

INTELLIGENT ARCHITECTURE \ ISSUE NINE

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Introduction: Architecture and Living

The notion of ‘architecture and living’ clearly extends beyond the residential sector and just housing – as we explore here in our latest addition of iA. The way in which we live and occupy our cities and communities is clearly informed by most, if not all of the various typologies to be found within our built fabric, as well as all of the supporting infrastructure that surrounds us. Obviously however, the main substance of our ‘living’ evolves around the home.

Here, Richard McCarthy, Board Director responsible for leading our residential team, explores the identity of our position on housing and home as an introduction to the main body of articles contained within this issue of iA – we hope you find it informative and, enjoy!

GRAND DESIGNS ARE INSPIRATIONAL BUT HOW DO WE SOLVE THE PROBLEM OF DENSITY?

For architects, designing your own house is the Holy Grail. A rare chance for unconstrained expression of personal style and experimentation. Finding your own Edgar J Kaufmann, is an equally compelling prospect. The Pittsburg department store owner became a brave and willing patron to one of the world’s most acclaimed private residences when he commissioned Frank Lloyd Wright to design Fallingwater, as a family retreat, hidden in Pennsylvania. Wright was given free rein to express his philosophy of organic architecture. My hope is a taste of Fallingwater’s dramatic relationship

with nature is imparted to the people now living in our Vista apartment building, overlooking Battersea Park, in London.

Another early experiment in modern living and industrial design, the Maison de Verre (the glass house), in Paris inspired Scott Brownrigg’s houses at 3 Down Street Mews, featured in article 12. The Maison de Verre’s translucent design was a collaboration among a furniture designer, Pierre Chareau, a Dutch architect, Bernard Bijvoet and a metalworker, Louis Dalbet. Combining their individual crafts created a juxtaposition of new ideas on how to live, work and entertain in one space.

Such private commissions will not solve the housing crisis but as with high fashion on the catwalk, they can drive innovation and creativity that will eventually find its way into everyday living.

I’m conscious architects perhaps stand alone in this grandiose view of what a house can represent. The public, and by extension our politicians, often have a very different relationship with housing. To the less fortunate, sadly it remains a basic need for shelter and for many it’s an investment first, home second, thus the housing market is intrinsically tied to how we feel about the economy. For most, our homes are a refuge, a safe place we share with family and friends, ideally embedded in a community we can relate to and want to be a part of. And this is why things change slowly in housing.

In other industries, the influence of urbanisation, technology, climate change and ageing population is driving change and modernisation apace. The property industry is slow to react to such trends and housing appears unperturbed. Disrupters exist: co-working is morphing into co-living; in the city we’re toying with the idea of micro-living; whilst the private rental market is developing brands to attract millennial tribes, embracing modular construction and finally gaining traction with institutional backers. Though shifting the British psyche away from its obsession: the property ladder is never going to be easy.

The housing shortage grabs headlines and the very real challenge of affordability is latched onto by politicians, however in the flurry to churn out housing, architects have a duty to stay calm and focus on quality. Through design and collaboration, we have the skills and vision to bring people together and create vibrant places to delight.

When it comes to housing two questions have always pre-occupied me. Why are Georgian houses and streets so universally admired? Conversely, why is post-war housing inspired by the international style and Le Corbusier’s Vers une architecture so maligned? Georgian architecture commands a 20% premium in value, adored for its light airy spaces,



LEFT

Frank Lloyd Wright's Fallingwater in Pennsylvania

BELOW LEFT

Vista by Scott Brownrigg



mathematical proportion and balance. The innovation and ideas utilised to solve the post-war housing crisis should be applauded, but instead this architecture shoulders much of the blame for dysfunctional communities.

Erno Golfinger's brand of brutalist, high rise buildings was derided by the public and post modernists. Balfour Tower in Poplar is often featured on British TV and music videos to depict an air of gritty, urban deprivation. Ironically, the building enjoys something of a cult status and was controversially listed in 1996. Robin Hood Gardens, another brutalist housing scheme nearby (designed by Alison and Peter Smithson) was less fortunate, reflecting broader public sentiment it was demolished as a failed experiment in creating 'streets in the sky'.

Streets and garden squares appear to be more successful at creating communities than lifts and skywalks, but to solve London's space problems we still need to find a way to build higher in the city that already exists.

Paris, as conceived by George-Eugène Haussmann, is roughly equivalent in size to London's zones 1 and 2 with a population density of approximately 21,500 people per square kilometre, which is more than twice the density of inner London, at around 10,000. Yet both cities are considered leafy and green. Paris has very few high rise buildings in comparison with London's skyline, but this belies the fact that London is generally very low compared to the Paris streetscape of seven to eight storey apartment blocks which sit atop cafes, bars and shops. This density makes Paris a better, often livelier, more interesting place. My point is, London is constrained by policy and NIMBY mindset to protect itself from overdevelopment, but density in itself is not a cause of community dysfunction, it is how it's handled.

New London homes should reflect the diversity of people living in a global city but we need to imbue the quality and thinking that gave us those quintessential leafy Georgian streets into solving the problem of density. In a way that encourages street life to thrive and people to venture out of their tiny castles to meet each other. Nothing builds communities like schools or culture, so why not incorporate them or emerging 'smart' clean industries into new urban typologies?

The best thing we can do as architects is to focus on quality not quantity. Housing must be adaptable and resilient enough to serve generation after generation. It's impossible to predict what people will need 100 years from now and risky to try. People, their families, pets and eventually their robots will adapt the spaces to suit their own needs. Building homes is always about building communities of the future and history tells us design quality endures ●



Retrospective: Cedar Homes 'The America Line'

Between 1959 and 1965 founding Partner John Brownrigg designed a range of prefabricated timber bungalows for Cedar Homes. 'The America Line' was both progressive and innovative in terms of spatial efficiency and finish. His work in this area also provided an alternative perspective to mass housing for density based on the value of variation. Here Miguel Peluffo presents some of Brownrigg's work.

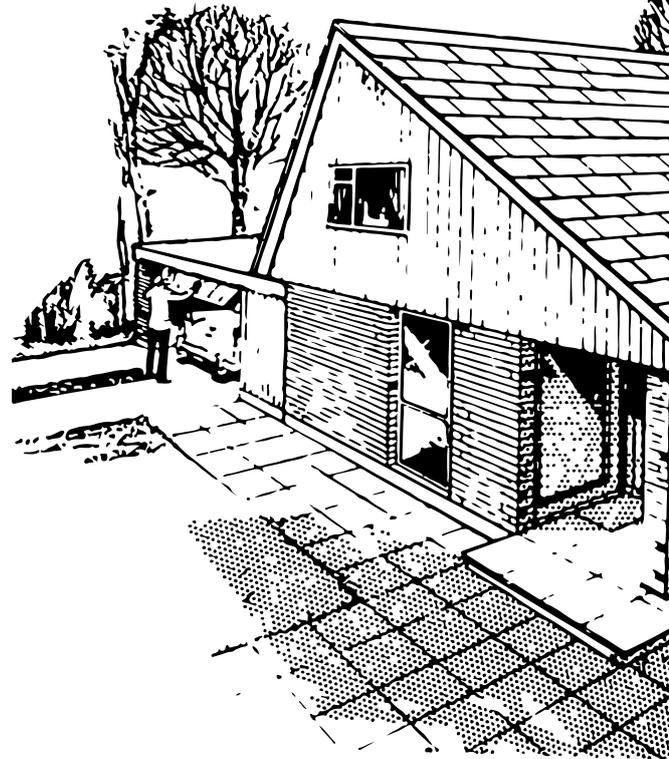
Guildway, formally known as Cedar Homes from 1955-1964, was a timber frame manufacturer that was very successful during its time for providing and introducing prefabricated timber bungalows across the UK. In 1998 it was acquired by a larger timber supplier.

The rise in prefabricated bungalows was a response to the severe housing shortages experienced from 1944. Initially it was employed as a temporary solution with government programs pushing for mass adoption; the standard composition being a metal frame with corrugated sheets wrapping the envelope and plasterboard lining the interior. All the essentials were incorporated at the factory with prefabricated kitchen and bathroom modules, enabling houses to be assembled in a matter of days on a simple concrete raft slab.¹

As a housing typology, characterized by its simple pitched-roofed bungalow with a highly efficient compartmentalized two-bedroom plan, it was an exemplification of the bare necessity meant to satiate the situation. Its acclaim instead rested on the novel introduction of industrialised housing it achieved by undercutting both traditional construction costs, time and mobility. Cedar Homes would go on to further develop on the idea of prefabricated homes with the help of John Brownrigg, streamlining several designs to build a product catalogue. John Brownrigg was invited to the first Show House presented by Cedar Homes in 1955, an overly optimistic salesman

“ When the market becomes more competitive it is the builder with the goodwill and the reputation who will come out on top. ”

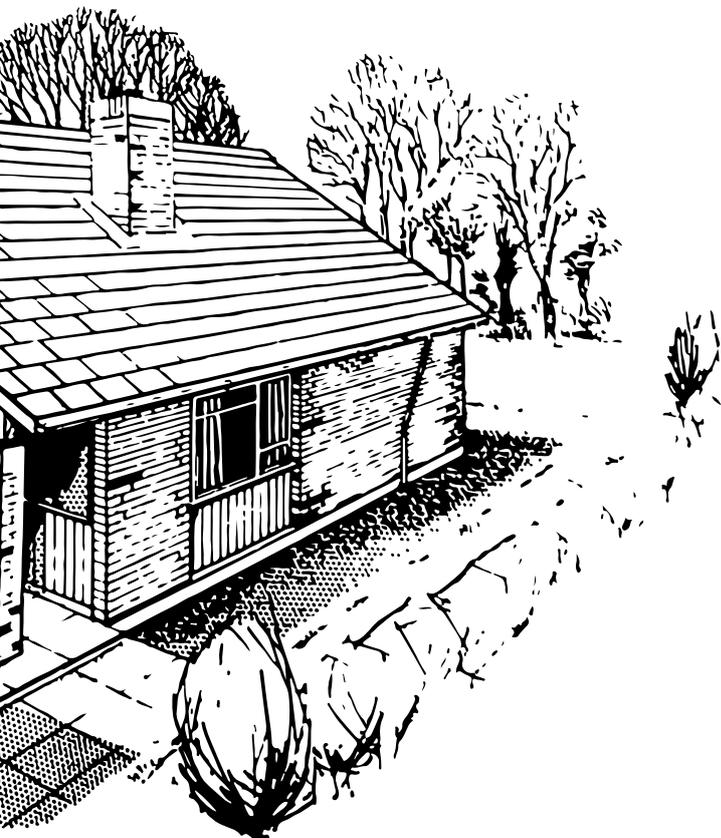
John Brownrigg, 1961



assured Mrs. Brownrigg that she could have a home in three months with an ability to have it re-erected anywhere in the country at a future date for an unprecedented economical proposition. Brownrigg, who had recently purchased land, a deserted quarry in Guildford inlaid with unique qualities of topography, was attracted to the quoted price of £1,750 for the home. Working in conjunction with the architect as client and expert, they built the house, albeit at a longer time frame and higher cost, to his specification. The successful venture was closed with some critical remarks by the client architect, and in response, Cedar Homes expressed their desire to work together in the future.²

James More-Molyneux (1920 – 2013) of Loseley Park was the founder behind Cedar Homes. He had started his construction venture after World War Two when he became interested in the idea of mass-producing flat-roofed concrete houses to help solve the wide-spread housing crisis. Through further investigation with a design in mind he found it unfeasible for mass production and turned to providing simpler units and products, forming Guildcrete Limited in 1947.

The development of their concrete products, although successful in the short-term, would not satiate More-Molyneux initial ambitions. From 1949, the company received several farm building enquires, ranging from piggeries, poultry houses to fences and gates. This required several business visits to Scotland, where More-Molyneux witnessed several timber houses built for forestry workers



ABOVE

The South America Line sketch by John Brownrigg

using construction methods rooted in Canadian ancestry. It took till 1955 to develop the first timber bungalow and for his first step into the residential market. Initially operating as a subsidiary department, the timber bungalow operation grew to become its own company, Cedar Homes Ltd in 1958, under the full ownership of More-Molyneux.³

His visit to America in 1959, where prefabricated housing had become the fuel to power the American suburbia phenomena, brought forth an embracing of American progressiveness. Scott Brownrigg & Turner were subsequently appointed, with Brownrigg as the lead architect, who had also been to the States and understood what his client was aspiring to achieve - designing a new line of timber bungalows, marketed as The America Line. The first typology, *The Long Island* as it was called, used the same framed prefabricated construction system as the previous designs except for the added external brick skin, a vital addition for overcoming the prejudice from local authorities and insurance offices. The sketches and new rectangular plan shown in *Figures 01 & 02* overleaf, provided an efficient compartmentalization of living spaces only overshadowed by the innovative speed of construction and diminished costs to the consumer. Its name undoubtedly was a contributing factor to its success, which not only related to the timber prefabrication but also to the layout of the house itself which saw the plan prioritize communal spaces with kitchen, dining and living

integrated in an open plan format, triggering a strong sense of progressiveness that people associated with America.⁴

The design incorporated special features including a Cathedral ceiling in the living area and large picture windows. Sliding doors that led from the dining area to the garden were entirely glazed, bringing the outdoors indoors. The kitchen itself was packaged with space saving cupboards and modern appliances meant to appeal to the modern housewife. In terms of the external aesthetic treatment, choice was a staple of the America Line, with a selection of bricks, blocks and stone available to builders and owners to help broaden the imaginative scope of the typology.

These were big improvements compared to the predecessor line of Cedar Homes, whose layout appear to be a simple scaled version of the bungalow layout used directly after the war in response to the housing emergency. Primarily organized by a centred entrance leading to an enclosed hall with a short but wasteful corridor leading to the bedrooms on one side, and on the other side, a door bringing one into the living quarters, where kitchen and living room would be separated.

Brownrigg showed a drastic improvement in quality of approach and spatial efficiency by offsetting the entrance to the corner of the short side, replacing the traditional entrance hall with a porch, another American association, to provide the transition zone into the dwelling. In terms of the materialization of house type, the architect was meticulous in detailing the house so that high-quality finishes were expressed where he specifies the positioning of the cedar cladding below the window and for the gable. A simple alternation, but one which helps distance itself from its uniformly clad predecessor. He also advocated strongly for proper external treatments and spatial organization in the immediate vicinity of the bungalow, as he believed this would distinguish Cedar Homes further in terms of customer salesmanship.⁵

Within a few years, the success of the design fuelled several larger and smaller units to be added to the range and exploit a growing demand, which saw over a thousand houses being rolled out across the United Kingdom. For example, Brownrigg bungalow designs included; the *'Chalet'*, one of the smallest designs with three bedrooms in a compact two-storey arrangement with an attractive double height ceiling space in the living and dining areas; the *'South America Line'*, a completely new range of L-shaped bungalows for added luxury appeal, it accommodated between 3-5 bedrooms and benefited from higher end finishes, such as floor to ceiling glazing panels. These designs are illustrated in *Figure 03* and *04* overleaf.

