MAYOR OF LONDON

London Plan Guidance

Optimising site capacity: A design-led approach

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City Hall

Kamal Chunchie Way

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E16 1ZE

www.london.gov.uk

Enquiries 020 7983 4000

Email planningsupport@london.gov.uk

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Acknowledgements

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London Plan Policy	Policy D1 London's form, character and capacity for growth – Part (B3) Policy D3 Optimising site capacity through the design-led approach Policy D4 Delivering good design
Plan making	Planning authorities and neighbourhood planning groups should use this guidance during the local and neighbourhood plan-making process, when setting design parameters and establishing an indicative site capacity for site allocations and masterplans. This includes any existing site allocations that are being brought forward into new or revised Development Plans, as well as those that have been assessed as part of Strategic Housing Land Availability Assessments (SHLAAs) and have been found to be suitable and available. Where a site is brought forward through an appropriate Development Plan Document (DPD), it should be accompanied by a set of design parameters. These should take account of any relevant site-specific work that has been already undertaken, such as an area masterplan or characterisation assessment.
Planning Application type and how the London Plan Guidance will be applied	All development must make the best use of land by following a design-led approach that optimises the capacity of sites. This must be evident in the design and access statements submitted at the planning application stage. While this guidance applies to all land uses, it is mainly directed at residential or residential mixed-use sites.
Who is this guidance for?	Anyone involved in the planning, design, construction, delivery and operation of new major development including local borough planners, planning applicants, energy consultants, designers, developers, contractors, building owners, network operators and facilities managers. Specialists in urban design, including heritage and conservation officers, should be involved in the process set out in this document and as such should refer to this guidance.

1 About this document

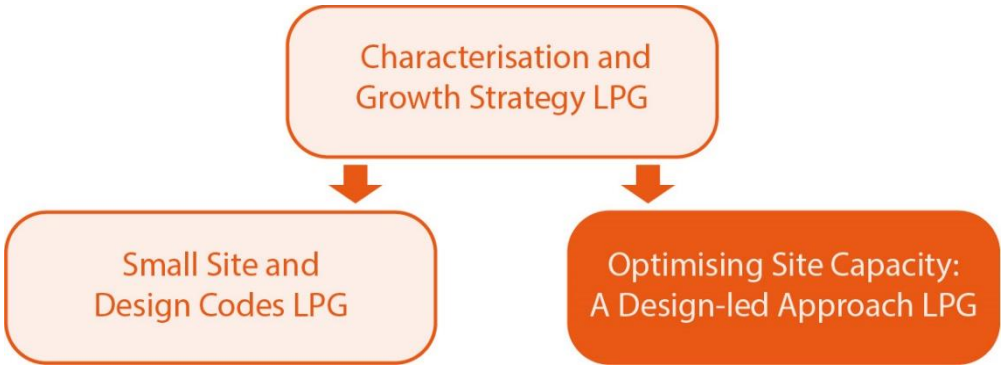
1.1 What is the design-led approach?

1.1.1 Good growth across London requires development to optimise site capacity, rather than maximising density. This means responding to the existing character and distinctiveness of the surrounding context and balancing the capacity for growth, need for increased housing supply, and key factors such as access by walking, cycling and public transport, alongside an improved quality of life for Londoners. Capacity-testing should be the product of the design-led approach, and not the driver.

1.1.2 This document sets out how the design-led approach, set out in Policy D3 of the London Plan, should be used to determine the most appropriate form of development on a site. The design-led approach is the process of setting site-specific design parameters and codes for development sites to provide clarity over the future design. These comprise a set of high-level strategic parameters addressing the form, massing and layout of a future development. They should be informed by a site-specific design vision that prioritises placemaking. They should be formulated at the local and neighbourhood plan-making stage to establish the design aspirations; and, for residential applications, to determine the indicative site capacity. Where design parameters have been set by the local planning authority or neighbourhood planning group, applicants should demonstrate that they have met these while following the process, set out in the document, to determine a more detailed design.

1.1.3 On sites where design parameters have not been set by the local planning authority or neighbourhood planning group, applicants should carry out this process during the preliminary design stages to determine a site's optimum design response and to clarify their design intentions. The design review process should be used to assess and inform design options early in the planning process (see Policy D4, Part D). This process should be carried out at the pre-application stage, with documents submitted as part of the design and access statement within a planning application.

Figure 1.1 Relationship between the design LPGs



1.1.4 This document is mainly directed at residential or residential mixed-use sites, but the process can be used for non-residential sites as well. It should be used in conjunction with the National Model Design Code (NMDC). This guidance builds directly upon the guidance in the Characterisation and Growth Strategy LPG, and differs from the area-wide design codes set out in the Small Site Design Codes LPG. The high-level design parameters set out in this guidance are site-specific, whereas the design codes in the Small Site Design Codes LPG are based on character types and cover an area – not just a single site.

1.1.5 The design-led approach prioritises placemaking, which should capitalise on the insight and knowledge of local communities. This should involve meaningful upfront engagement and collaboration with local communities, organisations and businesses, to ensure they have a greater say on the type of development in their local area at the plan-making stage.

Indicative Site Capacity Toolkit

1.1.6 An Indicative Site Capacity Toolkit has been developed as part of this guidance to assist in determining the indicative site capacity of residential sites. This digital toolkit includes a set of 3D residential building types[1] in SketchUp; and an Excel-based indicative site capacity calculator which can be used when calculating a site's indicative capacity. Boroughs, applicants and neighbourhood planning groups may choose to use other digital design tools if preferred.

1.2 Neighbourhood planning

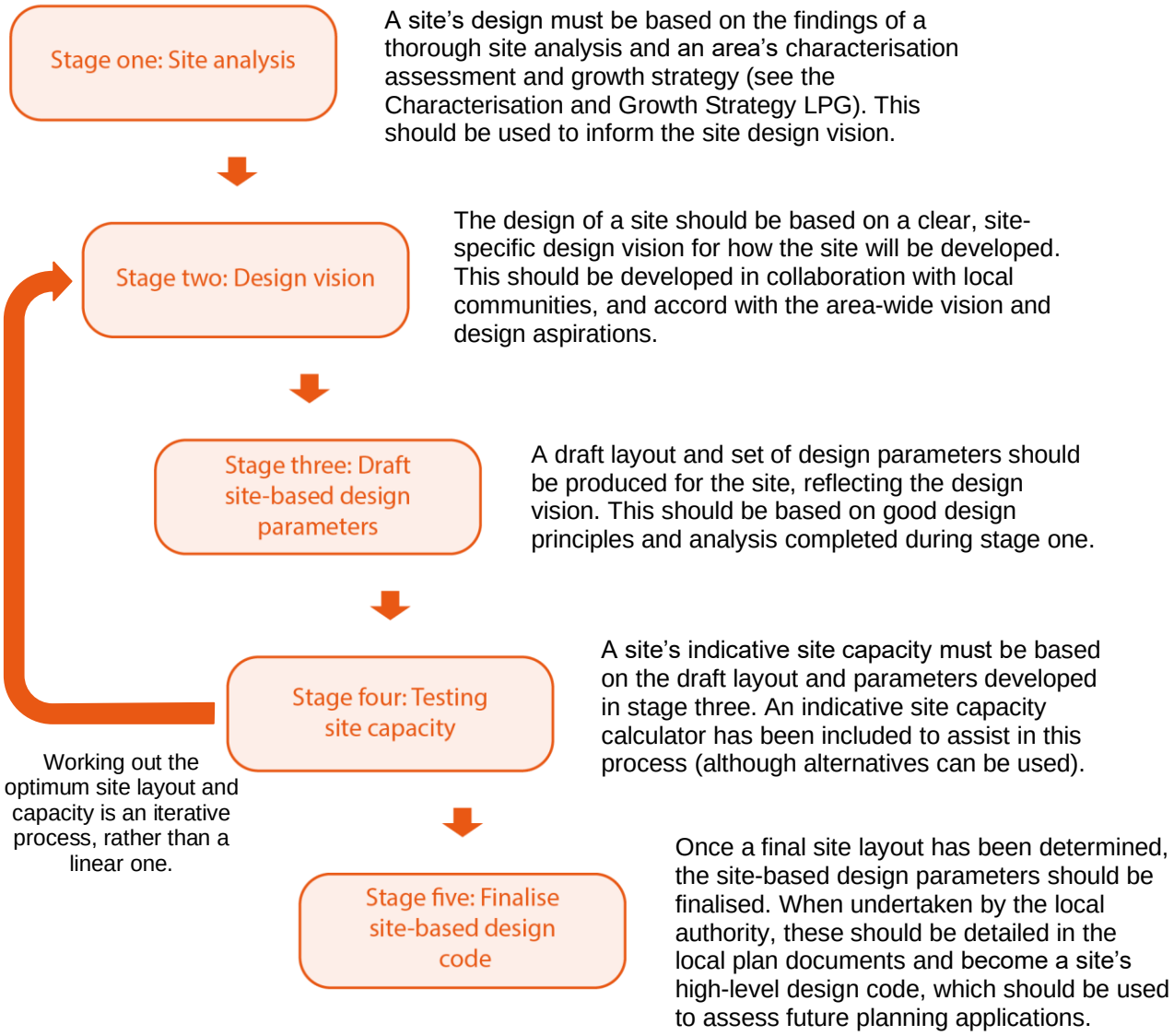
1.2.1 Neighbourhood planning groups are encouraged to develop design parameters for sites within their designated neighbourhood area. For residential or residential mixed-use sites, this should include determining the indicative site capacities.

[1] The 3D residential types are based on common block types in London that comply with the Housing Design Standards LPG. As a result, this toolkit includes a selective, and not exhaustive, list of residential types.

1.3 Stages of the design-led approach

1.3.1 Optimum site capacity is defined as development with the most appropriate form for its site, following an evaluation of the site's attributes, its surrounding context and its capacity for growth (London Plan Policies D1, D2 and D3). There are five stages to the design-led approach, detailed in Figure 1.2, below. When undertaken by a borough or neighbourhood planning group, this process should be carried out during the plan-making stage, when setting design parameters and working out indicative site capacities for sites.

Figure 1.2 Five stages to the design-led approach



2 Stage one: Site analysis

2.1 Site context

2.1.1 Stage one is an analysis of the site and its surrounding context. This stage should reflect findings from the borough-wide characterisation assessment as well as a more detailed analysis of a site's opportunities and constraints. This analysis should form the basis of any future redevelopment of a site, informing the appropriate scale and character. It should also take account of how a place changes around the clock and across the week.

2.2 Planning policy, guidance and history

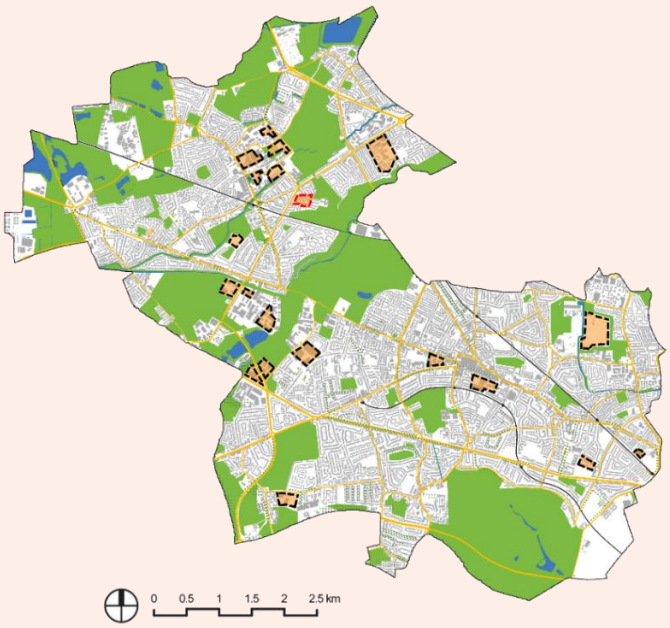
2.2.1 Boroughs, neighbourhood planning groups and applicants should first consider the existing and emerging development plan designations, including any relevant current allocations, planning designations for the site or adjoining sites, and local plan requirements. Relevant site-specific planning guidance documents or strategies – as well as any prior pre-application discussions or engagement with landowners and developers, existing planning applications, and planning approvals – may also provide useful insights during the site analysis.

Example site

An example site, outlined in red below, is used within this guidance to illustrate the key aspects and stages to the design-led approach.

Figure 2.1 Area map showing development sites

Sites brought forward through a DPD should be located on digital coding plan



2.3 Environmental and infrastructure opportunities and constraints

2.3.1 Boroughs, neighbourhood planning groups and applicants should first consider the environmental and infrastructure factors when analysing a site's potential for redevelopment. This should include factors such as flood risk; air quality; soundscape; land contamination; below-and-above-ground utilities; and site ownership. An analysis of the topography of a site should also be conducted as this will assist in defining the layout, orientation, building height, drainage and accessibility of a site. Considering these factors will help influence the design of a site and may highlight any potential constraints or opportunities early in the design process.

