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**IJSCET**<http://publisher.uthm.edu.my/ojs/index.php/ijscet>

ISSN : 2180-3242 e-ISSN : 2600-7959

International  
Journal of  
Sustainable  
Construction  
Engineering and  
Technology

# Dynamism of Building Standards & Designs to Private Developers Towards Urban Poor Low-Cost Resettlement Quality of Life: A Review Comparison in Malaysia & Singapore

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DOI: <https://doi.org/10.30880/ijscet.2023.14.03.001>

Received 30 March 2021; Accepted 25 April 2022; Available online 21 September 2023

**Abstract:** Malaysia's government adopted many resettlement initiatives and housing policies to eliminate the growing number of informal settlement as well as meet the housing demands and improvement in the quality homes in order to achieve its aim of being a civilized country by 2020. Critical number of studies has been carried to investigate the low-cost dwelling in city centre effect to quality of life of occupants. However, there lack of study comparisons in terms of design and building standards structured being made to our neighbouring country Singapore which more developed in its city planning and shared the same climatic condition as Malaysia. Therefore, this paper aim to investigate the impact of the both dynamism building design and standard for the private developers concerns with regards to low-cost urban settlement. This paper explores the methodology through secondary type of data by articles, guidelines and researches involved with architectural design modifications and intervention programs establishment offered by both countries. This paper then discussed on Malaysian resettlement policy programmes intervention criteria and its nature in interior thermal comfort condition, improper layout plan, exterior design scheme and public amenities provision practiced in improving quality of life of the urban poor resettlements. As the outcome of these findings, this research suggest that Malaysia still have possibilities that could be improved for these dwellings through imposing stringent protocols on building plan, certificate, permit, licences and other documentation by local authorities for each states and Commissioner of Building for the private developers to ensure the upgraded consistency level urban settlements is being maintained.

**Keywords:** Planning, sustainable, urban settlement

## 1. Introduction

The burden on housing demands has recently increased, particularly among low-income populations. In keeping with the government's goal of eradicating poverty and squatter settlements in metropolitan areas, a greater emphasis is being

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placed on the supply of low-cost housing for group with low income and after relocation of ex-squatters (Economic Planning Unit, 2000). Despite Malaysia's rapid economic growth and successful rehoming initiatives, the group with low income and urban poor's quality of living remains a source of worry (Goh & Ahmad, 2011; Ibrahim, Aziz, Hussain, Aminudin, & Young, 2011; Karim, 2013; Zainal, Kaur, Ahmad, & Khalili, 2012). Both policymakers and researchers have raised concerns regarding the success of relocation programmes in terms of uplifting life status of low income community. However, the current regulations imposed somehow plunge the in maintaining the overall objective the programmes. Among the causative agents have been identified as resettlement programme (Ibrahim et al., 2011), a lack of employment prospects (Zainal et al., 2012), and insufficient social infrastructure (Zainal et al., 2012). The impact of Malaysian construction regulations (Goh & Ahmad, 2011) is one of the many contributing elements, and there is evidence that these regulations are contributing considerably to the lowering of rehomed people's quality of life standards. As a result, the goal of this research is to look into the impact of existing construction standards in low range urban settlement and affect tenants' life condition.

## **2. Literature Review**

### **2.1 Informal Planning and Urban Structure**

The availability of jobs and the infrastructure's ability to accommodate the expanding population are two major concerns concerning urbanisation (Richards & Thomson, 1984c). The existence of informal housing such as slums and squatters communities in a city is the most obvious sign of both urban expansion and poverty (Faiz, 2011; Gilbert & Gugler, 1992). The growth of squatter's communities demonstrates that the city's urban poor population is growing, and there is definitely inadequate suitable property for the ownership. An unplanned dwelling is essentially a continuous residence that is frequently not recognized by the council as an important part of the city and whose residents are always without basic amenities. Because the majority of squatters in Malaysia do so unlawfully, the government has every right to demolish their camps. Despite the many problems and issues that come with living in a squatters' setting, informal cities have proven to be more favorable to the poor than formal towns (Ejigu, 2011). This is likely because they have a strong feeling of community and neighborhood because they live close to one another (Ejigu, 2011), have a lower economic strain and the source of income that they may gained in the vicinity (Ibrahim et al., 2011; Sufian & Mohamad, 2009).