Apart from supplying several designs to supplement the housing range of his client, Brownrigg was particularly interested in the planning implications on the wider scale addressing his concerns and solution in a series of articles written for Cedar Homes and Guildway News, an internal company newsletter. The predominant mode of planning for residential developments up until then was to assemble as many dwellings side by side on a given plot at minimum layout costs. Brownrigg established a strong reactionary stance towards such development with a clear understanding of its economical underpinnings and social context. His writings helped clarify what he perceived as wrong with current building

outcomes, provided context of the post-war housing crisis and acted as a sort of guideline for the next step in scaling the prefabricated dwelling units into better planning layouts.

Through these articles, Brownrigg provides an insight into an alternative perspective to mass housing for density centred on the value of variation in architecture. Brownrigg's criticism of the 'cheek by jowl' approach to estate planning, a highly established pattern across the face of Britain, stemmed from its inability to break its pattern of uniformity, showing no consideration to approach, orientation, site topography and modern requirements. He acknowledged that the pressures to supply housing under strict economic conditions played a major role in the monotony of the building stock as well as a fundamental craving for land-ownership by the mass. Given the strong traditional relationship between ownership and land, combined with a lack thereof, he saw it as a duty for everyone involved to preserve it as a commodity and reintroduce landscape as a quality of environment which had been lost in modern Britain. The architect made it clear that qualities related to landscape were missing and had little to no leverage in current site-layout practices.⁶ His criticisms can be viewed as valid when taking the perspective of countryside traditions as aspired by the Arts and Crafts movement. However, he was by no means constrained by these morals in his work with Cedar Homes, otherwise his contribution towards industrialised prefabricated housing would border on complete irony. The urgency for densification in housing combined with the potential of what his client had to offer held a pragmatic premise for his exploration into site layouts.

Brownrigg's main aim in his approach to densification of site layouts using the America Line as building blocks was to achieve a sense of informality and individuality to improve dwelling quality. His initial approach prioritised the repetition of a type of house provided the layout reacted to the natural topography of the site and that layout arrangements varied given the dwelling typology.⁷ The cluster layout was a simple proposal he put forward to improve the housing quality of individual Cedar Home units by arranging them in a group around a courtyard with an open side for access, as shown in the diagram below. Such an arrangement provided a pleasant outlook for each house and mitigated outward views of the roadway as well as noise. It also had provisions for communal garage space, which could aid in enclosing the central space further and declutter the natural environment by storing cars in a specified communal

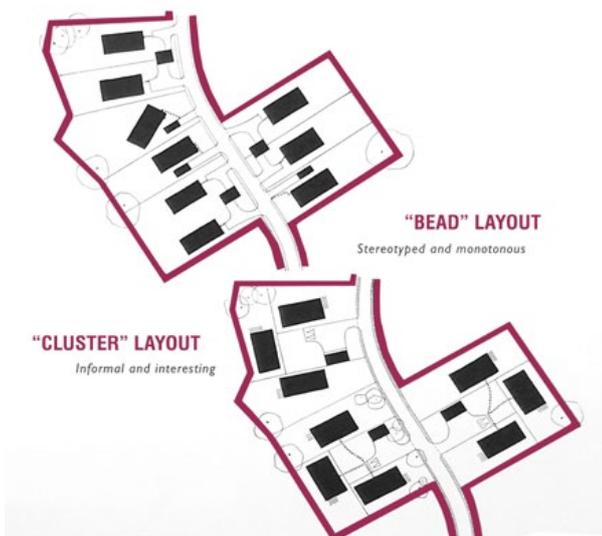
zone rather than on the street. Brownrigg argued that these alterations made more space useful, compared to the traditional layout, which meant neighbouring windows facing each other between narrow unusable strips of land.

In addition with layout, careful consideration to natural features was incorporated as a guiding principle as a way of giving each cluster an individual character derived from the site's environment. It was advised to keep it simple and work with what was present on site to provide an unencumbered area with a tree or two, a well grouped and aligned set of shrubs and a small area allocated for a flower bed. Paving and lawns could be used in the central space as way to demarcate ownership – an aspect Brownrigg acknowledged was sensitive given the prejudice of joint-ownership in Britain – in order to avoid slicing the space up with fences and hedges.⁶ Consequentially, with a natural feature here and there, a resulting minimalism was born, which Brownrigg argued provided maximum perception of open space and rural qualities. The layout was first tested and applied in 1964 for an estate development on Holland Park in Cheveley, a tiny rural village in the county of Cambridgeshire, using the primary unit from America Line range. A total of eight clusters scatter around the plot, accessible via cul-de-sacs that run from the main road, in a contrasting arrangement to the plots in the north, which maintain a traditional 'bead' order.

As Guildway grew with an expanding catalogue of houses, Brownrigg was able to provide an additional layer of variability to his site layouts by mixing different types ranging from three-storey to single storey dwelling, each accommodating spatial requirements for different demographics. It reinforced his ideas on individuality and boosted his crusade on monotony. He maintained that the site layout should react to topography and natural features and design for an arrangement that pertained to the requirements of the accommodated.⁷

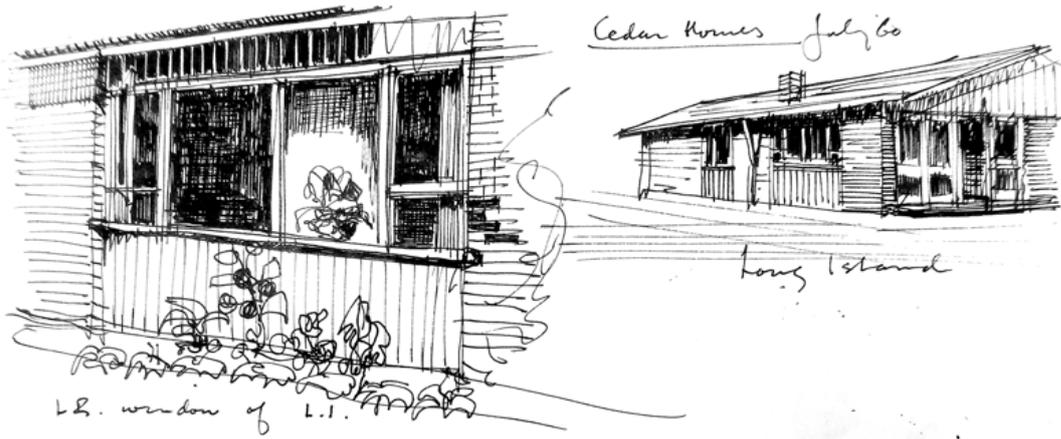
The range of bungalows produced by Guildway represented a successful adaption of timber prefabrication in mass housing; it cut costs and construction time making it readily available start satisfying a growing hunger for housing while sustaining several degrees of quality by providing modern spatial requirements and a psychological sense of progressiveness, popularized by American culture.

Brownrigg's role was crucial in the design of the bungalows as demonstrated by the improvements he was able to offer from Guildway's previous range of bungalow, which used the same construction system but whose design did not offer anything new other than in size and material in the post-war bungalow market. With the success of the product, Brownrigg was able to use it in an exercise of high-density low-rise developments site layouts to explore how questions of human wellbeing could be addressed in denser layouts with his overarching convictions of establishing place and individuality. The work he carried out with Guildway from 1959 to 1965 can be regarded as an early and alternative example to densification approaches of the time with clear roots originating from the American approach to housing. but also with Brownrigg's local influence and reactive stance on traditional site layout ●



1. Arcon prefabricated housing, 2018
2. Scott Brownrigg & Turner, 1964
3. More-Molyneux, 1962
- 4 Cedar Homes, 1961
5. Brownrigg J. A, 1961
6. Brownrigg & Blower, 1963
7. Brownrigg J. A, 1963

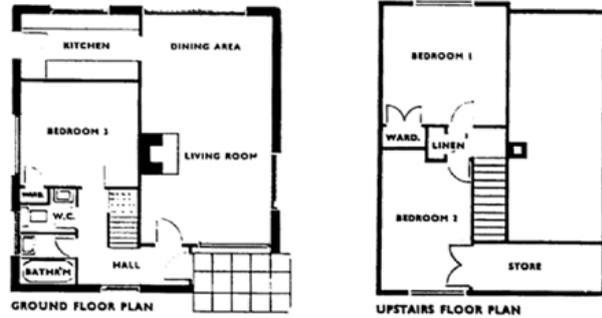
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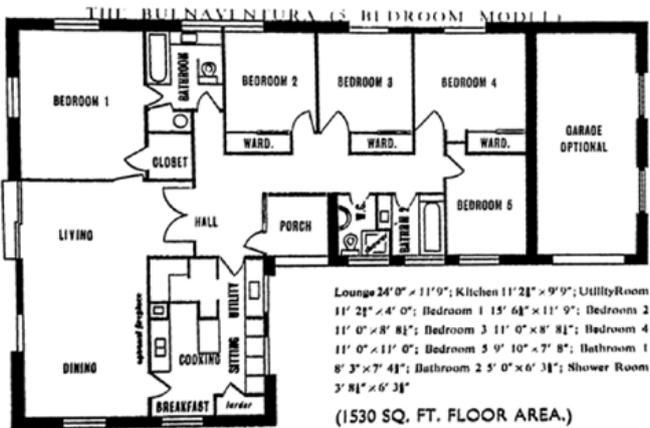
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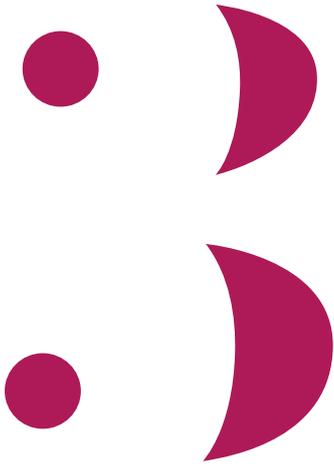


04



ABOVE

Figures 01 & 02 The Long Island | Figure 03 Chalet | Figure 04 South America Line



Building Study: From Weissenhof to Vista. Scott Brownrigg's contemporary take on European Modernism.

How have stylistic gestures affected the perception of the contemporary UK housing market and is there an answer to the style versus substance debate? Alistair Brierley explores further.

Following the First World War, economic circumstances meant that architectural extravagance was no longer realistic. In response to this, the Deutscher Werkbund, a German association of artists designers and architects commissioned leading architects such as Walter Gropius, Peter Behrens and Le Corbusier to showcase a new domestic architecture of 'modernity'. The completion of the Weissenhof Estate in Stuttgart would mark the start of the Die Wohnung (The Home) exhibition of 1927, allowing patrons to personally experience a new vision of society through architecture based around the ideals of reducing costs, simplifying housekeeping and improving living conditions. Up to this point, for much of the 1920s, the creative world had been led by the art nouveau movement, but such ornate decoration was unceremoniously dumped by the Modernists who promoted functional architecture using simple geometric forms.

In essence, The Weissenhof Estate was an international showcase of residential prototypes that later became known as the International Style of architecture. Comprising twenty one buildings containing sixty one dwellings, and designed by seventeen architects the estate was envisaged and curated by the German architect Mies van der Rohe. In fact, he selected the architects, budgeted and coordinated their entries, prepared the site and oversaw construction. Le Corbusier was awarded the two prime sites with the largest budgets and closest proximity to the city. The twenty one buildings varied slightly in form and consisted of both terraced and detached houses and apartment buildings. The aesthetic was consistent. Commonalities were the simplified façades, flat roofs used as terraces, ribbon windows, open plan interiors and a high level of prefabrication which enabled the project to complete in five months. The selection of Le Corbusier was a recognition by Mies that the exhibition would lack credibility



ABOVE

The Weissenhof Estate, Stuttgart

without his influence which had grown as a result of the publication of his ideas in *Vers une Architecture* and *L'Esprit Nouveau*. All architects were given schematic guidelines for the location, size, budget and programme for each dwelling, but were disappointed by the preliminary design proposals from most of the architects including Le Corbusier. Budget concerns grew with the fear of cost overruns and code violations, and initial designs were reduced by 30% in terms of area.

The 63 apartments in the 21 houses were designed for the modern city dweller from blue collar workers to the upper middle classes. This was a socialist alternative to the contemporary slum housing suffered by the poor. As well as showing a radically new architectural style, an alternative way of living was promoted. Spaces were light and bright with tranches of verdant landscaping around the buildings to promote healthy living. New construction was also on show with the use of steel and concrete frames and prefabricated components. Weissenhof was wildly popular receiving 500,000 visitors in 1927, but subsequently fell into disrepair before popular opinion once more swung in its favour. By the early 1980s it had been restored and still provides clues to the ideologies and excitement that were proposed nearly a century ago.

As such, even though many designers and architects turned their focus towards mass housing schemes, few of them were ever completed. The housing plans were not always practical, and flat roofs, external staircases and glass walls offered little protection against the elements. Some proposals were denounced as crowded, stark and unsuitable for families or workers in need.

What did endure from the intense interest in experimental housing in the interwar period was the standardisation of the building process. New construction techniques relied on steel, concrete and glass rather than the traditional materials of stone, brick and wood. Architects admired steel for its tensile strength, concrete for its resistance, and glass for its ability to transmit light. They sought innovative and expressive ways to reveal these properties. There was a newfound emphasis on ventilation, hygiene and the benefits of sunshine. Proponents of healthy living embarked on campaigns to divulge the health risks of previous housing typologies and favoured roof gardens, a lack of clutter, large windows and open-air spaces. Substandard housing was linked to tuberculosis, influenza and disease and housing projects aimed for rationally designed hygienic buildings.

Stark, white homes, clinical environments and rigorous geometric plans didn't enchant everyone. Opponents criticised the loss of human warmth in the sterile exteriors of modern design, whilst others felt that the clarity and originality of the concept imbued it with both spirit and beauty. As Modernism disseminated from its European origins to become a widespread international phenomenon, each country began to put its own vernacular twist on the movement.

The British more than any other nation struggled to accept the values and aesthetics of the International Style. Broadly, wider mainland Europe accepted the premise of form and function expressed as unadorned white space. Expressionism crept in via the like of Hans Scharoun and Eric Mendelsohn in Germany, Alvar Aalto in Finland and the Amsterdam School led by Michel de Klerk. In fact the Dutch version of social housing would not look out of place in the UK and was closer in terms of a quirky and tactile use of brick and tile. There was an emphasis on craftsmanship here that saw the architects use a variety of differently profiled bricks, and despite the integration of decorative forms remained clean and simple. Wrought iron elements, usually painted black (or very dark green) were used as functional elements, and elaborate yet sober carpentry, usually painted white or green completed the buildings.

