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What are the social implications of micro-grounded housing in Indonesia?

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Being a dissertation submitted to the faculty of The Built Environment as part of the requirements for the award of ***MSc Housing and City Planning*** at University College London:

I declare that this dissertation is entirely my own work and that ideas, data, and images, as well as direct quotations, drawn from elsewhere are identified and referenced.

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List of Abbreviation

APERSI	Asosiasi Pengembang Perumahan dan Permukiman Seluruh Indonesia – Indonesian Housing Developer Association
BPS	Badan Pusat Statistik – Statictic Center
GCH	Growing Core Home
Kementrian PUPR	Kementrian Pekerjaan Umum dan Perumahan Rakyat - Ministry of Public Works and Housing
KEQ	Key Evaluation Questions
MGH	Micro Grounded Housing
MHH	Modest Healthy Home
PSR	Program Sejuta Rumah – One million houses program
SVH	Standard-sized Vertical Housing
WHO	World Health Organization

Abstract

As the urban population in Indonesia is growing, limited availability of land, especially in big cities, causes micro-grounded housing phenomenon to emerge. However, the social sustainability aspects of this housing model are little understood. This research seeks to understand the potential social implications on residents who live in micro-grounded housing in Indonesia. The adverse effects of crowding from case studies all around the world are collected, combined with Maslow's hierarchy of needs theory and the housing value framework created by McCray and Day, to measure the social sustainability of the residents in Surabaya, one of the biggest cities in Indonesia. Combining interviews with empirical observations, this study used two opposite case studies: micro-grounded housing and standard-sized vertical housing, as a comparison to understand the distinct characteristic of the former. This study found that micro-grounded housing caters to fewer human needs and therefore only satisfies the lower part of Maslow's hierarchy. When the basic daily need has not been fully satisfied, the need to higher needs of housing value such as social interaction, prestige, and beauty, does not occur as this research found. A recommendation is made for more strict enforcement of space standards, for both building and plot size. Additionally, another form of housing such as co-living model could be an alternative to provide social sustainability through provision of more communal facilities. Moreover, the housing strategies need to focus on increasing not only the quantity of the house but also its quality to reach a higher level of social sustainability.

Keywords: Indonesia, Surabaya, social sustainability, space standard, micro-grounded housing.

1. Introduction

1.1. Background

In human lives, a house holds an important role as we spend eight to ten waking hours on average at home (Casselman & Koeze, 2021). With the pandemic that has been going on since 2020, we are learning to accomplish more activities at home, from leisure to work. Thus, it is essential for people to have access to a decent dwelling which can cater to all their needs, not only today but also in the long term.

As the largest economy in Southeast Asia, Indonesia is also the fourth most populous country in the world. The Indonesian government, through the 1945 constitution, has the responsibility to ensure that "Every person shall have the right to live in physical and spiritual prosperity, to have a home and to enjoy a good and healthy environment, and shall have the right to obtain medical care.", and it is strengthened by Law number 1 year 2011, which stated that "country responsible for protecting the entire Indonesian nation through the implementation of housing and settlement areas so that people are able to live in decent and affordable housing in healthy, safe, harmonious and sustainable condition throughout Indonesia." It is clearly stated that a sustainable home is a matter of public affairs that must be provided by the government for all Indonesians.

On the other hand, housing has become an unaffordable and inaccessible product for some layers of society in Indonesia. In 2017, Sri Mulyani explained that housing backlog was estimated at 12 million units, especially in urban areas in Indonesia (Hamdani, 2017). Moreover, based on the census, 39% of Indonesian households do not have access to decent and affordable housing (BPS, 2020). This phenomenon is caused by several entangled issues, such as increasing land prices, annual inflation, and property speculation. After the 1997 crisis, the economic reform changed the Indonesian welfare regime into neo-liberalism, which also gave an impact on the reduction of mortgage subsidies and the support of private sector-led housing provisions (Tarigan, 2016).

The private sector aims to generate profit and make business; The housing product they create will follow the demand from the market. According to realestat.id (2022), affordable grounded housing that ranges from IDR 300 million to IDR 1 billion (£16.516 to £55.050)[1] has the biggest share in Indonesian property market. Moreover, the Indonesian consumer still prefers grounded housing to vertical housing such as flats or apartments. Bambang Eka Jaya, Vice Chairman of Real Estat Indonesia (Indonesian Real Estate), explained that such preference is derived from the common belief that ground housing holds better investment value than another type of housing, such as vertical housing, since land ownership certificate is considered to be more valuable than strata title certificate (Fadli, 2022). Furthermore, the mental imagery of a home for Indonesian comes in grounded housing form, since many people who live in big cities come from rural areas, as shown in figure 1, where land is still widely available. In developing countries, human settlements usually have the characteristic of rural housing (Funo, Yamamoto and Silas, 2002).

[1] As the current exchange rate on 20 June 2022, £1 = IDR 18,165

Figure 1. Rural settlement in Java (source: Jabarnews.com, 2019)

Responding to this demand, it is more feasible for Indonesian private developers to produce grounded housing rather than vertical housing. This type of dwelling development also has a faster cycle and requires a smaller capital to start with. However, since the brown land in the middle of the city is scarce and the land price keeps rocketing, developers make the land plot and building size smaller. The idea of micro houses and compact living becomes a trend that has been generated by companies to accelerate the sales of small houses. The Indonesian government tried to limit the minimum size and grounded housing through Law Number 1/2011 about Housing and Settlement Areas, but it got so much opposition from the private sector. House developer association (APERSI) submitted the judicial review on article 22 which stated "*The floor area of a single house and a row house has a minimum size of 36 (thirty-six) square meters.*", and it was granted by the Supreme Court in 2012 with the argument that this article hinders homeownership, especially for the low-income society, while the government supposedly guarantees decent housing provision to all people based on 1945 State Constitution(Jamadin, 2012).

Figure 2. Compact home for sale brochure (source: jualo.com)

As the house price keeps rocketing, there is no sign that the micro-grounded housing (MGH) trend will end in the near future. Furthermore, with the annual additional new homes that can only fulfil 60% of the new housing demand, a further backlog is unavoidable. Increasing, or at least, maintaining, the housing supply is a crucial issue in Indonesia and

therefore the focus of the government will be on increasing housing delivery number. Based on World Bank's projection in 2019, by 2045, 70% of the Indonesian population will have lived in the cities, due to better economic opportunities there(Harrison et al., 2020.). Therefore, the phenomenon regarding housing in Indonesian cities is important to be anticipated as it heavily affects the well-being of the citizen, which is one of the important virtues of the city's social sustainability.

Developing countries and developed countries have a different scale of concern regarding social sustainability aspects. In developing countries, such as Indonesia, the size of dwellings is one of the major concerns besides poverty alleviation and socio-economic equity (Dave, 2011). The research on the relation between compact urban form and social impacts in developing countries is very little known, but measuring the social sustainability of the people is very vital since they make up a big proportion of the world population and economy (Dave, 2011). Hence, this dissertation aims to identify the impact on the well-being of residents who live in MGH in the Indonesian context. The below-standard living space might lead to an overcrowding situation, which WHO (2018) has warned might lead to many negative impacts. However, the social attributes of every society will be different and the impacts might differ from one another. Furthermore, this paper is expected to contribute to the discussion of social sustainability in urban micro-housing, especially in developing countries.

1.2. Location

Figure 3. Surabaya in Indonesia map

The research takes place in Surabaya, the second biggest city in Indonesia which is in East Java Province. Surabaya's population is estimated at 3,15 million in 2018, and almost 10 million residents live in the metropolitan area (Gerbangkertasusila – an acronym for "Gresik, Bangkalan, Mojokerto, Surabaya, Sidoarjo, Lamongan" cities combined). Based on Koppen's climate classification, Surabaya's climate is categorised as a Tropical savanna climate. The temperature is consistently ranging from 23 to 31 degrees Celsius, with an equal period of wet and dry seasons yearly. The average humidity is ranging from 54-67%, with abundant sunshine throughout the year.

In terms of transportation, most Surabayans, like other Indonesians, prefer private vehicles to public transportation. East Java is the province with the largest vehicle ownership in Indonesia, counted at 22 million vehicles (BPS, 2020). Surabaya, as the province's capital, shares the highest number among all the cities in East Java. The ownership of private

vehicle(s) occurs almost in every household, and therefore, parking space is needed. Unlike western cities, Surabaya housing does not have communal parking spaces (unless in vertical housing buildings) nor dedicated parking spaces along the street. Therefore, a parking space is usually provided inside the house for most grounded housing.

1.3. Research Questions

With the Indonesian government's commitment to providing access to sustainable housing to all Indonesians, the questions regarding the sustainability dimensions that are affected by housing size will be explored in this research. The research questions are as follows:

1. In which aspect of social sustainability does housing size have an impact?
2. How are micro-homes compared with the general design standards for housing in Indonesia?
3. What social sustainability issues arise from micro-grounded housing compared with public or vertical housing for similar income groups?
4. What is the social sustainability implication of MGH in Indonesia? Does it bring a positive or negative impact on its residents?

2. Literature Review

2.1. Sustainable Development and Its Three Pillars

The word "sustainable development" was stated in Brundtland Report with a description of "development which meets the needs of the present without comprising the ability of future generations to meet their own needs" (United Nations, 1987). Sustainable development goals, which comprises 17 points, were established in 2015 by United Nation member states and had the goal to end all kind of poverty in the world and achieve sustainable development in its three dimensions.

There are three pillars of sustainability: economic, environmental, and social (Goodland, 1995). At first, the discussion on urban sustainability is mainly related to environmental and economic issues. The 1992 UN conference in Rio de Janeiro was the first time human development and social sustainability were explicitly mentioned, which are vital to preserving the environment through economic development and poverty alleviation (Harun et al., 2014 cited in Mehan & Soflaei, 2017) The research about social sustainability then started to emerge in the 2000s (Mehan and Soflaei, 2017). Due to their long recognition, the assessment of environmental and economic sustainability can mostly be quantified, thus developing rigorously (Castillo *et al.*, 2007); however, social sustainability is very hard to assess due to its subjective nature.

2.2. Social Sustainability

Until now, the definition of social sustainability is little agreed on by researchers, and different frameworks of research lead to a different definition of social sustainability (Weingaertner and Moberg, 2014; Mehan and Soflaei, 2017). However, some researchers agree that social sustainability is an anthropocentric term, which means it revolves around human and their needs. (Griessler and Littig, 2005; Mehan and Soflaei, 2017). Woodcraft et al.(2011) create a definition of social sustainability in the context of built environment and housing, which is a process of creating a prosperous society by a close and thorough understanding of people's needs. Furthermore, social sustainability should combine the design of the physical realm with the social world infrastructure to support social and cultural life, social amenities, systems for citizen engagement, and space for people and places to evolve (Woodcraft. et al., 2011 cited by Rasouli & Kumarasuriyar, 2016).

Based on Coloantonio's (2010) division of social sustainability components, housing and other physical aspects such as food and health are considered basic needs component. The other component, which is equity, refers to the distribution of public services, education, and intra-generational redistribution of wealth (Rasouli and Kumarasuriyar, 2016). Similarly, Dempsey et al (2011) and Winston and Eastaway (2008) also mention decent housing as a physical factor that has been discussed by many researchers and practitioners as one of the factors that contribute to social sustainability. The housing condition will reflect the living quality of its dwellers, but it has been neglected in sustainability discussion although many policies have referred to the importance of housing (Winston and Eastaway, 2008).

2.3. Housing and Fulfilment of Human Needs

Housing quality has major implications for human health, both mental and physical. Housing standards are then argued as "... a key pathway for providing healthy housing conditions and improving health and well-being for all" (World Health Organization, 2018). As the urban population will likely double by 2050 (World Health Organization, 2018), housing conditions dan health issues will be critical to tackling to create a sustainable community. Good dwelling condition has many benefits to its residents and the city such as reducing disease, increasing life quality, and decreasing poverty; thus, it plays a vital role in a city achieving WHO's Sustainable Development Goals.

Beauty	This home has nice colors, good design both inside and outside.	Health & Safety	Good ventilation and natural lighting throughout the house, and the house should be free from danger.
Prestige	Home which you are proud of, attract attention and respect from people.	Convinience	The home is neat and has many labor-saving device.
Personal & Family	Good layout, providing space for individual and collective activities.	Comfort	The dwellers could relax and rest inside.
Social	Provide space for various social activities.	Location	Proximity to important place (work and school) is good, as well as other public services.
Privacy	Privacy from outsiders and neighbours.	Economy	Affordability and maintenance cost.

Figure 4. Housing values (modified from source: McCray and Day, 1977)

As discussed in the previous point, the key indicator of social sustainability is the fulfilment of human needs in the present and future. The categorization of human needs, in general, is following Maslow's hierarchy of needs (1943). According to Hutchins et al (2009), basic physiological needs are the lower-order social sustainability indicators, while belongingness, esteem, and self-actualization are the higher-level indicators. Based on Maslow theory, the nature of this layer of needs is hierarchical: for motivation to step up, lower-level needs should be satisfied beforehand. McCray & Day (1977) have established housing values framework that could be used for assessing human satisfaction with their houses, as shown in figure 4. Furthermore, Mehan and Soflaei (2017) stated that certain spatial qualities in a built environment can fulfil some layers of human needs. Based on those theories, ten housing values are categorized in the hierarchy of needs to examine which values are considered more basic and therefore to understand which value should be fulfilled first before others. The translation of Maslow's needs hierarchy to housing values is described in figure 5 below.