### **2.2 Program Effectiveness in Demolishing Squatters' and Relocation Dwelling**

In Malaysia, one of the strategies that has been enacted, the Zero Squatters Policy, has been successful in reducing the number of squatters that have formed in the city. By demolishing a large number of informal settlement in the central city and relocating squatter populations to settlement expansion, particularly low-cost and public housing, the strategy came close to meeting its goal. However, the overall outcome of Malaysia's relocation schemes does not appear to be totally effective in terms of increasing the urban poor's quality of life. Physical wellness, personal security, criminal, financial, and social concerns for urban poor and squatter persist long after they have been resettled, and have a substantial impact on their everyday lives (Ibrahim et al., 2011). This is likely because urban poverty is characterized by various deprivations, including social and cultural breakdowns, which planners and administrators frequently overlook (Richards & Thomson, 1984b). With reference to Singapore resettlements initiative which first implemented by the Singapore Improvement Trust (SIT) in the 1920s and then by the Housing and Development Board (HDB) in the 1960s, demonstrated that relocation can still be an effective tool in resolving squatter issues in which the major concern was equality on the life standard for the growing urban poor by means of authoritative involvement (Naidu & Tan, 2014). Singapore has met its housing targets while still maintaining a relatively high degree of development quality through centralizing management and authority (Wong & Yeh, 1985).

### **2.3 The Role of Building Standards**

In the case of housing development, correct construction standards are essential for ensuring the building's quality and suitability for its tenants, as well as for subsequent phase (Central Building Research Institute India, 1984). Malaysia in principle showed relatively insufficient necessities for low-cost urban resettlement programme for occupants' quality of life enhancement. Good housing should allow residents to be as flexible as possible, rather than being created based on an assumption about what the poor's needs are (Gilbert & Gugler, 1992). Apart from the economical aspect, building standards have a significant impact on the overall quality of a home development. Thus, the goal of this study is to figure out what role construction standards serve in the urban poor resettlement policies' failure and recommendations on how to rectify or eliminate the limitations caused by construction standards so that the resettlement programmes meet Malaysian policy goals of rehoming the urban poor without lowering their quality of life.

## 2.4 National Plan: Policies for Resettlement Housing

Since the 1950s, Malaysia has been pursuing a various economic development plan, with the Malayan Second Five-Year Plan reaching its conclusion in 1965. This comprehensive and integrated plan aims to assess all aspects of development, including transportation, education, healthcare, social, industry, and housing. In Malaysia's Sixth Malaysia Plan, which strives to create a balanced and un-biased style of growth across the country, housing building became a priority. The Plan placed a special emphasis on ensuring that low-income people have access to appropriate and affordable shelter (Economic Planning Unit, 1990). Various housing projects were launched under the Seventh Malaysia Plan to offer affordable housing for all people, particularly to communities with small and mediocre income. During this time, the developers will likely start to be engaged in various execution of residential programmes (Economic Planning Unit, 1996). Whilst, Eighth and Ninth Malaysia Plans were more focused on the importance of quality of life in housing development, measuring affordability and quality residences for people of all income levels.

## 3. Methods

This research explores the methodology through secondary type of data in which it inculcates articles, guidelines and researches involved with architectural design modifications and intervention programs establishment offered by Malaysian and Singaporean urban low cost housing settlement. The literature on two instances of Malaysian rehousing policies in the Kuala Lumpur and Selangor areas is reviewed in particular. Building regulations and physical conditions in comparisons are being studied in order to identify their characteristics and requirements effect in diverse building quality outcomes. As per Figure 1 below, the standards are assessed by evaluating two key criteria: design and planning requirements.

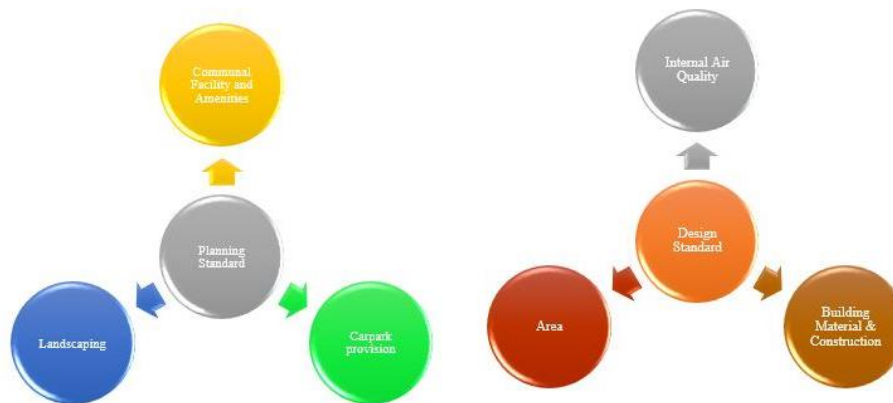


Fig. 1 - Comparison in criteria for both urban settlements in Malaysia and Singapore

Based on the comparisons conducted, the detailed discussion will be deliberated in all aspects and criteria mentioned and possible recommendations will be highlighted for the Malaysian government to consider and strategize. The relationship between construction standards' dependability and the life quality of the urban poor will next be critically examined. The original study was limited to a comparison of construction standards in the United States and Singapore. As a result, this study adequately investigates a critical aspect of a very complicated subject and connects it to urban planning strategy important to Malaysia or other emerging nations.

