Foreign & Commonwealth Office

Heliópolis Case Study

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Implementing Agency:

usefulsimpleprojects

MITSIDI PROJETOS

Supported by:

Usefulstudio

LEEP

Project Partners

Useful Simple Projects, together with our Project Partners, were commissioned by the Foreign and Commonwealth Office to support the São Paulo City Government in the design and delivery of sustainable social housing projects.

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1	Draft for comment	MB	JS	02.03.16
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3	Final	MB	JS	02.06.16

Aim of this report

This report presents a case study of the Heliópolis, a Pilot Project for the application of sustainable design principles and processes to social housing projects.

The Pilot Project was developed in collaboration between the UK and the Municipality of São Paulo, commissioned by the Foreign and Commonwealth Office.

Contents

Introduction

Housing Challenge in Brazil

Brazil faces a huge housing deficit, combined with housing inadequacy and significant levels of poverty. In 2009, the government launched the Minha Casa Minha Vida as a national programme that aims to reduce Brazil's housing deficit, provide affordable housing for low-income families, reduce slum areas and inadequate housing stock and stimulate the construction industry.

Demand for Sustainable Development

Among the challenges identified in early MCMV projects is successful integration within the urban context and surrounding communities. Some of the issues that have been highlighted include placing housing in locations away from public transport, lack of community infrastructure and cases where construction quality has been poor.

As a result, there is a demand for sustainability and placemaking to be more explicitly considered as part of future social housing projects in Brazil.

Shared experience with the UK

Brazil is not alone in tackling the challenges of providing sustainable social housing. There are many examples globally of similar social housing projects that have resulted in acute social problems that can, in part, be attributed to poor design.

The UK has a particularly rich history of social housing projects, from early 20th century slum clearances to post-war high-rise estates. The scale of housing construction in an era of austerity in Britain, followed by the subsequent decline of housing estates built in that time, provides useful insights for the challenge facing Brazil.

In recent years there has been a focus on replacing many post-war developments that have generally been regarded as low quality and poorly designed, with mid-rise developments and more traditional housing typologies. The focus of new housing developments is very much on the creation of sustainable neighbourhoods that promote environmental performance, construction quality and enhance the quality of life of residents.

In the current UK climate, social housing is no longer exclusively delivered by the government, but increasingly by the private sector as mixed use developments. Social housing is included alongside private sale, intermediate (key worker or part-buy-part-rent) and is 'tenure blind'.

Sustainable Development Pilot Project

Heliópolis, a large social housing development in São Paulo, has been selected as a pilot project to demonstrate how sustainable development principles and process can be utilised to raise the quality and environmental performance of housing developments, contribute to stronger and more cohesive communities, reduce Brazil's carbon footprint and the costs of living for some for its poorest inhabitants.

The Heliópolis project is being delivered by the city's Municipality of Housing (SEHAB) as part of the MCMV programme. It will provide 4,000 social housing units on a brownfield site on the northern edge of the existing Heliópolis favela situated in the Ipiranga neighbourhood in the south-east of the city.

The aim of the project is to share experiences between the UK and Brazil, and through the pilot project, inform the masterplan for the São Paulo, contribute to improving standards for social housing standards and influence future developments in Brazil.

Project Partners

Useful Simple Projects, together with our Project Partners; Mitsidi, Useful Studio and LEEP, have been invited by the Municipality of São Paulo to assist with setting the sustainability vision for the Heliópolis Pilot Project and to review and make recommendations for the design proposals. The project has been funded by the Foreign and Commonwealth Office as part of an umbrella programme of work with the City of São Paulo to promote sustainable growth.

Typical slum areas in Brazil

Typical MCMV projects

Post-war slum clearance in the UK

Demolition of post-war high-rise estates in the UK

Overview of Heliópolis

Location

Heliópolis is one of the largest favelas in São Paulo, located in the Ipiranga neighbourhood in the south-east of the city. It is home to approximately 80,000 people, the vast majority of which live in self-constructed dwellings.

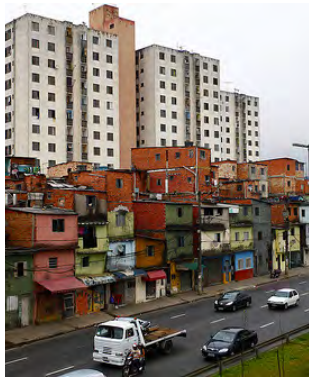
History

Heliópolis takes it's names from Vila Heliópolis, so-called by Countess Alvares Penteado in 1923 when the area was largely open land. It remained an open leisure area until the 1970's when occupation began. Heliópolis rapidly grew into one of the largest favelas in the city. During the 1980's residents began campaigning for improved living conditions that ultimately resulted in the land being transferred to COHAB in 1987. COHAB divided the area into 14 Glebas and initiated improvement works and interventions that have continued over the past three decades.

Site Opportunity

A large vacant brownfield site on the north-east corner of Heliópolis offers an opportunity for social housing development. The site has been under the long-term ownership of Petrobras, and is currently in the process of being transferred to the Prefeitura of São Paulo.

Site location within Heliópolis

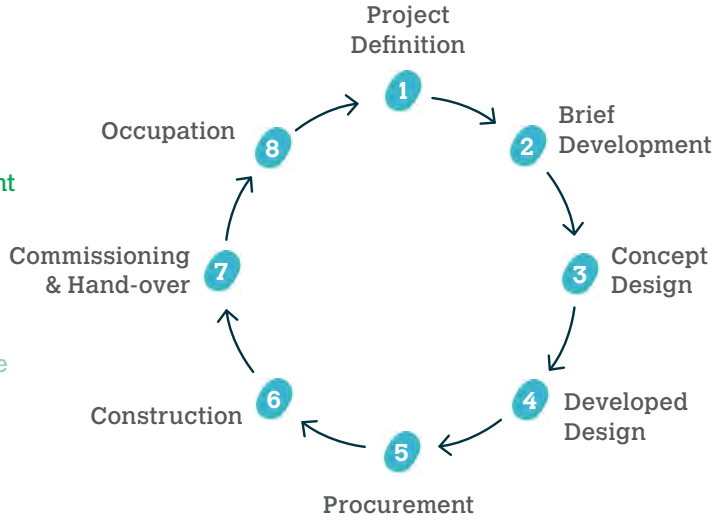


Typical self-constructed dwellings

Aerial view of Heliópolis from the north-west illustrating COHAB interventions


Aerial view of the site from the south-west

Our Approach

Sustainable design must be embedded in the approach to the design and delivery of projects. USP have developed a framework for approaching sustainable housing projects based on setting sustainability objectives, following a sustainable development process and applying urban design principles. This framework has been applied to the Heliópolis Pilot Project.



Sustainability Objectives

Successful sustainable developments respond to a clear vision and articulation of objectives, agreed with the range of stakeholders involved in the project. In building consensus among stakeholders, it is helpful to develop a common language and precise understanding of sustainable themes and priorities. USP have developed 8 sustainable development themes that can be tailored for different projects and different contexts.

