ELDERLY – FRIENDLY CONDOMINIUM DESIGN FOR INTERGENERATIONAL FAMILIES IN BANGKOK

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การออกแบบคอนโดมิเนียมที่เป็นมิตรกับผู้สูงอายุสำหรับครอบครัวหลากวัยในกรุงเทพฯ

นางสาว ชาเมี้ยะ นิตยจินต์

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ชาเมี้ยะ นิตยจินต์: การออกแบบคอนโดมิเนียมที่เป็นมิตรกับผู้สูงอายุสำหรับครอบครัวหลากวัยในกรุงเทพฯ (ELDERLY – FRIENDLY CONDOMINIUM DESIGN FOR INTERGENERATIONAL FAMILIES IN BANGKOK) อ. ที่ปรึกษาวิทยานิพนธ์หลัก : ผศ.ดร.วรภัทร์ อิงคโรจน์ฤทธิ์, 140 หน้า.

รูปแบบครอบครัวหลากวัยที่พบในกรุงเทพมหานครเป็นภาพสะท้อนหนึ่งของวัฒนธรรมและความเชื่อแบบไทย ซึ่งมีการปฏิบัติสืบทอดกันจากรุ่นสู่รุ่นโดยรูปแบบการอาศัยดั้งเดิมจะเอื้อต่อผู้สูงอายุ ลูกหลานมีหน้าที่ต้องดูแลบิดามารดาเพื่อเป็นการแสดงความกตัญญูรู้คุณ อย่างไรก็ตามปัจจุบันทัศนคติได้เปลี่ยนแปลงไปและความขัดแย้งไม่ลงรอยกันระหว่างสมาชิกในครอบครัวเป็นแรงผลักดันให้ผู้สูงอายุตัดสินใจแยกตัวไปจากการอาศัยอยู่ร่วมกันกับบุตรหลาน ความขัดแย้งภายในครอบครัวหลากวัยสามารถบรรเทาได้โดยการเพิ่มพื้นที่ส่วนตัวและแบ่งพื้นที่ครอบครัวให้เหมาะสม แต่สถานพักฟื้นผู้สูงอายุก็ยังไม่ใช่ทางเลือกที่ผู้สูงอายุพึงพอใจนัก

วัตถุประสงค์ของวิทยานิพนธ์นี้เพื่อปรับปรุงรูปแบบและกำหนดพื้นที่ใช้สอยใหม่ให้เหมาะสมสำหรับครอบครัวหลากวัยในกรุงเทพมหานคร วิ ทยานิพนธ์นี้จะเพิ่มความตระหนักในความปลอดภัยในสภาพแวดล้อมของที่พักอาศัยสำหรับผู้สูงอายุในครอบครัวหลากวัย วิ ทยานิพนธ์นี้จึงมุ่งเน้นการออกแบบคอนโดมิเนียมที่เป็นมิตรกับผู้สูงอายุสำหรับครอบครัวหลากวัยให้สามารถอยู่ร่วมกันได้โดยปราศจากความขัดแย้งภายในครอบครัว ทั้งนี้เพื่อให้เกิดความเข้าใจต่อผู้สูงอายุในครอบครัวหลากวัยในกรุงเทพฯ จึงได้ทำการทบทวนผลการวิจัยในอดีตที่ผ่านมาในเรื่องดังกล่าว จากการทบทวนวรรณกรรมได้พบว่าผู้สูงอายุไทยพึงพอใจที่จะอาศัยอยู่แยกจากบุตรหลานเพื่อหลีกเลี่ยงความขัดแย้ง แต่ยังคงมีความเชื่อว่าการอยู่ร่วมกันจะยังคงเกิดประโยชน์ นอกจากนี้ ได้ทบทวนกฎหมายและข้อบังคับที่เอื้อประโยชน์ต่อผู้สูงอายุและผู้พิการในประเทศไทยเพื่อเป็นแนวทางสำหรับการพัฒนาสภาพแวดล้อมที่เหมาะสมกับผู้สูงอายุ สถานพักฟื้นผู้สูงอายุและการออกแบบคอนโดมิเนียมได้ถูกเลือกมาเป็นกรณีศึกษาเพื่อทำความเข้าใจในการออกแบบพื้นที่สำหรับผู้สูงอายุคนไทย นอกจากนี้งานวิจัยในครั้งนี้ยังได้ทำการศึกษาที่อยู่อาศัยของครอบครัวหลากวัยจำนวน 6 ครอบครัว และที่พักอาศัยที่ถูกออกแบบสำหรับครอบครัวหลากหลายวัยขนาดใหญ่1 ครอบครัว เพื่อให้เกิดความเข้าใจลักษณะพื้นที่อยู่อาศัยที่เหมาะสมต่อความต้องการของแต่ละครอบครัว

วิทยานิพนธ์นี้ได้นำเสนอการออกแบบคอนโดมิเนียมที่มีสภาพแวดล้อมที่เหมาะสมกับผู้สูงอายุสำหรับครอบครัวหลากวัยรูปแบบหนึ่ง ที่ตั้งโครงการอยู่ในซอย แบริ่ง โดยพิจารณาจากความเหมาะสมของราคาที่ดินและสิ่งอำนวยความสะดวกทั้งการขนส่งและความเจริญโดยรอบที่เอื้อต่อผู้สูงอายุและครอบครัว บริเวณผังชั้นหนึ่งของอาคารจะต้องมีขนาดใหญ่เพื่อให้คงจำนวนชั้นให้น้อยที่สุดเพื่อความปลอดภัยของผู้สูงอายุ การออกแบบคอนโดมิเนียมมีการวางผังที่หลากหลายเพื่อเป็นทางเลือกให้กับผู้สูงอายุและครอบครัว โดยจะได้อยู่ร่วมกันแบบเพื่อนบ้านต่างชั้น หรืออยู่ร่วมกันในห้องแบบดูเพล็กซ์ ห้องดูเพล็กซ์ได้ถูกปรับปรุงใหม่โดยเพิ่มความเป็นส่วนตัวและแบ่งพื้นที่ต่างๆใหม่เพื่อให้สมาชิกในครอบครัวสามารถอยู่ร่วมกันได้โดยลดความขัดแย้งในครอบครัว พื้นที่ส่วนกลางได้ถูกจัดสรรไว้ให้ผู้สูงอายุและจัดไว้ในตำแหน่งที่เอื้อต่อการถ่ายเทอากาศ สิ่งอำนวยความสะดวกเพื่อนันทนาการและการรักษาพยาบาลได้ถูกจัดเตรียมไว้ในคอนโดมิเนียมและเปิดให้ประชาชนทั่วไปเพื่อให้เกิดมิติสัมพันธ์ทางสังคมระหว่างผู้สูงอายุกับชุมชน ความสะดวกเหล่านี้จะเอื้อให้เกิดสภาพแวดล้อมที่ปลอดภัยในการดำรงชีวิตของผู้สูงอายุ วิทยานิพนธ์นี้ได้นำเสนอการออกแบบที่อยู่อาศัยแนวตั้งในกรุงเทพฯ ที่ให้ความสำคัญกับผู้สูงอายุและเอื้อต่อการอยู่อาศัยสำหรับครอบครัวหลากวัย

ภาควิชา สถาปัตยกรรมศาสตร์ ลายมือชื่อนิสิต .....

สาขาวิชา การออกแบบสถาปัตยกรรม ลายมือชื่อ อ.ที่ปรึกษาวิทยานิพนธ์หลัก .....

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KEYWORDS: ELDERLY–FRIENDLY CONDOMINIUM / INTERGENERATIONAL FAMILIES / BANGKOK

CHANMYA NITTAYACHINTA: ELDERLY – FRIENDLY CONDOMINIUM DESIGN FOR INTERGENERATIONAL FAMILIES IN BANGKOK. ADVISOR : ASST. PROF. VORAPAT INKAROJRIT, Ph.D., 140 pp.

Intergenerational households in Thailand are the result of Thai's cultural values and beliefs, practiced throughout generations, forming the traditionally preferred living arrangements for Thai elderly. Adult children were to be responsible of their elderly parents' welfare. However, changing attitudes and conflicts among family members have driven elderly parents away from living with their children. Conflicts within intergenerational households can be reduced through appropriate levels of privacy and intimacy. Nursing home is not an option preferred by elderly parents.

The objective of this thesis is to redesign and reconfigure living space suitable for the elderly and their intergenerational families in Bangkok. This will raise awareness on safe living environment for the elderly in intergenerational families. The study focuses on designing an elderly-friendly condominium for intergenerational families to live together without family conflicts. In order to understand elderly in intergenerational families in Bangkok, previous literatures on the topic were reviewed. Recent studies showed that Thai elderly prefer to live separately from their children to avoid conflicts, but still believe that intergenerational living arrangement is beneficial. Related laws and regulations facilitating the elderly and handicaps in Thailand were reviewed as guidelines for an elderly-friendly environment. Case studies on nursing homes and condominium designs were conducted to understand spaces designed for Thai elderly. In addition, six intergenerational households, and a residence designed for a large intergenerational family were analyzed to understand how the living spaces were configured to fit each family's needs.

An elderly - friendly condominium for intergenerational families is derived. A site in Bearing is selected in consideration to land price and availability, as well as the conveniences of transportation, and its surrounding amenities for the elderly and the family. The condominium has a large building footprint to keep the number of floors low, for the safety of the elderly. The condominium gives alternatives for the elderly and adult family to either coreside as neighbors by living on designated floors, or together in intergenerational duplex units. Duplex rooms are reconfigured to enhance privacy and designated area for intimacy, so families can live together in harmony without the family conflicts. Private common areas are provided to enrich the elderly's lives; and located to enhance natural ventilation. Medical and recreational facilities provided are open to the public to encourage social interactions between the elderly and the community, offering a safe living environment to support an active lifestyle. The thesis offers an elderly orientated vertical living environment within the context of Bangkok, as well as options to support intergenerational living.

Department : Architecture Student's Signature .....
Field of Study : Architectural Design Advisor's Signature .....
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INTRODUCTION

1.1. Problem Statement

Distinguished from other western countries, the presence of extended or intergenerational households in Thailand forms the traditionally preferred living arrangement for the elderly. Traditionally, Thai elderlies were to be taken care by their family under their responsibility when they become weak and frail as an act of respect and gratitude. However, changing attitudes and disagreements among family members have driven elderly parents away from living with their children. When personal spaces collide, conflicts between household members become inevitable when sharing the living space. Alternatively, nursing home is not an option preferred by elderly parents. The objective of this thesis is therefore, to study the space usage of homes with extended family, and the issue of privacy and intimacy, and from that design a living space for intergenerational families.

Asian values of elderly respect have been expressed in many teachings; most dominant in Thailand are the Confucian teachings of filial piety, and the Buddhist belief of "katunya kataweti." As a Buddhist country, the teachings stress on respect and love for the elders, and has been an act of tradition through generations. The form of respect is expressed by care and services for an elder's mind and body (Sung, 2001). This is a form of "katunyu kataweti," where the adult children were to care for the elderly in return, with the sense of gratitude and debts to their elderly parents for raising them (Knodel, Knodel, J., Chayovan, Graiurapong, and Suraratdecha, 1999). Nursing homes are not a preferable option for Thai elderly, as relocating to a nursing home, the child should be ashamed as they are not able to fulfill their obligations (Knodel, Saengtienchai and Sittitrai, 1995). Apart from religious and social values, and public policies (Virajada Buasri, Steggell and Burns, 2005) also encourages Thais to aid their elderly parents when they become weak and frail. This dictates the living arrangements in Thailand, and therefore the common presence of intergenerational households (Beckett et al., 2002).

The changing demographics and lifestyles in Thailand are affecting the traditional living arrangements. Bangkok has developed rapidly during the past two decades in socio- economic conditions, modernization and urbanization, changes in the age distribution and cultural values (Bhasson Limmanonda, 1995). Moving towards capitalism, parents no longer aim on building large households for agricultural manpower, decreasing Thailand's fertility rate from 6.0 between 1965-1970 to a 1.9 between 2010-2015. For sufficient income, adult children migrates from their origin to the city for jobs opportunities, raising the growth rate of Bangkok to 0.92 in comparison to the 0.52 of the whole kingdom between 1993-2007 (Knodel, Saengtienchai and Sittitrai, 1995; Puntip Jongkroy, 2009). At the same time, the years of life expectancy increases from an average of 59.1 years between 1965-1970 to a 73.1 between 2010-2015 and predicted to increase to 79.1 years by 2050. Elderly over the age of 60 has increased from 4.9 percent in 1970 to 9.3 in the year 2000, and predicted to reach a quarter (24.9%) of the country's population by 2040. The decrease in fertility rate has resulted to a smaller household, lowering the number of children and the possibility to assist elderly parents when children go out to work. This influences decrease in the presence of extended family, and increase of nuclei family structure. Due to the migration and decline in fertility rate, caring for the elderly within the family structure is no longer assured, and the elderly are not yet prepared to live separately from their children at old age (Virajada Buasri, Steggell and Burns, 2005). Nursing homes are not a preferable option for Thai elderly, as relocating to a nursing home, the child should be ashamed as they are not able to fulfill their obligations (Knodel, Saengtienchai and Sittitrai, 1995).

Aware of the growing elderly population and the problems they will face, Thai government encourages the children and family to aid elderly parents through policies (Virajada Buasri, Steggell and Burns, 2005), such as tax reduction for those who accommodate their parents in their home. The 1997 Constitution of Thailand protects the wellbeing of Thai elderly. As mentioned in Article 54, "persons who are 60 years old and over and who have insufficient income to maintain their living are entitled to receive assistance from the state." Article 80 further states "the state must provide welfare for elderly, the poor, the handicapped or disabled, and destitute persons so they can have a good quality of life and be self reliant." Adult children are obligated by law to support their parents, and for who ever neglect their sick elderly parents or abuse parents will face penalties'.

Co-residence can be beneficial for both parties as elderly can provide busy parents with childcare, food preparation, and light housework, though it may demand the loss of privacy. Economically, extended family structure can provide the adult children with advantages. Proximity can offer adult children with convenience when providing elderly parents with medical care without the need for extra transportation to pick up parents. For adults with infants or toddlers at home, elderly parents can help save extra expenditures to hire nanny during the day. More independent elderly parents may even be able to send and pick up the children from schools. Light housework and cooking can be done to ease working parents after they return home. With the rising land price, co-residing is most economical. Benefits to both parties can form healthy relationships between the family members.

However, sharing living space may cause tension between the in-laws, and the attempt to avoid the friction has been the reason for elderly to live separately from their children (Knodel, Saengtienchai and Sittitrai, 1995). Friction between family members has been portrayed by many Thai soap opera (lakorn), especially of clashes between the in laws and broken relationships between family members. For example, the series "Country Daughter In law (2008)," which plots of the romance between a city man and a country lady, and their marriage life troubled by the disapproving mother-in-law and a crazy homosexual brother in-law. Though exaggerated for entertainment and their dramatic stories, it is not wholly fictional. There is great potential for disagreements over a range of daily activities between the in-laws and co-resident elderly.

Friction within the family may be caused by the different personalities and characteristics, different ways of brought ups, food preparations, beliefs, and preferences;

The different ways of brought ups: Every family has their own way of nurturing their children, shaping their children to be individuals with their own beliefs and characteristics. The elderly and the in laws are from different families where their differences may cause conflicts in daily activities. They may also have different hobbies, defining them from one another, for example, one may enjoy quiet moments in the reading room, as one gets lost in the entertainments in the family room, or some may enjoy the company of family members at the mahjong table. All these activities have

different characteristics and usage of space.

Food preparation: Difference in taste and cooking methods may result to clashes in the kitchen. Complaints on taste or odor are common. Some households with extended family tend to enjoy separate kitchens, a Thai and western kitchen.

Beliefs: Religious beliefs may not be the most problematic as individuals should be able to belief and practice according to their religion or their partner's. Conflicts may occur when the object of religious belief becomes excessive to either the elderly or the in laws. Younger adults may not prefer the presence of shelves and shrines.

Preferences: Sharing the same living space may be challenging with difference in preferences in aesthetics or practicality. Conflicting preferences may be from the different styles in home layout and decorations, to arguing between an old but familiar tool to a shiny high-technology appliance. An example could be the positioning of a tea table in Chinese families: differences in preferences may occur when the tea table doesn't correspond with the style of decoration in the house, or the positioning of the table may bother co-residents.

Views of the grandchildren: Among the grandchildren, elderly can be perceived as "long-winded and nagging" as mentioned by Giles, which may result to poor intergenerational relations (Giles, et al., 2003).

Similarly, elderly prefer living in their own home, as living with their children and grandchildren may be hectic and noisy (Siriwan Siriboon and Knodel, 1994). Elderly desire living in a quiet and peaceful environment. Not only the children that longs for privacy in an intergenerational household, but also the elderly.

According to recent studies (Knodel, Saengtienchai and Sittitrai, 1995), 96% of Thai adults and elderly prefer elderly parents to live with their children, or alternatively to live nearby, usually next-door or in the same compound or related cluster of houses. In addition, 87% of adults said that they expect to live with a child when they age, preferably their daughter, as they are perceived to be emotionally closer to the parents and better caregivers. It is also possible that elderly may feel more comfortable with their daughters more than their in laws as they can openly mention their dislikes and

requests without feeling bad to bother them, or as Thais would say 'klaeng jai.' Elderly fear that living with their children may trigger problems with the in laws, therefore some prefers to live privately where they can be more comfortable and carefree (Knodel, Saengtienchai and Sittitrai, 1995; Durand, 2007). However the circumstances, they made clear that they depend on their children for care on daily basis, and especially when sick or when their partner dies; to co-residence as a moral obligation.

Unfortunately, in the past neither the governmental nor the private sector in Thailand has shown much interest in building housing specifically for the elderly (Virajada Buasri, Steggell and Burns, 2005). With the population of elderly predicted to reach a quarter (24.9%) of the country's population by 2040, Colliers International suggested the 50-60 age groups as the new growing market. Intergenerational living arrangements in urban areas are more common than of the rural taking in consideration land availability and price (Knodel and Chayovan, 2009), as it is more feasible for elderly to stay within the same compound as their adult children in an urban area. A vertical living for intergenerational household will be an advantage for the elderly as elderly will have more chance to interact with people in an urban neighborhood, than when residing in a detached residence. Elderly people should be able to live with their children and other younger adults, rather than relocating to nursing homes for care.

Age-integrated environment provides much more stimulation then the age-segregated environment, and therefore a better quality of life and health for the elderly (Kahana and Kahana, 1970). Elderly will have more chance to interact with people in an urban neighborhood, than when residing in a detached residence, as they tend to remain in their residence all day. Infrequent contacts with friends are significantly associated with poor health status (Beckett et al., 2002). Lack of communication with family members is harmful to their mental health status, causing loneliness and depression, which is ranked top of the cause of suicide and harm to oneself among the Thai older population (Department of Mental Health, 2006). The majority of daily activities and movement of elderly people are on foot; amenities and friendly public areas for elderly to relax and interact should be at close proximity, with respect to their limited mobility (Fobker and Grotz, 2006; Temelova, J. and Dvorakova, N., 2011). With the close proximity to amenities and family, a vertical lifestyle may answer to some of the needs of the future generation of elderly parents.

1.2. Objective

The presences of intergenerational households are common in Thailand; however, the living arrangement may cause conflicts between the elderly and the in laws. Conflicts within intergenerational households can be reduced through appropriate levels of privacy and intimacy. The objective of this thesis is to redesign and reconfigure living space suitable for the elderly in intergenerational families in Bangkok. Reconfigured living spaces will allow elderly and the adult children's family to live together in harmony without the family conflicts. This study will focus on the physical living environment of the elderly to encourage a healthy and active lifestyle. Existing intergenerational residences and the perspectives of the elderly were studied in order to reconfigure a suitable living space where both parties can control their desired level of privacy and intimacy. This thesis urges to allow intergenerational living in Bangkok, in consideration to elderly parents' preferences and their physicality, as well as the young's changing attitudes and desires. An elderly – friendly condominium for intergenerational families will be derived. As the study will focus on the elderly, the details of designs for the elderly's physicality will be incorporated into the design. The conveniences of medical and recreational facilities will be provided according to both urban condominium and elderly residence standards. Facilities provided for the elderly will allow a safe living environment to support an active lifestyle. The residential will provide families with the convenience of transportation as required of most condominiums, and life enriching factors for the elderly residences. To obtain a residential with the above characteristics, a site around the urban setting will be selected; for the convenience of transportations, amenities, low density residential, and an affordable land price, suitable for a mid-rise condominium.

1.3. Scope and Limitations

This study focuses on the elderly in intergenerational environment. Intergenerational families are where the family members are of different generations; specifically childhood, adulthood and elderly. Family members are preferably immediately relatived such as; adult couples, their children, and elderly parents or relatives. The study will focus on the physical living environment of the elderly to encourage a healthy and active lifestyle. The objective of this study is to design an elderly-friendly condominium for intergenerational families, in the context of Bangkok. In order to fit to the context of Bangkok residents, a site near public transportations will be picked for the convenience. As study will be based on the designed living environment for the convenicences of the elderly, the financial analysis be not be conducted to depth.

The design will be a residential for the elderly in intergenerational families, and not a senior residence. Due to this typology, staffs at the residence will come to work and return home on daily basis.

Persons 60 years and older are considered the elderly according to Thai Law. The study will focus on independent elderly, with and without help from mobility equipment. By considering elderly with mobility equipments, rooms will be large and incorporate the details of universal design standards in order to accomodate these equipments.

1.4. Terminology

Elderly: An older person of age 60 or above.
Ederly Parents: Parents who are 60 years or older. In an intergenerational family, they are likely the 'grandparents.'
Elderly – Friendly: The environment that is catered towards the physicality of the elderly for their conveniences and safety.
Intergenerational Family: A family with members of different generations. For example, a family might consist of children, adult parents, elderly relatives and grandparents.
Adult Children: The children of the elderly. These children will be in their adult phase, and may have children of their own.
Adult Family: Consist of the adult children and their children. This does not refer to the elderly parents.
Living Environment: Indoor or outdoor space where a person spends their time daily.
Individual Quarter: Space where a family member can enjoy their privacy and territoriality. Individual spaces are private areas that belongs to that individual.
Shared Space: A space that is used and shared between the family at different time of day. This space is used to promote interactions between elderly and the adult family.
Condominiums And Vertical Living: A residential that is arranged vertically, of 2 floors or higher. It will require the residents to travel in a vertical manner in order to enter their living quarters.

1.5. Benefit of the Study

This study will benefit intergenerational families with elderly coresidents, which are commonly found in Thai cotext. By understanding the needs of the eldelry according to their physicallity, living in intergenerational environment, the design will give alternatives for intergenerational residences. The design is inteneded to demonstate how families of different generations can live together within the city environment. Through the help of universal design and consideration for privacy, an elderly – friendly condominium will be designed. The study will benefit future residential designs for intergenerational families with elderly coresidents.

1.6. Method and Design Analysis

Comprised of methods such as literature reviews, case studies, and analysis on existing designs of low-rise and mid-rise condominiums; to gain further knowledge on the current issue and direction of design (please refer to figure 1.1 for chart showing methodology). Regarding literature reviews and case studies related to the issues surrounding elderly and intergenerational environment, the information collected will be summarized and analyzed in order to find solutions to the issues. Data analyzed will be based on the following issues;

Elderly and Health

To design a suitable living environment in accordance to elderly's health status and recommendations for elderly housings

Eldery and Issues in Intergenerational Families

In order to design a living condition that best suits the needs the elderly living in intergenerational families so family members can live in harmoney without tension.

Case Studies: Eldery and Residential Design

To study designs of existing residentials and find advantages and disadvantages as guidelines towards designing a safe living environment for the elderly.

Reviewed literature and theoratical research will be analyzed and represented diagramatically in order to formulate a design that will be best for the elderly living in intergenerational environment. Case studies will be compared to understand the design of residences of the elderly, which will then be used to develop the research into a completed design.

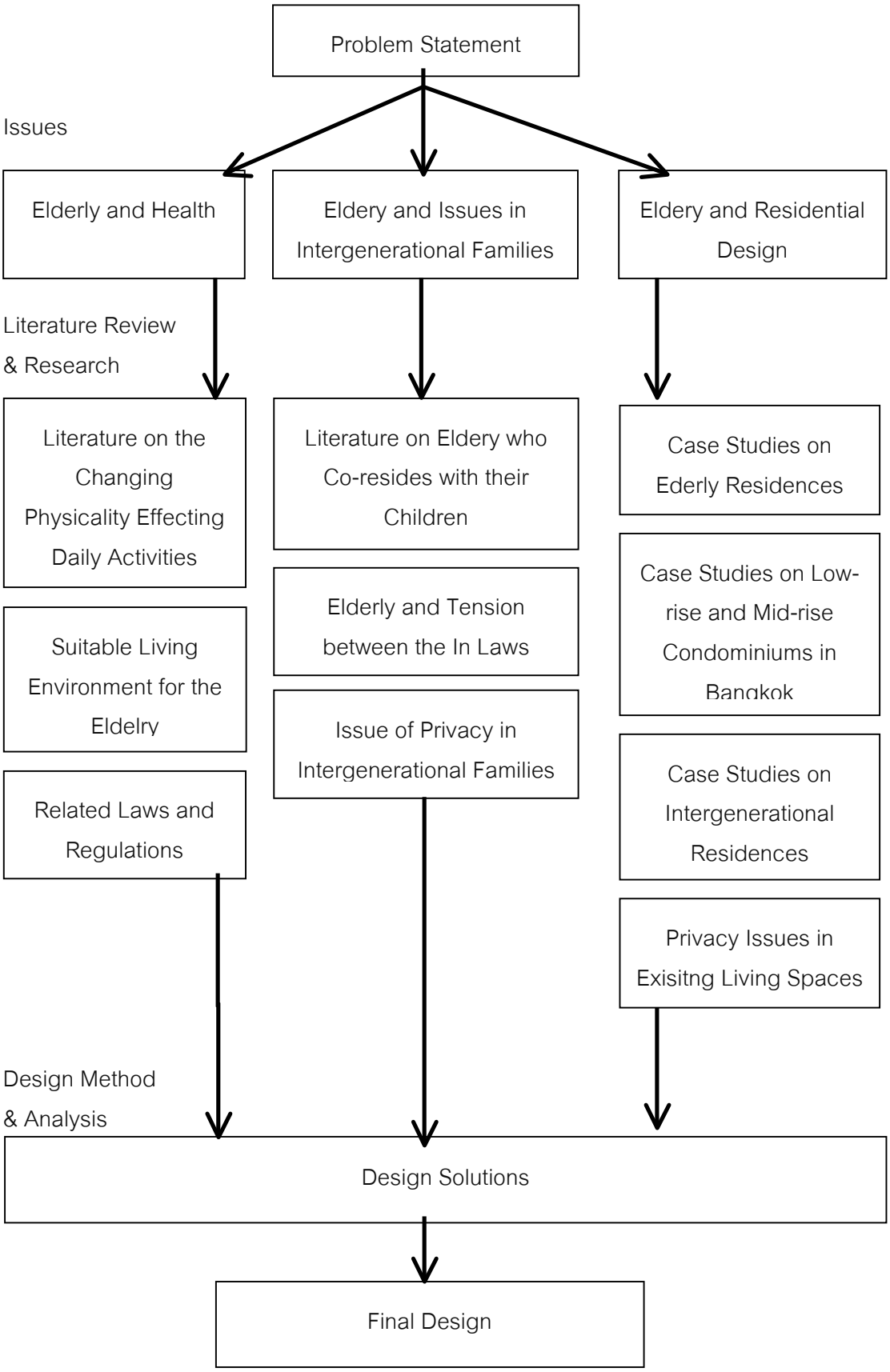


Figure 1.1 Methodology

CHAPTER II

LITERATURE REVIEWS

In order to attain more knowledge on designing for the elderly living intergenerational families, literatures related to elderly and design for elderly including; 'Elderly and Health,' 'Elderly and Issues in Intergenerational Families,' and 'Case Studies on Elderly and Residential Design' were review.