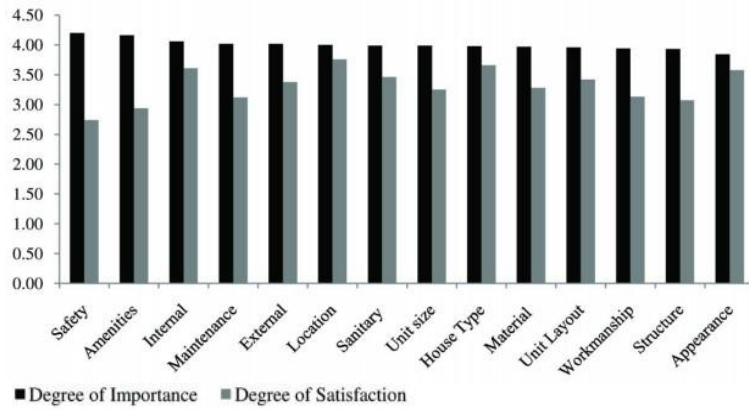
## 4. Discussion

### 4.1 Consideration Design Aspect on Low Cost Urban Resettlement Housing

Precedent study from Kuala Lumpur and Selangor are being examined with regards to effects on squatter relocation into new public dwelling development on the life quality of the occupant.

#### 4.1.1 Inappropriate Design Layout Planning for Individual Unit and Facility Floor: Kuala Lumpur Low-cost Strata Building Study

Government initiatives under Projek Perumahan Rakyat (PPR) are comprehensive schemes which were being introduced in place since 1997 to rehabilitate squatters. However, a number of researches concluded that programme injected does not appear to uplifting the life quality of low income groups. According to Goh & Ahmad (2011), discontent level of the tenants with the programme recorded to be lower than the level of significance for every category studied.



**Fig. 2 - Factors influencing the quality of public low cost flats (Source: Goh & Ahmad, 2011)**

According to findings, among variables studied impacting the condition of flats are safety and availability of utilities, which are the most concerning to residents. The residents expressed their concerns about an increase in crime in their neighborhood, a lack of security features such as lampposts, an incorrect path from flat to amenities like playground compound including inappropriate carpark and motorbike compound (Goh & Ahmad, 2011). In terms of the physical state of most of the public low-cost flats, Goh & Ahmad (2011) raised on existing layout equipped by the flats was not complied to the standard for low-cost housing national regulations, particularly in sizing reliance (Goh & Ahmad, 2011).



**Fig. 3 - Improper kitchenette sizing and inexistence yard space for daily usage of household (Source: Goh & Ahmad, 2011)**

Apart from the sizing and total area issues, complaints about the low quality of the materials used for door and window frames were also recorded, which reduces the unit's security, and frequent facility failures such as burst water pipes and clogged manholes (Goh & Ahmad, 2011). These issues being raised primarily because specification required for the materials the construction were being controlled to the lowest quality during the design and tender stage the minimum standard established at the start of the project is too low in order to scale down costing the development and thus increase profit. Due to cheaper materials proposed to the complexes were created earlier, subsequently there is a high requirement for rehabilitation for maintaining over time as the tenants' household and amenities along the upcoming years. As a result, practices and regulations controlled during design stage for affordable public flats settlements should be revised, and a detailed assessment during and after the defect liability period shall be conducted on a regular basis to ensure continuous livability of the dwellings for the occupants (Goh & Ahmad, 2011).

#### **4.1.2 Inadequate Natural Lighting and Internal Space Capacity: Strata Public Housing in Klang Valley**

Lack of natural lighting, poor roofing system, faulty doors and windows installation, cracked floors and walls and inexistence of yard have been noted as the most serious issues and concerns tenants have encountered (Zainal et al., 2012). The most prominent complaint raised by residents in terms of the surrounding environment is inappropriate and unscheduled upkeep by authorities (Zainal et al., 2012). These occurrence has also been reported to create cause and effect link between housing conditions and occupant's conditions in four dimensions: healthcare, security, personality and social engagement. With reference to healthcare aspect, majority if the occupants claim to have a chronic ailment, but due to financial hardship and other concerns, only a tiny fraction of them seek formal hospital treatment (Zainal et

al., 2012). In terms of per unit sizing and numbers of bedroom provision, privacy for each of the family members or occupant is critical for promoting healthy relationships and preventing mental illnesses.