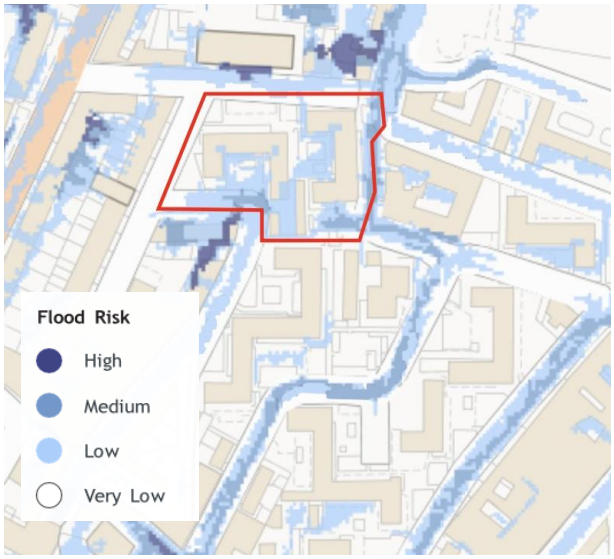


Figure 2.2 Assess flood risk

Development sites should be designed to adapt to the risks of climate change. As a result, a site's risk to flooding should be assessed and planned for. This could mean avoiding building on low-lying land and instead using it for sustainable urban drainage systems (SuDS). Options may also include ruling out basement accommodation and locating vulnerable uses on upper floors.

Figure 2.3 Assess below and above-ground utilities

A site appraisal of the below-and-above-ground assets and ground conditions should be carried out. This could include the presence of major utilities, overground pylons, sewers, London underground tunnels and site contamination. The Mayor's Infrastructure Coordination Service and Infrastructure Mapping Application (IMA) can support in this analysis.

2.4 Connectivity, permeability and access to local services

2.4.1 Connecting places with sustainable infrastructure and improving local and wider connections are key to successful places. Walking, cycling and public transport provision, accessible night and day, are crucial to creating healthy, inclusive and attractive places. An optimum capacity and density will be one where development takes full advantage of a site's current and future planned connectivity by public transport, walking and cycling to enhance access to services. When planning for connected, well-designed places, it is important to look beyond the boundaries of the site for opportunities to integrate with and enhance the surrounding streets, buildings and networks and to improve permeability and key connections. The hierarchy of streets can influence local movement and the opportunities for walking and cycling. The access to employment, local services and social infrastructure, such as education or health provision (including at night), should also be identified. This will help to determine if any new services or social infrastructure are required.

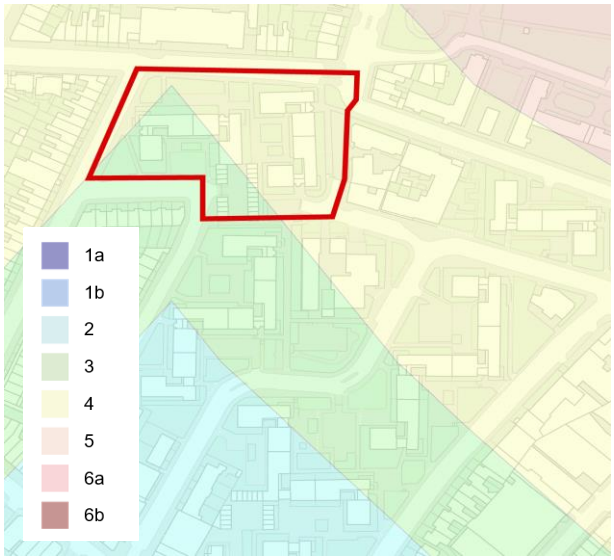


Figure 2.4 Connectivity measures

Connectivity measures such as Public Transport Access Level (PTAL), walking and cycling routes, and Time Mapping should be used to identify opportunities or potential barriers to site optimisation. In general, the better the connectivity, the greater the density and the lower the levels of car parking. How this may impact the design of the site and layout should be considered.

Figure 2.5 Hierarchy of streets

Existing street patterns and public rights of way should be analysed in terms of their function, hierarchy and strategic connections. Streets and public spaces within a development will be better used if they link well to those outside of the site – this will help encourage active travel, support new businesses and improve the sense of security on residential streets (see TfL's Healthy Street toolkit).

2.5 Built form and open spaces

2.5.1 Existing urban typologies near the site, which make a positive contribution to the character of the area, should influence the design vision for the site. This exercise may also involve assessing aspects of a site's surroundings that do not positively contribute to the character of an area (such as areas that are overly dark or secluded, or typologies that do not contribute positively to the area). The provision of public green space should be considered at this stage, with reference to the site analysis of topography, hydrology and the borough's wider green infrastructure network. Existing trees and ecology of value should be retained where possible due to the time needed to establish them. It is important to consider the proximity of (and ease of access to) green space to residential areas for recreation and relaxation, and to support biodiversity and reduce the urban heat island effect.

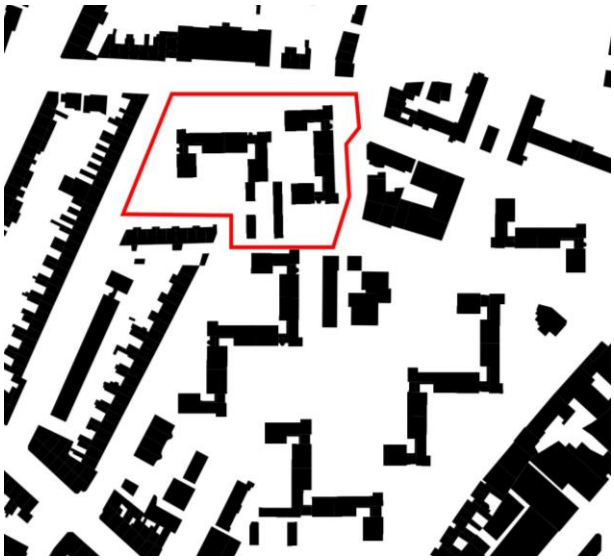


Figure 2.6 Urban typologies

Figure ground plans offer clues about the appropriate block size and urban typology that should be used. Larger urban blocks should be located next to wider streets. Smaller, fine-grain urban blocks should be separated by narrower streets. The orientation of buildings should be considered as this can affect a building's thermal performance, and quality and use of public open space (e.g. shadow, wind etc).

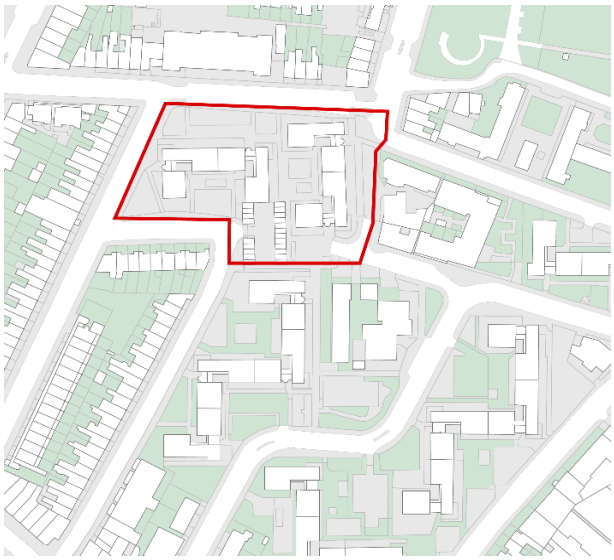


Figure 2.7 Green infrastructure

Site capacity can be optimised, safety-enhanced, and healthy lifestyles encouraged, where the benefits of green infrastructure are integrated into site design. Well-designed green infrastructure can make an important contribution to addressing flood risk; placemaking; mental and physical well-being; urban heat; and exposure to poor air quality for people more vulnerable to exposure, such as children and young people.

2.6 Heritage and placemaking

2.6.1 A site's history and heritage should heavily inform the design parameters and wider placemaking of a site. This should include the identification of heritage assets of varying significance including conservation areas, listed buildings, protected views and the presence of archaeological assets. Character types and areas (see Characterisation and Growth Strategy LPG) may also be identified. This will assist in informing the urban typologies of any future development. Local building styles and materials should be analysed as this can help determine aspects of identity that should be replicated. As per London Plan Policy HC1, proposals affecting heritage assets, and their settings, should conserve their significance. For buildings identified as being At Risk, boroughs should set out strategies for their repair and re-use. Community assets should be identified, as these might play a key role in forming existing communities around them and creating a sense of place (see Cultural Infrastructure Map).

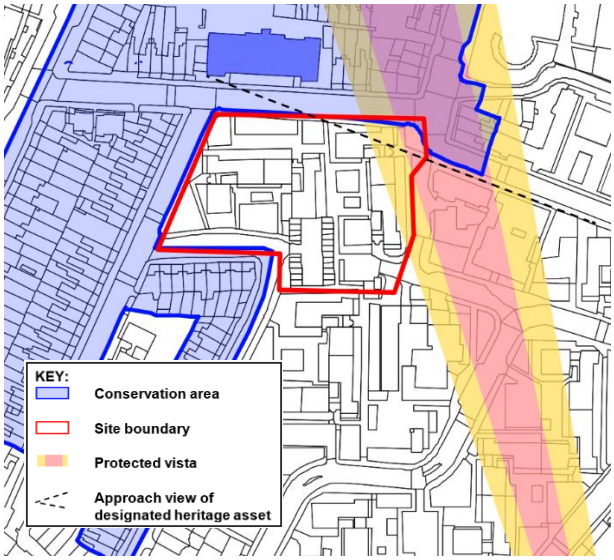


Figure 2.8 Identify heritage assets and protected views

Heritage assets are the remaining traces of the development history and contribute much to the legibility, continuity and identity of an area. They provide landmarks that aid navigation; and offer an opportunity to support culture, the circular economy and good placemaking. Sensitive interventions and adaptations to buildings help to preserve them for future generations.

Figure 2.9 Historic street map

Site parameters should be informed by an analysis of the historic and existing street patterns and urban grain. Historical street maps can give an insight into former street patterns that could be reinstated to reconnect to local streets. Appropriate urban block size can also help in good placemaking and improve permeability where this is poor. This process may also identify sensitive edges or boundary conditions that should inform the design of a site.

2.7 Building height, layout and uses

2.7.1 Next, a site analysis of the building heights, layout and land uses should be carried out. As part of this, the impact of potential future building heights should be considered on heritage assets, protected views, and the daylight and sunlight of neighbouring properties. This includes the impact of overshadowing on existing properties, open green space and the internal spaces within the site itself. An analysis of nearby land uses should also be used to inform the mix and location of uses for any future development. In analysing the layout, it may be useful to establish 'desire lines' across the site, and visually compare the size of the urban blocks within the site against those surrounding it. If the urban blocks on the existing site are particularly large, it may be beneficial to subdivide these. This should be closely informed by the characterisation assessment and historic street layout.

Figure 2.10 Land uses

Local building heights should be assessed to determine the appropriate height of new development. Heights of new development should relate to the width and hierarchy of surrounding streets and public spaces. Particular consideration should be given at a site's edges where it meets existing townscape. Overly abrupt changes in height should be avoided unless justified from a townscape perspective.

Figure 2.11 Building heights

Future development should contribute to creating diverse mixed-use places. The location of future land uses will be influenced by surrounding and nearby land uses. Often, non-residential uses – such as restaurants, cafés, and retail frontages – should be located on busier streets, while the quietest streets are likely to be purely residential. Existing formal and informal community spaces should also be identified.

2.8 Infrastructure capacity analysis

2.8.1 Practitioners should proactively plan for estimated population growth and change as this will have implications for what infrastructure should be provided on a site and thus influence the overall site capacity. This will involve an iterative process of identifying existing infrastructure provision, and any deficiencies; and then re-evaluating it once an indicative site capacity is determined, and thus likely population has been established. It should include an assessment of social infrastructure, such as local health and education services; and consider in particular the needs of children, young people and the elderly living within new housing developments. A key consideration here is planning for the needs of existing and new residents, taking account of protected characteristics. This includes ensuring that any new and existing service/s is accessible to those walking, cycling or using public transport (see Sustainable Transport, Walking and Cycling LPG).

2.8.2 Population and child yield vary across type of home and housing tenure. The GLA's Population Yield Calculator should be used, which gives an indication of the possible number and age of children that could be expected to live in a new housing development. The expected population yield can assist in determining the potential need for play space and social infrastructure generated by a new development, to inform the infrastructure-planning process when calculating the indicative site capacity (step 7 in section 5.1). This may include infrastructure such as schools and childcare facilities, as well as health and social care facilities.