Literature by Lawton (1975), Knodel (1995; 1999; 2009), Newell (1995), and Chermayeff and Alexander (1963) are the key to this section. Lawton studied the physical environment and was often referred to by other authors studying the issues of elderly. Knodel expertized on the living arrangements of elderly in Thailand, and Chermayeff and Alexander studied the different dimensions of privacy in shared space.

2.1. Elderly and Health

2.1.1. Changing Physicality and Daily Activities

The ageing process involves modifications in physiological and nutritional status. The age of an individual usually determine their stages in life in the society, where the elderly phase is usually after the age of 60. As an individual ages, their height, weight, body mass index and muscle strength decreases. Physical declination will result to decline in motor control, balance, vision, and lower extremity force and others.

Aching Joints: Bones and joints diseases such as osteoarthritis (joints) and osteoporosis (bones) are commonly found in the elderly. This could cause the elderly to feel limited and in need of help when walking, climbing up and down the stairs, sitting down or getting up. Dimensions in the living environment are therefore crucial in easing elderly in their daily lives. Riser of steps should not be too high, with using the minimal height of 10mm.

Weak Grip: Handrails should be at an appropriate size for best grip. Handrails should be provided along hallways and areas with steps, but without conveying an institutionalized environment.

Tired Feeling and Shortness of Breath: Elderly are easily exhausted and may have more need to rest. This may be due to the reduced lung capacity. Public areas for the elderly should provide a significant amount of chairs and tables.

Low Vision: Elderly's eyes receive significantly less light than the young healthier eyes. Residences with elderly require more lighting. Low vision impacts the elderly in general on their everyday activities. Though more lighting is preferred in the living environment, elderly are also impacted by glare from large windows or ceiling when there is too much amount of light. The ability to distinguish colors will also decrease, which will impact on self-care as elderly may not be able to color code their outfit or the intensity of their makeup. Lowered acuity will decrease elderly's ability to read small fonts. Elderly may not be able to recognize a face from a far distance or at low contrast. These can lead to visual-motor coordination, which often refers to hand co-ordination.

Colors: According previous studies by Cheng et al. (2007), colors can stimulate and emotions such as red stimulates excitement, orange expresses liveliness, yellow represents hope, blue delivers hygiene, and green evokes nature (see table 2.1). Cheng completed a research on favorable and unfavorable colors on Korean elderly. The research found that most male elderly preferred light combinations while disliking dark and strongly contrasting combinations. Female elderly preferred pinkish combinations and similarly, dislike dark combinations. In general, elderly preferred light and warm color combinations.

Table 2.1 Color combination preferences of Korean elderly (Cheng et al., 2007)

Male	Favorable combination							
	Frequency(%)	18.0	17.2	17.2	17.2	16.8	16.4	16.0
	Unfavorable combination							
	Frequency(%)	45.2	34.0	33.2	28.8	16.0	15.6	12.8	12.4	15.2
Female	Favorable combination							
	Frequency(%)	38.8	32.4	28.0	32.0	29.6	26.0	20.8
	Favorable combination							
	Frequency(%)	49.6	46.8	45.6	42.8	21.6	16.8	12.0	11.6

2.1.2. Suitable Living Environment for the Elderly

This section studies recommendations in designing the living environment suitable for the elderly in accordance to their health status.

The thesis aims to design a residence for the intergenerational families with the presence of the elderly; therefore, considerations when designing for the elderly have to be taken. Though the complex is not an elderly residence, the complex will serve mostly the elderly during the day as other co-residents goes to work. To acquire more knowledge on designing for the elderly, related literatures were reviewed.

Lawton (1975) talks of the psychological and physical aspects of elderly. Healthcare in elderly and the promotion of an active lifestyle were frequently mentioned in the text. According to Lawton, residences set in an urban environment is most likely to be enriching for the elderly. Though the high land price and crime rate, proximity to services and facilities is desired. Facilities and services favored to be within 1.6 km by the elderly are; grocery stores, bus stops, house of worship, drug store, clinic or hospital, bank, library, news-cigar store, restaurant, and movie house. However, having too many facilities may risk the relationship of the complex to the outside. He also studied the frequency of elderly's daily activities, which are; 2hrs of reading per day, 3hrs of TV per day, sits outdoor 3hrs per day, shops twice a week, and eat at restaurant once a month. Keeping this in mind, a suitable location to host the elderly will be selected.

Recommendations for elderly residential were given by Lawton. Similar notes have also been mentioned in Japanese elderly residences (Azur Corporation, 2006), disregarding the time difference between the authors. A safe physical and psychological housing environment with consideration to elderly's competence is most valued. Architects and planners are advised to consider various things while designing:

1. Security Needs:

Safety features such as installation of fall prevention equipment and other precautionary measures, fall-hazard free environment, non-slippery surface, and elderly friendly furniture and mechanisms. Materials and surfaces designs should prevent falls and shock absorptive. Entrances should have no threshold for the safety of elderly,

slow closing elevators with sensitive reopening mechanism, and handrails provided for steps and slopes, both indoor and outdoor. Some elderly feel that the presence of grab bars make them feel incapable of mobility. However, grab bars give crucial protection to many. Spaces within the housing unit should make elderly feel safe and secured with supporting elements. This will encourage and enable them to participate in an active lifestyle. Fear may result to confinement within their rooms, leading to an inactive life.

Emergency features such as one-way communication from bedroom and bathroom to call for help, two-way communication from dwelling units, and electronic portable one-or two-way signaling devices.

Lastly is security from personal attacks, such as the privacy between street and residential. Security should be provided to the elderly for their security from the crime on the streets, as well as privacy within the residential project.

2. Self-Maintaining Needs:

To design and manage the residence so elderly can function independently in their daily lives without making them feel incapable or disabled. In contrary to the previous number, too many grab bars can remind the elderly that the environment considers them incapable. This relates to size of dwelling units, size of toilet, size of bathing area, features to support dressing and personal care, housekeeping and cooking, sleeping, flooring, windows, temperature control, lighting, walking distance, shopping, and productive activities. The dwelling unit should be barrier-free and space must be provided to allow a turning radius for a wheelchair. Some recommendations were given in details as follows:

Toileting: A corner location for the toilet bowl is preferable. The sidewall allows convenient placements of toilet paper, grab bar, and emergency signal.

Bathing: Shower stall with seat and flexible showerhead is the safest arrangement.

Grooming, Dressing, and Personal Care: The important requirements for these tasks are proper illumination, convenient clothing storage, and mirror. For example, a

full-length mirror should be installed within the living unit when color coding their day outfit.

Housekeeping and Cooking: Cabinets should be placed in a reachable height, but also, not too low as it also represent a problem. This also follows with placements of window hardware, where locks and handles should be placed at a reachable height.

Lighting: Glare from a window can sometimes be a problem; some consideration should be given to controlling it through exterior fins or receding windows.

3. Knowing the World

Elderly should know where they are and their territory within their building by creating recognition. For example, putting up signage to show surrounding areas, and orientation of openings and pathways. Public and residential buildings that facilitate the elderly and handicaps in Thailand are enforced to put up signs within the building to let users know where they are. For example, the floor numbers have to be positioned at a visible height in stairways and elevators.

4. Life Enrichment

Recreational Spaces for various activities, hobbies, and events: to avoid monotonous daily life that can lead to dementia, disabilities, and depression.

Organized activities such as a designated common room, or centralized space for activities located in a desirable and accessible location should be provided.

Individual activities are such as spaces of solitude for expression or enjoy individual activities should be provided.

Aesthetical Enrichment is such as expression of styles in the interior and views from balconies.

Social Behaviors is the shared values of people of the same age such as the mutual liking of music, historical events, experiences, etc.

5. The Size of the Project

A large community will have more varied activities where a large proportion will participate, while a smaller group will encourage the less confident to participate.

Depending on the size of the project;

Common areas that gives accents to elderly life such as dining halls; of which spatial attention must be given to the location of these rooms, whether facing terraces and gardens or with a panoramic view.

The entrance hall gives meaning and the symbol of the quality of the residence. The lounge area should encourage elderly to spend time without specific purposes such as to listen to music, reading corners, cafes, and to meet people. Elderly can rely on front desk staffs for information on services and activities.

Despite elderly's mobile limitations, outdoor activities are essential to their daily lives. The outdoor spaces will give rhythm to their psychological clock (as elderly tend to sleep during the daytime) and encourage them to meet and interact with their neighbors.

Medical Fitness Facilities, ranging from rehabilitation exercises to light exercises should be provided. Clinics will also provide the sense of security to the residents. Restaurant and Café provided, serving healthy food and drinks to elderly.

6. Privacy, Territoriality, and Personal Property

Personalization of outdoor spaces will strengthen the sense of territoriality.

The reviewed recommendations will dictate the programs proposed within the intergenerational residential project.

Thai elderly have also given similar recommendations on life enrichment factors during interviews for previous studies. Many of the elderly have mentioned the enjoyment in gardening, and their time in the natural environment. They enjoy planting and watering their garden. Many felt that the outdoors should be more facilitated for the elderly as they spent most of their time there. By facilitating the outdoors for the elderly, will allow a safer environment for an active life. Elderly will feel more confident in going out and therefore, encourages social interactions. Seating will be placed in the shaded areas for elderly to participate in games and social activities. The presence of greeneries is also an aesthetical enrichment.

2.1.3. Related Law and Regulations

This section reviews laws and regulations enforced by the Thai government that facilitates the handicapped and elderly for their convenience, drafted in the year 2005 (กฎกระทรวง, 2548).

'Facility' provided for the handicap and elderly refers to building designs and equipment installed inside or outside of the building for their convenience.

'Elevator' means the equipment that transports people from floor to floor in the vertical direction. This does not include escalators or moving walkways.

'Net width' is the distant measured between two points without obstruction.

The following laws and regulations that facilitates the handicapped and the elderly are enforced in 1) hospitals, medical centers, welfare centers, academic institutes, libraries, museums, and transportation services larger than 300 sq.m, and 2) offices, auditoriums, hotels, conference halls, sport complexes, shopping malls with larger than 2000 sq.m. Though residential is not under these categories, laws and regulations will be considered to provide as much convenience for the elderly as possible.

Section 1: Signage

4. Signage for the handicapped and the elderly must be as follows:
    i. Handicap symbol
    ii. Signage directing way to facility
    iii. Symbol or signage conveying type of facility
5. Handicapped and elderly signal must be either; white on blue background, or blue on white background as shown in figure 2.1.
6. Signage must be of high contrast, well positioned, and well lit.

Figure 2.1 Handicap symbol as advised by law in section 1

Section 2: Slopes and elevators

7. Changes in levels must not exceed the height of 20mm, and nosing not more than 45 degrees.

8. Slopes and ramps must be as follows:

   i. Floor must be non-slippery

   ii. Areas where floors connect must be even to prevent trips

   iii. Width of ramp must not be less than 0.80m. Where total length of ramp is more than 6.00m, ramp must be at least 1.50m wide.

   iv. Landing must have a distant of 1.50m.

   v. Ramp must have a slope of not less than 1:12, and a distant not more than 6.00m. If ramp is longer than 6.00m, a landing not less than 1.50m must be inserted.

   vi. When there are no walls on the side of the ramped area, a 0.05m high partition must be raised and railing installed.

   vii. Ramps longer than 2.50m must have railings as follows;

      a. Material of railings must be smooth, strong and sturdy, safe to hold on to, and non-slippery.

      b. Diameter of handrails must be more than 0.03m, but less than 0.04m.

      c. Handrail must be raised to 0.80m, but not higher than 0.90m.

      d. Handrail extended from the wall plane must at least 0.05m. Height from the point of extend must not be higher than 0.15m. The surface of the wall where handrail is positioned must be smooth.

      e. Handrail must be continuous, and must not obstruct the handicapped.

      f. Handrail must offset the sloped area not less than 0.30m.

   viii. There must be a sign showing direction and floor level at beginning or the end of the ramp.

   ix. Signage showing handicapped symbol at ramp areas for the blind and the elderly.

9. Buildings with two or more floors must provide elevator or ramps. Elevators must be facilitated for the handicapped and elderly, and are located conveniently. Handicapped symbols must be placed outside the elevator entrance.

10. Elevator for the handicapped and the elderly must be as follows:

   i. Elevator car must have a width not less than 1.10m, and depth not less than 1.50m.

ii. Elevator door must be at least 0.90m wide. Safety system must be installed for closing doors for the handicapped and elderly.

iii. Texturized surface must be places in front of elevator door to alert the handicapped. The surface must have a width not less than 0.30m and length not less than 0.90m. Placed not less than 0.30m and no further than 0.60m from the elevator door.

iv. Button to floors, control panels, and emergency button must be as follows:

a. Last button must be raised from the elevator floor not less than 0.90m, and the highest button must not be higher than 1.20m. Control panels must be placed 0.400m from interior elevator corner where car is not wider than 1.50m.

b. Control panels must be at least 0.02m in diameters, with braille, lit and alerts when press.

c. No obstacles in the control panel area.

v. Handrails must be provided inside the elevator.

vi. Elevator must have sound and screen showing floor number as it travels.

vii. Signage showing floor level and direction in the elevator lobby.

viii. Red siren lights and alarm during emergencies to the handicapped and elderly, and green lights with voice to notify help is on the way.

ix. Telephone to notify staff of any emergencies within the elevator must be placed not lower than 0.90m and not more than 1.20m.

x. During electrical black out, emergency system must be installed to control elevator car to closest floor level, and doors must open automatically.

Section 3: Stair

11. There must be at least one designated stair that facilitates the handicapped and elderly.

i. Stairways must be at least 1.50m wide.

ii. Landing must be provided at every 2.00m in height.

iii. Handrails according to 8 (vi) must be provided.

iv. Risers must not be higher than 0.15m, and width not less than 0.25m. Area of steps when overlapped or with nosed must not be more than 0.02m.

v. Non-slippery materials must be used.

vi. Riser must not be left open.

vii. Signage showing floor level and direction at entrance to stairways.

Section 4: Parking

12. Parking for the handicapped and elderly must be provided as follows:
    i. 1 handicapped and elderly parking stall for parking lot size of 10-50 cars.
    ii. 2 handicapped and elderly parking stall for parking lot size of 51-100 cars.
    iii. For parking lot size of 101 cars or more, 2 parking stalls must be provided. For every extra 100 stalls, 1 handicapped parking must be provided. The remainder, if more than 50 cars, will be considered as 100 cars.
13. Parking for the handicapped and elderly must be near building entrance, not on the vehicle way, have smooth and even surface, and illustrated with a handicapped symbol (size not less than 0.90m x 0.90m). Another sign with size not less than 0.30m x 0.30m must be placed at a height not less than 2.00m from ground.
14. Parking stall for the handicapped and elderly must be not less than 2.50m wide and 6.00m deep, and extra spacing not less than 1.00m along the parking stall.

Section 5: Entrance to building, in between space, and connecting bridge between buildings

15. Entrance to building must be as follows:
    i. Floor surface must be even, non-slippery, and no obstacles.
    ii. On the same level as the road or the parking lot. If entrance is at a different level, ramp must be provided for convenience. Ramp must also be located near the parking lot.

16 and 17 focuses on regulating space between buildings and connecting bridges, which is not related to this study. The study will only focus on designing a small to medium scale residential area.

Section 6: Doors

18. Doors must be as follows:
    i. Easily operated
    ii. Threshold must not be higher than 0.02m and beveled with a slope not steeper than 45 degrees.
    iii. Door must be wider than 0.90m.
    iv. If door swings open, door must open to a space not less than 1.50m x 1.50m.
    v. If door slides open, a handle with details as stated in the handrail section must be provided. Handle must be installed vertically, on both sides of the door.

Handle must be raised no more than 0.80m from floor, and not higher than 1.00m, and 0.90m along the width of the door.

vi. If door is glass or transparent, signage must be place to alert the handicapped and elderly.

vii. Door hardware must be either be turned to open or pushed to open. Hardware must not be lower than 1.00m, but not higher than 1.20m.

Doors must not be automatic, as it might automatically swing or slide into a handicapped or elderly.

19. Number 18 is not enforced at fire egresses.

Section 7: Bathrooms

20. At least 1 bathroom stall provided for handicapped and elderly.

21. Bathrooms for the handicapped and elderly must be as follows:

i. Bathroom must have at least 1.50m in diameter of clearance point for wheelchairs.

ii. Door of bathroom stall must swing outwards to at least 90 degrees angle. A signage showing facility for handicaps and elderly should be placed on the door.

iii. Floor to bathroom stall must be leveled. If level is changed, slope must be provided as stated in section 2. Floor material must be non-slippery.

iv. Floor of bathroom must be drained properly.

v. Top of toilet seat must not be lower than 0.45m, and not higher than 0.50m. Water closet must include a backrest for balance. Flush handle must swing to flush, or if as flush buttons, must be large enough for the handicapped and elderly to flush conveniently. Water closet must be mounted adjacent to the wall or partition. Distance from wall to the center of water closet must be at least 0.45m, but not more than 0.50m. Grab bars must be installed at the wall adjacent to the water closet. Side not adjacent to the wall must have sufficient space for wheelchairs. In situations where distance from wall to water closet is more than 0.50m, bars must be installed as in (vii).

vi. Grab bars installed at the wall adjacent to the water closet must be as follows:

a. Horizontal grad bars must not be lower than 0.65m from ground, and not higher than 0.70m. Grab bars must extend from the wall not less than 0.25m, but not more than 0.30m.

b. Vertical grab bars must be installed continuously from the end of the horizontal grab bar at a perpendicular angle. Total distance measured vertically, starting from the end of the horizontal bar to the top of the vertical grab bar, must not be less than 0.60m.

Grab bars in (a) and (b) may be a continuous grab bar.

vii. Grab bars installed at the side not adjacent to the wall must be collapsible to the horizontal plane. When erected, there must be a lock system easily operated by the handicapped and elderly. Grab bars must be at least 150mm from edge of water closet, but not more than 0.20m. Grab bars must have a length no more than 0.55m.

viii. Other than grab bars must comply with (vi) and (vii), additional grab bars must be installed directing way to other fixtures. Grab bars must be raised from floor no less than 0.80m, but not more than 0.90m.

ix. Safety system must be installed for the handicapped and elderly inside the bathroom to alert caregivers of any emergencies. Help button must be easily accessed.

x. Sink must be as follows:

a. Space must be provided at area under sink for wheelchair access. Distance from wall to edge of sink must be at least 0.45m.

b. Height from floor to top of sink must not be less than 0.75m, but not more than 0.80m. Collapsible grab bars must be installed at both side of the sink.

c. Pushing or turning the handle, or automatic system to operate water faucet.

22. Bathroom stall for the handicapped and elderly inside public bathroom facility must be easily accessed. Braille language must be provided to direct the handicapped to the either the gentlemen's or the ladies' room.

23. Men's bathroom must have at least 1 urinal for the handicapped and elderly. A horizontal grab bar must be installed on top of the urinal. The grab bar must be at least 0.50m long, but not more than 0.60m. Height measured from floor level must be between 1.20m and 1.30m. Grab bars must also be provided at each sides of the urinal. Must be raised from the floor level not more than 0.80m, but than 1.00m, and extended from the wall not more than 0.55m, but less than 0.60m.

24. Grab bars in bathroom stalls must comply with 8 (vii) (a) and (b).

Section 8: Tactile warning strips

25. Provide tactile warning strips for the visually impaired in areas before changes in levels of more than 0.20m, stairs, entrance and exit of building, and before entering the bathroom. Tactile warning strips must be at least 0.30m wide, and length depending on slope width, stairs, and doors. Distance between tactile warning strips and changes in levels must be at least 0.30m, but not more than 0.35m.

This chapter does not depict all the laws and regulations, but just ones that are specifically related.

Other than laws and regulations related to the handicapped and elderly, the design will also follow all building laws and regulations as enforced by Bangkok.

2.2. Eldery and Issues in Intergenerational Families

2.2.1. Elderly who Co-Resides with their Children

Culture has a significant effect on the attitude towards the elders. Elders denote parents, grandparents, elderly relatives, teachers, neighborhood elders, and elderly in general. Asian values have stressed on the respect for the elderly such as the Confucian teachings of 'filial piety', and the Buddhist belief of 'katunyu kattaweti,' as a form of gratitude and to care for in return. About 95% of the people in Thailand practice Buddhism, typically of the Theravada branch (Knodel et al., 1999). Though of different beliefs, they similarly direct the children to recognize the care and aid received from the parents and, in return, to pay respect to them. This is a continual obligation that starts when the children is old enough to support their parents. Forms of elderly respect that have been frequently cited in literature are; care respect, salutatory respect, linguistic respect, victual respect, and acquiescent respect. To extend the meaning of the five different forms of respect, care respect denotes providing care and service, salutatory respect as greeting the elderly, linguistic respect as using respectful language when speaking to or addressing, victual respect as serving food and drinks of choice, and acquiescent respect as being obedient to the elders. This study focuses on the care respect as it includes homemaking such as preparing a suitable and comfortable living environment for the elderly. In culture, values, norms, roles, and patterns of social interaction associated with elderly respect continue from generation to generation. Thailand has practiced the tradition of elderly care as a form of respect. Thais have responsibilities on their elderly parents, which has been reflected in laws and social policies.

Urban elderly are more likely to coreside with their children. This may be due to the differences in land availability and housing styles. Residing within the same compound or nearby is more feasible in the rural areas. The numbers of elderly who coreside with their children have decreased from 77% in 1986 to 59% in 2007. In contrast, the numbers of elderly living independently with their spouse have increased. However, when one of the parents die, coresidence is likely to be initiated.

Table 2.2 Living arrangements of persons age 60 and older, Thailand (Knodel and Chayovan, 2009)

	% coresident with a child	% live alone	% live only with spouse
Trend (all persons 60+)			
1986	76.9	4.3	6.7
1994	72.8	3.6	11.6
2002	65.7	6.5	14.0
2007	59.4	7.6	16.3
Age (2007)			
60–69	56.6	6.2	18.5
70–79	61.9	9.6	14.6
80+	68.1	9.9	8.2
Gender (2007)			
Male	57.4	6.0	21.3
Female	60.9	8.9	12.3
Residence (2007)			
Urban	64.6	7.4	12.9
Rural	57.3	7.7	17.7

Decline in the number of elderly parents who coreside with their children may be due to the reduction in the average number of children. This is the result of the declined fertility in Thailand. Most importantly, the increase in the migration of adult children, often from rural to urban areas to find employment, influences the decrease in the number of intergenerational families. In the past, a family will have as much children to ease parents in agricultural practice. When married, wives would move into the family, creating a culture of extended families. In this context, caring for their elderly parents were guaranteed. Adult children are expected to care for their elderly parents, especially when sick. Elderly parents' home may not be located close to the children's work place, and may even be in different states or provinces. Therefore, it is common for the youngest child, or the daughter to stay behind and care for their parents as others goes to work (Knodel et al., 1995). However, this is no longer practical due to today's low fertility rate of 1.7 in average. Adult children tend to migrate to the city, and may even find a home there. Elderly parents will then be left at home, unattended.

However, according to past studies by Knodel, living with the adult children is still the preferred living arrangements of most elderly. 96% adult children also felt that coresidence is preferred for their parents. 87% of elderly felt that residing with their adult children will allow the adult children to provide care when needed and there will also be more chance to interact with them. The elderly depends on their children when they become weak and frail, as they feel that their children are obligated to support them out of gratitude. In many cases, co-residence will result to exchange of services and material support, beneficial to both generations.

2.2.2. Elderly and Tension Between the Inlaws

Elderly may choose to move in with their adult children, but there may be issues resulting from in law tensions. Care for the elderly are in the form of both body and mind (Beckett, 2002; Sung, 2001; Knodel et al., 1999), therefore, proximity and healthy relationships with the elderly parents should be achieved. According previous studies by Knodel, many elderly parents prefer to live as neighbors to their adult children so care can be provided, while maintaining distance and privacy between the in laws. Practiced by traditions, social values, and enhanced by public policies, adult children are obligated to care for their elderly parents, forming the presence of intergenerational households commonly found in Thailand (Knodel et al., 1995; Beckett et al., 2002).

Some elderly may alternatively prefer to live nearly, or usually next door to their children's home. With this, the two families will be related by sharing some functions such as meal preparation, child care, and care when ill. They felt that living with their grandchildren can be very noisy and hectic, but living near their children gives them a 'warm feeling.'

Thais commonly perceive that there is less potential for friction with a son-in-law than with a daughter-in-law. This likely stem from the large role of women in household chores, than of men. Because elderly spends most of their time at home, there is a greater potential for tension between the daughter-in-law and the elderly parent. Chores can range from food preparation to arrangements within the residential. This may also because women are more easily offended in these matters. As a result, some elderly prefer to live separately from their children's spouse to avoid tension.

According to recent studies by Knodel (1995), elderly revealed the common views on the in laws. Elderly felt that the in laws are not as devoted as their own children when giving care. As the in laws were not brought up by the elderly parents, the elderly felt that they do not have full sense of control over them. Elderly will not feel comfortable enough to complain as they can with their own children. To some extreme, some even mentioned that the in laws are nicer to them only when their children are present.

Lack of privacy is also an issue in intergenerational households. Elderly feels the need for peace, quiet, absence of interference from their children in their desired lifestyle. Elderly parents can be irritated by the nose and activities of the grandchildren as well as arguments between the adults. Space with a strong sense of individuality should be provided for the elderly or the children's family to enjoy their time, without the disturbance from the other. Having their own space may also mean that individuals can express their own preferences. This will strengthen the sense of territoriality as stated in the previous chapter.

Conflict and lack of privacy have been the most common strains mentioned by elderly parents. Though annoyed with the fussy parents, adults are obligated to show gratitude to them. Changes of residence are rare, unless circumstances are extreme.

To conclude, intergenerational living arrangements can be satisfying with 'privacy.' Private and individual quarters should be enhanced where elderly and adult children's family can live separately, but related in shared functioning space.

2.2.3. Issues of Privacy

Privacy has been the main issue in intergenerational families. According to Knodel (1995), elderly felt that children are too loud. Similarly, Giles (2003) mentioned that grandchildren also feel uncomfortable with the nagging and long whining of the elderly. Privacy is therefore a mutual issue between family members of intergenerational households.

Privacy have been clarified and categorized into; 1. Privacy as an interactive condition of person and the environment with the primary focus on the person; 2. Privacy as an interactive condition of person and the environment with the primary focus on the environment; 3. Privacy as an interactive condition of person and the environment with a balanced interactional focus (Newell, 1995). The condition of privacy as influenced by the environment is an important factor in design. Newell stated 3 elements within this, which are; territoriality, architectural privacy, and permeable privacy. Territoriality leads to the essence of security; Architectural privacy through the number of enclosures; and permeable boundaries that separates but at the same time allows interactions.

Chermayeff and Alexander (1963) have mentioned the natural environment as the desired of a residential. Territoriality plays a large role as “the little tree growing outside one’s room is more real than the largest tree in the park” or the ‘no-man’s land’ patches of green along the street. This relates back to Lawton’s text, as one’s ability to personalize the outdoor area will provide elderly the essence of territorially. Intergenerational families have triggered the issue of privacy as the freedom to express within one’s domain among Thai elderly without feeling ‘klaeng jai’ (Knodel, Saengtienchai, and Sittitrai, 1995; Durand, 2007). ‘Klaeng jai’ in this context is to be able to express oneself freely without the fear of disrupting another’s comfort. Designs for intergenerational families should separate individual private domains, to enhance the feeling of territoriality, while enabling them to interact.

The term ‘permeable boundaries’ were proposed by Chermayeff and Alexander (1963) on domains for all degrees of community living, ranging from the most intensely private to the most intensely communal; to separate and yet allow interactions, entirely new physical elements must be inserted between them. Achieving privacy while

allowing interaction is the goal of an intergeneration environment. As intergenerational households have individuals from different generations with different preferences, individuals should be able to express their freedom in their individual spaces, while able to interact with their family.