Sustainable Development Process

To ensure the sustainability vision is achieved, a clear process for delivery is essential. The delivery process sits as part of the overall management process, with different actions at each stage of the design process for different stakeholders/members of the delivery team. Following the sustainable development process illustrated can ensure that sustainability is embedded, rather than bolted-on to the design.

Sustainable Design Principles

Successful housing developments are based on good design. Good design makes an essential contribution to the sensitive integration of new developments in surrounding areas and communities. USP consider urban design at 3 different scales: neighbourhood scale, block scale and unit scale.

Our Approach

Project Context and Site

In order to be able to develop recommendations for the successful urban integration of the Heliópolis project it was important to gain an understanding of the project context and site through research and analysis.

Mapping and analysis

Existing site conditions were mapped and analysed to understand the site opportunities and constraints. Mapping included topographic levels, existing trees,planting and environmental conditions, surrounding building typologies and transport connections

Site visit

To better understand the Petrobras site and the surrounding context the project team spent a day on site observing and recording the existing conditions.

Minha Casa Minha Vida

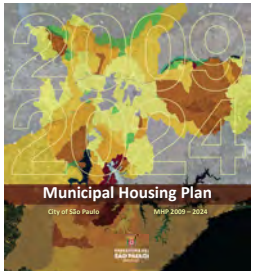
The Heliópolis project will be delivered as part of the national MCMV scheme, which follows particular standards and processes that the project team had to familiarise themselves with.

Policy and Guidance

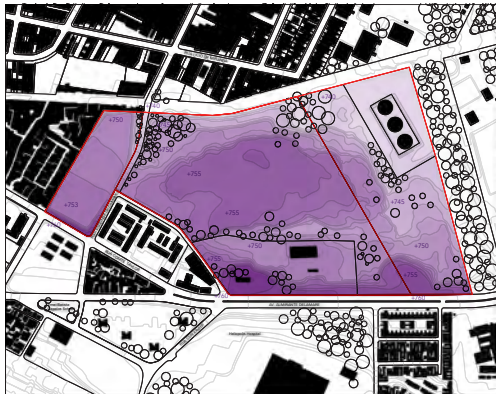
Developments are subject to a range of policies and guidelines that affect proposals. The Heliópolis project is influenced by the São Paulo Urban Plan and Municipal Housing Plan at a city scale, which impose certain constraints such as density, areas for non-residential use, and maximum block sizes. At a neighbourhood scale the Heliópolis project must align with the Heliópolis and Tamanduatei urban plans, which include transport connections, use zoning and amenities.

Stakeholders

As part of the sustainable development process it is important to map and understand stakeholders. The Heliópolis project stakeholders include federal, state and municipality stakeholders alongside private contractors, local communities and the project team.



Prefeitura Policies and Plans



Mapping and site analysis

Site photos

Our Approach

Review of Previous Housing Schemes

The project team visited several recent social housing schemes in Heliópolis to observe and analyse how sustainable design principles have been employed. Observations and understanding gained from reviewing previous housing schemes contributed to the brief and priorities for the Heliópolis Project.

'Missing' Design Principles

Where certain design principles were not included as part of social housing developments they had been added by residents over time. The project team saw examples of self-constructed commercial spaces to bring mixed-use to developments, self-built garages for secure parking, low fences installed to create defensible space and gates erected to divide large units blocks into smaller clusters. Such evidence of residents adapting developments to better follow recommended design principles supports the application of them in the São Paulo context.

Public / Private

A key observation was a different approach to the relationship between public and private spaces: The projects we visited lacked successful interaction between the urban public context and the residents' private spaces. Projects were generally either too public, leading to lack of security and ownership, or too private with residential blocks turning their back on the street and shutting themselves off behind barbed wire fences. In either scenario the challenges of creating positive interactions between the public and private realm affects the urban integration of social housing schemes.

Location of previous projects in Heliópolis


1. Gleba A Conjunto Habitacional, completed 2007


2. Gleba H, 162 units, completed 2011


3. Gleba K Comandante Taylor, 421 units, completed 2012


4. Gleba G, 420 units, completed 2013


Self-constructed garages to provide secure car parking in Gleba A


Self-erected defensible space Gleba G


Resident-built mixed-use, Gleba A


Barbed wire fence around the Gleba K development


Gates installed by Gleba A residents to create smaller unit clusters

Our Approach

Working Collaboratively with Stakeholders

Throughout the process the project team has worked in collaboration with project stakeholders: regular meetings and workshops have been held with the São Paulo Municipal Housing Secretariat (SEHAB) to develop recommendations for the site, work has been done with Caixa to review how the project can be delivered as part of MCMV and the project team facilitated a week-long workshop of mutual knowledge exchange and learning with the Prefeitura in São Paulo.

The Project Team during the week-long workshop in São Paulo

Our Approach

Establishing the Brief

Having understood the project and site context the team worked with the SEHAB to establish the following brief for the Heliópolis Project, as part of the sustainable development process:

- 3,000 – 3,500 units
- Commercial uses (min. 9,940 sqm), institutional facilities (min. 5,346 sqm) and green spaces (min. 8,215 sqm) to be provided
- Total non-residential uses not to exceed 20% of the site area
- In addition to the green spaces a large public park is to be provided along the eastern edge of the site
- Maximum utilisation coefficient of 4-6
- Existing petrol station on Avenue Almirante Delamare to be retained
- The eastern part of the original site has been excluded due to contamination and risks associated with the existing gasworks, reducing the development area from approximately 20 hectares in approximately 14 hectares
- The north-western part of the site, separated from the main site by Rua Visconde de Camamu, will form Phase 1
- A new primary road will be constructed along the north eastern boundary, Rua Marciel Parente; the proposals should provide a suitable frontage to this road
- New cycle routes to be provided, including a main route connecting Rua Marciel Parente and Avenue Almirante Delamare along Rua Projetada 2
- Preference for 200 units per condominium with a maximum of 300 units
- All residential units to conform to MCMV standards
- Lifts required for blocks more than 5 storeys

Setting the Vision and Objectives

Successful sustainable developments respond to a clear vision and articulation of objectives. In collaboration with stakeholders the project team developed a vision for the Heliópolis Project under Useful Simple Projects 8 key themes. The vision for Heliópolis was then developed into a set of objectives.

Environmental Enhancement

The Heliópolis site is a valuable green space in the middle of the city, which should be protected and enhanced as an integral part of creating a comfortable microclimate and mitigating flood risk.

The development will address the contamination issues on the site, reduce ground, air and water pollution, and minimise pollution resulting from the development to provide healthy external and internal environments.

Resource Efficiency

The Heliópolis Project will utilise resources in the most efficient and economical way to minimise waste and use, conserve São Paulo's scare water supplies, reduce costs and maximise potential.

Community

The Heliópolis Project will create a strong, secure and safe community that enables residents to live healthy, happy and productive lives. The new development will be successfully integrated into the existing context and communities.