2.8.3 Boroughs, neighbourhood planning groups and applicants should consider the viability and deliverability of sites when following the design-led approach. Sites should be designed to provide the relevant threshold level of affordable housing wherever possible, and the infrastructure needed to support delivery. Evaluating borough Infrastructure Delivery Plans (IDPs) provide a good starting point for assessing the adequacy of infrastructure capacity. Similarly, annual Infrastructure Funding Statements (IFS) may provide further detail to IDPs by detailing the projects where funds received through developer contributions and the Community Infrastructure Levy will be spent. Where infrastructure capacity is deemed inadequate, the borough should seek to ensure that sufficient capacity will exist at the appropriate time. Planning Obligations Supplementary Planning Documents and IFSs will help clarify priorities and locations for infrastructure-capacity improvements, and how funding may be secured. If the infrastructure necessary to support the development cannot be delivered, the scale of development being considered for the site should be reduced to reflect the level of infrastructure that will be available; and/or it may be necessary to phase development tied to infrastructure delivery (see Policy D2 Infrastructure requirements, for sustainable densities).

3 Stage two: Design vision

3.1 Placemaking

3.1.1 Using the information gathered during the site-analysis stage, a clear design vision should be formulated for what the site will become in the future. The foundation of this design vision should be a placemaking exercise that is focused on the design principles and physical attributes of a future development and how these should relate to the surrounding area. This is likely to include the scale and massing of the built form; routes through the sites; location of open spaces and other key green infrastructure features; and land uses. For boroughs and neighbourhood planning groups, this process should avoid duplicating policy aspirations that can be found elsewhere in the local or neighbourhood plan, and instead aim to clarify the site-specific design intentions and high-level parameters for a site. In areas undergoing significant change, approaching the design of multiple nearby sites together, rather than as individual sites, is encouraged. This will secure a more coherent approach to placemaking, thinking beyond 'the red line boundary', and improve an area's future legibility. New development must also support and promote the creation of an inclusive London where residents and visitors can access and benefit from places and spaces that offer safety, dignity and acknowledge diversity and difference in our city, during both the day and the night.

3.2 Public engagement and consultation

3.2.1 Communities, organisations and businesses should be meaningfully engaged with when developing the design vision for a site. As part of this, practitioners should present the evidence and findings of their site analysis to the local community and other stakeholders. This provides an opportunity for the local community to comment on or clarify the findings of the site analysis, and for any amendments or additions to be made.

3.2.2 Engagement should be inclusive, with the participation of all parts of a community and their views taken account of. Providing engagement online and in person, as well as offering different times of day for engagement, is also encouraged. This should involve the gathering of local insight and knowledge, as well as the communities' preferences on design, massing and land use. The community's perception of safety can also be gathered at this stage, as this will be an important consideration in the design of streets and the new development. Engaging the public at this stage brings forward discussions about the scale and form of development to the plan-making stage (or early design stages for applicants), where there is greater opportunity to shape future development in an area. Where relevant, feedback gained should then be used to shape the design of the development site. Examples of consultative community engagement could

include interactive Q&A sessions, setting up a community review group, and carrying out co-design meetings and workshops.

3.3 Borough-wide growth strategy and location of tall buildings

3.3.1 A site's design vision should clearly articulate what constitutes acceptable design quality for a site; and should be informed by the local area's spatial strategy. This may be in the form of a local masterplan; an Area Action Plan; a Neighbourhood Plan; or an area-specific Supplementary Planning Document (SPD).

3.3.2 The site's location within one of the three 'areas of change' (*conserve*, *enhance* and *transform*), and any area-wide visions, policies and parameters, should assist in informing the design vision for a site and the subsequent design parameters and codes. As a guide, the form and scale of development in each of the three areas of change should be similar to that detailed in section 4.2 of the Characterisation and Growth Strategy LPG. This process should take into account an area's capacity for growth. As a result, the form and scale of development in areas with a lower or higher capacity for growth will vary.

Locations where tall buildings may be appropriate

3.3.3 The London Plan requires boroughs to identify locations that may be appropriate for tall buildings and set their appropriate heights. Where relevant, these locations and heights should inform the design vision of a site, and any subsequent design parameters. In locations where tall buildings are not appropriate, the height parameters for a site should not exceed those set out in the borough's tall building definition.

3.3.4 Even in areas where tall buildings may be appropriate, boroughs and applicants should test alternative building typologies and building configurations, such as mansion blocks and mid-rise typologies, to determine whether they are a more suitable design solution for the site than tall buildings; and can achieve a similar number of homes.

3.3.5 As stated in the Characterisation and Growth Strategy LPG, the categorisation of a site within a *transform* area does not necessarily mean that a tall building is appropriate. Tall buildings should only be envisioned in areas that have been identified as part of a borough's development plan in accordance with Policy D9 Tall buildings. It is anticipated that many areas identified as *transform* areas will not necessarily envision building tall, but will rather focus on increasing density in the most appropriate way. Some of London's most densely populated neighbourhoods are areas that have no tall buildings, using mansion blocks and other mid-rise typologies. Often these typologies provide the optimum density, providing much needed housing using a street-based approach to intensification. Mid-rise typologies may also be more suitable for families with young children.

Figure 3.1 A dense, street-based mid-rise townscape

This area has been transformed, creating a dense, street-based mid-rise townscape in which a new positive character has been created. Example reference: Wyke Road (before and after), Hackney Wick, LB Tower Hamlets.

4 Stage three: Draft site-based design parameters

4.1 Site-based design parameters

4.1.1 Following the formulation of a site's design vision, a set of draft design parameters reflecting this vision should be drafted. These parameters should set out the layout and design aspirations for the site and will form the basis of the design codes and parameter finalised in stage five.

4.1.2 **Site-based design parameters:** concise, graphical or numerical, simple-to-understand parameters that relate specifically to a development site. These high-level design parameters should include limits on acceptable building heights, scale, massing, indicative layouts and, where appropriate, the amount of floorspace that should be provided for different land uses. These will form the basis of design parameters and codes that are formalised during stage five.

4.1.3 The level of detail provided in the design parameters for each site will vary depending on its size, location and characteristics. For sites not carried forward as allocated sites, such as SHLAA sites, the design parameters will deal simply with the strategic issues of layout, height and massing. However, for others that are strategic in scale, are at planning applications stage and/or are allocated sites, a more detailed set of design parameters/codes may be necessary. Nevertheless, it is important that the design parameters leave sufficient flexibility to avoid stifling innovation or the viability of a site.

Example strategic site

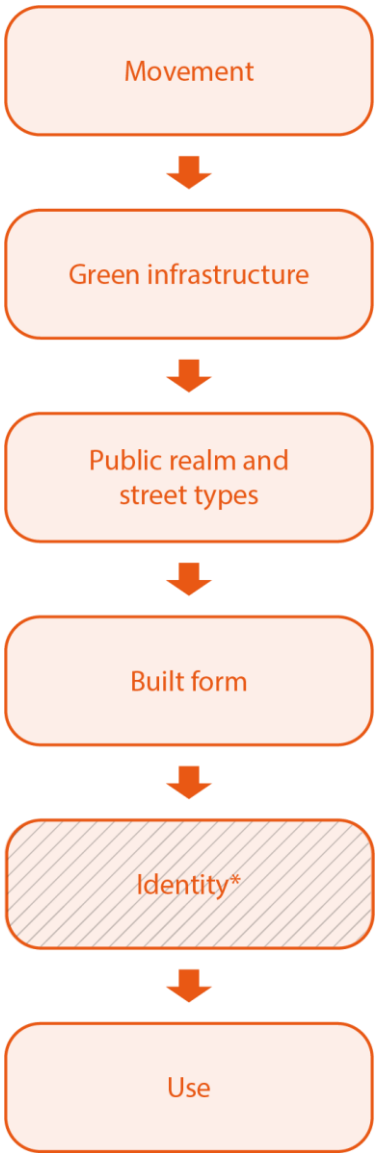
This example site will be used to illustrate the design coding process. The site does not fall within an area appropriate for tall buildings.*

Figure 4.1 3D map of the example site

*A tall building in this location has been defined as a building over 30m in height from the base to the top of the building.

4.1.4 As a minimum, boroughs, neighbourhood planning groups and applicants should clarify the following design parameters. These are set out in the NMDC, and covered in the next section under the following headings: Movement; Green Infrastructure (referred to as Nature in the NMDC); Public Realm and Street Types (referred to as Public Space in the NMDC); Built Form; Identity; and Use. In addition to these, a more exhaustive list of design coding parameters that boroughs can use is contained in the NMDC.

Figure 4.2 List and sequence of parameters that should be defined for a site



Define the movement routes and hierarchy in and around the site. While this may include vehicular movement for large sites, it should fundamentally prioritise walking and cycling.

Define and locate the green infrastructure on site. This may include formal green spaces such as parks; SuDS; street trees; and opportunities for food growing.

Define and locate the street types on site. This will include any new streets and public squares being envisioned for a large, site as well for any boundaries or edges of the site that connect with existing streets.

Define the block type, building line and height of buildings on the site. Boroughs may also wish to set parameters on the plot ratio and plot coverage of a site.

Define parameters on the materiality, window sizes, detailing, roofscape and how the building meets the ground (such as entrances, etc).

Finalise the mix and location of uses on site.

* This element is not fundamental to defining the indicative site capacity of a site and is therefore optional. Nevertheless, boroughs and neighbourhood planning groups are encouraged to set parameters for this element for any site that is likely to become an allocated site for development.

4.2 Movement

4.2.1 Designers should take a Healthy Streets Approach when designing a site. This should prioritise walking and cycling, as well as reinstating historic street patterns where possible. Often, clues in the surrounding streets will assist and offer the potential to easily connect beyond the red line of the site. Historic maps sourced during the site analysis may also help to identify old movement corridors that could be reconnected. This could include considering where some transport modes might be restricted to support active travel or public transport options, for example using barriers/cameras to restrict use as a through route for vehicles. For sites that create new streets, the experience and convenience of pedestrians and cyclists need to take priority over other users which consider 'place' as well as 'movement'. Designers should identify the hierarchy of streets and access for emergency/utility vehicles via an Air Quality Positive approach. Knowledge of the infrastructure capacity, and an understanding of local land uses, can also highlight nearby uses that would benefit from improved connections.

Figure 4.3 Street hierarchy

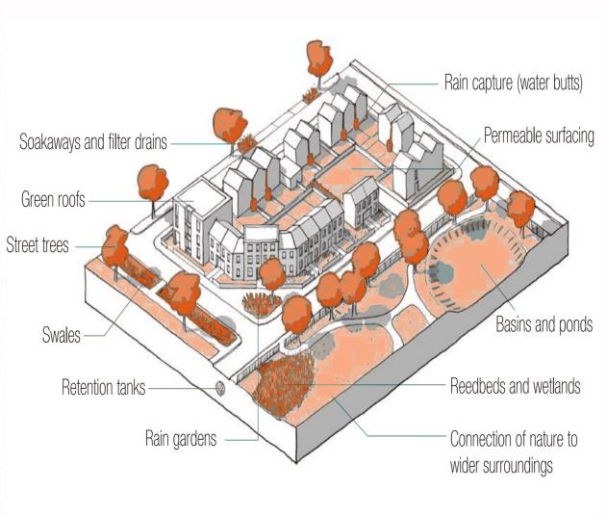
For large sites, a network of routes should be formulated that consider the location and hierarchy of streets. This should address issues of permeability through the site, connection to the existing street layout, desire lines and any key junctions and servicing requirements (see Active Travel Zone assessment). For smaller sites, it may not be necessary to provide guidance on this design coding element.

Figure 4.4 Worked example

A new walking and cycling route through the site has been introduced that connects two roads at either side of the site. This helps connectivity in the area and provides a frontage to position buildings. It is proposed to help link a network of green spaces, which was identified in the area during the design vision stage. A maximum parking provision of 0.25 car parking spaces per dwelling has been planned for.

4.3 Green infrastructure

4.3.1 In the context of the climate and ecological emergencies, it is vital for urban designers to consider aspects related to nature and green infrastructure early in the design process. A site's green infrastructure should be defined and positioned to optimise the benefits provided by existing and new greening. This should be informed by the borough's green infrastructure strategy, and can be broken down into a hierarchy of green spaces such as parks and green spaces; communal spaces; and private gardens. It can also include allotments or other food-growing places; play space; and urban greening features such as street trees, reflecting any site requirements or opportunities. Identifying opportunities for green infrastructure to deliver wider objectives such as sustainable drainage, net biodiversity gains and linking or integrating into existing key assets is also necessary at this stage. The design of green infrastructure should complement, and be in addition to, taking a Heathy Streets Approach to movement in and around the site.



