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Sam Jacoby, Alvaro Arancibia & Lucia Alonso

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Space standards and housing design: typological experimentation in England and Chile

Space standards are a deliberately technocratic translation of housing experience, use, and demand into measurable minimum floor areas and dimensions by calculating standard furniture sizes, circulation, and activity zones in a dwelling. This paper discusses how space standards register regulatory cultures and affect housing design and perceptions of housing quality from a design research perspective. The definition and enforcement of standards depend on local design governance approaches. Housing standards are of particular importance to the protection of minimum subsidised housing supply in dualist rental systems with differentiated regulations, due to greater inequalities between private and subsidised housing sectors. This is characteristic of countries with neoliberalised housing access. Two archetypical cases are discussed here: England, whose privatisation of council housing is considered exemplary for Western neoliberal housing policy; and Chile, who is seen as the main Latin American neoliberal model. This comparison explores how neoliberal processes in housing relate to space standards, wider laissez-faire housing and social welfare histories, and design experimentation in subsidised housing. It further deals with the common issues of affordable housing in market-driven contexts, such as the peripheralisation of areas with less infrastructures and services, residualisation of social housing tenure, typological stigmatisation or preferences, home-ownership prioritisation, and private-sector support through subsidies. The discussion of housing design and space standards connects problems of design governance to technical, legal, and socio-spatial discourses, through which responses to cultural, social, and economic contexts, as well as changing modes of living, can be analysed.

Sam Jacoby

School of Architecture
Royal College of Art
London
United Kingdom
sam.jacoby@rca.ac.uk
ORCID 0000-0002-9133-5177

Alvaro Arancibia

School of Architecture
Pontificia Universidad Católica de Chile
Santiago
Chile
aaaranci@uc.cl
ORCID 0000-0002-9646-658X

Lucia Alonso

School of Architecture
Royal College of Art
London
United Kingdom
lucia.alonso@rca.ac.uk

Introduction

Housing quality has become equated to dwelling size with the introduction of space standards that define the usability of homes in terms of space provided for essential domestic functions. How essential functions and minimum

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acceptable dwelling sizes are determined not only depends on socially and culturally informed housing use and expectations, but also substantially on housing policy and regulations. Dwelling size can be considered both as a design and a regulatory issue that are commonly controlled by the government through prescribed space standards.[1] These standards are a technocratic translation of housing expectations into measurable minimum floor areas and dimensions, which are derived from the calculation of standard furniture sizes, necessary circulation, and activity zones in a dwelling. This defines what can be described as 'standard' housing, based on the standardisation of dwelling size and layout, especially in housing built with subsidies at a large scale for low-income groups.

How standards are determined and enforced depend on local regulatory cultures and design governance approaches.[2] For instance, the planning systems and regulations in the four UK countries differ due to devolved administration.[3] But generally, there are two approaches to housing design regulations: one that differentiates between sectors and another with universal regulations for all sectors. Where regulations are differentiated, they typically apply to the subsidised housing sector, while private housing is deregulated. This creates a dualist rental system with great differences between private rental and social housing, and in terms of owner-occupancy rates.[4] It also leads to a residualisation of subsidised housing, reducing it to function as a 'safety net'.[5] With state support only given to those considered in great need and vulnerable but not served by the private market, subsidised housing tends to be stigmatised and in less desirable locations with fewer infrastructural and service provisions. These characteristics are typical for countries with neoliberal housing policies. As Joe Beswick, Walter Imilan, and Patricia Olivera observe in their analysis of the neoliberalisation of housing access in England and Chile, the private housing market pushes lower-income groups to the urban periphery, social housing tenure is residualised and stigmatised, while homeownership is prioritised with state subsidies predominantly used to stimulate the private sector.[6]

In regulatory cultures that promote market self-regulation, policy interventions are reserved for significant market failures. Thus, minimum space standards are only prescribed for subsidised housing, leading to greater sectoral differences in dwelling size and housing quality. This is evident with the increasing privatisation of housing since the 1980s that came along with housing policies following the principle of subsidiarity, which led to new socio-spatial inequalities.[7] Some European and Latin American cities, especially London and Santiago, are 'archetypical' in this trend, with the privatisation of council housing in England seen as exemplary for Western neoliberal housing policy and Chile as the main Latin American neoliberal model.[8]

However, while sharing essential features, they also reveal differences in economic processes, regulatory cultures, and housing design outcomes that account for some of the diversity in approaches found in neoliberalised housing access. While the UK has the smallest average size of homes in Europe and no mandatory space standards, prescribed space standards for sub-

sidised housing in Chile have led to even smaller dwellings and historically low housing quality, especially during the Pinochet regime but with problems continuing today.[9] Some of this is rooted in historical housing policy, for example, substantial government housing subsidies in England have continued despite the partial dismantling of the welfare state in the 1980s, albeit in different forms, whereas subsidies in Chile since 1965 have often only supported incremental housing solutions that are part-financed and completed by its owners.[10] With the neoliberalisation of housing access — anticipated by laissez-faire housing policies in England harking back to Victorian times — in the second half of the twentieth century, there has been a dramatic shift from the state as the main provider to the private sector but also to a self-help ideology of personal and familial responsibility, a process in which increasing wealth through homeownership as a form of social security has played an important role.[11]

In this context, this paper asks: How do space standards register the regulatory contexts of England and Chile and determine housing design outcomes and experimentation? This is explored through the analyses of minimum dwelling size, 'standardised' layout, and usability in subsidised housing.

But rather than explaining neoliberal policies, this paper is interested in the outcomes of neoliberal processes in housing provisions while using a design research perspective to discuss issues arising from regulatory mechanisms that control subsidised housing design.[12] It specifically compares space standards and their role in housing design and typological experimentation. This is partially explored through the regulatory instrument of 'graphical space standards' (plans showing furniture and key dimensions), which have become a convention to evaluate the usability and quality of housing.

Building on the principles of 'scientific management' developed by Frederick Taylor in the late nineteenth century, the idea that the body's functions could be standardised and made more efficient became especially popular in architecture in the 1930s, which was translated into new graphic standards in modern planning and design reference manuals.[13] This method was adopted by *Design Bulletin 6: Space in the Home* (1963) in the context of space standards, becoming a socio-technical device. While a 'Taylorist' design logic standardises and reduces time by increasing efficiency in the home, it also reduces space to its minimum requirements. This reasoning has had a long-lasting impact on housing design. However, little attention has been paid so far to the interaction between social, technical, and spatial research translated into quantifiable terms such as space standards, which determines typical housing design and use.

The role of subsidised housing and space standards

Laissez-faire prehistory

A basic government intervention in the supply of housing is by setting minimum standards and creating regulations to enforce them.[14] England and Chile have both long histories of housing policies and design regulations. The earliest example is the Rebuilding of the City of London Act of 1667,

which in response to the Great Fire of London in 1666 led to a series of policies over the following decades that encouraged standardised housing design, economic building processes, and speculative development.

In response to a rapid industrialisation and urbanisation, which created large areas of unsanitary slum housing, philanthropic housing trusts began to emerge during the 1840s that developed so-called 'model dwellings'. These were meant both as the spatial models for standard housing design and as a social model to combat the 'immorality' found in slums. While improving the housing conditions of the working classes, model dwellings did so for a competitive rate of return on investment and became referred to as 'five per cent philanthropy'.[15] Starting in 1848, unsanitary housing conditions also led to public health acts and model byelaws, which were the first regulations to define minimum standards for housing. But government intervention and regulation of housing only fully developed during the First World War to deal with housing shortage, and included rent control to prevent the rise of profiteering landlords.[16]

Comparably, in Chile during the late nineteenth century, the Catholic Church recognised the importance of housing to a decent standard of living and social wellbeing.[17] The social housing it built inspired the Ley de Habitaciones Obreras (Workers' Housing Law) of 1906, which was Chile's first formal housing policy.[18]

Despite creating the first housing design standards, the pre-neoliberal era was characterised by a laissez-faire approach with minimal policy intervention and no comprehensive administrative structure for housing supply, which in England lasted until the mid-nineteenth century health acts.[19] The notion of housing as a private responsibility prevailed, with the development of new housing models for the working classes a concern taken up by philanthropic organisations.

Space standards

The problem of having to generalise the function and use of dwellings and, inevitably, define housing standards, emerged with public health concerns about how the working classes lived. However, in England this was only fully developed in the first half of the twentieth century through a series of government-commissioned housing reports: the *Tudor Walters Report* (1918), *Dudley Report* (1944), and *Parker Morris Report* (1961).[20] Deriving from the *Tudor Walters Report*, the first widely applied space standards in 1919 were for the large-scale state provision of council housing to combat housing shortage. The report aimed to improve the standards and quality of subsidised housing. Private developers were incentivised to meeting the new housing standards by receiving a subsidy of £130 for rented or £160 for sold compliant homes.[21] The promotion of space standards and growth in council housing supply lasted until the Housing Act 1974, a period in which access to decent housing was seen as an essential social welfare pillar and a right.

Space standards were to both define and protect the minimum usability of dwellings, largely based on the spatial hierarchies of a nuclear family, and sep-

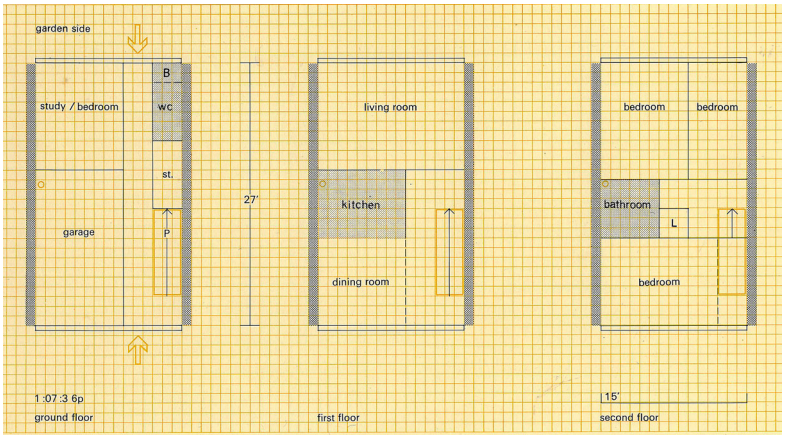


Figure 1.
Organisational diagram for a typical three-storey house, in National Building Agency, *Generic Plans: Two and Three Storey Houses* (London: National Building Agency, 1965)

arations between genders and domestic activities. Thus, 'housing quality, or people's experiences of domestic life and living, cannot be understood in isolation from the moral encoding or order of domestic design'.[22] Charles Booth's social cartography in the Maps Descriptive of London Poverty, a part of his survey *Inquiry into Life and Labour in London* between 1886 and1903, showed how social classes and their economic and moral standing were spatialised and could be mapped to the homes they live in. The *Tudor Walters Report* in 1918 instrumentalised this socio-spatial connection by determining the space standards needed to improve the life and behaviour of the lower classes.