**Fig. 4 - Exterior compound in the studied low cost complex in Klang Valley**  
(Source: Menon & Zulzaha, 2015)

#### **4.1.3 Public Amenities Provision: Shah Alam Low Cost Housing Study**

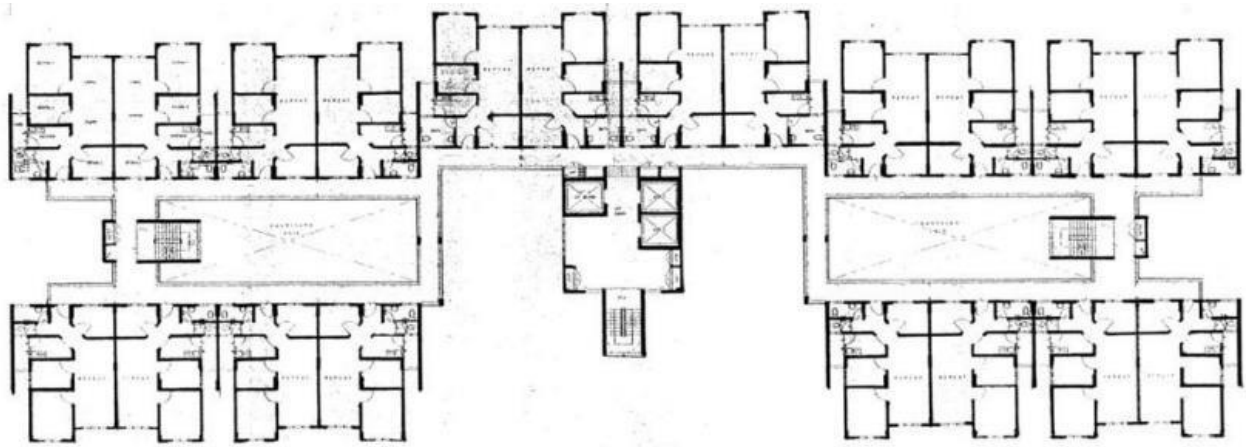
Since the 1990s, Shah Alam has been inhabited by urban poor and squatters due to its proximity to the regional hub and employment opportunities. The government then began to demonstrate its commitment by constructing various low-cost homes and public low-cost dwelling in the neighbourhood. However, a number of concerns exist now in relation to the urban poor's quality of life, which is steadily declining despite the fact that they have been relocated from their squatter's area. People frequently question the quality of living of people living in low-cost housing environments because of frequent discontent and complaints about the poor condition of the buildings, such as poor service quality, clogged drainages and toilets, dull and mould façade, poorly maintained lifts, and low-quality public infrastructure (Abdul Karim, 2011). There is a link between simulate such as domestic life, social setting, community facilities, and neighbourhood physical surroundings and characteristics of comfort, accessibility, satisfaction, safety, and utilisation (Abdul Karim, 2011). Financial challenges, hygiene, racism, crime, and public facilities are among the major issues and grievances raised by former squatters who have been relocated to new settlements provided by the authorities (Ibrahim et al., 2011). As a result, it is critical to place a higher premium on the advancement of social and communal facilities in the surrounding region in order to improve the former squatters' overall quality of life.



**Fig. 5 - Poor and unsafe condition of public area in Public Low Cost Housing Shah Alam**  
(Source: Menon & Zulzaha, 2015)

## 4.2 Analysis & Design Assessment of Building Standards: Medium/Low Cost Housing

The design standard and the planning standard are the two primary features included in the standard guidelines for the National Housing Standard for Low Cost Housing and the National Housing Standard for Medium/Low Cost Housing, respectively. Every part of the design process is covered by the design standard, including style, plan, size and floor area, building materials, finishes, and basic indoor facilities. Meanwhile, the planning standard encompasses a broader range of public infrastructure and services, including parking places, area, recreation centers, and landscapes.



**Fig. 6 - Typical plan for 18-storeys low cost flat**  
(Source: Housing Department, DBKL 2006, cited by Goh and Ahmad, 2011)

### 4.2.1 Design Standard

#### i. Size and Total Area

There are considerable variations between the low-cost and medium/low-cost housing minimum standards in terms of overall square footage and the size of usable rooms in each household. The National Housing Standard for High Rise, Low Cost Housing, published in 1998, sets the minimum number of rooms per household at three, with a total area of not less than 63.0 square metres (Construction Industry Development Board, 1998). Meanwhile, medium/low-cost housing must have a total space of at least 70.0 square metres and at least three bedrooms each unit.



**Fig. 7 - Standard unit layout plans for 18-storeys low cost flat**  
(Source: Goh & Ahmad, 2011)

The size and overall area of each unit has a significant impact on the residents, particularly in terms of psychological. Despite the fact that the minimal number of beds required per property has been raised to three, the total space of the unit has not greatly grown in proportion to the number of room. With the addition of a bedroom, the entire living and dining area, which serves as the primary gathering and bonding area for the family, shrinks. This issue causes

overcrowding and discomfort, especially in larger households, and has an indirect impact on their physical and mental health.

