RESIDENTIAL
RESEARCH

# TALL TOWERS 2012

London's high-rise residential developments

**Knight Frank**

BARTON WILLMORE
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EC HARRIS
BUILT ASSET
CONSULTANCY

**This report is the first comprehensive assessment of London's burgeoning residential tower sector. We examine the funding, planning, construction and pricing dynamics for tall residential buildings. We also confirm the location of all major schemes in the development pipeline.**

"There is real demand for apartments offering a slice of 'luxury' London and unrivalled views across the capital."

**Gráinne Gilmore,** Head of UK Residential Research

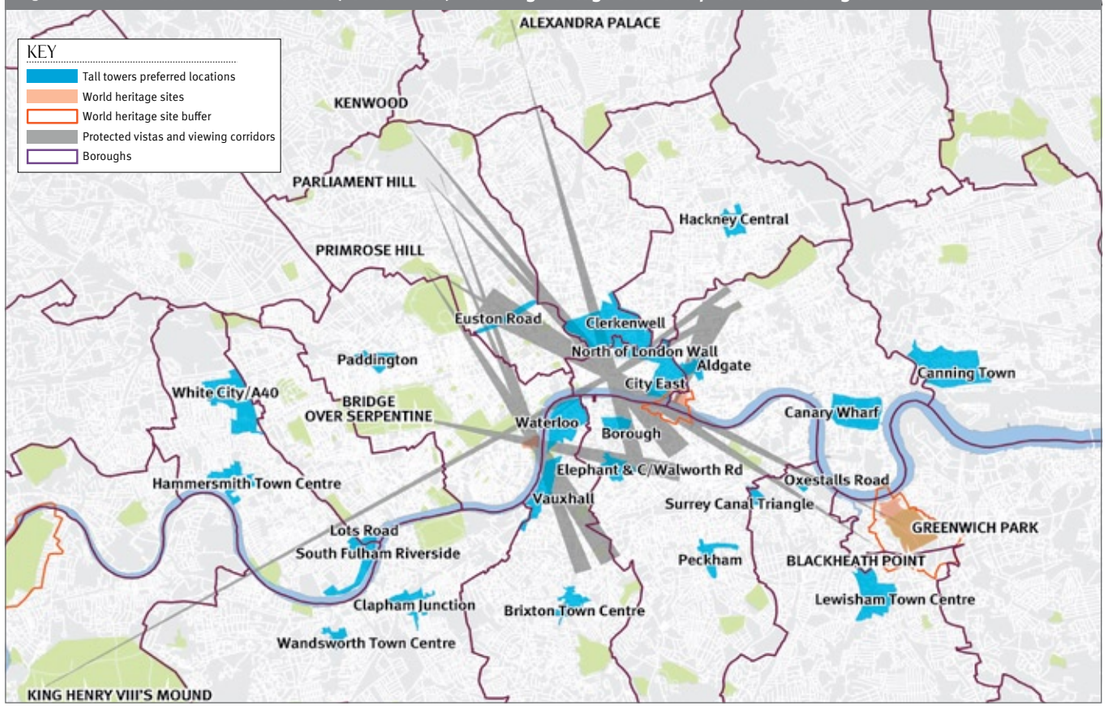
Tall towers, whether residential or commercial, have been a notable feature of the London skyline since the 1960s, when the lifting of height restrictions on buildings led to a flurry of development. But the poor appearance and quality of many of these early residential towers led to a backlash against building 'up' – until the noughties.

The recent completion of The Shard, designed in 2000 and completed this year to become the tallest building in Europe, has once again drawn attention to the scope for residential and mixed-use towers in London. But this development has not happened in isolation. The Heron, a 36-storey residential tower is almost ready to residents in the City of London, while The Tower at St George Wharf, which at 49 storeys will become one of Europe's highest residential buildings, will be completed next year. With the lack of residential supply in London, recently highlighted in our London Development Report, and the high price of development land in the capital, it is unsurprising that residential towers are increasingly being examined as a way to boost the supply of homes in London.

There are 25 schemes which include a tall tower, defined as having 20 or more storeys, currently under construction in central London, and a further 78 schemes that include at least one tower which have been granted planning permission, as shown in our unique London pipeline development maps on pages 8-9.

There are rewards for developers in this 'new wave' of tower development. There is a potential value premium achievable for schemes built to the right specification, as discussed on page 7. But there are also major challenges, including funding, planning and construction, which are examined in detail over the next five pages.

Figure 1 **Preferred locations for towers (London Plan) including heritage sites and protected viewing corridors**




Source: Barton Willmore, GLA

# Overcoming planning hurdles

**The only way is up for London, but tall towers pose unique challenges for planners, warns Chris Brett, Partner at planning and design consultancy Barton Willmore:**

City Planning Officer Peter Rees has publicly said that we're unlikely to see more tall towers in the City itself after the current spate complete. But while the square mile may have called time on building up, across London tall buildings are the landmarks of the future.