Perhaps the best-known space standards are those proposed by the Parker Morris Committee in *Homes for Today and Tomorrow* (1961) that specified minimum overall floor areas but no room sizes. This gave greater freedom to designers as 'the specification of standards of space by reference to individual rooms […] tends to assume a conventional arrangement of the dwelling and the particular way in which a given room will be used. This inhibits flexibility both in the initial design and in the subsequent use of a dwelling.'[23] The report thus promoted flexibility in design to accommodate the changing needs and use, and emphasised the importance of an architect in the design process.[24] Several design manuals adopted the Parker Morris standards, including *Generic Plans: Two and Three Storey Houses* (1965) by the National Building Agency and *Preferred Dwelling Plans* (1977) by the Greater London Council, which highlighted both the diagrammatic nature and specificity of the standards (Fig. 1, Fig. 2).

The reasoning underpinning the Parker Morris standards was explained in *Design Bulletin 6: Space in the Home* (1963) by the Ministry of Housing, which was based on studies of home use and calculations of essential furniture and space requirements of a typical family. Its approach to graphic visualisation and assessment was prototypical for the relationship between criteria, evidence, and calculations of usability found in modern space standards.[25]

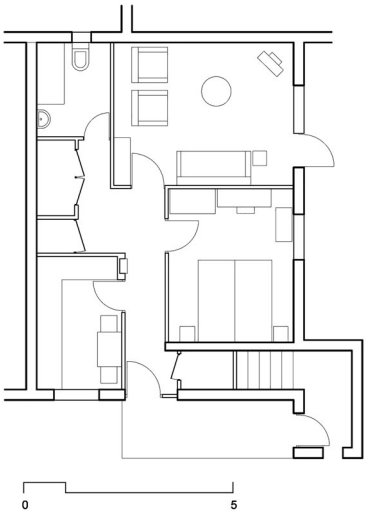


Figure 2.
One bedroom flat, from Greater London Council, Department of Architecture and Civic Design, *Preferred Dwelling Plans* (London: Architectural Press, 1977), redrawn by authors, 2021

Based on anthropometric data, it stipulated the minimum dimensions for items of furniture and space needed to use and move them, while considering the flexible use of homes. The bulletin translated the domestic activities found essential by the Parker Morris Committee into dimensions, then into typical housing arrangements and graphical standards representative of a normative idea of life at home (Fig. 3).[26] The explicit focus on usability provided a measurable assessment against dwelling dimensions, with its graphic standards and explanation widely adopted since (Fig. 4). The Housing Subsidies Act 1967 made compliance with the Parker Morris standards a condition for all government subsidised housing until 1982, when the standards were abolished.[27]

In Chile, space standards were first introduced during the Pinochet era (1973–1990) to tackle a large housing deficit, which affected around 50% of the population living in informal settlements. The principles of subsidiarity were translated into a rudimentary furniture schedule and space standards for subsidised housing, the *Cuadro Normativo de Espacios Mínimos para el Mobiliario* (*Design Standards for Minimum Spaces*) in 1984 (Fig. 5), which was subsequently updated in 2003 and 2017.

Arising in the context of the social welfare state, space standards in England were aspirational, meant to set the minimum usability that could be improved on, whereas in Chile they were notional, prescribing a minimum dwelling size that does not guarantee usability, evident from the insufficient furniture schedules used to calculate them. As Claire Harper highlights, there is extensive criticism of the housing generated through this numbers-led approach.[28]

Housing neoliberalisation

While the term 'neoliberal' housing is often contrasted to the right to housing, this right is not entirely abandoned but commodified, resulting in the promotion of a private housing sector and prioritisation of homeownership.[29] Since the 1970s, market-based economic policies have been institutionalised as a near-global policy paradigm.[30] As David Harvey notes, Chile and Britain had such 'similar restructurings of the state apparatus' regardless of different moments and geographies, suggesting the imperial power of the USA during this time.[31] However, local institutions and the history of their state-society relations were also decisive in shaping the way these neoliberal transitions were carried out.[32] Nevertheless, the varied expressions of neoliberal market mechanisms can include both efforts of de-regulation alongside re-regulation depending on the context.[33]

Housing neoliberalisation in Chile was introduced by Pinochet's Urban Development Policy in 1979 and conveys the four core principles of neoliberalised housing.[34] First, all housing demand is to be met by the private sector and free-market competition. With this the only form of housing supply, there is generally no social housing. Second, private-market supply prioritises homeownership to avoid long-term housing management responsibilities. Third, to assist lower-income groups to access the market

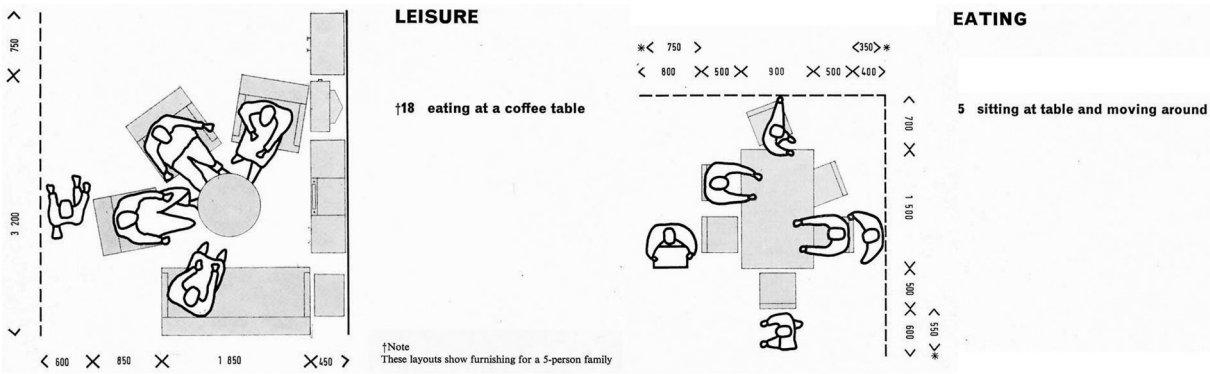


Figure 3.
Typical example of graphical standard, in Ministry of Housing and Local Government, *Design Bulletin 6 – Space in the Home* (London: HMSO, 1963)

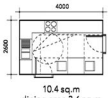
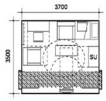
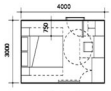
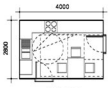
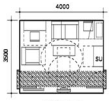
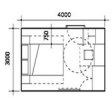
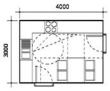
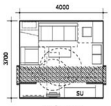
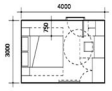
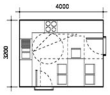
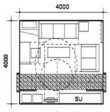
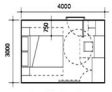
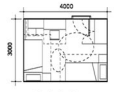
and offer freedom of choice, state subsidies are used to stimulate competition in unprofitable sectors. However, this follows the principle of subsidiarity: the state only intervenes and as little as possible where private actors fail. And fourth, in return for the private market taking on sole responsibility for housing procurement, it is deregulated and design standards can be negotiable. This all supports profitability and encourages speculative housing developments.

Housing neoliberalisation in England was preceded by a retreat of the state from housing supply in the late 1960s. The Right to Buy Act 1980 under Margaret Thatcher is often described as the moment when neoliberalised housing policy was first fully enacted, resulting in far-reaching market deregulation and privatisation of council housing. Despite this, England as a social market economy continues to intervene to a far greater extent in housing markets and supply, which are also more diverse than in Chile. Government subsidies, for example, have 'shielded' many households from market pressures.[35] At the same time, neoliberalised housing access has led to a residualisation and stigmatisation of social housing by association with marginal housing needs and poor-quality homes.

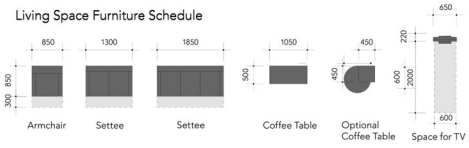
Despite the free-market rhetoric, substantial financial support of the private sector and homeownership is essential to maintaining housing affordability and access in both England and Chile. Where direct subsidies are paid for affordable housing delivery, space standards are prescribed. Yet given the private-sector principle of profitability, housing is often built to minimum permissible sizes and at scale, using repeated and standardised layouts. While the term 'standard' has attained many connotations, it mostly implies now minimum guidelines expressed in numerical terms.[36] But regulations and standards cannot be merely conceived in an abstract or quantifiable way, as the quality of housing and beliefs around minimum standards are subject to specific contexts and experiences that can both reveal and influence the purpose of homes, whether seen as a commodity or a right.[37] Standards are a product of their time informed by cultural perceptions around space and assumptions on the use of homes.

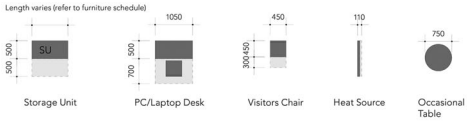
Figure 4.
Graphic representation of space standards, furniture schedules, circulation zones, and activity zone, excerpted from 'Appendix 1' and 'Appendix 2' of Mayor of London, *London Housing Design Guide* (London: London Development Agency, 2010)

Appendix 1 – Space Standards Study

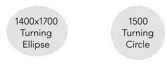
	Kitchen *see key to kitchen items	Dining dining area calculated as difference of kitchen dining and kitchen	Living	Double	Twin	Single	GIA [exc. amenity]
1-bed, 2-persons	 6.8 sq.m	 10.4 sq.m dining area 3.6 sq.m	 13.0 sq.m	 Double Bedroom 12.0 sq.m			50 sq.m
2-bed, 3-persons	 7.5 sq.m	 11.2 sq.m dining area 3.6 sq.m	 14.0 sq.m	 Double Bedroom 12.0 sq.m		 Single Bedroom 8.0 sq.m	61 sq.m 77 sq.m
2-bed, 4-persons	 7.5 sq.m	 12.0 sq.m dining area 4.5 sq.m	 14.8 sq.m	 Double Bedroom 12.0 sq.m	 Twin Bedroom 12.0 sq.m		70 sq.m 83 sq.m
3-bed, 5-persons	 8.3 sq.m	 12.8 sq.m dining area 4.5 sq.m	 16.0 sq.m	 Double Bedroom 12.0 sq.m	 Twin Bedroom 12.0 sq.m	 Single Bedroom 8.0 sq.m	86 sq.m 96 sq.m 102 sq.m

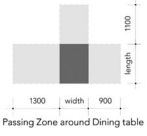
Living Space Furniture Schedule





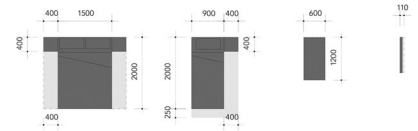
Circulation Zones

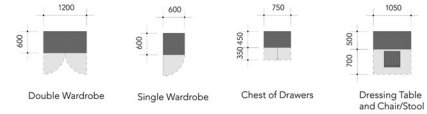




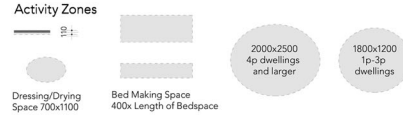
Passing Zone around Dining table

Bedroom Space Furniture Schedule





Activity Zones



Subsidised housing design: typological experimentation

Typological analysis is common in architectural practice, as it offers a means to reason design decisions based on relationships between social and spatial precedents.[38] With notions of function and use – and their role in design decisions – rooted in social practices and norms, the analysis of this interrelation can explain how typological preferences, design value, and spatial quality change in relation to individual and collective expectations.