Importantly, Chermayeff and Alexander mentioned privacy between 'public to the community' and the 'family-private.' As there are numerous dimensions to privacy, 'the attachment of the public and private domains' will be looked at specifically. The placement and aspects of privacy are based on daily activities and not taste.

Privacy of 'public to the community'

1. Accommodation and land use: spaces for group occupancy.
2. Problems of protection: security devices, safety, and pollution.
3. Responsibility: the question of ownership and maintenance.
4. Climatic control: at entry for comfort linkage between the climatically controlled vehicle and the climatically controlled dwelling.
5. Illumination: visibility for safety, pleasure, day and night.
6. Acoustics: insulation of community from the traffic, or insulation within the private dwelling.
7. Circulation: transition between the vehicle and pedestrian.
8. Communication: for convenience and security purpose
9. Equipment and utility

They proposed the term 'permeable boundaries' where domains for all degrees of community living, ranging from the most intensely private to the most intensely communal. To separate and yet allow interactions, entirely new physical elements must be inserted between them. Clear separation between elements for security and safety reasons, while issues of privacy through visual, noise, etc. were resolved by placements of buffer zones.

Privacy of 'family-private'

1. Is there an entry lock to give the house as a whole an adequate buffer zone against intrusion? Question of protection.

2. Is the children's domain directly accessible from outside so as not to interfere with the adult's private and family domains? Question of noise, interruption, and dirt.
3. Is there a buffer zone between the children's private domain and the parents' private domain? Question of noise.
4. Is there a lock to the parents' private domain? Question of noise, interruption, and modesty.
5. Can a living room be isolated acoustically, as either a quiet or a noisy zone, from the rest of the house? Questions of separating sounds of conservation, reading, listening and looking, from silent occupations,
6. Are the outdoor spaces private and differentiated? Questions of interference between children and adults, and between individual and family domains.

Here, privacy between individual domains, individual to family domains, and the family domain to the outside. 'Buffer' was frequently mentioned as the solution to provide individuals with the privacy they desire.

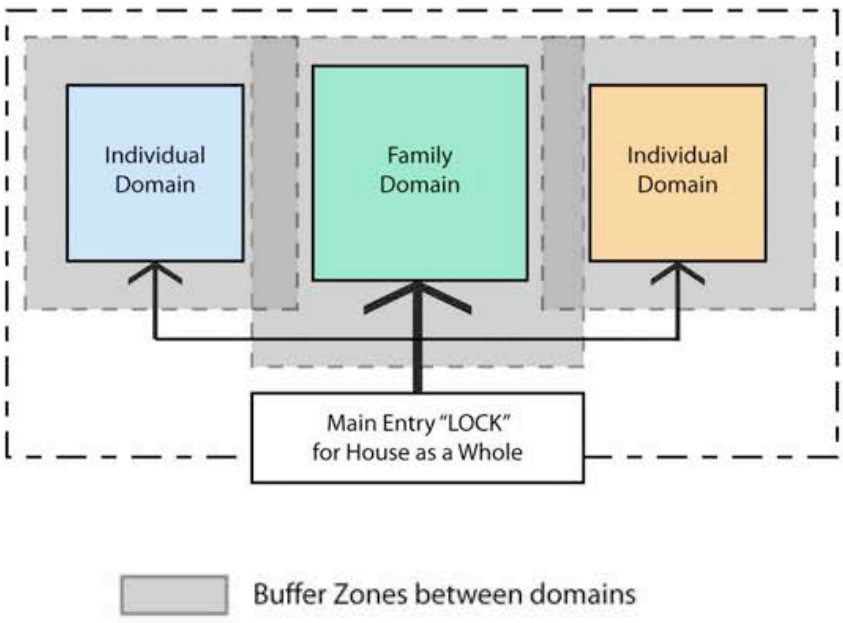


Figure 2.2 Conceptual diagram of privacy in 'family-private'

2.3. Case Studies

2.3.1. Nursing Homes, Baan Bangkhae

2.3.2. Elderly Residence, Sawangkanives

Studies on current housing designs for the elderly in Bangkok, which includes the “Baan Bangkae nursing home” sponsored by the government, and LPN’s new estate development for the elderly, “Sawangkanives.” Analyses were done to understand dimensions, layouts and usage of space.

3.2.3. Vertical Living in Bangkok: Low-Rise and Mid-Rise Condominiums

Analyses of low-rise and mid-rise condominiums in Bangkok were done to understand building layout and see patterns in designs. 10 residences by LPN, Pruksa and AP were selected, which includes; LPN’s Sawangkanives phase 1 and phase 2, Lumpini Condotown Ramintra-Laksi, Lumpini Ville Ramintra-Laksi, Lumpini Ville Sukhumvit 77, Lumpini Ville Prachachuen-Phongphet, Pruksa Condolette Dwell, Pruksa Condolette Light, AP: The Address Patumwan, and AP: The Address Sukhumvit 61.

2.3.4. Intergenerational Residences

Layouts of 6 intergenerational residences were studied to understand the usage of space. Areas of privacy and spaces causing tension can be determined through the analysis of the 6 different scenarios.

2.3.5. Privacy Issues in Existing Living Spaces

Further analysis of space usage of elderly residences and existing condominiums as categorized in the study to determine the disadvantages of spaces commonly found in residences for intergenerational usage.

2.3.6. Design for Intergenerational Family: U – House by Openbox Architect

To understand the residence design for intergenerational family, which could then be apply to designing an elderly-friendly condominium for intergenerational families in Bangkok.

2.3.1. Baan Bangkhae Nursing Homes

www.banbangkhae.com

Supported by the government for low-income elderly. The area consist of 6 main buildings divided between male and female, elderly with intensive care, elderly with Alzheimer, varying between 1-3 stories, and a total of 11 private one story bungalows. Open space terraces, garden and sports facilities are provided for leisure, and a nurse is presented at all times for emergency aid. The total of 267 elderly, 91 male and 176 female; Private bungalows: 1 male and 12 females, Sooksan (males' dormitory): 68 males, Sawudipol (female's dormitory): 44 females, Piboonsook (recovery center quarter): 39 females, Mahudtai 100 years (Alzheimer's elderly): 10 males and 21 females, Clinic: 7 males and 35 females, and Main Dormitory: 5 males and 35 females. Elderly ranges from independent individuals who can care for themselves, to those who are in bed patients (see figure 2.3).

Amenities for elderly's wellbeing within and surrounding the compound:

- Located within in a walk able proximity to the market, bus stops, and pedestrian bridge, elderly can commute to places independently.
- Frequent visits from schools, companies, government officials, organizations, etc. may encourage elderly's confidence and social interactions.
- A prayers' building for occasional merit making and preaching from monks (refer to figure 2.3, image 8)
- Medical facilities such as clinic and recovery center are located within the compound for elderly's wellbeing (refer to figure 2.3, image 5).
- Vegetated landscapes with large trees and man-made pond where elderly can spend their time during the day, becomes a designated exercising area for locals. Seeing new faces may be healthy for the elderly, and sometimes can even encourage social interactions (refer to figure 2.3, image 3 & 4).
- The elderly uses common spaces within the buildings during the day. Elderly tend to sit along the corridor space where it is highly ventilated, and also in front of their quarters as elderly tend to be highly possessive of their belonging (refer to figure 2.3, image 1, 6, & 10).
- Constant complaints from elderly of their caregivers and co-residence.
- Alzheimer's quarter provokes many controversial comments as elderly seems to loose their freedom to a 2.5m X 2.5m isolated space.

- Seating and Sala located in the garden area are always populated by elderly evening during the hot early afternoon (refer to figure. 2.3, image 3 & 4). There are many hang out spots in Baan Bang Khae Nursing homes, which elderly with mutual interest can participate. This related to Lawton's design guideline for elderly residences to encourage social behavior for an enriching life.
- There should be an inner courtyard for elderly to relax during the hot hours, and still remain near their living quarter.

Figure 2.3 Map and images within Baan Bangkhae Nursing Homes

2.3.2. Sawangkanives, LPN and Red Crossed

www.sawangkanives.com

With a total of 166 residences in Phase 1, and 300 more units after completion of Phase 2, the Sawangkanives expects to have at least 466 elderly residing in their complex. Phase 2 will consist of eight 6 stories buildings, 300 studio layout units at 38.00-41.50 sq. m. The complex provides elderly with facilities such as Active facilities (Pool, fitness, and open space plaza), Passive facilities and Medical facilities. Elderly living in the complex are at an average of 70 years of age, with 90 years old at the oldest, which all residences are able to care for themselves and only to be assisted with room maintenance. Elderly in Phase 1 were to pay 2000 baht per month, and 2500 baht per month for Phase 2. The project clearly states that it serves the middle class elderly who can afford the fee. Funds raised will go to the 'Red Cross' for further studies and those who are in need. Future plans for Alzheimer's and in-bed patients are under consideration (see figure 2.4).

Amenities for elderly's well-being within and surrounding the compound:

- Located at close proximity to Wat Asokewanararm and Schools where elderly could participate in activities.
- A community clinic for the surrounding community including the elderly in the Phase 1 building, and a private clinic when completed will serve elderly from both Phase 1 and 2 buildings.
- Nursing room and physical therapy room provided for residence of the main entrance floor in the Phase 1 building. After the completion of the private clinic building will hold all medical facilities where elderly from both buildings can be at service.
- Fitness room opens 24 hours for elderly to use freely.
- Prayer's room and a reading room with computer service located on the main floor for elderly.
- Elderly can order their daily meals from the kitchen and delivered to their rooms or the cafeteria.
- Rooms available for rent for family members of elderly on visits.
- Bathrooms in Phase 1 contain many fall hazards such as shower rims and shower curtains.

- More trees or shading device should be presented for elderly to relax in the outdoors during the hot hours of the day.

Phase 2 units are designed from the errors of Phase 1.

- Fixtures and furniture were chosen to fit the ergonomics of elderly, for example, height of bed and softness of the sofa.
- Floors are furnished with laminated wood to provide a softer impact when fall.
- All steps and rims were avoided to prevent falls.
- Bathrooms are located next to the pantry and the balcony for efficient ventilation.

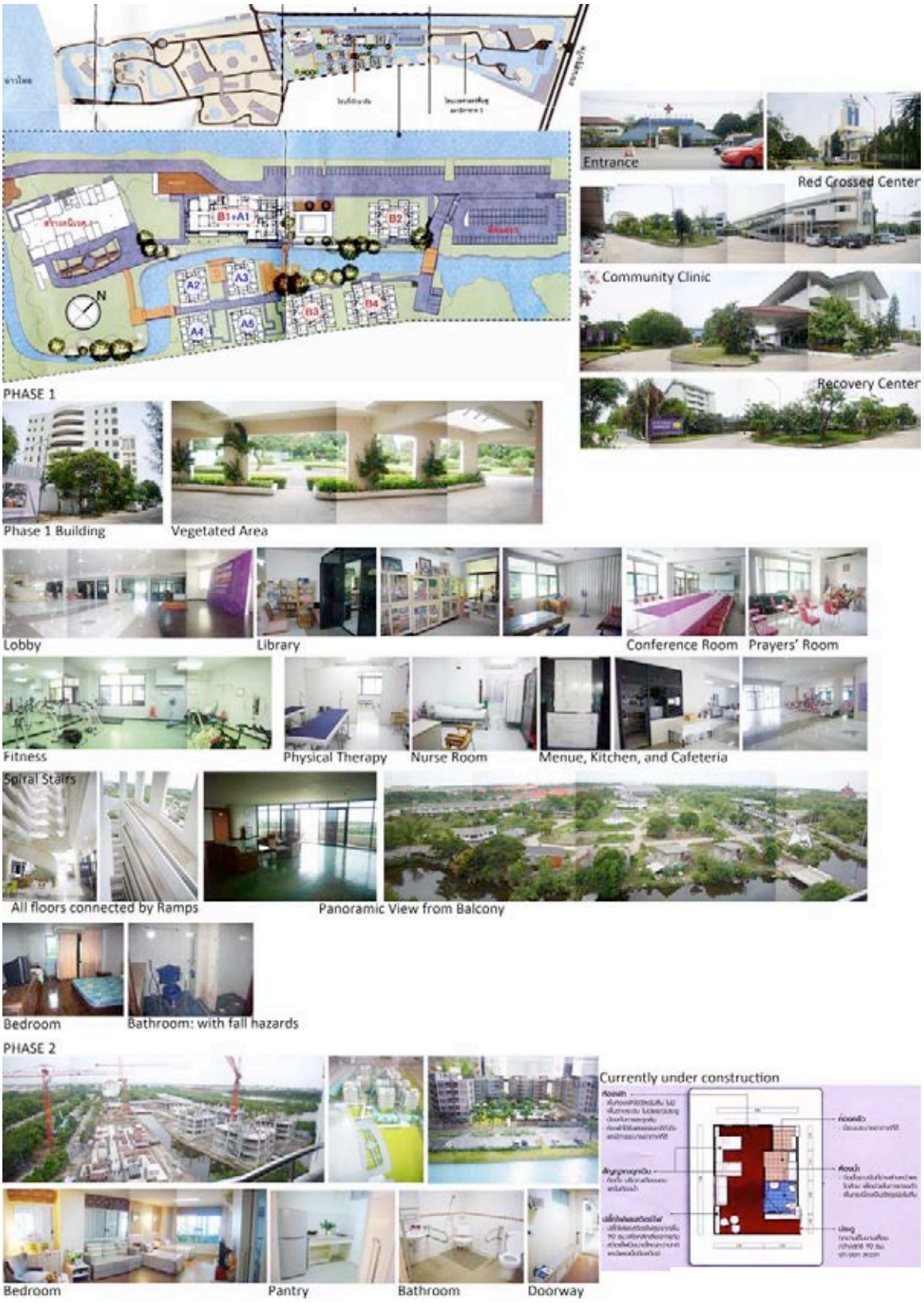


Figure 2.4 Images from Sawangkanives

2.3.3. Low-Rise and Mid-Rise Condominiums in Bangkok

In order to understand the planning of condominiums in Bangkok, analyses of low-rise and mid-rise condominiums in Bangkok were done to understand building layout and see patterns in designs. 10 residences includes; LPN's Sawangkanives phase 1 and phase 2, Lumpini Condotown Ramintra-Laksi, Lumpini Ville Ramintra-Laksi, Lumpini Ville Sukhumvit 77, Lumpini Ville Prachachuen-Phongphet, Pruksa Condolette Dwell, Pruksa Condolette Light, AP: The Address Patumwan, and AP: The Address Sukhumvit 61 (refer to table 2.3). The planning of the residences were analyzed individually (refer to figure 2.5 – 2.14), and compared to find a common pattern of building and room layout (refer to figure 2.15 and figure 2.16).

Table 2.3 Comparison of 10 low-rise and mid-rise residential buildings in Bangkok

	LPN						AP		Pruksa	
	Sawangkanives		Lumpini Condotown	Lumpini Ville			The address		Condolette Dwell	Condolette Light
No.	1	2	3	4	5	6	7	8	9	10
	Phase 1	Phase 2	Ramintra-Laksi	Ramintra-Laksi	Prachachuen-Phongphet	Sukhumvit 77	Sukhumvit 61	Patumwan	Sukhumvit 26	Convent
Image										
Zones	Bangpu, Samut-prakarn	Bangpu, Samut-prakarn	Low Density Residential	Medium Density Residential	Medium Density Residential	Medium Density Residential	High Density Residential	Commercial	High Density Residential	Commercial
Area Code			R.4-7	R.6-3	R.5-4	R.7-16	R.10-10	C.5-1	R.10-10	C.5-6
FAR (:1)			3	4.5	4	5	8	10	8	10
OSR (%)			10	6.5	7.5	6	4	3	4	3
No. Of Stories	8	8	8, 2 bldgs.	14	19, 2 bldgs.	Bldg. A1&A2: 16 Bldg. B1&B2: 18	8	8	8, 2 bldgs.	8
Unit Size (sq.m.)	20.00	41.44	25.00-35.00	25.00-64.50	32.50-64.50	22.50-60.00	1 bedroom: 41.50-61.50 (69) 2 bedrooms: 65.0-109.75 (29)	1 bedroom: 46.00-49.00 2 bedrooms: 60.60-80.35	1 bedroom: 28.93-34.81 (207) 2 bedrooms: 69.12-63.25 (14) Duplex: 66.65 (3)	1 bedroom: 33.2-47.2 (82) 2 bedrooms: 64.0-72.6 (29)
No. Of Units	166	300	1505	1278	894	956	99	A: 78 B: 78 (156)	224	111

Table 2.3 Comparison of 10 low-rise and mid-rise residential buildings in Bangkok (Continued)

No. Of All Elevator: Rooms	2:24	1:4, 1:6	2:28	6:102	A: 3:28 B: 3:32	A1&A2: 2:16 B1&B2: 2:14	2:14	2:13	A: 2:9 B: 2:22	2:15
No. Of Designated Service Lift				1	A: 1 B: 1					
Parking Stalls					540	370	70	60		
Outdoor Features	Ground Floor		Ground Floor	Parking Rooftop (4th Floor)	Parking Rooftop (4th Floor)	Ground Floor	Rooftop	6th and Rooftop	Parking Rooftop (2nd Floor)	Rooftop
Facilities	Dance room, Swimming pool, Fitness, Garden, Library, Computer-Internet room, Prayers' room, Nursing room, Physical Therapy, and Community Clinic		Retail Units (9), Fitness, Running Track, Garden, Playground, Laundry, and Library	Garden, Playground, Swimming Pool, Fitness, Sauna, and Laundry	Garden, Playground, Swimming Pool, Fitness, Sauna, and Laundry	Garden, Playground, Swimming Pool, Fitness, Sauna, and Laundry	Swimming Pool, Sauna, and Fitness	Swimming Pool, Sauna, Lobby, Security, Fitness, and Garden	Swimming Pool, Fitness, and Pocket Park	Swimming Pool, Fitness, and Pocket Park
Longest Distance of Corridor*	56.0m	5.6m	63m	166.5m	120m	41.6m	36.0m	33.0m	55.0m	50.0m
Building Layout Pattern	Centralized Core: Linear	Centralized Core: Squared	Corridors' End	Centralized Core: at Intersections	Centralized Core: at Intersections	Corridors' End	Centralized Core: at Intersections	Centralized Core: at Intersections	Centralized Core: Linear and at Intersection	Corridors' End
Room Layout Pattern	Semi-Defined Space	Defined Separation	Semi-Defined Space	Defined Separation	Defined Separation	Defined Separation	Semi-Defined Space	Semi-Defined Space	Semi-Defined Space	Semi-Defined Space