In thriving cities like London, tall towers work. They allow many thousands more people to live and work in the central zones near major transport hubs and have tremendous power to regenerate the area around them.

Planners recognise the benefits of tall buildings too. The economic, aesthetic and sustainable planning advantages are well known. Clusters of towers can give previously unheralded areas an identity – just look at Canary Wharf. At Chelsea Creek, St George's forthcoming 25-storey residential tower will help identify an area that was home to a former gas works. Towers add character to an area, acting as signposts across the capital.

But if the benefits of tall buildings are so widely accepted, why is the planning process so fraught with challenges, and how can developers ensure success?

Towers that have a limited impact on the historic context of London are far more likely to be given the go-ahead. Clustering tall buildings is also preferred so that their effect on the London skyline can be managed, making areas like the Docklands and, more recently, Nine Elms a natural home for towers.

Experience shows that towers which have good access to transport links have the best chances of success, given that there is infrastructure in place to cope with a rise in the numbers of people travelling to and from the vicinity.

The London Plan sets out clear criteria against which tall buildings will be assessed.

These insist that towers do not adversely affect their surrounding area, relate well to the existing urban grain especially on ground level and achieve high standards of design and construction. Publicly accessible top floors are also looked upon favourably.

Planners must also consider highly protected viewing corridors towards strategically important landmarks including both the corridors themselves and wider setting. Aspects of views which contribute to World Heritage Sites are also protected, which for London means the Tower of London; Westminster Abbey, Palace and St Margaret's Church; Maritime Greenwich; and Kew Royal Botanic Gardens, some of which are included in figure 1.

If those hurdles can be overcome, then developers can expect a warm reception. In recent years there has been a sea change in attitudes towards tall buildings, largely as a direct result of the creation of a Mayor of London. The capital has long needed someone in a position to take a strategic overview, with the power and teeth to deliver it.

Ken Livingstone was clear in his support for tall buildings which met the above criteria and Boris Johnson has continued this through the London Plan process. Both have recognised the important role tall buildings play aesthetically and as an economic catalyst for regeneration.

The fruits of this support can be seen throughout the capital and regardless of who is in power one thing is for certain – London's future lies in the sky.

"Tall buildings are widely accepted, but the planning process is challenging. How can developers ensure success?"

## NEW LOOK:
### How new sustainability rules could affect tower design

**When the Coalition Government came to power in 2010, it continued the Labour Government pledge that all new homes built in the UK would be zero-carbon from 2016. This not only has an impact on the wider house-building industry, but affects plans for new towers which will provide residential housing.**

Defining zero-carbon has always been a thorny issue. The Coalition Government diluted the definition of zero carbon so it no longer includes 'unregulated emissions' such as electrical appliances and equipment used within the home, however even the revised requirements are considered undeliverable by many developers. The revised definition is broadly comparable to Level 5 of the Code for Sustainable Homes rating system, which indicates that there must be zero net emissions of carbon dioxide (CO2) from all energy use in the home. Many recently built houses are built to Code for Sustainable Homes Level 3 or 4.

This not only reduces the impact on the environment, but results in lower bills for occupiers, something that has increased in importance in recent years after sharp jumps in both electricity and gas costs. In 2011 alone, electricity bills rose by 15%, while gas bills were up nearly 20%.

David Goatman, Head of Sustainability Consultancy at Knight Frank, says: "The move to zero-carbon residential development means that buildings could look very different. Large glass structures, the kind which are very popular for those building residential towers, are not ideal when trying to drive down carbon emissions and energy consumption. For example, the glass facades often act to heat up the internal spaces of the building, so a lot of electricity is needed to cool it down again. Unless technology can find ways of adapting to the low carbon challenge, for example producing more efficient types of glass facade, tall residential buildings may be forced to change in appearance."

# Construction: cost drivers

**The cost dynamics of building a tower differ markedly from those in a lower rise lateral development. Paul Cohen, Partner at EC Harris, the built asset consultancy, explains:**

"The largest incremental increase in construction costs occurs in the 25-40 storey range."

Paul Cohen

Tall towers are not surprisingly more expensive to build than low-rise developments, but why?

Firstly, the building form and technical design complexities of tall towers incur higher costs than other types of development. In fact, the design of a tall tower, needs to be cutting edge not only to attract buyers but to secure initial planning consent. Such high quality design adds a premium to the costs often driven by the planning imperative of delivering an iconic, high profile building.

Most tower developments are based in very desirable locations where land values are high, usually in restricted city centre sites. This has an impact on the logistics of delivery, storage, and handling of materials, leading to another premium on cost. There may be restricted time allowances for working, for example the times at which tower cranes can be used. Planning the development around such restrictions adds expense and lengthens the programme.

In addition, labour productivity on towers tends to be lower due to various logistical factors, including the increased time taken to get workers to the workface, especially as the tower gets higher, and the increased health and safety measures needed to keep those workers safe.

**43%**

Uplift in construction costs per sq ft between the 10th and 50th floor

Looking more closely at the design of tall towers, the height, shape and slenderness ratio are important considerations for developers because these make tall towers intrinsically less efficient, and therefore more expensive, than lower rise schemes.