Neoliberalised housing policy has challenged the idea of the 'minimum' with typological speculations and experiments on the limits of spatial demand, and how associated social and spatial relationships might translate into housing design. This is particularly visible in Chile's housing programmes since the 1980s that extensively experimented with housing typologies and density, with fast-changing architectural and urban development strategies responding to emerging typological preferences or stigmatisation, and new spatial needs and space standards.[39] Typological preferences have been also formative to housing design in England, where policies and design guides often promoted design models representative of specific socio-spatial norms, such as terraced houses. In both countries, typological reason-

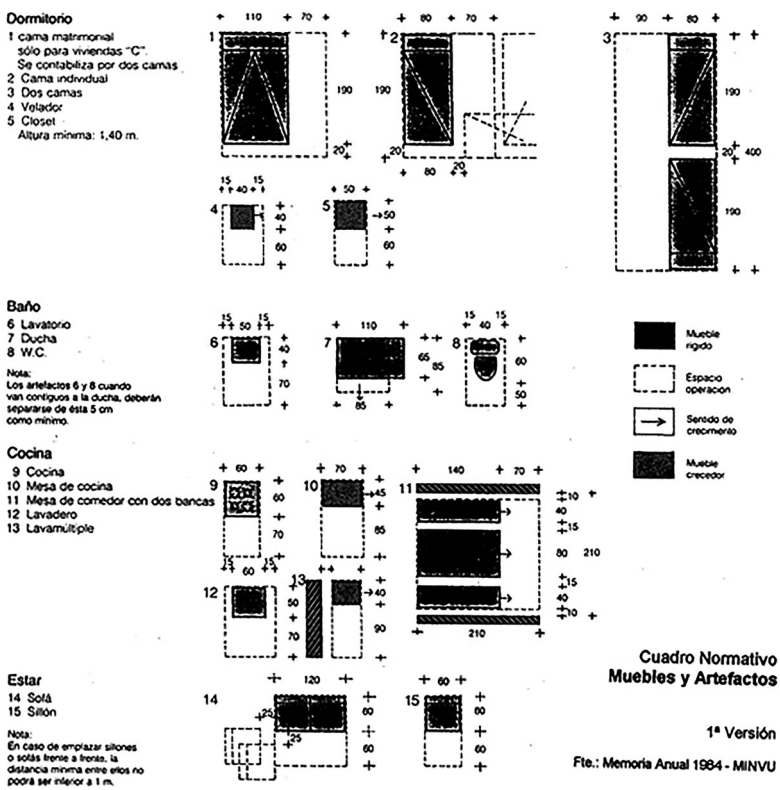


Figure 5.
First furniture schedule in Chile, in Ministerio de Vivienda y Urbanismo, *Cuadro Normativo de Espacios Mínimos para el Mobiliario* (1984)

ing has greatly shaped design responses to social and demographic transformations, changing housing expectations, and economic pressures. It thereby has challenged and reinforced assumed patterns of use and their generalisation into space standards.

First implementation in the suburban context in England and Chile

Since the seventeenth century, speculative development, building regulations, and pattern books have standardised housing typologies and design in England. Georgian, Victorian, and byelaw terraced houses have dominated the image of English cities and towns until the early twentieth century. In 1911, terraced houses accounted for 87% of all housing in England.[40] Yet the spatial hierarchy and organisation and, subsequently, housing design, changed with transforming social norms and functional association of rooms. By the early twentieth century, the question of what dwelling standards and organisation might be appropriate was formalised through several housing reports that were to guide major subsidised housing programmes and significantly shaped modern housing standards and use.

British housing reports and space standards (1918–1961)

The earliest comprehensive housing report in the UK was by the Tudor Walters Committee, which consolidated the first space standards and developed typical dwelling plans for a post-First World War public housing programme. It was 'the first time that housing quality was formally acknowledged to be a matter of national importance'.[41] The report highlighted the need to regulate the size of dwellings and key town and site planning aspects. It argued for the simplification and standardisation of housing through good proportion, asserting that better design would save money. The report advocated that new council homes would have their own bathroom, located on the first floor above the kitchen, and that scullery and kitchen should be combined. While still regarding the parlour as the most important social space in a home, it provided both layout options for larger houses with a parlour and cheaper and smaller houses without one. These modernising ideas of home use were illustrated by the five type-plans for two-storey semi-detached and terraced houses for single families, which were to be adopted in public housing and ranged from 76 m^2 to 114 m^2 in size (Fig. 6).

Many recommendations of the *Tudor Walters Report* were further detailed in the *Manual on the Preparation of State-aided Housing Schemes* (1919) and adopted by the Housing and Town Planning Act of 1919, which made local councils responsible for the supply of affordable rental homes (Fig. 7).[42] To address widespread issues of overcrowding, these new suburban homes were just over half the size of a previously standard terraced house and designed for a single nuclear family.[43] But space standards ultimately led to rising rental costs, making the new homes unaffordable to the working classes they were intended for.[44] While previously local authorities only

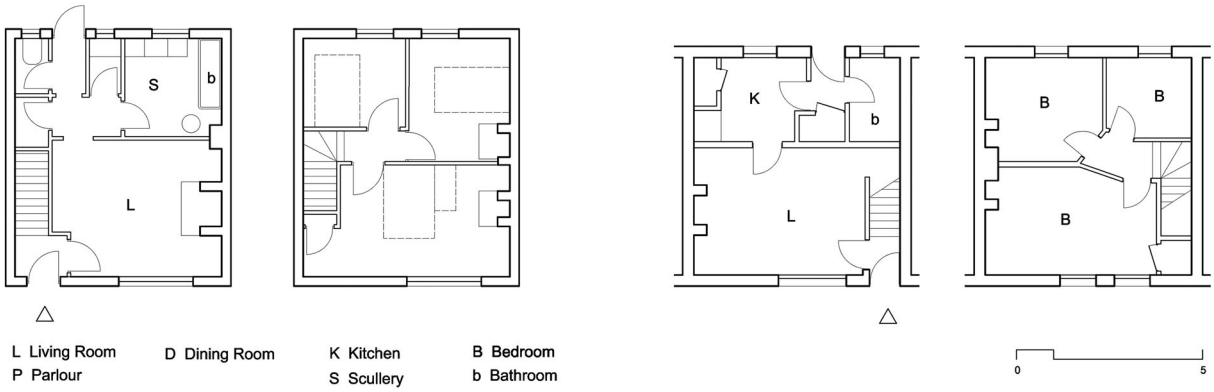


Figure 6.
Comparison of housing plans, (left) three-bedroom type-plan from the *Tudor Walters Report* (1918); (right) three-bedroom house, Chapel House Estate designed by the Office of Works (1921), in Committee to Consider Questions of Building Construction in Connection with the Provision of Dwellings for the Working Classes in England and Wales, and Scotland [Tudor Walters Committee], *Report on the Provision of Dwellings for the Working Classes and Report Upon Methods of Securing Economy and Despatch in the Provision of Such Dwellings* (London: HMSO, 1918), redrawn by authors, 2021

supplied 2% of new housing, from 1919 to 1923 this rose above 60%.[45] In 1918, less than a quarter of England's homes were owner-occupied, and with new homes primarily for rent (social and private), inhabitants had little or no control in altering their homes to better meet their needs.

In anticipation of post-Second World War housing construction, the Dudley Committee reviewed housing standards in its *Design of Dwellings* (1944) report. This proposed layouts for two-storey homes that separated previously combined kitchen and dining into different rooms.[46] The report offered three alternative ground-floor plans, of which only one had the traditional living room, scullery, and 'sitting room' – the latter renamed, as 'the expression "parlour" carries an implication which is old-fashioned and obsolete' (Fig. 8). It recommended a minimum of three bedrooms for a family of five, which was no longer argued in terms of a moral need to separate genders and ages but in terms of personal privacy and usability. This was manifest in the proposed standard furniture layouts that introduced desks and built-in storage into the bedroom.[47]

The Housing Manual of 1944 adopted the recommendations of the *Dudley Report* and provided new guidelines to local authorities on the design of estates including density, site layout, house and flat types, and size of rooms (Fig. 9).[48] Its standard plans experimented with the relationship between cooking, eating, and living, with different layout options showing a separate kitchen from dining, which now took place in the living room, or a kitchen-diner separate from a smaller living room. The manual also acknowledged the need for a more diverse, long-term housing programme, in contrast to the previous *Tudor Walter Report*, by considering the varied needs of single dwellers, young families, the elderly, and people with disabilities, including a table of recommended minimum rooms and dwelling sizes for different users.[49]

Following the *Dudley Report*, space standards peaked with the *Housing Manual* of 1949 until the recent introduction of the *Nationally Described Space Standard* (2015).[50] Compared to the suggested 74.3–83.6 m^2 in