Placemaking

A key challenge with housebuilding at scale is to create a unique identity and sense of place. In designing the Heliópolis Project, we will draw on historic and cultural references to ensure a unique place that it embedded in its context. The aim is to create a great place to live that residents will value and take pride in.

Connectivity

The Heliópolis Project will enable easy access to public transport networks and encourage sustainable modes of transport such as cycling and walking. It will be build-off a robust infrastructure platform that includes all utilities, communications and services.

Resilience

The Heliópolis development should be resilient and adaptable to changing demands. We are particularly interested in how changing climate and demographics will impact the masterplan

Financial Stability

As a mixed-use development the Heliópolis Project will incorporate entrepreneurial and economic opportunities for residents, start-up companies and local businesses. Cultural, educational, commercial and sporting facilities will offer further job opportunities.

The Heliópolis Project will consider the whole life cost of the development; it will be designed to utilise funding efficiently, ensure value, maximise the longevity of the initial investment and minimise the costs of operation and maintenance.

Governance

The Heliópolis Project will ensure the design and delivery of the sustainability objectives through constructive governance and leadership. Successful governance will contribute to the quality, success and long-life of the project. Effective and meaningful collaboration with project stakeholders and communities will be integral to the design process.

Our Approach

Applying and Testing Design Principles

Successful housing developments are based on good design: Good design makes an essential contribution to the sensitive integration of new developments in surrounding areas and communities.

The project team developed a set of design principles at neighbourhood, block and unit scale that were applied to the Heliópolis Project.

Neighbourhood scale

Neighbourhood scale considers the whole development site as part of the wider urban context. Successful developments are stitched into their existing context to ensure both the integration of new developments with surrounding neighbourhoods and the ability of new developments to foster complex and rich communities where people can live, work and play.

Neighbourhood scale design principles include:

- Road hierarchy
- Connections to context
- Neighbourhood centre
- Public, green and blue spaces
- Mixed use
- Density / typology / massing
- Ground conditions
- Microclimate
- Ecology
- Surface water management
- Soundscape
- Infrastructure
- Transport orientated design
- Heritage

Of these principles creating a centre, mixed use, density/ typology/massing, ground conditions (topography and contamination) and environment were identified as priorities for the Heliópolis project.

Block scale

Block scale might focus on one building alone or a small cluster of buildings within a phase or development parcel. Well designed blocks are efficient, create successful relationships between public and private realms and enable safe, strong communities. The design at block scale also has a significant impact on the environmental performance and conditions of a building.

Block scale design principles include:

- Orientation
- Layout
- Boundaries
- Security
- Entrances
- Unit clusters
  Shared spaces
- Outside space
- Parking
- Services
- Maintenance
- Adaptability
- Materials
- Building Fabric

Of these the principles relating to the relationship between public and privates spaces, resource efficiency and low maintenance were identified as priorities for the Heliópolis project.

Unit scale

Unit scale is concerned with the layout and performance of individual housing units to achieve comfortable, flexible, high-quality and energy efficient homes.

Unit scale design principles include:

- Layout
- Daylight, sunlight and ventilation
- Privacy
- Fittings and finishes
- Flexibility / adaptability
- Utilities and waste storage

Standard unit layouts as part of MCMV projects are quite compact, efficient layouts, therefore unit layouts were not considered in detail as part of the pilot project.

The Concept Masterplan

Scheme Overview

We have created a vision for a new sustainable community in Heliópolis. The neighbourhood plan is a pattern of city blocks that connect with the surrounding districts while forming its own focus around a new public open space. Our vision is informed by case studies form Europe and can be developed with the municipality and the stakeholder groups to provide affordable secure living but also a vibrant street-life, focus for the community and a real sense of place.

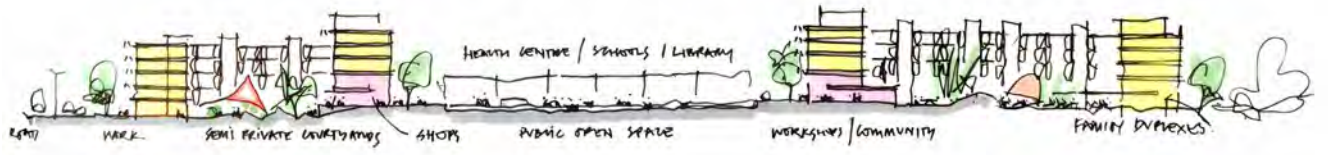
The new neighbourhood offers precious natural environments within the city; enhancing the existing green space through extensive tree planting, vegetation, landscaped courtyards and parks. Abundant planting contributes to achieving a comfortable and pleasant microclimate.

The blocks are an attempt to optimise both the site dimensional constraints and also the cap of 200 units per block. A mixture of compact single aspect and dual aspect 2 bedroom flats are modularised to maximise efficiencies and reduce plot size to maintain high densities.

The integration of some commercial, parking and institutional uses into the blocks is proposed. This enriches street-life and defines an urban grain that will encourage good citizenship through uses with public active frontages. These combined with courtyard residential screening envisages secure blocks that can be achieved with a mix of uses giving back to the street a sense of activity and high quality public realm.

Blocks maximise passive design techniques to ensure adequate light and thermal comfort as part of a low-energy, resource efficient development that will be easy to maintain and affordable to run for residents.

Recommended Masterplan proposals



Section through the public square at the heart of the masterplan

The Concept Masterplan

Key Neighbourhood Principles

Massing / Typology / Density

Massing is based a mid-rise, high-density courtyard typology to achieve approximately 215 units / hectare or circa 3,000 units across the site.

Blocks are typically 5 storeys, the maximum allowable above/ below the main entrance level without requiring lifts. The natural topography is then exploited where possible to add extra storeys.

Taller blocks are concentrated around the central public space and at the edge of the site along the surrounding primary roads.

10+ storeys
8 storeys
7 storeys
6 storeys
5 storeys
1-3 storeys

Road Hierarchy and Connectivity

The neighbourhood plan creates and responds to a clear hierarchy of roads across the site that connect to the existing road network and surrounding communities.

Existing primary roads bounding the site are connected by new primary routes across the neighbourhood, in turn these new routes are connected by a further primary road. Active frontages and mixed-use are concentrated along these main roads.

Radial routes form the secondary road network; these roads are typically residential, quieter and greener.

Existing Primary Road
Proposed Primary Road
Secondary Road
Green Radial Route

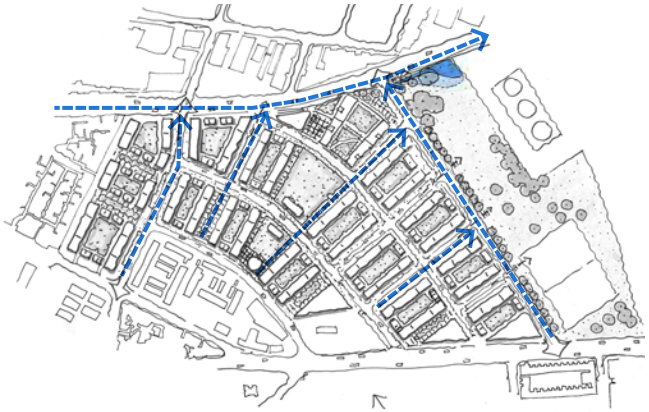
Heart / Public Spaces

At the centre of the neighbourhood is a large public space that is intended as a gathering space for the community that could host events, markets or pop-ups. Mixed-uses, including a school, are concentrated around the public space to provide vibrancy.

