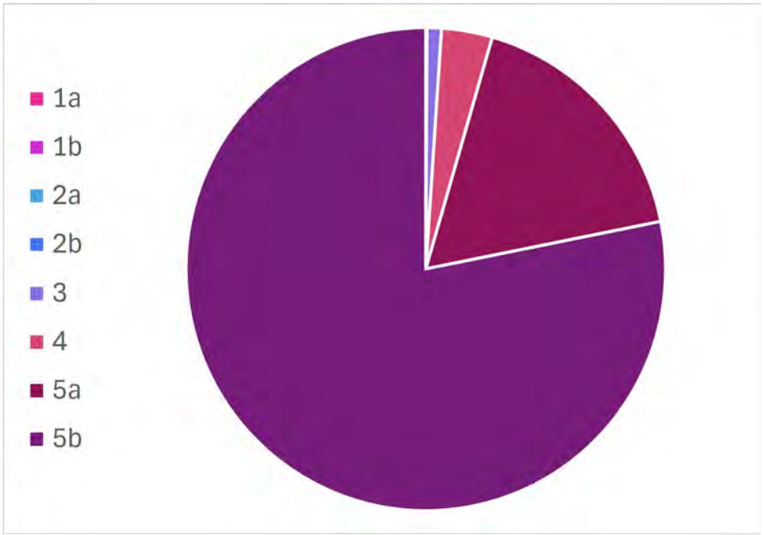
- High site coverage with less open space. Public parks located throughout.
- Large plot sizes
- Street to width ratio = 1:1 – 2:1

SETTING E – KEY CONSIDERATIONS



High concentration of listed buildings and conservation areas across SAM areas.

Bulrush Court, Tower Hamlets (8 – 9 storeys)



Proportion of Setting E within each SAM band

Housing potential - Key considerations

- The proportion of this setting within conservation areas or near high concentrations of listed buildings is high throughout this setting.
- Building heights are currently predominantly around 3 – 7 storeys with some taller buildings.
- Limited number of large areas/sites likely to be redeveloped.

Future typology assumptions

- Suitable for flatted development between 5 – 11 storeys.
- Higher plot coverage is assumed for all areas due to existing morphology.
- Increases in height in higher SAM areas have been assumed (noting that with the higher sensitivity of some of these areas, and that tall building locations are outside this framework, this has been set indicatively at up to 11 storeys).

Design metrics	SAM 1	SAM 2	SAM 3	SAM 4	SAM 5A	SAM 5B
Height range (storeys)	N/A	N/A	4 – 8	5 - 9	5 - 10	5 - 11
Average height (storeys)	N/A	N/A	6 storeys	6.5 storeys	7 storeys	7.5 storeys
Site coverage	N/A	N/A	40 - 50%	45 - 55%	50 - 60%	50 - 60%
Density (net hrph)	N/A	N/A	370 - 700 hr/h	470 - 860 hr/h	570 - 1030 hr/h	640 - 1120 hr/h

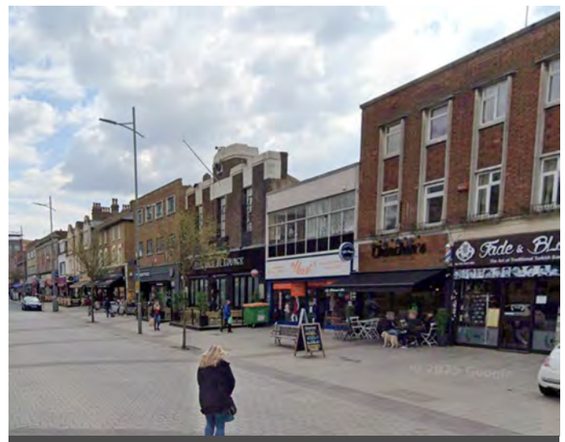
SETTING E – RESULTING MASSING SCENARIOS

Proposed design response in low SAM area (DA6 7ER)