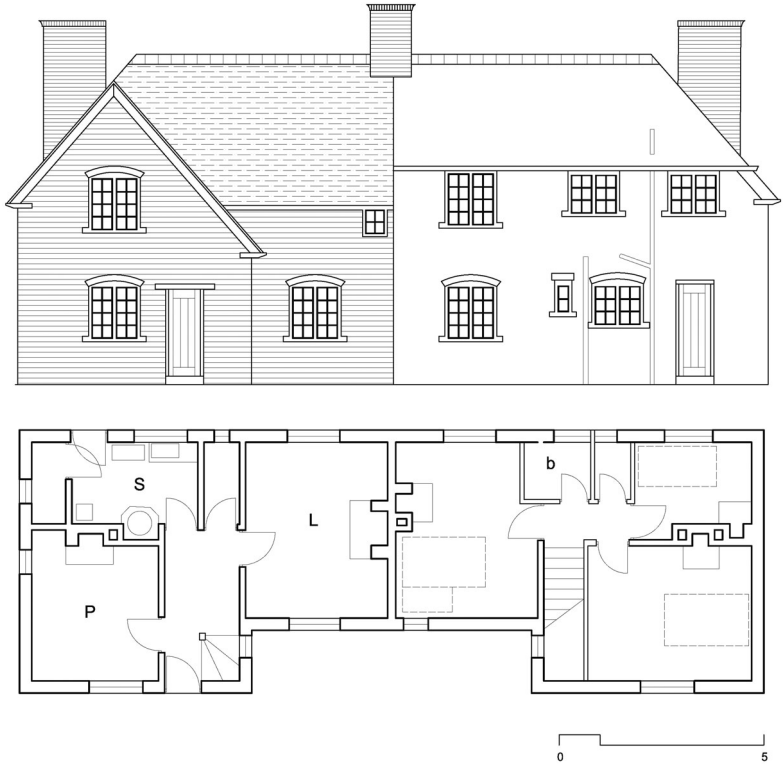


Figure 7.
Three-bedroom type-plan and elevation, in Ministry of Health, *Type Plans and Elevations of Houses Designed by the Ministry of Health in Connection with State-aided Housing Schemes* (London: HMSO, 1920), redrawn by authors, 2021

1944, the *Housing Manual* of 1949 proposed a size of 83.6–88.3 m^2 for a typical three-bedroom home (Fig. 10). But in fact, new dwellings had an average size of 92.9 m^2 compared to 74.3 m^2 in 1939. Inflation and the larger dwelling size led to a 25% increase in construction cost.[51] To take pressure off public housing supply, policies began to promote homeownership as 'most satisfying to the individual and most beneficial to the nation'.[52]

Housing standards were later reviewed in the *Parker Morris Report* (1961). The frequent reviews of space standards were based on evidence collected by housing committees, who were tasked with improving the quality of council housing. But with neoliberalised housing policy in the 1980s, these aspirational space standards were abandoned. By contrast, this was the moment when Chile introduced its first space standards, which however were not immediately concerned with dwelling usability or quality but with a basic dwelling programme that could be achieved with limited subsidies. Although housing marketisation occurred in both England and Chile in the same period, different histories of housing regulations and supply led to differences in response. While England deregulated the market and had an existing large public housing stock, Chile had to introduce design regulations to control the private-sector provision of subsidised housing.

By the 1980s, homeownership rates in England were already rapidly rising — from 32% in 1953–51% in 1971, reaching an all-time peak in 2006 at 71%.[53]

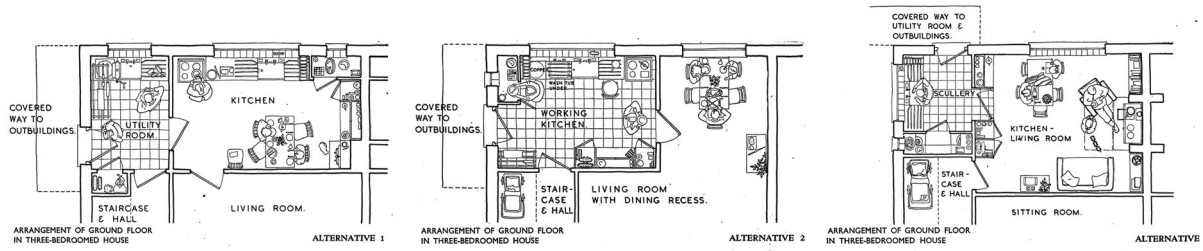


Figure 8.
Alternative kitchen, dining, and living arrangements, in Subcommittee of the Central Housing Advisory Committee [Dudley Committee], *Design of Dwellings* (London: HMSO, 1944)

With the establishment of a UK welfare state in the early twentieth century, state-led intervention shifted from a laissez-faire attitude to extensive regulation and investment after the world wars. When housing was subsequently deregulated, the private sector began developing their own standards in the early 1980s. An example is the minimum space standards issued by the National House Building Council for new-built homes to qualify for its warranty — but the so-called 'starter homes' built to these standards did not meet market expectations, forcing the abandonment of these standards and reliance on market self-regulation.[54] However, in response to low housing quality, industry and charitable organisations in the 1990s proposed new standards such as the Building Research Establishment in its *Housing Design Handbook* (1993) or the National Housing Federation through its *Guide to Standards & Quality* (1998).[55] England eventually reintroduced formal space standards again in 2015 with the *Nationally Described Space Standard*.

In comparison to the UK context, when the Pinochet regime enacted its first urban policy in 1979 that declared urban land in Santiago as no longer a scarce commodity, its aim was to foster demand-led growth and a free market. But the lack of housing design guidance resulted in chaotic urban growth, greater land speculation, and housing for the most vulnerable groups that did not meet the minimum habitability standards. Already one year later in 1980, this immediate failure of housing deregulation led the government to radically change its approach, announcing that regulation is a constitutive part of 'successful' neoliberal policies while introducing the country's first space standards.

Basic Dwelling Programme in Chile (1980–1990)

The first Chilean design standards were part of an aggressive urban expansion policy. The *Basic Dwelling Programme* (1982) gave subsidies for semi-detached, one-storey houses of 34 m^2 built on plots of 9 × 18 m. Their standards were based on a minimal dwelling programme of one bedroom, one bathroom, and a 'public' room with space for a tiny kitchen, dining table, and a combined living and sleeping area (Fig. 11). Acknowledging their inadequate size, this provision was promoted as the first infrastructural phase of a conventional three-bedroom family home, planned for incremental completion by their owners by adding two bedrooms.[56] But the undifferentiated proliferation of

Figure 9.
Comparison of (left) three-bed, two-storey house type from the *Housing Manual* (1944) and (right) Somerford Grove designed by Frederick Gibberd (1947), in Ministry of Health, *Housing Manual 1949* (London: HSMO, 1949) and *Architectural Review* (1949), redrawn by authors, 2021

low-density semi-detached houses caused serious urban problems along Santiago's periphery, as these areas lacked any additional infrastructures.

What the state subsidy provided was meant as a means for households to lift themselves out of poverty — considered a form of individual capitalisation that allowed the state to solve the problem of housing demand 'forever'. In fact, the programme could be radically reduced to a 'sanitary cabin' of 6–8 m^2 with a kitchen and bathroom, and the remainder left for self-building. The strategic location of these cabins in one corner of the building plot determined the possible future layout of a semi-detached house (Fig. 11). Despite minimal physical intervention, it had an explicit typological design rationale, and was based on a standardised construction system that formed part of the design standards. Despite the government supporting the standardisation of construction since the 1960s, this approach was unsuccessful and eventually abandoned.[57]

Typological experimentation with urban and high-density housing

Common to the first implementation of space standards in England and Chile was the experimentation with suburban house typologies for family households.

Figure 10.
Elevation and type-plan for a six-person urban terrace house, in Ministry of Health, *Housing Manual 1949* (London: HSMO, 1949), redrawn by authors, 2021

But the locations of these developments raised issues of access to infrastructures and services, as well as to the city in which most residents worked, creating social segregation and urban exclusion.

In England, the well-studied post-war experimentation with tower blocks was enabled in 1946 by a lift subsidy that made the use of costly lifts in council housing viable.[58] As part of its call for radical building solutions, the *Dudley Report* (1944) had been the first to discuss the design of high-density housing, especially highlighting the benefits of natural light in Y- and H-shaped tower blocks over common mid-rise courtyard or semi-courtyard layouts (Fig. 12). The mass housing provided by tower blocks was part of an effort to address the housing shortage and clear urban slums. But poor maintenance and construction quality led quickly to a stigmatisation and residualisation of high-rise council housing in England.

By comparison, unregulated self-building in Chile due to incremental housing had resulted in extensive informality, overdevelopment, and low construction quality. This, similarly, led to the stigmatisation of subsidised housing

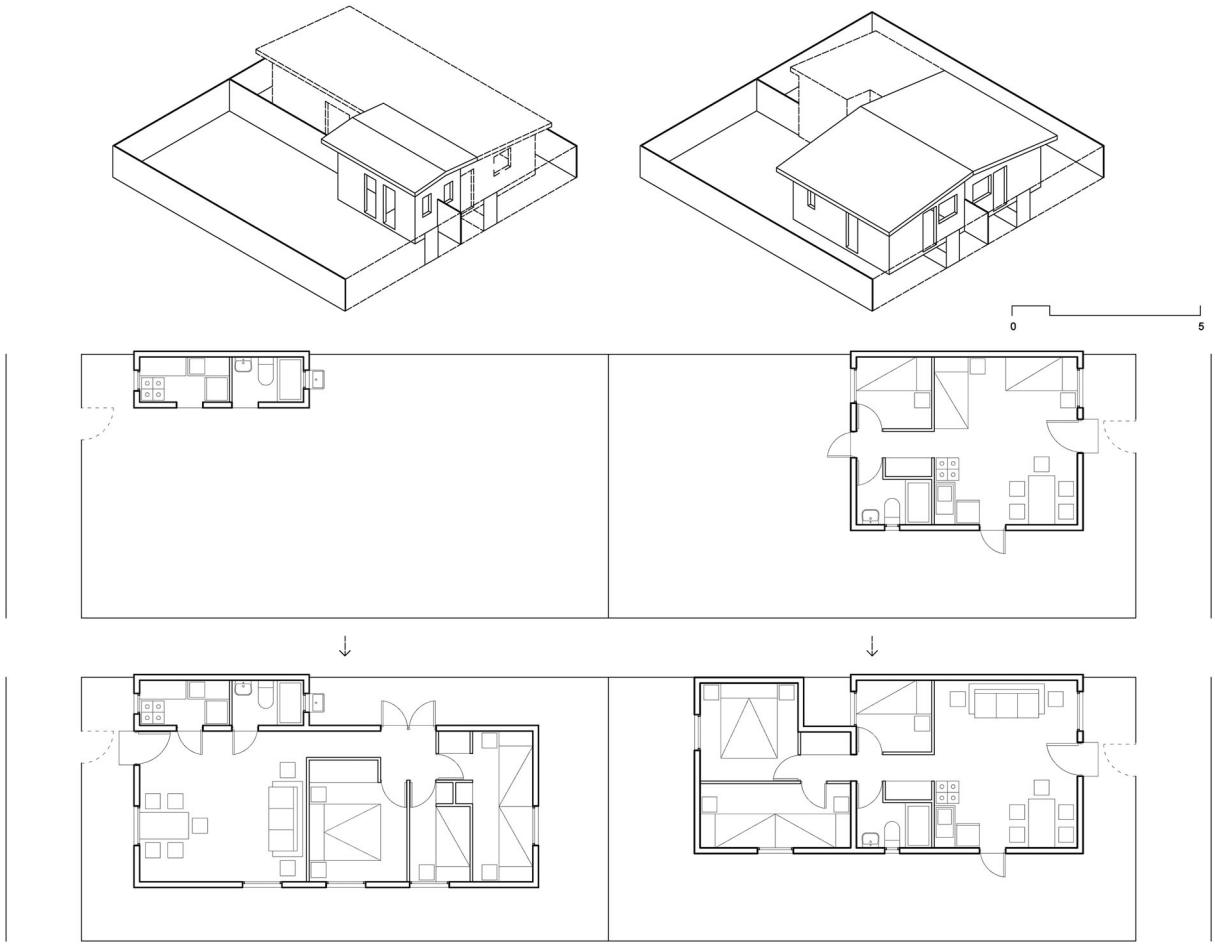


Figure 11.
The principle of the *Basic Dwelling Programme* (1982) and its incremental housing strategy, (left) sanitary cabin; (right) semi-detached house, drawn by authors, 2021