Central Public Space
Park / Green Space

The Concept Masterplan

Key Neighbourhood Principles



Mix of uses

The Heliópolis project will create a new neighbourhood where residents should be able to live, work and play, which requires a mix of uses alongside residential units.

Retail units, cafes and restaurants line the primary roads contributing to an active, safe streetscape. A school occupies the ground and first floor of a block that faces onto the central pubic space, activating the plaza during the day. Workspaces and community uses are located on the lower levels of blocks on the perimeter of the site, making such amenities accessible to surrounding communities.

A programme of meanwhile uses is recommended to encourage use of the site during development and to help initiate the founding of new communities.

School
Community
Workspaces
Retail / Cafe / Restaurant

Environment

The environmental strategy for the site is based on retaining and protecting the value of the existing site as an established green space within the city.

Existing trees are retained as far as possible and an abundance of new trees and landscaping are established early to contribute to a comfortable microclimate and rich ecology.

The neighbourhood plan creates a network of green spaces, varying in character, that form part of green corridors connecting to adjacent neighbourhoods.

Public Park
Public Space
Shared Residents Courtyards
Green corridors for walking and cycling
Connection to wider green network

Water

A sustainable surface water drainage strategy is designed to ensure no surface water flooding fro 1 in 5 year events and no significant risk of flooding for 1 in 100 year events, taking into account the potential impact of climate change.

Existing ground conditions and contamination are not suitable for infiltration drainage, therefore surface water drainage is discharged into local drainage ditches and sewers following attenuation to match existing discharge rates. An attenuation pond is integrated into the landscape in the lowest part of the site within the park.

1,300 m^3 attenuation volume to control flooding for events up to 1 in 100 year. 2,800m^3 with 30% climate change allowance (*)
2,700m^3 attenuation volume to ensure no surface flooding for 1 in 5 year (*)

(*) Preliminary attenuation volumes based on site area of 13ha and 1/3 soft landscape in proposed plan

The Concept Masterplan

Key Block Principles

The block design has been driven by the need to achieve a high-density development within a limited number of storeys to limit the requirement for elevators. The recommended layout achieves 180 units over 5 storeys, divided into 4 clusters. A generous central corridor with voids enables cross ventilation to units.

A degree of flexibility is built into the block design to enable it to be adapted to given conditions across the site, for example where the natural topography enables additional storeys to tucked beneath the primary entrance level or for different shaped/sized plots.

Courtyard

Each block is arranged around a central courtyard that provides secure shared green and play spaces for residents. Open cores and gaps in the block provide glimpses into the courtyard from the surrounding streets.

Ground Floor Uses

The ground floor arrangement plays a vital role in how the block will be integrated in the wider urban context; the recommended block design offers the possibility of varying ground floor as appropriate to its location and orientation. Along quieter residential streets blocks have residential units and/or parking at ground floor, while on busier streets the ground floor is used to animate the streetscape with commercial and community uses.

The use of high-quality boundaries and defensible space balance privacy with passive surveillance and generating an active frontage to the public realm.

Typical block section through the central shared courtyard

Blocks with all residential units | Blocks with parking | Blocks with commercial uses | Blocks with community uses

Tranquil and green residential courtyard, Paris

Low maintenance residential courtyard, London

Open access core precedents

High-quality boundaries

The Concept Masterplan

Key Block Principles

Shading and Thermal Comfort

The key objectives of the environmental design at block scale are to use passive design techniques to keep the building from overheating in summer and keep warm in winter without the use of active systems. Preliminary modeling to assess the block layout was undertaken as part of the design process.

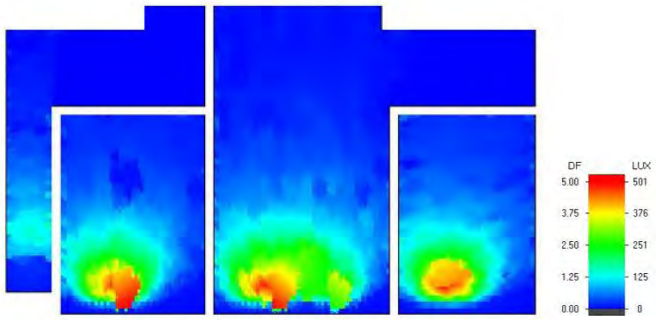
Blocks are orientated so that each facade has access to natural light over the course of the day, with additional shading provided where required to prevent solar gains. Abundant tree planting also helps shade block elevations.

The treatment and size of windows is considered to provide adequate natural ventilation and balance the need for solar shading against daylight. Typical MCMV specified windows only allow for 45% of the available area to be utilised for ventilation and/or light, it is recommended that 100% of the specified area be available and tests conducted on a scheme by scheme basis to ensure adequate ventilation and lighting levels are achieved.

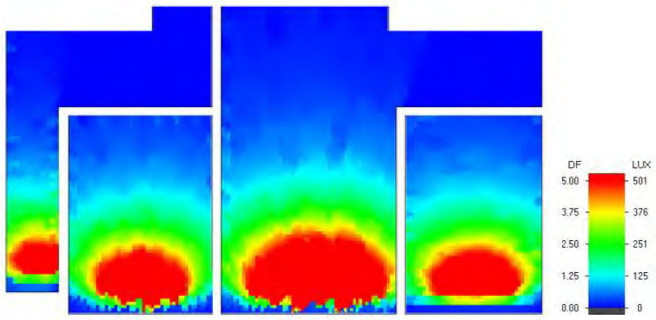
Daylight analysis of the block design shows that on average a daylight factor in excess of 2% is achieved, in accordance with best practice.

For thermal comfort the building fabric is designed to achieve NBR 15.575 'superior' performance levels, that requires walls to have a U-value below 3.7 W/(m²K) and the roof below 2.3 W/(m²K), and that peak internal temperatures in living spaces should be 4°C lower than peak external temperatures. Blocks are painted white or light colours, with absorptance levels below 0.3 to minimise solar gains.

Thermal modelling carried out using the ASHRAE 55 adaptive thermal comfort model for both winter and summer conditions included 'critical' units on the top floor facing north or west as well as typical units. The initial results are promising and show limited overheating. Further simulations should be conducted during the detailed design stages to develop and confirm the thermal performance of the blocks.



INADEQUATE SOLUTION : Daylighting test illustrates that the three part sliding windows typically used in MCMV projects do not provide adequate daylight



POSITIVE SOLUTION: Daylighting tests show that if the whole area specified by MCMV is available then adequate daylight is achieved

PVs

Photovoltaics are incorporated into the block design in order to provide a renewable, affordable and secure energy source for residents.