Net to gross area ratios in tower schemes are lower, since the percentage of space taken up by the cores and service provision areas are comparatively high. This means that the effective revenue-generating space is less than in an alternative lower-rise development.

The layout of apartments also has key cost implications. While it is understandably desirable to have the maximum number of apartments possible per service core in order to keep costs down, this needs to be balanced against the need to meet fire and building regulations, as well as the overriding need for each apartment to have optimum external views. Units need to be as deep as possible to maximise efficiency commensurate with achieving required day-lighting and internal layout requirements.

The external envelope costs on a high rise scheme can account for as much as a quarter of the total bill for the project. Cladding costs increase as the height and slenderness ratio of the building increases, as shown in figure 2.

Typically, the most efficient plan shape is square. The bigger the square, the smaller the wall to floor ratio. But in towers, as the slenderness ratio increases, in most cases so does the wall to floor ratio, and in many instances the net to gross ratio will fall as the core area does not reduce in proportion to total floor plate area.

As the tower rises higher, the specification of the cladding has to increase to withstand high wind loading. In many cases, to maximise the benefit of views, developers will demand a cladding system which is predominately glazed. This too increases cost to ensure the building complies with the requirements to avoid excessive solar heat gain and achieves the required code for sustainable homes rating.

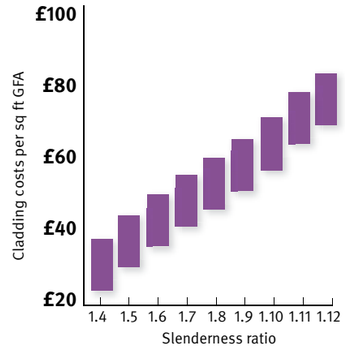
In addition the treatment of balconies and winter gardens will add extra expense as the building height increases.

There are also key points when costs 'step-up' in terms of mechanical and electrical engineering services. A height of around 100 metres, which is usually 30 floors, represents a barrier beyond which there is a cost 'step point'.

There are a number of inter-related factors which drive these cost differentials, which include:

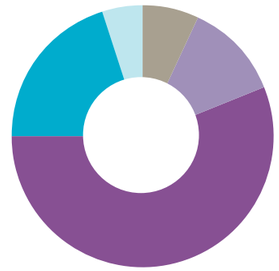
- Water supply – the cold water supply needs to be boosted in high rise buildings. One solution is to provide break tanks at an intermediate floor level with further booster pumps
- Heating presents similar problems – high pressure radiators can push up costs by an additional 30%
- Intermediate plant floors may be required over 100 metres, creating a loss of net saleable area
- Sprinkler systems will be needed instead of dry risers above 60 metres, at an extra cost of at a cost of around £25 per sq m
- Super-fast lifts need very high quality engineering. This costs extra money and time.

Figure 2
**Cladding costs versus slenderness ratio**




Source: EC Harris

Figure 3
**Tall Tower schemes development pipeline**
Construction status



| | |
|---|---|
| Pre Planning | 7% |
| Application/Appeal | 12% |
| Permission | 56% |
| Under construction | 20% |
| Recently completed | 5% |

Source: Knight Frank Residential Research, Molior London

A quarter of schemes containing one or more tall towers in the development pipeline are under construction or have reached completion.

However careful attention to detailed design allows some of these issues to be mitigated, or effectively 'engineered out', which will provide substantial cost benefits.

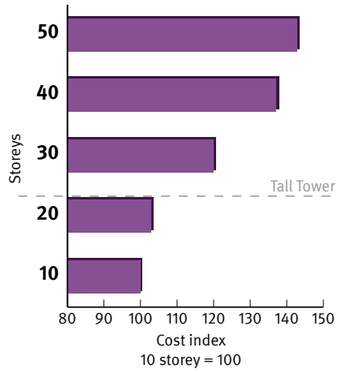
## What are the biggest 'step changes' in the cost of building?

EC Harris has developed a model which examines how the cost of construction is affected by the height of a building. It is able to plot the typical cost per sq ft of constructing a tall residential tower at different heights.

The graph opposite shows how construction costs rise as the height of buildings increase, although it is worth noting that costs tend to broadly level off after 40-50 storeys. This is largely a result of the increased complexity of building at height which means that economies of scale really only come into play from 40 storeys upwards.

There is often a tricky optimisation exercise to be done balancing build costs, total floor area and unit numbers, cash flow, funding and planning constraints.