through an association with poor-quality housing. In response, Chile began extensive typological experimentation as part of the frequently changing architectural and urban design strategies. Key to this was a shift to more central urban sites, with the need for densification leading to a focus on flat typologies and new urban forms of living.

When returning to democracy in 1990, the Chilean state promised an increase in subsidies to improve housing standards, and an integrated approach to housing supply and city planning. To deliver this, the state created a new *Progressive Housing Programme* (1992) for high-density and larger housing units with at least two bedrooms and a minimum size of 40 m^2. Although this led to more efficient land use, continued reliance on an incremental housing approach also created problematic overdevelopment, with extensions practically doubling the original dwelling size. This came at the cost of habitability and housing quality due to poor natural light and ventilation, with the cheap

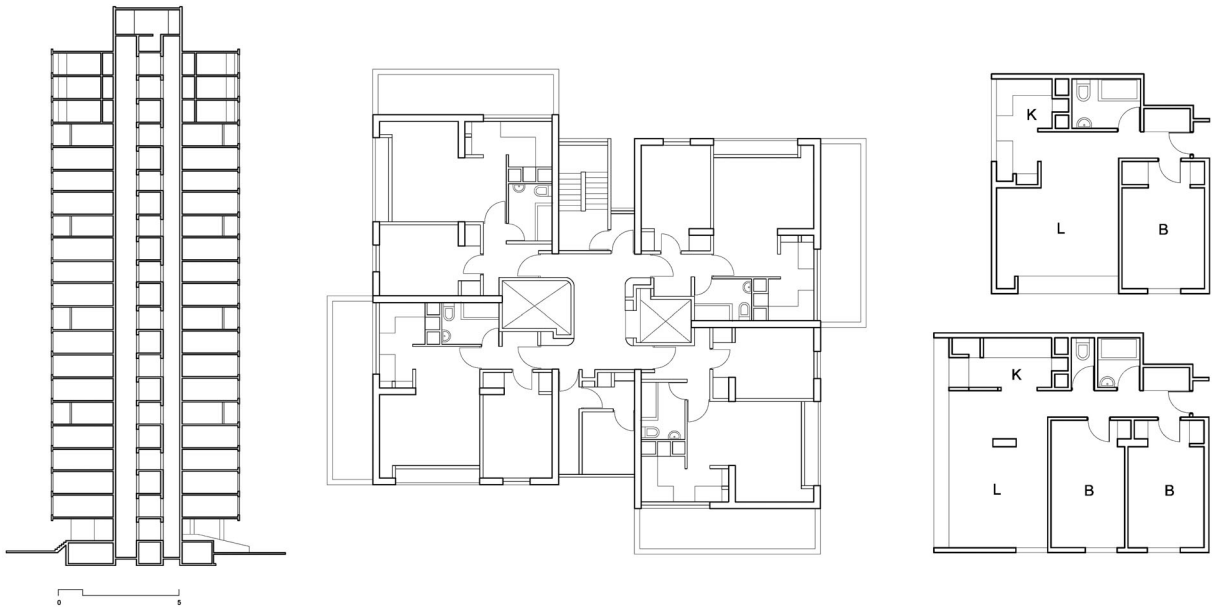


Figure 12.
Section, floor plan, and unit plan of a typical H-shaped tower block in Canada Estate (1962) designed by the London County Council Architects' Department, from *A Decade of British Housing, 1963-1973*, ed. by David Crawford, (London: Architectural Press, 1975), redrawn by authors, 2021

construction materials used by self-builders often achieving insufficient sound and thermal insulation.

The first designs of the programme were two-storey row houses, with pre-planned future extension in their backyard for a third bedroom typical for a family home (Fig. 13).[59] Row housing was an important first step in the densification of Santiago and became a source for typological experiments.[60] An example of this is Comunidad Andalucía (1994), a housing scheme with 330 units in Santiago's city centre that combined 'row houses' of different heights. Its most unique arrangement is a four-storey typology, enabled by stacking two maisonettes and introducing a floating linear staircase and a connecting bridge, creating a massing similar to a slab block (Fig. 14).

In the late 1990s, the state began to promote multi-storey housing through an updated version of the *Basic Dwelling Programme* (1994) that provided flats of 42 m^2 in three-storey slab blocks. To avoid external access decks, these so-called 'scissors blocks' had a staircase connecting two parallel buildings, giving direct access to each dwelling.[61] Each unit offered a conventional family programme — a living-dining room, three bedrooms, one bathroom, and a kitchen with a laundry area — which complied with the furniture schedule of the original design guide (1984). To make this possible, no corridors were provided, leaving all rooms to face the living-dining room that also functioned as the main circulation space (Fig. 15). Due to the severely constrained position of furniture, these homes lacked flexibility. This forced occupants to take desperate measures, with illegal extensions built on all floors by attaching hanging structures to the outer walls or taking over the ground floor. It reduced communal spaces and obstructed the view of neighbouring dwellings, affecting

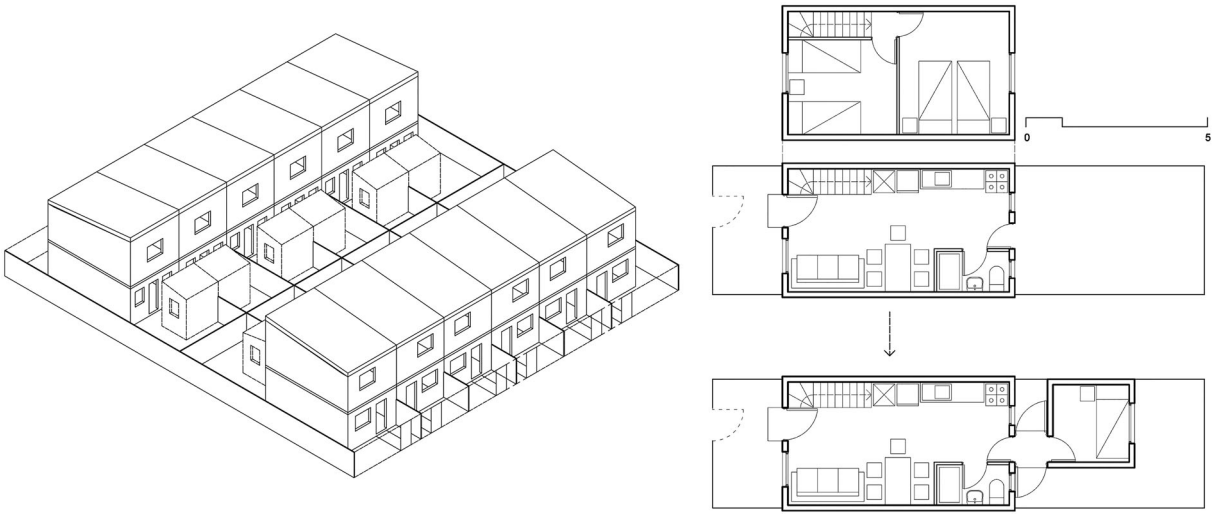


Figure 13.
Progressive Housing Programme (1992), typical design and extension, (left) two-storey, two-bedroom house; (right) self-built extension of third bedroom on the ground floor, drawn by authors, 2021

both privacy and sunlight, and brought back problems of housing quality typical for self-building (Fig. 16).

The failure of the slab blocks caused their social stigmatisation and led to a return to incremental housing. A new housing design guide was created in 2005 (Supreme Decret N° 174) that proposed larger minimum dwellings based on a slightly expanded furniture schedule (Fig. 17).[62] The original 45 m^2 dwelling could be increased by 10 m^2 once a third bedroom was added. Importantly, the house was designed in such a way that this addition could be accommodated within the existing building envelope.