To accommodate daily activities inside the dwellings and set the normative standard of shared spaces between dwellers, space standards need to be defined (Kearns, 2022). The standards, however, will be different in each culture. Thus, in the next section, the legal housing standard in Indonesia will be examined.

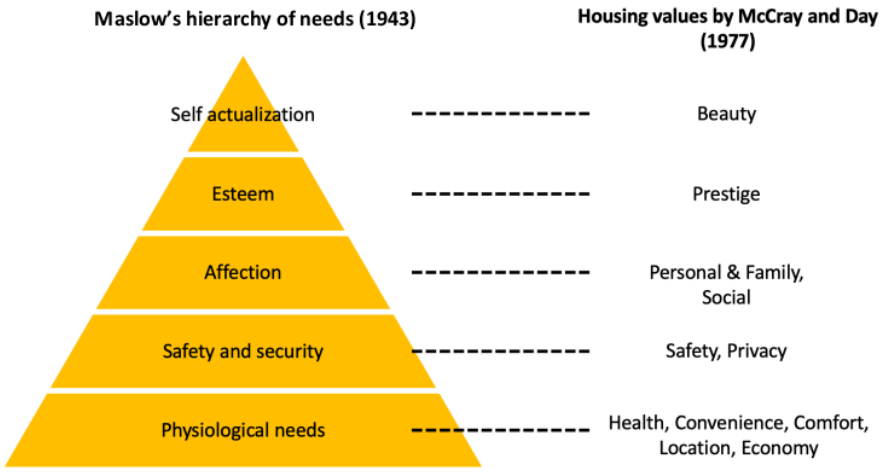

Figure 5. Translation of Maslow's hierarchy of needs to McCray and Day's housing values.

2.4. Housing Standard Guidelines in Indonesia

Based on the literature research, currently, there are several government regulations issued by governmental bodies in Indonesia that mentioned grounded housing size inside. Both Kementrian PUPR (Ministry of Public Works and Housing) and the president have issued statutory regarding the housing standard. Government regulations number 14 year 2016 (and later updated with government regulations number 12 year 2021) was issued by the President regulating the organization of housing and residential areas, which in article 14 stated the standard requirement for housing as follows:

1. Safety aspect of the building

The ability of the building to hold the building load, wind load, and earthquake load as the applicable standard

2. Minimum space needs

a. Location

The house should be located outside the disaster-prone zone and must follow the regulated setback.

b. Plot size and dimension

In line with WHO recommendation, the minimum space needed is 9 sqm per person with ceiling height measured no less than 2,7 meters - article 14 verse 3b.

The minimal land plot for each house in the housing area is 60 sqm with minimal plot width measured at five meters - article 14 verse 4c

c. Housing design

Housing design should comply with architectural, structural, and mechanical electrical regulations.

3. Health aspect of the building

Ventilation system, lighting system, sanitary system, and qualified building material.

Furthermore, the Ministry of Public Works and Housing issued a guideline (Minister decision number 403/KPTS/m/2002) for developers and regional regulators in building modest healthy (grounded) homes (MHH), which gives the guideline about the minimal space needed for housing as follows:

Table 1. Indonesian minimum space standard based on Minister Decision number 403/KPTS/m/2002

Standard per person	Area (m2) for 3 people				Area (m2) for 4 people			
	Building	Land			Building	Land		
		Minimal	Effective	Ideal		Minimal	Effective	Ideal
(minimal) 7,2	21,6	60	72-90	200	28,8	60	72-90	200
Indonesia 9,0	27	60	72-90	200	36	60	72-90	200

The nature of this statutory is advisory, and it is meant to be a reference for regional government to issue another binding regulation locally. However, there is no specific statutory issued by Surabaya government about the minimal plot size and building area in Surabaya. Therefore, based on this finding, the minimal dimension for grounded housing in Surabaya based on the statutory can be summarized as follows:

- The building size is 9 sqm/person, so for a family of four, the minimal building size is 36 sqm
- The minimal land size is 60 sqm with at least five meters width

Due to affordability reason, in Minister decision number 403/KPTS/m/2002, the ministry also introduces the term growing core house (Rumah Inti Tumbuh). Growing core house (GCH) is a term to call a housing model that only accommodates the minimal standard space, which contains an enclosed room and an open shaded area with bath/toilet/washing facility. GCH will have a generic roof shape that anticipates the future expansion of the house and should provide cross ventilation and natural lighting for each and every room. Whenever possible, the design of the roof should still follow local architecture. The statutory also recommends the standard module for rooms inside, which are:

- Bedroom : 3 x 3 sqm
- Multifunction room : 3 x 3 sqm
- Bath/toilet/washing : 1,2 x 1,5 sqm

Taking the expansion budget into account, the 60sqm land plot is essential to keep the expansion construction budget low. If the owner has to build an upper storey for housing expansion, the budget will rise and hinder the growth of the house. Thus, a bigger land plot secures the expansion of the house at a later stage. The module study of the transformation from GCH to MHH is explained in figure 6 below.

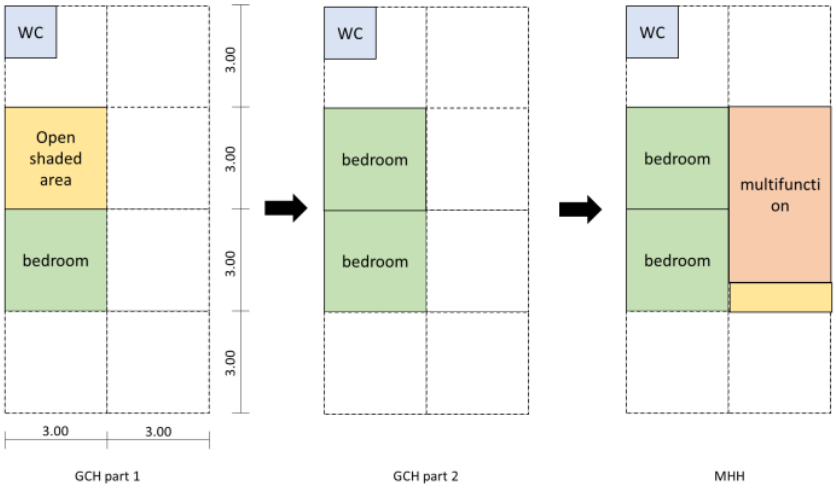

Figure 6. the development simulation of Growing Core House (Rumah Inti Tumbuh)

Government Regulations number 14 year 2016 article 129 explains the administrative sanctions for individuals whose new building does not comply with the technical standard mentioned in article 14. The sanction will be imposed through several steps: first written notice, second written notice, and finally fine. In other words, below-standard housing development is not encouraged by the government.

Looking at the details, SNI (Standar National Indonesia – Indonesian National Standard) 03-1746-2000 regulates the standard dimension of building stairs in Indonesia. Table 2 below details the dimension requirement of stairs for a building with fewer than 50 occupants.

Table 2. Stairs dimension requirement based on SNI (Modified from source: SNI, n.d.)

Nett width	90cm minimum
Staircase rise	10cm minimum, 18cm maximum
Staircase going	28cm minimum

2.5. Housing Standard in Traditional Housing in Indonesia

Looking back, the standard of traditional housing in Indonesia is different from what is seen in the modern context. Indonesian vast and diverse ethnicity results in various traditional housings across the islands with different layouts and sizes. The design was a product of culture, climate, religion, and myths (Dawson, 1994). Every region has its own vernacular houses, and most people in one community will follow the same building rules, guided by a master carpenter in their village. Most traditional houses in Indonesia share the same characteristic as other traditional houses in the Austronesian region (Goode, 2009). However, as Schefold (2004) stated, the traditional houses of hundreds of Indonesian ethnics are extremely varied and specific. Most houses contain space for practical functions such as shelter, storage, and ritual performances.

One of the earliest housing structures found in Indonesia is the communal longhouse, as seen in several different geographies across Indonesia. Research conducted by Zein (2017) on three different vernacular houses—Uma in Mentawai Island, Lamin in East Borneo, and Gadang house in West Sumatra—found that although these three houses are in three different islands, they share more similarities than differences in terms of the physical aspect of the building. The houses are occupied by several households from one big family, and they only have a bedroom as their private space. Other activities like cooking, eating, and rituals are done in the public space. Take an example of Gadang Tiga house's plan, as shown in figure 5. The layout consists of four 7.3 sqm bedrooms with a 49 sqm hall in the middle for communal activities. Zein (2017) found that in traditional Indonesian housing, the territoriality boundary is still vague, and the homeownership model is collective ownership. Moreover, anthropometric and proxemics concept does not exist in the housing design, and therefore the concept of personal space does not exist in traditional society (Zein, 2017).

Figure 7. Gadang House (source: sindonews, 2021)

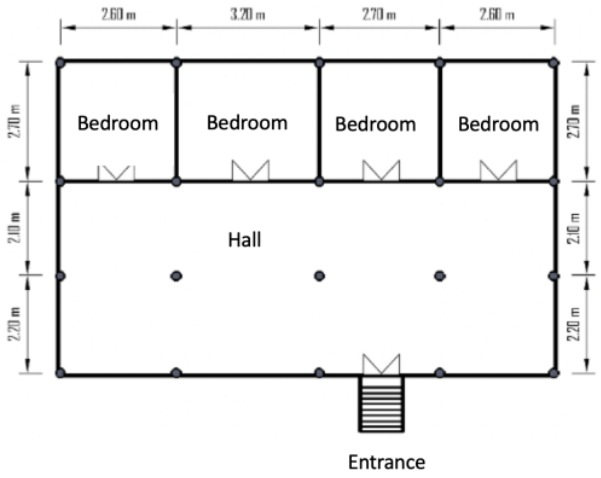

Figure 8. Layout of Gadang Tiga House (source: Abdullah et al., 2015)

2.6. Micro-grounded Housing (MGH) Terminology in the Indonesian Context

Micro-housing is a term that is widely used around the globe, but there is no common ground among countries about the standard dimension. The British Property Federation defines micro-housing as a house around 20-40 sqm, while in Indonesia, there is no legal definition of micro-housing. Micro housing is not a new concept (Yee, 2013), but it has gained popularity in recent decades to combat housing price hikes, especially in big cities where land is scarce.

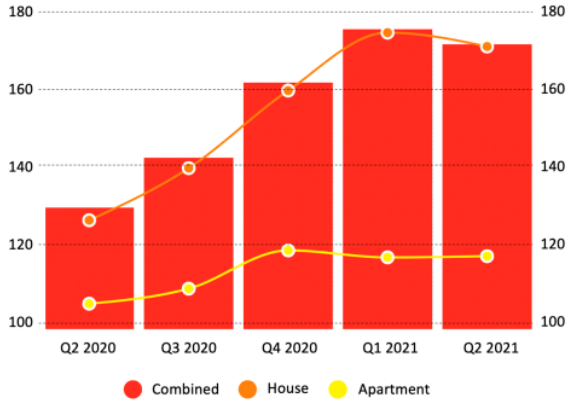

Figure 9.Supply chart of grounded housing and apartment in Indonesia 2020-2021 (Modified from source: Rumah.com, 2021)

Grounded housing plays a vital role in the Indonesian property market. Overall, the market supply is still dominated by grounded housing, and the supply grew solid even during the COVID outbreak in 2019 – 2010 (Rumah.com, 2021), as shown in figure 9. This data does not mention the self-built grounded houses that dominate the housing segment in rural areas, which will make the proportion of grounded housing even bigger than vertical housing. Based on the census done by the Central Bureau of Statistics (BPS – Badan Pusat Statistik) as seen in figure 10, almost 80% of homeowners in Indonesia build their homes themselves instead of buying from developers. Furthermore, with limited knowledge and resources, individual housebuilders only develop terraced housing, often resulting in informal low-rise high-density settlement areas called "kampung" (Winarso, 2010).

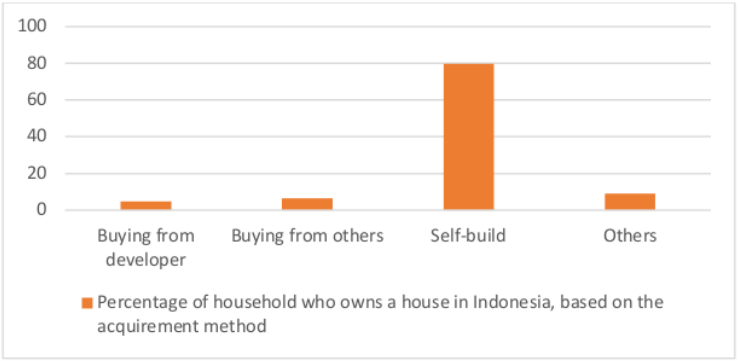

Figure 10.Percentage of household who owns a house in Indonesia, based on the acquirement method (Modified from source: BPS, 2019)

In line with that small-self-built housing, to fulfil the new housing demand in the city that is affordable by the lower-to-middle-income class, the private sector and the landowners have also started to develop smaller houses on tiny land plots. The land is so small that the house have no open spaces beside the front part, and it must share the party walls on both sides and on the rear side of the house. The house and the land can be bought by the individual from the developer company and has the Right to Build (Hak Guna Bangunan) that can be upgraded to the Right to Ownership (Sertifikat Hak Milik) after several years of occupation. This phenomenon starts to emerge nationally and the term micro-housing in Indonesia has been mentioned several times in mass media in the past few years as a solution to tackle the affordability and land availability in big cities in Indonesia. The definitions of micro-housing defined by mainstream media masses in Indonesia are compiled in Table 3 below.