In São Paulo's climate, a well designed PV installation can be expected to generate around 1.250kWh/kWp/year.

The energy generated by PVs can be used in social housing to reduce the energy bills of the homeowners or to feed in to the condominium's energy bill, which usually represents around R$50 per month in typical MCMV apartment blocks, of which around R$6/month is the energy cost of the common parts. The homeowners' own energy bills are much greater, but installation of PV systems to meet the demands of the users is complex, and the financial viability is currently being studied by Caixa Econômica.

A block of 180 dwellings should be able to meet its estimated energy consumption demand in the common parts with the installation of a 25kWp PV system, composed of 100 panels and a single inverter. This could be financed through the PEE (Energy Efficiency Programme), provided by the energy utilities.

The Concept Masterplan

Conclusion

The collaboration between the UK and the Prefeitura has identified a number of shared challenges in delivering sustainable social housing projects. We have applied UK expertise in overcoming these challenges to the Heliopolis project.

Through the project we have demonstrated the importance of taking a design approach to housing projects. In particular the need to:

- Be clear about project outcomes
- Respond to local context and undertake background studies to support understanding of the local environment
- Undertake feasibility studies to test different ways of achieving objectives
- Work in a cross-disciplinary way to integrate design solutions and achieve more holistic outcomes
- Value design in the development of places that are distinctive

Further work will be required in the next stages of project development to continue to test and develop the proposals. We recommend that the steps set out in the sustainable development brief? are followed to embed sustainable development within the delivery process. It will be particularly important to:

- Undertake further testing and explore the contamination issues on the site and appropriate mitigations strategies.
- Carry out a local needs assessment to establish requirements for community facilities and retail, from which a strategy for their delivery should be undertaken.
- Develop the design with input from those responsible for transportation and public parks to ensure that proposals can be implemented.
- Establish the procurement route and engage with potential contractors, to ensure that sustainability principles and technologies are understood, and requirements are embedded within contractual arrangements.

By exploring how lessons learnt from the UK could be applied to the pilot project in Heliopolis we have been able to make recommendations for the delivery of sustainable places, both through the MCMV scheme and more widely through similar programmes as set out in the next section. The Pilot Project Team hope that the output of this collaboration can contribute to the body of evidence on how sustainable housing projects can be developed and the value of UK expertise in supporting Brazil in the delivery of a sustainable built environment.

Recommended Masterplan proposals

Recommendations for Delivery of Social Housing Projects

Delivering Sustainable Places

It is very easy to establish a sustainability vision, but far more difficult to deliver it in practice. It requires those involved in project delivery, from planners and designers to funders and the local community, to think and act in a different way. However, cultural, financial and political barriers can often present difficulties in achieving sustainable development and mean that business as usual paths are easier to implement.

Through the pilot project, we also discussed with the project stakeholders how sustainable development principles could be delivered in practice. Workshops and discussions were held with the Prefeitura of Sao Paulo, the Ministry for Cities, and Caixa Economica to explore the barriers to implementation and possible solutions on how they may be overcome.

Based on these discussions, and drawing on UK practices, we developed recommendations which can enable the development of sustainable communities.

Developing a Shared Vision amongst Stakeholders

As part of the brief for Heliópolis, we have set out a vision and set of objectives, developed with the project team to clearly describe the aims of the development. Ideally, this framework would be used to engage a wider group of stakeholders including government bodies, funding agencies and the local community so that every one has a shared understanding of what sustainable development means in the context of Heliópolis. As part of this process, strategies for delivering the objectives can be identified and responsibilities assigned.

Key Recommendations

- Overall objectives are agreed amongst relevant stakeholders
- Responsibilities for delivering specific objectives are assigned to key members of the delivery team.

Creating Mixed Use Communities

One of the challenges for the MCMV programme is that funding is provided only for housing. Hence, Municipalities have to ensure additional funding is available for any community facilities within the scheme such as nurseries, schools, health centres, and community shops. The ideal is that these are incorporated within the ground floor of residential buildings to maximise the value of land as illustrated in the Heliopolis pilot project.

There is also some concern about how retail areas can be managed to create the right mix of activities. Through the visits to inform the Heliopolis projects, it was observed that community run retail activities tended to be limited to individually operated bars and salons. Allocating units to individuals in a fair and transparent way was also considered challenging. Within the workshop held, there was appetite to reconsider the retail approach in a way that benefited the community rather than the individual.

In the UK, retail and commercial activities are controlled through strict zoning laws as illustrated in Box 1. Each of these types of facilities is licensed and operators have to apply for a change of use. This does require policing of retail spaces but this can equally be done by the local community informing local government of any illegal changes in use.

Tenants of retail outlets are private businesses who rent or purchase retail space. In addition to recognized brands, independent retailers are encouraged; this includes community run shops. Even community shops are legally constituted using the form of a 'Community Interest Company'.

Taking a more market based approach to include known brands such as smaller supermarkets and banks will also help shift the feel of social housing to create safer and more prosperous environment. These anchor tenants can also help contribute towards development costs in exchange for long term rental contracts.

UK Zoning Principals

A1 Shops
A2 Financial and professional services
A3 Restaurants and Cafes
A4 Bars
A5 Hot food takeaways

B1 Offices
B2 General Industrial
B3 Storage and Distribution

C1 Hotels
C2 Residential Institutions
C3 Dwellings

D1 Non-residential institutions
D2 Assembly and Leisure

Box 1

Recommendations for Delivery of Social Housing Projects

Key Recommendations

- Consider mechanisms and pooling allocations from other government departments to provide additional funding for community infrastructure.
- Refine zoning requirements and enforcement mechanisms to provide a broad range of community retail facilities. This should be based on a needs assessment to ensure facilities are financially sustainable.
- Consider different models for operating community facilities including:
  - » Community Interest Company for community led shops and activities where profits are reinvested for the benefit of the community, rather than the individual.
  - » Anchor tenants of known brands on a leasehold or freehold model where revenues from rents are reinvested in the maintenance of community infrastructure.
- Consider special purpose funding vehicles for strategic or significant development projects which marshal a range of funding sources to deliver mixed use communities with a range of facilities.

Mix of Tenures

Housing developments in the UK are typically mixed tenure, with affordable (social) and private being combined on one site. Sometimes social housing is peppered throughout the development, but more commonly it is located in a separate building or has separate entrances. The aspiration that housing is 'tenure blind' has been developed in response to historic social problems created by isolated poorer communities.

The mix of tenures includes:

- Social rented (discounted from market rent)
- Shared ownership models
- Market rented
- Full ownership

Social rented and shared ownership models are usually managed through Housing Associations, specially constituted local organisations with responsibility for allocating and maintaining housing.

Under the MCMV programme, housing is owned by residents who pay back the cost through rent over a certain period of time. The maintenance of the building is therefore the responsibility of residents, which can lead to problems if there is a great disparity of earnings and hence varied ability to contribute to the upkeep of a building.