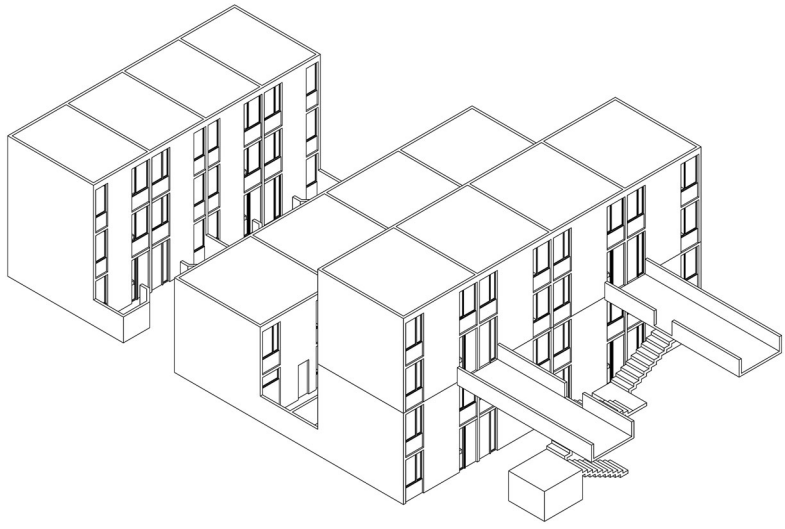


Figure 14.
Comunidad Andalucía (1994), fragment showing the typological combination of three- and four-storey housing, drawn by authors, 2021

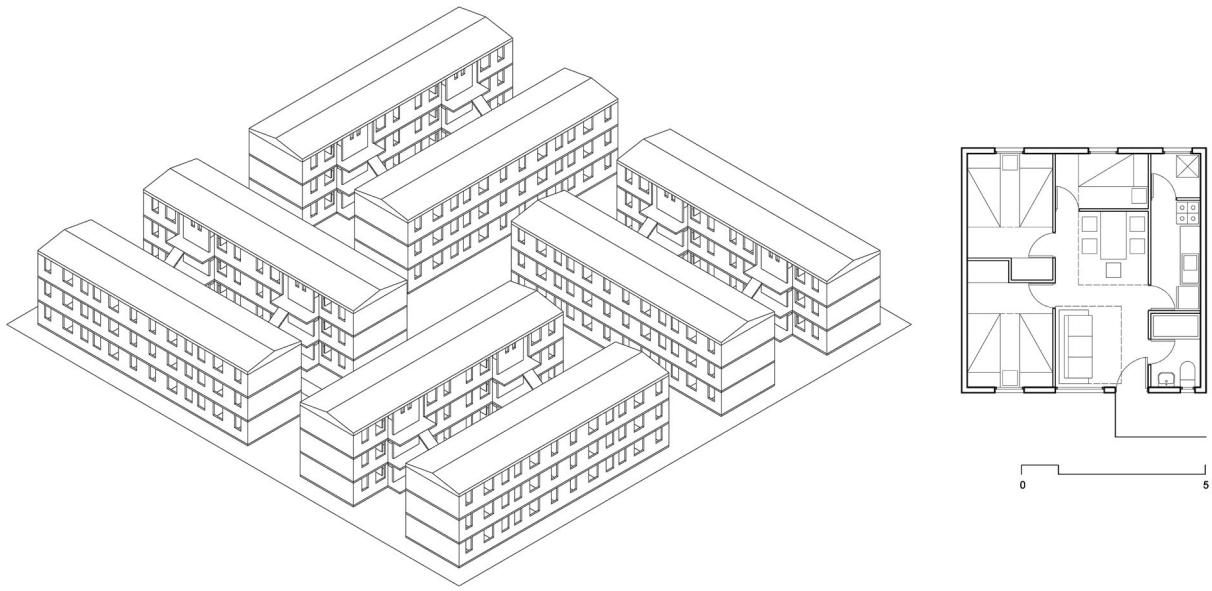


Figure 15.
Scissor block, (left) typical block layout; (right) dwelling plan, drawn by authors, 2021

This is when the architectural practice Elemental proposed a three-storey row house that rejected the previous subsidised housing models but accepted the existing housing standards and budget constraints. Considering the common lower-class aspiration of owning a middle-class home of typically 70–80 m^2 size, but without having sufficient savings, mortgage, or subsidy, Elemental asked: 'If the money can only pay for around 40 m^2, instead of thinking of that size as a small house, why don't we consider it as half of a good one? […] the key question is [then]: which half do we do?' Their answer was to provide the more difficult to build half that includes the service areas. Thus, they argued, 'self-construction can stop being seen as a problem and start being considered as part of the solution' to giving homeowners what they want (Fig. 18).[63]

However, this return to incremental housing lowered minimum housing provision to a level comparable to the first *Basic Dwelling Programme* and exacerbated the principle of subsidiarity by paradoxically making dwelling size and quality the financial responsibility of homeowner with very limited economic resources. Even though Elemental achieved densities similar to slab blocks, they did not address the key problem of land cost, which meant that housing had to be built in urban peripheries without infrastructures.

Experimentation with homeownership models

Building at higher density in locations with better access to infrastructures, however, has not resolved housing inequalities. To tackle this, there are growing attempts to integrate different tenures and demographics. In England, developments with mixed tenure have become a preferred policy

Figure 16.
Example of typical informal dwelling extensions at the outskirts of Santiago, original building painted in red, photographed by Alvaro Arancibia, 2022

option, thought to reduce deprivation, social inequalities, and stigmatisation, but its success is neighbourhood dependent and requires wider access to social welfare services and resources.[64] Mixed tenure developments, especially those including units for social rent, have visible differences in design, quality, and amenities for different tenures that can reinforce social divides. In addition, occupants of rental homes have no control over investment to maintain or adapt them to their needs.

As part of increasing mixed tenure developments and affordable homeownership, shared ownership schemes have become popular, which permit first time buyers to initially purchase a small equity share and pay a subsidised rent on the remaining, with the option to acquire full ownership later. The scheme, however, makes shared owners responsible for the full service and maintenance costs and, with properties valued at market rates and designed like other for-sale properties, is targeted at mid- to high-income households.

The move to eradicate differences between subsidised and market housing is also evident from a regulatory perspective in the most recent space standards. The Nationally Described Space Standard (NDSS) of 2015 applies for the first time also to the private housing sectors and is the minimum standard local authorities are permitted to use (Table 1). However, the NDSS is not a mandatory building regulation but a technical planning standard whose adoption has to be justified by each council in its local plans. Questions about the enforce-

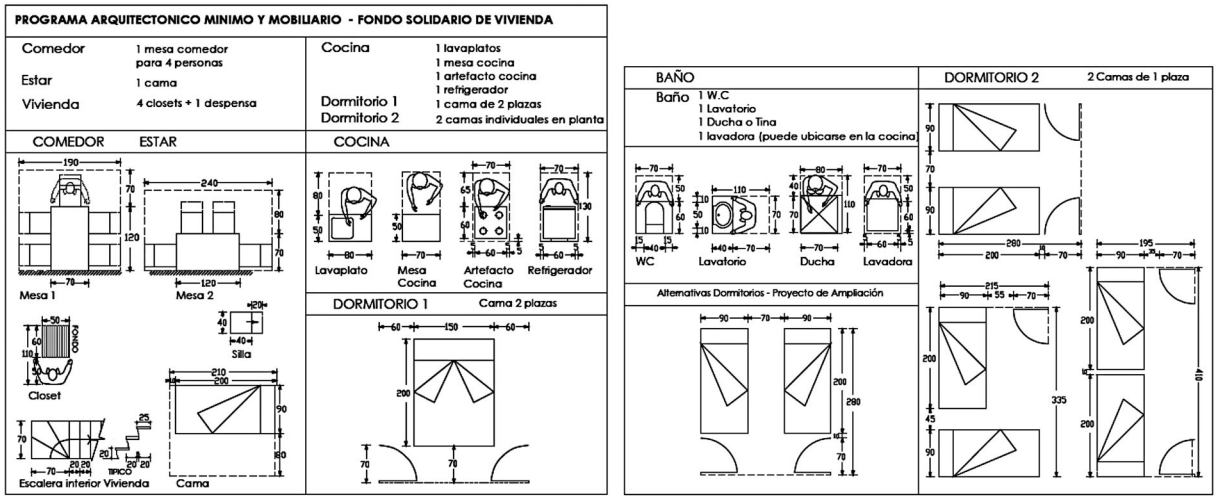


Figure 17.
Second furniture schedule, in Ministerio de Vivienda y Urbanismo, 'Cuadro Normativo D.S. 174' (2005)

ability and impact of the NDSS thus remain. In fact, despite being hailed a success, in the early 1990s, only 2% of housing association homes met the Parker Morris' storage standards and a third had insufficient space for people to sit down and eat together.[65]

Despite the problems arising in London, in Santiago tenure mix has been instrumental to increasing space standards. Until 2015, housing policies largely focused on addressing the housing deficit without regard for infrastructural, economic, or social planning needs. To change this, a new social integration policy — Programa de Integración Social y Territorial, DS19 — was

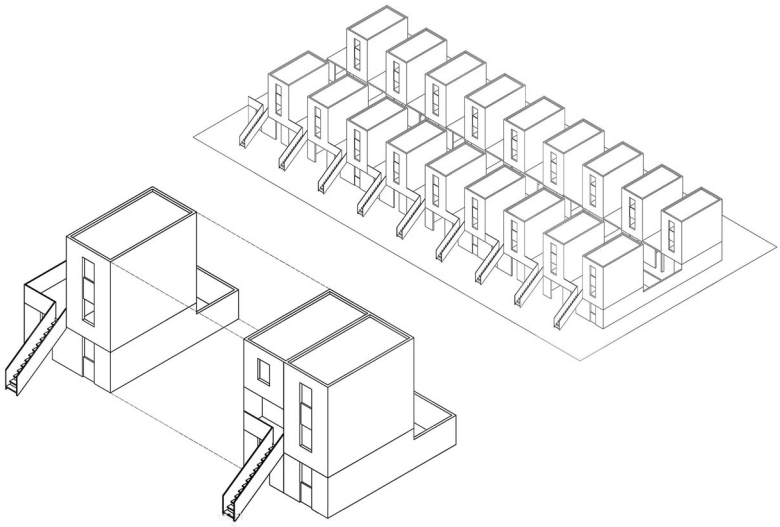


Figure 18.
Incremental row housing principle by Elemental, (left) the two stages of the house, first the 'half-house' then the completed house with self-built addition; (right) proposed block arrangement, drawn by authors, 2021