* Approximate value

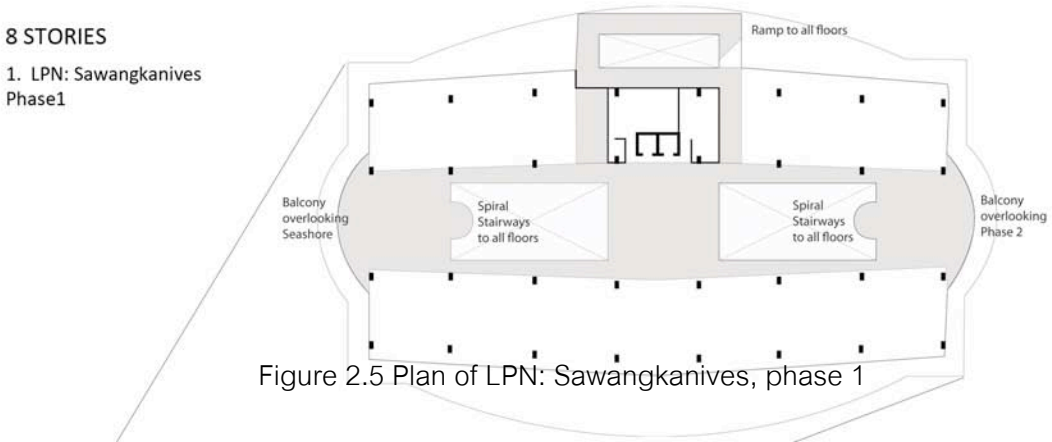


Figure 2.5 Plan of LPN: Sawangkanives, phase 1

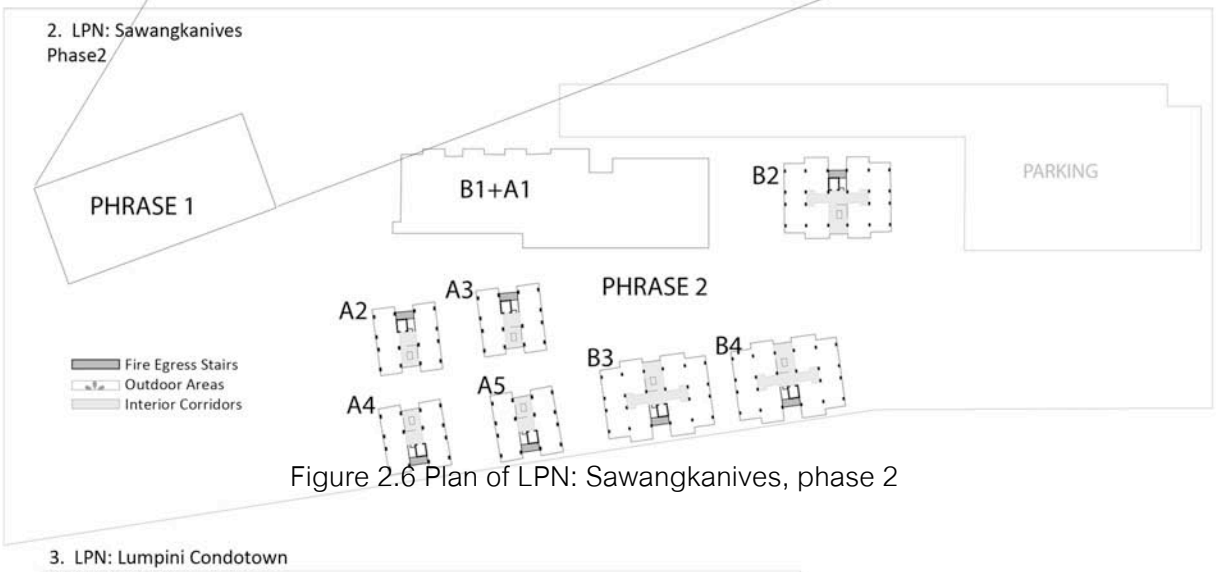


Figure 2.6 Plan of LPN: Sawangkanives, phase 2

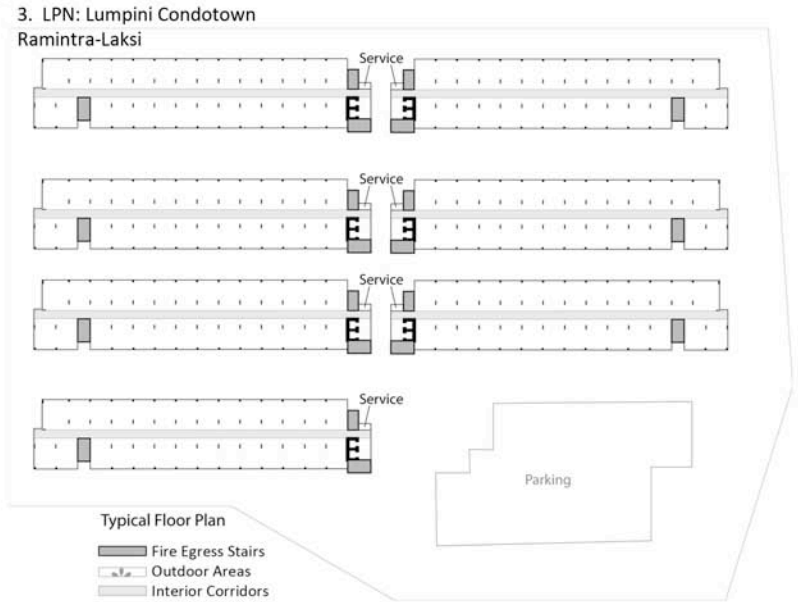


Figure 2.7 Plan of LPN: Lumpini Condotown, Ramintra-Laksi

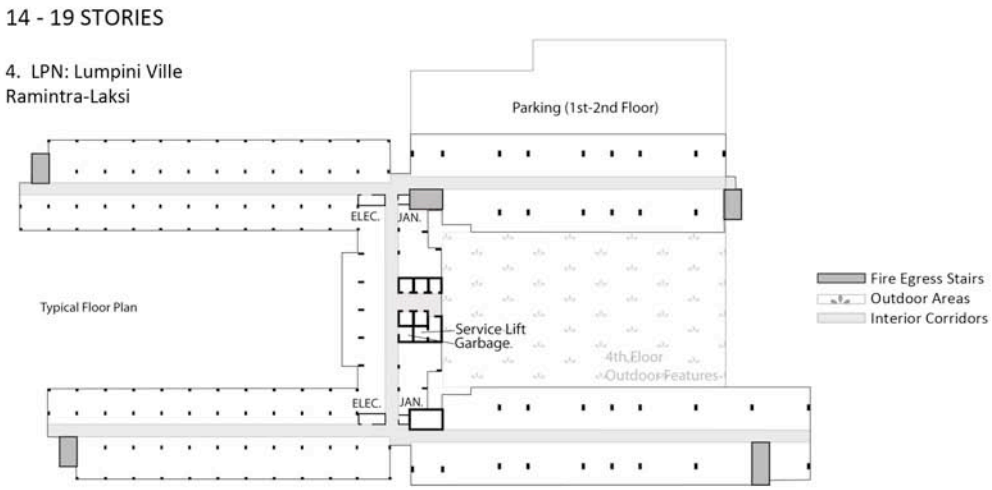


Figure 2.8 Plan of LPN: Lumpini Ville, Ramintra-Laksi

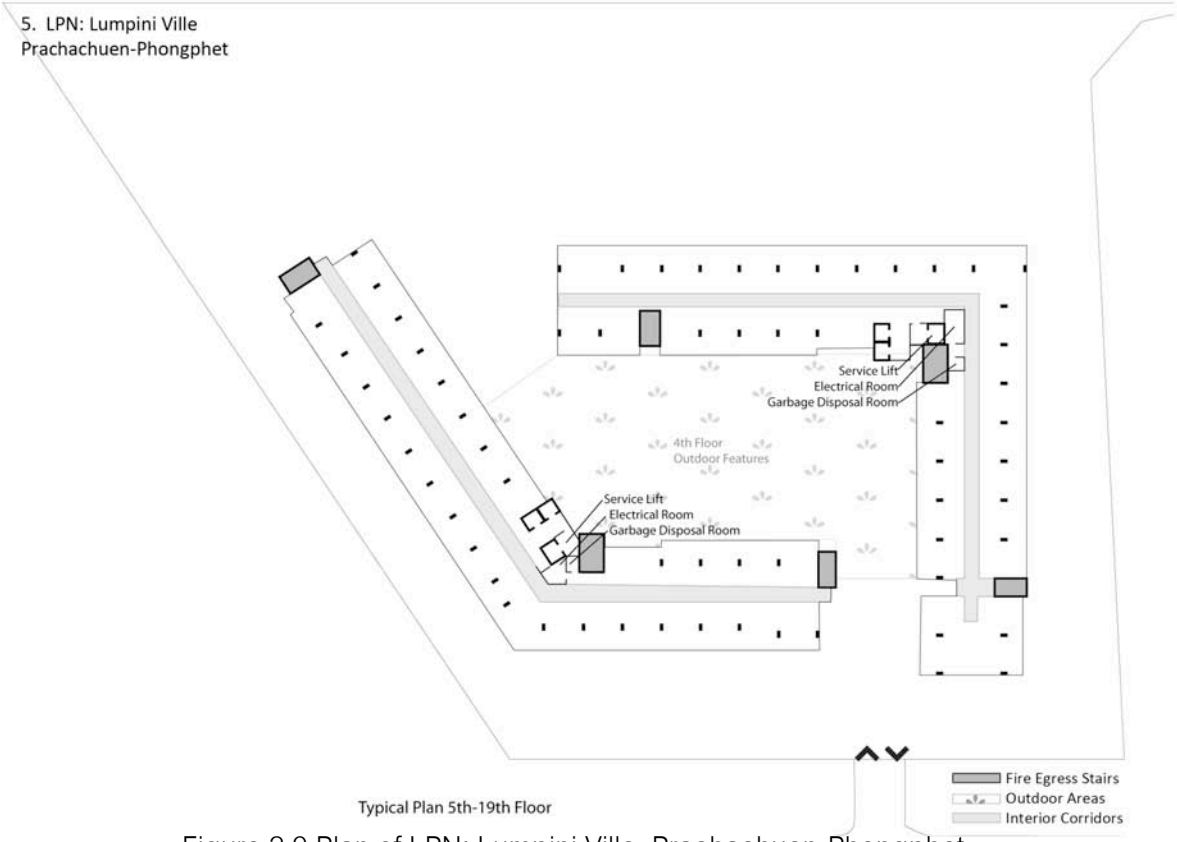


Figure 2.9 Plan of LPN: Lumpini Ville, Prachachuen-Phongphet

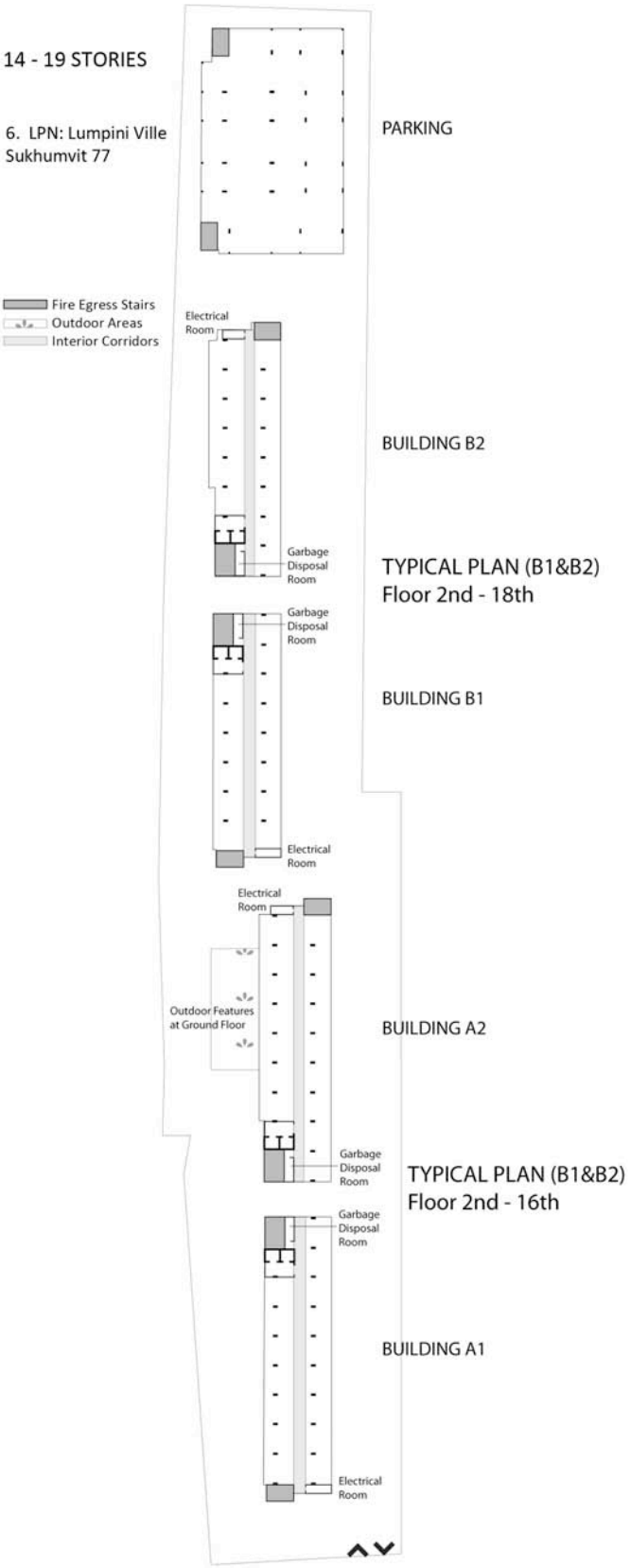


Figure 2.10 Plan of LPN: Lumpini Ville, Sukhumvit 77

8 STORIES

7. AP Condominium
The Address: Sukhumvit 61

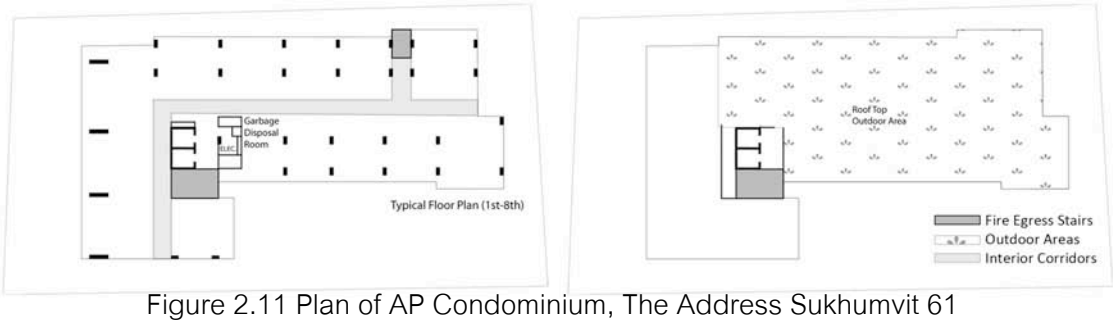


Figure 2.11 Plan of AP Condominium, The Address Sukhumvit 61

8. AP Condominium
The Address: Patumwan

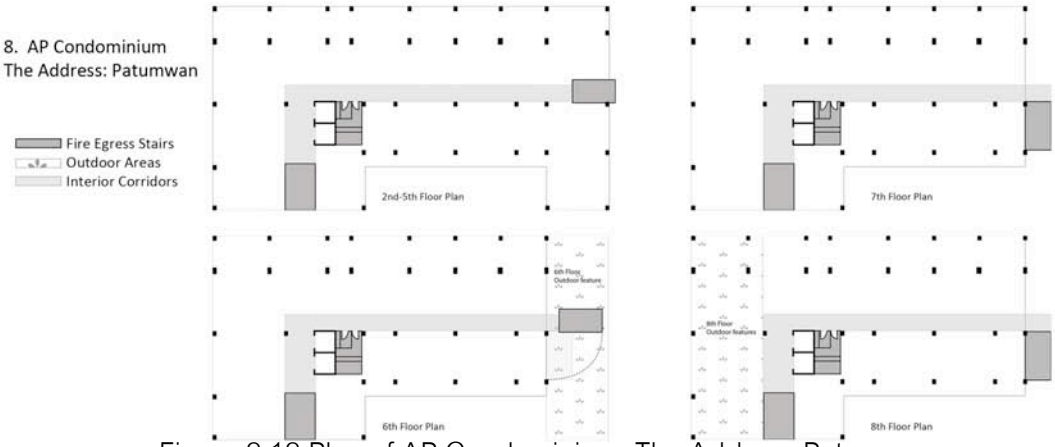


Figure 2.12 Plan of AP Condominium, The Address Patumwan

9. Pruksa Condominium
Condolette Dwell: Sukhumvit 26

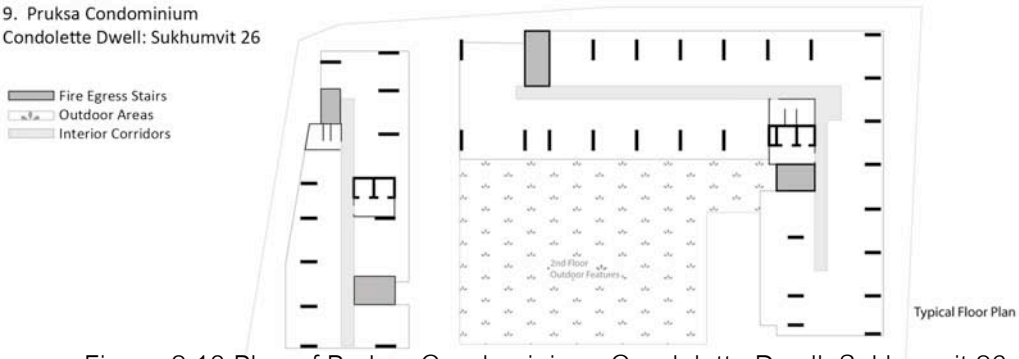


Figure 2.13 Plan of Pruksa Condominium, Condolette Dwell: Sukhumvit 26

10. Pruksa Condominium
Condolette Light: Convent

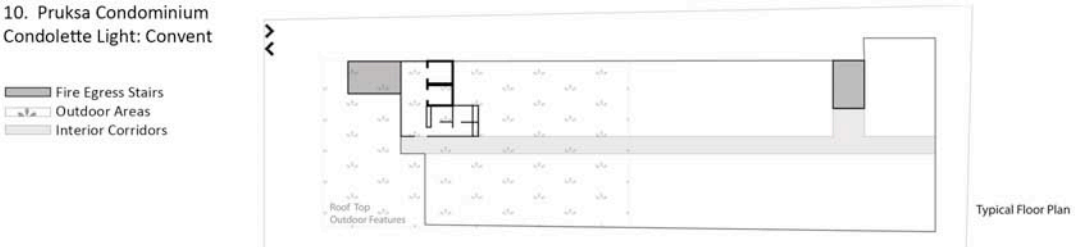


Figure 2.14 Plan of Pruksa Condominium, Condoletter Light: Convent

Patterns of Building Layout

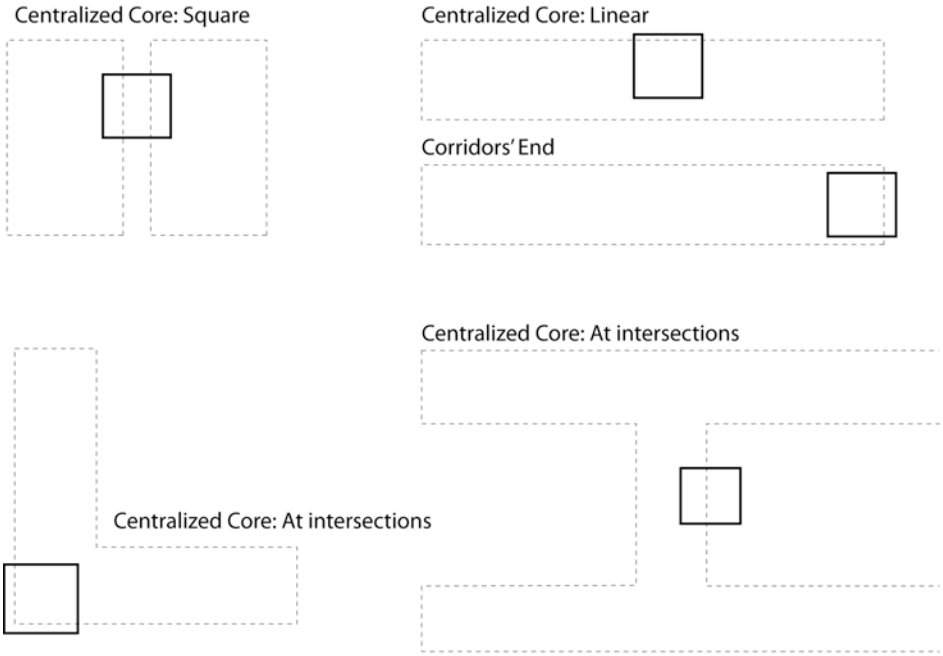


Figure 2.15 Patterns of building layout

Patterns of Room Layout

Figure 2.16 Patterns of room layout

Table 2.4 Comparison of building and room layout

Patterns of Building Layout (refer to figure 2.15)

	Centralized Core: Squared	Centralized Core: Linear	Centralized Core: At Intersections	Corridors' End
Advantages	Short distance to elevator core and services.	Shorten walking distance to rooms. A fire egress may be presented at the core, and therefore increases the safety of residents as they have alternatives during emergencies.	Shortens walking distance to rooms. Increases the level of safety as fire egress may be presented. Efficiently uses the residence's "back" space.	Reduces the quantity of fire egresses. With a core already presented at the end, it serves both the purpose of daily usage and emergency exits.
Disadvantages	Limits the quantity of rooms as corridor perimeter decreases.	Egress is required at every corner; a centralized cores means having at least two more egresses at each ends.	Egress is required at every corner; a centralized cores means having at least two more egresses at each ends.	Longer walking distance to private rooms at the opposite end.

Patterns of Room Layout (refer to figure 2.16)

	Semi-Defined	Defined Separation
Advantage	Higher level of privacy as residents have to travel passed the service area and then the living room before reaching their private personal space.	Bathroom, service areas, and balcony are connected, enabling rooms to be ventilated at all time. Odor can circulate as wind is ventilated from the corridor and out through the balcony.

Table 2.4 Comparison of building and room layout (Continued)

Disadvantages	Room cannot be freely ventilated, leaving cooking odor to circulate pass all areas before leaving through the balcony or window.	Odor from cooking may stench up corridor.

Summary of Analysis

Structural Analysis

- All 10 residential buildings are double loaded corridors as it is most feasible and rooms can be optimized.
- Egress stairs are within 30 meters travelled distance as required by law, approximately 60 meters apart from each other, and alternative routes with no dead-ends. Elevator cores are located at the heart of the building where all programs connect (lobby, parking, residence, etc.) for optimized usage, which is usually between the egress stairs.
- All 10 residences were analyzed and simplified to 4 different patterns; centralized core: square, centralized core: linear, centralized core: at intersections, and at corridors' end (refer to figure 2.15).
- Cores are all placed in the central area of the building. In residences where cores are at corridors' end, the adjacent building mirrors it to create a 'central.'

Space Usage

- To maximize space usage of the 8-story building, outdoor features are located on the ground floor or the rooftop. The low-rise structure only holds the private residence, and using the rooftop as its outdoor feature maximizes building area; treating the roof as the 9^{th} floor but remaining as an 8-story building according to the Thai law.
- Two of the ten residences, a 19 and 14-story building, the outdoor features were elevated to the 4^{th} floor, roofing the 3-story parking lot. Similarly, using the rooftop of the structure as the outdoor feature efficiently optimizes the building space usage.
- Located with the elevator core are usually the egress stairs, electrical room, garbage disposal room, and the occasional service lifts. Pump, mechanical and generator rooms, and septic tanks are usually on the ground or the basement.

- Ducts that supports the plumbing systems of units are at least 30cm in depth or more as pipes can be as large as 6”(15cm).
- The rooms of all 10 residences are categorized into two main layouts; semi-defined and defined separation of spaces (refer to figure 2.16). Semi-defined rooms put emphasis on the perceived personal space. This layout may provide residences with a higher level of privacy through the illusion of having to travel through different spaces before arriving in their private area according to Edward Hall’s ‘interpersonal space’ theory. On the other hand, room with defined separation of space between the living and the service allows the opportunity for ventilation of odor from cooking or any activities.

Attitudes of Condominiums in Bangkok

From the study on factors effecting buying decisions of medium cost residential condominiums in central Bangkok (Kittipong Trisarnwathana, 1995), showed that most buyers of mid-rise low-density complexes are married couples (36.6%) or more, while the higher density complexes of both mid-rise and high-rise buildings are mostly accommodating one person (31.7%).

Buyers of mid-rise low-density desire a healthy living environment, proximity to their workplace, developer’s reputation, appropriate room size, and services and facilities provided, respectively. Though results are similar to the buyers of high-density condominiums, higher density buyers desire proximity to their workplaces of between 1-30minutes. Low-density residents take 31-45 minutes or more to travel to their workplace.

Facilities frequently used by mid-rise low-density residents are playground (30days/month), complex (30days/month), convenient stores (30days/month), pool (11days/month) and fitness (8days/month). High-density residents use the fitness 30days/month, convenient stores 30days/month, pool 20days/month, playground 20days/month, and the complex 10days/month.

To conclude the study by Trisarnwathana, mid-rise low-density buyers look for a healthy living environment and security of the residence, while high-density residential buyers look for the convenience of transportation and proximity to their workplace.

2.3.4. Intergenerational Residences

Privacy of shared living space between family members as concerned by Chermayeff and Alexander will be analyzed. By analyzing the current design will help us determine the advantages and disadvantages of different living environment, and therefore, a solution to the design most suitable for the modern intergenerational families.

Privacy of 'family-private' as mentioned by Chermayeff and Alexander were taken into consideration in the analysis. Privacy is represented through 'Protection,' 'Noise and Interruption,' 'Visual Privacy,' and 'Interference from others.'

Protection

1. Is there an entry lock to give the house as a whole an adequate buffer zone against intrusion?

Noise, Interruption, and Visual Privacy

2. Is the children's domain directly accessible from outside so as not to interfere with the adult's private and family domains?
3. Is there a buffer zone between the children's private domain and the parents' private domain?
4. Is there a lock to the parents' private domain?
5. Can a living room be isolated acoustically, as either a quiet or a noisy zone, from the rest of the house?

Interference from others

6. Are the outdoor spaces private and differentiated?

Existing residences with elderly coresidents will be compared to the terms stated above by Chermayeff and Alexander. 6 residences found in the rims of the Bangkok city were observed and studied to understand the physical living environment of the elderly in intergenerational households.

To analyze the relationship between shared space and private domains of individuals

Individual Quarter 1

Individual Quarter 2

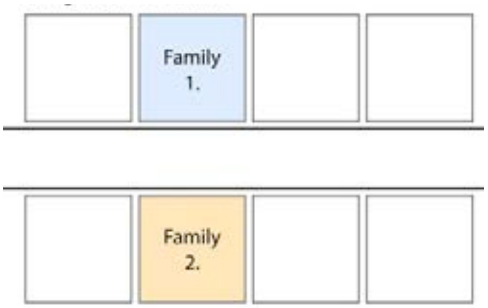
Individual Quarter 3

Shared Space

Privacy: Single Family Housing

Case 1.

Living across the street



Case 2.

Living in different homes, same compound

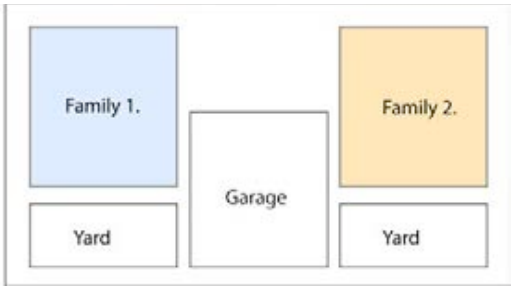


Figure 2.17 Diagram of single-family housing, case 1 and 2

Chermayeff and Alexander's Questions for Privacy	Observation from Case Study
1. Entry 'lock' to give the house as a whole an adequate buffer zone against intrusion or the privacy at access.	Both houses have a private access to the interior space.
2. Private access to Individual domains, without interfering other private domains.	Individual domains are located in different buildings.
3. Private access to Individual domains, without interfering family domains.	Entrances to individual domains are separated from the family domain.
4. Buffer zone between individual domains.	Individual domains are on different side or the corridor. The study room separates individual domains.
5. Buffer zone isolating living room.	Living room is set in an isolated part of the house.

Case 1.

Families living across the street provides both with large territorial space and privacy within their family. The two families in this scenario are able to design and arrange their living space to their preferences, without permission from the other as they are in different compounds. Though the high level of privacy, the two families remain intimate. They often meet when the adult child needs childcare for their infant from the extended family living near by. Family dinners would bring the two families together occasionally.

Case 2.

Living in different homes within the same compound will provide the more dependent members with security. Preferences will be according to the individual, and the level of privacy is still high. With such proximity, the families share spaces on daily basis and join in family activities such as dining and watching television.

Case 3.

Living in the same home:

Figure 2.18 Diagram of single-family housing, case 3

Chermayeff and Alexander's Questions for Privacy	Observation from Case Study
1. Entry 'lock' to give the house as a whole an adequate buffer zone against intrusion or the privacy at access.	There is a private access to the interior space.
2. Private access to Individual domains, without interfering other private domains.	As there are two entrances, individuals may choose to access their domains privately.
3. Private access to Individual domains, without interfering family domains.	Accesses to individual domains are separated from family domains.
4. Buffer zone between individual domains.	Office room, family room and corridors separate individual domains.
5. Buffer zone isolating living room.	Living room is set in an isolated area of the house.

The family shares the detached home with an elderly parent. The house was modified to create a quarter for the elderly parent, which includes a sleeping area and living area. The elderly parent spends most of her time in the quarter, indicating comfort. The quarter is located next to the dining area, making it convenient for the elderly to join the family for dining and family activities. The family and the elderly parent living quarters are separated by elevation, where they can meet on the ground floor.

Case 4.

Living in the same home:

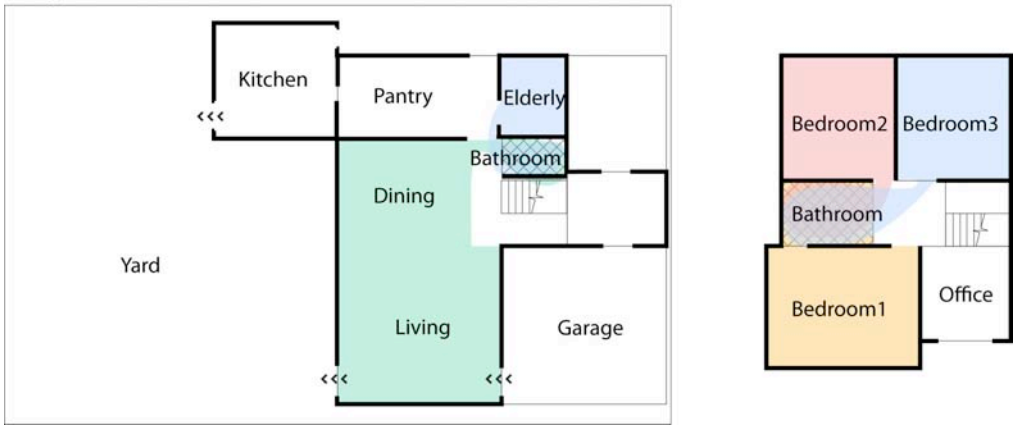


Figure 2.19 Diagram of single-family housing, case 4

Chermayeff and Alexander's Questions for Privacy	Observation from Case Study
1. Entry 'lock' to give the house as a whole an adequate buffer zone against intrusion or the privacy at access.	There is a private access to the interior space.
2. Private access to Individual domains, without interfering other private domains.	Individual domains are situated close to one another. Encounter with family member while accessing individual domains may be unavoidable.
3. Private access to Individual domains, without interfering family domains.	Individuals have to pass family domains to go to their individual domains.
4. Buffer zone between individual domains.	Individual domains are closely located
5. Buffer zone isolating living room.	Living room is not isolated from the dining quarter

The family lives in a two-story house, where the elderly remain on the lower floor. Elderly seem to enjoy spending time outdoors and in the kitchen and the outdoors, only occasionally returning to the elderly quarter, and even more rarely to the living room. This creates privacy between the family and the elderly. Adult sometimes enters the kitchen before meals. This may cause tension between the elderly and the adult.

Privacy: Townhomes

Case 5.

Living in the same home: Townhome

Figure 2.20 Diagram of townhomes, case 5

Chermayeff and Alexander's Questions for Privacy	Observation from Case Study
1. Entry 'lock' to give the house as a whole an adequate buffer zone against intrusion or the privacy at access.	The house has a private access.
2. Private access to Individual domains, without interfering other private domains.	All family members have to pass through the elderly domains.
3. Private access to Individual domains, without interfering family domains.	Due to limitations of space, the elderly is situated downstairs within the family domain. Interference is inevitable.
4. Buffer zone between individual domains.	Apart from bedrooms 1 and 2, which are on different levels, however, there is no buffer zone or enclosure for the elderly domain.
5. Buffer zone isolating living room.	Space is shared for living, dining, and sleeping.

Due to the limited space of the townhouse, a private quarter cannot be constructed for the elderly. The elderly sleeps in the living room area, which is also used as the dining area when table is placed. Though on weekdays elderly remains in the elderly area, but when the living room becomes crowded on weekends, elderly alternatively stays in the kitchen area. Adult can choose to privately spend time in the office room upstairs. This may result to discomfort if the elderly desires privacy.

Case 6.

Living in the same home: Townhome

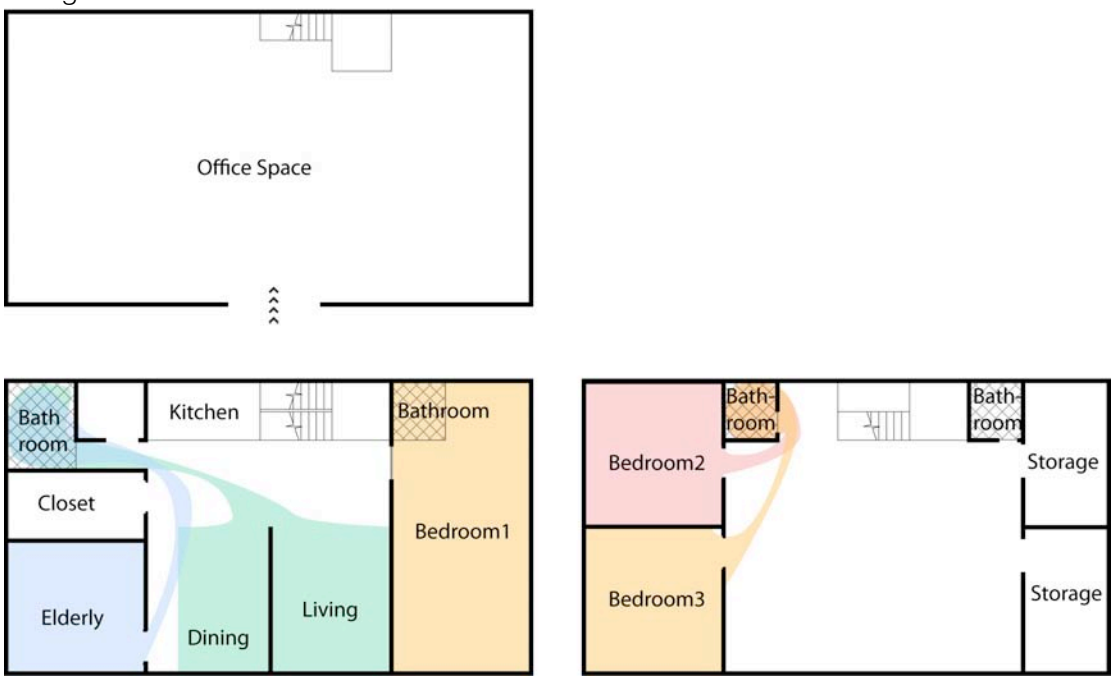


Figure 2.21 Diagram of townhomes, case 6

Chermayeff and Alexander's Questions for Privacy	Observation from Case Study
1. Entry 'lock' to give the house as a whole an adequate buffer zone against intrusion or the privacy at access.	The house has a private access.
2. Private access to Individual domains, without interfering other private domains.	Individual domains are located at different levels or at different areas of the house.
3. Private access to Individual domains, without interfering family domains.	Privacy is provided as stairs leads directly to private domains without interference other individual domains. Except for the elderly domain, which has to pass through the family area.
4. Buffer zone between individual domains.	As they are on different levels
5. Buffer zone isolating living room.	2 individual domains surround family domain.

The family shares a multilevel townhome. Family members mostly spend time in their private quarters such as watching television and reading. The extended family member helps with cooking; apparently no other members seem to share the space. Dining and living areas are places where the family interacts. Though the living room is seldom used only on weekends for tea. They may choose to join such family activities or remain within their quarters.