It may be argued that the Amsterdam School took a backward step in terms of the Modernist ideologies expounded by Gropius and the Bauhaus. After all their buildings were more closely associated with the Arts and Crafts Movement led by William Morris in the late Nineteenth Century. The adopted notion here was that the skills of the craftsman (for so long threatened by industrialisation and mass production) were to be re-established and celebrated. Architecture was to be free of any imposed style and was to source and use local materials. Where this architecture does converge with the values of the Modern Movement is in the celebration of function, need and simplicity (without spurious ornament) and is encapsulated in the work of Philip Webb, Richard Lethaby and Charles Voysey. Although this movement declined in England after 1900 it was influential in Europe (mainly in Germany) through the publication of Herman Muthesius's *Das Englische Haus* and the creation of the *Deutscher Werkbund* (1907).

It did however have a more lasting legacy in the architecture of the London suburbs. This was primarily driven by the expansion of the railways and saw the creation of the English Metroland. This highly successful formula was a diffused and somewhat two dimensional version of the work of Voysey and his contemporaries, and sold the aspiring urban dweller a romanticised and idealised piece of England beyond the confines of the city. It was easy for the property developers



ABOVE

The Isokon Building, London | Copyright Steve Whitton/Anise Gallery

to associate a rural idyll and village type feel with the gabled and half-timbered look of the Metroland semi-detached with its carefully clipped hedges and honeysuckle around the door.

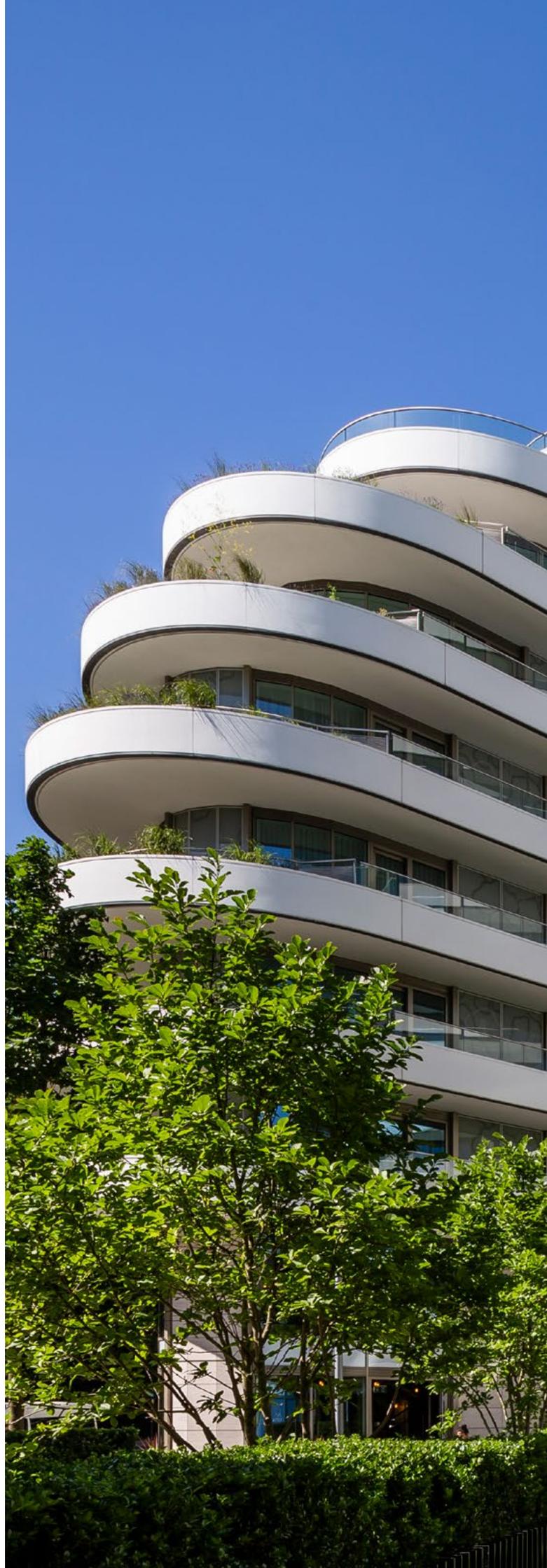
In comparison the austere European parallel with its cubist aesthetic, smooth white walls, and stripped down feel of austerity was not for the British public. Unlike the Germans or the French, the Englishman was used to living on the ground, in a street, and wanted his own front door and porch. Living in apartments was of course part of the British residential equation, but these generally occupied extremes and were either tenements or luxurious mansion blocks and not for the majority of the population. True Modernist dwellings in Great Britain were very rare and that is why the architecture of Wells Coates is still seen as anomalous in the context of the English townscape. The Isokon building in Hampstead embraced Le Corbusier's theory that houses should be 'machines for living in' and demonstrated his theory that with a well-planned kitchen, bathroom and dressing room, one room living should be possible. The building was compared to an ocean liner by the novelist Agatha Christie, who lived there for a time, so clean and striking was the design. However Isokon was ahead of its time and won second place in *Horizon Magazine's* Ugliest Building competition in 1946, a demonstration of how uncomfortable the public felt about such architecture. Continental imports by Berthold Lubetkin and Erich Mendelsohn were also realised in the UK but were once again rare and mostly for the cognoscenti.

The big leap of faith that was taken in terms of Modernism in England occurred with the new Brutalism of the 1950s, 60s and 70s. The big difference with the earlier counterparts from the 1920s and 1930s was the sheer scale and ambition of

these projects and the fact that this was social housing funded by the state. The needs of this period in terms of demand are now even greater than ever, but the political landscape and the ability to make public housing a core component of the welfare state dissolved in the late 1970s when the government took control of housing policies. Brutalist buildings remain the most viable manifestation and embodiment of the post war belief in the common good, and progress towards a country that is more comfortable and affluent for all, irrespective of wealth or class. Of course there were successes and failures, and many iconic buildings have not survived whereas others have been recognised by the architects and critics who have resuscitated and inhabited them. Erno Goldfinger's Trellick Tower is a powerful reminder to London of how such heroic architecture could succeed and bring high quality living to high rise social housing. However this is a rare example and won't find much support from the general public.

In conclusion, it is worth considering the legacy of the enduring picturesque sentiment that has predominantly led the English taste for their homes. Recently it has (more often than not) been the case that a thin veneer of stylistic gestures has fed into the residential equation, particularly in terms of applied porches, gables, hung tiles and applied timberwork. This however, is changing with the primary need to create smart buildings that respond positively to increasing densities, modular construction, global warming, and thermal performance, refuse and traffic management. The extreme nature of Bauhaus Modernism was always going to struggle, not only in England but also across Europe, whereas the clues to the new modern vernacular were born out of the Arts and Crafts Movement and in turn the work of the Amsterdam school. Clever use of brick, ceramic trims and entablatures, elegantly pitched roofs, expressed flues and a real depth to reveals and openings all borne out of both vernacular tradition and real functionality are entirely legitimate.

An interesting blend of the Modernist tradition of clean white architecture with a more crafted approach can be seen in Scott Brownrigg's recently completed Vista building in Battersea. The elegantly stacked white bands of the linear balconies and the recessed glazing is a nod in the direction of Wells Coates' Isokon building and has the appearance of an enormous liner docked on the eastern boundary of the park. Sinuously expressive, the swaying recessive curves that rise above the Battersea tree tops are also suggestive of the work of Hans Scharoun and Alvar Aalto, and stand out as refreshingly different to much of the more rectilinear stripped down classicism that has become a large part of the London residential vernacular. Buildings such as Vista are very precisely site specific and are able to acknowledge and respect their physical and cultural context. This wasn't always the case with the mass housing ambition of the early Twentieth Century, and demonstrates a more tactile and humane approach to envisioning and building desirable homes in a strong and coherent architectural language ●



RIGHT
Vista by Scott Brownrigg





Pure Research: The British and the Picturesque.

Reflections by Alistair Brierley on how nostalgia and sentiment have influenced popular taste in residential design and how architects are seeking to address both the style and substance of contemporary housing models.

An affection for the picturesque has long been part of British mass culture and has had widespread influence across the design and production of our housing and our individual choices in choosing and making a home. There have been strands within British residential design that have veered away from this ornamented style but generally these have been for the avant garde and the privileged. The Eighteenth Century saw the development of a neo-classical residential model as exemplified in the terraces and villas of Bath Spa. Although significant, this movement was nothing compared to the size and power of the Beaux Arts City projects and theoretical approach of the French. Besides the stripped down aesthetic of the Parisian Grands Projets, the architects and town planners made sure that the legibility and geometries of the replanned Paris reflected that of a modern and contemporary city in 'the age of reason'. Boulevards and squares swept away the complexities of the old Medieval City and clean incisive geometries opened up the French Capital.

London had also undergone changes after the ravages of the Great Fire, but the extent of opportunities that were taken to rationalise and streamline the city were relatively minor when compared to those undertaken in Paris. The series of streets and spaces envisaged by Nash that linked the formal terraces of the 'park' to Regent Street and Piccadilly were a statement of intent that demonstrated to Europe that the English were able to embrace and accept the notion of formality, albeit with a nod in the direction of the picturesque. In London both curves and cupolas were acceptable, as were the less formalised landscaping solutions as seen in Regent's Park. Hausmann in Paris would have avoided these geometric inflections as can be seen in the directness and length of the Rue de Rivoli with its endless sequence of colonnaded arches. Moving on from the stylistic elegance and austerity of the

“ The broad mix of the contemporary model (Metroland 2) comprises a mix of private rentals, homes for sale and social housing underpinned by areas of active frontage in terms of retail, leisure and social facilities. ”

Georgian era we see the rolling out of the Victorian brick-faced terraced house. This overwhelmingly popular formula has survived and is acknowledged as a favourite with the British. The formula of plan and section is coherent and entirely consistent. Relative densities for the smaller dwellings are surprisingly high as can be seen throughout large swathes of south London. The singular variation incorporated into the design formula for both the more modest and the larger dwellings was the 'off the shelf' decorative package. Porches, window surrounds, stone trims, architraves and columns differentiated streets and neighbourhoods imbuing a sense of history and a cultural past long gone. These decorative items can largely be excused as they are usually well integrated into the formula, and seldom seem gratuitously applied or added on. The fact that the brickwork was loadbearing (and not the contemporary veneer of stretcher bond) of the cavity wall allowed for a genuine depth and texture to these façades. Everything was well considered and synthesised into the composition, and these dwellings are still seen across the UK as a massive legacy to the Victorian house builders.

The first Industrial Age (that saw the Victorians change the face of Britain) was both ambitious and forward looking. Anything seemed possible, and nostalgia and a romanticism of the past was not on the agenda. Yes, the antique Gothic and Classical trims that adorned the well-proportioned frames of the Victorian model were more exuberant than their Georgian equivalent, but they still remained modern and a standardised piece of construction capable of meeting the demands of a burgeoning market.

As such, up to this point we see an authentic and robust approach to the aesthetic of the standard British family home. This was all about to change, and was largely a reaction to the crowded and dirty cities of the Victorian age. By now the railways had enabled the rolling out of swathes of housing across the cities of London, Liverpool, Manchester and Birmingham. Cities however were still relatively nuclear and the architecture of suburbia had yet to arrive.

The evolving style was to borrow heavily from the Arts and Crafts movement and its exponents, and was first reviewed in 1946 by J M Richards in his book, *Castles on the Ground: the anatomy of suburbia*. The prime objective of the book was to address the problem of the unpopularity of modern architecture in Britain. The main argument was that people's taste had nothing to do with aesthetics, but was the product of tradition, social values and cultural associations. He wanted to understand the style of the suburb and why it was popular; to elucidate the puzzle of, on the one hand, 'the deficiencies of



ABOVE

Pastures House by CFA Voysey | Copyright Steve Cadman Photography

suburban taste', and on the other 'the appeal it held for ninety out of one hundred Englishmen'. He summed up his position on suburban vernacular by insisting that modern architects 'pay more attention to the expressed preference of the majority, to what people themselves want, not what we think they ought to want'.

In the 1960s Reyner Banham, in his publication *New Brutalism*, described Castles on the Ground as a 'blank betrayal of everything that modern architecture was supposed to stand for', and in an essay, 'Revenge of the Picturesque' - that this was a retreat into the 'debased English habits of compromise and sentimentality'. It is true that Metroland was an intrinsically English invention, selling a cut-price version of that Edwardian nirvana, the country cottage with honeysuckle around the door. While continental architects adopted modernist principles intended for mass habitation, Metroland's house style was nostalgic and individualistic, English Conservatism writ small. Proud new owner - occupiers were urbanites, but the lifestyle they aspired to was pastoral. 'Charming country houses, built of all-English materials,' promised the brochures. Yet Metroland was an artificial construct, as synthetic in its own way as Fritz Lang's *Metropolis*. Even the name was a slogan, coined in 1915 and a rural idyll within the city limits was always a false promise.

Nevertheless, between the wars, Metroland became the template for London's expansion, as the capital swallowed Middlesex, Bucks and Herts and ate into Surrey and Kent. Metroland turned Domesday Hamlets into halts on the new railway, then into vast swathes of urban sprawl. These places, these 'non-places' were defiantly unfashionable, but profoundly English in a way that Art Deco apartments never were. As such the avant garde occupants of apartment buildings by Wells Coates (Isokon in Hampstead) or Highpoint I and II by Berthold Lubetkin were anomalous, exotic and generally for the well off. Their stripped down aesthetic and

horizontal emphasis were in sharp contrast to the endless avenues of mock-Tudor country villas; semi-detached dwellings with steep roofs, bay windows and half-timbered gables.

John Betjeman described Neasden as 'the home of the gnome and the ordinary citizen' and understood the tragedy-comedy of suburbia, championing its beauty and absurdity in verse. In a film he made for the BBC in 1973, the reality of the first Metroland vision was already on the decline, and the film is a wistful epitaph for an England forsaken long ago. Although he found a residential community of 'quiet contentment, a citadel of home ownership and hedge trimming - golf clubs, garden fetes and ladies who lunch' there was already something missing from the original vision.

Fifty years later these suburbs as originally envisaged have almost vanished and Betjeman saw this coming. As he remembers pastures that were once 'bright with buttercups' you wonder how many more meadows will be buried beneath tomorrow's Metrolands. Estate agents Savills have produced a map showing how London's inner boroughs have climbed in socio-economic status in recent years becoming up-market red whilst some outer suburbs have turned a downmarket blue. The Economist has dubbed the trend 'the great Inversion', and the suburbs are absorbing those priced out of central London. Back in 1938 Osbert Lancaster (the influential pre-war architectural critic) predicted they would inevitably become the slums of the future, and it may be that this unlikely prediction is on the verge of coming true. To counteract this eventuality, and to answer the burgeoning need for more homes some peripheral boroughs are working hard to reverse this trend. The broad mix of the contemporary model (Metroland 2) comprises a mix of private rentals, homes for sale and social housing underpinned by areas of active frontage in terms of retail, leisure and social facilities.