Source: NMDC

Figure 4.5 Location of green infrastructure

Boroughs, neighbourhood planning groups and applicants should define the location and type of green infrastructure that will be provided on site. This may include requirements for rain gardens, street trees, green roofs, green open space and the retention of existing trees. It should also consider the sites connection to any wider green networks or infrastructure.

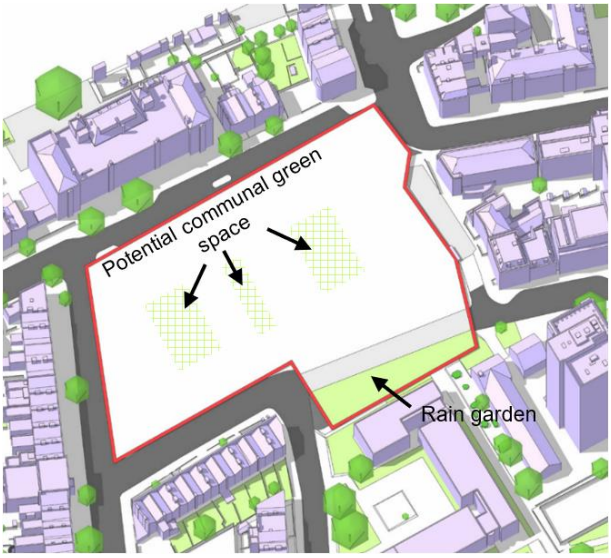
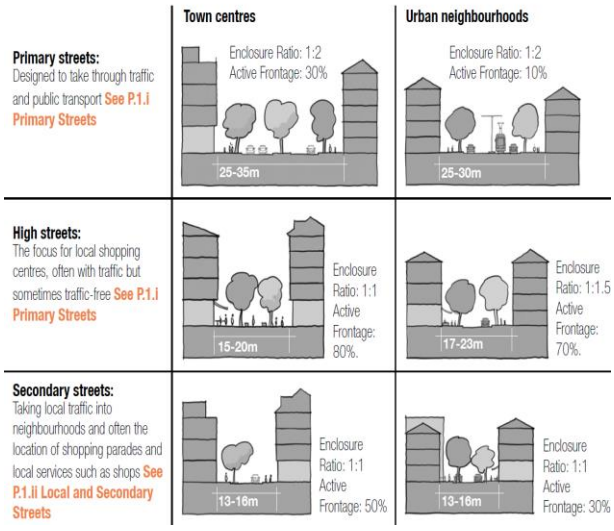


Figure 4.6 Worked example

Local analysis has indicated a low risk of flooding to the south of the site. Therefore, a rain garden has been located to the south of the site to capture and store rainwater in the event of a heavy downpour. This rain garden aims to reduce the risk of flooding while serving as green space for residents and locals. It is distinct from the semi-private green spaces that sit within the courtyards.

4.4 Public realm and street types

4.4.1 The character, quality and potential usage of public space is influenced significantly by the way it is enclosed by buildings. Appropriate building height-to-street width ratios can encourage vitality while allowing good levels of daylight and sunlight to be reached in public realm, and to dwellings along the street. It can also impact on how safe users feel while being in the space, particularly during the evening or at night. As a result, boroughs, neighbourhood planning groups and applicants should define the street types that are appropriate for the site using the street types in the NMDC. Where a site borders an existing street, the aim should be to provide a strong street frontage, and clear fronts and backs. Using these street types and the subsequent enclosure ratios will also help reinstate existing streets that have become less desirable. In addition, these types can help inform the appropriate heights of buildings by defining the street height-to-street width ratio. For further guidance, please refer to Manual for Streets.



Source: NMDC

Figure 4.7 Street types

The street types included in the NMDC should be used when defining a site's design parameters. These have dimensions and enclosure ratios that can be commonly found in London. These should be used to create a network of public spaces that are of good quality and well proportioned.

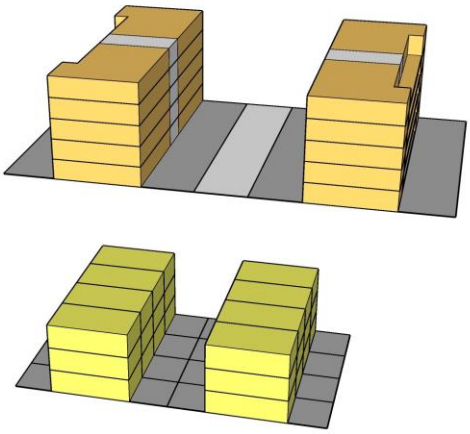


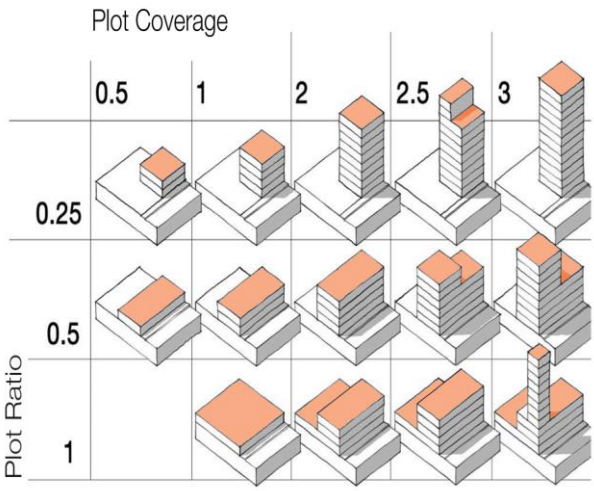
Figure 4.8 Street typologies models in SketchUp

To assist in the layout of sites, the residential building types, included in the Indicative Site Capacity Toolkit (see Appendix 1-Appendix 3), can be used to create different street typologies. Examples shown include an urban neighbourhood street with an enclosure ratio of 1:1.5, and a mews street with an enclosure ratio of 1:1 (see NMDC).

4.5 Built form

Block type, plot ratio and plot coverage

4.5.1 Having set out the design parameters for the site's movement, network of green/open spaces and public realm, the built form should be considered next. This should include defining the block type or types on the site. In many areas, the rhythm and variety of smaller or larger buildings may be intrinsic to the character of an area. Defining the plot ratio and plot coverage, instead of residential density, can be a more useful and context-appropriate way, as they take account of the form and massing. In doing so, these measures can provide ways to optimise a site's capacity while ensuring the design positively contributes to the character of an area. For larger sites, it may also be appropriate to define different character areas that have a combination of different block types and urban grain.



Source: NMDC

Figure 4.9 Plot ratio and plot coverage

It is encouraged to set parameters on the plot ratio and plot coverage of a site. Plot ratio is the ratio between site area and the total building floor area while plot coverage is the proportion of the site area occupied by buildings.

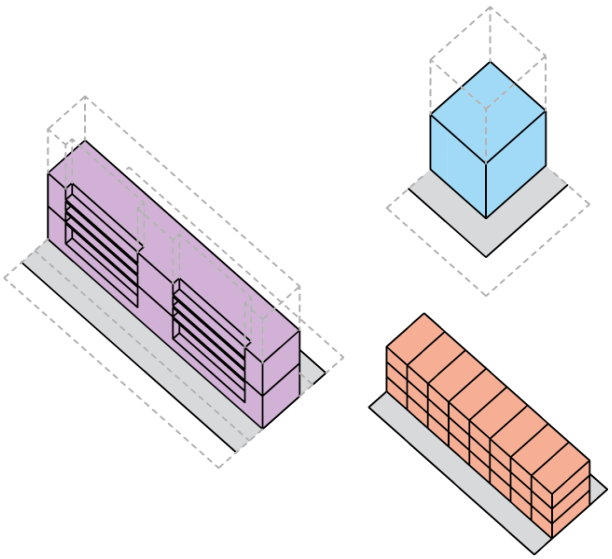
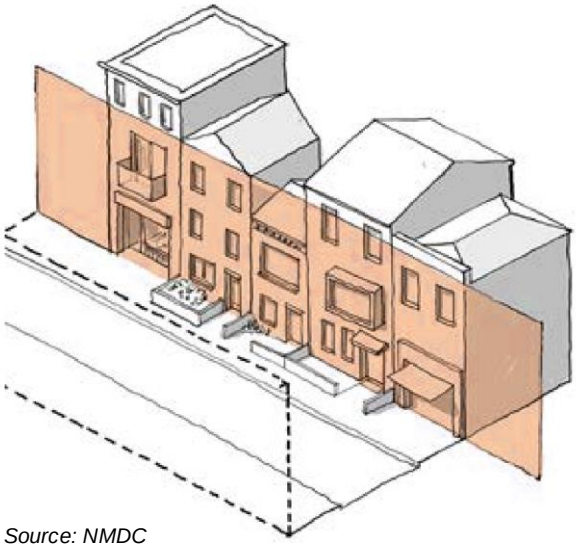


Figure 4.10 Residential/block type models in SketchUp

Boroughs, neighbourhood planning groups and applicants should define the block type that is appropriate for the site. If using the Indicative Site Capacity Toolkit, detailed within this guidance, boroughs are encouraged to use the pre-set residential types in the digital toolkit library, which can be used to model different street types and courtyard blocks.

Building line and height

4.5.2 Next, a site's height and building line parameters should be determined. These should specify the maximum heights for different locations within the site. This should be based on a site's design vision (see stage two) and influenced by the street types, hierarchy and any planning constraints such as protected views or nearby heritage assets. Height is particularly significant for sites that are in close proximity to different areas of character and identity. It is important to avoid a 'cliff edge' in height or massing where one boundary meets another, as illustrated in Figure 4.12, below. Consideration should be given to these boundary conditions with the aim of creating coherent conditions at a boundary. Tall buildings should only be located in areas that have been identified as appropriate. Guidance should also be provided at this stage on the future use or restoration of existing buildings on site that are of historic interest or townscape merit.



Source: NMDC

Figure 4.11 Building line

The building line is created by the primary front face of buildings along a street. Building line and set-back parameters should take into account the street type, building type and height of the anticipated massing on site. The size of a set-back will vary with the nature and context of the street, and may also consider any positioning of any defensible space.

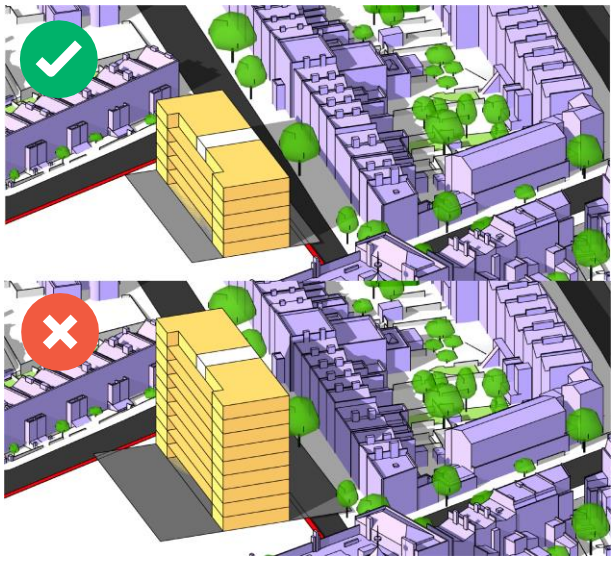


Figure 4.12 Appropriate boundary conditions

Practitioners should consider the boundary conditions of a site. Boundary treatment should provide a clear distinction between public and private space; and give a sense of security, enclosure and ownership of an area, whilst integrating with existing form and character.

Perimeter blocks

4.5.3 Having defined a site's layout, street type and building type, boroughs, neighbourhood planning groups and applicants are encouraged to consider the use of perimeter blocks where appropriate. Perimeter blocks characterise much of historic London, forming strong street frontages and clear backs. This is because it allows a continuation of the grain of London's streets, legibility and safety through active frontages and overlooking, and the ability to provide high-quality amenity space for residents away from vehicles. Figure 4.13 to Figure 4.17 also illustrate the potential of combining block types to optimise a site's capacity.