Table 3. Definitions of micro (grounded) housing based on mass media in Indonesia

Source	**Definition**
Bisnis.com (Purba, 2019)	Architect Yu Sing stated the micro house concept is a house that is built on a small land plot but has been designed to fulfil the dwellers' needs. Not only does it save the construction budget, maintenance cost also can be minimised due to small building area.
Kumparan.com (|2021)	Micro-house is a house that has a very limited land plot and building, but the house layout can accommodate all the dweller's needs. The (land) area is under 70m2, approximately 40-50m2.
Kompas.com, (2021)	It is called a micro house because the (land) size is only 40 to 50 sqm. Micro-house is designed to maximise the available spaces. This kind of housing also provides a more affordable option compared to the above-70-sqm-house.
Propertinews.id(n.d.)	Micro-housing concept is storied housing in a narrow plot that is inspired by the high-density settlement area (perkampungan) in the city centre. This concept can be applied as a few small houses in a single land plot.
Bbc.com (Sebag-Montefiore, 2018)	Narrow houses have become a reality for most people, and therefore many ask how to make a small house become beautiful and practical. Harbard, finance director of Pocket Living, saw micro-housing as a weapon against ghettofication which segregates the poor and the rich.
Antaranews.com (Herlinawati, 2018)	Micro-housing can be a comfortable solution in urban areas for narrow land plots. Micro-housing concept tries to minimize the land usage, but at the same time still provide all the spaces needed such as bedroom, kitchen, and working room.

The common ground that can be concluded from these articles is that micro-housing is a type of housing situated in urban areas whose building and/or plot size is below the current standard but still caters to all the needs of its dwellers to live comfortably. Every definition of micro-housing by the media refers to grounded housing. Therefore, for this research, the MGH is used to call grounded housing whose building size and/or plot size does not meet the standard set by the Indonesian government as stated in point 2.4.

2.7. Overcrowding and Its Impacts

Insufficient living space leads to an overcrowding situation in the house. Much research has shown that crowding in housing has several disadvantages, affecting the social sustainability of the residents and the communities. The specific literature about crowding impacts in Indonesia has not been established. Therefore, overcrowding studies from cities all over the world are being compiled to help identify the possible impact of living in crowded spaces.

World Health Organization (2018) argued in their guidelines that crowding in any housing tenure might lead to a higher chance of infectious diseases such as dysentery, asthma, and bronchitis. Another study conducted by Clauson-Kaas (1997) also found that the crowding situation also contributes to diarrhea and fever cases for children in Jakarta. In addition, it is discovered that noises created from crowding situations, both internal and external, might prevent people from resting properly. However, this might be confounded by several other factors such as poverty and malnutrition (Hwang *et al.*, 1999).

Inadequate house space also might cause social conflict between parents and children, as Evans et al. (1998) found during his research in India, in which he suggested that his finding might be applicable to other countries as well. Edwards et al. (1994) and Clauson-Kaas (2017) suggested that crowding condition makes the resident feel they lack personal space, which causes stress and helplessness. According to Altman (1975), other psychological distress that might arise with a crowding situation will be: unwanted social interactions, difficulties in accessing simple goals such as eating or watching television, and forced coordination with others for several activities such as using the bathroom. Since the COVID pandemic started in 2020, the daily task has also included studying and working from home for the family members. Makinde et al.(2016) found that crowding in housing conditions in Nigeria might trigger domestic violence and antisocial behaviour among adolescents due to victimization from adult or sibling aggression. The shortage of space inside the house also affects furniture possession, storage, and residents' mobility inside the house (Kearns, 2022). Moreover, inadequacy in space is a major factor in house moving (Clark and Huang, 2003), which affects the sustainability and stability of the neighbourhood. In summary, the possible adverse impacts of inadequate house spaces can be seen in Table 4.

Table 4. Possible impacts on in-house overcrowding situation

Impact category	Possible Impacts
Health	- Diarrhea - Dysentery - Asthma and bronchitis (lung problem) - Fever
Individual well-being	- Sleeping disorder - Difficulties in performing daily tasks - Stress and helplessness - Mobility inside house - Studying/working from home

Social well-being	- The conflict between family members - Lack of personal space - Unwanted social interactions - Forced coordination with others for several activities - Antisocial behaviour among adolescents - Sibling aggression
Long term occupancy	- House moving
House layout inefficiency	- Thermal and humidity comfort - Lighting usage - Limited furniture possession - Limited storage space

However, the health problems that occur are not solely caused by overcrowding situations (Lowry, 1989). It is also related to health policy, sanitation, and education matters. As for mental health, Kearns (2022) argued that it might be associated with perceived crowding, which will differ for each society.

The connection between social sustainability and MGH in the Indonesian context has never been researched, thus becoming the main exploration in this research.

3. Research Design and Methods

3.1. Methodology

Castillo et al (2007) argued that assessment of social impact is a highly subjective nature and not easily quantified. Therefore, qualitative methodology is chosen in this dissertation to understand the individual experience of living in MGH. In order to find the exact social impact of MGH residents, a qualitative comparative case studies approach is taken in this research. Comparative case studies are arguably important in examining human-environment interaction, offering an in-depth understanding of each case that would not be shown in statistical analytics (Knight, 2001).

The framework of this research is established based on Yin's model of case study research (2014) and described in figure 12. Key Evaluation Question (KEQ), stated in research questions, is established in the introduction part and set out to be the overarching guide of this research. The theory of social implications of micro-housing and the standard of MGH in the Indonesian context is examined through literature research. The summary of possible impacts on overcrowding, as shown in table 3, is used as the structure of the interview question set out for the residents of MGH. In addition, the housing standards and MGH definition are used to select the case studies.

This research focuses on two attributes, 'micro' and 'grounded', which are embedded in MGH. Thus, the experience of residents in MGH and standard-vertical housing are compared with the opposite case study in order to find the pattern, similarities, and, most importantly, the differences that form the experiences of MGH dwellers. Therefore, the standard-sized vertical housing (SVH) case studies would act as a control group in this research. The housing that is used as the research object must satisfy the following criteria:

- Located in Surabaya, Indonesia.
- Does not meet one or more of the criteria stated in the minimum space needs based on the government regulations number 12 year 2021.
- Must be occupied by more than 1 person in one house to test the interaction among dwellers.

The control must fulfil these criteria:

- Located in Surabaya, Indonesia.
- Must be a part of vertical housing (apartment, social housing, flat).
- Have more than 9 sqm space per person, as recommended by WHO and government standards.
- Must be occupied by more than 1 person in one house to test the interaction among dwellers.

3.2. Data Collection

To get a deep understanding of the cases and the context, interviews and observations are selected as data collection tools, and therefore the protocol of each tool is created. The protocol is essential to ensure that the data gathered can be compared later in the analysis stage (Goodrick, 2014). A brief description of each data collection method used will be explained in the following points.

3.2.1. Interview

The interview method is commonly used in the explorative study (Mathers, Fox and Hunn, 1998). The semi-structured interview method was chosen for this research due to its attitudinal nature. The open-ended questions are useful to open possibilities for more discussion on a certain topic (Mathers, Fox and Hunn, 1998).

In this research, the possible impacts of overcrowding conditions resulting from inadequate space in MGH are used as the main framework for the interview questions. Each impact is translated as an open-ended question. It is important to keep the neutrality of the question to ensure the independence of interviewees' opinions. Residents from both study cases are interviewed with the same set of questions, and the interview recording is then translated into a transcript.

3.2.2. Observations

Dwelling's layout plan and documentation are used to analyse the spaces created compared to the corresponding case study and Indonesian national standards. Since the observation will be held remotely due to limited time and cross-border restrictions, observation data will focus more on quantitative data such as room size, land plots, and staircase dimensions. Documentation acquired about the dwelling condition is used to support the narrative data gathered from the interview collection.

3.3. Discussion & Conclusion

The discussion chapter of this research will cover the "analyze & conclude" section in Yin's model. The data synthesized from both data collection methods will be compared with the theory of social sustainability gathered in the literature review chapter. Data from both case studies will be sorted based on their similar impact and the unique impact on social sustainability, and thus will be connected to how each housing type can fulfil the social needs of the residents. It will also be correlated back to Maslow's hierarchy of needs, in which every social sustainability is categorized in layers. Furthermore, the analysis chapter will also explore the model of improvement and/or alternatives of MGH, based on the existing policies that are applied in Indonesia.

3.4. Location Consideration

With urban density counted at 7.134/km2, Surabaya can be considered denser than London, UK's capital, whose density was measured at 5,727/km2 in 2020 (ONS, no date). Like the other metropolitan cities in Indonesia, housing provision in Surabaya is mostly self-built or provided by a private developer. Rumah.com (2021) reported that in the third quarter of 2021, the highest property price jump happened in East Java which makes housing affordability becomes challenging, especially for middle-low families. Therefore, Surabaya was chosen as the location for this research.

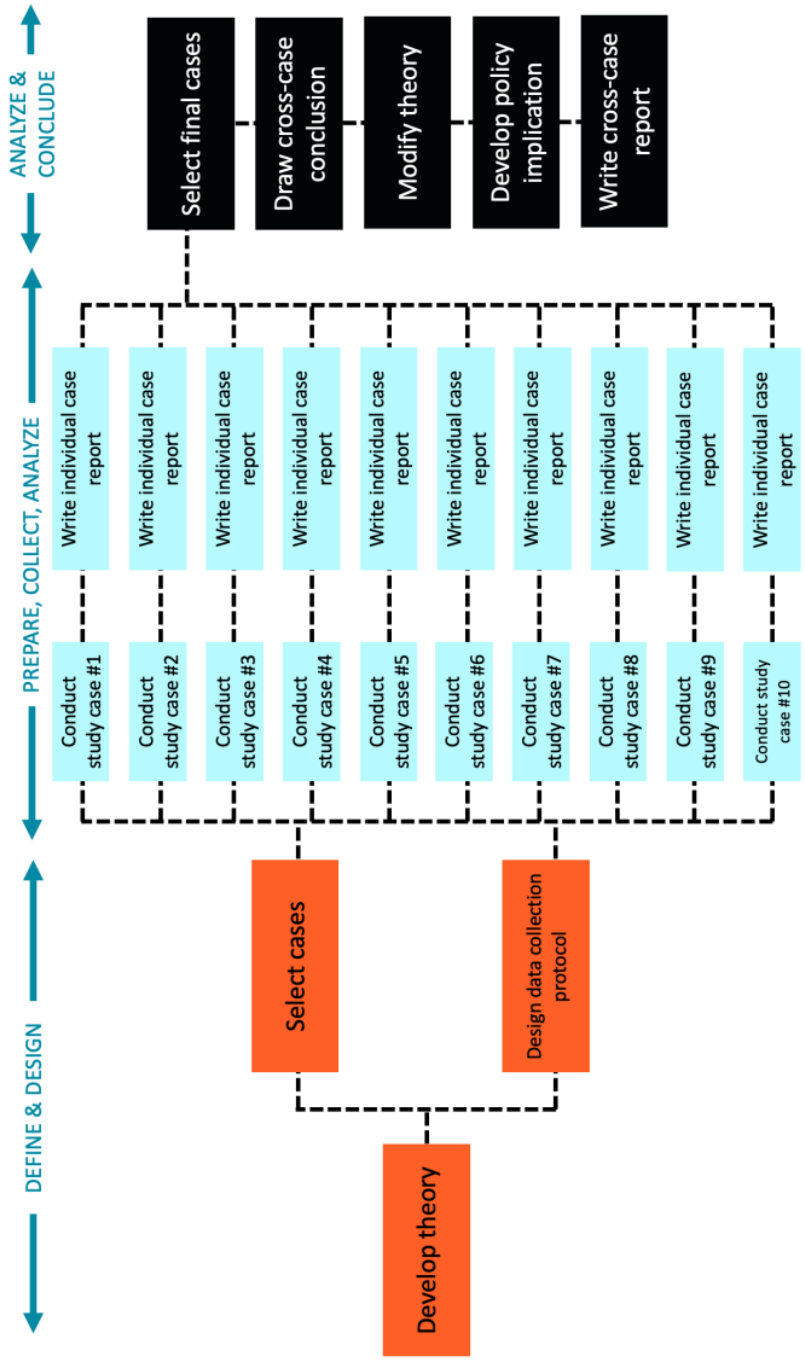

Figure 11. Methodological framework for this research based on Yin's model of case study research (2014)

4. Research Material and analysis

The case studies of MGH and SVH are examined in this research. Each case study group consists of five data units. The representative of each house is interviewed with the question set prepared, and the house layout is measured and drawn. Each house is then labelled with a code which is detailed in table 7 and will be used to mention the house in the following data presentation and analysis chapter. The layout plan and photos of each dwelling can be seen in appendix 2.