It looks like Metroland 2 will resemble other parts of inner, residential London where higher apartment blocks are

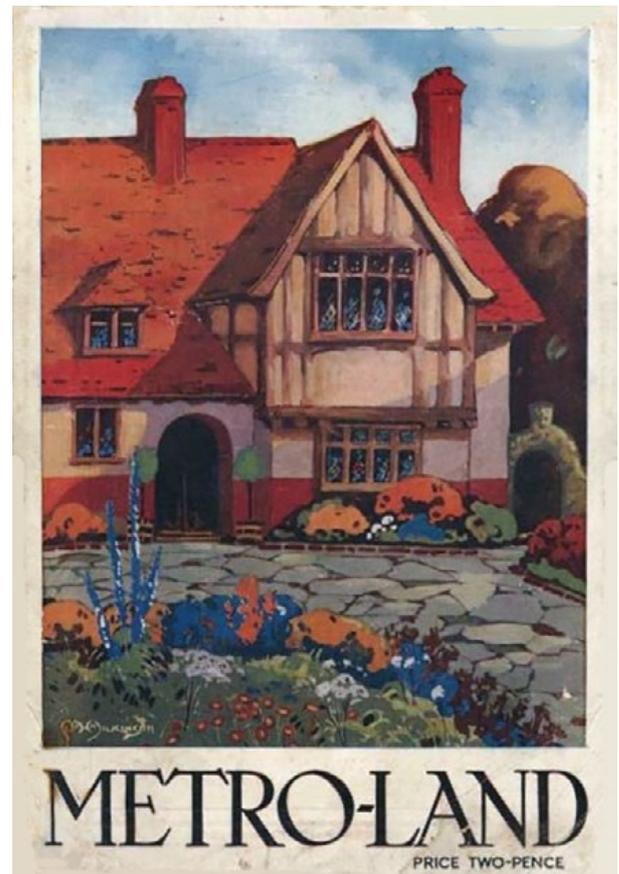


RIGHT

1933 Metro-Land Print Advert

LEFT

Scott Brownrigg's residential high rise 'Culinary Quarter'



introduced to accommodate a shift in tenure type. Private rental in the suburbs has risen dramatically in recent years and this is reflected in the changing morphology of the suburbs, particularly around the original centres and transport hubs of these areas. As saturation point has been reached for four bedroom houses with gardens, brownfield sites within the suburbs are providing a mix of family housing where there is a strategic need to achieve higher densities with some buildings reaching between 15 and 20 storeys. Interventions such as Scott Brownrigg's 'Culinary Quarter' high-rise in West Ealing and mid-rise in Staines provide examples of how a step change in scale, and the utilisation of brownfield sites. Underpinned by permeable and active frontage as well as high quality public realm such projects can prove catalytic in breathing life and energy into the monoculture of low-rise suburbia.

Higher density enclaves that are being introduced into the ageing and somewhat hum-drum building stock and streets of the original Metroland are in a sense enriching and invigorating a tired and compromised typology and adding a welcome layering and complexity to the low rise swathes of crescents and avenues. These interventions when well executed are not the utopian experiments of the Heygate Estate or Robin Hood Gardens, and attempt to address the contextual issues of their surroundings in terms of their materiality, their mix and their relationship with both pedestrians and traffic. To an extent the notion of the picturesque has not survived on the periphery of London, and the re invention of these former suburbs with the new scattering of medium/high density mixed use development is validating the protection of the Green Belt and the further spread of London's boundaries ●



Pure Research: Intergenerational Living

Here Victoria Savage explores the heritage, complexities and social and wellbeing benefits of multi-generational living.

"So have you moved back in with your parents to save money?"
"Actually I'm living with my 90 year old Grandmother instead..."

While this might seem a somewhat random dialogue for some, for many of us young professionals it is actually a far more common current trend than you might first imagine. Think about it, the newly qualified graduate is in need of cheap (or even better, rent-free) digs while they transition into the world of work at just the same time that - two generations ahead of them - their elderly grandparent(s) begin to need extra company and/or care to allow them to maintain their independence and continue to live in their own home. While the proposal of cross-generational living is by no means without its accompanying challenges, it nevertheless still kills two birds with one stone. Or to be more accurate, solves two housing problems with one architectural solution; this mutually symbiotic arrangement allows the former to get a foot in the door of the working world without breaking the bank or worrying about associated financial implications while the latter gains increased company, conversation and a little extra daily care and supervision.

Combined with the umbrella profitability of a maintained sense of independence for both, the more sensible this typology becomes and evidential support can easily be identified in a three-fold combination of current trends; firstly, the percentage of retirees and pensioners as an age group within the average population is increasing, secondly, housing prices continue to rise and thirdly growth of university fees is exponential, bringing with it higher-than-ever student loan debt. This collectively forms a strong argument for the demographic trend in question: houses owned by the older generation shared with their younger counterparts, especially when within families this offsets costs on both sides. From a property perspective it is also a no-brainer to allow younger generations to reap the benefits of paid-off mortgage and halve the living expenses of insurance and utility bills that could otherwise be a financial drain on a single person's savings.

As we find ourselves in an ageing population; one million more people are over the age of 65 than five years ago, and due to growth of medical research and pharmaceutical advancements, with longer life expectancy, we also encounter growing increase in diagnosis of age-related diseases such as Alzheimer's and Dementia¹. Designing for Dementia is in its own right a specialist design skill, regrettably likely only to be in ever increasing demand. Generally, maladies such as these affect a person's ability to live independently as their sensory capabilities decrease, with loss of vision, hearing and balance – not to mention obviously memory - all impacting daily routine and day-to-day living at home.

CUE THE ENTRANCE OF THE ARCHITECT AND THEIR TRADEMARK PROBLEM-SOLVING SKILLS

Multi-generational living is not a new design typology: in Asian and Hispanic cultures it is actually the norm. Architects commissioned to design residences for three generations (or more) can look to Japanese, Chinese and Indian housing layouts for inspiration as care for elderly parents is a key pillar in filial duties for these cultures. In these cultures for example, it is traditional for the first-born son to bring his new bride home to live with her new in-laws so that parental care is paramount in their new duties as husband and wife. The greatest design factors for consideration in such scenarios therefore might well be those of accessibility and privacy; ability for all household members to use and enjoy spaces without worry or inhibition whilst still providing moments of privacy and time alone away to oneself.

Nor is this trend limited to only the residential sector. Le Corbusier famously declared the house a 'machine for living in'² and so other machines are also evolving with the fluctuating demographic; the motor vehicle industry has learned to adapt with a plethora of "people-movers" and other family-friendly models for sale as well as smaller-scale upgrades such as in-built DVD players and screens to entertain children on long car journeys. These vehicles with greater passenger capacity support the multi-generational needs by enabling families to drive both children and grandparents all together. The greater the awareness within the architectural profession of this emerging demographic trend, the greater the scope to hone ideas to address this cultural phenomenon and turn a potential accommodation problem into a timely design-led overhaul of the residential stereotype.

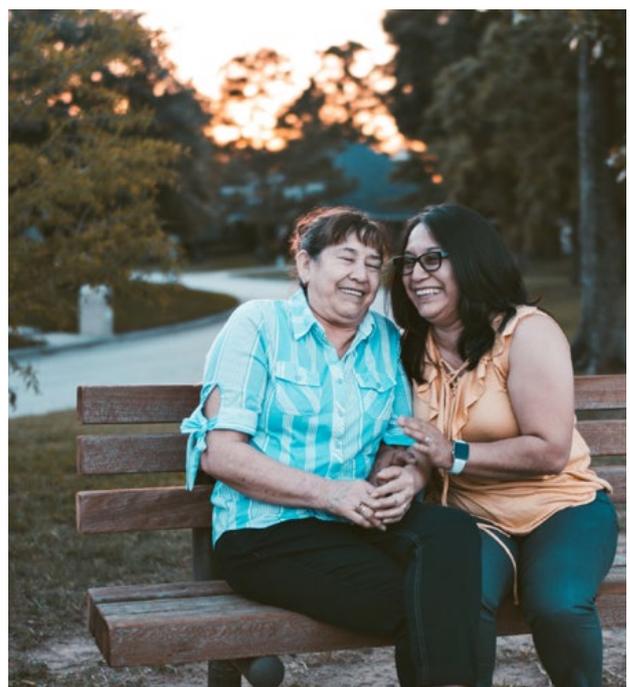
“ Multi-generational living solves two housing problems with one architectural solution... the broadening of social architecture within the family can mutually benefit future generations to come.”

New York-based architect Mattias Hollwich has drawn on his personal experience of living with his elderly Grandmother right up until the day that she passed away in their family home; Hollwich draws on his European upbringing as he seeks to inject the stereotypical approach to designing for senior living with a radical re-imagining of social architecture and likens it to harnessing social media: 'find a way to focus on people's interests, wants, and desires. Don't try to re-educate people, channel their social energy into the right direction [...] and design spaces that allow for neighbours to have the same kind of emotional responses as family members.'³

When exploring the practical needs and personal desires of these user groups, there is a surprising amount of correlation between the two, further strengthening the argument for the mutual symbiosis of their pairing; practically speaking, each would benefit from living in a neighbourhood equipped with efficient public transport networks, convenient location to central amenities, restaurants and reliable medical services. On a personal level, cross-generational living would also benefit both through its provision of relationship building, extended independence, financial support and the peace of mind of enhanced stability and security.

In design terms, this typology would typically be more relevant to retrofit rather than new-build, given the aforementioned argument to keeping property within family ownership, however consideration of how demographically diverse living arrangements could inspire new residential developments – perhaps by way of adaptable modular units – would certainly make for a fascinating study.

So as we have come full circle and return to the home of our graduate and granny, let us be inspired to keep our eyes open and our minds attuned to the future possibilities afforded by the broadening of social architecture within the family and be ready to break the mould for the mutual benefit of copious future generations to come ●



1: [telegraph.co.uk/news/2018/08/07/uk-bottom-league-table-life-expectancy-gains](https://www.telegraph.co.uk/news/2018/08/07/uk-bottom-league-table-life-expectancy-gains)

2: [britannica.com/biography/Le-Corbusier](https://www.britannica.com/biography/Le-Corbusier)

3: [curbed.com/2016/4/4/11360202/aging-in-place-architecture-elderly-new-aging](https://www.curbed.com/2016/4/4/11360202/aging-in-place-architecture-elderly-new-aging)



Pure Research: Architecture and Living: Liveable Cities?

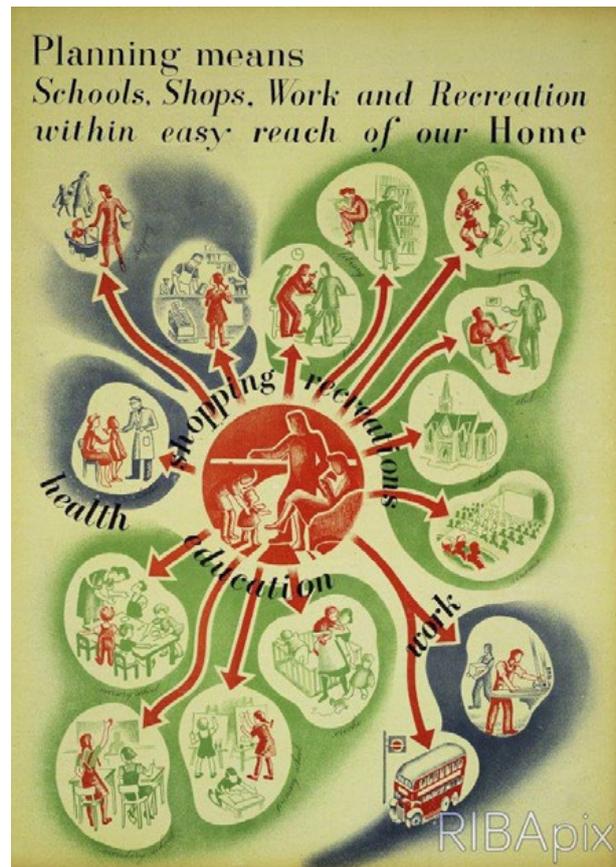
Of the 4 billion people living in urban areas today, nearly a third of them are children. It is estimated that by 2050, almost 70% of the world's children will live in urban areas*.

Helen Taylor on Liveable Cities meeting the needs of children.

During World War II Erno Goldfinger presented his vision of the reconstruction of a post war Britain in a series of exhibitions mounted for the Army Bureau of Current Affairs (A.B.C.A.). In the 1943 ABCA exhibition entitled 'Health' Goldfinger proposed a blueprint for improved housing, sanitation, working conditions, schools and diet. The RIBA Photography collections include the images he developed intended for use on an exhibition display board. Images of families, and schools, and children are integral to this vision.

Confirming this vision 50 years later, in 1996 the second United Nations Conference on Human Settlements (Habitat II) passed a resolution to make cities liveable places for all. The Conference declared that the wellbeing of children is the ultimate indicator of a healthy habitat, a democratic society and of good governance. The provision of education opportunities at the heart of cities is key to children's wellbeing. Alongside policies and plans to manage urban growth and ensure access to infrastructure and services, architectural design can play an important role in addressing barriers to participation in education.

UNICEF point out that, alongside access to early year, primary and secondary education, access to "positive, welcoming and safe learning spaces." is crucial.¹ This is necessary to overcome cultural and emotional barriers to participation in education, including fear of institutions, shame regarding economic status, a sense of alienation, and lack of confidence, and to developing a range of capabilities through education.² Providing this kind of access is a matter of school culture and teaching practice but it is also a challenge for the design and construction of urban schools. Educational spaces can be far more than mono-functional institutions when woven



ABOVE

1944 Erno Goldfinger illustration demonstrating the advantages of having facilities within easy reach of the home

into the social and material fabric of communities and their needs, particularly in high density environments.

Concern about building vertical schools needs to be considered in the context of children's experience. Many of our children already live in high rise accommodation or large scale development. Educationalist Dr Sharon Wright comments, 'over 15 years of working with young people on school design, many have looked at me with bewilderment when asked for their views on high rise schools and whether they would feel safe with, for example, open balconies or upper floor learning terraces. They ask me why those spaces would be any different or less safe than the high rise homes they live in, or the shopping centres they regularly visit. It's hard to argue with their logic!'

City centres are changing. While lack of space is currently an issue, new opportunities are arising through technological disruption. Ride-sharing, car-sharing and soon autonomous vehicles are challenges the dominance of the private car in our mobility systems and the need for space for parking. Entire job types and services- travel agents, department stores- are ceasing to occupy physical space in the middle of a city. Technology could also enable a more fluid use of space for education, and a richer form of teaching and learning. The curriculum model of learning must change to match changing societal needs and wants and the capability of technology. Education environments matter. The adoption of education technology may mean the environment matters in new ways.

Schools add value. When the school becomes a key piece of the community, the real value of creating educational buildings can be realised. This value is not just social but can be a very real financial value to the school itself. The addition of a good school has also been shown to increase prices for



ABOVE

The High Line, New York - transforming a disused elevated railway line into a public park

homes in the catchment area, potentially increasing returns for a developer and further reducing their risk. Schools can become the focal point for a new development, creating a centre that may not naturally arise, around which the community can be created.