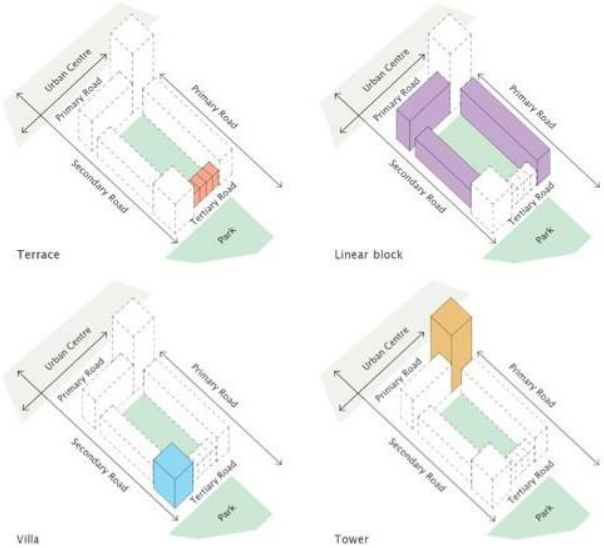


Figure 4.13 Combinations of different types within a perimeter block

The character and surrounding area should inform the use of different building types and heights within a parameter block. Where appropriate, the use of different combinations of types on the same site can help in optimising the site's capacity and enhancing spatial diversity.

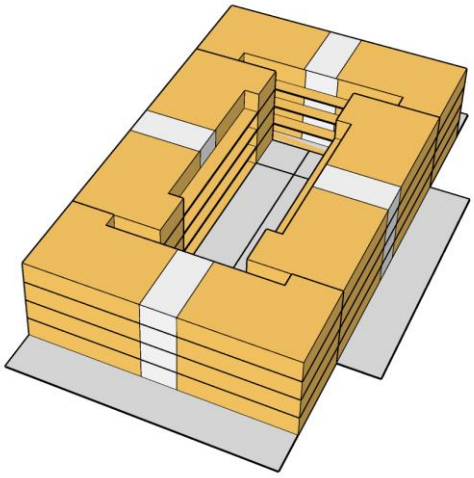


Figure 4.14 SketchUp model showing a perimeter block using four linear blocks

The SketchUp residential building types within the Indicative Site Capacity Toolkit can be combined to create different layouts including courtyard-forming or perimeter blocks. Care should be taken when using tall, enclosed courtyard blocks as this may limit the daylight and sunlight within the courtyard.

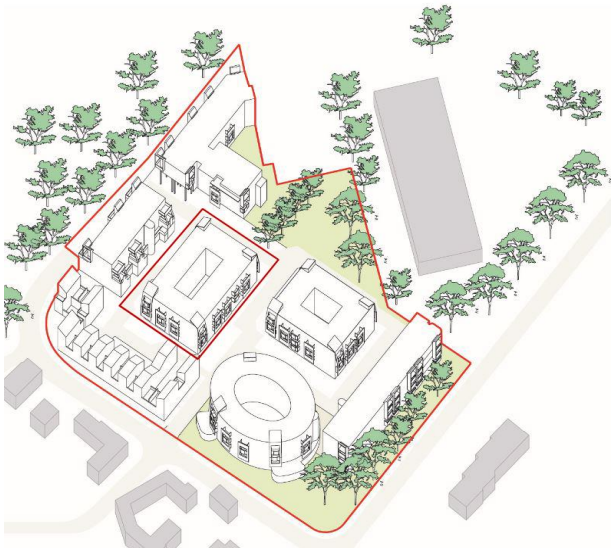
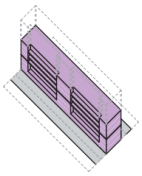


Figure 4.15 Redwood Park, Southwark

Four Linear blocks

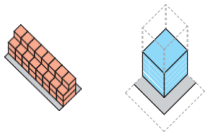


This is made up of four interlinked gallery access linear blocks. The four blocks form a perimeter block with a communal courtyard in the centre.

Figure 4.16 Brentford Lock West Phase Two, Hounslow

Six villa blocks

Ten terraces

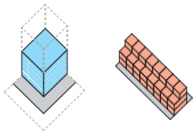


This development comprises six villa blocks which are connected by ten townhouses. The block encloses a courtyard garden that sits above an underground car park. Distinct sawtooth roofs make reference to the neighbouring wharf architecture.

Figure 4.17 Caudale, Camden

One villa block

Three terraces



This is made up of a villa block, which gives height and marks the street corner, and a connected terrace of three houses. The latter helps form an active urban edge to the street.

4.6 Identity

Sense of place and local character

4.6.1 Boroughs, neighbourhood planning groups and applicants may wish to produce design codes and guides on a site's detailing, materiality and local identity. These codes are unlikely to impact on a site's indicative site capacity and therefore for boroughs, may not be necessary for all sites. However, where suitable, guidance on these aspects can provide clarity on the aspirations of a final design and provide greater certainty.

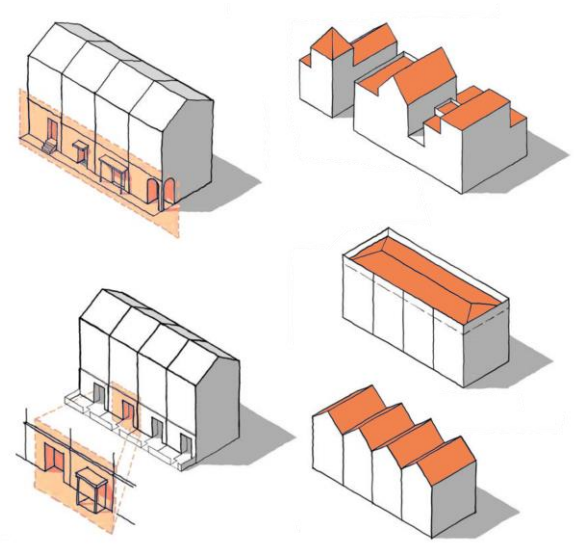


Figure 4.18 Building base and roofscape

Guidance on how the building meets the ground, and how it meets the sky, can assist in ensuring that a new development is in keeping with the local character of an area. This can include clarity over the design of a building's entrances and roofline.

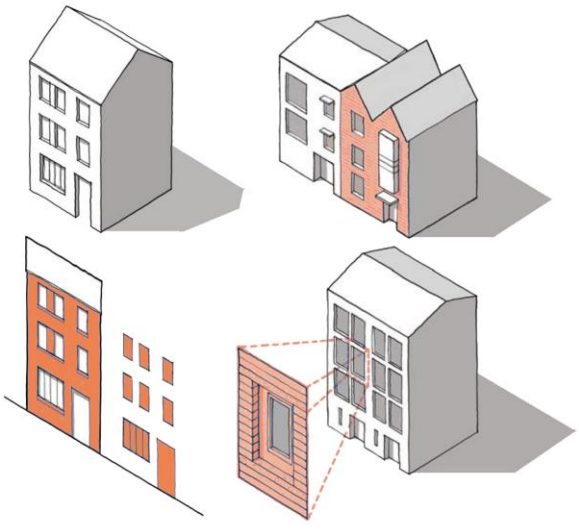


Figure 4.19 Windows, materiality and detailing

The size and positioning of windows, as well as the materiality and detailing, can significantly influence the appearance and identity of the final design. When setting guidance on these aspects, boroughs may wish to provide a set of visual precedents or examples that illustrate 'what not to do'.

Source: NMDC

4.7 Use

Active frontages and mixed-use developments

4.7.1 Lastly, the mix of uses for the site should be finalised following their consideration throughout the design process. This may include, for instance, a requirement for a mix of uses on the ground floor or basement. Social infrastructure and public services – such as nurseries, libraries, community centres, cultural venues and police stations – are often best placed in prominent and central locations that can emphasise their civic status. It is also important to consider the placement of separate entrances in mixed-use developments, and the level of activity at different times of the day and night, in order to enhance a sense of security. For example: retail, community and leisure uses will all require street frontages, whereas offices and industrial uses may not. As a result, it may be useful to consider how the development proposal will look/feel/work in the dark.

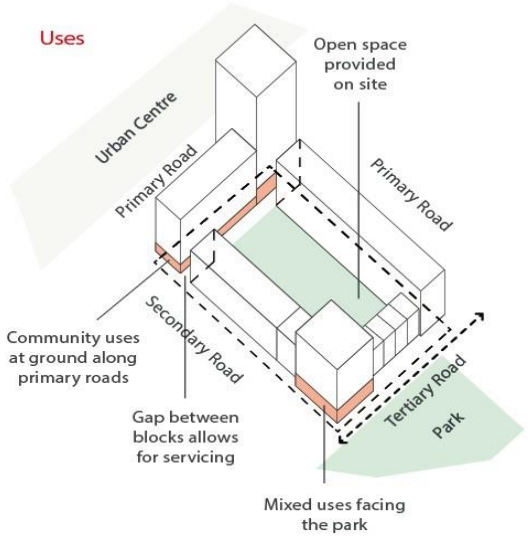


Figure 4.20 Integrating residential above commercial uses

The placement of commercial uses on the ground floor can promote vitality and a sense of community. Where appropriate, these should be placed in locations that promote social interaction and engage with the surroundings such as a local park or urban centre.

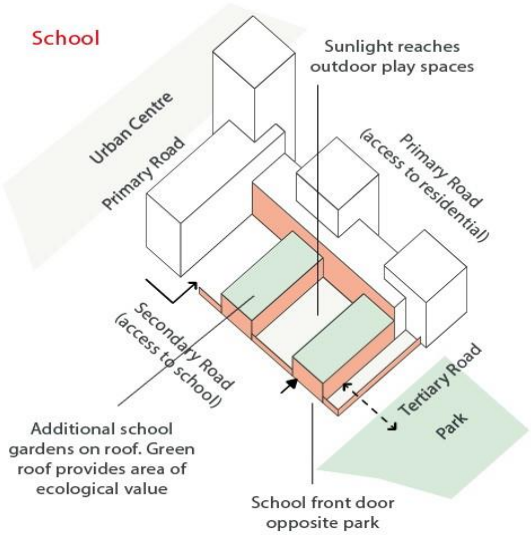


Figure 4.21 Integrating a school as part of a residential block

When integrating community uses into a residential block, the placement of entrances and play space should be carefully considered. In this example, the school entrances are located near a local park and the play space is located in the centre of the site.

5 Stage four: Testing site capacity

5.1 Modelling the site and determining the indicative site capacity

5.1.1 This section applies to sites that have residential dwellings (use class C3). For these sites, an indicative site capacity should be calculated using the draft design parameters set during stage three. The testing of a site's capacity is intended to be undertaken digitally using simple CAD software such as SketchUp or other 3D modelling software. Modelling the site allows boroughs, neighbourhood planning groups and applicants to test the appropriateness of several layouts; and combine different residential types, providing they are in accordance with the draft design parameters. In this way they can model the design parameters and select the option that best optimises capacity and responses to local context and character considered during the site-analysis stage.[2]

5.1.2 Boroughs, neighbourhood planning groups and applicants can use the Indicative Site Capacity Toolkit detailed in Appendix 1-Appendix 3. This tool can be used without significant training, and by neighbourhood planning groups as it is widely available. This section provides a step-by-step guide to using the Indicative Site Capacity Toolkit as an illustration of how to determine a site's residential capacity. This toolkit enables boroughs to identify the indicative site capacity and net number of additional new homes for a given site at plan-making stage. Alternatively, assessments can be made by drawing to scale the types on a site plan and adding up floor areas to arrive at the gross external area (GEA) to be entered on the calculator. Regardless of which tool a designer uses to assess a site's capacity, boroughs and applicants must base their modelling of a site's capacity on the draft design parameters set. As with any capacity-modelling exercise, site capacities should be treated as an approximation for development coming forward on site and not an absolute maximum or minimum.

5.1.3 Using the example site shown in Figure 4.1, a scenario is provided to illustrate the sort of design decisions that could be made. This scenario assumes that the site has been identified as being in an '*enhance*' area. The surrounding context has been assessed as having a mixed built quality with positive characteristics that should be enhanced. The worked example uses the residential types illustrated in Figure A1.2. The types are available through the GLA website as a downloadable digital resource.

[2] Building efficiencies, in terms of net to gross floorspace ratios, delivered by different built forms should also be considered at this stage as this will impact on deliverability.

3D modelling steps

Step 1. Having imported the site plan into 3D modelling software, the site movement infrastructure and street hierarchy should be placed onto the site. This will form the basis of the site layout and should be based on the site's design parameters.

Step 2. Next, the proposed green/open space, and aspects relating to green infrastructure, should be located on the site. These should consider the role of green infrastructure such as green space, SuDS, net biodiversity gain, and suitable locations for play.

Step 3. The public realm and street types will now inform the width of streets as well as the enclosure ratio that is desired. Where a site is bounded by an existing road, the proposed development should aim to create an appropriate street type and enclosure ratio that complements the existing character.

Step 4. The built form or building types should be selected, reflecting the site's parameters. If using the Indicative Site Capacity Toolkit, available as part of this guidance, the relevant residential types should be selected. Appropriate building heights should be modelled at this point which are based on the design parameters. The buildings should be arranged using the appropriate guidance on building lines and site arrangement.