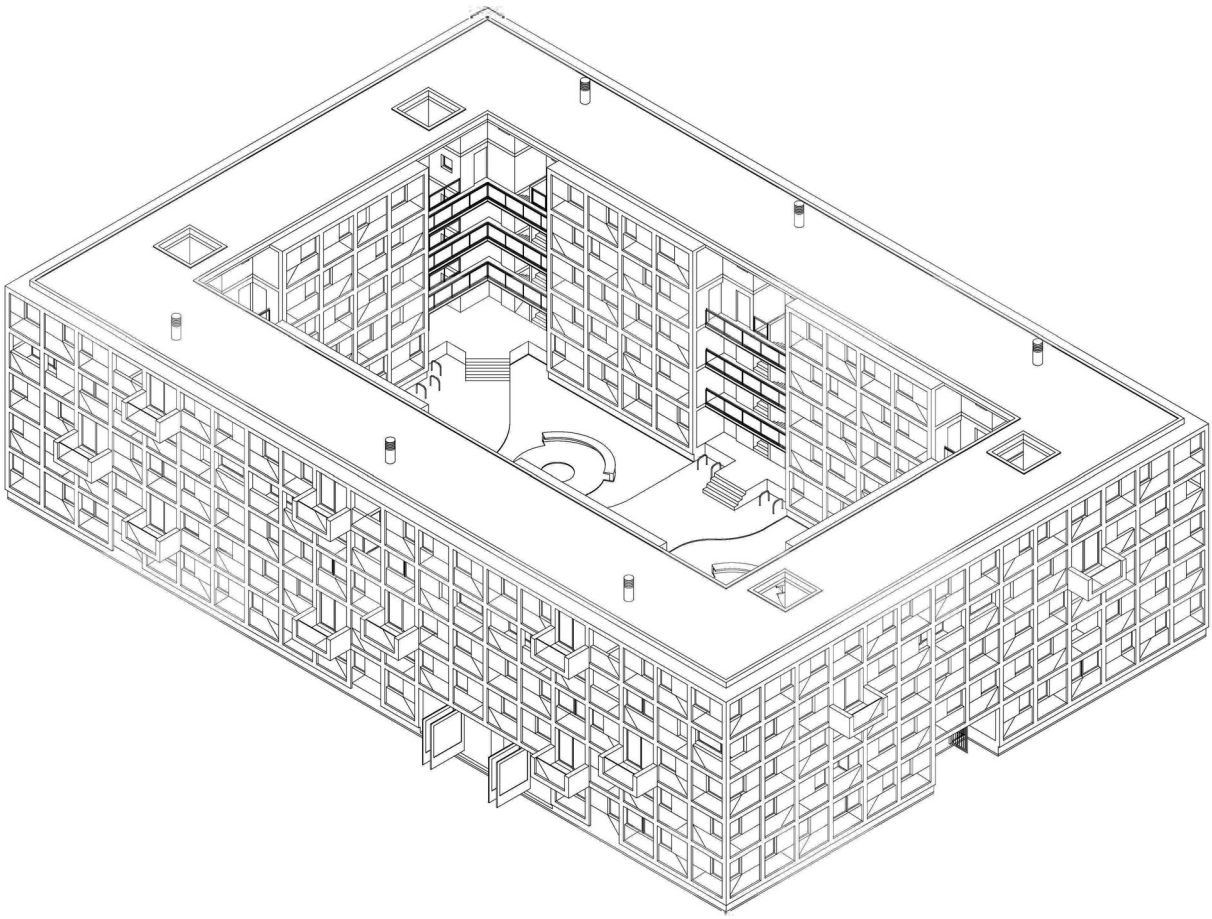
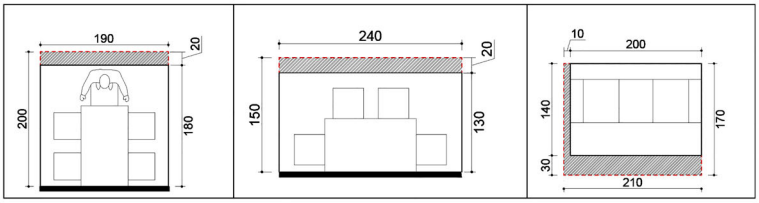


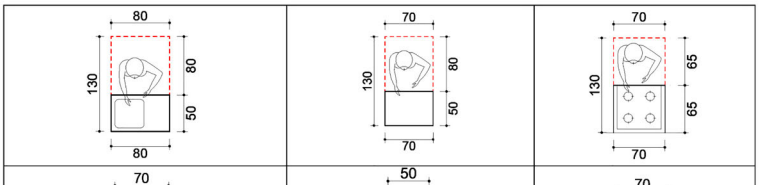
Figure 19.
Ministry of Housing's pilot project for social integration (2018), by Alvaro Arancibia and José Riesco Architects

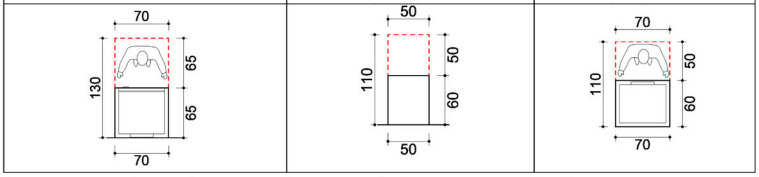
created (Fig. 19). Subsidies have since been used to incentivise mid-income groups to live in relatively dense, typically mid-rise, residential complexes with a social tenure mix to cross-finance lower-income housing in central urban areas.[66] The level of subsidy depends on the socioeconomic classification of applicants — typically 95% of housing costs for low-income, 15% for emerging, and 10% for mid-income groups.

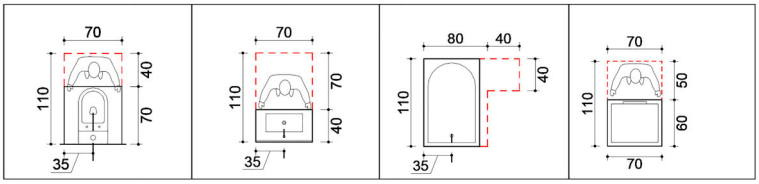
While mixing social classes in an integrated development, class-specific design standards and dwelling programmes were introduced (Fig. 20). This permits the state to regulate a broader spectrum of private housing that, for the first time, includes the middle-class sector. In the case of low-income groups, the standards are slightly more demanding by including requirements for communal areas and accessibility, controlling the design from parking areas to the dwelling interior.[67] No longer understanding rooms in isolation from one another, the new standards consider the entire dwelling unit or group of rooms

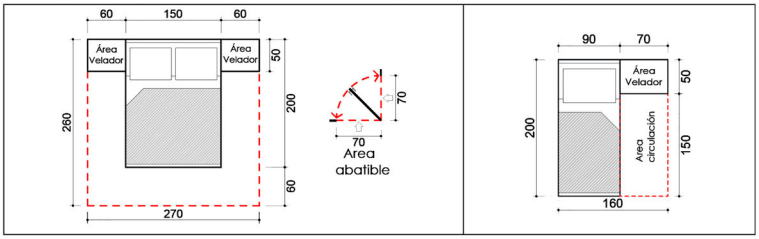
Figure 20.
Furniture schedules, (left) for low-income housing; (right) for emerging and mid-income housing, in Ministerio de Vivienda y Urbanismo (2012 and 2017)

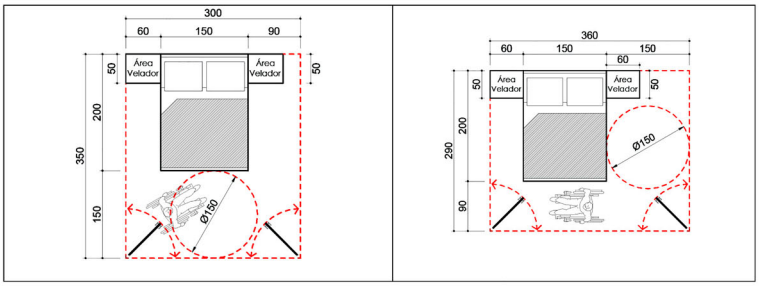


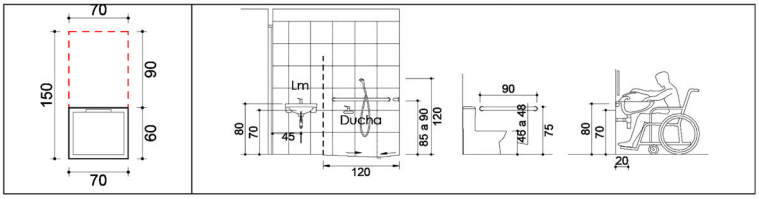












Recinto	Gráficos
Closet -Superficie Mínima Interior (m2) 0,3 m2 cumpliendo el modulo, o de 0,4 m2 con una profundidad mínimo a de 0,5m.	Gráfico N° 3 Planta Closet Elevación Closet
Baño -Superficie Mínima Interior (m^2) 2,3 m^2. Si la vivienda considera uno o más baños adicionales, la superficie mínima del baño principal podrá considerar como mínimo 2,2 m^2.	Gráfico N°4 WC Lavatorio o vanitorio Ducha o tina Lavadora

Recinto	Gráficos
Dormitorio Principal -Superficie Mínima Interior (m^2) 7,3 m^2	Gráfico N° 1
Segundo Dormitorio -Superficie Mínima Interior (m^2) 7,0 m^2 -Ancho Mínimo Útil (metros) 2,2 m **Tercer Dormitorio Construido (o más)** **Dormitorio adicional proyectado (2° o 3° según corresponda)** -Superficie Mínima Interior (m^2) 7,0 m^2 -Ancho Mínimo Útil (metros) 2,2 m	Gráfico N° 2 Area velador Area circulación Area puerta

Recinto	Gráficos
Cocina - Estar – Comedor	Gráfico N° 5 Mesa 1 Mesa 2 Lavaplato Mesa Artefacto Refrigerador
Loggia en Departamento -Superficie Mínima Interior (m^2) 1,3 m^2	Gráfico N° 6 Var Var Lavadero Lavadora
Circulaciones y/o pasillos fuera de dormitorios, cocina y baño	Gráfico N°7 Variable Circulación

Recinto	Gráficos
Escaleras	Gráfico N° 8 Circulación Peldaño típico
Calefón	

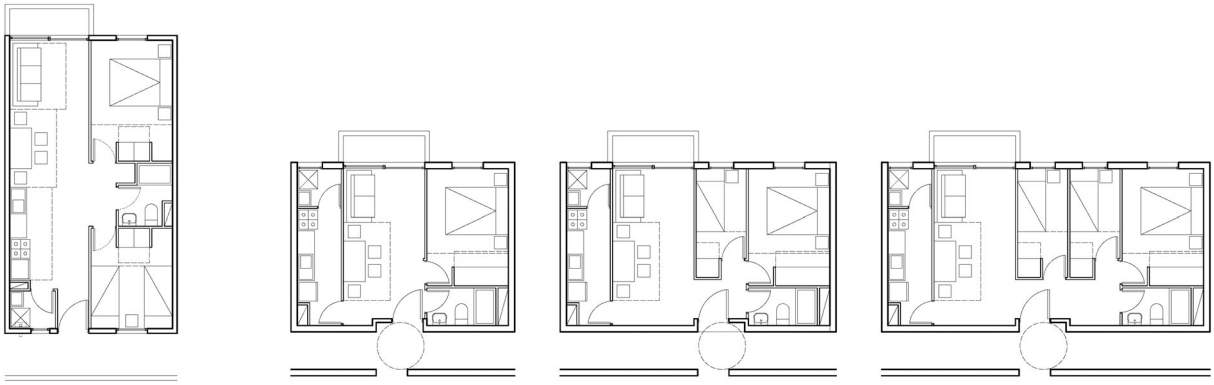


Figure 21.
Integrated housing in Recoleta by Francisco Izquierdo Architects (2017), (left) 52 m^2 unit for low-income groups; (right) 37 m^2, 46 m^2, and 55 m^2 dwellings for emerging and mid-income groups, redrawn by authors, 2021

Table 1. Minimum gross internal floor areas and storage (m^2), from Nationally Described Space Standard, Department for Communities and Local Government, 2015.