Conversely, schools in already desirable areas may be sitting on a valuable asset. The land value of some schools, including their playing fields, is an enticing opportunity to fund a new building and transform their learning environment. In practice, the overwhelming value of housing can skew priorities away from schools. This can lead to schools being overshadowed, squeezed or side-lined, and outdoor spaces, aspect, or both, being severely compromised. While the homes themselves should not be neglected, the balance between the two is where the skill of mixed-use design lies, recognising the value of both.

And while the pressure on development space and land values grow, liveable cities must retain access to and contact with the natural world. A lack of suitable, accessible play areas, increasing time "on line", and a fear of the crime and safety issues, are contributing to children spending more time indoors. A study commissioned by Natural England¹ found that three-quarters of UK children spend less time outside than prison inmates. Research has shown that spending time in nature can improve attention, memory, cognition, sleep, self-esteem and happiness, and reduce blood pressure, anxiety, depression, stress, rumination and mental fatigue. Classrooms with views to green landscapes have significant, positive impacts on recovery from stress and mental fatigue². Schools can play a key role in providing time outdoors and contact with the natural world. Encouraging active outdoor lifestyles and fitness to help counter mental health issues, static screen time and obesity add to the multi-functional positive impact that schools can have within the community and the local environment.

Green space adds value for everyone. Commercial developers are increasingly retaining good quality landscape design and appreciate trees within their proposals, as they have a demonstrable asset value to the development. The reward from retaining existing trees within a redeveloped site will far outweigh those of new planting. A large tree with a trunk diameter of 75cm can intercept 10 times more air pollution and store up to 90 times more carbon than a 15cm diameter tree³, amounting to up to 24% reduction in particulate matter. Trees can reduce temperatures by up to 2°C, through shade and evapotranspiration, and green walls also improve air quality and cooling.

When faced with the design challenge of creating a new urban learning environment, looking for the 'right' answer elsewhere, can stifle innovation. Comparable precedents may not exist. Open minded clients and creative designers working together to develop a bespoke solution can bring forward something new and exciting which works for everyone. These high density challenges provide both opportunity for innovation in teaching and learning and truly bespoke designs that can embed and permeate education and wellbeing into the city. To achieve this outcome, including the school in the design process is crucial. The potential rewards provide value way beyond the boundaries of the site ●

* Unicef: childfriendlycities.org/growing-cities/

i UNICEF, *Education Uprooted: For every Migrant, Refugee and Displaced Child*, Education, New York, UNICEF (2017), pp. 29.

ii Pillay, Jace, 'Experiences of Learners from Informal Settlements', *South African Journal of Education*, 24(1), 2004, pp. 5-9.

1. *Natural England Study*: gov.uk/government/news/childrens-visits-to-natural-environments-new-evidence

2. Dongying Li & William C. Sullivan (2015)

3. McPherson, E. G., Nowak, D. J., Rowntree, R. A., eds. 1994. *Chicago's Urban Forest Ecosystem: Results of the Chicago Urban Forest Climate Project*.



Pure Research: Revisiting Parker Morris? Innovative ways to safeguard space standards.

This discussion piece by Rob Cullen provides thoughts and opinions on residential design standards over the past fifty years. Starting by looking at the aspirations of the Parker Morris standards; he then looks at the period of deregulation of the 1980s and 1990s, and then the current Nationally Described Space Standards, which appear to have a viability driven mismatch in standards between private and affordable dwellings. The second part of this article offers a suggestion for how to address such shortfalls in space standards.

Space Standards for UK residential design are not a new thing and have been around for over 100 years with early example being Tudor Walters 1918 "Homes for Hero's" report and have led to the delivery of reasonably sized social housing across the UK. Such standards have been a key part of planning policy and have been adopted to ensure that quality accommodation is provided.

Since the deregulation of the 1980s, residential design standards have evolved; so now we are finding that there is a conflict between the commercial viability of a development and the provision of good space standards. Here, we take a look back over the standards of the past 50 years and investigate how, with Modern Methods of Construction, quality dwellings can be provided for all tenures.

PARKER MORRIS

In 1961, the Parker Morris Committee met to assess housing space standards for social housing and drew up their influential "Homes for Today and Tomorrow" report. The committee took a pragmatic 'room by room' approach in

developing space standards. Starting with an assessment of what furniture was required within rooms overlaid with an ergonomic assessment of space required to circulate around the furniture within the room and to carry out normal household activities.

The standards were set to ensure that dwellings were comfortably liveable and had adequate sanitary provision, were fitted with heating systems to maintain living and dining spaces at 18°C whilst the outside temperatures are minus 1°C whilst being sufficiently ventilated. Given the backdrop of the awful living conditions of pre-war slum land Britain, these standards were ground breaking insofar that they represented social inclusivity and modernity.

In addition to setting internal standards for living, the framework facilitated architecture for living by providing guidance on space standards, ensuring that rooms had sufficient space for residents to utilise them. Many architects were familiar with the space standards table illustrated in *Figure 01* which was contained in the report.

The 1961 Parker Morris recommendations were mandatory in 1967; and despite being over 50 years old are still considered the best internal related space standards in the world. It ensured that dwellings could be designed to provide good quality of life whilst not constraining the architects designing them. Most significantly, the standard did not overly constrain the designer or the constructor of residential buildings with excessive regulation leading to the delivery of some inspirational architecture for living.

“ Now there is the potential to deliver entire buildings containing multiple dwellings as a series of modular components.”



Least Net Floor Area in sq m	1 Person	2 Person	3 Person	4 Person	5 Person	6 Person
3 Storey House					93.8	97.5
<i>int & ext storage</i>					4.6	4.6
2 Storey House (Centre terraced)				74.3	84.5	92
<i>int & ext storage</i>				4.6	4.6	4.6
2 Storey House (Semi or End)				71.5	81.6	92
<i>int & ext storage</i>				4.6	4.6	4.6
Maisonettes				71.5	81.6	91.6
<i>int & ext storage</i>				3.2	3.2	3.2
Flat	29.7	44.6	56.7	69.7	79	
<i>int & ext storage</i>	2.6	2.8	3	3.3	3.3	
Single Storey House	32.5	48.3	60.9	71.5	79.9	88.2
<i>int & ext storage</i>	2.8	3.7	4.2	4.6	4.6	4.6

ABOVE

Trellick Tower, London | Figure 01 - Homes for today and tomorrow, Parker Morris 1961

DE-REGULATION - WHAT HAPPENED NEXT...

Therefore, up until 1980, British housing design standards were in quite a good place. Unfortunately, it would appear that like many other great Twentieth Century British institutions, standards or inventions... think Concorde, the NHS and the nationalised British Rail System - in Parker Morris we had pioneered a world-leading standard, only then, as is perhaps, very British, to have to rethink it because we couldn't afford it...

Deregulation of housing standards, coupled with 'Right to Buy' and a trend towards private home ownership in the UK led to the emergence of 'viability led' residential development. Throughout the 1980s and 1990s there was a noticeable decline in sizes of dwellings within new-build residential developments. The reduction in dwelling size was endemic to the capitalist climate that had gripped the UK during the 1980s and 1990s.

In the 1990s Section 106 planning agreements were introduced as legislation which sought to mitigate the impact of proposed developments upon their immediate neighbourhood context, and as such it was not an arbitrary system (Alun Evans, Director ROK Planning). Consequently, Section 106 agreements were negotiated so that developments containing more dwellings designed to lower space standards would provide greater monetary contribution to the local authority.

Housing Corporation funding at the time was determined by Total Cost Indicators (TCI's), which provided a means of allocating grants for affordable housing, with dwellings categorised into 'unit type' and 'cost group categories'. Whilst TCI's could not really be considered to be space standards – the bands were too wide reaching – it is clear that the minimum sizes of dwellings had reduced considerably. Consequently, there are large numbers of small apartments, particularly in London from this period.

1993 - TCI BANDS

TCI's became superseded by HQI standards, more akin to the Parker Morris approach insofar that they required furniture to be provided within rooms, and stipulated minimum areas for each dwelling type; once these were overlaid with 'Lifetime Homes' standards, applied to apartment design by many local planning authorities.

In 2010, with the introduction of the London Housing Design Guide, which became more of a 'catch all' were minimum dwelling sizes (based upon National Housing Federation Indicative Minimum Dwelling Areas) applied across all London Boroughs, these standards linked to the HQI standards for furniture provision, and also referenced Lifetime Homes standards:

TCI Bands	
Occupancy (or persons)	Dwelling Area (sq m)
1	25 - 40
2	30 - 60
3	50 - 80
4	60 - 90
5	70 - 100
6	80 - 120
7	100 - 120

TODAY'S CHALLENGE

Therefore, up until 1980, British housing design standards were in quite a good place. Unfortunately, it would appear Fast forward to where we are today... The London Housing Design Guide, and Mayor's Plan Standards have been superseded by the Nationally Described Space Standards (2016), which is arguable a similar legislation to Parker Morris. The 2016 NDSS specifies minimum floor areas, which are based upon the NHF Minimum Dwelling areas as shown in *Figure 02*. The NDSS is however fundamentally flawed insofar that it is an only an optional piece of legislation as opposed to a mandatory one. So are we any further forward than we were in 1980?

In London, the answer is yes – because most London Boroughs have made NDSS mandatory, with high quality development underpinned by high land values. Regrettably, this is not always the case regionally, particularly where land values may not be strong enough to support it the legislation. There are many instances of Local Planning Authorities only partially adopting NDSS space standards for residential development, applying them to affordable housing where there is crossover with the HQI funding legislation. Inevitably, the result of this is that social housing is larger and more expensive to develop than its market sale counterparts, meaning that local authorities and developers are locked into viability arguments. Such cases usually result in provincial, affordable and social housing provision percentages being low, albeit with dwellings designed to meet NDSS standards, whilst market sale dwellings are well below NDSS standards in area terms. So what can we as an industry do about this?

HOW CAN WE MEET THE CHALLENGE OF EXCESSIVE HOUSING DEMAND?

The answer to unlocking the housing standard conundrum could lie in off-site fabrication of dwellings. Pre-fabricated housing within the UK has been around longer than the Parker Morris standards.

In the UK the origins of pre-fabricated housing stem from as far back as 1942, with the Burt Committee set up by Sir Winston Churchill to investigate how to tackle a post war housing crisis, with contemporary estimates suggesting a shortage of 200,000 houses nationally. Pre-fabricated housing of this time had certain limitations, including a width constraint of 2.3 metres so that dwellings could be transported on the vehicles of the time.

The strengths of these dwellings lay in fast construction, and the use of lightweight materials inevitably became their weaknesses. They were, after all, only designed for ten years. Amazingly, some of these dwellings still survive today. Since these early beginnings, off site fabrication has evolved with the industry – through precast reinforced concrete panel systems to steel framed building solutions. A lot has happened since then, our understanding of Modern Methods of Construction and the ability to utilise BIM in the production process are game changers. Ten years ago it was a construction industry norm to fabricate items such as bathrooms and balconies in off-site factory conditions, with these items being delivered to building sites for installation once complete.

Now there is the potential to deliver entire buildings containing multiple dwellings as a series of modular components. If such components are coupled-together, then sized appropriately, they can create dwellings which meet or exceed the areas set out in NDSS 2016. For example a module of 3.6m wide by 7.2m deep satisfies

BELOW

Figure 02 - NHF Indicative Dwelling Areas (IMDAs)

Dwelling Type	Flat or Bungalow	2 Storey House	3 Storey House
1b2p	50		
2b3p	61		
2b4p	70	82	
3b5p	86	96	102
3b6p	95		
4b6p	98	108	114
4b7p	107	117	123
5b7p		120	126

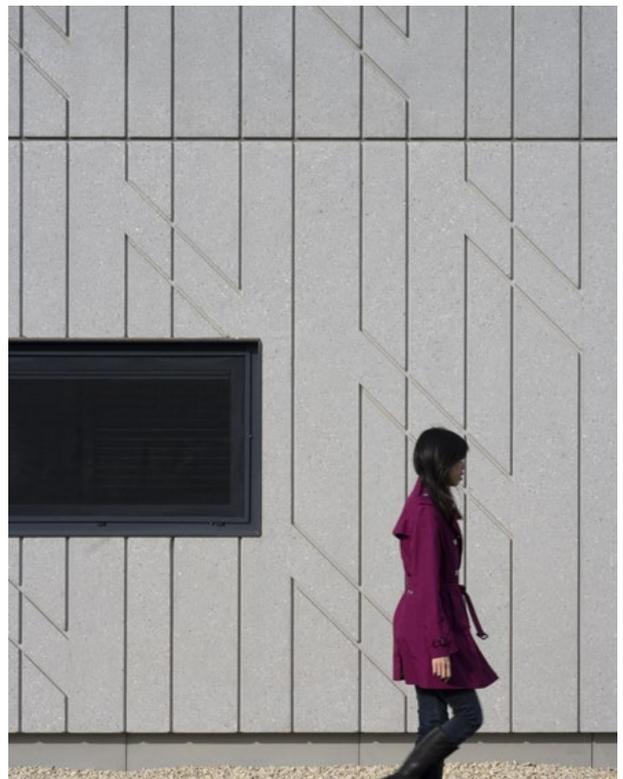
the 25 square metre criteria and can be transported by road. The design of each module can include public health drainage to its rear wall which facilitates stacked services and flexible configuration of layouts. Two such modules may be laterally combined to create a 1 bedroom, 2 person apartment of 50 square metres; three may be laterally combined to create a 2 bedroom 4 person apartment of 75 square metres and four to create a 3 bedroom apartment of 100 square metres. Things are slightly different now, what if the factory for fabricating such dwellings were to be demountable and to be built on building sites? There is potential for entire apartment buildings to be fabricated in factory conditions, as might houses. Once a factory is set up, manufacture is relatively fast and facilitates high quality finishes reducing cost delays.

Standardising module sizes serves two purposes: it delivers economies of scale in terms of tooling for factories, driving costs down whilst facilitating complete flexibility of tenure distribution within both buildings and across wider developments. If modules are sized appropriately, there is the potential for the pricing point of both social and private dwellings to come down so that NDSS space standards become achievable at reasonable costs.

And what about design quality? How does quality of design and contextual variety work with a modular system? The answer is quite simple – the quality of the rooms provided by a modular system can be of a set high standard, as such the dwellings are designed from the inside out. However the places where such buildings are arranged, the built form that they generate and their elevation treatment are still well within hands of the urban designers and architects. Modularity need not mean monotony.

The key aspiration of a modular approach is to provide high quality dwellings for the Twenty First Century; relieving cost pressures on developers and social landlords alike and to afford architects, urban designers and masterplanners to deliver new dwellings to meet standards of which Sir Parker Morris would have been proud.

Of course if economic viability of projects be challenged and smaller dwellings be required, modules could be reduced in size.... But then again, wouldn't that be a shame? ●



ABOVE

Modular Construction by Scott Brownrigg: Project Allenby Connaught / Bodleian Book Storage Facility



Design Process: The Role of the Garden City

The Garden City has much to offer us in the pursuit of experiencing better place. Here Bruce Calton explores a number of critical elements brought together to deliver real change in the way we interact with and live within these new environments.