Illustrative Town Centre setting in a low SAM context

Indicative street scene

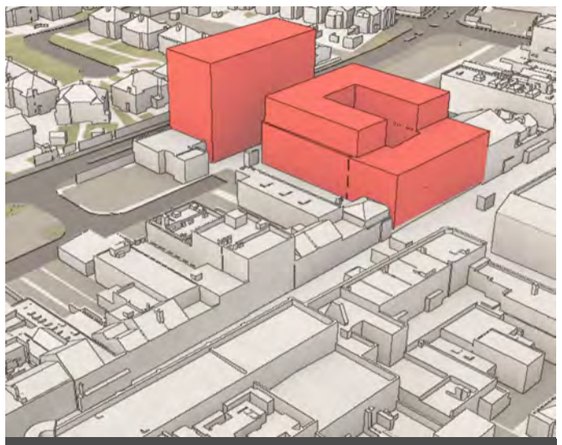
Indicative street scene



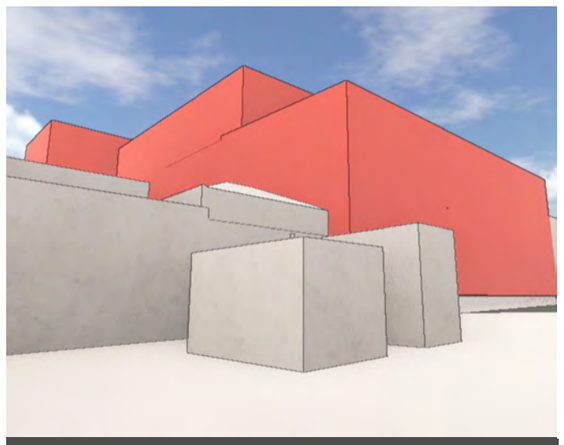
Indicative street scene

SAM

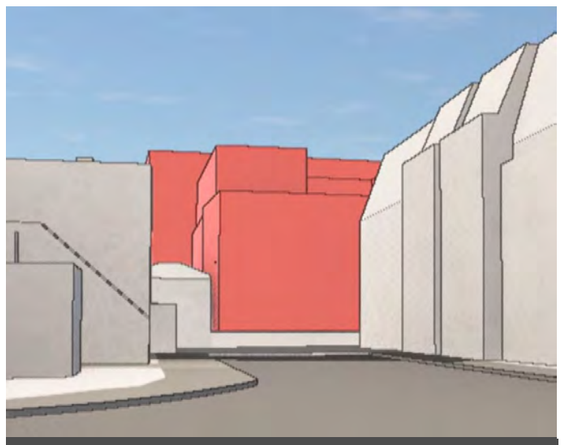
3



Indicative massing scenario (overview)



Indicative massing scenario 4 – 8 storeys



Indicative street scene

Illustrative proposed massing

SETTING E – RESULTING MASSING SCENARIOS

Proposed design response in high SAM area (EC1V 9HX)

SAM 5B

Illustrative Large Town Centre/Central setting in a high SAM context

Indicative street scene

Indicative street scene

Indicative street scene

Illustrative Large Town Centre/Central setting in a high SAM context

Indicative massing scenario
5 – 11 storeys

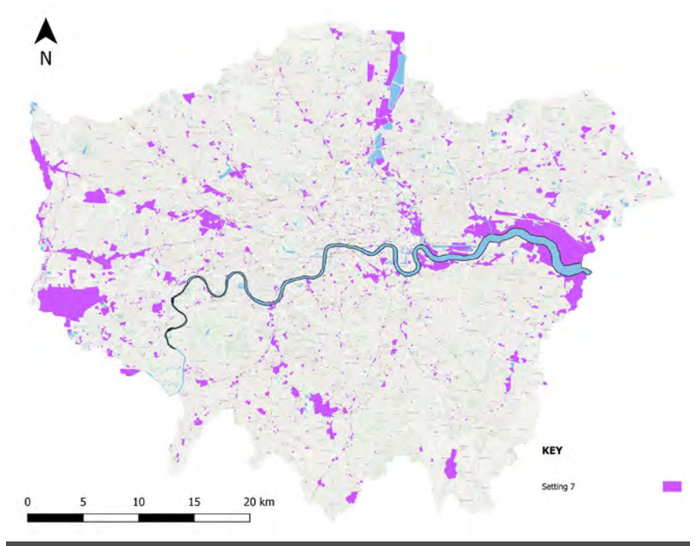
Indicative street scene

Illustrative proposed massing

SETTING F – EXISTING CONTEXT

Predominant characteristic: Areas of low-density land such as car and retail parks, ex-industrial units etc.