Figure 4
**Construction costs relative to height of tower**




Source: EC Harris

## DEVELOPMENT ECONOMICS

**Gráinne Gilmore**

**Tall towers offer the potential for optimising the use of a site, a distinct advantage in urban areas where land values are high. But the funding structure of a tower scheme is much more capital intensive than a lateral or low-rise development due to the lack of opportunity for phased completion. As such, tower schemes generally only become viable in areas where buyers are willing to pay a relatively high base price, starting at around £800 - £1,000 per sq ft.**

High levels of pre-sales are a pre-requisite. Developers funding a scheme from their balance sheets can set their own criteria, but where developers are relying on bank lending or other sources of senior debt to fund the development, the conditions will be more onerous. Some 30% of the units in the tower will need to be pre-sold as a minimum, although in some instances funders will demand that the value of the development funding advanced be matched pound for pound by the value of units sold off-plan. In most cases the exchange deposits received from such pre-sales cannot be used as part of a scheme's cash-flow unless expensive warranties are purchased, further intensifying the capital requirements.

It is worth noting that UK banks have been largely inactive in development funding for towers in recent years, despite the uplift in activity. There are calls for UK banks to become more active in the construction sector, but UK banks are only willing to fund developers who are well established and can show an exemplary track record. There seems little prospect of this status quo changing in the short-term, and in the meantime overseas banks are plugging the funding gaps for tower schemes in London.

The challenges inherent in funding a high-rise residential development go some way to explain why in some cases a tower is started towards the final stages of a larger overall scheme. This allows developers to benefit from the critical mass and a sense of place they have already created in a particular locality.

There are rewards on offer for building high residential towers however. There is real demand for apartments offering a slice of London 'luxury' and unrivalled views across London. When the scheme has been designed correctly, buyers will pay a premium for a birds-eye view of the capital, as we discuss on page 7.

# Building 'up': adding value

**We have explored how the funding, planning and construction dynamics differ for towers compared to other lateral or low-rise schemes. But building 'up' certainly has benefits. Gráinne Gilmore explains:**

Funding a tower can be onerous and expensive, but such schemes, especially those placed in desirable areas of London, can offer attractive returns. Residential property prices in London far outperform the rest of the country. The current disparity in prices has led to much political debate, but average house prices across London have been more than double those in the rest of the UK for more than two decades.

This has, in turn, driven up land prices. But the ability to command higher prices per sq ft means high density residential or mixed-use towers, designed to the correct specifications and in the right locations, can lead the way when it comes to returns.

In terms of price, the general rule is the higher the apartment, the greater the price premium. This not only reflects the enhanced views, but also the increased exclusivity of living towards the top of a tall tower. In many cases, developers will also change the floor plates and design of apartments on the highest floors, in some cases creating apartments across a whole floor or duplexes and triplexes, which help underpin this price premium. But as discussed, these apartments must be of a higher specification and easily accessible, in some cases by private super-fast lifts, to attract high net worth buyers.

We have calculated that the typical uplift in price per sq ft per storey is 1.5%. This will not apply in every situation, and is certainly not intended as a formula, but reflects recent data and our market intelligence on the pricing of residential tower schemes in London.

The 1.5% increase in price per floor excludes the effect of the additional premiums charged for the most desirable of all tower apartments – the penthouses. Once these are included, the average price uplift per floor rises to 2.2%.

The views across the city, which take on a different complexion from each floor of a tower, are a prime attraction for buyers.

In addition, the prospect of a home in an iconic scheme also has its own appeal. There is a 'luxury' cachet attached to buying the highest available apartments in London.

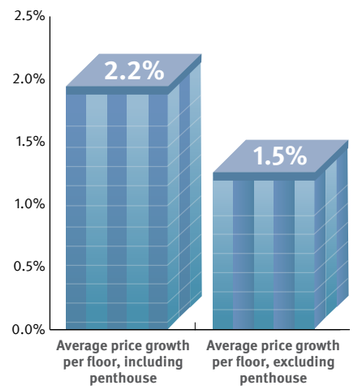
It is no coincidence that towers are popular with overseas buyers particularly those from Asia, who are familiar with 'high-rise' living.

Our development map illustrates the number of schemes in the development pipeline which include one or more tall towers. We have also included some prominent student accommodation schemes of 20+ storeys in and around the centre of London, as these too will play a part in re-defining the capital's skyline.

The reality is that some schemes may be hampered before nearing fruition by the on-going funding crunch.

There is no doubt however, that even if development volumes pick up sharply, there will still be a 'rarity' value placed on high-rise London living. After all, London is still far from the skyscraper city culture of Manhattan or Shanghai.