The sense of personal space and territory will provide family members with comfort, and therefore ease the amount of tension. On the other hand, entering spaces that may have a high value to an individual can cause discomfort.

2.3.5. Privacy Issues in Existing Living Spaces

To further understand the issues within a family living unit in vertical living situations, 2 to 3 bedrooms units from existing living spaces of the 10 condominiums projects were analyzed.

Privacy: Condominium Interiors

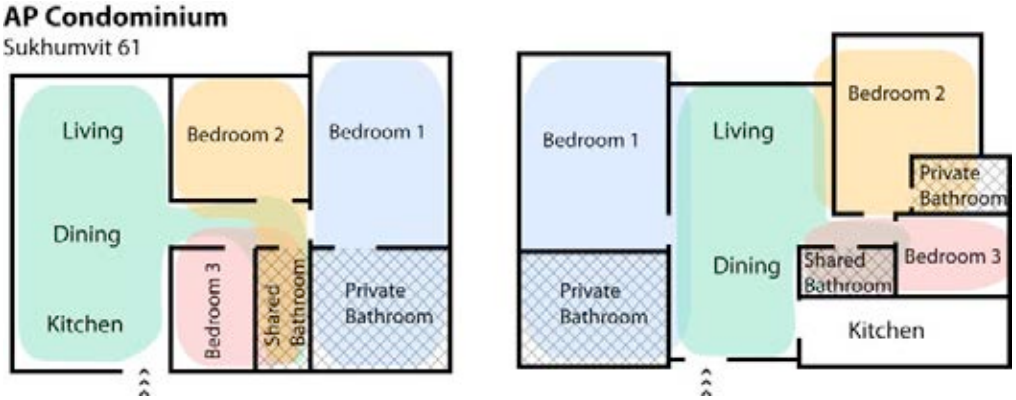


Figure 2.22 Diagram of condominium interiors 1

Chermayeff and Alexander's Questions for Privacy	Observation from Case Study
1. Entry 'lock' to give the house as a whole an adequate buffer zone against intrusion or the privacy at access.	Secured access at entrance and vertical circulation core.
2. Private access to Individual domains, without interfering other private domains.	All individuals' domains are located along the same corridor.
3. Private access to Individual domains, without interfering family domains.	All individuals have to go through the family domain to enter room.
4. Buffer zone between individual domains.	Rooms are located next to each other, or next to the living room.
5. Buffer zone isolating living room.	Living room is not isolated from the dining.

Typically, condominium units are arranged by entering through the shared space; the kitchen, dining, and the living area. Household members will have to travel through the main shared functioning space before separating to their individual spaces. Privacy within this living unit is not high individuals cannot enter their domain without having to interfere or interact with others.

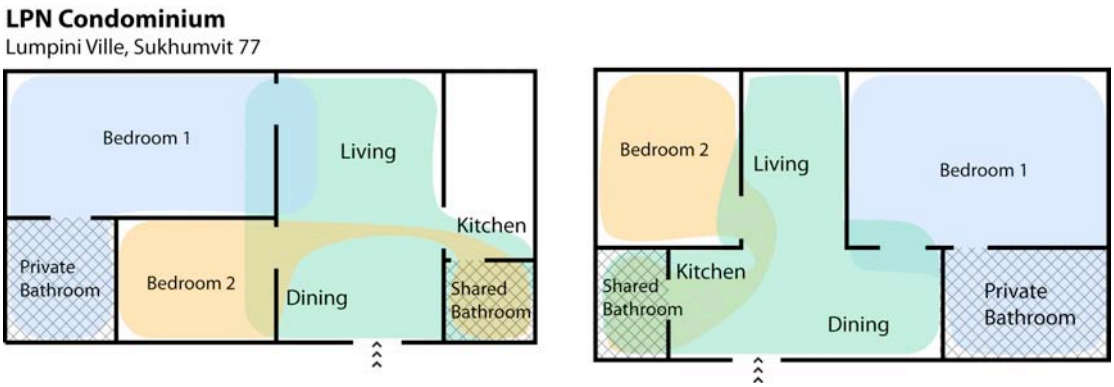


Figure 2.23 Diagram of condominium interiors 2

Chermayeff and Alexander's Questions for Privacy	Observation from Case Study
1. Entry 'lock' to give the house as a whole an adequate buffer zone against intrusion or the privacy at access.	Secured access at entrance and vertical circulation core.
2. Private access to Individual domains, without interfering other private domains.	Individual domains are located at opposite ends.
3. Private access to Individual domains, without interfering family domains.	Individual domains become less private when bathroom is shared over family domain.
4. Buffer zone between individual domains.	Rooms are located next to each other.
5. Buffer zone isolating living room.	Living room is not isolated from the dining.

Figure 2.24 Diagram of condominium interiors 3

Chermayeff and Alexander's Questions for Privacy	Observation from Case Study
1. Entry 'lock' to give the house as a whole an adequate buffer zone against intrusion or the privacy at access.	Secured access at entrance and vertical circulation core.
2. Private access to Individual domains, without interfering other private domains.	Access to individual domains is shared.
3. Private access to Individual domains, without interfering family domains.	Individual domains become less private when bathroom is shared over other private and family domains.
4. Buffer zone between individual domains.	Rooms are located next to each other.
5. Buffer zone isolating living room.	Living room is not isolated from the dining area.

According to the diagram of condominium interior 2 and 3 (refer to figure 2.23 and figure 2.24), the individuals in bedroom 2 will have to walk across or into a shared space to enter the bathroom. This may not be preferred when privacy is needed. The arrangement of kitchen and bathroom is appropriate as odor can easily be ventilated.

Not only the interior and the shared living space between the family members is considered in vertical living situation, but also the shared space between other co-residences. Corridor layouts were analyzed to see the relationship between co-residences, and also to the environment; ultimately, to see 'privacy at access.'

Privacy of Access in Vertical Living: Condominiums in Bangkok

Condominiums developed by favored developers with commonly found designs were analyzed

Figure 2.25 Single-loaded corridor

- Exterior views can be seen from the corridor
- End residents will have a longer walking distance to units
- This type of layout is also used in Baan Bangkhae's dormitory. Connecting elderly to the natural environment without the effort to go out.

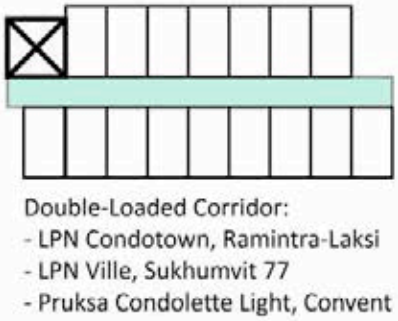


Figure 2.26 Double-loaded corridor, type 1

- No exterior view from corridor
- Entrances opposite one another may lead to invasion of visual privacy of living space
- End residences will have a longer walking distance to units

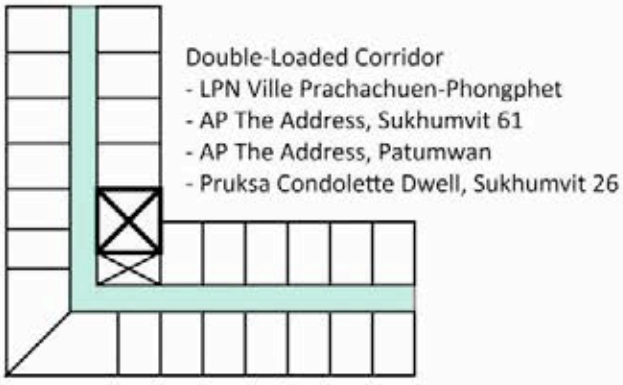


Figure 2.27 Double-loaded corridor, type 2

- No exterior view from corridor
- Entrances opposite one another may lead to invasion of visual privacy of living space
- Equal walking distance to both end residences

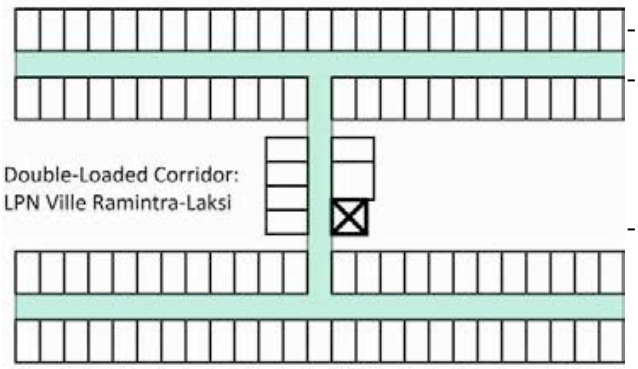


Figure 2.28 Double-loaded corridor, type 3

- No exterior view from corridor
- Entrances opposite one another may lead to invasion of visual privacy of living space
- Though creating wings will accommodate more units, distance to units will increase. This will not be appropriate for elderly residents.

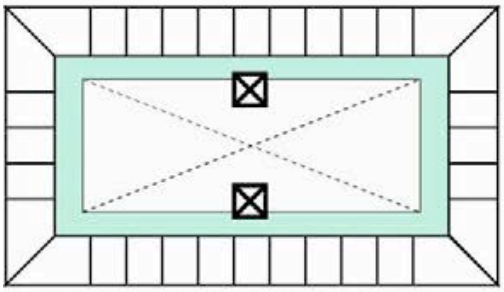


Figure 2.29 Single-loaded corridor with inner court

- View to inner court from corridor
- This type of layout is also used in Baan Bangkhae's dormitory. Connecting elderly to the natural environment without the effort to go out.

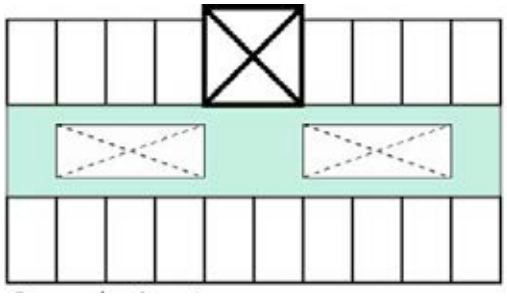


Figure 2.30 Sawangkanives 1

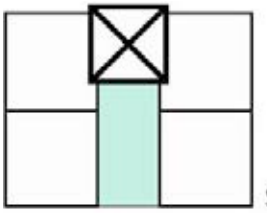


Figure 2.31 Sawangkanives 2

Sawangkanives 1

- Panoramic view from balconies
- View to interior court from corridor provides residents visual privacy from co-residents
- Equal and short walking distance to units

Sawangkanives 2

- Framed exterior view from elevator hall
- Protection from invasion of visual privacy by location of doors
- Short distance to units

Sawangkanives elderly residence focused on enriching the elderly's lives through outdoor activities and recreational facilities. Views of the exterior can be seen from the interior corridor so elderly will be able to keep track of the time of day, and orientation of where they are to the elderly who remained indoors. Baan Bangkhae was excluded from this section as it assesses the corridor layout of 'vertical living situation.' Baan Bangkhae Nursing homes consist of mostly 1-story buildings, and a couple 2-story buildings, which does not account as a vertical residence.

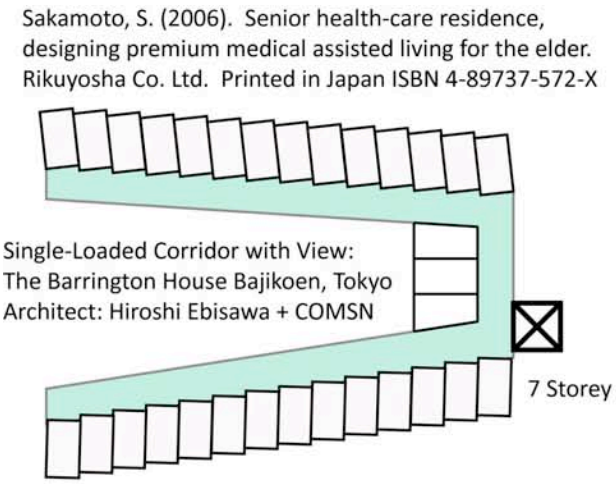


Figure 2.32 Elderly residences in Japan, case 1

- Panoramic view from corridors
- Pivoting unit to increase privacy of private balconies
- Equal walking distance to end units
- Single loaded corridor protects residents from invasion of privacy to their private space

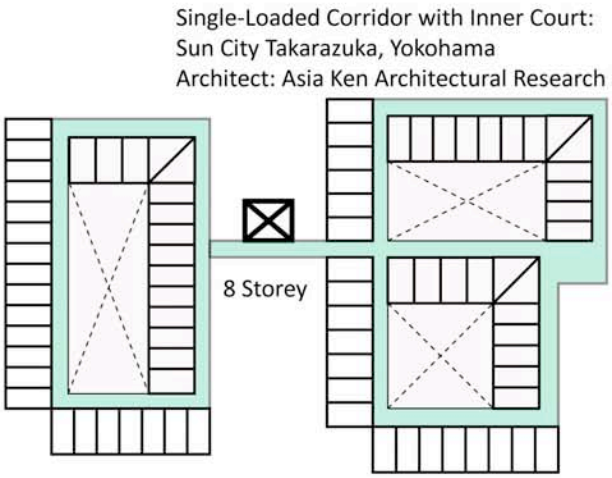


Figure 2.33 Elderly residences in Japan, case 2

- View to interior court and exterior from corridor as corridor is enveloped by greenery.
- Long walking distance to units

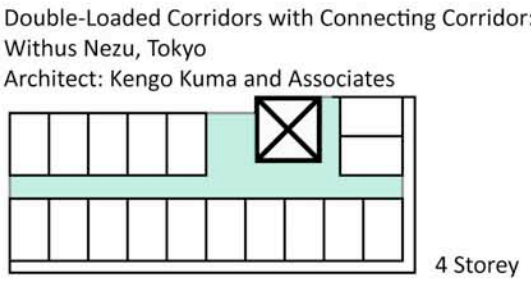


Figure 2.34 Elderly residences in Japan, case 3

- Essence of old wooden house in the Meji Era
- Exterior view is not dominant from corridor
- Shared balcony connecting all private units together to create the sense of community, promoting interactions between neighbors.

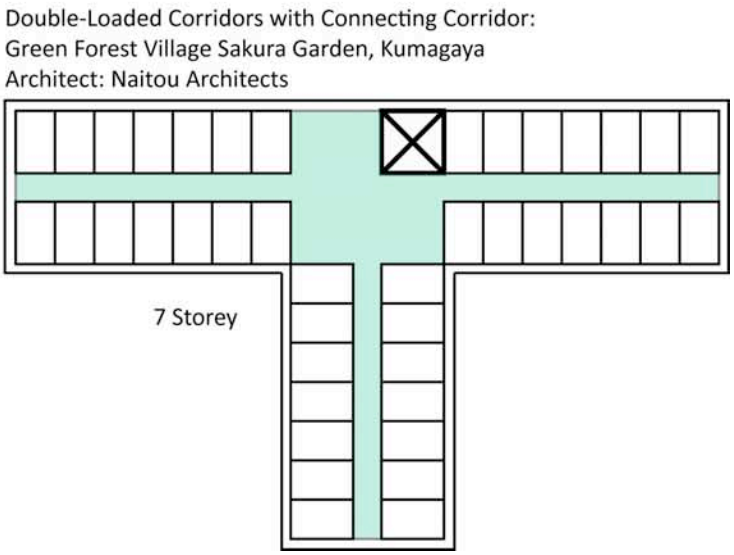


Figure 2.35 Elderly residences in Japan, case 4

Though view to exterior cannot be seen from the corridor, shared balcony promotes exterior view from inside the private dwelling. Shared balcony connecting all private units together

Residences for the elderly have focused on designing for enriching the residents' lives; whether to emphasize on outdoor features or spaces for activities and interactions.

2.3.6 Design for Intergenerational Family: U – House by Openbox Architect

The residence was designed for a large, intergenerational family with various preferences, and requirements. Similarly to the thesis topic, the concept was to create a 'home' where different family members can live happily together, while maintaining appropriate, and well-balanced interaction and privacy. The family members are located at different areas of the house, but are still connected.

The residence design follows the tropical guidelines. The public area, such as the pool and lawn are raised and placed in the center, surrounded by the residence. This creates a U-shaped building. This arrangements follows the traditional design of 'Ruen Thai.'

The family members' individual quarters are located at different areas of the house. Access to each individual quarter is designed to enhance the level of privacy. This is achieved by inserting staircases at different areas of the house; allowing family members their own private access. Changes in levels can also enhance privacy. Individual quarters located adjacent to each other are separated by elevating one quarter higher, and reconnecting them at the shared living area. Small living areas, corridor, or other semi-private shared functioning space are placed between individual quarters; as buffer zones to enhance the level of privacy. A bedroom is provided on the first floor for the convenience of the elderly family member.

Small living areas are provided frequently around the house; either as a private living area within the individual quarter, or as the main living area for the floor. This offers the family members the choices of 'where,' and 'with who' to spend their time. With this, family conflicts or unwanted encounters can be avoided.

Though separated, family members can be connected at the main living and dining area on the ground floor. The main living and dining area acts as the shared space of the whole residence, while small living areas on each floors acts as the shared space of the floor. Not only the living areas that connects the family members, but also along the corridors and terraces. According to Chermayeff and Alexander, corridors and terraces are used as the 'buffer zone.' However, these spaces are also used as connection halls. The connection hall allows interaction between family members as the

space have to be used daily. There are various staircases in the connection hall, which allows family members to walk straight up to their quarters in the shortest distance for convenience and privacy.

The design of the U-house is suitable for a large intergenerational family. Family members are able to maintain their privacy, and separation from others. Privacy of individual quarters is enhanced by private access, and appropriate distant between rooms. Distance could be translated in plan, or in elevation. Interaction between the family members is controlled, by applying the levels of interactions. From the more private living area located as pockets around the house, to the main living area on the ground floor. Interactions is also allowed in the connection hall, where family members have to meet daily as they walk up to their quarters.

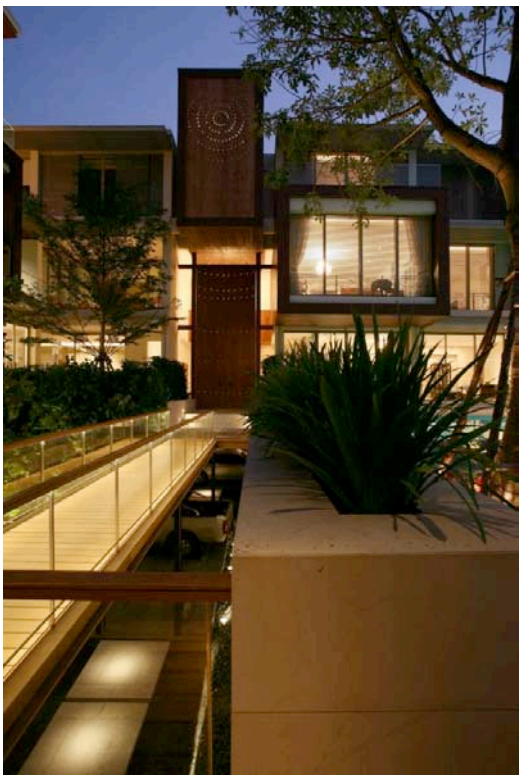


Figure 2.36 Entrance of U-House

Figure 2.37 Connection hall

Figure 2.38 Planning of U-House by Openbox Architect

CHAPTER III

DESIGN METHOD AND ANALYSIS

3.1. Design Criteria

To design dwelling units for the elderly and their intergenerational families; considering the generations of elderly parents, adults, and their children. This building type will not only target the senior citizens, but also the adults by providing privacy and the convenience of transportation and amenities. The complex will be an exclusive low-rise condominium that will provide a safe community for the residences.

Community

The condominium will provide public areas, which will not only be used by the residents, but also for the surrounding neighborhood. As the new neighborhood facility, elderly residents will have more chance and be encouraged to interact with new familiar faces.

Elderly Friendly

The condominium will be designed to accommodate elderly's physicality. Safety equipment will be installed, and dimensions will be catered to the elderly. Clinic will be provided for any medical attention of nursing to. Other convenience and amenities provided are such as; convenient store, laundry, barber/beauty salon, café, fitness and pool, reading room, game room, and Internet corner.

Terraces will be provided in various areas in the condominium to encourage elderly restrained within the floor to interact with neighboring units. Elderly may be restrained within the floor of their unit, as they feel uncomfortable to take the elevator, or the perception of distant to facility floor might seem too far. The terraces will not only serve as common areas for elderly, but also to promote natural ventilation through the building. Double height ceiling will allow more sunlight into the hallway and the perception of being outdoors.

The presence of gardens and green terraces are life-enriching factors, according to Lawton's design guidelines. It will create a recreational space for the elderly and

other residents to socialize and participate in activities. Green landscape plays a large role in the daily lives of many elderly. Aesthetical values will also be added to the residential.

Family

As a condominium that will serve intergenerational families, facilities and living units will be designed to achieve a healthy relationship between the family members. Conceptually, living units will be large in order to accommodate both the adult children's family and the elderly parents. An appropriate size unit will provide each individuals with a their own domain, a solution to the lack of privacy of intergenerational families. With the sense of privacy increase, the potential of conflicts within intergenerational families will be reduced. The family members will be able to meet in the shared functioning space such as the dining area and living room.

Convenience

The selected site will provide the conveniences of transportation for the condominium. Location proximate to the Bangkok sky train is most preferable, most beneficial to the residents. Surrounding amenities such as schools and places of worship should be at proximate distance. This will also enhance the sense of community of the project.

Project Owner

As Bangkok population is ageing, developers should consider new customers of age 50 and above as recommended by Colliers Internationals. The proposed design is predicted to have more characteristics of single-family house rather than urban condominiums. Pruksa have marketed on not only condominiums, but also on single and townhome family units, focusing on a healthy living environment. They have also provided many large and duplexed units within their project, such as Condolette Dwell that have sold out all their duplex units. Therefore, Pruksa is a suitable candidate to own an apartment type residence for intergenerational households for its family-orientated market.

3.1.1. Scenarios for Design

In order to design an elderly – friendly condominium for intergenerational families, scenarios were created based on common situations in intergenerational households.

Scenario 1: Elderly Babysitters

Elderly parents coreside with their adult children's family. The family has two young children of which elderly parents babysit while the adult child and spouse goes out to work. The elderly parents have to pick up their grandchildren from a nearby elementary school and babysit them in the afternoon until their parents return home.

Scenario 2: Unattended Elderly

The elderly parent lives with her adult child and spouse, and their child. During the day, the adult child family all goes out to work, leaving the elderly unattended at home. The elderly refuses to get a caregiver as she can manage herself around the house and is capable of doing daily activities independently.

Scenario 3: Tension Between the Elderly and the In-laws

There are tension between the elderly parent and the in law. Due to the tension between the family members, the elderly and the in law prefer to meet only occasionally during meals. Though the presented conflicts, proximity of residency is still preferred as adult child can easily care for the elderly parent, and elderly parent can ask for help when needed.

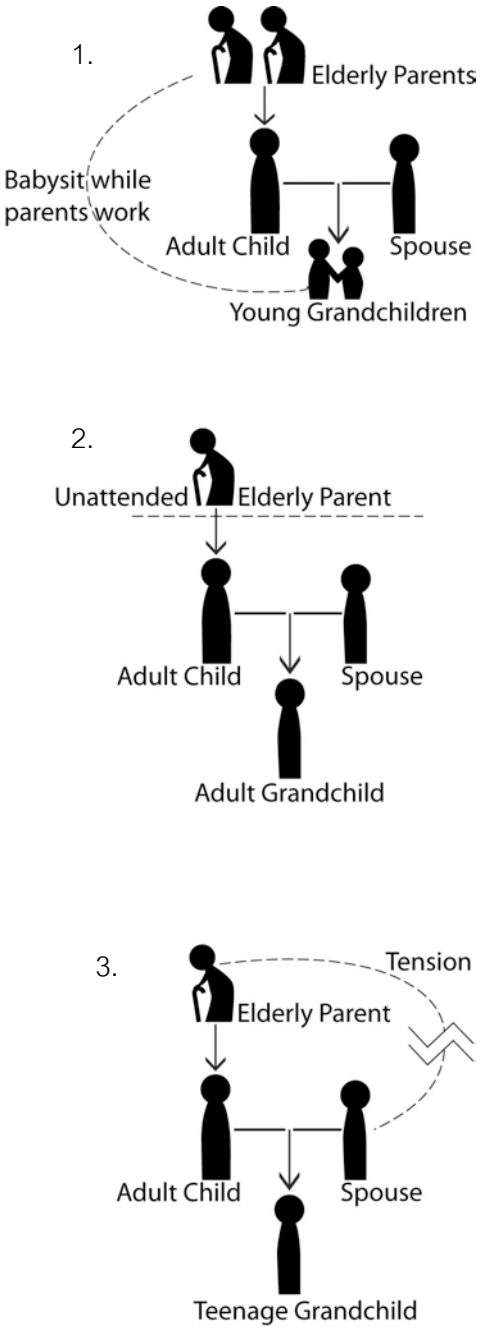


Figure 3.1 Scenarios for design

3.2. Selected Site

The project proposes an elderly – friendly condominium for the elderly and the adult children's family to co-reside. It will be an age – integrated environment, promoting an intergenerational living arrangement in Bangkok. Criteria for selection of site reflect the two main aspects: the physical and the psychological, which are as follows;

Physical Aspects

The site should provide a convenient mode of transportation for the younger generation, preferably by Subway or Sky train (MRT or BTS). Proximity to amenities will benefit elderly residents, as elderly tend to travel in consideration to their limited mobility.

Land price determines the price of units for sale. It is logical for the site selected to be in the "medium and low density residential" areas. The further it is located to the city center or the riverfront, the lower the price.

Psychological Aspects

Neighborhood areas that portray residential characteristics may attract the older age group. "Medium density residential" areas are most appropriate. "High density residential" areas may leave elderly feeling restless. Entertainment venues or services leading to noise and sound pollution should be avoided.

Towards the selection of site, areas proximate to the mass transportation systems are considered. According to figure 3.2, the path of both the BTS and MRT are highlighted. The medium density residential (shaded in orange) along the transportation is favored as the study aims toward designing an elderly – friendly condominium for intergenerational families.

Regarding comparisons of land prices listed in the Bangkok market, the medium density residential area on the southern rim of Bangkok is most affordable (source: thaihomelist.com). With this the site can be selected. Bearing BTS Station is located at the rims of Bangkok. Sukhumvit 105 and Sukhumvit 107 are located below the BTS Stations. These areas show high potential as many prestigious schools such as St.

Andrews International School and Bangkok Patana Internaitonal School; medical centers; and sport complexes are located nearby. Both are residential areas, however, Sukhumvit 105 can be more chaotic from the various activities in the streets. Sukhumvit 107 is more preferable.

The selected site is located in Sukhumvit 107, on the Bearing Street, and 1km from the Bearing BTS station. It is located in the R.6-45 Medium Density Residential, with a FAR of 1:4.5, and an OSR of not less than 6.5%. The site itself will provide residents with the conveniences of transportation as the street is connected to main roads such as the Sukhumvit, Bang Na Trad, Srinakarin, and Laselle Street. Motorcycle taxi stand located just opposite of the site will be very convenient. Schools, places of worship, convenient stores, medical facilities, restaurants, and supermarket are some amenities surrounding the selected site.

Amenities

Schools: St. Joseph Bangna School, St. Andrews International School, Bangkok Pattana School, Songvitaya School, Baan Nu Elementary School, Primjutha Suksa School, Patsawee Nursery, Dr. Kitima Kindergarten, and Western University Sam Rong Center.
Medical Facilities: Samitivej Clinic, Local Clinic on Bearing road, Manarom hospital, Lasan Medical Clinic, and Kluaynum Thai Hospital.
Sport Facilities: Hatsadin Driving Range, Phut Ana Stadium, Ratchanawi Bang Na Shooting Range, Ratchanawi Sports Complex, and Badminton Court.
Religious Places: Jesus Christ Church, Darnnasireen Mosque, and Wat Bang Na Nai.
Food: Food stalls available along Bearing and Lasalle road; restaurants open both daytime and nighttime along road connecting Bearing and Lasalle.
Market: Big C and Lotus Express, along with many more roadside market areas
Samrong Market: Transportation hub (buses, vans, and motorcyclist taxis), sells edible goods and other products.