**Table 1 - Size and area of habitable rooms in low cost housing and medium/low cost housing standard**

	CIS 2	CIS 4
<b>1<sup>st</sup> Bedroom</b>	11.70 sqm	12.80 sqm
<b>2<sup>nd</sup> Bedroom</b>	9.90 sqm	11.80 sqm
<b>3<sup>rd</sup> Bedroom</b>	7.20 sqm	9.90 sqm
<b>Kitchen</b>	5.40 sqm	6.0 sqm
<b>Toilet</b>	1.80 sqm	2.70 sqm
<b>Bathroom</b>	1.80 sqm	2.70 sqm
<b>Living Area</b>	Not specific	Not specific

Table 1 demonstrates that the size and square footage of usable rooms change significantly between low-cost and medium/low-cost building standards. Regardless of the fact that the household size is not a major complaint among the residents, it has an impact on their everyday lives that they are unaware of. Most residents of low-cost apartments can cope with such problems because they have become accustomed to them. They are also left with the impression that they live in low-cost housing and embrace it as a fact of life (Abdul Karim, 2011). Overcrowding and a lack of privacy, on the other hand, are a growing problem today, leading to social issues such as teen pregnancies, loitering on the street, bullying, and drug use. Children, particularly those in their adolescent years, have a proclivity to be affected by their peers and strangers. They will choose to go out and hang out together with their buddies because they cannot find comfort and solitude in their own home. This type of society is unhealthy for women, both in terms of societal milieu and in terms of the Muslim religion, which forbids women from socialising with men outside of marriage. As a result, the allotted construction standard for low-cost dwelling should address this problem and evaluate the relation of the unit's size to the household size to avoid problems in society among the residents.

## ii. Construction Materials

According to Malaysia's minimum housing requirement, the materials utilised for flooring are bare cement, which covers the entire floor area excluding the kitchen or bathroom. In contrast, ceramic tiles are used as the minimal floor finish for medium/low-cost dwellings. Meanwhile, when it comes to wall finishes, the minimal criterion for low-cost housing and medium/low-cost housing is to use emulsion paint on the inside and a weather-resistant paint layer on the outside. In terms of public facilities such as prayer halls, multi-purpose halls, waste collection sites, lift lobbys, staircases, and public bathrooms, however, there is no specified specification of building material for low-cost housing. This will provide developers the advantage of using the lowest quality construction materials possible in order to cut costs as much as feasible. As a result, there should be no disparity or discrimination in minimum building regs for low-cost housing, as this has a significant impact on the overall development quality.

## iii. Indoor Air Quality

In terms of light and ventilation, both low-cost and medium/low-cost housing standards mandate a window area of at least 10% of total floor space and allow natural ventilation to reach a least of 5% of total area through the interior. Cross ventilation is strongly advised. However, no precise criteria for the minimum standard of air well for low-cost housing has been established. In general, there is a dwelling trend in Malaysia nowadays that prioritises and considers natural ventilation less, particularly in low-cost housing units, as shown in Table 2. (Hamzah, 1997). In a crowded atmosphere, poor ventilation can cause serious health problems and discomfort, especially in youngsters. This problem can be overcome by rethinking the minimum ceiling heights and window sizes for each unit, which have a significant impact on thermal effects and ventilation (Hamzah, 1997).

**Table 2 - Indoor air and lighting quality for each unit in low cost housing and medium/low cost housing**

	CIS 2	CIS 4
<b>Windows area</b>	>10% of total floor area	>10% of total floor area
<b>Natural ventilation</b>	>5% of total floor area	>5% of total floor area
<b>Size of air wells</b>	Not specific	Must be certified by UBBL1984, Part III, Clause 40

#### 4.2.2 Planning Standard

##### i. Social and Community

Several fundamental amenities, such as a community library, disabled facilities, and public restrooms, are not included in the minimum criterion for low-cost housing. Low regard for the quality of the public amenities, such as the level of quality of a waste collection site, can have negative consequences for the health and safety of the occupants. One of the elements contributing to this never-ending problem is a lack of money and expensive costs. According to Chanter and Swallow (2007), the cost of overall maintenance work is frequently more than the cost of new building work, resulting in an undesired loss for investors (cited by Azlan Shah et al., 2010). As a result, the problem can lead to ongoing building quality difficulties, which will have a costly impact on the tenants. There are considerable disparities among low cost and intermediate cost housing minimum standards in terms of total floor space and the size of usable rooms for each household, as shown in Table 3. The National Housing Standard for High Rise, Low Cost Housing, published in 1998, sets the minimum number of rooms per household at three, with a total area of not less than 63.0 square metres (Construction Industry Development Board, 1998). Meanwhile, medium/low-cost housing must have a total space of at least 70.0 square metres and at least three bedrooms each unit.