Typically, this setting is made up of large sites with low rise buildings and surface car parks



Setting F is located throughout London with the largest sites in Outer London

Average building cover for a 1ha site: 42%
:

Built form

- Prevailing height: 1 – 4 storeys
- Age of buildings: 1950 – 2010s

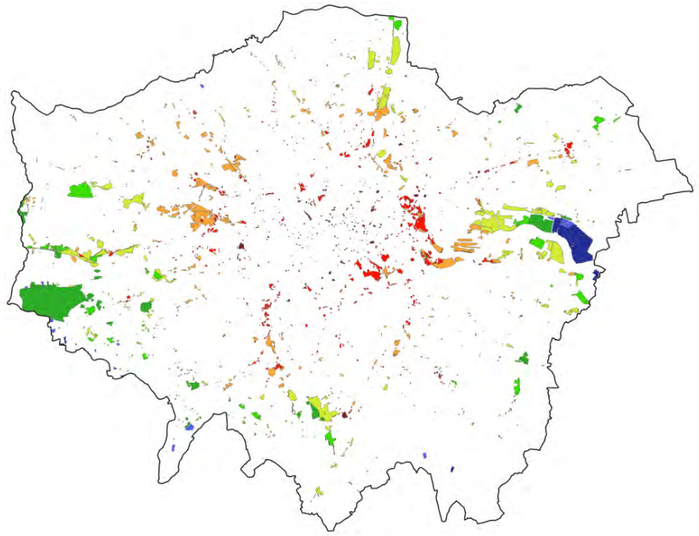
Opportunities and constraints

- **3%** of setting F is within a conservation area
- Lowest proportion of listed buildings of all the settings and a low degree of sensitivity in general.

Prevailing street/building pattern

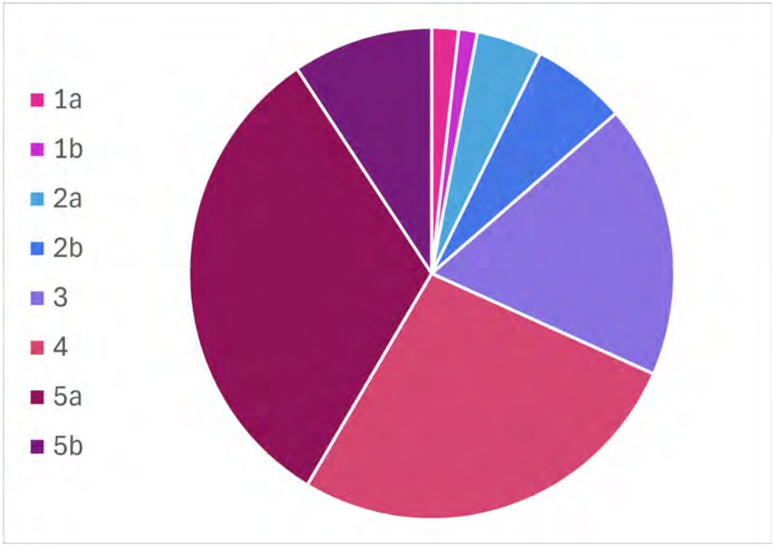
- Coarse urban grain with large blocks/buildings surrounded by large areas of unbuilt on space.
- Street to width ratio = 1:5 to 1:2

SETTING F – KEY CONSIDERATIONS



Setting F categorised by SAM band

Kidbrooke Park North, Greenwich (5 – 11 storeys)



Proportion of Setting F within each SAM band

Housing potential - Key considerations

- The proportion of this setting within conservation areas or near high concentrations of listed buildings is very low throughout this setting.
- Building heights are currently predominantly around 1 – 4 storeys.
- Sites are predominantly of significant size and have potential to create new character within larger sites.

Future typology assumptions

- Suitable for mid-rise flatted development (with taller elements of between 5 – 12 storeys).
- Higher plot coverage is assumed for all areas due to existing morphology.
- Increases in height in higher SAM areas has been assumed.