Table 5. Coding for research's study cases

MGH case study	Code	SVH case study	Code
Micro Grounded Housing 1	G1	Standard Vertical Housing 1	V1
Micro Grounded Housing 2	G2	Standard Vertical Housing 2	V2
Micro Grounded Housing 3	G3	Standard Vertical Housing 3	V3
Micro Grounded Housing 4	G4	Standard Vertical Housing 4	V4
Micro Grounded Housing 5	G5	Standard Vertical Housing 5	V5

4.1. Similarities Between Groups

Most house owners pick their current dwelling based on market availability. Financial capability budget and proximity to the workplace are the main considerations of buying/renting a house. They do not consider building façade or layout plans as the main considerations when they choose to live/rent in their houses. Four of MGHs are bought/rented from the private sector, while G5 was built in the 1970s by their parents.

Most of the respondents moved from a rented one-room flat, which is notably smaller than the housing they live in right now. Given the previous living environment, privacy is not a big issue for most respondents, and intra-societal conflict rarely arises. Most interviewees argue that they do not have many societal conflicts because they spend less time together at home due to excessive working time. Although they do not have many rooms inside their houses, they can adapt and find their personal space at home well.

All respondents stated that they have everything they need inside their house, although they wish for a storage room in their houses. G2 resident stated that he could not own a pet because of a lack of space, and V4 resident said she could not bring her hobby toolkit from her parent's house for the same reason. On the weekend, when they have more free time, they usually go to parks/shopping malls to get some fresh air. Two households from the SVH group who live in apartments with facilities use the apartment's facilities (such as a swimming pool) quite often to refresh and interact with their neighbour. Therefore, although both MGH and SVH provide space for essential activities, recreational and family activities cannot be done inside the house for both groups due to a lack of space. However, it is worth mentioning that there are different degrees of difficulty in performing the essential activities between MGH and SVH residents, which will be elaborated on in the next point.

> *"Saturday (and) Sunday (we are) certainly going out. Not all day, maybe noon until afternoon... My child would be so bored if he stayed at home all the time. With this house size, if (he) just stays in the room, it will be so boring."*
>
> *G1 resident*

Nine out of ten households stated that in the future, they are thinking of moving to another dwelling that is bigger when they have saved enough money or when their children start to work. Only G1 dweller said they plan to live for the long term in their present dwelling. Still, his family is planning to add another storey in the future to accommodate more space as their kid is growing up, but further preparation is needed as the house structure's capability to carry more load is still unknown. Overall, it can be concluded that both groups do not have secure feelings for the future as they feel that their house right now will not accommodate their needs in the future. Eley (2004) argued that more spaces inside the home is a major quality factor of a building, enabling the future adjustment of the space needed for the user. The need for the space capability to adapt is also emphasized by Carmona et al. (2010). He argued that larger space leads to more adaptable space, which can suit its dweller's needs in the future for growth or change of lifestyles. By enabling the existing house to be rearranged, the need to move to another house is diminished, and therefore sustainability can be achieved. This will also affect the social stability of the neighbourhood, which is one of the dimensions of social sustainability.

> *"... We still want to have bigger space... and apartment does not seem to be working for us. Especially when the kid is growing up."*
>
> *V3 Resident*
>
> *"For the future, I have a discussion with my wife to find a bigger house, in terms of car parking space (availability) and two-bedroom house, because our kid is grown already."*
>
> *G3 resident*

If we look at the floorplan, most of the kitchen is merged with the main room. Although located next to openings, the odor from the cooking activity still leaks into the living room and create an inconvenience for the other family members. Most homes do not have a cooking hood above the stove as it is perceived as an electric-consuming device. Taking the example of V4, as shown in figure 13 below, cooking and drying laundry activities could not be done simultaneously, as both activities are allocated in the same space and the cooking odour might ruin the washed clothes.

Figure 12. Living room of V4, where there is a bed, drying space, and kitchen all together.

Noise disturbance from neighbours is experienced by both groups and caused by thin party walls, bad wall insulations, and small room size. Some of the residents could hear the neighbour talking in the next room, although they stated that they could not hear the exact conversation. This occurrence also makes the residents aware that if they made any noise, the neighbour could hear their noise as well. Reduced privacy is experienced here by all residents.

Regarding the temperature and illumination comfort inside the house, most respondents do not rely on mechanical cooling and artificial lighting during the daytime. In rooms that do not have any windows, the resident will open the door so the sunlight and wind will enter the room. Since the house length of the house is not too deep, sunlight and wind can still reach the furthest room, and thus, the room will still be comfortable enough. Figures 14 and 15 show the short proximity between entrance door through the bedroom, which is the furthest room of the house. In contrast, at night, a fan or air conditioning unit must be used, although the temperature is cooler at night-time compared to daytime in Surabaya. Half of the houses from both groups are using air conditioners, while the others do not install AC units to save on electricity bills. This suggests that the perceived thermal comfort for daytime and night-time is different for Surabayans, where the latter is lower.

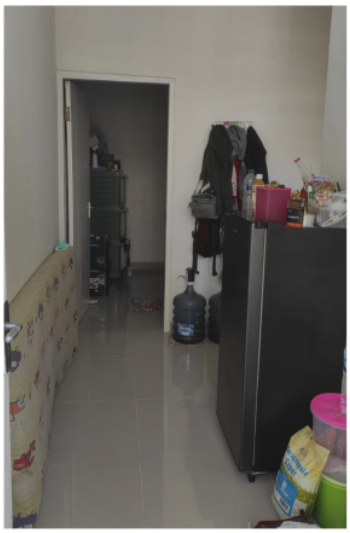

Figure 13. door to bedroom in G1, taken from main entrance door

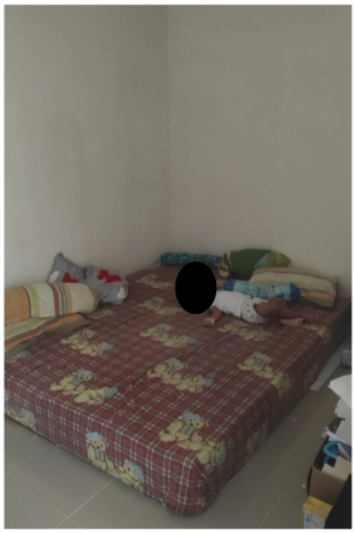

Figure 14. G1's bedroom

> *"The wall partition was made from multiplex board. Automatically, when it was hot, it was super-hot (inside the room) ... But where else can I sleep? So just stay at my bedroom, although it's too hot, but it was okay."*
>
> *G5 resident*

4.2. Differences Between Groups

Most of the breadwinners in MGH case studies work more than 40 hours a week, more than the standard set by the Indonesian Government in Law number 13 year 2003. This implies that they have more workload; thus, less time is spent

at home. Most of them said they are overworked for economic purposes (to get extra income for living and saving). On the other hand, SVH's earners tend to have only one occupation and spend 40 hours per week for work on average.

> *"At first when (we) live here, we feel not safe. But what we else can we do, my previous rent was about to end, and we had to move out. At first, there was no fence. This fence, I just installed (it) recently."*
>
> *G1 resident*

Overall, the SVH residents feel they have better security than living in grounded housing. In most vertical housing building, there is a security personnel who guards the entrance 24 hours a day. Every lift has a fingerprint sensor, which only authorized personnel can access on certain floors. This argument is also supported by the behaviour of MGH residents. During the interview, they stated that every night they would put their motorcycle inside the house due to security issues in their neighbourhood. Some interviewees feel that there are too many people living in their area, combined with the narrow and empty streets at night, making their neighbourhood unsafe at night. It concedes with the theory stated by Hawley (1950) that increased criminality in denser areas is caused by a surplus of opportunities in the form of structure and people. Constant surveillance combined with mixed land use planning is needed to create a safer environment for residents (Jacob, 1961).

The laundry and drying spaces are located next to each other in SVH units. Although most households utilize the terrace as a drying space, in three MGH units, the drying space is located on the second floor, which makes the washing activity inefficient. They must pass through the narrow and steep staircase while carrying the heavy laundry, making daily activities become dangerous. In G3 instance, as shown in figure 16 below, the housewife needs to wait for the husband to come back from work to lift the laundry from the first to the second floor.

Figure 15. location of washing machine and dryng space in G3.

Furniture such as chairs, desks, and sofas could be found in all SVH units. This furniture allocation is crucial to support learning and working activities, especially during pandemic times when people are forced to be inside their homes all the time. Resident of G4 stated that her children must go to a nearby food stall in order to get a table, chair, and Wi-Fi to attend

online classes during the pandemic time[2] . This is due to there being no proper space dedicated to studying inside their house. From the interviews, one of the reasons they put minimal furniture in their homes is that the space is inadequate. Connecting the MGH residents' experience to Altman's proposition (1975), the residents of MGH experience psychological distress in performing basic daily tasks due to a lack of supporting furniture and spaces. This instance shows that MHG fails to satisfy the first layer of Maslow's hierarchy of needs, where the house should provide convenience to its residents.

Figure 16. Living room of V2

Figure 17. living room of G2

Although both groups experience noise disturbance from neighbours' noise that leaks from the party wall, noise from the main road is only experienced by residents of MGH. This is due to the house's proximity to the road. Since most houses are located on narrow housing streets, there are a lot of human interactions and activities, although vehicle traffic is moderate. However, most MGH residents do not experience casual interaction with their neighbours, even when the family members stay at home all day. Only G5 resident developed a deep relationship with her neighbours, but it developed after a long period, as she had already lived there for more than 30 years. Conversely, although the SVH residents live in their places for a relatively shorter time (less than five years of occupation), they have developed interaction with neighbours, especially when they visit the communal recreational facilities in their building (e.g., the swimming pool, as shown in figure 19).

> *"It's quite okay to live in an apartment, especially here where there are a lot of kids, so (we) still meet each other and my kid still can socialize with others... there is a receptionist, there is security staff, something like that, so he (the kid) is not too timid."*
>
> *V5 resident*

> *"(I) barely know them (his neighbour), because to be honest I seldom stay at home as well."*
>
> *G1 resident*

[2] at lockdown times due to COVID-19 pandemic, every food stall should not be operating. However, in smaller streets, the enforcement was not strong enough and therefore some businesses were still running.

Figure 18. Communal facility in one of high-rise development in Surabaya. (source: Agoda.com, n.d.)

4.3. Layout Plan and House Condition Comparison Analysis

Most of the houses do not meet the plot width requirement standard, which is at least five meters. Inadequate width results in an ineffective layout plan, where too many spaces are wasted for circulation. The house cannot have openings on both sides due to the continuous party wall from the front until the end of the house building. This party wall may lead to many potential problems, such as rainwater leakage and sound insulation, and more technical details are needed to avoid the disturbances. In vertical housing, leakage problem is minimized (due to a better mechanical engineering system), and there is a management group that helps the residents with technical problems.

Moreover, the land vs building ratio of MGH is very high compared to government standards. Table 8 below shows the building-land ratio in MGH case studies, averaging at 87,54%, while the government standard calls for 36 sqm building on a minimal 60 sqm land plot (60%).

Table 6. land and building coverage ration in MGH study cases.

House code	Land (sqm) - A	Building coverage (sqm) - B	Ratio (B/A)
G1	28	21,5	76,7%
G2	18	14,5	80,5%
G3	18	14,5	80,5%
G4	21	21	100%
G5	48	48	100%
Government standard	60	36	60%

Looking back at the concept of the core growing house initiated by the government, the MGH could not be extended horizontally due to land unavailability. The only possible house expansion would be adding more storey vertically, but the construction cost would be higher per sqm compared to horizontal expansion. Thus, in terms of house expansion possibility, MGH does not possess any advantage compared to SVH. Having reference to social sustainability, the

inflexibility of the space to grow forces the dwellers to move somewhere when they need more space, making it less sustainable.

Every SVH has two adequate bedrooms which meet the government standard, and the number of bedrooms also matches the number of dwellers inside. On the other hand, MGH units do not provide enough bedrooms for their dwellers. In G1 case, the family merge the initial two bedrooms into a single bedroom because they feel the default bedrooms were too small that they could not fit the furniture. The comparison of the previous and existing layout can be seen in figure 20.

Figure 19. comparison between brochure's layout plan versus existing G1 layout plan

In MGH cases that have two storeys, the stairs are not ergonomically designed due to space availability. Compared to the SNI, every aspect of the stair dimension is falling below the standard: The width is too narrow, the going is too shallow, and the riser is too high. The comparison of each detail of staircase dimension in MGH units can be seen in Table 9 below. Therefore, it can cause a hazard to its dwellers, especially when climbing stair activity is combined with other activities such as carrying laundry. One of the hazardous experiences caused by the compact house layout and steep staircase is explained in figure 21 and the quote below:

> *"I am the one who always brings (the laundry) upstairs, but there is one time I fell down after slipping at the stairs. That's because my child, after he went to the bathroom, he did not dry his feet properly, and then (went upstairs and) made the stairs wet. When I went down, I slipped."*
>
> *G3 resident*

Figure 20. Stairs in G5 house.

Table 7. staircase dimension comparison in MGH two-storey units.