**Table 3 - Community facilities minimum standard for low cost housing and medium/low cost housing**

	CIS 2	CIS 4
<b>Prayer hall</b>	200 people – 0.2 hectare 500 people – 0.5 hectare 1000 people – 1.0 hectare	Must meet the criteria of Manual Planning Standards, Department of URP 1988, Community Facilities Planning Guidelines 1997
<b>Kindergarten</b>	0.1 hectare for 500 units	To be certified by Department of URP 1988 & local authorities
<b>Multipurpose Hall</b>	0.25 hectare	To be certified by Department of URP 1988 & local authorities
<b>Shop lots</b>	1 shop for every 30 units	To be certified by Department of URP 1988 & local authorities
<b>Waste collection</b>	Required	To be certified by Department of URP 1988 & local authorities
<b>Mini library</b>	None	Required for every 2000 occupants
<b>Disabled facilities</b>	None	Must meet the criteria of Planning Guidelines for Disabled Facilities

##### ii. Carparks Allocation

Four to one ratio on the carpark and motorcycle space provision ratio was recorded as normal identified parking spaces for low-cost housing. These provision are being allocated in accordance with the local authority's plot ration regulation and requirements based on the typology and land uses of the building with reference to the Department of Urban and Regional Planning's planning rules. There are no notable reports of insufficient parking places, according to various research and literature on the unhappiness of low-income housing inhabitants. This is likely due to the fact that many low-income residents do not possess vehicles and instead rely on motorcycles and public transportation to get to work. As a result, parking is not regarded as a serious issue that will have an influence on the effectiveness of living of urban poor residing in low-cost apartments.



**Table 4 - Parking spaces minimum standard for low cost housing and medium/low cost housing**

	CIS 2	CIS 4
<b>Car</b>	1 space for every 4 units	Must meet the criteria of
<b>Motorcycle</b>	1 space for each unit	Manual Planning Standards,
<b>Guests</b>	20 percent of total units	Department of URP 1988

### iii. Landscape

Table 5 illustrates that in the production of low-cost homes, a specific section is designated for a minimum requirement of landscapes and recreational spaces. Hardscape features such as public areas, recreational spaces, playgrounds, and cycling paths, on the other hand, do not have the same codified and detailed standards as medium/low-cost housing, which must meet the minimal requirement of guideline recommendations and planning. Developers will readily take advantage of this advantage in order to construct low-quality and unacceptable amenities in order to save money. Even though the minimal criteria are adequate in comparison to the cost of building, the quality of existing low-cost housing is not encouraging or safe for the community, particularly in children (Ibrahim et al., 2011; Zainal et al., 2012). As a result, the need to re-evaluate the basic threshold of hardscape features in low-cost housing developments in aims to enhance the quality of the development's overall performance as well as the inhabitants' safety.

**Table 5 - Landscape minimum standard for low cost housing and medium/low cost housing**

	CIS 2	CIS 4	
<b>Softscape</b>	Must meet the criteria of National Landscape Standard Guidelines	Must meet the criteria of National Landscape Standard Guidelines	
<b>Hardscape</b>	10% of total development area		
<b>1) Public and Recreational Space</b>	Required		
<b>2) Playgrounds</b>	Must meet the criteria Manual Standard Guidelines for Public and Recreational Area, Department of URP		
□ <b>Above 12 years old</b>			0.06 ha for up to 400 units
□ <b>Below 12 years old</b>			1.2 ha for up to 1000 units
<b>3) Soccer field</b>			

## 5. Planning Criteria in Comparison with Singapore

Since more than 90% of Singaporeans now live in public apartments created by the Singapore major housing body, the Housing and Development Board, public housing has been hailed as a great success (HDB). HDB was also awarded the UN-Habitat Scroll of Honor in 2010 for "offering one of Asia's and the world's most environmentally friendly and socially conscious housing initiatives." Singapore's public housing practises can serve as useful models for Malaysia in addressing current issue of relocation programmes. Singapore's centralised housing authority, as well as centralised construction standards for all forms of housing, is among the best practises for avoiding difficulties like redundancy and fragmentation of functions. The following are details of Singapore's planning and housing policies that can be transferred or re-evaluated to Malaysian resettlement:

- i. *Centralized planning system.* Singapore is among the countries that uses the Housing Development Board (HDB), a centralised public housing authority that oversees and manages all public housing developments in the country. This strategy is designed to avoid issues like redundancy and fragmentation of responsibilities, as well as bureaucratic rivalry that come with multiagency implementation. With an increase of 85 percent of the resident population that lives in public housing since 1985 and the majority of

the people owning the flat they occupy, the public housing sector has become the most affordable housing supply in Singapore (Yuen, 2007).