CURRENT HOUSING DEVELOPMENT CHALLENGE

Increased housing demand across much of the UK, and general undersupply of homes within each local authority boundary aligning with a new local plan period to deliver higher housing numbers from 2020 onwards, has led to a hiatus of strategic and significant land promotion activity.

Spurred on by greater general housing need and the Governments revised NPPF white paper, plus Homes England's enhanced remit to significantly accelerate housing supply across the country, a wave of garden city / suburb proposals are being sought and promoted through the planning system.

GARDEN CITIES – ARE THEY RELEVANT TODAY?

Garden Cities originally grew from the Sir Ebenezer Howard philosophy and vision authored in 1898, with Welwyn Garden City and Letchworth being the earliest examples of the thirteen key developments where the principles were realised. Still highly respected today, they have become models and aspirations for new developments. The challenge facing the industry is how to develop a strategic and architectural response at a higher density than that of the original garden city model, while retaining the quintessential qualities of a high quality and 'green' living environment.

Garden cities evolved in 2007 into New Towns and Eco Towns, with notable examples such as Bicester, North Oxford transforming from its 'eco town' label back to reflect a Garden Town. The terminology 'Garden Cities' emerged once more in 2015 as government favored the notion of green leafy car free streets. Notable examples include Gilston, North Essex, Aylesbury and Taunton. Garden Cities today should



ABOVE

Letchworth Garden City | Copyright Dave Wood: flickr.com/photos/liverpoolpictorial

reinterpret access to social and recreation space, but we face new challenges of transforming attitudes to living close to the work place and access to the wider city by promoting walking, cycling and use of public transport ahead of our ingrained choice of the car as the means to move around a place.

CURRENT IMPLEMENTATION OF LARGE SCALE SCHEMES

Transport, social infrastructure, education and significant housing numbers, in excess of 10,000 units are key features that can succeed or equally trip developments up at an appeal and enquiry stage if failure to demonstrate how the delivery of critical social infrastructure items can be implemented. The socio economic, political and community benefit is key to demonstrate a holistic approach in planning for communities of 20,000-25,000 people brought together

SCOTT BROWNRIGG'S POSITION IN THIS PLAN

Scott Brownrigg are passionately developing a landscape led garden city of at least 10,050 new homes and have had to consider the delicate balance of density demands and Garden City principles. How have we balanced the economics of achieving best value from the land, and characterful



“ The new masterplan considers the positive aspects delivered from reference to history, reaction to what has been built and a future that is more collaborative, healthy, connected, and socially vibrant. ”

garden city place making where the precious release of green belt has been the only way to deliver much need land for housing? We explore from the outset, a philosophy of a landscape led, sensitive, environmental masterplan approach retaining trees and field boundary hedges rich in ecology, to shape communities, and enable local distinctiveness of place reinforced by established woodland and hedge lines. Topography is fundamental to the scheme, informing a SuDs and swales strategy, response to the local context of historic growth patterns and wider linkages to established local centres and town centre rejuvenation.

With new communities growing by 20-25,000 new residents, the challenge is to provide the social infrastructure side by side as homes are built whilst positively promoting easy access to the wider landscape enhancing the health and wellbeing of new and existing communities. These have been critically considered design aspects in the masterplanning stage to the benefit of future residents whilst providing additional benefit to existing communities who we are asking to accept a significant new place to be built alongside their existing setting. Key details of the masterplan elements include:

Sport England 'Active Design' - 10 principles including: activity for all; walkable communities; connected walking and cycling routes; colocation of community facilities; a network of multifunctional open space and fitness activity zones; high quality active streets and spaces; appropriate social infrastructure; active and vibrant buildings; management, maintenance, monitoring and evaluation and active promotion and local champions. Our Garden Community being created provides evidence of all these design and management ideas.

The Garden City movement has led to the **Town & Country Planning Association (TCPA)** developing 12 principles that include; Land value capture for the benefit of the community; a strong vision, leadership and community engagement; community ownership of land and long-term stewardship of assets; mixed-tenure homes and housing types that are genuinely affordable; a wide range of local jobs in the Garden City within easy walking and cycling commuting distance with easy access to enhanced public transport; beautifully and imaginatively designed homes with gardens, combining the best of town and country to create healthy communities that access open space with ease, and including opportunities to grow food; development that enhances the natural environment, providing a comprehensive green infrastructure network and net biodiversity gains, and that uses zero-carbon and energy-positive technology where possible to ensure climate resilience; strong cultural, recreational, educational and shopping facilities in 500m walkable zones, vibrant, sociable neighbourhoods including new co-working opportunities; integrated and accessible transport systems, with walking, cycling and public transport designed to be the most attractive forms of local transport and health & wellbeing of communities and residential districts that have better wellness standards to promote enjoyable neighbourhoods.

A **charter and vision** has been established based upon the strategic masterplan in development by Scott Brownrigg with both the local authorities and master developer. The main objectives are defined by key principles embedded within the philosophy of the masterplan creating: connected green infrastructure; transformative mobility improvements; diverse employment opportunities; vibrant communities; exemplar design; strong corporate and political public leadership; empowering communities; innovative approaches to delivery and active local stewardship. Our task is to take these criteria

and deliver a community that is aspirational, functional, socially and economically vibrant plus a great place to live that also benefits the wider community, enhancing lives beyond the red line planning application boundary. The role of the masterplanner also considers how the economic prosperity of the wider town can benefit through intelligent connectivity of existing local centres linked through streets, paths and public transport routes enabling a flow of residents from outer areas into the core town centre whilst revitalising centres with greater footfall.

The role of the masterplanner is not just to deliver an illustrative masterplan, framework and phasing plan of a 2D plan, but to juggle and interweave the principles, desires and objectives not just of the developer and local authority but more importantly the local community residing in and around the areas – an imaginative balancing act and a key skill in making sure all aspects of community life can prosper with the minimum of impact on the environment, physical and social infrastructure.

The master developer has appointed leading consultant research looking at re-imagining the suburbs; rejuvenating the suburbs through design and density, and design discussions have embraced forthcoming technology considering homes for the future where the car may not be present, or indeed part of the environment plus the evolution of the business campus environment being served by autonomous electric cars requiring charging and storage. In all cases, the aim of the masterplan objectives is to have a much wider beneficial impact on the town or city.

SCOTT BROWNRIGG'S APPROACH

Scott Brownrigg embody a philosophy that is research led to reflect on emerging trends such as the evolution of home working vs co working local centres. These are explored through our new 10,050 home Garden Community and through the key learnings from our commercial sector. Local centres can play an important part in enhancing social cohesion and promoting active participation, in creating mini centers of social interaction rather than the solitary isolation of private studies. The emerging masterplan considers the role of the modern local centre fostering a nucleus for home working more centrally; enlivening the space with business activity sustaining the local shops and facilities whilst generating creative space to be inhabited by people who can converse, interact, and innovate together. The new masterplan considers the positive aspects delivered from reference to history, reaction to what has been built and a future that is more collaborative, healthy, connected, and socially vibrant.

A new wave of five Garden Communities have been announced in April 2019 and receive essential government funding to promote design excellence delivering healthy and prosperous new communities. Our current passion for drawing together all these successful ingredients of Garden Community life has contributed to our project being selected as one of these new Garden City allocations. The hard work now begins, drawing each vital ingredient together enhancing and promoting the best of new Garden City design where the next generation can experience and enjoy a new interpretation of well being bringing back to the fore the original intentions of Sir Ebenezer Howard who reacted to the overcrowding and deterioration of industrialised cities over 120 years ago ●



ABOVE

Letchworth Garden City and Letchworth Centre for Arts Model: a Scott Brownrigg masterplan for a community-focused arts centre.



Building Study: Cambium

Scott Brownrigg's latest residential scheme 'Cambium' provides a sustainable, inclusive community. Maximising site usage, the built form and landscape have been driven by a pedestrian 'domestic scale approach' through a sequence of courtyard spaces and shared surface streets, with an urban meadow at its heart. Here architect Albená Atanassova discusses the scheme in detail.

Following the end of Britain's heroic era of social housing provision and local authority construction in the 80s, the next four decades saw the Government put its faith in the private sector to build homes in the numbers that Britain needed. However the resultant shortfall in meeting the needs of an ever growing population has contributed to a significant rise in property prices. These have rocketed beyond the reach of the younger generation and the UK housing market is now heavily dependent on a handful of volume house builders.

At a time when the Government and the housebuilding industry are concerned about whether we are building enough homes, we should not lose sight of the quality of these homes, and the importance of making them fit for purpose today and in the future. In a rush to build cheaply and quickly, it is easy to think about housing in numbers, percentages, bricks and mortar, but we must not forget our duty of care as to what we are building and who we are building for. Examining aspects of our lives such as new technologies, flexible working and wellbeing alongside spatial standards and comfort are crucial in the creation of thriving communities and inspiring architecture.

The inspiration behind Scott Brownrigg's latest completed residential scheme - Cambium in Southfields, was to produce an exemplary urban environment: a desirable place to live that balances density and usable private space with high quality public space within London; a negotiation between the dwelling and the city. In creating the new development, St John Bosco College originally located on the site was demolished and relocated to its former Surrey lane site in Battersea. Cambium and a further residential development on Surrey Lane, have enabled the rebuild and delivery of the new St John Bosco College in the absence of the originally envisaged BSF funding.

“Cambium demonstrates the ability to maximise capacity on a relatively suburban site, whilst mixing several townhouse and apartment typologies.”

Richard McCarthy
Board Director, Scott Brownrigg





ABOVE

Completed Cambium scheme | All photos © McLaren Construction Group PLC

The 1.25Ha site is located circa 1.5km to the west of Southfields Underground station, and is positioned between Princes Way to the east and Victoria Drive to the west. The site shares a boundary with Our Lady and St Peter Roman Catholic Church.

Scott Brownrigg's vision for Cambium has created a sustainable, inclusive community that incorporates the best principles of quality residential design and delivers a place where people aspire to live and thrive. This exemplary urban development makes use of its 'T-shaped' site, maximising the opportunity to create a vibrant and sustainable new community with plenty of opportunities for residents to come together to enjoy the great outdoors, meet with new neighbours and live life to the full as part of a long lasting community.

The masterplan is mainly east-west orientated and has been carefully designed around a 200 year old oak tree, believed to have been planted by the celebrated landscape architect Capability Brown. This together with an urban meadow forms the heart of the development.

The built form and the landscape are driven by a pedestrian and 'domestic-scale' concept which is achieved by a sequence of courtyard spaces linked by shared surface mews street types; a pedestrian route that runs east-west on the edge of the central green space ensures good permeability and connectivity with the neighbourhood; and there is a balance of landscaped on-street car spaces, drive ways and garages. External routes and entrances are level or are provided with suitably specified ramped and associated stepped access. The masterplan utilises innovative housing typologies which face each other to create a new mews street. This has been achieved within a site which is only 43.1 meters at its narrowest.

The local context offers a rich mix of dwelling types and communities, accommodating a broad age range of people at different stages of life. In enhancing this, Cambium offers a generous mix of typologies; from starter apartments to innovative courtyard houses and more traditional family townhouses. Comprising a total of 110 residential units including a six storey apartment block of 55 one, two and three-bedroom units with car parking at basement level and 55 three, four and five-bedroom houses which are a mix of typologies including townhouses, mews houses, courtyard style houses and semi-detached houses. During the evolution of the masterplan a series of 12 housing typologies were developed

to respond to the proposed landscape, site orientation, the surrounding context and the purchaser market.

The form of the buildings has not only been determined by the relationship and scale of the open space, urban frontage and surrounding existing context, but also by solar orientation. The larger scale apartment building is associated with the entrance to the site, which with the adjacent large scale car parking, is located to reduce overshadowing of the adjacent homes.

For a site with a 50:50 houses to apartments ratio the project exceeds the borough's average density of 40.9 dwellings per hectare. Making good use of the land, protecting the existing trees and adding safe, naturally surveyed, play space accessible to new and existing communities.

PROJECT DATA: CAMBIUM

Architect: Scott Brownrigg

Client/developer: Lendlease

Location: Victoria Drive, Southfields, London SW19 6QE

Borough: London Borough of Wandsworth

Project value: £45m

Tenure mix: 100% private - enabling scheme to fund relocation of existing school to a new site

Townhouses: 21 x 3 bed, 14 x 4 bed, 20 x 5 bed

Apartments: 19 x 1 bed, 30 x 2 bed, 6 x 3 bed

Project size: 1.25 Hectares

Status: Completed March 2019

Apartments across Levels 00, 03 and 04 have private terraces, whilst the remaining units typically have private amenity space with projecting steel frame balconies. The roof is a green roof with a wild flower blanket and paving slab area for mechanical equipment. In addition to a front garden area, each townhouse features garden space to the rear with timber enclosures to house bikes, garden tools and refuse bins.

The apartment block has a covered ground floor car park with 25 parking spaces including two larger lifetime homes bays and eight electric charging spaces. Three further spaces, plus a visitor disabled space are provided to the North West elevation. The development has provision for a club car space to encourage residents to reduce car journeys. With a bus stop on Princes Way, and Southfields underground station a 15 minute walk away, healthy travel options for residents are encouraged. This is reinforced with secure bike storage, walking maps and a one year's membership to a car sharing scheme for every household. Decked terraces or balconies lead into open-plan living spaces, which flow to maximise space and light. The balcony design is a perforated steel panel which reduces any overlooking issues into the rear gardens of other house types. The treatment to the south of the apartment building is slightly more 'open.'

Key aspirations right from inception have been centred on health and wellbeing. This has informed the choice of construction material and open plan layouts as well as ventilation systems and the use of energy saving products. Heating is delivered through underfloor heating and efficient use of energy through an air-source heat pump, connected to a forced ventilation system for the townhouses and through an MVHR located within utility cupboards in each apartment.



This is further reflected in the landscaping of both shared and private spaces to allow natural interaction.

A simple palette of materials including zinc, metal and brick have been used, the latter chosen as the predominant material for its quality, robustness and in response to the local brick detail. This contributes to the design of simple and calm façades, which focus on the detailing.

The site context features a large amount of established planting and many of the surrounding roads are tree lined with mature trees. The landscape strategy aims to enhance the existing 'leafy' nature of the surrounding context and provide a usable, high quality setting for the proposed buildings by using complementary materials to create a sense of continuity. To the north east of the site house types are positioned around a focal landscape courtyard whilst the south side of the site features a tree lined mews.