Considering a rental model whereby the government can retain the asset and is invested in its upkeep may provide an attractive alternative approach.

Key Recommendations

- Consider social rental models as a complimentary alternative to MCMV approach.
- Promote approaches which are inclusive and do not outwardly differentiate between income levels

Working in an Integrated Way

On large projects such as Heliópolis it is vital that all stakeholders work together to generate and deliver fully integrated design solutions. One of the challenges identified through the Heliópolis project was the difficulty in seeking involvement of different representatives within the Prefeitura at the critical early stages of the project; this was due to the way in which department funding is allocated. This meant that bringing together departments responsible for urban planning, housing, parks, and transport, to ensure that at a strategic level the proposals for the Heliópolis are integrated into the wider development context, was extremely challenging.

For strategically significant projects, it would be beneficial to hold an early stage workshop with multiple departments to:

- Agree the vision for development
- Identify opportunities to resolve multiple challenges through development of, for example, schools provision, new cycling routes, public park provision etc.
- Identify ways in which different funding sources might be allocated to maximise investment returns, considering social and environmental value alongside economic value.

Key Recommendations

- Consider mechanisms to engage multiple departments in the early stages of project development, particularly for strategically important and significant projects like Heliópolis.

A Clear Brief for Sustainable Development

The brief for development is especially important. People will deliver what you tell them to deliver so if sustainable development objectives are not included at the outset, it will be harder to embed these at later stages.

The Heliopolis project illustrated how this could be done in practice, translating the initial vision into clear and practical requirements through different stages of the project lifecycle.

Through the workshops, all identified their roles in demonstrating leadership in this area.

Key Recommendations

- The Ministry of Cities and Caixa Economica to include sustainable development requirements in their policies
- Municipalities and state organisations responsible for delivering housing to include requirements for sustainable development which are translated into project specific briefs.

Recommendations for Delivery of Social Housing Projects

Design Standards and Specifications

A number of international design standards have been established to drive sustainable design practices; these include LEED, BREEAM and the Code for Sustainable Homes. Whilst they can be quite prescriptive, and in that way are very different from briefs, they have undoubtedly raised awareness of sustainable design practices. In the UK, local planning authorities require that new developments achieve high ratings and will not grant planning permission until developers provide sufficient evidence to demonstrate how these will be achieved. Sustainable design standards have been particularly successful in driving energy and water efficiency, and promoting transit orientated development. Ensuring new housing fits within proposals for transport is especially important for a city's social, environmental and economic sustainability.

In addition, both the UK and MCMV programme have design standards that govern layouts and detailing of social housing. As part of this project, we have reviewed how the MCMV standards support the sustainable development ambitions of Heliópolis. A detailed appraisal is indicated on the adjacent page.

The Transit Orientated Design Standards offer another benchmark to demonstrate how well connected communities are. This is especially important for social housing projects, to ensure that lower income residents have affordable access to economic opportunity and community facilities.

We recommend that CAIXA develop a more holistic approach to reviewing how new schemes deliver more sustainable homes. This could include specific targets for water, energy and ecology, based on regional climates. However, sustainable designs and in particular, sustainable placemaking, can require a more subjective appraisal.

Design Review Panels

Key Recommendations

- Consider the development of a flexible process and set specific targets for sustainability management on MCMV projects as part of the funding approval process
- Review and develop design standards and specifications for MCMV
- Consider how Transit Orientated Design Standards can be applied at a strategic level

As highlighted above, judging a development's contribution towards placemaking can be more subjective. In the UK, proposals for significant projects are typically presented to Design Review Panels (DRP). The DRP is a tried and tested method of promoting good design and is a cost-effective and efficient way to improve quality. DRPs are normally independent bodies of leading built environment experts, such as architects, engineers, researchers, sustainability advisors, landscape designers and urban planners, who offer independent and impartial advice on development proposals during the conceptual phases of design. The process works by design teams submitting documents for review during the concept (Basico?) phase of design. Following a site visit, the design team presents the design to the panel. The panel asks questions and makes recommendations which are captured by the panel chair in a report. It is then the responsibility of the developer to take on board the recommendations before submission for planning approval.

Local DRPs are an essential part of the planning process in the UK; for example, each of the London Boroughs has its own DRP who consider most large planning applications. DRPs are also set up for special projects such as the London 2012 Olympics or the new HS2 rail link. Professionals often will give their time for free in exchange for the profile and kudos of being associated with the DRP. The principles and practice of DRPs is set out in a guidance document published by the Design Council.

We suggest a DRP is established by Municipalities to review larger significant schemes. The panel could be drawn from representatives across the urban design, engineering and sustainability disciplines to drive and promote sustainable urban design.

If successful DRPs could become an integral part of the MCMV programme to ensure good sustainable and urban design is applied to every project.

Key Recommendations

- Establish Design Review Panels to promote sustainable approaches for social housing schemes.

MCMV Specifications

Caixa set minimum specifications for MCMV projects concerning the sizes, layout and finishes to units, infrastructure and services provision and accessibility.

Some of the specifications are very useful for ensuring reasonable standards, however others are potentially detrimental to urban integration or do not go far enough to ensure sustainable development.

Windows

As recommended as part of the block environmental strategy, the window area requirement should be developed to ensure adequate free opening area is provided and an acceptable daylight factor achieved.

Condominium Enclosure

MCMV requires a 1.8m high fence around the perimeter of condominiums, whilst this approach provides a secure

boundary it creates gated communities and contributes little to the public realm.

We strongly recommend this requirement be reviewed and alternative methods of creating a secure boundary are considered that allow for better urban integration and a more positive contribution to the streetscape. The recommendations in section 2.8 include suggestions for condominium enclosure.