- ii. *Policy interventions.* The Singapore government considers two kinds of policy interventions to be excellent policy for housing the poor: physical and financial (Yuen, 2007). The policy's physical intervention encompasses housing conditions of occupancy and minimum physical standards in order to improve urban residents' living conditions as well as the country's overall urban growth. Meanwhile, economic intervention is focused on housing affordability and access initiatives, particularly for the poor who want to rent or purchase a home (Yuen, 2007).
- iii. *Building standards.* Building requirements for house development in Singapore are now consolidated, in accordance with the system, in order to ensure the housing's quality. The structure building code is set out from the Building Control Regulations 2003, and the Fifth Schedule of the Regulations sets out the aims and performances that must be met with design developments, according to the Building Construction and Authority of Singapore. Meanwhile, the Authorized Document describes technical solutions for each development item in order to achieve the project's goals and performance requirements.

## 6. Conclusion

In brief, few dynamisms of the building standards and design practice in both countries are being compared to understand the cause and effect on the quality living condition for sustainable habitable dwellings for low income communities. With reference to the discussion part presented, poor representation on the low-cost resettlement programs in Malaysia such as policy interventions, interior thermal comfort condition, improper layout plan, exterior scheme design, public amenities provision, planning standard on landscape and carparks groundworks should be taken into consideration by policy makers with comparisons and study made in low-cost dwelling procedures in Singapore. Thus, local authorities like Majlis Perbandaran, Dewan Bandaraya and Commissioner of Building should improve and re-evaluate their guideline procedure before any developers submits their application for future developments submission which shall include building plan, certificate, permit, licences and other documentation on resettlement programs, particularly to ensure the consistency of the quality level for the low cost and public housing.

## Acknowledgements

The authors would like to thank the universities for allowing to conduct this research.

## References

- Azlan Shah, A., Syahrul Nizam, K., Raha, S., & Cheong, Y. P. (2010). Factors affecting housing maintenance cost in Malaysia. *Journal of Facilities Management*, 8(4), 285-298. doi: <http://dx.doi.org/10.1108/14725961011078990>
- Central Building Research Institute India. (1984). *International Conference on LowCost Housing for Developing Countries*, India.
- Construction Industry Development Board. (1998). *Construction Industry Standard National*
- Economic Planning Unit. (1990). *Sixth Malaysia Plan*. Kuala Lumpur, Malaysia: Percetakan Nasional Malaysia Berhad.
- Economic Planning Unit. (1996). *Seventh Malaysia Plan, 1996-2000*. Kuala Lumpur: Percetakan Nasional Malaysia Berhad.
- Economic Planning Unit. (2000). *Tenth Malaysia Plan, 2000-2015*. Kuala Lumpur: Percetakan Nasional Malaysia Berhad.
- Eng, T. S., & Kong, L. (1997). Public housing in Singapore: interpreting 'quality' in the 1990s. *Urban Studies*, 34, 441+.
- Ezeanya, A. C. (2004). *Malaysian housing policy: Prospects and obstacles of National Vision 2020*. *International Conference on Adequate & Affordable Housing for All*, 12.
- Faiz, A. (2011). *Transportation and the Urban Poor*. Institute of Transportation Engineers. *ITE Journal*, 81(12), 40-43.
- Gilbert, A., & Gugler, J. (1992). *Cities, poverty, and development: urbanization in the Third World (Vol. 2nd)*. Oxford;New York;: Oxford University Press.
- Goh, A. T., & Ahmad, Y. (2011). *Public Low Cost Housing in Malaysia: Case Studies on PPR Low Cost Flats in Kuala Lumpur*. *Journal of Design and Built Environment*,8(1).
- Gusti, R. C., & Perez, R. A. (2008). *Analyzing urban poverty: GIS for the developing world (Vol. 1st)*. Redlands, Calif: ESRI Press.
- Hamzah, M. (1997). *Housing Policy in Malaysia: Conditions, Perspectives and Islamic Values*, University of Leeds: Ph.D. Thesis
- Housing Standard for High Rise Low Cost Housing. Kuala Lumpur, Malaysia. Economic Planning Unit. (1965). *First Malaysia Plan, 1966-1970*. Kuala Lumpur, Malaysia.