	Minimum width	**Staircase going**	**Staircase Rise**
SNI 03-1746-2000	**90cm**	**28cm**	**10-18cm**
G1 (single storey)	N/A	N/A	N/A
G2	60cm	30cm	27cm
G3	60cm	30cm	27cm
G4	45cm	25cm	32cm
G5	75cm	15cm	35cm

5. Discussion

5.1. Social implications on MGH

Overall, both residents in MGH and SVH acknowledge the crowding situation in their houses. However, the social conflict between family members as stated in the literature review chapter rarely arises. Based on the interview, this is due to family members rarely spending time together inside the house, given that most of the family member has activities outside the house (work/school). In some cases, the breadwinner of MGH has two or three jobs to fulfil the needs of the family, spending more than 40 hours per week working, and therefore they spend very limited time at home and have little interaction with the family member. This seems to contradict the work-family conflict theory by Kahn et al. (1964) which stated that overtime or take-away jobs might cause conflict around time spent with family in the evening. However, in MGH case, overtime is something that is desirable as it is seen as one of the ways to get more income. Alternatively, this phenomenon might be seen from a cultural perspective. In the Indonesian context, personal space is less acknowledged, and often big family lives under one roof as shown in Gadang House[3]. As Hall (1966) found in his research, Asian society is a "close contact" and overcrowding is a common condition occurring in Asian households, regardless of their income level. Overcrowding perceived by western standards might be judged as voluntary or tolerable (Myers, Baer and Choi, 1996).

Lack of storage space, combined with the fear of the jump in energy bills, makes MGH residents consider very carefully when they are about to buy household equipment, hindering the convenience value of their housing. Two of the residents stated that even before buying new things, they must throw some existing items in their houses due to lack of space.

The social interaction between MGH residents and their neighbours can be considered low. Although the house is smaller than SVH residents, MGH residents are rarely involved in community activities nor deeply interact with their neighbours. Small house space does not affect the social interaction between neighbours.

In terms of house thermal and humidity comfort, there is no serious problem experienced by MGH housing residents. The only complaint that arises is that sometimes they feel the house is too hot on sunny days. Most houses possess fans and/or air conditioning to help cool down the temperature while also reducing the humidity inside.

As Maslow stated in his theory of needs, in order for a higher-level need to occur, the lower-level needs must be satisfied at first. Looking at the points stated above, convenience, privacy (between family members due to lack of space), and safety, which all are in the first and second layer of Maslow's pyramid, have not been fulfilled by MGH model. Subsequently, the need for social value in housing, which is in the third layer of Maslow's pyramid of needs, is not expected in MGH. Low-income families, who are the main occupants of MGH, will deal with basic physiological and safety needs. The fulfilment of these lower-level needs is essential before other higher-level needs emerge, such as a

[3] See chapter 2.5.

sense of place, public participation, and individual characteristic (McCray and Day, 1977). The lack of open land throughout the house also further hinders the possible growth of MGH, making it unsustainable in the long term.

Residents in vertical housing, although they still feel that their dwellings are relatively small, have better fulfilment of housing needs compared to MGH residents. While all MGH residents plan to move to a bigger house in another neighbourhood, three out of five interviewees who live in SVH feel they are satisfied with their house right now and not planning to move anywhere at least for the following five years. This thought would diminish the need for house-moving budget and will enhance the community stability of the neighbourhood. According to Hightree et al. (2018), low resident mobility will enhance attachment, social feelings, and social capital, which would result in the enhancement of education and public facilities and the minimization of criminality and anti-social behavior. All these merits are required to support the social sustainability attainment of a community.

Another point worth mentioning is the unimportance of mental imagery about a house when the customers pick their housing choice. All MGH residents stated that location and budget are the main considerations in their housing selection. Again, this might be connected to the fulfilment of Maslow's pyramid, where beauty and prestige are higher-order housing values that will be considered by more affluent families. Therefore, the supply of grounded housing by the private sector in Indonesia could be interpreted more based on the developer's economical point of view. The developer is selling grounded housing because it requires less upfront capital, fewer building safety and regulation issues, and a shorter development life cycle.

> *"If there is nearby (-to- the-workplace) vertical housing, I would consider (living there). If my wife has to travel far from work to home at night, I would be worried, that is why I'm looking for (somewhere) nearby... My focus is just looking for a place nearby my company (where I and my wife are working)."*
>
> *G3 interviewee*

Looking back at the UK's housing history, this MGH phenomenon resembles the back-to-back terraced housing in the UK, as seen in figure 22, which was outlawed in 1909 with Housing Act. Back-to-back terraced housing was popular during Britain's industrial revolution. Inexpensive and high in density, back-to-back housings offered a solution to the rapid increase in factory towns across the UK. They were built to accommodate worker-class citizens in the middle of the city. However, the layout suffered from poor illumination and ventilation, and the construction was efficient but poor in quality, and therefore was judged unsatisfactory by the UK parliament. From this comparison, grounded housing in small size and without adequate land plots in different places, although with different cultures, could not satisfy the well-being need of the residents.

Figure 21. Back-to-back terraced housing in Leeds (source: Leodis.net)

5.2. Recommendations

Based on World Bank's projection in 2019, by 2045, 70% of the Indonesian population is projected to live in the cities. As Sahme Wahba, World Bank Director for Urban, Disaster Risk Management, Resilience, and Land Global Practice, stated, better economic opportunities in the cities have helped lift millions of Indonesians out of poverty and even join the middle class (World Bank, 2019). Limited land availability, combined with increasing demand, will make micro-living in demand more than ever. Indonesian urban people in the future will inevitably live in more compact dwellings. To enhance the social quality of micro-housing residents, several interventions are proposed.

For the conventional form of housing, it is important for the standard housing size to pertain. The finding of this research shows that Indonesians who live in bigger dwellings have more fulfilment in their social sustainability aspect compared to smaller dwellings. Performing general daily tasks is easier to do in adequate space without any major difficulties. This finding seems to correspond with a study done by HATC Ltd in the UK, as quoted by Carmona et al. (2010) where extra space in homes can result in benefits in wellbeing, health, and quality of life.

The Indonesian government launched "Program Sejuta Rumah" (One million houses program) in 2015, which aimed to reduce the housing backlog in Indonesia. However, the government strategy to increase the housing supply would not decrease the overcrowding level per se, as argued by Myers et al. (1996). Besides adding housing numbers, there is an urgency for the government to have a housing betterment strategy. While it is important to address the housing backlog in Indonesia, it is also essential to enhance the quality of living of the residents. By 2021, BPS stated that only 40% of Jakarta households lived in affordable and decent dwellings (Maharani, 2022).

In light of current global trend, co-living spaces can be considered as one of the solutions to rapid urbanization while combating its social problems, such as loneliness and social cohesion (Indah and Wardono, 2021). This alternative form of housing has also been deemed a solution to reduce the rental price for the young generation, especially in big cities. A study conducted by Indah and Wardono (Indah and Wardono, 2021) concluded that the millennial generation in Indonesia is thinking about a co-living lifestyle as a solution to living in big cities such as Jakarta. Figures 23 and 24 show

the example of a co-living building in Ubud, Bali. Although currently the building is being let for short term, mostly for ex-pats, the demand for this kind of dwelling is growing. This seems aligned with this research's finding of how communal facilities in vertical housing, such as swimming pools and communal gardens, could enhance social cohesion between neighbours.

Figure 22 and Figure 23. Communal spaces in co-living spaces in Bali (Source: dezeen.com, 2016)

Interestingly, this co-living lifestyle has been practiced by traditional Indonesian society, which can be seen in some traditional communal housings such as Gadang house. Each household/person only occupies a small bedroom, which is only used for sleeping and changing clothes, while the other activities are done in the public area of the house. However, this kind of housing needs different space standards that need to be separated from existing guidelines for housing.

6. Conclusion

6.1. Conclusion

Housing is categorised as a basic need that affects social sustainability (Coloantonio, 2010). Certain spatial aspects of housing can fulfil human needs, for the present and future, which will follow Maslow's theory of needs (Maslow, 1943) Housing size, whether it is the building size or the land plot size, has a significant impact on the living quality of its dwellers. According to a lot of research, living in inadequate spaces might lead to an overcrowding situation, which can trigger many problems such as health problems, individual well-being problems, social well-being issues, resident migration, and house layout inefficiency.

Indonesian regulations acknowledge the minimum standard of housing. However, its implementation seems to be not strict enough. In certain areas in Surabaya, there are several private-led or self-built houses which do not satisfy the regulated size. Micro-housing term itself has been utilized by many mass media and developers in Indonesia to promote small living, especially in big cities. From the literature research, the term "micro-housing" in the Indonesian context refers to grounded houses whose land plot size is under 60 sqm, has a narrow width, and/or the building size is below 9sqm/person.

This research compares two types of housing: micro-grounded housing (MGH) and standard-vertical housing (SVH), in terms of the fulfilment of its resident's social needs. MGH occupants find difficulties in performing daily tasks, such as studying, laundry, and eating. This is due to a lack of furniture inside their houses, such as tables and chairs, and other labour-saving devices. The convenience aspect of housing, based on Maslow's hierarchy, is compromised here. Since the space inside is limited, leisure activities such as doing hobbies or having a pet cannot be done inside the house. Most of the weekend, they feel the urge to go out and spend time outside the house. Further layout observation indicates MGH cannot be expanded to cater to future needs; if stairs are present in the house, the dimension does not match the standard required which will cause hazards.

From the interview and observation conducted, it is found that most of the residents from both groups acknowledge that their living space is small. However, although they do not have privacy, they do not perceive it as a problem. Moreover, conflict between family members is unlikely to arise in both groups. This might relate to the Asian cultural perspective where personal space is less addressed, and overcrowding is seen as an acceptable condition among households.

In the future, the MGH residents thin of moving to a bigger house in short term. SVH residents, on the other hand, are showing the desire to live in the same dwelling for a longer period. This shows that bigger spaces of housing enhance the social sustainability of development as it will satisfy the present and future needs of the dwellers. They also experience higher satisfaction in social interaction with their neighbour. The verticalization of dwelling creates an opportunity to provide nearby communal facilities that can be enjoyed by dwellers easily, and therefore increase social interaction.

In conclusion, the MGH model does not provide a higher level of satisfaction in social needs compared to SVH. Looking back to Maslow's hierarchy, MGH does not attain the convenience, privacy, and safety needs. As long as the lower layers

of the needs have not been satisfied, the social need of the residents will not occur. The absence of interfamily issues in MGH households can therefore be seen as a consequence of the failure of MGH fulfilling the basic values of housing.

It is important to impose a regulation that guarantees access to decent housing conditions for all layers of society. While the government's focus through "Program Sejuta Rumah" is on addressing the housing backlog, the standard size enforcement for traditional grounded housing model needs to be stronger, especially in the planning permission and construction phase. Furthermore, acknowledgment of micro-housing issues by officials would be useful to regulate the standard, rather than keep it in the dark. There is also an urgent need for national, comprehensive housing improvement policies that address the undersized housing issue. This is to guarantee the social sustainability of all Indonesians, as stated in the 1945 constitution.

6.1. Limitation and Future Research

Given the limited time and resources allocated for this research, there are several areas in which this topic could be further explored. The quasi-experimental design could provide a more detailed picture and comparison of how MGH affects social sustainability, compared to broader types of housing in Indonesia. Besides the data collected in this research, both MGH and SVH Resident's health records, academic, and/or professional performance of individuals could be monitored, which will produce quantitative data that will help to further assess the social sustainability of the residents. Periodical measurement of temperature and humidity in each room inside could also provide more quantitative data in this research and will show the actual thermal comfort of the person, rather than the perceived one. However, this kind of data is unlikely to be gathered as there may not be any consent from the residents due to continuous monitoring required. Moreover, the literature about micro-housing and social sustainability in Indonesia is very limited, and thus literature review chapter mostly is peered with international pieces of literature.

In the future, this research could be expanded to further examine the social interactions in the neighbourhood scope. More comprehensive urban data is needed to see the typical urban form which will be used to determine the typical housing model in one neighbourhood. Interaction within a community with the dominance of MGH type and its relation to social segregation issues in a city can be tested for future research.

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Appendices

Appendix 1 - Questions list for interviews

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Semi Structured Interview Question Set / R1 / July 2022

Interviewer : Felix Ciosconara
Interviewee :
Address :
House code :
House Type : Grounded housing / Vertical Housing
Date of Interview :

Thank you for giving your time for this research interview. I hope that this interview would benefit you as the house users for the long term; helping you reflecting on your overall experience living in this house and discover things that you might consider improving such as house safety, thermal comfort, etc. This interview will be managed in utmost confidentiality. The data about the building objects, household's member, and interview recordings will be accessible only for interviewers, while the interview transcript in English would be provided to supervisor for supervision purpose only. Should the direct quotes are needed to be quoted in the published report, consent will be asked prior to the interviewees. Therefore, I would be truly grateful if you could answer the questions as detail as possible.

A. Introduction

A.1. Please tell briefly about you and your family
A.2. How long have you been living here? How could you end up in living here? What's the consideration when buying the house?
A.3. How's your previous dwelling looks like?
A.4. Usually, how many hours you spend in this house on weekday? What do you usually do?
A.5. How many hours you spend inside the house on weekend? What do you usually do?

B. Individual well-being

B.1. Do you ever experience sleeping disorder?
B.2. When you are doing daily tasks (cleaning, laundry, cooking, etc), do you ever find difficulties?
B.3 Do you ever feel bored/suffocated at home that makes you want to go outside?
B.4. Do you have everything you need inside the house? If there's something missing, how you compromise with it?
B.5. Is it easy for you to accidentally hit things around you? Do you feel this house is safe for toddler?
B.6. Do you find your staircase too steep / too hard to move around within (especially while carrying stuff)?
B.7. During the pandemic period (2019-2021), when working and/or studying has to be done online, how was it? Did you find any difficulty?