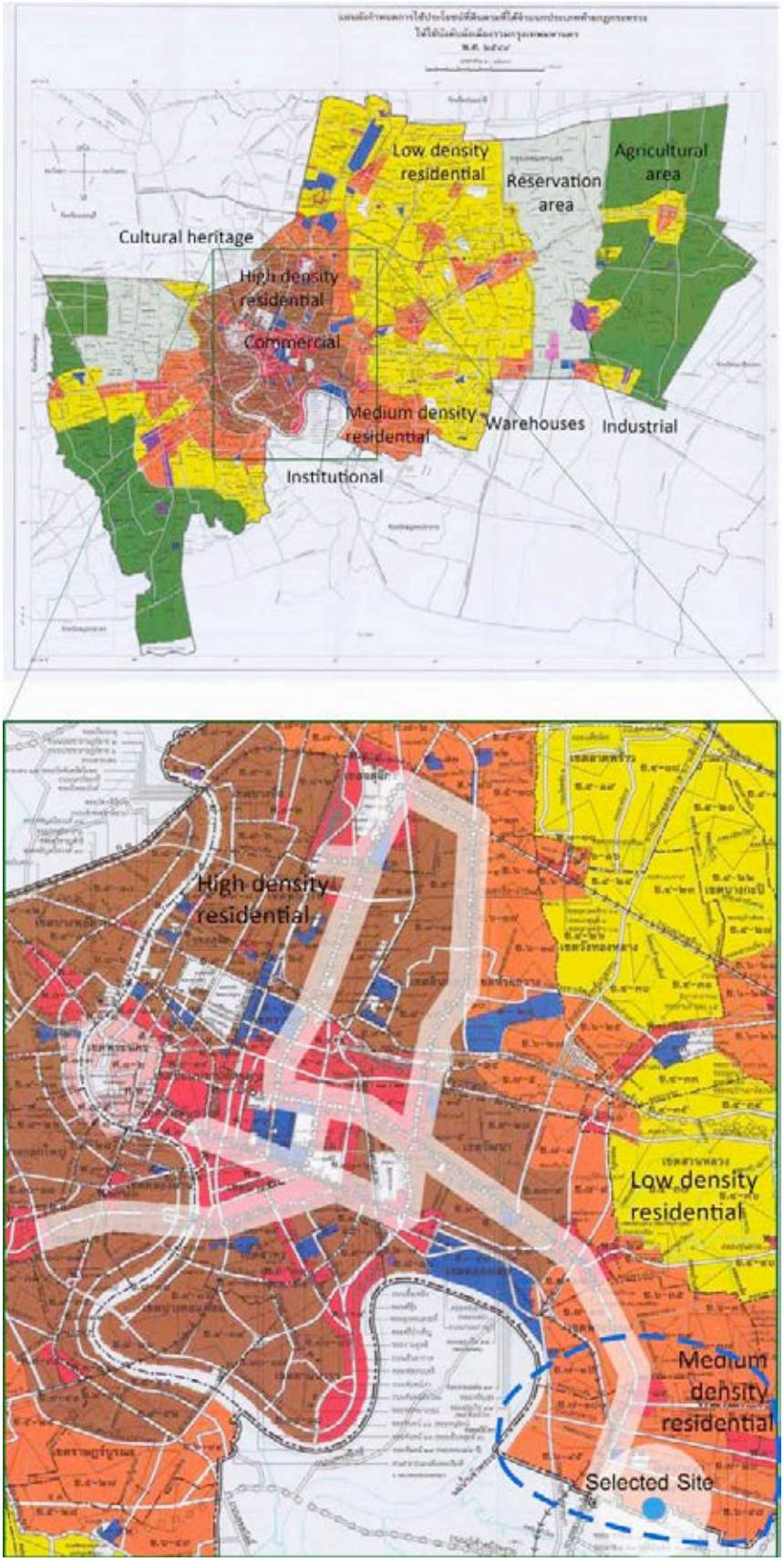


Figure 3.2 Selected site

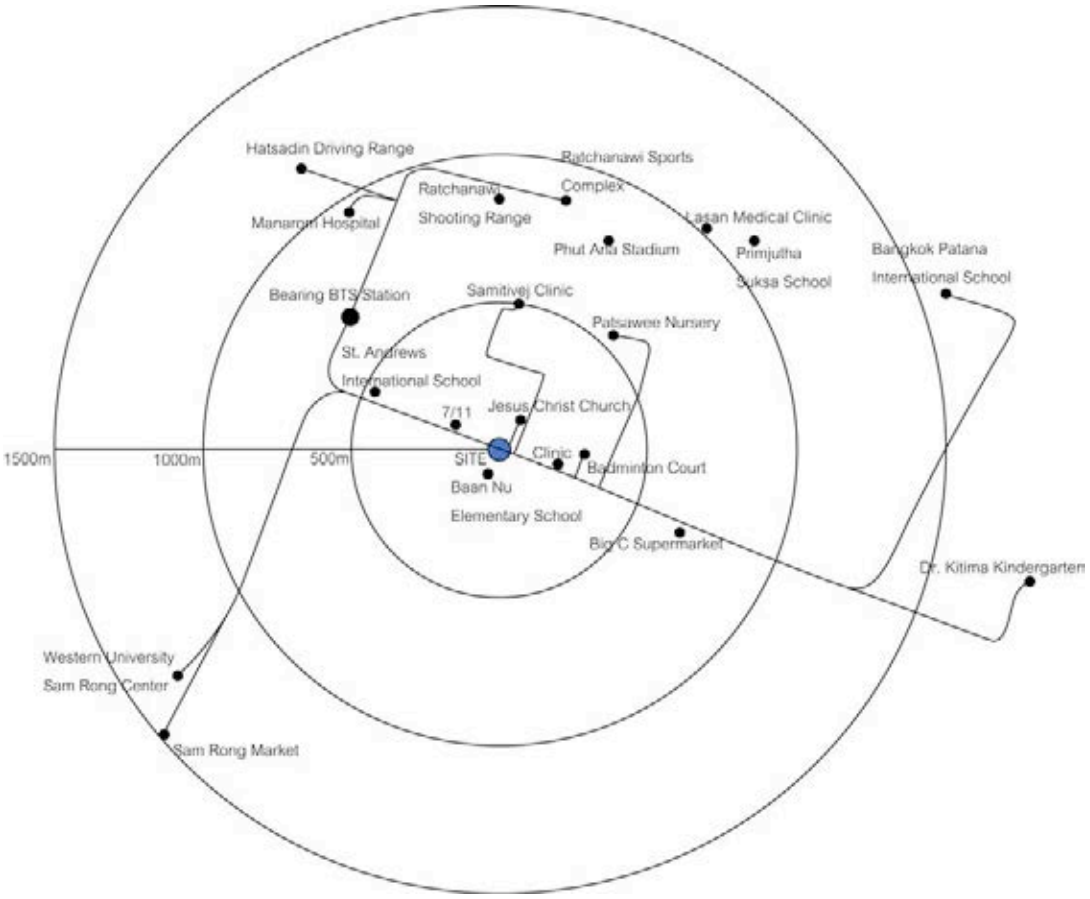


Figure 3.3 Amenities surrounding the site

Facilities and services favored to be within 1.6 km by the elderly are; grocery stores, bus stops, house of worship, drug store, clinic or hospital, bank, library, news-cigar store, and restaurants. Such facilities and services are provided in proxemics distant to the site.

Figure 3.4 Site surrounding

3.3. Design Concept

Gardening is one of the elderly favorite activities as mentioned by many caregivers and the elderly themselves. They enjoy spending time outdoors, however, some outdoors environment were not modified to facilitate elderly physicality. By facilitating the outdoor areas, elderly can function safely in their daily lives. The condominium represents a safe haven. Appropriately designed public areas for the elderly and their lifestyles will discourage them from remaining within their living quarters. The presences of green landscapes are life-enriching factors, according to Lawton's guidelines. This includes recreational factions, aesthetical values, and encourages social activities. The design revolves around the concept of a homely "garden."

The project hosts as a garden for the elderly in the condominium, and the community. Activity space for the community to encourage interactions between the elderly and the younger generation is provided. This is possible by the location of the elementary school and St. Andrews international school, proximate to the site. Elderly grandparents are able to send off and pick young grandchildren from schools. Seeing interaction between others is also as effective, to avoid the feeling of seclusion from the society.

Figure 3.5 Conceptual diagram of project

Elderly – Friendly Condominium Design for Intergenerational Families

The project provides alternatives for intergenerational living with elderly coresidents either as; coresiding as neighbors or coresiding within the same unit. Alternatives were given to accommodate the different lifestyles and preferences of the elderly in intergenerational households.

1. Coresiding as Neighbors

Elderly and their adult children's family can live separately as neighbors; living within the same residence but on different floors. Elderly who decides to live as neighbors will reside on the elderly floor. This may answer to scenario 2 and 3 according to section 3.1.1 on Scenarios for Design. Elderly, who are left unattended during the daytime as their adult family goes out to work, can reside on the elderly floor. Elderly will be provided with services and care, and will also give them the chance to interact with other elderly during the day. Elderly who are involved in family tension can also reside on this floor. The elderly and their family can meet occasionally in public areas and meal times.

2. Coresiding in Intergenerational Household

Rooms provided for intergenerational families with elderly coresidents will be large. The room will be divided into: elderly quarter, service quarter, shared space, and adult family quarter. The elderly and the adult family will have separated entry to their private areas. They can enjoy each other's company in the provided shared space for dining and leisure. This will provide family members with a high level of privacy. Although the high level of privacy, benefits of intergenerational household is still provided. Elderly can babysit the young toddlers in the shared space during the day as adult parents go to work. Through separated, the family members are still connected through the shared space. The shared space is provided for family activities and interactions when they choose to.

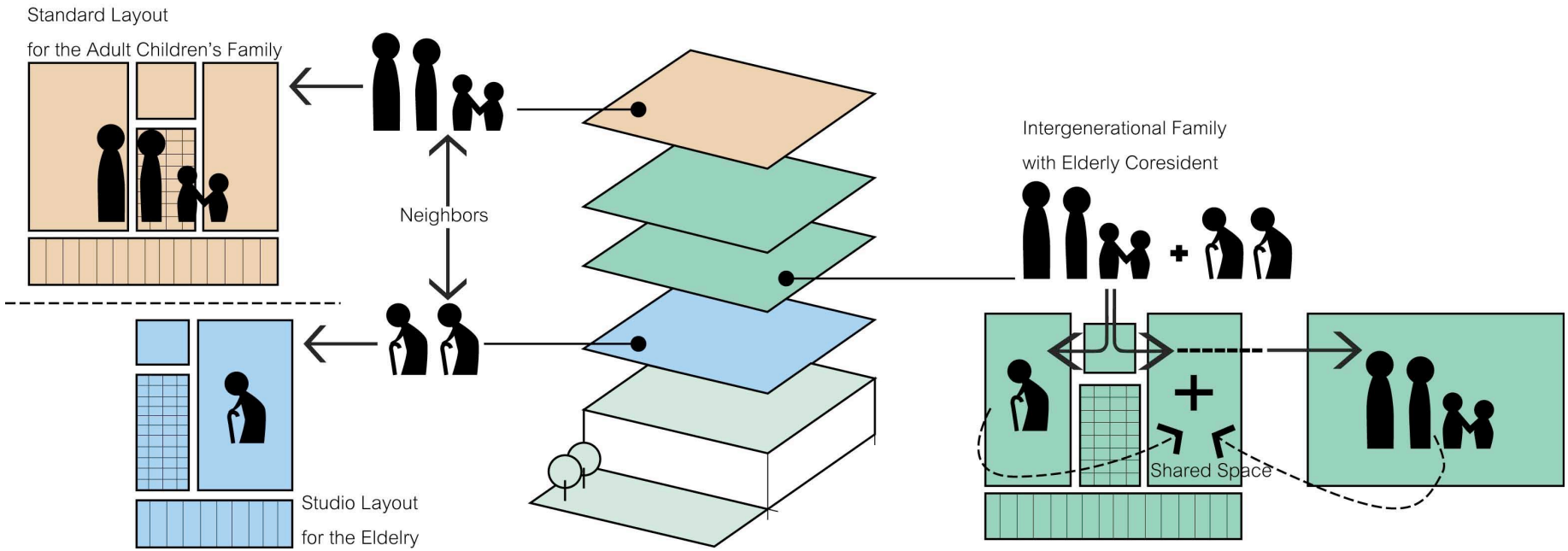


Figure 3.6 Conceptual diagram of residential units

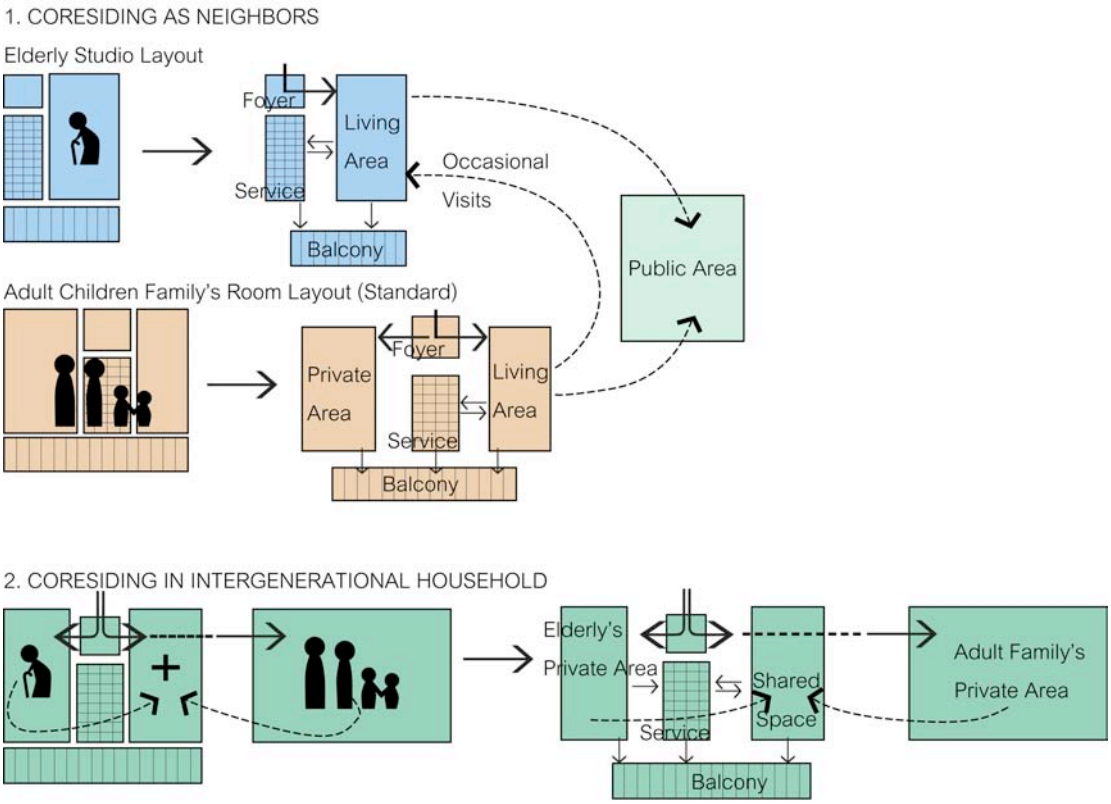


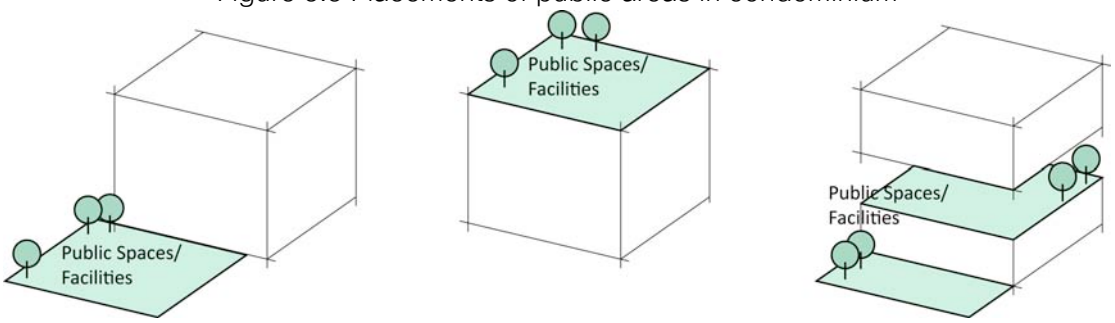
Figure 3.7 Conceptual diagram of living units for co-residence

3.4. Layout of Public Spaces/Facilities

Locating the public spaces and facility areas on the ground floor will increase the accessibility for residents; however, privacy is needed for pool and some recreational areas. Public spaces and facility areas such as roof gardens are not appropriate for residences with elderly. Many elderly are not accustomed to highly elevated grounds. Some elderly residents may not feel comfortable to join others, and will remain in their unit.

The solution is to place public areas on the ground floor, and the more private facilities a few floors up. Having the public areas on the ground floor will attract people from nearby communities. Elderly residents will have the advantages of interacting with other community members and socializing. The more private facilities will be open to the public use, with security by membership. Residents will feel more private at this level, which is elevated from the street view and the views from adjacent homes. The upper facility level includes swimming pool, terraces, gym, reading area, café, Internet access, and gaming area.

Figure 3.8 Placements of public areas in condominium



a. Public Level b. Roof Top c. Upper Level

3.5. Zoning

The private residences are located above all public areas for the privacy of the residents as seen in figure 3.9. This is also for security purposes, as public circulation can be easily controlled. The private residential is also divided into 3 mains zones: adult families, intergenerational families, and elderly according to figure 3.10. The 1-2 bedrooms catered to the elderly are located on the lower floor. This encourages the elderly to interact and participate in social activities in the public area located below, enhanced through to perceived short distance to public spaces. It is also an advantage to the elderly during fire emergencies, where flight of stairs to ground is much shorter on the lower floors. Adult families are located on the upper levels in 2-3 bedrooms units, as neighbors to the elderly. Intergenerational living units, which are duplexes with 3-4, are located in the midlevels due to safety issues of the elderly during fire emergencies. The condominium provides alternatives for elderly who coresides with their children; either to live together in an intergenerational living arrangement, or separately as neighbors.

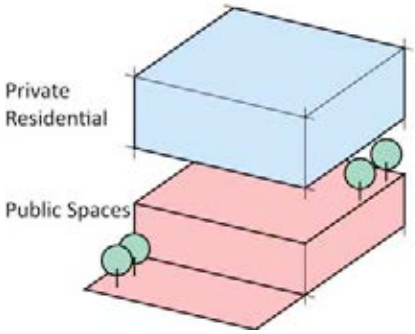


Figure 3.9 Public to private zoning

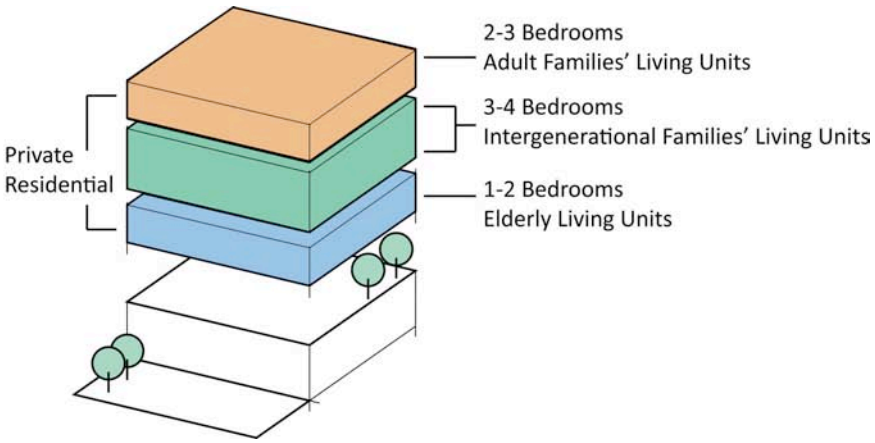


Figure 3.10 Residential zoning

3.6. Building and Unit Placements

The site is a rectangular plot at the corner where a small street intersects the main. Surrounded by double story houses and apartments, the site is located within the residential area of Bearing. Considering 6m setbacks from site boundary and setback from street front, the condominium is erected while maximizing the buildable area as seen in figure 3.11. As elderly tend to stay indoors, views and activities are directed to the outdoor terraces and exterior according to figure 3.12.

Usually, units may be aligned along both sides of the corridor to maximize sellable area according to figure 3.13. By removing some units, natural ventilation is allowed through the floor. Voids created to allow natural ventilation are also used as the floor's common areas. Elderly can use these common areas daily if going to public areas on lower floor is not preferred. As some units are duplexes, common areas and corridor areas have the privilege of double height ceilings. With double height ceiling and a ventilated corridor, it is possible to design rooms to have at least 2 sides of opening. This allows the floor and rooms to be fully ventilated.

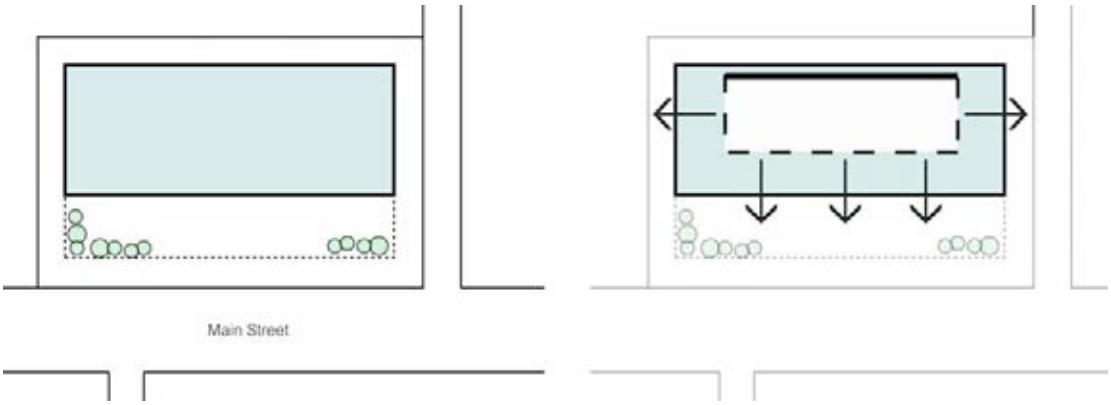


Figure 3.11 Building location on site

Figure 3.12 Directed views from building

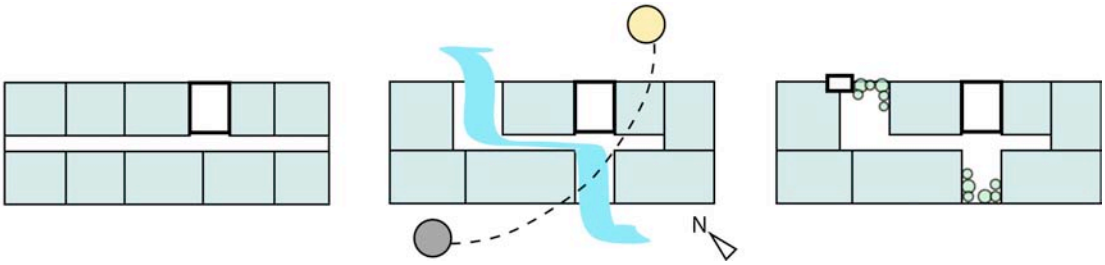


Figure 3.13 Maximized plan

Figure 3.14 Naturally ventilated

Figure 3.15 Common areas

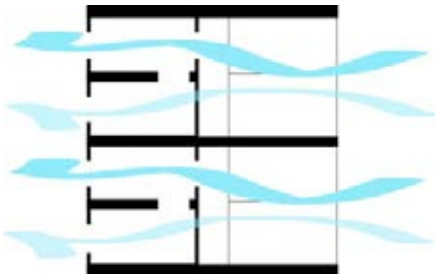


Figure 3.16 Naturally ventilated units

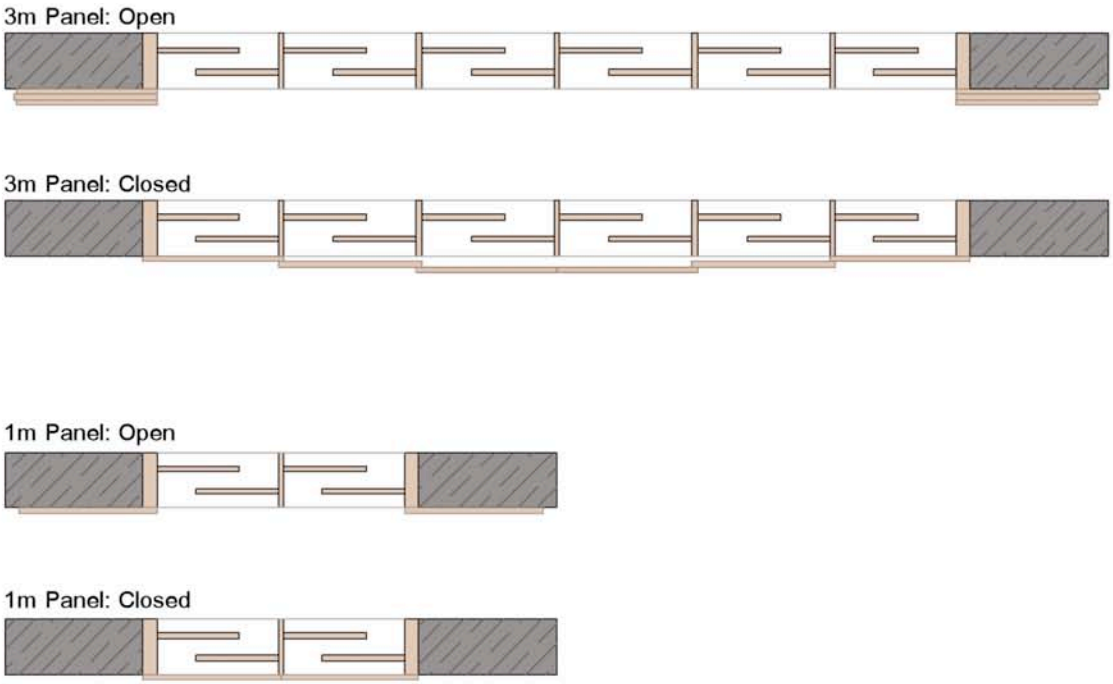


Figure 3.17 Ventilated walls keep units ventilated

VENTILATED WALLS

Ventilated wall panels allow living units to be ventilated, by ventilating wind captured in the corridor into interior living units. Blinds on wall panels allow ventilation while blocking views from corridor. When natural ventilation is not needed, occupants can close all blinds.

3.7. Layouts of Intergenerational Residences

Revised from above study

Separated in plan, with private entry: Individual quarters have private entries to enhance privacy. Encounters with family members can be avoided. Interactions between the family members are allowed in the shared space such as the living room and dining area. This layout provides a clear separation between the elderly and adult children's family living quarters, only meet when wanted. This type of setting can be seen in detached residential (see chapter 2.3.4. Intergenerational Residences, under Case Studies) where entry to private homes are through garage or the front yard. The planting areas have seem to favored many elderly parents as their leisure area. Many wishes for more concentration on the outdoors when modifying homes for the elderly.