Figure 5
**Average uplift in prices per floor**
Central London tower schemes



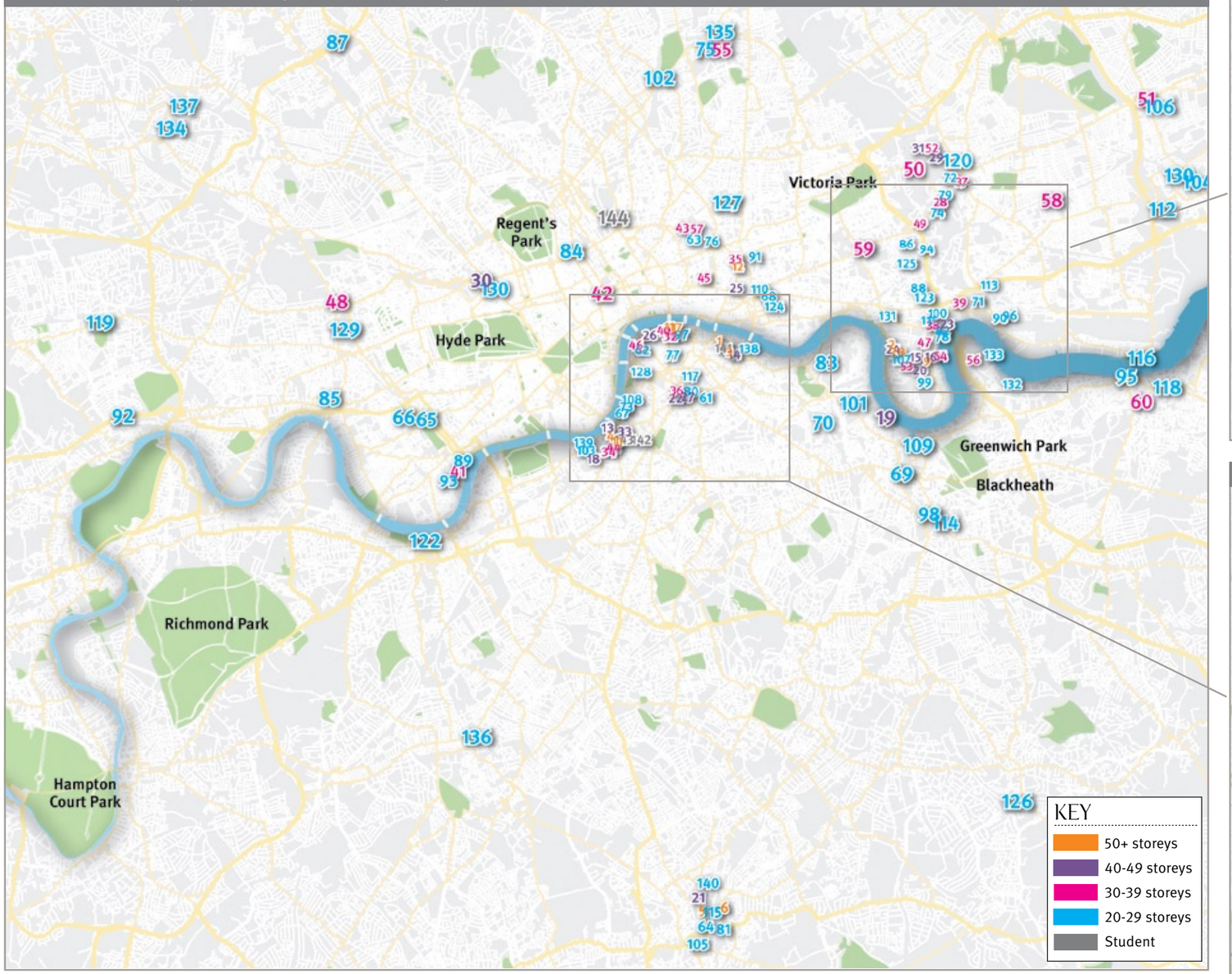

Source: Knight Frank Residential Research

**25**
Schemes including one or more tall towers **under construction** in London

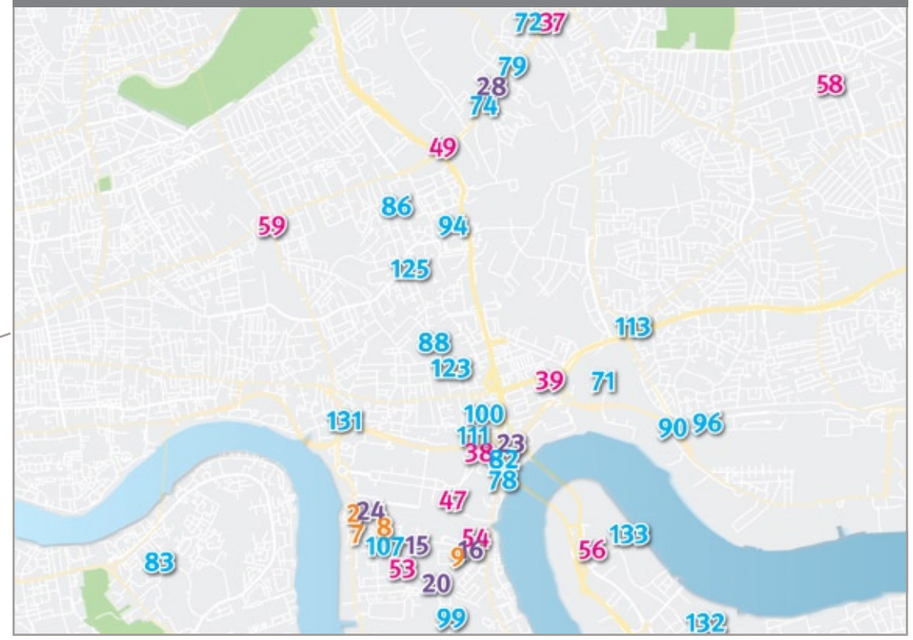
**78**
Schemes including one or more tall towers **with planning permission** in London