C. Social well being

C.1. Do you feel that you're too often seeing your family member? Does it give positive/adverse impact to your relationship with others family member?
C.2. Does conflict often arise within family member? And if the answer is yes, how do you resolve it?

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C.3. Overall, what do you think about the safety of the neighbourhood? Do you ever feel you're afraid that thieves can easily barge into your house?
C.4. Can you hear your neighbour talking/making some noise?
C.5. How often do you get to pass by with your neighbour?
C.6. How close are you to your neighbour? Do you talk often / do activities together with them?
C.7. Do you feel comfortable inviting people to your place?
C.8. Do you feel you have privacy in this house? Could you elaborate with any example?

D. Long term occupation - Residential Stability
D.1. With the development of your family (kids growing up), do you think you and your family would stay here for the next 10 years? What kind of improvement/expansion that you think you can do in this house?
D.2. Do you feel more secure knowing that you own a piece of land, rather than renting / owning a flat? Or is there any other consideration?

E. Layout
E.1. How is your lighting fixture usage? Do you turn it on anytime anywhere inside the house? (Especially during daytime)
E.2. Do you install air conditioners in each of the rooms? How often do you use that? Do you ever feel that the room is too hot / too cold / too humid? And how often does that feeling occur?
E.3 Do you ever feel uncomfortable when using the bathroom/kitchen? Is there any unpleasant odour after using the room? How do you deal with that?
E.4. How do you do laundry? Do you ever feel troubled with the lack of drying space?
E.5. Do you often feel that you should not buy the things you want/need because lack of storage inside your house? How do you feel about that?
E.6. Do you own any vehicles? Do you find it hard to park/go out with the car / another vehicle?

Any more thoughts you'd like to share?

Appendix 2 - case studies layout plan and documentations

G1 residence – grounded housing

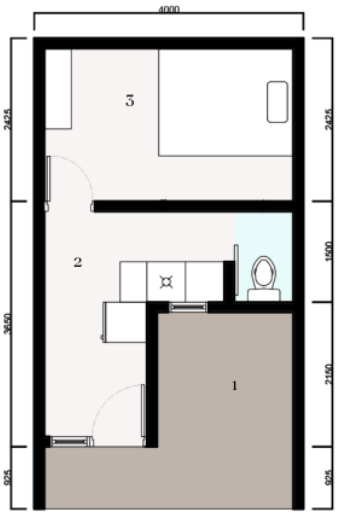

Figure 24. G1 Layout Plan, scale 1:100

Legend:

1. terrace	4. bathroom
2. hall	5. kitchen
3. bedroom	

Figure 26. G1 – house facade

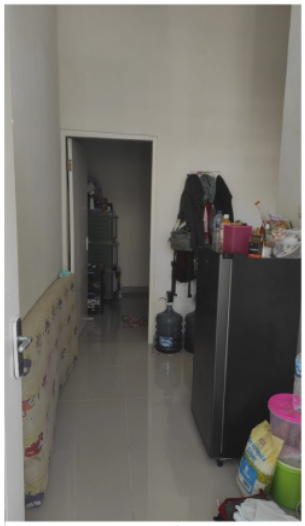

Figure 27. G1 – view from main entrance

Figure 25. G1 – bedroom

Figure 28. G1 - kitchen and bathroom door

G2 residence – grounded housing

Legend:
1. terrace
2. hall
3. kitchen
4. bathroom
5. bedroom 1
6. living room / bedroom 2
7. balcony

Figure 30. G2 – kitchen and hall 1st floor

Figure 31. G2 – house facade

Figure 32. G2 – house facade

Figure 29. G2 – view to 1st floor hall from stairs

Figure 34. G2 – kitchen

Figure 35. G2 - bedroom

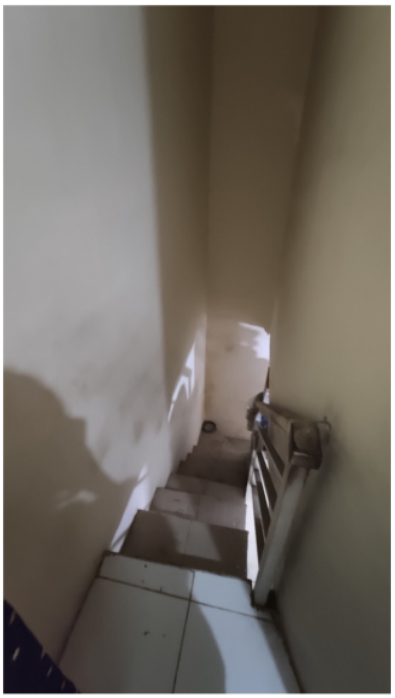

Figure 36. G2 - stairs

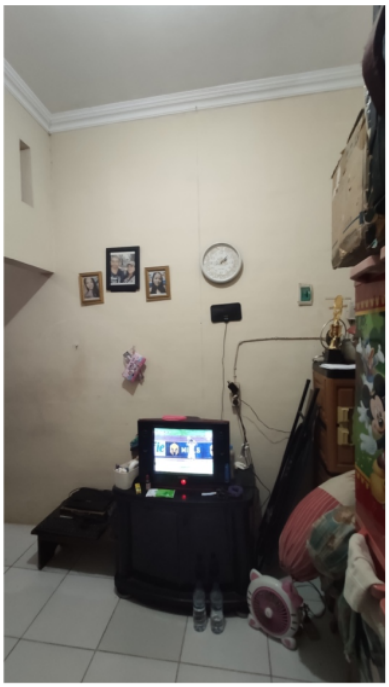

Figure 33. G2 – living room / bedroom 2nd floor

G3 residence – grounded housing

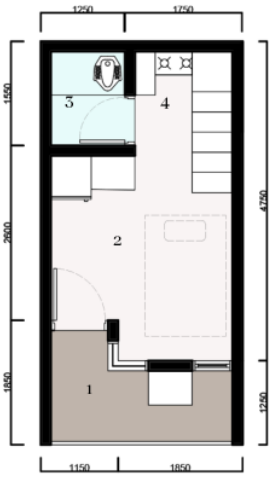

Figure 38. G3 – 1st floor layout plan, scale 1:100

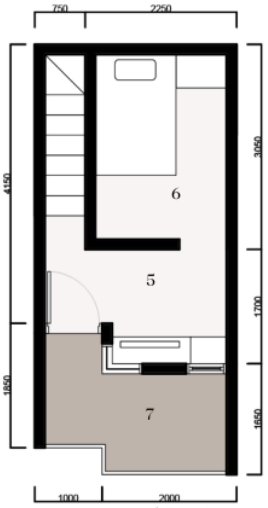

Figure 37. G3 – 2nd floor layout plan, scale 1:100

Legend:
1. terrace
2. hall
3. bathroom
4. kitchen
5. bedroom 1
6. living room
7. balcony

Figure 40. G3 – house facade

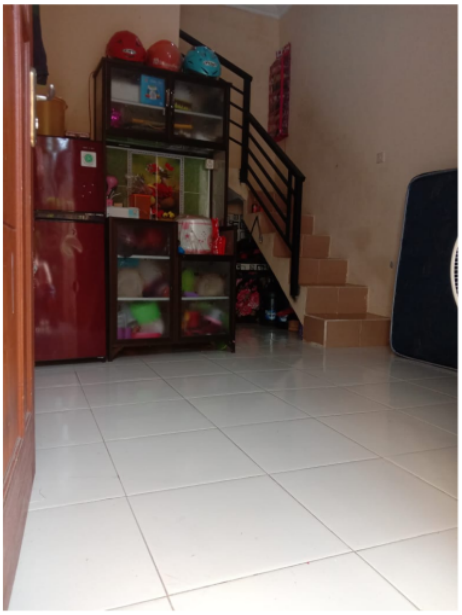

Figure 39. G3 – 1st floor hall view from main entrance

Figure 41. G3 – kitchen and stairs

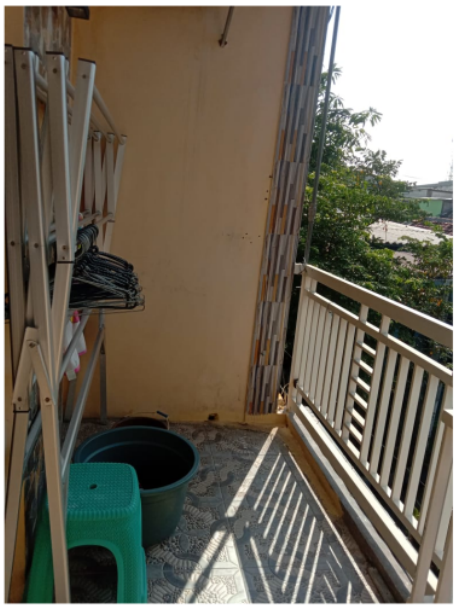

Figure 42. G3 – drying space and balcony 2nd floor

Figure 43. G3 - Living room 2nd floor

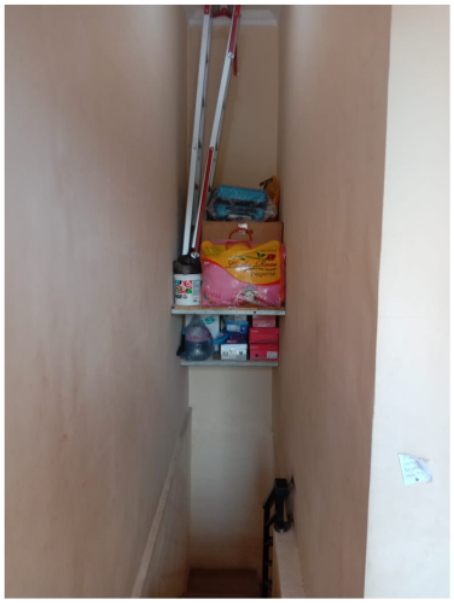

Figure 44. G3 - storage above stairs

G4 residence – grounded housing

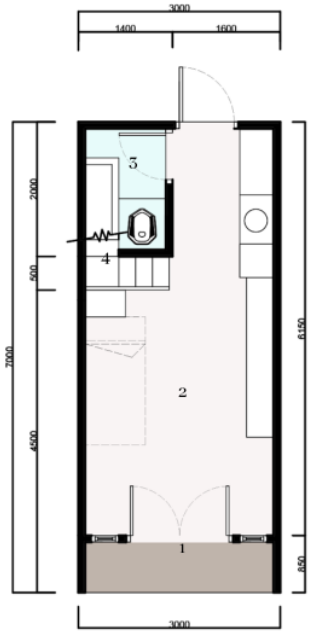

Figure 48. G4 – 1st floor layout plan, scale 1:100

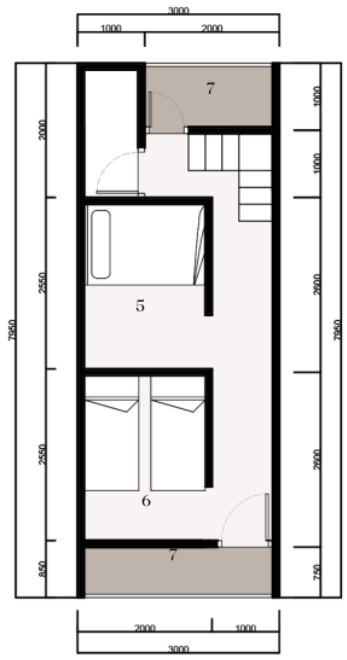

Figure 47. G4 – 2nd floor layout plan, scale 1:100

Legend:
1. terrace
2. hall
3. bathroom
4. stairs
5. bedroom 1
6. bedroom 2
7. balcony

Figure 50. G4 – 1st floor hall

Figure 49. G4 – house facade

Figure 46. G4 – bedroom 1

Figure 45. G4 – bedroom 2

G5 residence – grounded housing

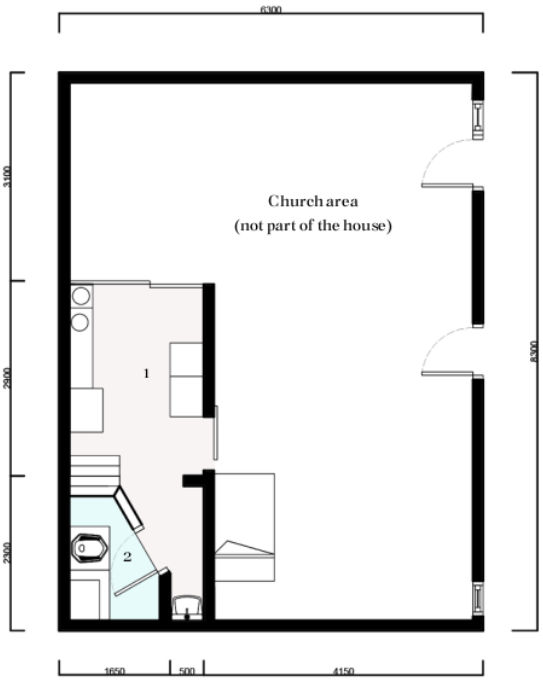

Figure 52. G5 – 1st floor layout plan, scale 1:100

Figure 51. G5 – 2nd floor layout plan, scale 1:100

Figure 53. G5 - house facade

Legend:
1. kitchen / church pantry
2. toilet
3. hall / kitchen
4. bedroom 1
5. bedroom 2