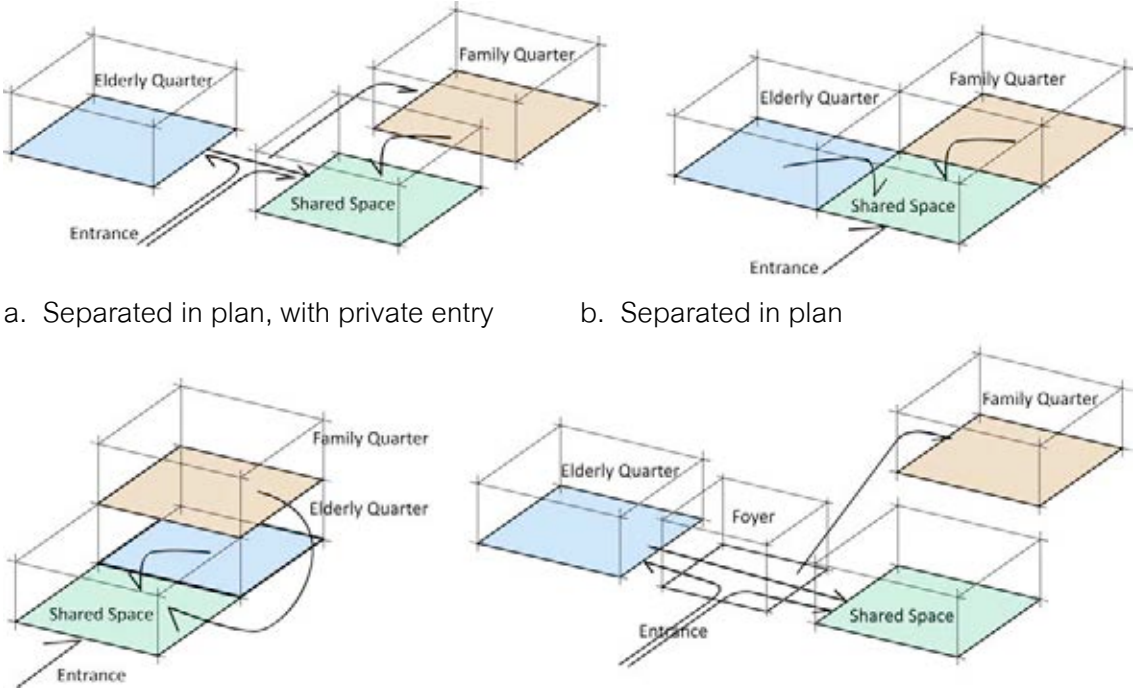
Separated in plan: Due to limitations in space, entry to individual spaces may be through the shared space such as the living room. Encounters with family members may be unavoidable. This can commonly be found in condominium layout where space is limited.

Separated in elevation: Depending on the availability of space, individual may or may not have private entry to their quarters. Stairs to upper level may be in the shared space. With the declining physical capabilities, elderly quarter remains on the lower floor, which is usually on the same level as the shared space.

Solution

Space per floor in condominiums are limited, therefore, to extend the living space to accommodate intergenerational families, duplexes are introduced. Elderly quarter remains on the lower level, where it is also the level of entry and shared space, to provide as much comfort and safety according to the declining physicality. As the family members enter the unit, they enter a foyer, which gives access to either the shared space and the private quarters. Unwanted encounters between the family members can then be avoided to enhance the level of privacy. Interactions are allowed in the shared space.

Figure 3.18 Layouts of intergenerational residential



a. Separated in plan, with private entry

b. Separated in plan

c. Separated in elevation.

c. Solution to condominium unit layout

3.8. Elderly Friendly

Private units also follow the recommendations for safety of handicaps and elderly as stated by the Thai law and regulations. This encourages elderly's independence in daily activities. Attention to details such as keeping floors of bathrooms and public areas dry, step height, seating height, and slope of ramp are given. However, facilities installed for the use of elderly and handicaps are discreet in appearance, and does not reflect institutional environment.

Balcony spaces of the private dwelling units are maximized to encourage homebound elderly to spend time outdoors. The maximized balcony spaces, of up to 3m deep, can be used for recreational activities such as small gardening projects. The 3m setbacks also shade the dwelling unit from direct sun, as well as protecting the elderly from glare with the use of appropriate materials.

CHAPTER IV

FINAL DESIGN

4.1 Program and Design

This section reveals the final design of the elderly-friendly condominium for intergenerational families in Bangkok.

Table 4.1 Site and construction details

Selected Site		
Address	Bearing soi 3 (Lasalle 8, Yaek 4)	
Land Size	4675	sq.m.
Land Price	11250	b/sq.m.
Total Land Price	52,593,750	baht
OSR	6.50%	
FAR	4.5	
Buildable Area	21037.5	sq.m.
Construction price (x15000)	315,562,500	baht
Total	368,156,250	baht

Table 4.2 Programming

	Unit Size (sq.m.)	Quan.	Total Size (sq.m.)
RESIDENTIAL UNIT			
ELDERLY LEVEL			
(Studio-2 bedrooms)			4380
DUPLEX LEVEL			
(3-4 bedrooms)			3543
STANDARD			
(2-3 bedrooms)			4770
Circulation (20%)			
Total			12693

Table 4.2 Programming (Continued)

COMMERCIAL			
Minimart	160	1	160
Shops and Retails	35	7	245
Circulation (20%)			20
Total			120
ADMINISTRATIVES			
Office	70	1	70
Circulation (20%)			14
Total			14
VESTIBULE			
Lobby	100	1	100
Post and Mailbox	10	1	10
Bathroom	35	2	70
Circulation (20%)			36
Total			216
FACILITIES			
Fitness + Locker	360	1	360
Pool	450	1	450
Nurse Room	50	1	50
Reading Room	80	1	80
Restaurant + Kitchen	240	1	240
Internet Corner	40	1	40
Café	40	1	40
Laundry Service	40	1	40
Circulation (20%)			260
Total			1560

Table 4.2 Programming (Continued)

SERVICE AND MECHANICS			
Housekeeping Storage	6	8	48
Loading Area	20	1	20
Storage	70	1	70
Staff Room	70	1	70
Garbage Disposal Room	55	1	55
Generator	50	1	50
Pump Room	50	1	50
M/E	50	1	50
Pool Mechanical	150	1	150
Circulation (20%)			112.6
Total			675.6
Residential Parking		45	2200
Outdoor Guess Parking		11	
Outdoor Staff Parking		9	
Total			2200
GRAND TOTAL			20785.6

Table 4.3 Sellable areas: residential

Residential Unit	Sellable Area (sq.m.)	Quan.	Sales Price (50000 B/sq.m.)	Total (Baht)
4th-5th FLOOR (Elderly level)				
STUDIO TYPE	100	24	800,000	19,200,000
2 BEDROOMS	140	4	1,000,000	4,000,000
6th-7th FLOOR				
DUPLEX TYPE A1	600	2	30,000,000	60,000,000
DUPLEX TYPE A2	560	1	28,000,000	28,000,000
DUPLEX TYPE B	560	2	28,000,000	56,000,000
DUPLEX TYPE C	480	1	24,000,000	24,000,000
8th-10th FLOOR				
3 BEDROOM TYPE A	250	6	12,500,000	75,000,000
3 BEDROOM TYPE B	200	6	10,000,000	60,000,000
3 BEDROOM TYPE B2	200	3	10,000,000	30,000,000
2 BEDROOM TYPEC	120	3	6,000,000	18,000,000
		52		374,200,000

Table 4.4 Sellable area: commercial and facilities

Commercial&Facilities			Rent price (200 B/sq.m.)	Total (Baht)
Minimart	160	1	32,000	384,000
Shops and Retails	35	7	7,000	588,000
Restaurant + Kitchen	240	1	48,000	576,000
				1,548,000