# SHIFTING SKYLINE: TALL TOWER SCHEMES IN LONDON

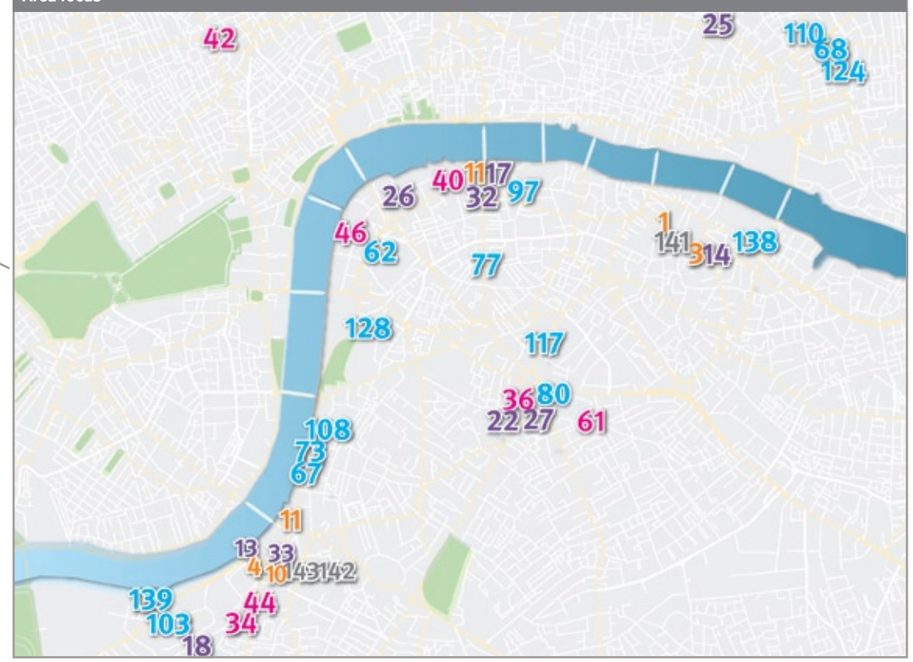
Figure 6
**Tall residential towers: pipeline developments and recent completions**




Area focus



Area focus



Source: Knight Frank Residential Research, Molior London
All schemes data is based on current information available and is subject to change