- Ibrahim, I., Aziz, N. A., Hussain, F., Aminudin, N., & Yahya, M. A. Y. S. (2012). Issues and Policies on the Aftermath of Squatters Resettlement: A Case Study on Kg. Desa Hormat Tambahan, Selangor. *Procedia - Social and Behavioral Sciences*, 36(June 2011), 698–706. <https://doi.org/10.1016/j.sbspro.2012.03.076>
- Jones, A. P. (1999). Indoor air quality and health. *Atmospheric Environment*, 33(28),4535-4564. doi: [http://dx.doi.org/10.1016/S1352-2310\(99\)00272-1](http://dx.doi.org/10.1016/S1352-2310(99)00272-1)
- (Ibrahim et al., 2012) Cartwright, R. (2010). Book Reviews: Book Reviews. *Perspectives in Public Health*, 130(5), 239–239. <https://doi.org/10.1177/1757913910379198>
- Karim, H. A. (2012). Low Cost Housing Environment: Compromising Quality of Life? *Procedia - Social and Behavioral Sciences*, 35(December 2011), 44–53.
- Menon, P., & Zulzaha, F. F. (2015, 4.2.2015). Selangor public housing residents grapple with dangerous living conditions, *The Star*. Retrieved from [http://www.thestar.com.my/Metro/Community/2015/02/04/Highly-unsafe-flats-Selangor-public-housing-residents-grapple-with-dangerous-living-conditions/Ministry of Housing and Local Government. \(2011\). National Housing Policy. Kuala Lumpur.](http://www.thestar.com.my/Metro/Community/2015/02/04/Highly-unsafe-flats-Selangor-public-housing-residents-grapple-with-dangerous-living-conditions/Ministry%20of%20Housing%20and%20Local%20Government.%20(2011).%20National%20Housing%20Policy.%20Kuala%20Lumpur.)
- Mohamad, A. S. dan N. A. (2009). Squatters and Affordable Houses in Urban Areas: Law and Policy in. *Theoretical and Empirical Researches in Urban Management*, September 2015, 108–124.
- Mohamad, A. S. dan N. A. (2009). Squatters and Affordable Houses in Urban Areas : Law and Policy in. *Theoretical and Empirical Researches in Urban Management*, September 2015, 108–124.
- Naidu, V. L., & Tan, S. Bin. (2014). *Public Housing in Singapore: Examining Fundamental Shifts*. Lee Kuan Yew School of Public Policy.
- Richards, P. J., & Thomson, A. M. (1984a). *Basic needs and the urban poor: the provision of communal services*. London; Dover, N.H.: Croom Helm.
- Richards, P. J., & Thomson, A. M. (1984b). *Basic needs and the urban poor: the provision of communal services*. London; Dover, N.H.: Croom Helm.
- Richards, P. J., & Thomson, A. M. (1984c). *Basic needs and the urban poor: the provision of communal services*. London; Dover, N.H.: Croom Helm.
- Satterthwaite, D., & Mitlin, D. (2004). *Empowering squatter citizen: local government, civil society, and urban poverty reduction*. Sterling, VA;London: Earthscan.
- Sufian, A., & Mohamad, N. A. (2009). *Squatters and Affordable Houses in Urban Areas: Law and Policy in Malaysia*.
- Suzaini Zaid, & Graham, P. (2010). *Low-Cost Housing in Malaysia : a Contribution To Sustainable Development ? Proc., Energy, Environment and Sustainability*, April 2014, 82–87. <https://doi.org/10.13140/RG.2.1.2715.9120>
- Teo, S. E., Kong, L., Eng, T. S., & Kong, L. (1997). *Institutional Knowledge at Singapore Management University Public Housing in Singapore : Interpreting ' Quality ' in the 1990s Public Housing in Singapore : Interpreting ' Quality ' in the 1990s*. 34, 441–452.
- Ubale, M. Y., Martin, D., & Seow, T. W. (2010). *The Current Practices of the Malaysian Formal Low Cost Housing Provision System*. *Proceedings International Conference of Technology Management, Business and Entrepreneurship 2012*, 2010, 211–237.
- Wong, A. K., & Yeh, S. H. K. (1985). *Housing a Nation: 25 Years of Public Housing in Singapore*: Maruzen Asia.
- Yuen, B. (2007, November 2007). *Squatters no more: Singapore Social Housing*. *Global Urban Development Magazine*, 3.
- Zainal, N. R., Kaur, G., Ahmad, N. 'Aisah, & Khalili, J. M. (2012). *Housing Conditions and Quality of Life of the Urban Poor in Malaysia*. In *Procedia - Social and Behavioral Sciences* (Vol. 50, pp. 827–838). <https://doi.org/10.1016/j.sbspro.2012.08.085>
- Zehadul Karim, A. H. M. (2013). *Living condition in the low cost apartments in Malaysia: An empirical investigation*. *Asian Social Science*, 9(17), 20–29. <https://doi.org/10.5539/ass.v9n17p20>