Design metrics	SAM 1	SAM 2	SAM 3	SAM 4	SAM 5A	SAM 5B
Height range (storeys)	4 – 7	4 - 8	5 - 9	5 - 10	5 - 11	5 - 12
Average height (storeys)	5.5 storeys	6 storeys	6.5 storeys	7 storeys	7.5 storeys	8 storeys
Site coverage	35 - 45%	40 - 50%	40 - 50%	45 - 55%	50 - 60%	50 - 60%
Density (net hrph)	350 - 600 hr/h	390 - 750 hr/h	450 - 820 hr/h	550 - 980 hr/h	670 - 1170 hr/h	670 - 1250 hr/h

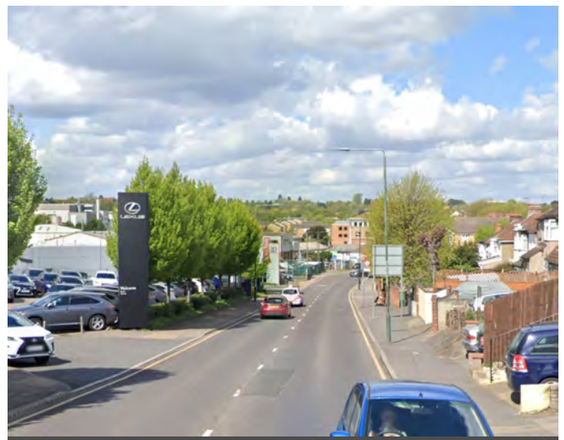
SETTING F – RESULTING MASSING SCENARIOS

Proposed design response in low SAM area (DA14 5BL)

SAM 2

Illustrative Low Density Land setting in a low SAM context

Indicative street scene

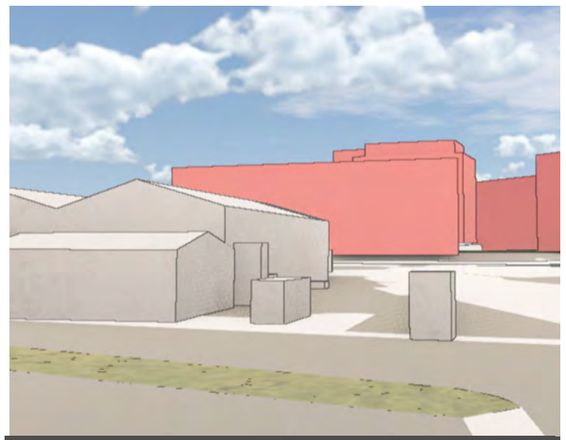


Indicative street scene

Indicative street scene

Illustrative Low Density Land setting in a low SAM context

Indicative massing scenario 4 – 7 storeys



Indicative street scene

Illustrative proposed massing

SETTING F – RESULTING MASSING SCENARIOS

Proposed design response in high SAM area (SW8 4UN)

SAM 6a

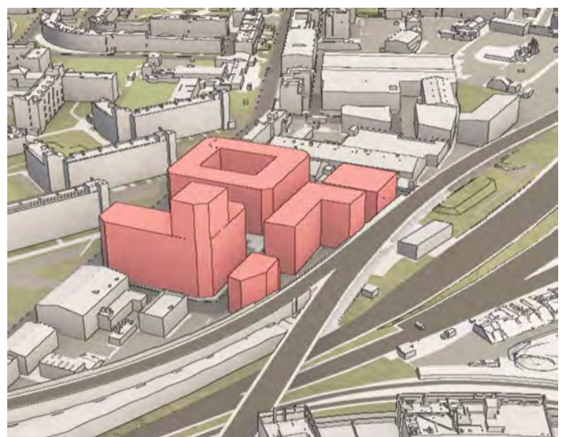
Illustrative Low Density Land setting in a high SAM context

Indicative street scene

Indicative street scene

Indicative street scene

Illustrative Low Density Land setting in a high SAM context



Indicative massing scenario 5 – 12 storeys

Indicative street scene

Illustrative proposed massing

MAYOR OF LONDON

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