## Shifting skyline: tall tower schemes in London – key

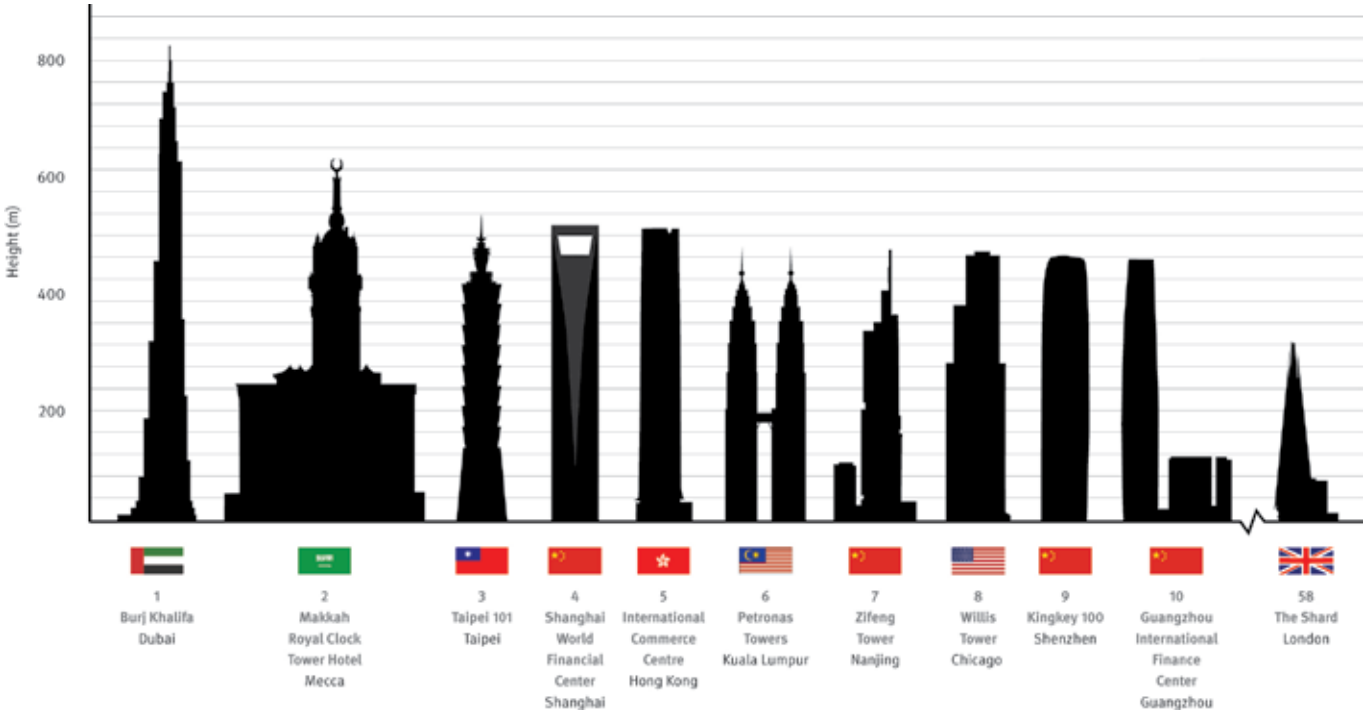
KEY

50+ storeys | 40-49 storeys | 30-39 storeys | 20-29 storeys | Student

| Map no. | Site name | No. of Storeys | Location |
|---|---|---|---|
| 1 | The Shard | 87 | SE1 |
| 2 | Landmark North | 62 | E14 |
| 3 | Spires at London Bridge - Tower 1 | 61 | SE1 |
| 4 | One Nine Elms | 59 | SW8 |
| 5 | One Lansdowne Road | 55 | CR9 |
| 6 | Morello Tower | 55 | CR9 |
| 7 | Cuba Street Site | 52 | E14 |
| 8 | Quay House | 51 | E14 |
| 9 | Skylines Village | 50 | E14 |
| 10 | Vauxhall Square | 50 | SW8 |
| 11 | One Blackfriars (Beetham Tower) | 50 | SE1 |
| 12 | Principal Place | 50 | EC2 |
| 13 | St George Wharf | 49 | SW8 |
| 14 | Spires at London Bridge - Tower 2 | 49 | SE1 |
| 15 | Pan Peninsula | 48 | E14 |
| 16 | Angel House / Innovation Centre | 47 | E14 |
| 17 | Sampson/Ludgate House | 47 | SE1 |
| 18 | The Garden | 46 | SW8 |
| 19 | Convoys Wharf | 46 | SE8 |
| 20 | Baltimore Wharf | 46 | E14 |
| 21 | Saffron Square | 45 | CR0 |
| 22 | 360 London | 44 | SE11 |
| 23 | New Providence Wharf - Providence Tower | 44 | E14 |
| 24 | The Landmark | 44 | E14 |
| 25 | Heron Plaza | 44 | EC3 |
| 26 | Doon Street Tower | 43 | SE1 |
| 27 | Strata | 43 | SE1 |
| 28 | Stratford Halo | 43 | E15 |
| 29 | Manhattan Loft Gardens | 42 | E20 |
| 30 | Merchant Square - The Cucumber | 42 | W2 |
| 31 | Stratford City | 42 | E15 |
| 32 | 19-23 Blackfriars Road | 42 | SE1 |
| 33 | Vauxhall Cross Island Site | 40 | SW8 |
| 34 | Sainsburys - Nine Elms Lane | 39 | SW8 |
| 35 | Plough Yard | 39 | EC2 |
| 36 | St Mary's Tower | 37 | SE1 |
| 37 | Broadway Chambers | 37 | E15 |
| 38 | Helix | 37 | E14 |
| 39 | Land On West Side Of Leamouth Road | 37 | E14 |
| 40 | Kings Reach Tower | 37 | SE1 |
| 41 | Lots Road Power Station | 37 | SW10 |
| 42 | Centre Point | 36 | WC1 |
| 43 | 261 City Road | 36 | EC1 |
| 44 | Vauxhall Sky Gardens | 36 | SW8 |
| 45 | The Heron (Milton Court) | 36 | EC2 |
| 46 | Shell Centre | 36 | SE1 |
| 47 | Wood Wharf (Master permission) | 35 | E14 |
| 48 | Imperial College Woodlands | 35 | W12 |
| 49 | 2-12 High Street | 35 | E15 |
| 50 | Queen Elizabeth Olympic Park | 33 | E20 |
| 51 | Pioneer Point | 33 | IG1 |
| 52 | Athletes' / East Village | 32 | E20 |
| 53 | Canary Quarter | 32 | E14 |
| 54 | Dollar Bay Court | 31 | E14 |
| 55 | Woodberry Park | 31 | N4 |
| 56 | Greenwich Peninsula (Master Permission) | 31 | SE10 |
| 57 | Canaletto London | 31 | EC1 |
| 58 | Queen's Market | 30 | E13 |
| 59 | 562 Mile End Road | 30 | E3 |
| 60 | Woolwich Central (Master Permission) | 30 | SE18 |
| 61 | Elephant & Castle - Heygate Estate | 30 | SE1 |
| 62 | Elizabeth House | 29 | SE1 |
| 63 | City Forum | 29 | EC1 |
| 64 | Croydon College | 29 | CR9 |
| 65 | Earls Court - 1 - Kensington | 28 | SW5 |
| 66 | Earls Court - 2 - Hammersmith | 28 | SW5 |
| 67 | Eastbury House | 28 | SE1 |
| 68 | Altitude Aldgate | 28 | E1 |
| 69 | The Distillery | 28 | SE8 |
| 70 | Surrey Canal Triangle | 27 | SE14 |
| 71 | Leamouth Peninsula North | 27 | E14 |
| 72 | Olympian Tower | 27 | E15 |
| 73 | Hampton House | 27 | SE1 |