Designed to Level 4, Cambium follows Lifetime Homes and Secure by Design standards. The environmental performance for each dwelling type has been considered in terms of water usage, materials and construction methods. The development delivers housing options for all stages of life within a tranquil 'urban village' location surrounded by protected parkland ●

KEY DESIGN STANDARDS

Code for Sustainable Homes Level 4
Lifetime Homes and Secured by Design
The Adopted London Plan: (2011)
Interim GLA Housing Design Guide
National Planning Policy Framework (March 2012)
Wandsworth's Core Strategy (October 2010)
Wandsworth's Development Management
Policies Document (February 2012)
Building Regulations 2010

LEFT

Six storey apartment block adjoining mews street

BELOW, CLOCKWISE

Townhouse mews street

Play area and meadow around 200 year old tree

Townhouse block





Design Process: Parametric architectural principles in a residential setting

Here Project Director Anna Kulik challenges the most common use of parametric tools in architecture. Rather than focusing on external skins and a formalistic approach, she looks at setting the parameters to determine the brief and addresses the opportunities and constraints of a site within a residential setting.

IDEA IN BRIEF

Parametric architecture is often referred to when speaking of a particular style of architecture— while it is not limited to it. The key is in the name itself. Parametric architecture is driven by the set of parameters that the designer defines appropriate to achieve a specific result.

Most of the architectural examples recognised widely as parametric use the software for form-finding exercise and generation of architectural skins – façades of the buildings. But equally well, a parametric approach can be applied to a variety of scales. Masterplanning and buildings orientation, apartment-splits within the building, internal layouts generation, even delivery drawings can benefit from parametric tools. Creation of specific tools within a parameter driven environment will ultimately result in time optimisation of architectural design tasks during different stages of the project.

This paper will challenge the most common use of parametric tools in architecture. Focusing on early feasibility stages of design, I will establish some key parameters that may apply to a variety of scales for the residential setting. I will build a simplified version of the tool and demonstrate the logic, the process and the value of such an approach. Have you ever tried to search for parametric architecture? Google “parametric architecture” and you would encounter over thirty-seven millions of images. Most of them would portray a variety of shapes, forms, fluid and/or deconstructive examples of architectural responses in a range of scales, component-based structures, patterned façades.

A large portion of architectural students, professionals, users and clients would automatically think of the architectural projects with a strongly expressed stylistic reference, and/or with a direct correlation to the computer-generated component-based systems. The majority would take the term of parametric architecture very close to what Patrick Schumacher calls “parametricism”. Schumacher claimed it as a new style in his Manifesto written for 11th Venice Architectural Biennale, 2008.

“We might think of liquids in motion, structured by radiating waves, laminar flows, and spiralling eddies. There are no platonic, discrete figures with sharp outlines. Within fields only the global and regional field qualities matter: biases, drifts, gradients, and perhaps even conspicuous singularities like radiating centres. Deformation does no longer spell the breakdown of order but the lawful inscription of information.”

However, the stylistic reference in parametric architecture is only a small sight of it – albeit, successfully marketed - it is not a central focus of its definition. The key to parametric architecture is within its name – it is based on the parameters that are to be defined by the designer to achieve a particular result. In Patrick’s manifesto case, as in the case of the projects designed in his studio Zaha Hadid Architects, those parameters serve the purpose of aesthetical differentiation. But we can define alternative purposes, objectives, fitness criteria.

I find that parametric tools in architectural design bring more value when they are used to break down and layer complexity within the project. Different parameters can be used in various stages. The software becomes a multi-dimensional calculator that can demonstrate a great variety of solutions in a short timeframe. Use of genetic algorithms as a part of this process only increase the amount of possible variations. The parameters are set as Genes and tested, and the Fitness criteria define the objective of what the designer wants to achieve.

With or without the genetic algorithm feature, the designer will set the required parameters, the hierarchical position of those and the desired objectives. Clarity is vital for building a working algorithm. Ultimately, the designer has the responsibility to prioritise one proposal of the generative proposed solutions over the others.

If executed successfully, such an approach becomes a powerful optimisation tool for the design tasks, applicable to a variety of project design stages from early feasibilities to developed design.

“ A parametric approach can be applied to a variety of scales. Masterplanning and building’s orientation, apartment-splits, internal layouts generation, even delivery drawings can benefit from parametric tools. ”



ABOVE

Skolkovo car park, 2017. Parametric façade options - common use of parametric tools in architectural practices

THE BRIEF

To demonstrate the opportunities the tool may offer, I set an example for an early feasibility stage. Let's consider a residential block within a tight dense urban setting and define the parameters that may be important for it. In a non-computational environment, that would be similar to the opportunities and constraints analysis coupled with the overarching ambition for the project.

For testing, I chose the area of High Holborn, where we have previously worked on a feasibility study for a mixed-use proposal. The area of the site is approx. 5,000 sq m; the Client aspires to create 35,000 sq m of space on site. For this exercise, we will only look into the residential setting. If the building was to occupy the full area of the site as an extruded volume, it would reach seven storeys to achieve the desired area.

As a progression for the project, I will look into the overall block mass, moving through towards the appropriate typology and finally looking into the whole mass articulation.

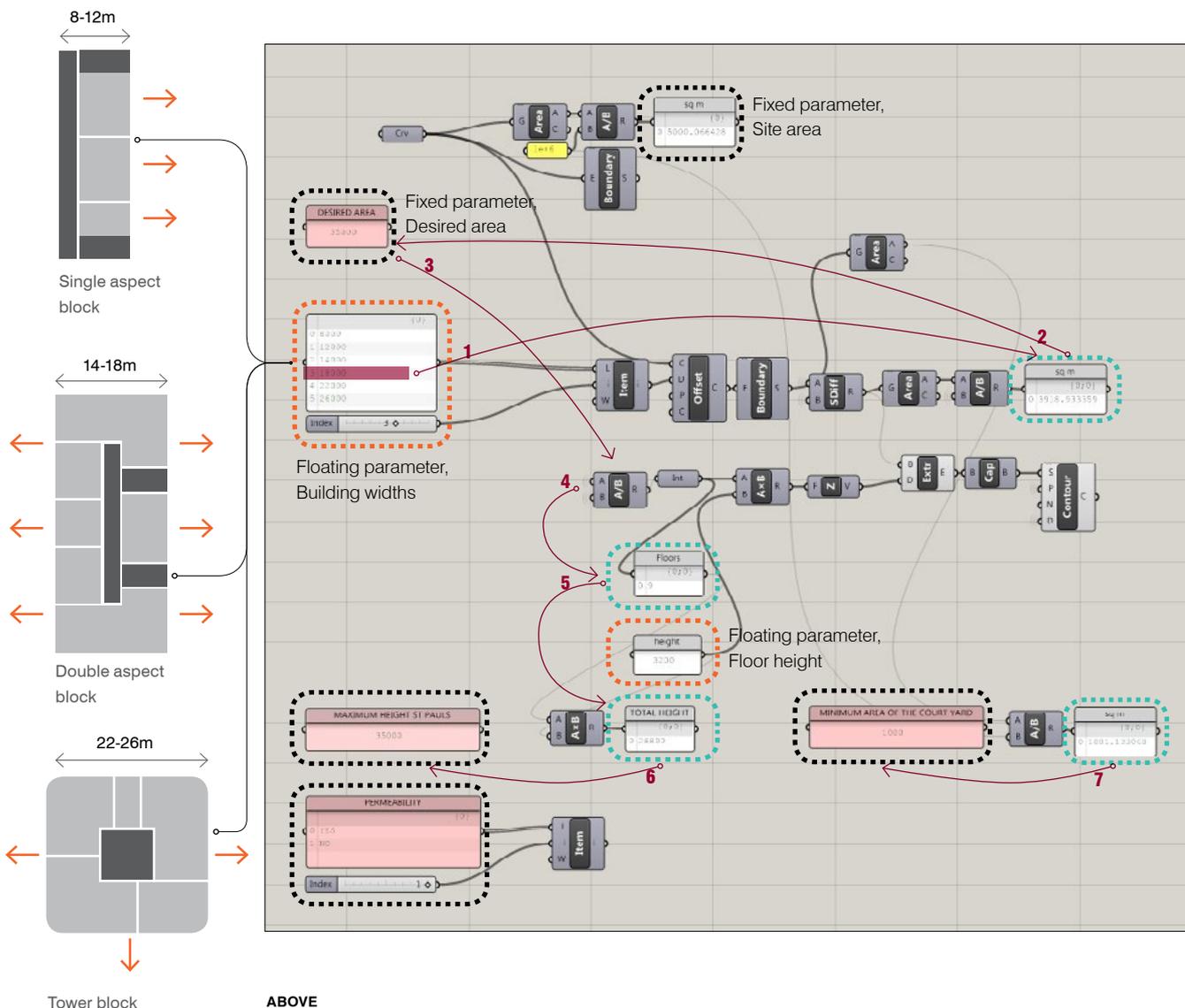
The parameters should be explored three-dimensionally, both plan and the overall massing of the imaginary bounding box that we will be creating.

THE TOOL

The nature of the parameters is the following:

- Fixed (set) parameters are those which should remain constant within the definition. The set parameters are related to best practice guidance, regulations, and our aspirations/targets for the project to achieve. In Genetic algorithms, these parameters are the fitness criteria, benchmark to what the proposals are aiming to evolve. The fixed parameters are highlighted in **black**.
- Floating parameters are the gene pool within the definition. Floating parameter provide differentiation and options for the proposal during the algorithm testing stages. The floating parameters are highlighted in **orange**.
- Finally, resulting parameters are the outputs of the algorithm. Resulting parameters are compared to the fixed parameters – or benchmarked to the fitness criteria in case of genetic algorithms. The resulting parameters are highlighted in **blue**.

Even in the simplified version of the algorithm, the relationship between the parameters and fitness criteria benchmarks can be observed. For example, in the below sequence, shown in the red arrow lines, the width of the block (floating parameter) drives the height of the building to reach the desired area. The width of the block refers to a particular typology, that is suitable for



residential use. St Pauls restrictions dictate the maximum height for the development, so while the blocks are extruded and areas calculated, the resulting form will not go above that line. The minimum courtyard area drives the results of the public space within the block.

The automation within the tool allows testing a multitude of options in a short timeframe. The logic built within the algorithm as constraints eliminate the unfit options.

Similarly, additional drivers can be embedded within the algorithm and re-tested, not requiring an effort to build the system from scratch. For example, if the Client wants to test larger resulting areas, it will result in a minor adjustment to the original definition, and the results will be produced instantly. The level of automations related to the level of sophistication of the created algorithm. The more optimised is the algorithm, the less manual interaction the designer needs to invest in the later stages of testing.

The diagrams on the right demonstrate the tool work in progress and the immediate massing results that emerge from the simplified definition described in the tool section. Parameters are set as shown on the snapshot.

The first diagram demonstrates a simple relationship between the block width offset and the height extrusion to achieve the desired areas. Immediately, the extremes of 14m and 26m are eliminated from the pool of possible results - due to unsuitability to the St Pauls height constraints and minimum viable public space areas.

Second and Third diagrams show the 18m width block as a general offset and test the extra height and floor-to-ceiling levels to maximise area and spatial values for the Client.

Diagram 4 explores the permeability of the block. It is a decision of the designer whether permeability of the scheme is viable for the proposal, or it should be a private courtyard for residents instead. In this case, the value of the public interacting with the development on the ground level through the potential introduction of retail use is considered to be more significant. Overall, the fourth diagram gives us the base scheme, the simple massing that now can be revisited to introduce more variation into its blocks.

With the same constraints attached - St Paul's views, minimum courtyard areas - the widths of the blocks are revisited with the new fitness criteria. While keeping the resulting area as above, the focus now is on a percentage of the south-facing units, 360-views aspect and mass articulation. The above two become the fitness criteria. The diagram shows the resulting option with two tower typologies and an element of single aspect block on the south.

Ultimately, the exercise described above doesn't address any of the aesthetic characteristics of the building yet. Instead, it looks into the maximisation of functional gain for the client, creating a framework for the future proposal in a three-dimensional format. The parametric aspect of such an approach allows time optimisation for the designer to test areas, heights, views and other criteria for the preliminary client discussions. The resulting massing model is a base option and can be further developed to bring additional aesthetic values to the proposal ●

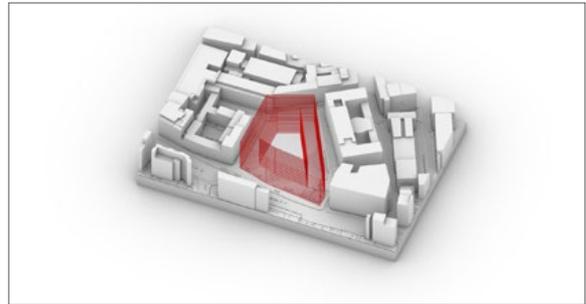


Diagram 1: Floating Criteria, 14m width. Eliminated as over 35m height - unfit to St Paul's heights restrictions.



Diagram 2: Floating Criteria, 18m width. Considered fit. Match the St Paul's height restrictions and min yard size.



Diagram 3: Testing larger area - 40,000sq m - within same height restriction. Considered fit.

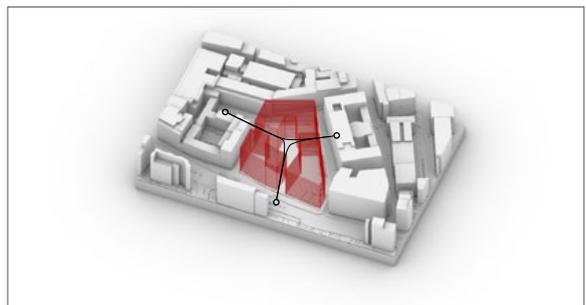


Diagram 4: Testing permeability, but retaining the same area and height restrictions. Considered fit.

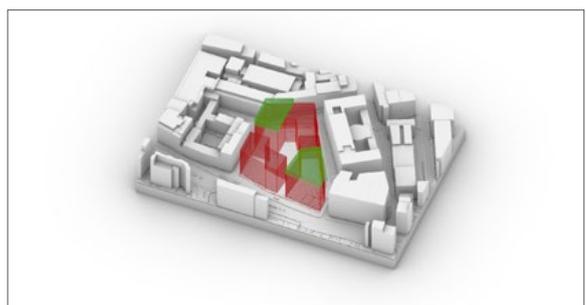


Diagram 5: Introducing parameters of views and southfacing aspect. Mass articulation with areas retained.



Design Process: Volumetric Modular Systems / The Hatch System

Offsite manufacture is a fast growing categorisation within the construction industry, encompassing sub-assemblies, Volumetric and Panelised systems manufactured off site and delivered for inclusion in the works. Here Barry Clarke considers a number of unique issues that Volumetric Modular design needs to navigate, taking as its vehicle its application to multi-storey residential apartment buildings, one of the more usual applications of the technology.

Volumetric off-site construction is where large finished building elements, forming all or part of the desired accommodation are assembled in a factory, and delivered to site complete. Typically they form their own structure and enclosure, and can come substantially fitted out.

Producing volumetric modular designs does however have some unique issues, as it is effectively more product design than traditional building design. This means our thinking, instead of being Design for Construction, needs to be Design for Manufacture and Assembly (DfMA).