Step 5. Where applicable, the non-residential uses on the site should be located. The approximate floor area should be defined.

Step 6. Once satisfied with the design option produced, the residential GEA (m^2) can be taken from the modelled scheme and used to identify indicative site capacity based on tenure and type mixes. If using the Indicative Site Capacity Toolkit contained within this guidance, the capacity calculator should be used. The GEA is based on the building capacities minus any loss due to the allocation of non-residential uses or parking.

Step 7. Lastly, using the indicative site capacity, an indicative scheme population using the Population Yield Calculator (see paragraph 2.8.2) should be produced to estimate the likely population and child yield to feed into the infrastructure-planning process.

This is an iterative process in which designers are encouraged to reflect on whether a site proposal provides sufficient social and physical infrastructure. The steps necessary to produce an indicative site capacity and indicative net number of additional new homes will be demonstrated in the following section using a worked example.

5.2 Scenario and worked example

This scenario assumes that the site is in an area of mixed quality and PTAL 3. It has been identified as having a moderate capacity for growth and should promote incremental change that seeks to enhance the overall character of the area. The area-wide vision for the area has identified the predominantly street-based, low-rise nature of the built environment as a positive characteristic. There is the opportunity for new forms of design and architecture providing it contributes to the street-based low-rise character. A listed building is located towards the north of the site and the analysis of the topography revealed that the site slopes down towards the southeast.

Worked example: This layout introduces a mix of four-storey terraces, five-storey linear blocks and a pedestrian-focused mews street in the middle of the site; together, these elements aim to respect the street-based, low-rise character of the neighbourhood. The layout follows the historic street pattern which was revealed during the site analysis, and aims to reinstate the local streets and urban block size. Four-storey terraces face onto the school, while a mews street has been placed at the centre of the site. Two courtyard spaces provide open green spaces for residents which have play space. A rain garden is located to the south of the site, which responds to the topography of the site to capture and store rainwater in the event of a heavy downpour. In addition, the linear blocks have green roofs.

Figure 5.1 Indicative massing of the worked example

5.3 Worked example – indicative site capacity

5.3.1 The indicative site capacity for the worked example above has been determined using the Indicative Site Capacity Toolkit, available as part of this guidance.[3] Using the excel spreadsheet template, the number and types of residential blocks have been entered in along with the tenure split.

5.3.2 There is also an option to include the total GEA of non-residential uses as well as the proposed parking ratio. These will lead to a reduction in the indicative site capacity for the number of housing units due to the floor area that they take up.[4] As a result, the number of car parking spaces should be minimised as this space will reduce the number of homes that can be accommodated on site, and compromise the efficient use of the site for other purposes.

Figure 5.2 Indicative site capacity calculator

This screenshot shows the indicative site capacity for the worked example

Type (select from pulldown menu)	GEA per storey (m2)	Number of storeys	Total GEA per block (m2)	Quantity	Total GEA per type (m2)	Car parking circulation factor	Ground floor car parking factor
Linear Urban Block	453.7	5	2268.5	3	6805.5	1.50	0.87
Terrace	55.0	4	220	24	5280.0	1.00	1.00
Terrace	55.0	3	165	8	1320.0	1.00	1.00
-Select Type-	0.0	0	0	0	0.0		
-Select Type-	0.0	0	0	0	0.0		
-Select Type-	0.0	0	0	0	0.0		
-Select Type-	0.0	0	0	0	0.0		
-Select Type-	0.0	0	0	0	0.0		

Capacity Calculator

Residential GEA*	**13,406**	m2
Non-residential	900	m2
Residential GIA	11,255	m2
Residential NIA	7,878	m2

Proposed average parking ratio: **0.25**
Proposed average circulation factor 1.254
Ground car floor parking factor 0.932

* If fields are added to Digital Toolkit Record above, ensure formula for Residential GEA is

Tenure	Tenure Mix	NIA (m2)	Type	Type Mix	NDSS Area (m2)		Unit area including parking		Indicative Unit Count
Private	**50%**	3,939	1 bed	**30%**	50	23.0	53.4	22.1	22
			2 bed	**40%**	70	22.0	73.4	21.5	21
			3 bed	**30%**	86	13.0	89.4	13.2	13
			4 bed	**0%**	108	0.0	111.4	0.0	0
				100%	Total				56
Affordable (Intermediate)	**20.0%**	1,576	1 bed	**30%**	50	9.0	53.4	8.9	8
			2 bed	**40%**	70	9.0	73.4	8.6	8
			3 bed	**30%**	86	5.0	89.4	5.3	5
			4 bed	**0%**	108	0.0	111.4	0.0	0
				100%	Total				21
Affordable (Rented)	**30.0%**	2,364	1 bed	**30%**	50	14.0	53.4	13.3	13
			2 bed	**40%**	70	13.0	73.4	12.9	12
			3 bed	**30%**	86	8.0	89.4	7.9	7
			4 bed	**0%**	108	0.0	111.4	0.0	0
	100%			100%	Total				32

Indicative Site Capacity **109**
Indicative capacity impact of accomodate car parking -7

Indicative site capacity with 900m^2 of non-residential floorspace and 0.25 parking ratio: 109 dwellings (the floorspace of the allocated car parking has led to a reduction in seven homes).[5]

[3] Boroughs may choose to use alternative methods if necessary.
[4] Car parking has been included to highlight the detrimental impact of parking spaces on the capacity.
[5] Please refer to Appendix 3 for further details on the worked example calculations.

6 Stage five: Finalise site-based design parameters and design codes

6.1 Formalising site design parameters

6.1.1 Once a set of design parameters and an indicative site capacity have been determined for a site, the design parameters should be formalised. These design parameters will become a high-level strategic design code for the site and used at either of the stages listed at paragraphs 6.2 and 6.3.

6.1.2 Figure 6.1 displays the layout, form and heights of the scenario in stage four. It identifies the movement routes through the site, as well as aspects relating to green infrastructure and heights of buildings.

Figure 6.1 Example design parameters for the worked example

6.2 Local and neighbourhood plan stage

6.2.1 For masterplans or sites brought forward through a local plan or neighbourhood plan, a final set of site-based design parameters should be determined and included in local/neighbourhood plan documents. These parameters should be definitive, allowing them to be used in the determination of future planning applications on the site. They should be clear about any harms that arise from alternatives. Information on harm will be important for development management decision-making if a proposal does not accord with the design parameters. As a minimum, these should set out the building heights; scale; massing; indicative layouts and capacity; and, where appropriate, the amount of floorspace that should also be provided for different land uses. It may also be appropriate for more detailed design codes to be developed for these sites and included in later SPDs, planning briefs, masterplans or Opportunity Area Planning Frameworks.

6.2.2 It is recommended that sites, and their subsequent design parameters, are accessible via a digital online map. These online maps can improve accessibility and provide an opportunity to link the site boundary with the design parameters that have been formulised during the design-led approach. As such, online digital maps can strengthen ongoing engagement and transparency during the plan-making processes. Where boroughs and neighbourhood planning groups have used 3D massing models, there is also the opportunity to display these.

6.3 Planning application stage

6.3.1 Applicants of sites should follow the design-led approach and process set out in the document during the preliminary design stages to determine a site's optimal capacity and to clarify their design intentions. This should be carried out at the pre-application stage; and evidenced and submitted as part of the design and access statement within a planning application.

Appendix 1 Indicative Site Capacity Toolkit – Residential types

A1.1.1 The Indicative Site Capacity Toolkit requires the selection of residential types (shown in Figure A1.2) based on the drafted site-based design parameters set during the draft design parameters stage (see 'Stage three: Draft site-based design parameters').

A1.1.2 Each of the four residential types has an indicative capacity that can be calculated using the indicative site capacity calculator.[6] This will enable a design-led approach when calculating an approximate capacity of sites, which is based on an understanding of the character and identity of the place. Each building type has been based on a policy-compliant typology, taking account of dwellings per core and the provision of dual-aspect homes. Each of the residential types is discussed below, accompanied by an outline of anticipated strengths and weaknesses/other considerations.

The residential types available in the Indicative Site Capacity Toolkit only illustrate the form and massing. As a result, the architectural style is intended to be neutral.

Figure A1.1 Bourne Estate – An example of a linear block residential type

[6] The Tower type has not been included as a SketchUp model in the indicative site capacity toolkit. This type will be included following revisions to fire regulations.

Figure A1.2 Residential building types

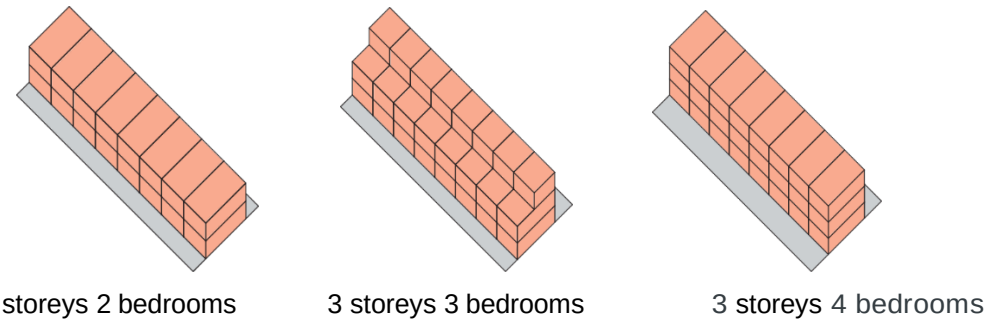
Terrace	
Linear block	
Villa block	
Tower	

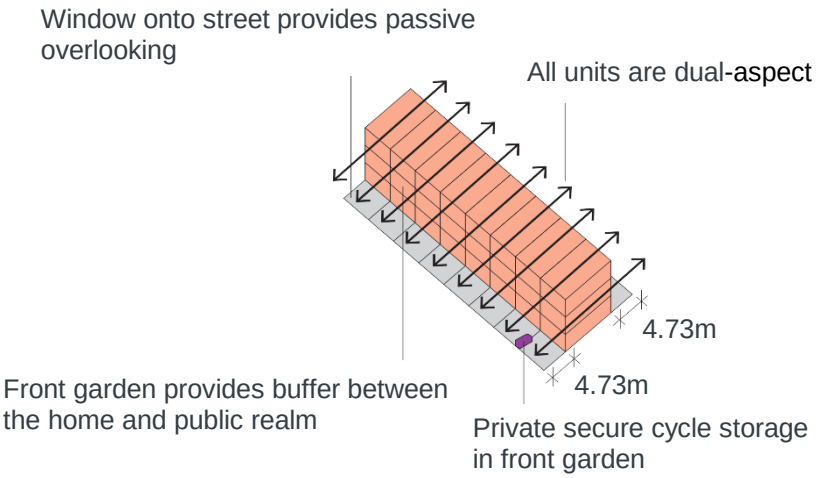
Terraces

Typical height range: 2 – 5 storeys

A1.1.3 Terraces enable the optimisation of site capacity where forms of development associated with moderate growth are contextually appropriate. They provide access to semi-public street frontages and private rear gardens, offering benefits for families with children. On larger sites, terraces may provide a useful intermediate scale that can connect existing streets to more intensive forms of development. On smaller or more irregular sites, they can be used as infill development. In terms of future-proofing, the repetitive character of terraces offers some opportunities to increase densities in response to planned enhancements to infrastructure, or where incremental growth is anticipated in the medium term.

Figure A1.3 Performance of terrace type against key Housing Design Standards[7]





[7] The SketchUp models have a grey base to represent an area (setback distance) that should not be built on. This base gets bigger as the building gets taller, and has been based on an offset distance to achieve a basic 45-degree visual sky component.