| 74 | Stratford Edge | 27 | E15 |
| 75 | Woodberry Park | 27 | N4 |
| 76 | Eagle House | 27 | EC1 |
| 77 | Blackfriars Road Central | 27 | SE1 |
| 78 | Gallions Quay | 26 | E14 |
| 79 | 206-214 High Street | 26 | E15 |
| 80 | Tribeca Square | 26 | SE17 |
| 81 | Altitude 25 | 26 | CR9 |
| 82 | Streamlight | 26 | E14 |
| 83 | Maple Quays 3 | 26 | SE16 |
| 84 | The Triton Building | 26 | NW1 |
| 85 | Kings Mall Car Park | 25 | W6 |
| 86 | Bow Cross (Master permission) | 25 | E3 |
| 87 | Brent Cross Cricklewood (Master Permission) | 25 | NW2 |
| 88 | 136-156 Chrisp Street | 25 | E14 |
| 89 | Lots Road Power Station | 25 | SW10 |
| 90 | 28-34 Tidal Basin Road | 25 | E16 |
| 91 | Avant-garde | 25 | E1 |
| 92 | Great West Quarter | 25 | TW8 |
| 93 | Chelsea Creek | 25 | SW6 |
| 94 | St Andrews - No.1 The Plaza | 25 | E3 |
| 95 | Mast Quay | 24 | SE18 |
| 96 | The Pump House | 24 | E16 |
| 97 | NEO Bankside | 24 | SE1 |
| 98 | Renaissance | 24 | SE13 |
| 99 | Asda - Crossharbour District Centre | 23 | E14 |
| 100 | Blackwall Reach / Robin Hood Gardens Estate | 23 | E14 |
| 101 | Cannon Wharf Business Centre | 23 | SE8 |
| 102 | City North Islington Estate | 23 | N4 |
| 103 | Nine Elms Parkside | 23 | SW8 |
| 104 | Vicarage Field Shopping Centre | 23 | IG11 |
| 105 | 4-20 Edridge Road | 23 | CR0 |
| 106 | Britannia Music Site | 23 | IG1 |
| 107 | Mastmaker Court | 23 | E14 |
| 108 | 81 Black Prince Road | 23 | SE1 |
| 109 | Creekside Village East | 23 | SE8 |
| 110 | One Commercial Street | 23 | E1 |
| 111 | Poplar Business Park | 22 | E14 |
| 112 | Fresh Wharf Estate | 22 | IG11 |
| 113 | Rathbone Market (Master Permission) | 22 | E16 |
| 114 | Lewisham Gateway Site | 22 | SE13 |
| 115 | Ruskin Square | 22 | CR0 |
| 116 | 2 Pier Road | 22 | E16 |
| 117 | 89-93 Newington Causeway | 22 | SE1 |
| 118 | Royal Arsenal | 21 | SE18 |
| 119 | The Apex | 21 | W5 |
| 120 | Stratford City (Master Consent) | 21 | E15 |
| 121 | Merchant Square 3 | 21 | W2 |
| 122 | Osiers Gate | 21 | SW18 |
| 123 | The Panoramic | 21 | E14 |
| 124 | Goodman's Fields | 21 | E1 |
| 125 | Bow Enterprise Park | 20 | E3 |
| 126 | Bromley South Central | 20 | BR2 |
| 127 | Colville Estate (Master Permission) | 20 | N1 |
| 128 | Founder Place (Guy's and St Thomas') | 20 | SE1 |
| 129 | North of Westfield Shepherds Bush | 20 | W12 |
| 130 | 16-34 Cambridge Road | 20 | IG11 |
| 131 | 82 West India Dock Road | 20 | E14 |
| 132 | GMV | 20 | SE10 |
| 133 | Greenwich Peninsula | 20 | SE10 |
| 134 | Wembley City (Master Permission) | 20 | HA9 |
| 135 | Woodberry Park | 20 | N4 |
| 136 | The Tower | 20 | SW19 |
| 137 | Atmosphere | 20 | HA9 |
| 138 | One Tower Bridge | 20 | SE1 |
| 139 | Riverlight (Tideway Wharf) | 20 | SW8 |
| 140 | Iylo | 20 | CR0 |
| 141 | The Quill/Capital House | 32 | SE1 |
| 142 | South Lambeth Road, Vauxhall | 31 | SE11 |
| 143 | Vauxhall Square | 28 | SW8 |
| 144 | King's Cross | 27 | N1 |

Source: Knight Frank Residential Research, Molior London
All schemes data is based on current information available and is subject to change.

## The tallest towers: how London compares





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