Programa Minha Casa Minha Vida / FAR
Especificações Mínimas

Casa* (Para contratação com valor máximo de aquisição da unidade de acordo com o item 7.1 do Anexo I da Portaria Nº 465, de 03 de outubro de 2011)	
DIVERSOS	
Reservatório	Caixa d´água de 500 litros ou de maior capacidade quando exigido pela concessionária local. Para reservatório elevado de água potável, em condomínio, prever instalação de no mínimo 2 bombas de recalque com manobra simultânea.
Vagas	Vagas de garagem conforme definido na legislação municipal.
Cercamento do condomínio	Alambrado com baldrame e altura mínima de 1,80 m no entorno do condomínio.
Proteção da alvenaria externa	Em concreto com largura de 0,50 m ao redor da edificação.
Calçadas para circulação interna no condomínio	Largura mínima de 0,90 m.
Máquina de Lavar	Prever solução para máquina de lavar roupas (ponto elétrico, hidráulica e de esgoto).
Equipamento de lazer / uso comunitário	Obrigatório para empreendimentos em condomínio, com 60 UH ou mais, devendo prever recursos de, no mínimo, 1% da soma dos custos de infraestrutura e edificações. Considerado o valor destinado para este item, serão produzidos os equipamentos a seguir especificados, obrigatoriamente nesta ordem: centro comunitário; espaço descoberto para lazer/recreação infantil; e quadra de esportes.
	Em condomínio, obrigatória a execução de depósito de lixo e local para armazenamento de correspondência.
TECNOLOGIAS INOVADORAS	
	Aceitáveis as tecnologias inovadoras testadas e aprovadas conforme a Norma de Desempenho - NBR-15.575 e homologadas pelo SINAT ou que comprovarem desempenho satisfatório junto à CAIXA.
SUSTENTABILIDADE	
	Aquecimento solar nas unidades (item obrigatório em todas as regiões). Sistema aprovado pelo INMETRO.
	Medição individualizada de água e gás (ou sistema de botijão individualizado).
INFRAESTRUTURA	
	Pavimentação definitiva, calçadas, guias, sarjetas e sistema de drenagem.
	Sistema de abastecimento de água.
	Solução de esgotamento sanitário.
	Energia elétrica e iluminação pública.
ACESSIBILIDADE E ADAPTAÇÃO	
Áreas de uso comum	Deverá ser garantida a rota acessível em todas as áreas públicas e de uso comum no empreendimento. Orientações disponíveis na Cartilha de Acessibilidade a Edificações e Espaços e Equipamentos Urbanos, elaborada pela CAIXA.
Unidades adaptadas	Disponibilizar unidades adaptadas ao uso por pessoas com deficiência, com mobilidade reduzida e idosos, de acordo com a demanda, com kits específicos devidamente definidos. Na ausência de legislação municipal ou estadual que estabeleça regra específica, disponibilizar no mínimo 3% das UH.

OBSERVAÇÕES	
	* Edificação residencial unifamiliar de um pavimento.

Programa Minha Casa Minha Vida / FAR
Especificações Mínimas

Casa* (Para contratação com valor máximo de aquisição da unidade de acordo com o item 7.1 do Anexo I da Portaria Nº 465, de 03 de outubro de 2011)	
Projeto	Casa com sala / 1 dormitório para casal e 1 dormitório para duas pessoas / cozinha / área de serviço (externa) / circulação / banheiro.
DIMENSÕES DOS CÔMODOS (Estas especificações não estabelecem área mínima de cômodos, deixando aos projetistas a competência de formatar os ambientes da habitação segundo o mobiliário previsto, evitando conflitos com legislações estaduais ou municipais que versam sobre dimensões mínimas dos ambientes)	
Dormitório casal	Quantidade mínima de móveis: 1 cama (1,40 m x 1,90 m); 1 criado-mudo (0,50 m x 0,50 m); e 1 guarda-roupa (1,60 m x 0,50 m). Circulação mínima entre mobiliário e/ou paredes de 0,50 m.
Dormitório duas pessoas	Quantidade mínima de móveis: 2 camas (0,80 m x 1,90 m); 1 criado-mudo (0,50 m x 0,50 m); e 1 guarda-roupa (1,50 m x 0,50 m). Circulação mínima entre as camas de 0,80 m. Demais circulações mínimo de 0,50 m.
Cozinha	Largura mínima da cozinha: 1,80 m. Quantidade mínima: pia (1,20 m x 0,50 m); fogão (0,55 m x 0,60 m); e geladeira (0,70 m x 0,70 m). Previsão para armário sob a pia e gabinete.
Sala de estar/refeições	Largura mínima sala de estar/refeições: 2,40 m. Quantidade mínima de móveis: sofás com número de assentos igual ao número de leitos; mesa para 4 pessoas; e Estante/Armário TV.
Banheiro	Largura mínima do banheiro: 1,50 m. Quantidade mínima: 1 lavatório sem coluna, 1 vaso sanitário com caixa de descarga acoplada, 1 box com ponto para chuveiro – (0,90 m x 0,95 m) com previsão para instalação de barras de apoio e de banco articulado, desnível máx. 15 mm; Assegurar a área para transferência ao vaso sanitário e ao box.
Área de Serviço	Quantidade mínima: 1 tanque (0,52 m x 0,53 m) e 1 máquina (0,60 m x 0,65 m).
Em Todos os Cômodos	Espaço livre de obstáculos em frente às portas de no mínimo 1,20 m. Deve ser possível inscrever, em todos os cômodos, o módulo de manobra sem deslocamento para rotação de 180° definido pela NBR 9050 (1,20 m x 1,50 m), livre de obstáculos.
CARACTERÍSTICAS GERAIS	
Área útil (área interna sem contar áreas de paredes)	36,00 m²
Pé direito mínimo	2,30 m nos banheiros e 2,50 m nos demais cômodos.
Cobertura	Em telha cerâmica/concreto com forro ou de fibrocimento (espessura mínima de 5mm) com laje, sobre estrutura de madeira ou metálica.
Revestimento Interno	Massa única, gesso (exceto banheiros, cozinhas ou áreas de serviço) ou concreto regularizado para pintura.
Revestimento Externo	Massa única ou concreto regularizado para pintura.
Revestimento Áreas Molhadas	Azulejo com altura mínima de 1,50 m em todas as paredes do banheiro, cozinha e área de serviço.
Revestimento áreas comuns	Massa única, gesso ou concreto regularizado para pintura.
Portas e Ferragens	Portas internas em madeira. Admite-se porta metálica no acesso à unidade. Batente em aço ou madeira desde que possibilite a inversão do sentido de abertura das portas. Vão livre de 0,80 m x 2,10 m em todas as portas. Previsão de área de aproximação para abertura das portas (0,60 m interno e 0,30 m externo), maçanetas de alavanca a 1,00 m do piso.
Janelas	Completa, de alumínio para regiões litorâneas (ou meios agressivos) e de aço para demais regiões. Vão de 1,50 m² nos quartos e 2,00 m² na sala, sendo admissível uma variação de até 5%.
Pisos	Cerâmica esmaltada em todo a unidade, com rodapé, e desnível máximo de 15mm.
Ampliação da UH	Os projetos deverão prever a ampliação das casas.
PINTURAS	
Paredes internas	Tinta PVA.
Paredes de áreas molhadas	Tinta acrílica.
Paredes externas	Tinta acrílica ou textura impermeável.
Tetos	Tinta PVA.
Esquadrias	Em esquadrias de aço, esmalte sobre fundo preparador. Em esquadrias de madeira, esmalte ou verniz.
LOUÇAS E METAIS	
Lavatório	Louça sem coluna e torneira metálica cromada com acionamento por alavanca ou cruzeta. Acabamento de registro de alavanca ou cruzeta.
Vaso Sanitário	Louça com caixa de descarga acoplada.

MCMV Minimum Specifications

Procurement

In the UK, when a private contractor is responsible for the design as well as the delivery of a project, it is normally a "Design and Build" contract. The brief, specifications, quality and performance standards that the contractor must achieve are set out in the Tender Documents, which can be based on initial design information or fully developed, detailed and coordinated proposals. To best ensure high quality and control over the design, tender documents tend to be based on reasonably detailed design information.