Figure 57. G5 - stairs

Figure 56. G5 – bathroom 1st floor

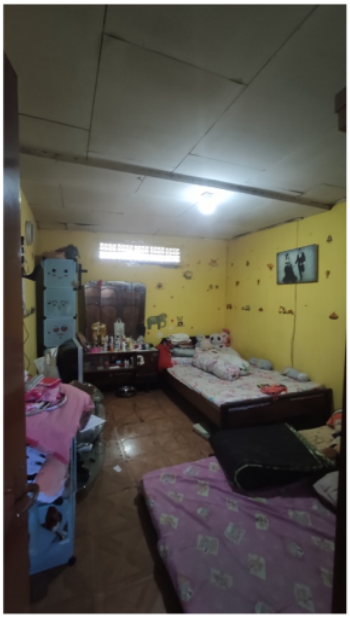

Figure 55. G5 - bedroom

Figure 54. G5 - hall 2nd floor

V1 residence - flat

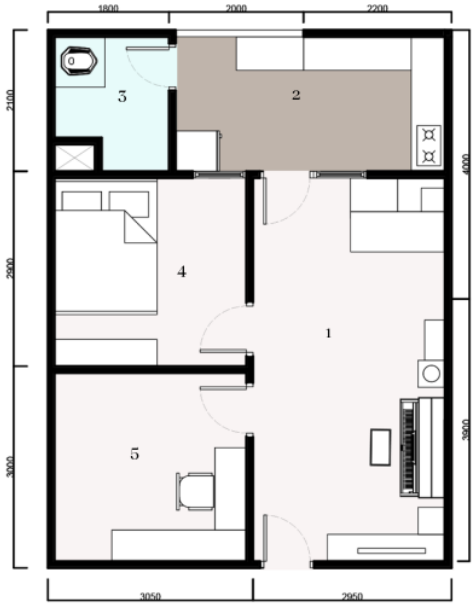

Figure 60. V1 – layout plan, scale 1:100

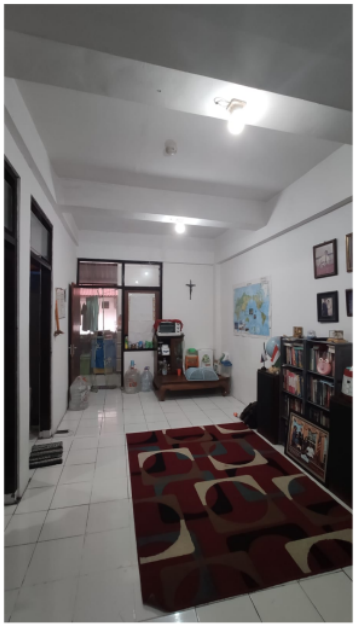

Figure 61. V1 – living room

Legend:

1. living room	3. Bathroom	5. study room
2. kitchen / dining room	4. bedroom	

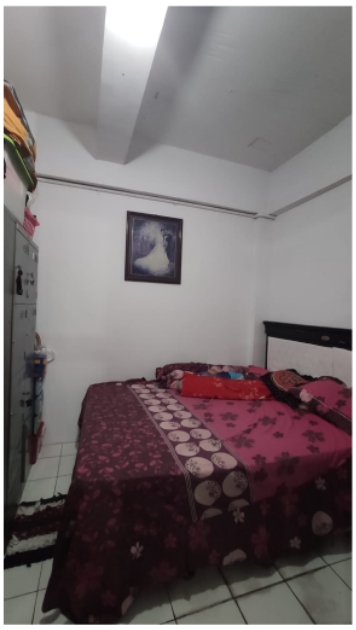

Figure 62. V1 -bedroom

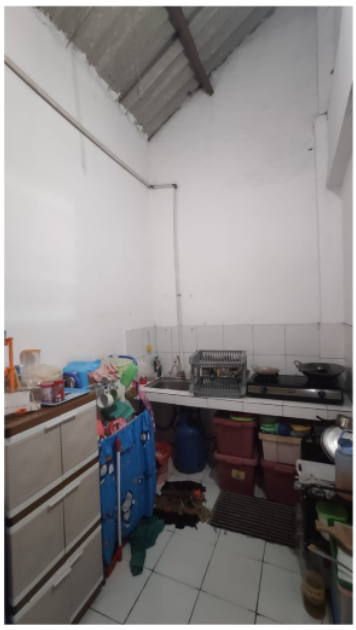

Figure 58. V1 - kitchen

Figure 59. V1 – study room

V2 residence - flat

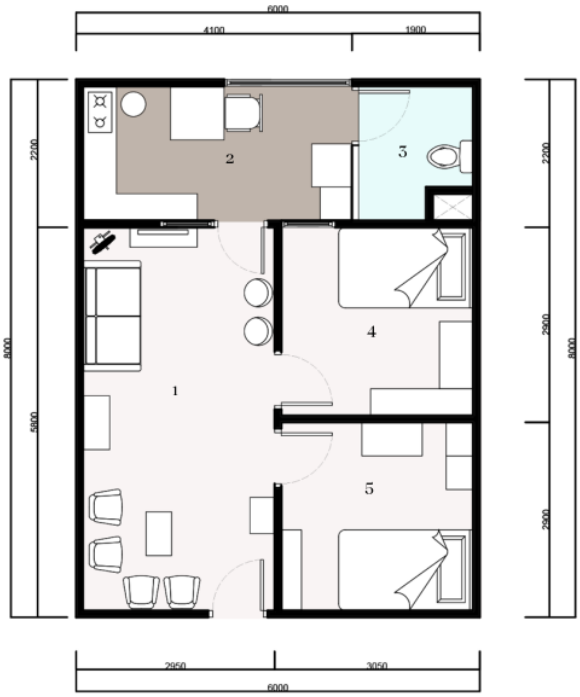

Figure 64. V2 – layout plan, scale 1:100

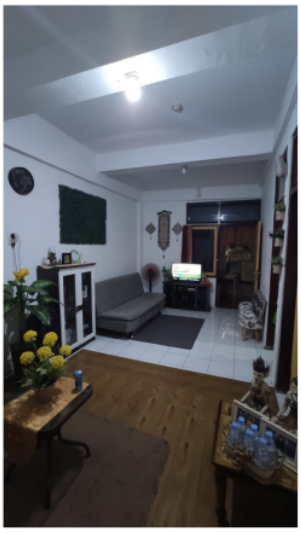

Figure 63. V2 – living room

Legend:

1. living room	3. Bathroom	5. Bedroom 2
2. kitchen / dining room	4. bedroom 1	

Figure 66. V2 – bedroom 1

Figure 65. V2 – bedroom 2

Figure 67. V2 -dining room

V3 residence – flat

Figure 71. V3 – layout plan, scale 1:100

Legend:
1. living room & kitchen
2. bathroom
3. bedroom 1
4. bedroom 2
5. balcony

Figure 72. V3 – drying space

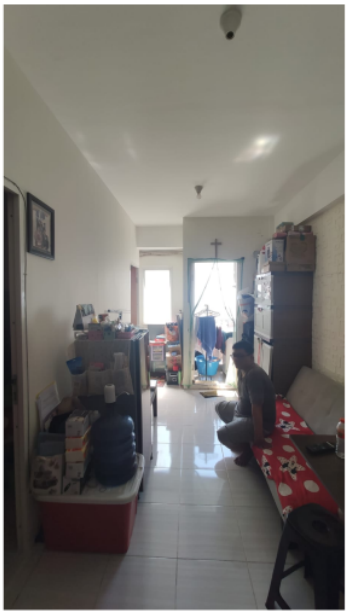

Figure 68. V3 – living room

Figure 70. V3 - kitchen

Figure 69. V3 - bedroom

G4 residence - flat

Figure 73. V4 – layout plan, scale 1:100

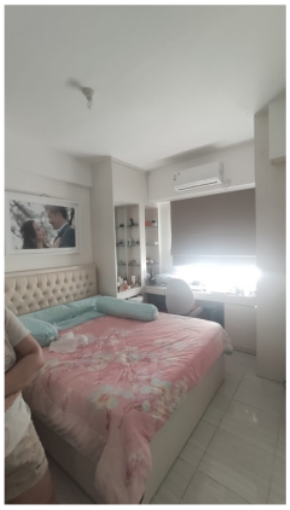

Figure 77. V4 - bedroom

Legend:

1. living room	3. Study room	5. bathroom
2. kitchen / dining room	4. bedroom	6. balcony

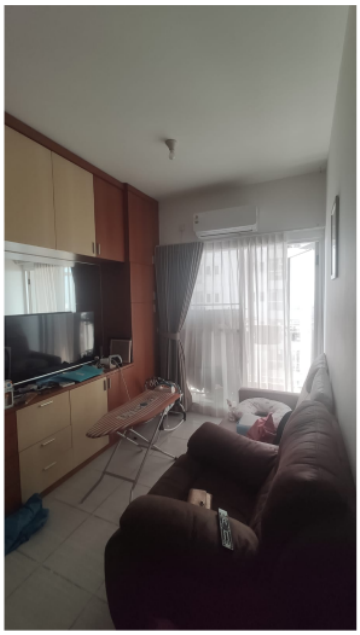

Figure 75. V4 – living room

Figure 74. V4 – kitchen and dining room

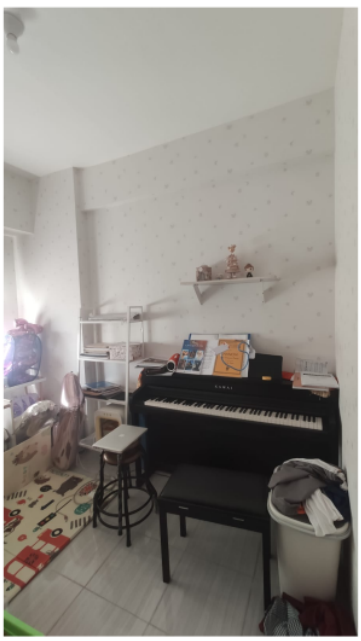

Figure 76. V4 – study room

V5 residence – flat

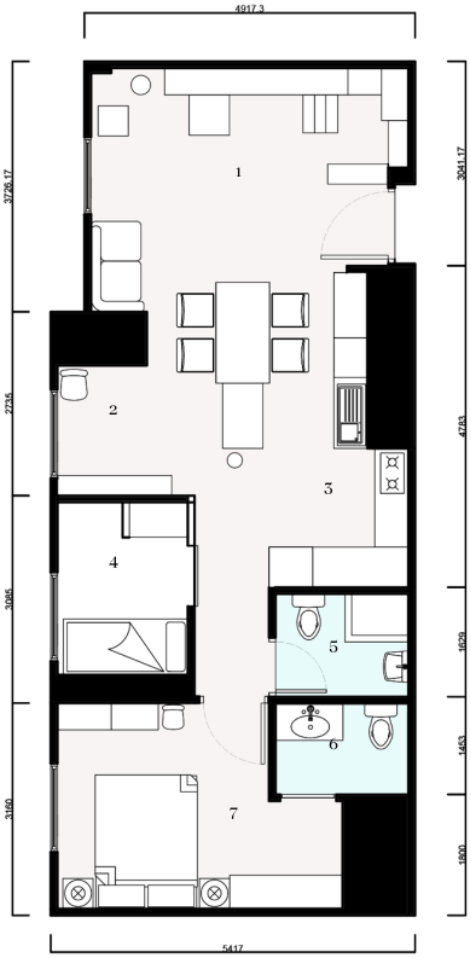

Figure 79. V5 – layout plan, scale 1:100

Legend:
1. living room & dining
2. TV room
3. kitchen
4. bedroom 1
5. bathroom 1
6. bathroom 2
7. bedroom 2

Figure 78. V5- dining room & living room

Figure 82. V5 – dining room & kitchen

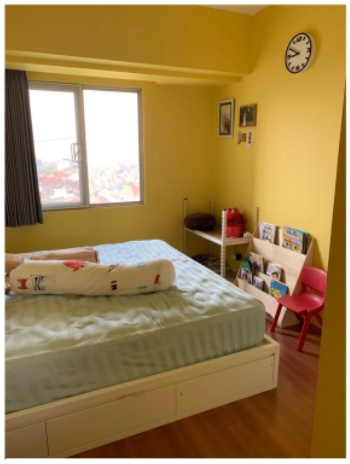

Figure 81. V5 - bedroom

Figure 80. V5 - toilet

Appendix 3 - Ethic Clearance Form

Note: this is a copy of the proforma that each student MUST complete and submit directly on Moodle. Please reproduce your submission here for the purpose of your supervisor signing off on its review and approval.

Ethical Clearance Pro Forma

It is important for you to include all relevant information about your research in this form so that your supervisor can give you the best advice on how to proceed with your research.

You are advised to read though the relevant sections of UCL's Research Integrity guidance to learn more about your ethical obligations.

Submission Details

1. **Name of programme of study:**
   Housing and City Planning

2. **Please indicate the type of research work you are doing (Delete that which do not apply):**
   - Dissertation in Planning (MSc)

3. **Please provide the current working title of your research:**
   What are the well-being and social implication of landed, low rise, high-density micro-housing in Indonesia?