MINIMUM AREAS

The Technical Housing Standards – Nationally Described Space Standards provide minimum GIAs for different dwelling types, based on numbers of bedrooms (beds), and numbers of bed spaces (persons), for one, two and three storey dwellings.

Apartments, although in multi-storey blocks, constitute one storey (or occasionally two storey for duplex units). The increase in GIA from one to another are based on the required space for a set number of residents. The incremental changes are complex, but essentially are not uniform.

Ideally, to maintain flexibility and efficiency of manufacture, modules will be the same area, so volumetric modular designs



ABOVE
Stacked modules mid-construction

by their very nature provide given GIA, which increases in discrete increments between apartment types as more modules are added. The result is that whereas the volumetric modular system increases in multiples of a base size, the NDSS requirements do not.

This means that modular apartment designs cannot match the minimum areas for all apartment types. Some over provision will occur. Usually this would have economic consequences, however there is another aspect of modular design that need to be considered alongside this.

COST MODEL

One of the efficiencies of factory assembly comes from the consistency and repetition of task in assembling modules on a production line.

The work processes in assembly of a volumetric module represent one of the most significant costs involved in the end product. Small increases in floor area of modules, provide they do not change the work processes, result in a small increase in base material costs, but not in work process costs.

Stepping outside of this logic to assemble multiple variations in volumetric module size increases work process costs to a degree that out-scales the changes in base material costs. The significance of this is that the fundamental cost per square metre basis of traditional build, where the material and work process costs are applied mathematically to the GEA, do not align with the volumetric modular construction cost basis.

Volumetric modular construction requires a paradigm shift to think in terms of cost per unit rather than cost per unit area.



ABOVE

Module sizes are effectively limited by the requirements of road transport

EFFICIENCIES

Volumetric Modular construction is generally recognized as offering benefits in speed and quality in construction projects.

Although each module is individually fabricated in the factory, and so theoretically each module can be unique, for these time and quality efficiencies to be both practical and economic, the design needs to include a degree of consistency. This enables the most efficient factory assembly techniques to be applied to the process.

This does not need to be seen as a restriction, but can be regarded as an opportunity. Consistency of Module sizes better allows for them to be stackable, and also offers the possibility of interchangeability within the design.

This leads naturally to a model employed by car manufacturers; the Platform Concept. This is where those components that are common to more than one Volumetric Module form a general module “chassis” that can then be tailored with the introduction of more bespoke components to form a complete Volumetric Module. This drives the manufacturing efficiencies that come with production line logistics, allowing common tasks to be carried out as a single stage.

TRANSPORT

A feature of factory assembled constructions is that they need, eventually, to be delivered to site. Typically, this means road transport. It is physically possible to transport very large structures by road, but generally road transport is limited to a maximum vehicle weight of 44 tonnes gross (truck, fuel and load) with a trailer up to 16.5m long and 2.55m wide

(2.9m with overhangs), or a road-train up to 18.65m long of the same width.

Loads over 2.9m wide, over 18.65m long or over 44 tonnes are category 1 loads, and constitute an abnormal load that requires 2 days advanced notification to the Police and Highways Authorities.

Where the load is over 4.3m in width, it changes to a category 2 load and requires an escort vehicle in addition to the advanced notification. Over 5.0m requires a special permit from the Secretary of State, and over 6.1m in width (category 3) requires 5 days advanced notification and a police escort.

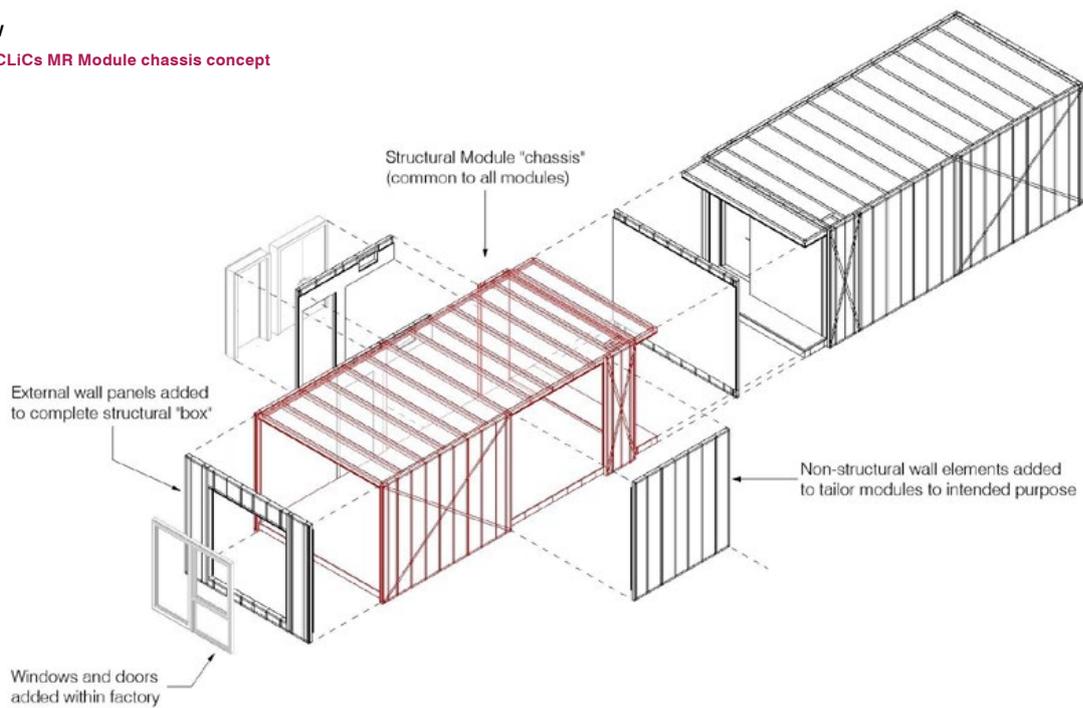
Obviously, as the width of a volumetric module increases, the space planning problems become less, but the costs and associated issues of delivery become greater. Keeping the finished module width (including external insulation and projection of window frames etc.) below 4.3m offers the most efficient solution, but limits the module internal finished width to less than 3.9m, which itself presents a number of space planning restrictions, and militates to at least two modules to form an apartment.

DUPLICATION OF STRUCTURE

There are some inherent cost inefficiencies in a Volumetric Modular design compared to traditional build solutions that cannot be avoided, and need to be accommodated within the proposed solution. For a volumetric module to be stable for transportation and stacking, avoiding deflections the easiest solution is a complete structural box forming a module. In effect a cube of six panels.

BELOW

Hatch CLiCs MR Module chassis concept



Openings (for doors and windows, or to link spaces between modules) need to be limited in size so they do not compromise the structural integrity of the box.

The result is that forming an apartment from more than one volumetric module results in a duplication of structure. At module to module abutments, side wall of one module to side wall of a neighbouring module or floor of one module to ceiling of the module below, there will be two panels within a volumetric modular solution where only one is required conventionally. Whilst not a problem in itself, this also has an impact upon costs.

Trying to void this by introducing larger openings in a panel, of a size that would impact upon the structural integrity of the box, tends to require additional structure (such as welded hot rolled steelwork), which adds significantly, and disproportionately, to the cost.

SERVICES DISTRIBUTION

In order to complete as much of the fit-out of a Volumetric Modular unit in the factory as possible, domestic services distribution (lighting, small power, wet heating systems, sprinkler pipework etc.) needs to be installed within each module, to be connected up once the modules are in place.

A result of this is that the distribution networks are effectively less efficient radial systems rather than the more efficient ring-main systems. Access to make the connections between the modules is also necessary, requiring some aspect of the finished apartment finishes to remain incomplete and for site installation. Although not a major issue, this is something that the system design needs to consider, accommodate, and if possible, exploit.

Similarly, kitchen and bathroom plumbing can be completed in the factory, and the installation can be tested, however final

supply and drainage connections need to be carried out on site. Again this may impact upon the extent of finishes that can be completed, and if not properly considered can undermine the advantages of factory fit-out works.

All of these issues have been accommodated within the Hatch Homes Volumetric system, developed for them by Scott Brownrigg.

THE HATCH SYSTEM

Hatch Homes modular system (referred to as CLiCs MR) forms the basis of a multi-storey apartment building, up to 8 storeys in height, with single aspect one, two and three bed units arranged around a central corridor.

Each volumetric unit comprises of two modules and a section of central corridor, and has sufficient loadbearing wall panels and diagonal bracing to create a stable block when stacked up to 8 storeys high and 8-10 modules long.

Each of the apartment types is made up of a number of adjacent modules within the block, two modules to form a one bed apartment, three for a 2 bed apartment and four for a three bed apartment.

Modules are assembled from prefabricated and thermally insulated wall, floor and ceiling panels, formed from light gauge steel frame studwork, cold rolled from 1.2mm and 1.6mm galvanized steel sheet. The wall and ceiling panels are faced with plasterboard to provide both fire protection and an internal finish prior to assembly. The floor panels are boarded with a plywood and plasterboard sandwich floating floor to provide the required impact acoustic performance.

The modules are a standard size, and are based on a standard system 'chassis' common to all modules, and completed with external wall and corridor wall panels to create a basic structural box. These are then completed with non-structural wall elements, and a fit-out of partitions, doors,

BELOW

Standard sized modules flexibly stacked to create any combination of apartments



dropped ceilings, and architectural feature boxings to tailor them to the required purpose within the apartment. Kitchen, bathroom and utility cupboard are all factory installed and plumbed.

Rooms are arranged as much as possible to sit entirely within one module or another, enabling each module to be completed within the factory as fully as possible, and minimising on-site fit-out works.

Drainage is provided to each module in a consistent location to allow any combination of apartment units on any floor. Internal services distribution is accommodated within partitions, ceilings and feature boxings, to avoid compromising the basic structural chassis while suiting the layout.

Windows and balcony doors are fitted before the modules leave the factory, as is the external wall thermal insulation, and any external leaf support or restraint fixings as appropriate (tie channels for masonry, helping hand brackets for rain-screen cladding, timber cladding, tile hanging and brick slips etc.).

A limited amount of site completion works are required to join the modules (both structurally and cosmetically). Bespoke modules to accommodate staircases and lifts, plantrooms, bin and cycle stores, etc. are included to suit the specific project requirements.

The resulting module "stack" provides the completed internal form of the building. External wall cladding and roofing are site installed, allowing the building materiality to better reflect the locality and client design aspirations •



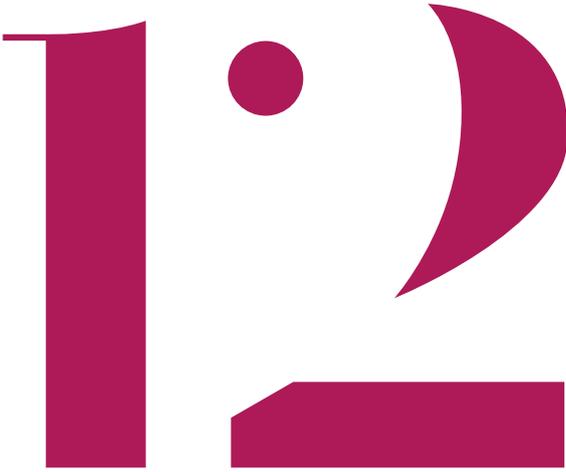
ABOVE

3 module 2 Bed, 4 Person Apartment: cut-away view

BELOW

Hatch CLiCs MR eight storey stable stacked apartment block





Detail: Down Street Mews Façade

Located in a constricted urban context, the Down Street Mews project is the result of exploring the parameters of light, privacy and form in the design process. Here Olga Mikhaleva examines the building's complex glass façade.

The brief was to demolish the former annex building to the Cavalry and Guards Club located within a quiet mews street adjacent to Green Park and to erect a new four storey building with three basement levels for use as two luxury single family dwellings. If the two dwellings were designed as glass boxes so as to let the light flow inside the rooms, the intention was also to explore a way of regulating the degree of intimacy and light in each room, playing an occasional game of shadows.

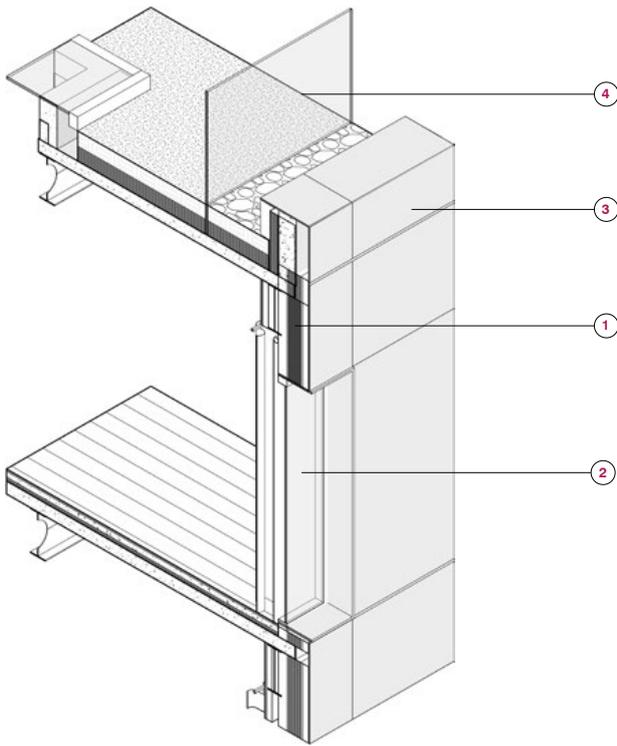
The composition of the façades is an interpretation of Japanese sliding screens made of either white translucent paper, which provides light, warmth and intimacy (the shoji), or opaque paper for privacy and interaction between the out-side and the inside (the fusuma).

Made of one layer of frosted glass applied on both sides of a steel frame, the façade has its outer skin running consistently on all façades whilst its inner skin changes to produce the opaque or the translucent finish required. Only the windows interrupt the outer skin leaving the space fully connected to the outside.

The façade is built with a SIPs (structural insulated panels) with a rain screen of 2x6mm laminated glass with white inter layer 'arctic snow'. For balustrades we used 2x8mm toughened low iron laminated glass, to provide sufficient protection from falling, windows are Schueco system with anodised aluminium frames. Technical details on the opposite page show window with a Juliette balcony and an external rainscreen build-up.

The resulting building form will facilitate the future resident in putting their own stamp on the building. It is however, not a blank canvas; it is a canvas that has many layers that creates a home which celebrates the light and openness achieved in a small space ●





Glass Facade Details:

1. SIPs - PUR 140 (177mm) 15mm inner panel, 140mm insulation, 22mm outer panel with weather guard film fixed to roof screed, structural steel, concrete slab via 3mm galvanised brackets, M12 chemfix screws at 500 centres
2. GC Casement Door – Translucent fire rated 60 mins side jamb fixed to Kerto Q goal posts
3. Rain screen of 2x6mm laminated glass with white inter layer 'Arctic Snow'
4. 2 x 8mm toughened low iron laminated glass balustrades