The public-private relationships in MCMV give a large amount of design responsibility to private contractors, who will typically maximise standardisation and repetition to generate efficiency and cost savings. The result can be overly homogeneous and characterless developments that are poorly integrated into their urban context.

To improve the design quality of MCMV schemes we recommend that design professionals prepare proposals to a reasonably developed stage before handing responsibility over to private contractors for delivery, and that the sustainability objectives, design intent and required standards are embedded in the tender documents.

Key Recommendations

- Consider the development of a flexible process and set specific targets for sustainability management on MCMV projects as part of the funding approval process
- Review and develop design standards and specifications for MCMV
- Consider how Transit Orientated Design Standards can be applied at a strategic level

Ensuring Quality of Construction

Historically, housing projects in the UK, particularly in the social housing sector, were notorious for their poor quality of workmanship. Through this project, building quality housing has also been highlighted as an issue in Brazil.

Ensuring a good quality of construction is such a fundamental part of a sustainable development that a huge amount of work has been undertaken in recent years, in the UK, to increase both the quality of construction and the functioning of building systems.

In the UK, once a project is handed over to a private contractor for delivery there are numerous quality control and inspection procedures in place to ensure the project is delivered to correct standards. The client will appoint an independent agent to oversee the contractor during the design and construction stage; the agent will review the contractor's drawings and proposals and conduct regular site inspections.

There are also independent quality control procedures such as NHBC (National House Builders Council). NHBC set technical, design, materials and workmanship standards for new homes, and provide warranties for projects that achieve these standards. NHBC will carry out their own review, sign-off design proposals and conduct site inspections.

It is our understanding that site inspections carried out by Caixa on MCMV projects are primarily concerned with quantities, rather than quality. We therefore recommend that quality control measures such as review and sign-off of contractor design proposals and regular site inspections are developed as part of MCMV Phase III.

In the commercial sector, much greater emphasis is also being placed on commissioning of building systems to ensure they operate efficiently. A 'Soft Landings' process is also being promoted which helps ensure that those who will be operating the building and end users understand how to run and look after new buildings. Key elements of the Soft Landings approach include:

- Identifying at an early stage, persons that will be responsible for maintaining the building so that they can be engaged in how the building is designed
- Development of a building users guide, a clear non-technical handbook on how to look after and maintain the building
- Conducting a well-defined commissioning and handover process to ensure that building systems operate effectively
- Carrying out post occupancy evaluation and monitoring for at least 18 months after completion

Key Recommendations

- Ensure site inspections are carried out during construction and that the contractor is obliged to respond to requests
- Training of site inspectors to understand how construction detailing supports the sustainability goals of the project
- Training of community leaders responsible for the maintenance of the building as part of a 'Soft Landings' process.

Community Engagement and Governance

It is best practice to engage the community in the delivery of major projects from the early stages, as described above. It is important to be clear about which aspects of the project can and cannot be influenced through the participation process and identify clear ways in which feedback will be included in the project development. For the Heliópolis project, it might be interesting to engage on types of retail and commercial outlets, and the range community facilities that would be needed. In particular, it would be good to engage on the layout of courtyard spaces which may offer different identities for different blocks.

Once the development is in place, it can take time for a community to fully establish and flourish. Engaging the community in potential cultural programmes or events can be a way of bringing a community together. In the UK, some major housebuilders have established community committees to support these activities, in addition to dealing with issues such as maintenance, cleaning and looking after condominium areas.

Key Recommendations

- Engage community in relation to the provision of community assets within the masterplan
- Establish community committee to help create a sense of place and bring residents together through a programme of events

Directory

UK Design Guidance and Standards

Lifetimes Homes

Lifetime Homes sets out 16 criteria that can applied to homes for minimal cost in order to ensure providing flexible, adaptable and accessible homes.
http://www.lifetimehomes.org.uk

Code for Sustainable Homes

The CfSH was the government's environmental assessment method for rating and certifying the performance of new homes. Unfortunately CfSH was withdrawn as a mandatory requirement in 2015.
www.communities.gov.uk/planningandbuilding/sustainability/codesustainablehomes/

HQIs

The HCA Design Quality Standards and Housing Quality Indicators (HQIs) is a measurement and assessment tool to evaluate housing schemes of the basis of quality rather than just cost.
www.homesandcommunities.co.uk/hqi

NHBC

NHBC is the UK's leading standard-setting body and provider of warranties for new homes.
www.nhbc.co.uk

Secured by Design

A national police project that advises on the design of new homes to reduce crime and increase security
http://www.securedbydesign.com

London Housing Design Guide

LHDG sets out minimum space standards, promotes better neighbourhoods, design and accessibility and high environmental standards for new homes in London.
https://www.london.gov.uk/priorities/housing-land/publications/london-housing-design-guide

Building for Life

Standards for well-designed homes and neighbourhoods.
www.designcouncil.org.uk/ourwork/cabe/sectors/housing/building-for-life/

BREEAM

An environmental assessment method and rating system for buildings, It is the most widely used such standard in the UK.
www.breeam.org

CEEQUAL

Sustainability assessment and awards scheme for civil engineering, infrastructure, landcaping and the public realm.
www.ceequal.com

LEED

An environmental assessment method and rating system for buildings, It is the most widely used such standard in the USA.

Mixed Use

http://cultureandsportplanningtoolkit.org.uk/fileadmin/user_upload/2013_Guide/TCPA_Culture_Guide.pdf

TCPA Design Guides

TCPA (Town and Country Planning Association) guidance accompanies the National Planning Plicy Framework.
Biodiversity By Design
Climate Change Adaptation By Design
Sustainable Energy By Design
Community energy
Your place, your plan - a community guide to planning
Planning for a healthy environment: good practice for green infrastructure and biodiversity
Good Practice Guidance: Sustainable Design and Construction
Planning for Culture, Arts and Sport
http://www.tcpa.org.uk/pages/by-design-guides.html

Design Council

The Design Council have an archive of reports, case studies and guides on all areas of good design, including Design Review Panels.
http://www.designcouncil.org.uk/resources/search

WRAP

Waste management good practice guidance
http://www.wrap.org.uk/category/sector/construction?viewfacets=302
Tools
http://www.wrap.org.uk/category/sector/construction?viewfacets=309

Environmental Product Declaration

http://www.environdec.com/

Directory

Products and Suppliers

Water Technologies List
http://wtl.defra.gov.uk/product_search_landing.asp?section=66&itemTitle=Product+Search

Water Label
http://www.water-efficiencylabel.org.uk/

The Green building Store
http://www.greenbuildingstore.co.uk/

Books and Reports

The Environmental Design Pocket Book
Sofie Pelsmakers

The Little Book of Density: A guide to Density in Urban Environments
Rachel Cooper and Christopher T. Boyko

Cities for a Small Planet
Lord Richard Rogers

CIRIA Guide to Sustainable Urban Drainage Systems

Making Space for Waste

Case Studies UK

Kings Cross Central

https://www.kingscross.co.uk/

London 2012 Athletes Village / East Village

https://www.kingscross.co.uk/

St Andrews

https://www.kingscross.co.uk/

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