4. **Please indicate your supervisor's name:**
   Iqbal Hamiduddin

Research Details

5. **Please indicate here which data collection methods you expect to use. (Tick all that apply/or delete those which do not apply.)**

   - Interviews
   - Questionnaires (including oral questions)
   - Documentary analysis (including use of personal records)
   - Audio-visual recordings (including photographs)
   - Systematic review
   - Secondary data analysis

6. **Please indicate where your research will take place (delete that which does not apply):**
   - Overseas only

7. **Does your project involve the recruitment of participants?**
   'Participants' means human participants and their data (including sensor/locational data and observational notes/images.)
   Yes

Appropriate Safeguard, Data Storage and Security

8. Will your research involve the collection and/or use of personal data?

Personal data is data which relates to a living individual who can be identified from that data or from the data and other information that is either currently held or will be held by the data controller (you, as the researcher).

This includes:

- Any expression of opinion about the individual and any intentions of the data controller or any other person toward the individual.
- Sensor, location or visual data which may reveal information that enables the identification of a face, address etc. (some post codes cover only one property).
- Combinations of data which may reveal identifiable data, such as names, email/postal addresses, date of birth, ethnicity, descriptions of health diagnosis or conditions, computer IP address (of relating to a device with a single user).

Yes

9. Is your research using or collecting:

- special category data as defined by the General Data Protection Regulation*, and/or
- data which might be considered sensitive in some countries, cultures or contexts?

*Examples of special category data are data:

- which reveals racial or ethnic origin, political opinions, religious or philosophical beliefs, trade union membership;
- concerning health (the physical or mental health of a person, including the provision of health care services);
- concerning sex life or sexual orientation;
- genetic or biometric data processed to uniquely identify a natural person.

Yes

10. Do you confrm that all personal data will be stored and processed in compliance with the General Data Protection Regulation (GDPR 2018)? (Choose one only, delete that which does not apply)

- Yes

11. I confirm that:

- The information in this form is accurate to the best of my knowledge.
- I will continue to reflect on and update these ethical considerations in consultation with my supervisor.

Yes

RISK ASSESSMENT FORM
FIELD / LOCATION WORK

DEPARTMENT/SECTION: BARTLETT SCHOOL OF PLANNING
LOCATION(S): INDONESIA
PERSONS COVERED BY THE RISK ASSESSMENT: Felix Ciosconara

BRIEF DESCRIPTION OF FIELDWORK (including geographic location): COMPLETE HERE

COVID-19 RELATED GENERIC RISK ASSESSMENT STATEMENT:
Coronavirus disease (COVID-19) is an infectious disease caused by coronavirus SARS-CoV-2. The virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes. Droplets fall on people in the vicinity and can be directly inhaled or picked up on the hands and transferred when someone touches their face. This risk assessment documents key risks associated fieldwork during a pandemic, but it is not exhaustive and will not be able to cover all known risks, globally. This assessment outlines principles adopted by UCL at an institutional level and it is necessarily general. Please use the open text box 'Other' to indicate any contingent risk factors and control measures you might encounter during the course of your dissertation research and writing.
Please refer to the Dissertation in Planning Guidance Document (available on Moodle) to help you complete this form.

Hazard 1: Risk of Covid -19 infection during research related travel and research related interactions with others (when face-to-face is possible and/or unavoidable)
Risk Level - Medium /Moderate

Existing Advisable Control Measures: Do not travel if you are unwell, particularly if you have COVID-19 symptoms. Self-isolate in line with NHS (or country-specific) guidance.
Avoid travelling and face-to-face interactions; if you need to travel and meet with others:
- If possible, avoid using public transport and cycle or walk instead.
- If you need to use public transport travel in off-peak times and follow transport provider's and governmental guidelines.
- Maintain (2 metre) social distancing where possible and where 2 metre social distancing is not achievable, wear face covering.
- Wear face covering at all times in enclosed or indoor spaces.
- Use hand sanitiser prior to and after journey.
- Avoid consuming food or drinks, if possible, during journey.
- Avoid, if possible, interchanges when travelling - choose direct route.
- Face away from other persons. If you have to face a person ensure that the duration is as short as possible.
- Do not share any items i.e. stationary, tablets, laptops etc. If items need to be shared use disinfectant wipes to disinfect items prior to and after sharing.

- If meeting in a group for research purposes ensure you are following current country specific guidance on face-to-face meetings (i.e rule of 6 etc.)
- If and when possible meet outside and when not possible meet in venues with good ventilation (e.g. open a window)
- If you feel unwell during or after a meeting with others, inform others you have interacted with, self-isolate and get tested for Covid-19
- Avoid high noise areas as this mean the need to shout which increases risk of aerosol transmission of the virus.
- Follow one way circulation systems, if in place. Make sure to check before you visit a building.
- Always read and follow the visitors policy for the organisation you will be visiting.
- Flush toilets with toilet lid closed.
-'Other' Control Measures you will take (specify):

NOTE: The hazards and existing control measures above pertain to Covid-19 infection risks only. More generalised health and safety risk may exist due to remote field work activities and these are outlined in your Dissertation in Planning Guidance document. Please consider these as possible 'risk' factors in completing the remainder of this standard form. For more information also see: Guidance Framework for Fieldwork in Taught and MRes Programmes, 2021-22

Consider, in turn, each hazard (white on black). If **NO** hazard exists select **NO** and move to next hazard section.
If a hazard does exist select **YES** and assess the risks that could arise from that hazard in the risk assessment box.
Where risks are identified that are not adequately controlled they must be brought to the attention of your Departmental Management who should put temporary control measures in place or stop the work. Detail such risks in the final section.

ENVIRONMENT	**The environment always represents a safety hazard. Use space below to identify and assess any risks associated with this hazard**
e.g. location, climate, terrain, neighbourhood, in outside organizations, pollution, animals.	Examples of risk: adverse weather, illness, hypothermia, assault, getting lost. Is the risk high / medium / low ? **Low**

CONTROL MEASURES	**Indicate which procedures are in place to control the identified risk**
	work abroad incorporates Foreign Office advice
	only accredited centres are used for rural field work
x	participants will wear appropriate clothing and footwear for the specified environment
	refuge is available
	work in outside organisations is subject to their having satisfactory H&S procedures in place
	OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

EMERGENCIES	Where emergencies may arise use space below to identify and assess any risks
e.g. fire, accidents	Examples of risk: loss of property, loss of life

CONTROL MEASURES	Indicate which procedures are in place to control the identified risk
x	participants have registered with LOCATE at http://www.fco.gov.uk/en/travel-and-living-abroad/
	contact numbers for emergency services are known to all participants
x	participants have means of contacting emergency services
	a plan for rescue has been formulated, all parties understand the procedure
	the plan for rescue /emergency has a reciprocal element
	OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

FIELDWORK **1** May 2010

EQUIPMENT	Is equipment used?	NO	If 'No' move to next hazard If 'Yes' use space below to identify and assess any risks
e.g. clothing, outboard motors.	Examples of risk: inappropriate, failure, insufficient training to use or repair, injury. Is the risk high / medium / low ?		

CONTROL MEASURES	Indicate which procedures are in place to control the identified risk
	the departmental written Arrangement for equipment is followed
	participants have been provided with any necessary equipment appropriate for the work
	all equipment has been inspected, before issue, by a competent person
	all users have been advised of correct use
	special equipment is only issued to persons trained in its use by a competent person
	OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

LONE WORKING	Is lone working a possibility?	NO	If 'No' move to next hazard If 'Yes' use space below to identify and assess any

	risks
e.g. alone or in isolation *lone interviews.*	Examples of risk: difficult to summon help. Is the risk high / medium / low?

CONTROL MEASURES	Indicate which procedures are in place to control the identified risk
	the departmental written Arrangement for lone/out of hours working for field work is followed
	lone or isolated working is not allowed
	location, route and expected time of return of lone workers is logged daily before work commences
	all workers have the means of raising an alarm in the event of an emergency, e.g. phone, flare, whistle
	all workers are fully familiar with emergency procedures
	OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

FIELDWORK **2** May 2010

ILL HEALTH	**The possibility of ill health always represents a safety hazard. Use space below to identify and assess any risks associated with this Hazard.**			
e.g. accident, illness, personal attack, special personal considerations or vulnerabilities.	Examples of risk: injury, asthma, allergies. Is the risk high / medium / low? **Low**			
CONTROL MEASURES	**Indicate which procedures are in place to control the identified risk**			
	all participants have had the necessary inoculations/ carry appropriate prophylactics			
	participants have been advised of the physical demands of the research and are deemed to be physically suited			
	participants have been adequate advice on harmful plants, animals and substances they may encounter			
	participants who require medication should carry sufficient medication for their needs			
	OTHER CONTROL MEASURES: please specify any other control measures you have implemented:			
TRANSPORT	**Will transport be required**	**NO**		**Move to next hazard**
		YES	**X**	**Use space below to identify and assess any risks**
e.g. hired vehicles	Examples of risk: accidents arising from lack of maintenance, suitability or training Is the risk high / medium / low? Low			
CONTROL MEASURES	**Indicate which procedures are in place to control the identified risk**			
	only public transport will be used			
x	the vehicle will be hired from a reputable supplier			
x	transport must be properly maintained in compliance with relevant national regulations			
	drivers comply with UCL Policy on Drivers http://www.ucl.ac.uk/hr/docs/college_drivers.php			
x	drivers have been trained and hold the appropriate licence			
	there will be more than one driver to prevent driver/operator fatigue, and there will be adequate rest periods			
	sufficient spare parts carried to meet foreseeable emergencies			
	OTHER CONTROL MEASURES: please specify any other control measures you have implemented:			
DEALING WITH THE PUBLIC	**Will people be dealing with public**	**NO**		**If 'No' move to next hazard** **If 'Yes' use space below to identify and assess any risks**

e.g. interviews, observing	Examples of risk: personal attack, causing offence, being misinterpreted. Is the risk high / medium / low?

CONTROL MEASURES	Indicate which procedures are in place to control the identified risk

	all participants are trained in interviewing techniques
	advice and support from local groups has been sought
	participants do not wear clothes that might cause offence or attract unwanted attention
	interviews are conducted at neutral locations or where neither party could be at risk
	OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

WORKING ON OR NEAR WATER	Will people work on or near water?	NO	If 'No' move to next hazard If 'Yes' use space below to identify and assess any risks

e.g. rivers, marshland, sea.	Examples of risk: drowning, malaria, hepatitis A, parasites. Is the risk high / medium / low?

CONTROL MEASURES	Indicate which procedures are in place to control the identified risk

	lone working on or near water will not be allowed
	coastguard information is understood; all work takes place outside those times when tides could prove a threat
	all participants are competent swimmers
	participants always wear adequate protective equipment, e.g. buoyancy aids, wellingtons
	boat is operated by a competent person
	all boats are equipped with an alternative means of propulsion e.g. oars
	participants have received any appropriate inoculations
	OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

MANUAL HANDLING (MH)	Do MH activities take place?	NO	If 'No' move to next hazard If 'Yes' use space below to identify and assess any risks
e.g. lifting, carrying, moving large or heavy equipment, physical unsuitability for the task.	Examples of risk: strain, cuts, broken bones. Is the risk high / medium / low?		

CONTROL MEASURES	Indicate which procedures are in place to control the identified risk
	the departmental written Arrangement for MH is followed
	the supervisor has attended a MH risk assessment course
	all tasks are within reasonable limits, persons physically unsuited to the MH task are prohibited from such activities
	all persons performing MH tasks are adequately trained
	equipment components will be assembled on site
	any MH task outside the competence of staff will be done by contractors
	OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

FIELDWORK 4 May 2010

SUBSTANCES	Will participants work with substances	NO	If 'No' move to next hazard If 'Yes' use space below to identify and assess any risks
e.g. plants, chemical, biohazard, waste	Examples of risk: ill health - poisoning, infection, illness, burns, cuts. Is the risk high / medium / low?		
CONTROL MEASURES	**Indicate which procedures are in place to control the identified risk**		

- ☐ the departmental written Arrangements for dealing with hazardous substances and waste are followed
- ☐ all participants are given information, training and protective equipment for hazardous substances they may encounter
- ☐ participants who have allergies have advised the leader of this and carry sufficient medication for their needs
- ☐ waste is disposed of in a responsible manner
- ☐ suitable containers are provided for hazardous waste
- ☐ OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

OTHER HAZARDS	Have you identified any other hazards?	NO	If 'No' move to next section If 'Yes' use space below to identify and assess any risks
i.e. any other hazards must be noted and assessed here.	Hazard: Risk: is the risk		
CONTROL MEASURES	**Give details of control measures in place to control the identified risks**		

Have you identified any risks that are not adequately controlled?	NO ☐	Move to Declaration
	YES ☐	Use space below to identify the risk and what action was taken

DECLARATION	The work will be reassessed whenever there is a significant change and at least annually. Those participating in the work have read the assessment.

	Select the appropriate statement:
	I the undersigned have assessed the activity and associated risks and declare that there is no significant residual risk
X	I the undersigned have assessed the activity and associated risks and declare that the risk will be controlled by the method(s) listed above

NAME OF SUPERVISOR Iqbal Hamiddudin

FIELDWORK **5** May 2010

BPLN0039_VLRV9

GRADEMARK REPORT

FINAL GRADE

/100

GENERAL COMMENTS

Instructor

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