Performance against Housing Design Standards

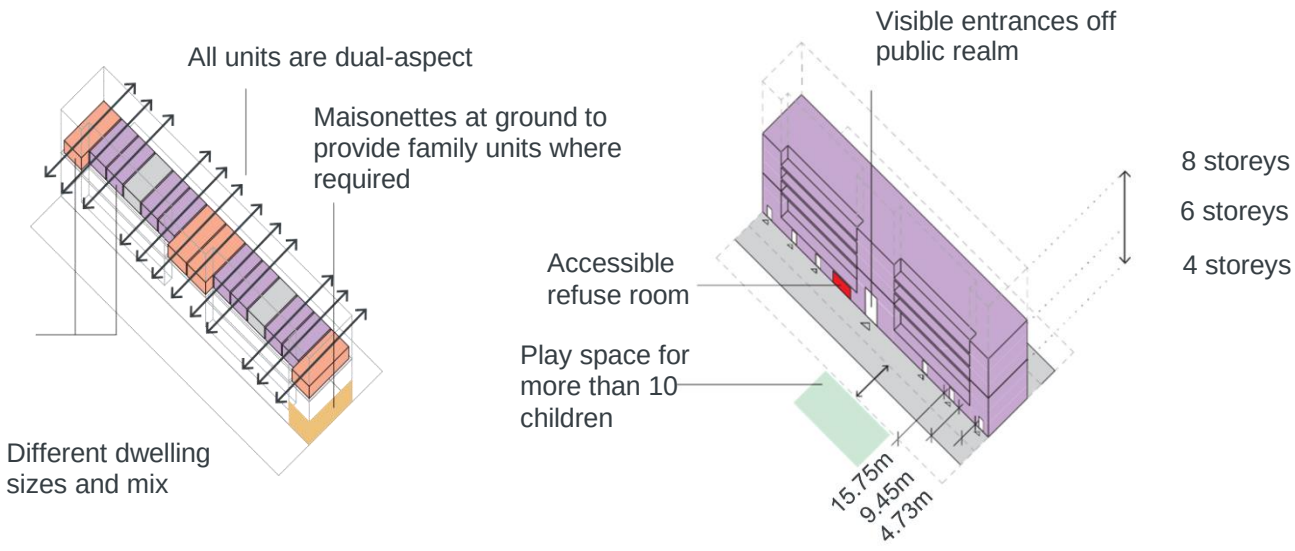
Strengths	• Relates well to the scale, massing and character of London's residential terraced streets. • Flexibility to deal with changes in topography. • Larger homes with gardens suitable for families. • Allows for phased construction, which can assist in project funding and viability. • Security of public realm through front doors and windows onto streets facilitating surveillance. • Ease of access and servicing due to direct relationship with street • Cycle parking can be within the domain of individual homes, so long as it is provided over and above the minimum space/ storage/circulation standards. • Dual-aspect is good for privacy, aspect, daylight, ventilation and passive cooling. • Opportunity for all dwellings to have private gardens. • Opportunity for interesting spatial relationships across multi-levels. • Potential to incorporate small scale live-work units. • Opportunity to increase biodiversity and green cover; and integrate SuDS into gardens and through green roofs. • Opportunity to incorporate rainwater-harvesting systems for outdoor water use, and SuDS within gardens to help reduce surface runoff. • Opportunity to incorporate property flood resilience measures. • Adaptability and flexibility due to singular ownership.
Weaknesses/ other considerations	• As accommodation is stacked over a number of storeys, it can be less suitable for many disabled and older people. • Less suited to integration with mixed uses. • More difficulty in meeting fabric energy-efficiency, but more opportunity for renewable energy.

Linear block

Typical height range: 3 – 8 storeys

A1.1.4 Linear blocks are a common type in urban arrangements, providing continuity of street frontage and flexibility in terms of height and dwelling mix. Four linear blocks can form a courtyard block of consistent scale, and provide an opportunity for private or semi-private amenity space. Linear blocks allow a similar relationship to the street as terraces, but offer higher densities by accommodating multiple dwellings in a vertical stack (Figure A1.4). Commonly, linear blocks comprise maisonettes at the ground and first floors, with additional maisonettes or lateral apartments at upper floors. This enables homes on lower floors to have individual entrances on the street, while homes on upper levels are reached by communal stairs and lifts. Upper-level homes may be paired around a lift or stair core; or accessed from a short corridor or external gallery. Mansion blocks are a common form of linear block in London, as is the creation of perimeter blocks through the use of four linear blocks together. Above eight storeys, achieving adequate daylight and sunlight into neighbouring homes, open spaces and streets can be problematic and should be avoided. At early capacity-testing, a useful principle is to assume that the shadow cast by buildings will be half that of the building height. Upper floors could be set back to reduce visual impact and improve daylight to the ground.

Figure A1.4 Performance of linear block against key Housing Design Standards[8]



[8] The SketchUp models have a grey base to represent an area (setback distance) that should not be built on. This base gets bigger as the building gets taller, and has been based on an offset distance to achieve a basic 45-degree visual sky component.

Performance against Housing Design Standards

Strengths	• Versatile and responsive to context. • Lower floors offer benefits for families with children and those with impaired mobility. • Linear blocks enable higher densities of varied dwelling mix and tenure. • Security of public realm through front doors and windows onto streets providing activity and surveillance. • Flats with kitchens fronting a gallery access can facilitate a good level of neighbourly interaction and passive surveillance. • Consideration needs to be given to the location of plant rooms, refuse and cycle stores. Car parking, if provided, must be designed to best support place-making and accessibility. • Dwellings at ground floor can have private gardens while balconies or terraces need to be integrated for upper levels. • Suited to incorporation of non-residential uses at ground floor. • Opportunity to increase biodiversity and green cover; and to integrate SuDS into gardens and through green roofs/facades. • Shallow block depths and structural systems allow dwellings to be easily adaptable.
Weaknesses/ other considerations	• If not designed well, long linear blocks can create deep, narrow dwellings that result in poor daylight levels due to internal spaces being some distance from windows. • Linear blocks have the potential to create double-loaded corridor arrangements that result in single-aspect dwellings. • Continuous tall linear buildings on narrow streets can concentrate air pollution. Consideration should be given to building location and orientation within the site.

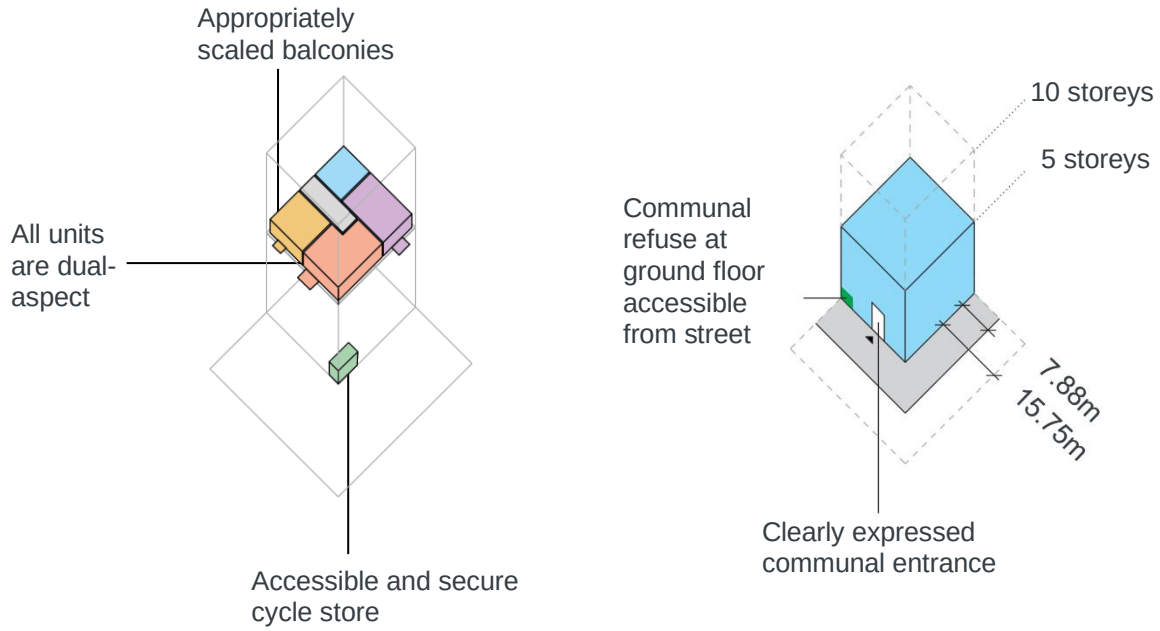
Villa block

Typical height range: 5 – 10 storeys

A1.1.5 The villa block is characterised by a central core and efficient circulation arrangement. This enables habitable rooms to be orientated towards the façade to provide frontage and aspect in all directions. Proportionally, the villa block is at least as tall as it is wide or deep, with a recommended height range between five and ten storeys.

A1.1.6 Within site arrangements, villa blocks can provide continuous frontage at corners, acting as landmarks in strategic locations such as crossroads, transport hubs and places of civic importance. They can also create gateways or edges between character areas. Four dwellings per floor provides good efficiency, while allowing all dwellings to be dual-aspect. The number of dwellings per floor will depend on dwelling type and size, but the central core allows for a variety of different flat types around it.

Figure A1.5 Performance of villa block against key Housing Design Standards[9]



[9] The SketchUp models have a grey base to represent an area (setback distance) that should not be built on. This base gets bigger as the building gets taller, and has been based on an offset distance to achieve a basic 45-degree visual sky component.

Performance against Housing Design Standards

Strengths	• Versatile in its use, either to define and densify corners/edges of urban arrangements, or when used independently. • Compact footprint can be useful when dealing with difficult topography. Flexible in its external appearance as it can be used to create distinction or blend in to surrounding context. • Multiple dwelling types can be accommodated within the same block, including wheelchair-accessible homes. • Can help deliver high levels of dual-aspect dwellings. • Multiple street frontages at ground level, which means that residential and mixed-use entrances can be easily separated. • Small building footprint allows for more space for green infrastructure and urban greening. • Efficient form and appropriate building fabric can enable energy-efficiency. Opportunity for communal heating and renewable energy, facilitated by efficient central core.
Weaknesses/ other considerations	• Ground floor needs careful planning to manage privacy and achieve active frontages. • Accessed by central cores, there is less potential to create a visual connection between front doors and play space at upper levels. This can be improved where stair cores have external windows that encourage passive surveillance of doorstep play. • When designed as a stand-alone building, careful planning is required to integrate refuse, plant or storage at ground level to avoid blank frontages. • Where flats per floor exceed four, single-aspect flats are inevitable. • North and south-facing single-aspect dwellings are likely to suffer from inadequate natural light and the potential for overheating respectively. • Active frontage limits scope to build in close proximity.

Tower[10]

A1.1.7 Towers are used in more limited circumstances than the other residential types. With increasing height, consideration should be given to the microclimate and potential for overshadowing of neighbouring homes, open spaces and streets, and the need to increase spaces between buildings to protect amenity and maintain adequate natural light. At early capacity-testing, a useful principle is to assume that half the building height will cast a shadow on the neighbouring ground. Consideration needs to be given to the space required at ground floor to access and service a high number of dwellings. As tower height and dwelling numbers increase, servicing the building becomes more complex and energy demand and Whole Life-Cycle Carbon emissions increase. Taller buildings do not always result in more affordable homes, as additional height can increase development costs. This can be more evident in lower-value locations. On such sites, alternative lower-rise build types may be more appropriate and may enable the delivery of development that is more sustainable.

[10] The Tower type has not been included as a SketchUp model in the indicative site capacity toolkit. This type will be included following revisions to fire regulations.

Performance against Housing Design Standards

Strengths	• Suitable for wheelchair-accessible houses with lift access. • Can work well in achieving mixed use when part of a larger site arrangement or designed with a podium. • Opportunity for communal heating and renewable energy.
Weaknesses/ other considerations	• Need considerable care to manage heritage and visual impact; and should be planned as part of a tall building strategy. • Higher construction costs, relative to other typologies, can impact on the deliverability of this type of development, particularly in low-value areas. • Impact of building orientation and the potential for single-aspect dwellings needs considering. Articulating the building and creating bays to allow windows to present perpendicular to the façade may limit the detrimental impact of single-aspect dwellings on residents. • Homes on floors high up in the building may be less suitable for family housing, particularly where they lack safe, convenient access to, and overlooking of, outside play and amenity spaces. • Design and layout should ensure the highest standard of fire safety. In particular, it needs to consider the likelihood of residents and visitors self-evacuating in the event of an emergency, as well as the ability of the fire service to service a fire. For instance, buildings over a certain height will need a second staircase.[11] Where a lift is provided, at least one evacuation lift per core is to be provided. This is in addition to a firefighters lift, where one is required. • When designed as a standalone building, careful planning is required to integrate refuse, plant or storage at ground level to avoid blank frontages. High operating and maintenance costs. • Needs consideration of the glazing proportions, ventilation and building structure on overheating risk, and the benefit of incorporating passive cooling measures. • Tall buildings can be less energy-efficient per square metre of floor area than linear or villa blocks; and have greater embodied carbon. • Can interact with air pollution in complex ways including the potential creation of accumulation of air pollution. • Offers limited scope for future conversion and have higher service and maintenance costs.

[11] For residential buildings over 18 metres applicants should engage the Building Safety Regulator and the London Fire Brigade (LFB) at pre-application stage. The Building Safety Regulator will be the Building Control body from 1 October 2023 and the LFB are a statutory consultee at this point.