Number of bedrooms (b)	Number of bed spaces dwellings (persons)	1 storey dwellings	2 storey dwellings	3 storey dwellings	Storage
1b	1p	39 (37) *			1.0
	2p	50	58		1.5
2b	3p	61	70		2.0
	4p	70	79		
3b	4p	74	84	90	2.5
	5p	86	93	99	
	6p	95	102	108	
4b	5p	90	97	103	3.0
	6p	99	106	112	
	7p	108	115	121	
	8p	117	124	130	
5b	6p	103	110	116	3.5
	7p	112	119	125	
	8p	121	128	134	
6b	7p	116	123	129	4.0
	8p	125	132	138	

* Where a 1b1p has a shower room instead of a bathroom, the floor area may be reduced from 39m2 to 37m2, as shown bracketed.

together, defining basic functional relationships between the kitchen, living, and bedroom areas. This new understanding of the dwelling as a whole, however, is almost imperceptible due to a limited dwelling programme and compact size.

Table 2. Comparison of space standards in England and Chile, compiled by authors, 2021.

Document England (Space Standards)	Person	1-storey	2-storey	3-storey	Storage	Living	Kitchen	Scullery/ laundry*	Larder/ utility*	Parlour/ sitting*	Bath	Main bedroom	Double bedroom	Single bedroom
Tudor Walters (1918)	5	–	79.4[a] 98.0[a]	–	–	16.7	–	7.4	2.2	– 11.1	–	13.9 14.9	9.3 11.1	6.0 10.2
Dudley (1944)	6	–	92.9[b]	–	1.8[c]	14.9 19.5 14.9	10.2 9.3	– – 4.6	3.3* – 3.3*	– – 10.2*	(1.45m)[6]	13.9	10.2	6.5
Parker Morris (1961)	5 6	75.2-79.0 83.6-86.4	81.7-84.5 92.0	93.8 97.5	4.6[e]	–	–	–	–	–	–	[2.0x1.4][5]	–	[2.0x0.9][5]
NDSS (2015)	4 5 6	74 86 95	84 93 102	90 99 108	2.5	–	–	–	–	–	–	11.5 (2.75m)[6] [2.0x1.5][7]	11.5 (2.55m)[6]	7.5 (2.15m)[6] [2.0x0.9][7]
Chile (Cuadro Normativo de Espacios Mínimos para el Mobiliario)														
Design Standards (1984)	5	34	–	–	–	–	–	–	–	–	4.0 (1.8 m)[d] [1.9 × 1.1][g]	6.8 (1.7 m)[d] [1.9 × 0.8][g]		3.2 (1.5 m)[d] [1.9 × 0.8][g]
Design Standards (2003)	6	45	0.3	–	–	–	0.5*	–	–	7.3 (2.7 m)[d] [2.0 × 1.5][g]	7.0 (2.5 m)[d] [2.0 × 0.9][g,h]		7.0 (2.5 m)[d] [2.0 × 0.9][g,h]	
Design Standards (2017)	5	50[i] 52[h]	0.3 –	–	–	2.0* 1.3*	2.0* 1.3*	–	–	7.6 (2.6 m)[d] [2.0 × 1.5][g]	7.6[j] (2.5 m)[d]		3.8 (1.6 m)[d] [2.0 × 0.9][g]	

Notes: [a] for house with two twin bedrooms; [b] house with 6 people, generally min size 83.6m² is also given; [c] plus shed: 4.6m²; [d] storage in flats: 3.2m²; [e] bed size from Design Bulletin 6; [f] minimum room width; [g] bed size; [h] for low-income groups; [i] for mid-income groups; [j] twin room.

The only low-income dwelling type offered by the programmes has two bedrooms, one bathroom, and a floor area of 52 m^2, with an approximately £36,000 subsidy equating to 95% of the property price. By comparison, the mid-income dwelling sizes range from a one-bedroom unit at 37 m^2 to a three-bedroom and two-bathroom flat of 54–58 m^2, with larger unit sizes determined by market demand and not the subsidy, which sets a price range of £45,000 to £70,000 regardless of bedroom numbers (Fig. 21). Illogically, despite acknowledging variations in dwelling sizes and programmes, the standards only consider the number of bedrooms, while the sizes of the living-dining and kitchen-laundry areas remain fixed without accounting for an expected increase in occupants as space standards in England do.[68]

The increase in mixed tenure in England and Chile points to the growing problem of unaffordability in neoliberalised housing markets across all sectors. Affordability is no longer a problem just affecting low-income but also mid-income households. This is partially caused by direct and indirect subsidies and taxation supporting private-sector supply, which has created a substantial market reliance on subsidies beyond social housing.

Conclusions

By analysing space standards and design experimentation through the lens of design research, a more nuanced understanding of how neoliberal processes determine housing outcomes has been revealed, as well as the wider laissez-faire histories that shape them. This enables the context of housing preferences or stigmatisation and regulatory cultures to be considered, whether market determined or socio-culturally driven, which further reveals a wide range of approaches to neoliberal policy implementation. Evidence of increasing policy interventions, increase in subsidies to support market housing due to a crisis in affordability, and re-regulation of private housing sectors also reflect on the failed neoliberal assumption that market competition leads to improved housing standards and quality. In addition, market-dependent housing delivery has exacerbated social and economic inequalities and deprivation, creating political pressure to recognise housing as a wider social welfare benefit, reverse the residualisation of social housing tenure, and tackle the peripheralisation of subsidised housing by providing more centrally located housing near existing public services and work. Altogether, this is leading to policy that contradicts neoliberal orthodoxy, softening differences between dualist and integrated housing systems, and their approaches to regulating housing design.

Neoliberalised housing policies since the late 1970s have proven highly effective in initially reducing the housing deficit and delivering affordable homeownership in Chile, supplying about half of the homes built since 1980 at an average rate of 80,000 dwellings per year.[69] However, having spent almost £3 billion on subsidies in Santiago alone, the Chilean government recently discovered that 40% of the subsidised housing stock has to be demolished and rebuilt or extensively refurbished at seven times the original subsidy cost.[70] Despite private homeownership, this will require substantial state investment.

The private sector in England also continues to be the main benefactor of direct and indirect housing subsidies. Government spending on housing benefits to private landlords exceeds the investment in public housing construction by more than 20 times, and 75% of the £71 billion housing budget between 2019 and 2024 supports supports the private market, with only 25% going to delivering affordable rent and low-cost home ownership.[71]

Neoliberal policy has not necessarily reduced state expenditure but shifted it from a state-led and long-term supply of affordable housing to that by the private sector. Rising property values are hereby essential to turning housing into a private responsibility and social security, with subsidies now increasingly benefiting middle- and higher-income households affected by housing unaffordability. This sustained support of homeownership reduces the state's long-term housing management responsibilities. As this discussion of space standards shows, however, a neoliberal housing market is conceptually and practically a misnomer as policy intervention and subsidies remain essential to the functioning of the private housing market and affordable provision. Yet the more housing supply is market-dependent, the greater the exclusion of those on lower incomes or with marginal housing needs. Despite apparent successes like the Chilean Model, market-driven housing has given rise to new forms of vulnerability, stigmatisation, and deprivation. These considerable problems of substandard housing and social and economic inequalities have created a new 'poverty of those with a roof'.[72]

While there continues to be a need to control dwelling design, it is essential to recognise that perceptions of housing size and quality are contextual. For example, although occupancy is critical to space standards calculations and dwelling design, actual rates can significantly differ. People tend to buy or build as much space as they can afford to, and while space standards impact large homes less, a lack of space in small dwellings can greatly influence usability and wellbeing. This is, for example, evident in the incremental housing projects in Chile. With space standards assuming a specific relationship between space and activities, this can severely limit flexibility and the long-term use of homes, requiring a critical reassessment of the context, calculation, and evaluation of standards.[73]

Graphical space standards and minimum internal floor areas are, as has been discussed, not always reliable indicators of housing usability or quality. Cultural norms, technological advancements, social status, personal and family backgrounds, lifestyle, age, and many other factors influence what is accepted as 'good' space.[74] Even nationally, people use and perceive space differently. Despite a near-universal reliance on regulatory regimes of similar requirements, activities, or functions, regulatory cultures are an important factor in how these are specifically calculated and enforced. This is evident when comparing housing standards and design across time and among countries, and how they are shaped by design governance (Table 2).

In both England and Chile, typological reasoning has greatly shaped design responses to social and demographic transformations, changing housing expectations, and economic pressures. It thereby has challenged and

reinforced assumed patterns of use and their generalisation into space standards. Typological preferences have been particularly legible in England, where policies and design guides often promoted housing models representative of socio-spatial norms. Typological experimentation predominantly took place in the post-war period prior to the neoliberalisation of housing policy. Consequently, it was not only driven by questions of minimum housing standards but also notions of social welfare and changes in housing expectations. By comparison, in Chile experimentation with housing typologies was essential to improving design standards and testing their limits — resulting both in typological stigmatisation and preferences. The housing programmes of the last forty years in Santiago and the changes in design demonstrate systematic experimentation with housing typologies to challenge the limitations of dwelling programmes and space standards. However, typological and design innovations have been increasingly limited, as rising land costs and recent policies promote densification and fewer housing solutions. Arguably in both cases, neoliberal policy ultimately suppresses experimentation as design innovation is hindered by the need to find cost-effective and hence often standardised solutions.

There is an urgent need to rethink the social value of housing in relationship to notions of minimum provision, usability, and housing quality. The failures of market-driven housing policies have already led to new experimentation with alternative forms of housing in Chile, such as socially and infrastructurally mixed housing schemes, the refurbishment of housing for social rent, and housing cooperatives. At the same time, in England, there is a growing call for a wider public housing provision to deliver more affordable housing and support alternative, community-led housing.[75]

With space standards continuing to reinforce assumptions that stem from twentieth-century norms such as the family and gendered space, there is also a need for new studies on home use patterns and household composition to re-examine the evidence on which current housing is based. The socio-technical discussion of housing design and space standards thereby brings together the problem of design governance with technical, legal, and socio-spatial discourses through which housing outcomes and their responses to cultural, social, and economic contexts, as well as changing modes of living at home, can be analysed and eventually transformed.

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