Appendix 2 Indicative Site Capacity Toolkit instructions

A2.1.1 The Indicative Site Capacity Toolkit is provided as a downloadable digital resource from the GLA's website. SketchUp components are available for each of the types described in Appendix 1 (terrace, linear block, villa block) and can be selected by height.[12] Each component is tagged with its number of storeys and the GEA. The following instructions demonstrate the use of the Toolkit when importing the residential types into SketchUp.

[12] Residential building types may be updated from time to time to ensure that they reflect up-to-date building regulations and other requirements. If updated, any new or revised residential building types will be made available to download as a digital resource from the GLA's website and replace any superseded types.

Figure A2.1 Sketch Up menu

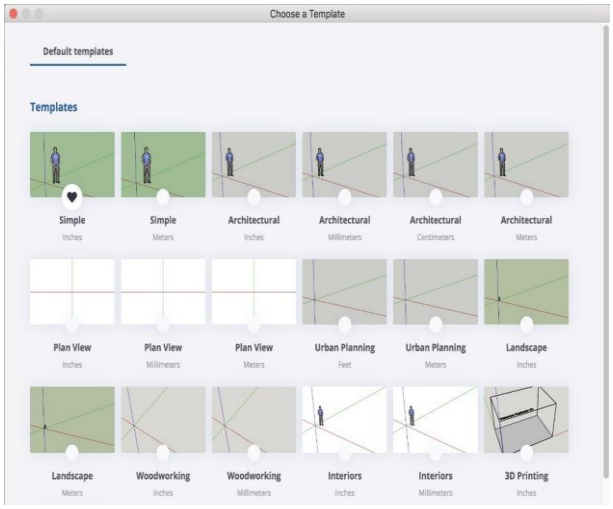


Figure A2.2 Importing a file

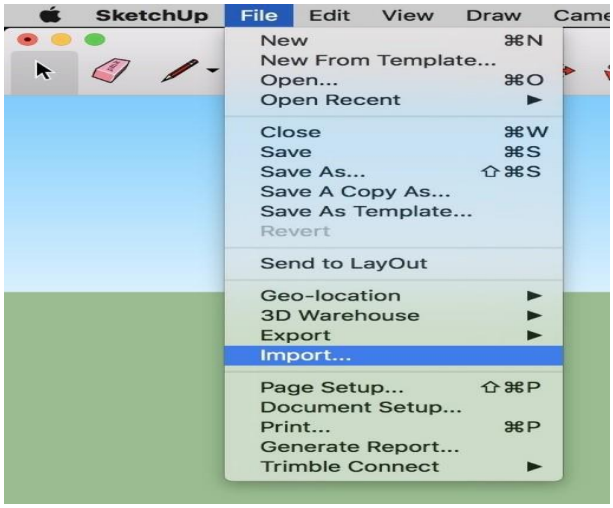
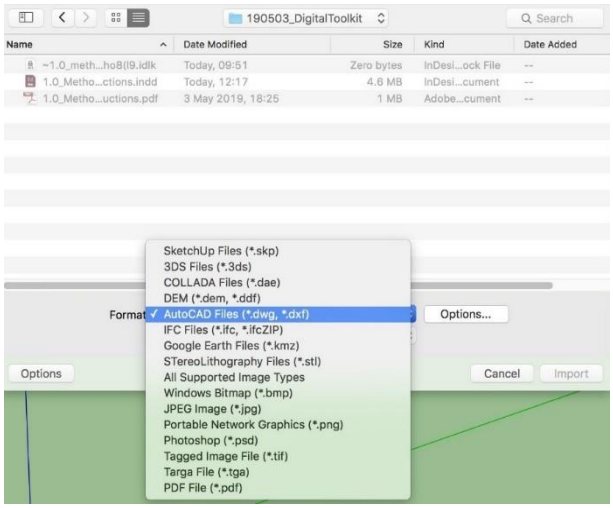


Figure A2.3 Format drop down menu



Digital Toolkit instructions

1) Download the component library of types from the GLA's website.

2) Open a new SketchUp file using a template set to measure in metres.

3) Import a 2D OS map or 3D site model to use as a base for testing proposals. External 2D or 3D files can be imported by selecting 'File' > 'Import' and then navigating to the source of the file, using the 'Format' drop-down list to select the file type. Ensure the base site information is imported at 1:1 scale and in metres.

Figure A2.4 Open component palette

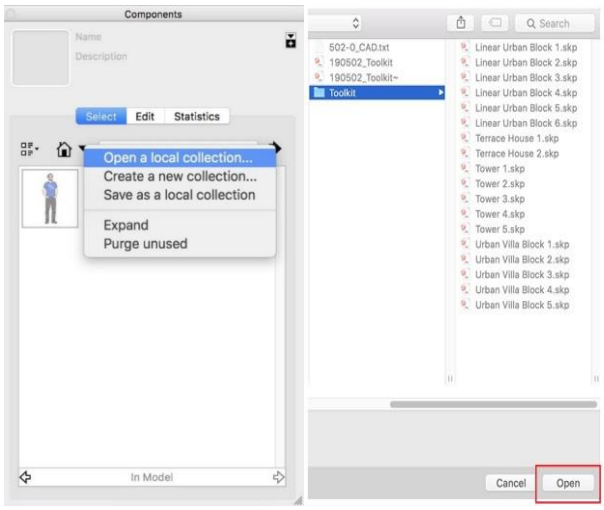


Figure A2.5 Component palette list

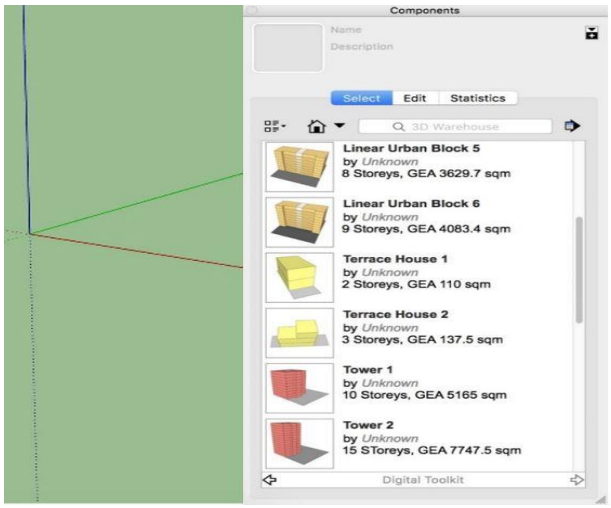
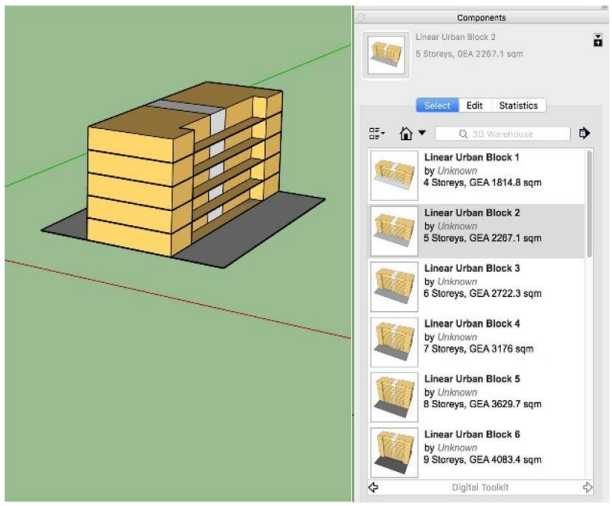


Figure A2.6 Select building type



Digital Toolkit instructions

4) In the component palette click on the 'details' arrow and select 'Open a local collection'.

5) Navigate to the downloaded toolkit of types and click 'Open'. Note: select the folder rather than individual SketchUp files to import the whole library of types.

6) The list of types will appear in the components palette within SketchUp. Each component is named by type, and has the number of storeys and total GEA of the block indicated.

7) Select types and place in the model space to test proposals.

8) Record the quantities of each type used in the GLA's indicative site capacity calculator. Record types with different storey numbers as separate lines in the record. Use the pulldown menu to select the type (a), fill in the number of storeys (b) and add the quantity used in the SketchUp model (c). The calculator will generate a total GEA per type (m^2) based on the inputted data (d).

9) The calculator will generate a residential GEA for the modelled scheme (e). Input tenure mix (f) and type mix for each tenure (g). The calculator will generate an indicative site capacity (h).

Appendix 3 Indicative Site Capacity Toolkit – Worked examples and site capacity calculator

A3.1.1 Once the layout of a proposal or site has been resolved, the indicative site capacity can be determined using the site capacity calculator. This is an excel spreadsheet that can be used without prior training.

A3.1.2 Boroughs should follow the steps below:

- Input the total number of residential blocks and types into the excel spreadsheet. Adjust for the number of storeys. This will automatically calculate the GEA (m^2) for each residential type.
- Enter in the non-residential floorspace that is allocated for the site.
- Input the proposed average parking ratio for the site. A higher ratio will lead to a lower number of dwellings overall, as some of the floorspace will be allocated to parking spaces.
- Input the policy compliant affordable (rented) dwelling mix and site appropriate mix assumptions for private and affordable (intermediate).
- Input the bedroom type mix.

A3.1.3 Output: The calculator will work out the indicative site capacity for the site. This is determined calculating the floorspace of the proposal, and subtracting the floorspace for parking and non-residential uses. Boroughs should also subtract any existing homes on the site/area to provide an indicative net number of additional new homes.

Worked example of the scenario used

GLA indicative site capacity calculator

Figure A3.1 Digital Toolkit Record – worked example of scenario

	GEA per storey (m^2)	Number of storeys	Total GEA per block (m^2)	Quantity	Total GEA per type (m^2)	Car parking circulation factor	Ground floor car parking factor
Linear Block	453.7	5	2268.5	3	6805.5	1.50	0.87
Terrace	55.0	4	220	24	5280.0	1.00	1.00
Terrace	55.0	3	165	8	1320.0	1.00	1.00
-Select Type-							
-Select Type-							
-Select Type-							

Figure A3.2 Capacity calculator – worked example of scenario

Residential GEA	13,406m^2
Non-residential	900 m^2
Residential GIA*	11,255 m^2
Residential NIA	7,878 m^2

Proposed average parking ratio	0.25
Proposed average circulation factor	1.254
Ground car floor parking factor	0.932

Car parking circulation factor: This is the circulation space required within a carpark. For the linear block and villa block residential building type, the circulation factor is set at 1.50 which equates to 50 per cent additional space allocated to circulation and manoeuvring of cars. This is a conservative estimate that assumes an optimal layout of parking is possible. For the terrace residential type, the circulation factor is set at 1.00 as it is assumed that any parking provided will be on-street.

Ground floor car parking factor: This accounts for parking on the ground floor that uses up space that may not be suitable for providing homes. The area available for parking under this factor depends on the (fixed) site area but decreases as a proportion of the total GEA as the density of a proposal increases. This means higher ratios of parking have an increasing impact on the number of homes at higher densities.

Non-residential uses: For the capacity-testing exercise, it is not necessary to determine whether non-residential use sits within its own building or across the residential buildings, for example across the ground floor. For capacity-testing, the floor area for non-residential uses can simply be deducted from the GEA once building blocks have been laid out to an acceptable height.

*If fields are added to the Digital Toolkit Record above, ensure the formula for residential GEA is extended to capture all types listed.

Figure A3.3 Tenure breakdown – worked example

Tenure	Tenure mix	NIA (m^2)	Type	Type mix	NDSS Area (m^2)		Indicative unit count
Market	50%	3,939	1 bed	30%	50	22.1	22
			2 bed	40%	70	21.5	21
			3 bed	30%	86	13.2	13
					Total		56
Affordable (Intermediate)	20%	1,576	1 bed	30%	50	8.9	8
			2 bed	40%	70	8.6	8
			3 bed	30%	86	5.3	5
					Total		21
Affordable (Rented)	30%	2,364	1 bed	30%	50	13.3	13
			2 bed	40%	70	12.9	12
			3 bed	30%	86	7.9	7
					Total		32
					Indicative site capacity		**109**
					Indicative capacity impact of accommodating car parking		-7

Notes:

- Editable fields for data input are denoted in white. Figures shown are illustrative.
- GIA calculated as 90 per cent of GEA.
- NIA calculated as 70 per cent of GIA (A reduced ratio has been used in conjunction with minimum space spaces to provide an indicative capacity. This reduced ratio aims to accommodate any additional site and scheme variables that may impact capacity).
- See Table 10.3 in the London Plan Policy for residential parking ratios.
- This example highlights the impact of residential car parking on the indicative site capacity. Even with a low parking ratio (0.25), the capacity is reduced by seven homes.
- Car parking calculations have been based on a 2.4m x 4.8m car parking space. If parking space standards are subsequently revised, these assumptions will have to be adjusted.