Figure 4.1 Site plan

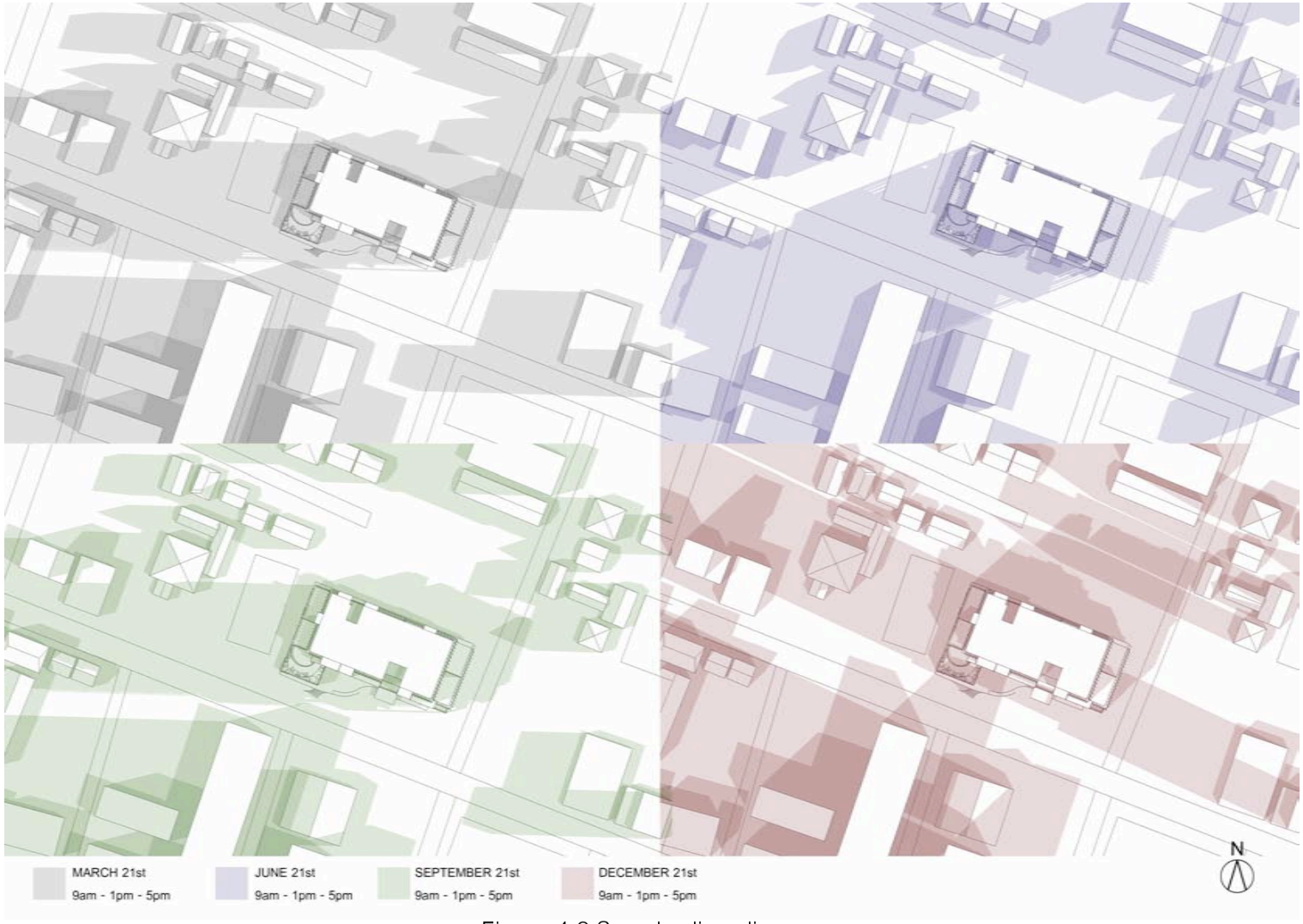


Figure 4.2 Sun shading diagram

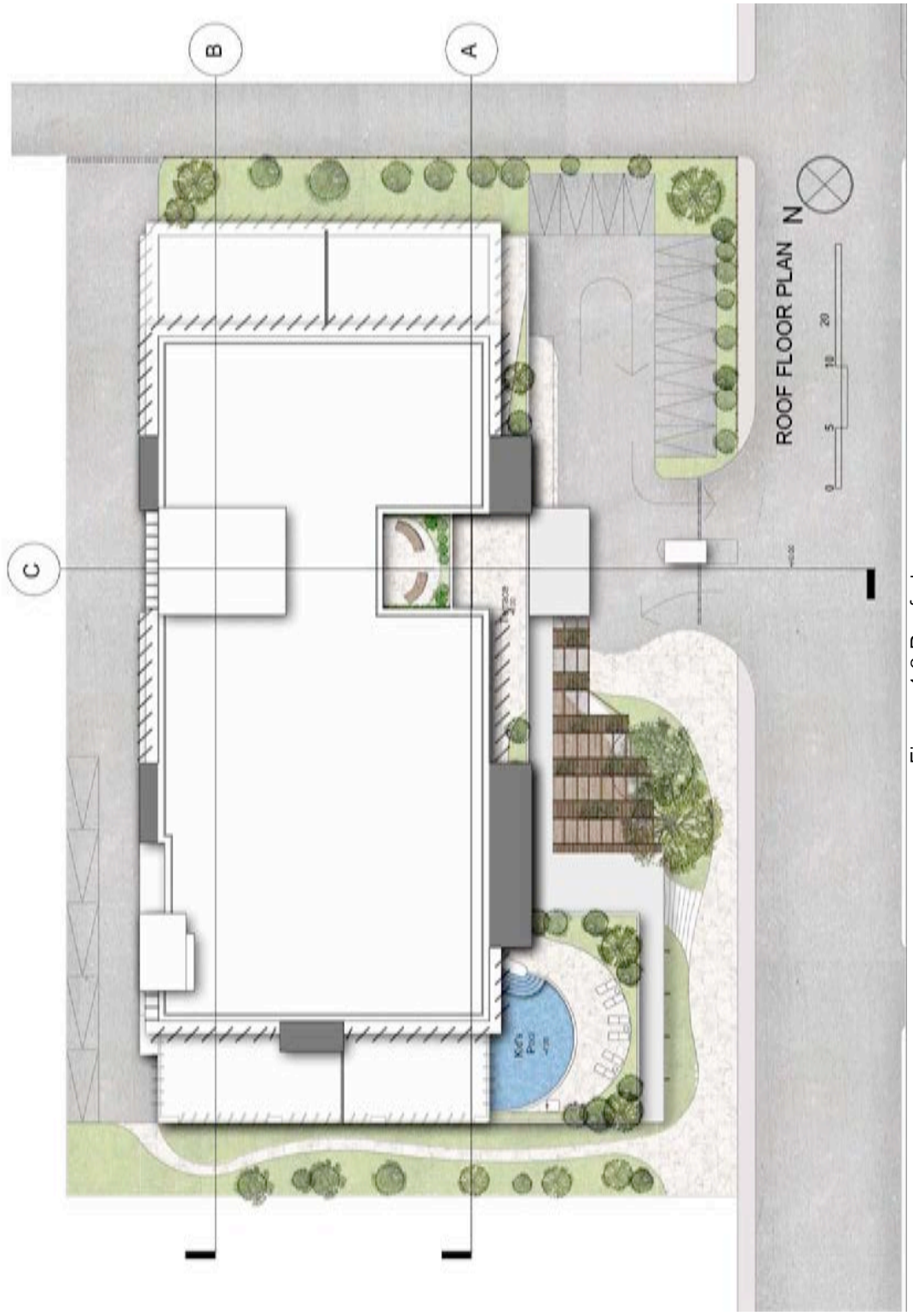


Figure 4.3 Roof plan

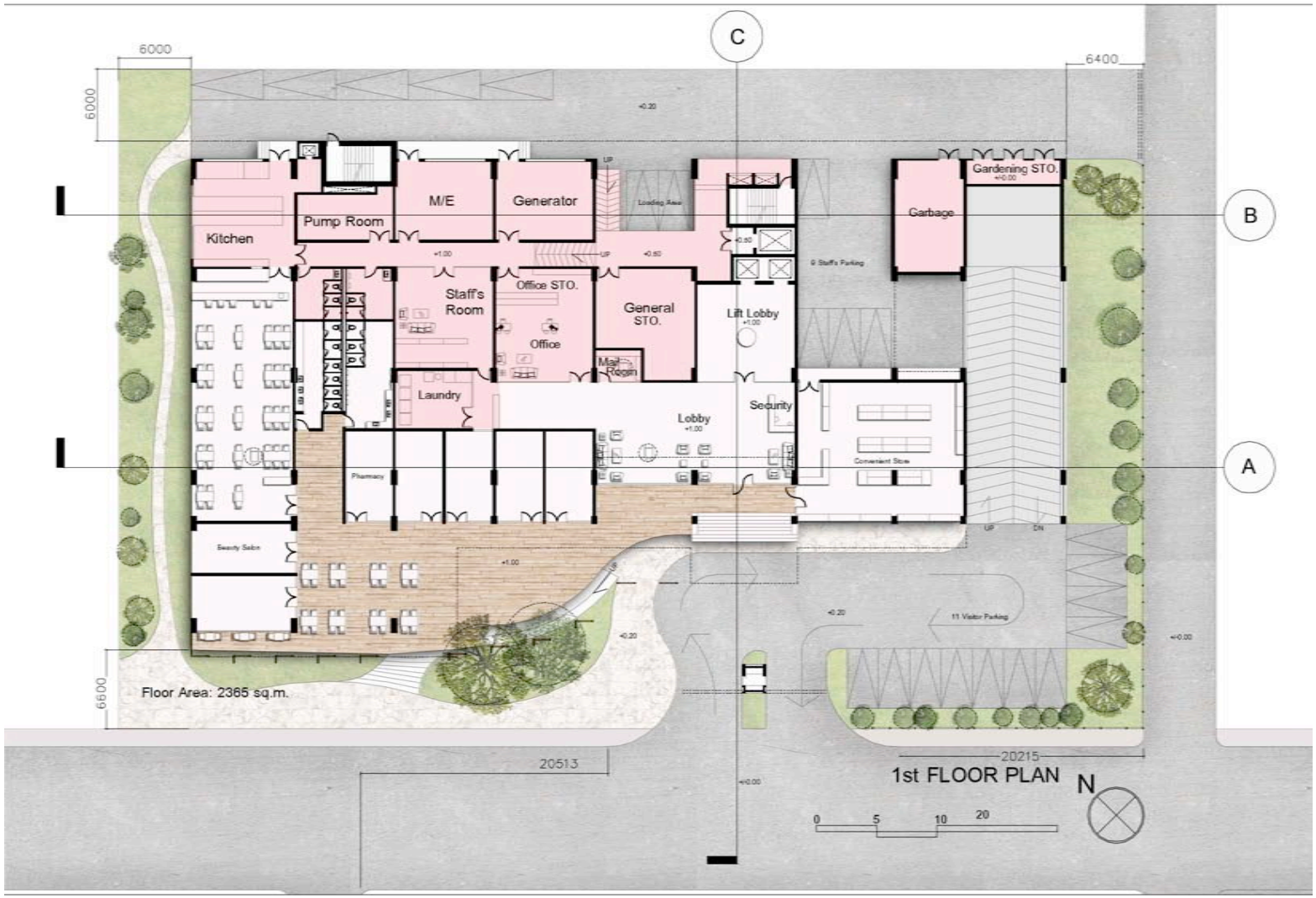


Figure 4.4 Ground floor plan

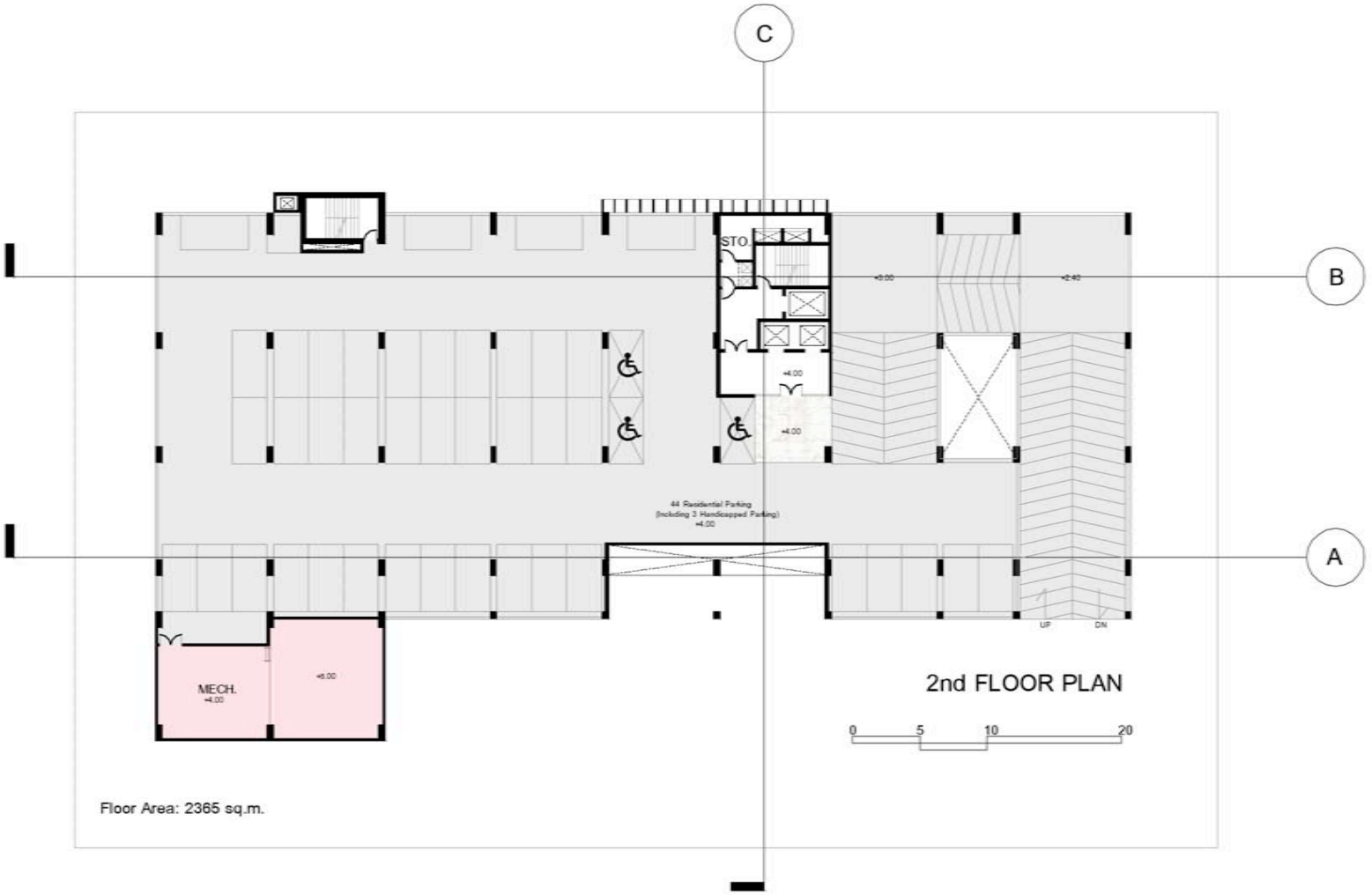


Figure 4.5 Second floor plan

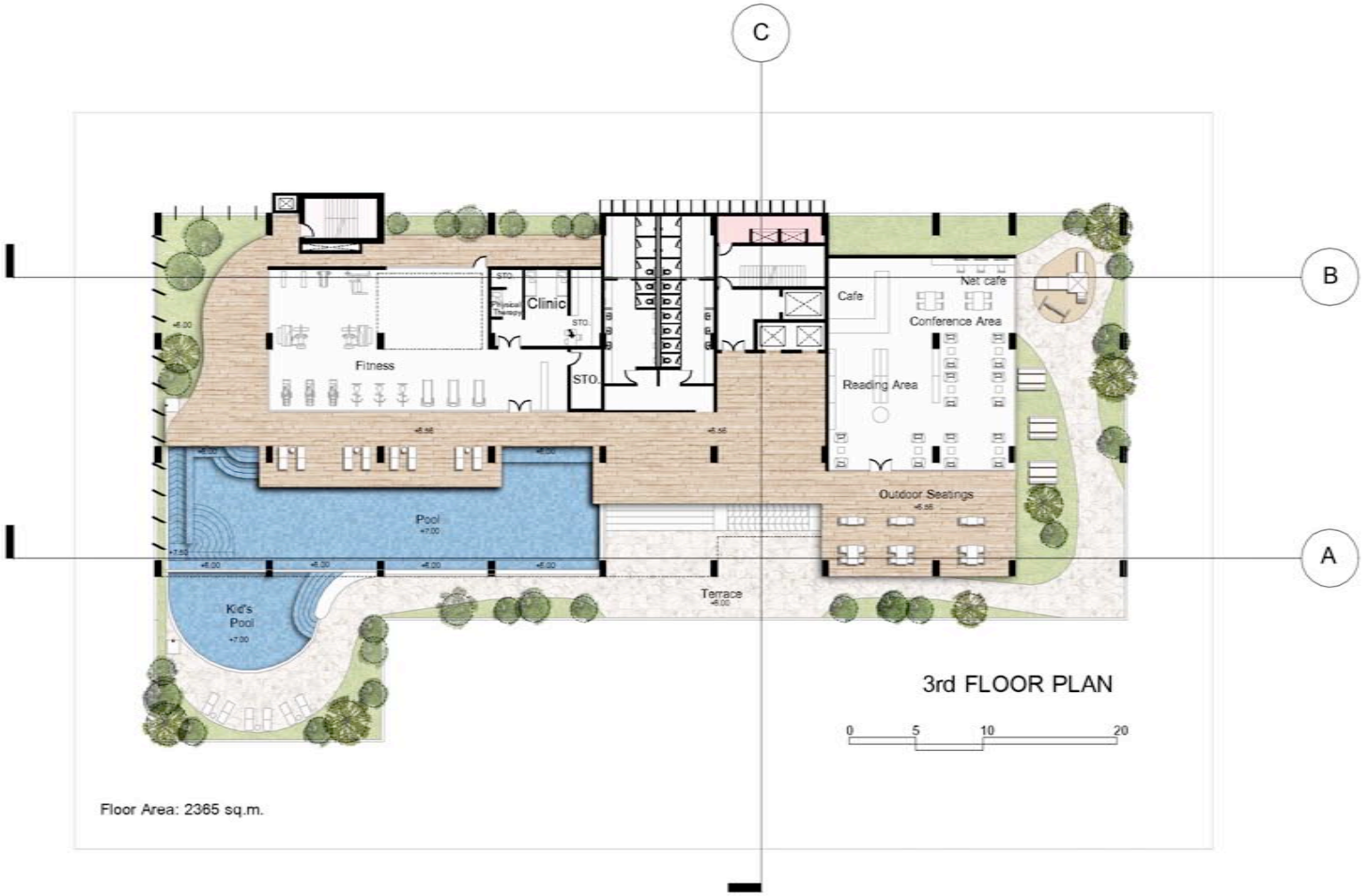


Figure 4.6 Third floor plan

Figure 4.7 Fourth floor plan

Figure 4.8 Fifth floor plan

Figure 4.9 Sixth floor plan

Figure 4.10 Seventh floor plan

Figure 4.11 Eighth floor plan

Figure 4.12 Ninth – tenth floor plan

Figure 4.13 Southwest elevation

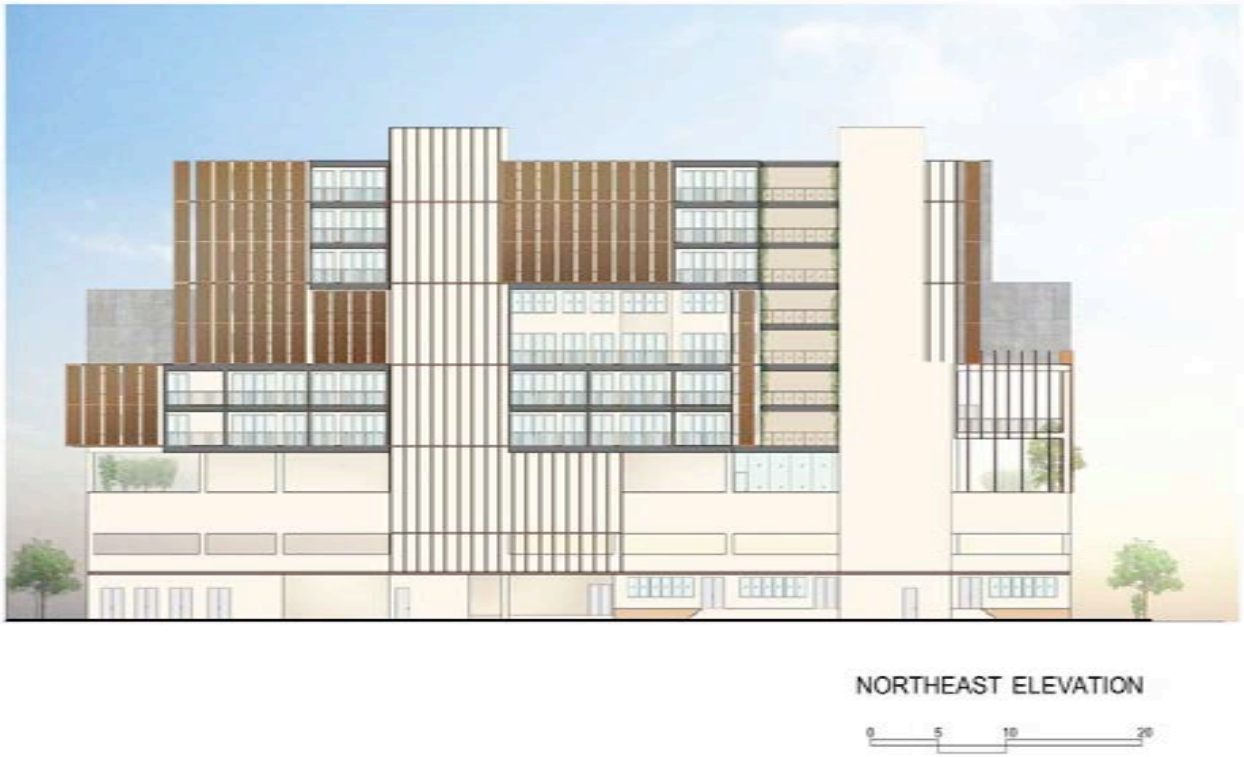


Figure 4.14 Northeast elevation

Figure 4.15 Southeast elevation

Figure 4.16 Northwest elevation

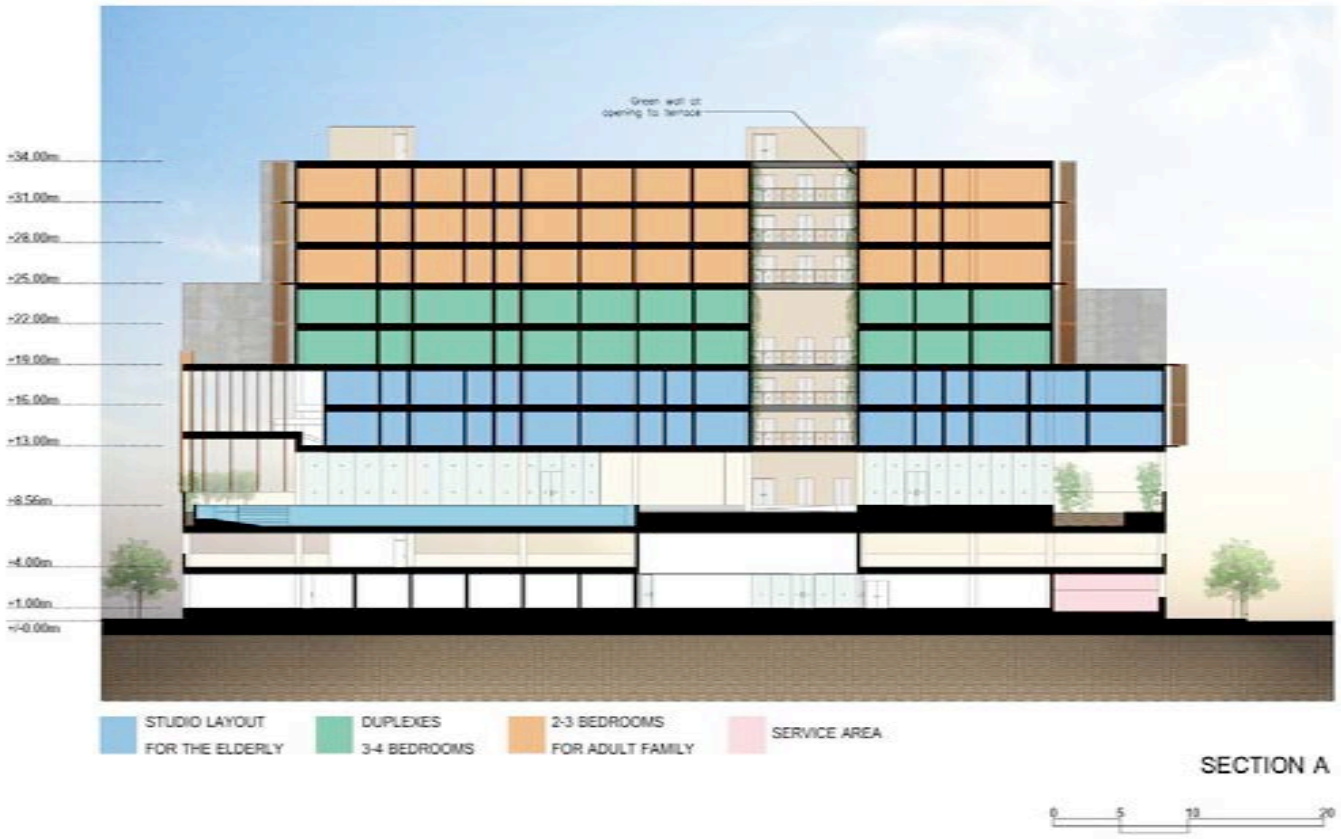


Figure 4.17 Section A

Figure 4.18 Section B

Fig. 4.19 Section C

Figure 4.20 View of project from surrounding plot

Figure 4.21 Entrance to condominium

Figure 4.22 Lobby and condominium entrance

Figure 4.23 Fitness and pool on facility floor

Figure 4.24 Outdoors seating area on facility floor

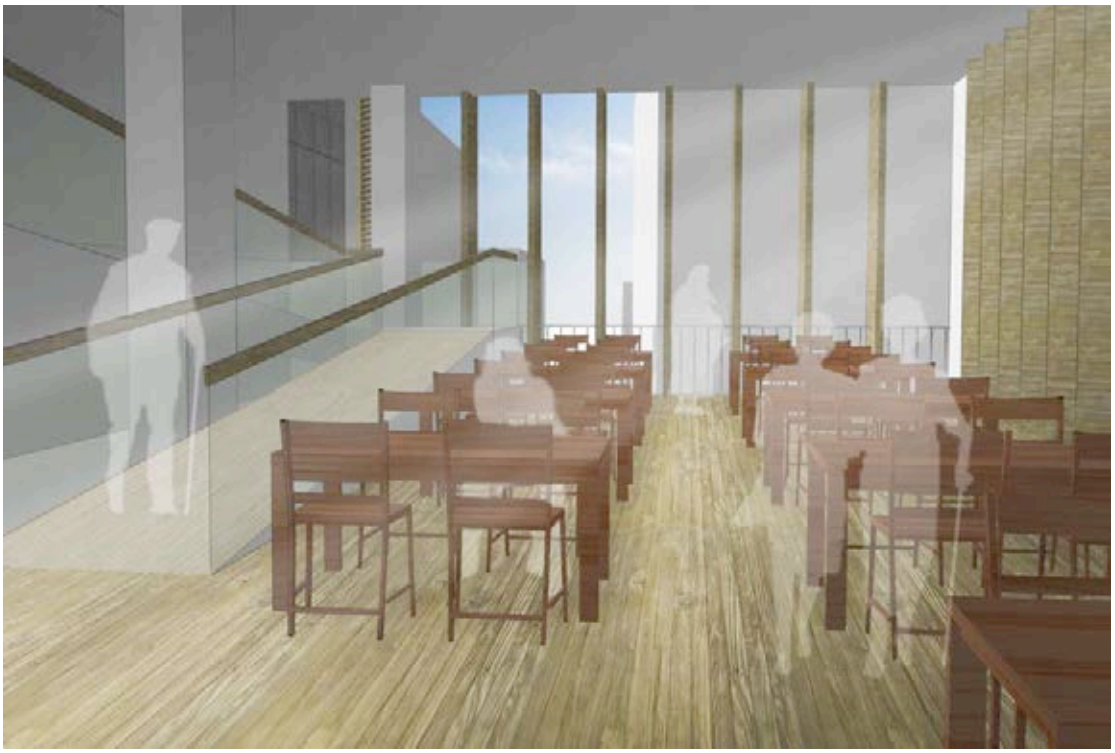
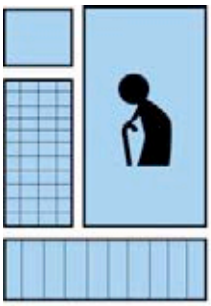


Figure 4.25 Private cafeteria for elderly residents

Room Types

Studio type and 2 bedrooms type are reserved for elderly on the 4th – 5th floor. The ownership of the rooms reserved for the elderly follows the principle of Sawangkanives. Elderly who wishes to reside will need to make a payment of 900,000 – 1,300,000 baht, and a monthly payment of 2500 baht, which includes cleaning services. However, there are no transfers of ownership, so room will be available for other elderly candidate if unoccupied. Elderly residents hold a temporary ownership over the unit, and not permanent. With this, the condominium is able to reserve specific units for elderly residents only.

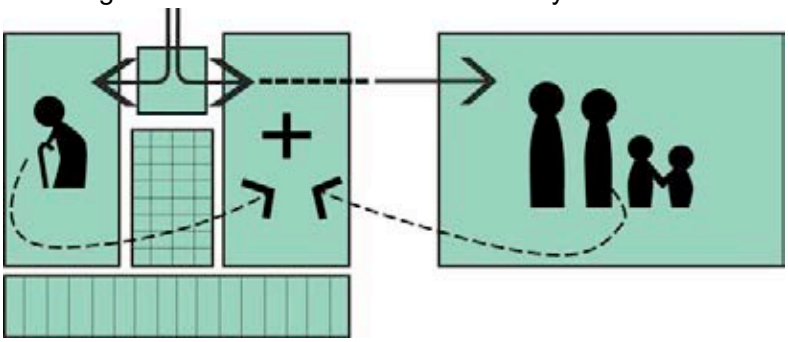
Living Units for Elderly Residents



Studio Type: 100 sq.m.

2 Bedrooms: 140 sq.m.

Figure 4.26 Studio type units



Duplex Type A1 (4 Bedrooms): 600 sq.m.

Duplex Type A2 (4 Bedrooms): 560 sq.m.

Figure 4.27 Duplex type units

Duplex Type B (4 Bedrooms): 560 sq.m.

Duplex Type C (3 Bedrooms): 480 sq.m.

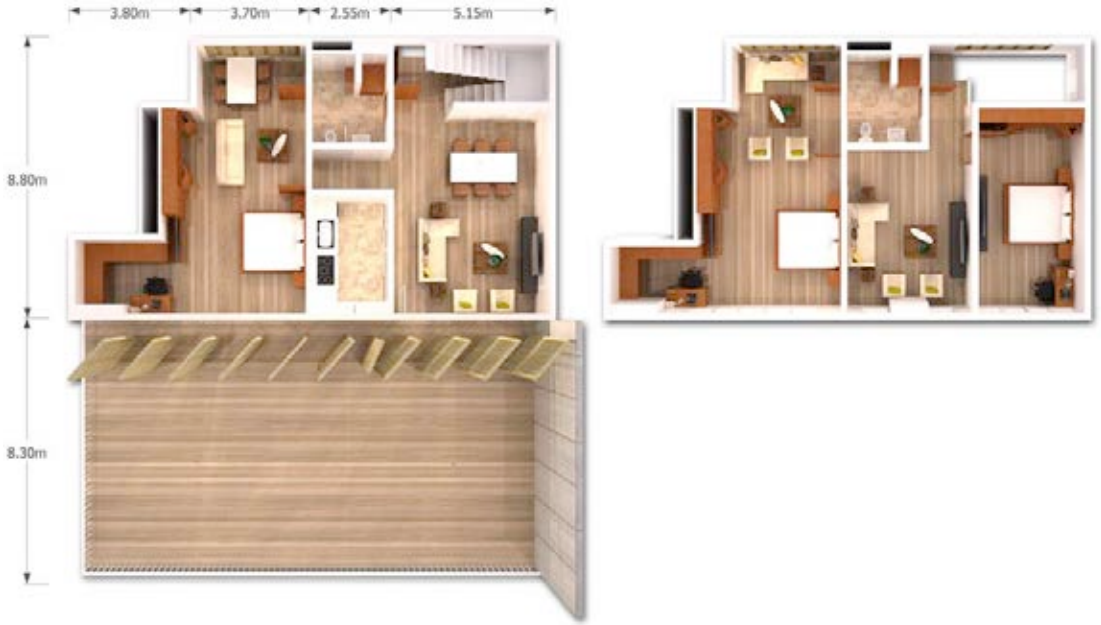


Figure 4.27 Duplex type units (Continued)

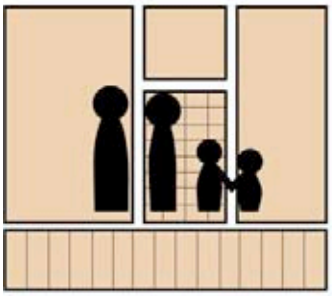
As the duplex units are intended for the intergenerational families units, therefore include at least 3 bedrooms for the adult children parents, and the children.

The unit is divided into three main areas; the elderly quarter, the adult children family quarter, and the shared functioning area. Elderly quarter remains on the lower level while the adult children family is on the upper level, to provide safety according to the declining physicality, and privacy. Elderly can choose to enter their living quarters privately through a separate entrance. Having different entrances separates the elderly and the adult children family's quarters. As the family members enter the main unit

entrance, they enter a foyer, which gives access to either the shared space and stairs to private quarters. Unwanted encounters between the family members can be avoided to enhance the level of privacy and lower the level of tension within the family. Interactions are allowed in the shared space.

Units intended for the elderly are designed to be barrier free with the minimum of 1.5m clearances for wheelchair. A large balcony space is also provided for homebound elderly. Recreational activities such as gardening and reading can be done privately in these areas.

Living Units for Adult Children's Family (Standard Room)



3 BEDROOMS TYPE A: 250 sq.m.

Figure 4.28 3-2 bedroom type units

3 BEDROOMS TYPE B: 200 sq.m.

3 BEDROOMS TYPE B2: 200 sq.m.

2 BEDROOMS TYPE C: 120 sq.m

Figure 4.28 3-2 bedroom type units (Continued)

2 – 3 bedrooms, types A, B, B2, and C are intended for the adult families on the 8th-10th floor.

All units are highly ventilated with the installment of ventilated walls as illustrated in figure 3.17. Ventilated walls allow wind flow from the inner corridor to the balcony, creating natural ventilation within living units.

4.2. Project Details

Design is straightforward to enhance elderly recognition of place and know where they are. Fins are installed to protect residents from glare, which causes low visibility. Also, as the project opposites existing shop houses, apartments, and school, fins are used to provide privacy.

Apart from the wooden appearance of the condominium created by the series of aligned vertical fins, a soft cream tone is chosen as the base color. According to previous studies of the elderly most favorable colors, the cream color is chosen, as it is neutral and is in the most favorable combinations among males and females.

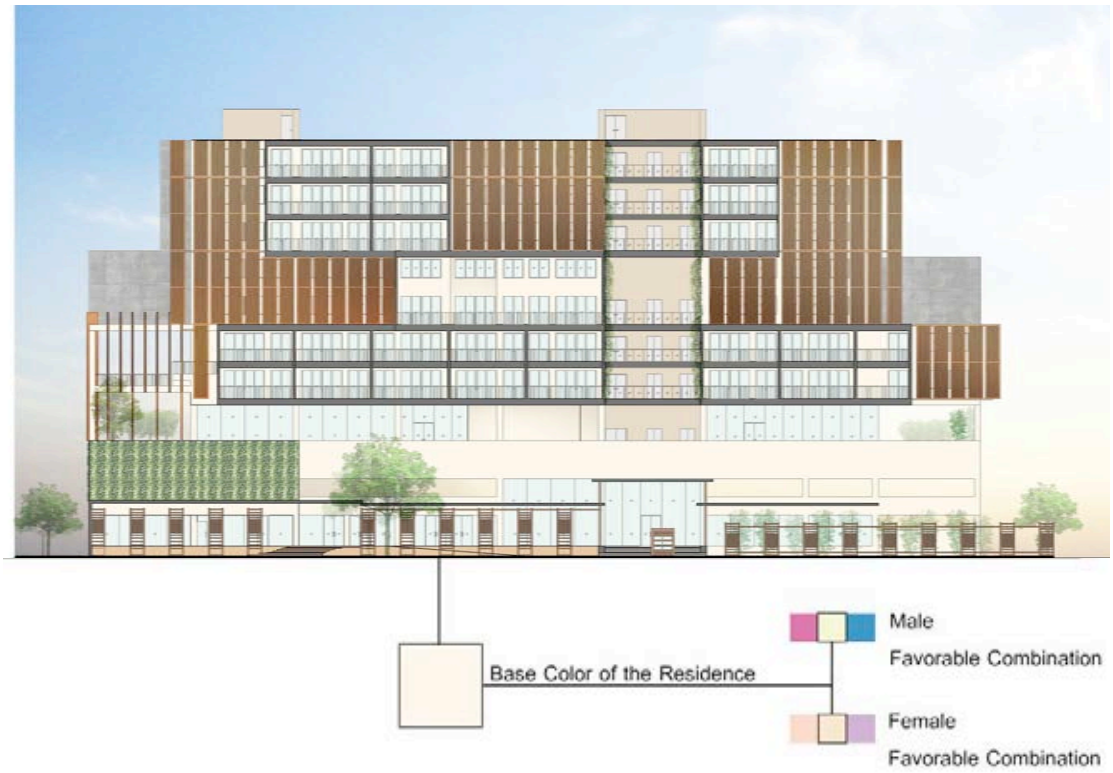


Figure 4.29 Base color of the condominium

Entrance to Condominium

Figure 4.30 Drop off area

As seen from figure 4.30, the terrace is accessible from both the pedestrian walkway and vehicles at building drop off area. An elderly friendly stairway welcomes visitors into the terrace area. Due to the laws and regulations and site limitations, the drop off area can accommodate 2 cars comfortably while still allowing circulation on the right.

The terrace at street level is designed to be visibly protected from the street activities by raising the platform by 1m and vertical fins, which are also used as planting panels. Planting panels are continued into a shading roof structure over the seating areas. The elements of fins and greeneries continue throughout the residential. Then, the sense of a hanging garden is achieved as seen in figure 4.34, showing sectional detail of green wall. The front terrace faces the southwest, directional to the prevailing wind to create a breezy garden-like space for the users. The prevailing wind of Bangkok is in the South-southwest.

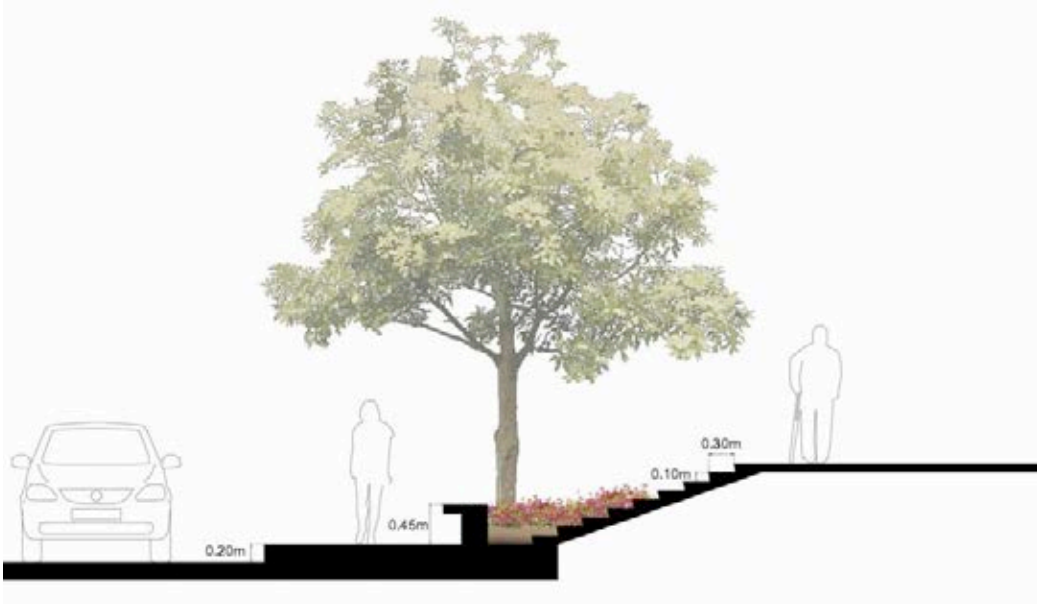


Figure 4.31 Section showing elevated terrace at street level

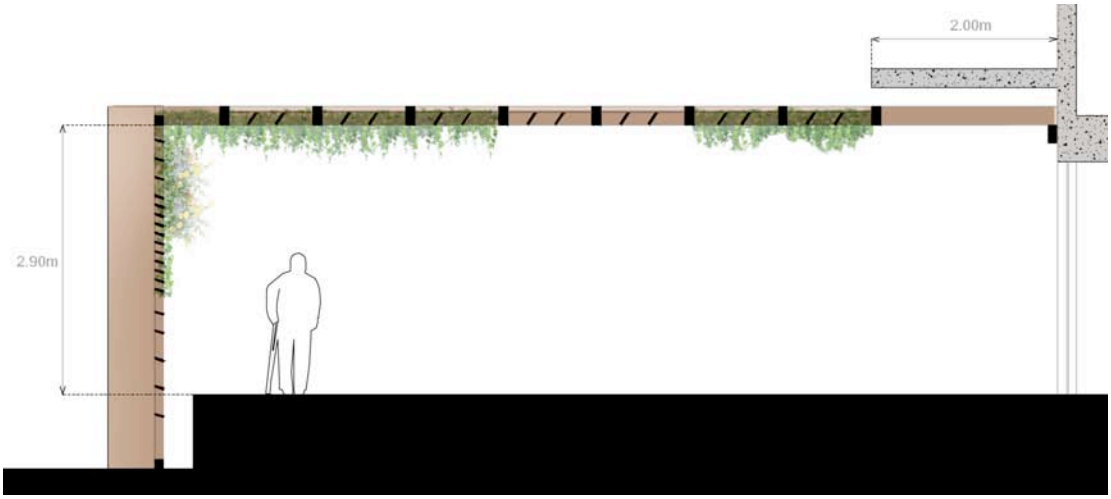


Figure 4.32 Section showing shading of terrace at street entrance

Elevating up the terrace platform of the ground floor public space by 1m enhances the level of privacy for the dwellers. Steps to elevated platform are of the minimal riser height of 0.10m for easy access by elderly. The small garden blocks view of vehicles to create a more peaceful atmosphere, for both adults and elderly. Seating areas are incorporated with architectural elements, to provide as much comfort for the elderly. Due to declining physicality, elderly will need to rest more often than adults. Height of seating are 0.45m, which best accommodate the elderly. Seating for elderly should not be too low, as it will hard to stand up from. Physicians have recommended elderly to sit in seats where they don't have to bend their knees for more than 90 degrees. This also enhances the sense of territoriality for the residents.

As illustrated in figure 4.32, the street front terrace is shaded at all times for the comfort of the residents and elderly visitors. The roof is constructed of louvers that shade off direct sunlight during the hottest hours of the day. The roof is also layered with translucent fiberglass panels, which further protect users from direct sunlight, while letting in visible light, as well as keeping the area dry during the rainy seasons.

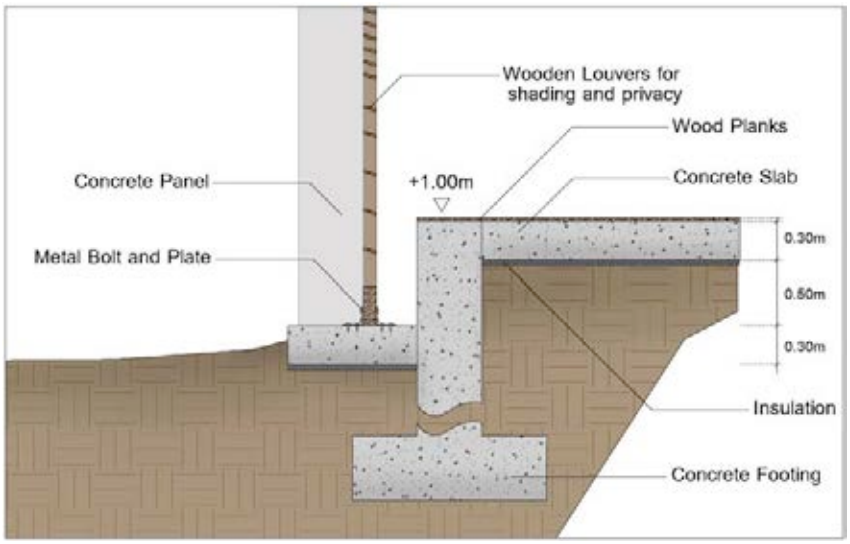


Figure 4.33 Sectional detail of concrete slab to grade, at terrace

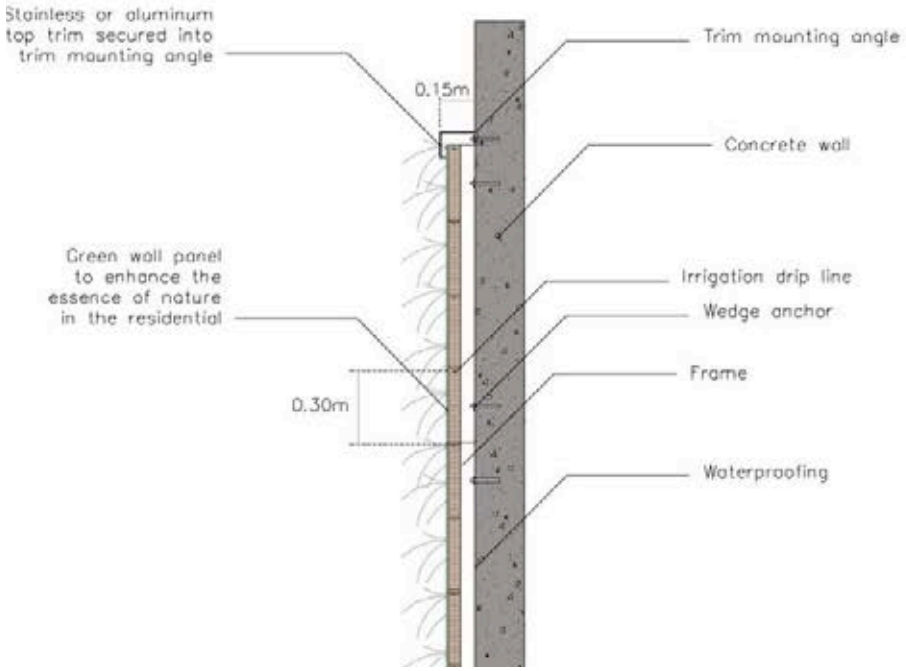


Figure 4.34 Sectional detail of green wall

Areas for socializing are important for elderly residents. They should also be situated in areas where they can see activities happening around them. Convenience of access is also necessary. These public areas should also include comfortable benches and seating, tables for card games and chess.

Public areas are not only facilitated with ramps, but stairs are also designed for the elderly. From the common height of 0.18m of stairs in public areas, all public stairs within the condominium is set at its minimum of 0.10m high. This eases the strains on elderly's knees as they climb up the stairs. By making the steps easily accessible by the elderly, this will encourage them to use the steps. Elderly should have some challenges in their daily activities to keep them active. Handrails are at height of 0.80m from landing, and 35mm in diameter.

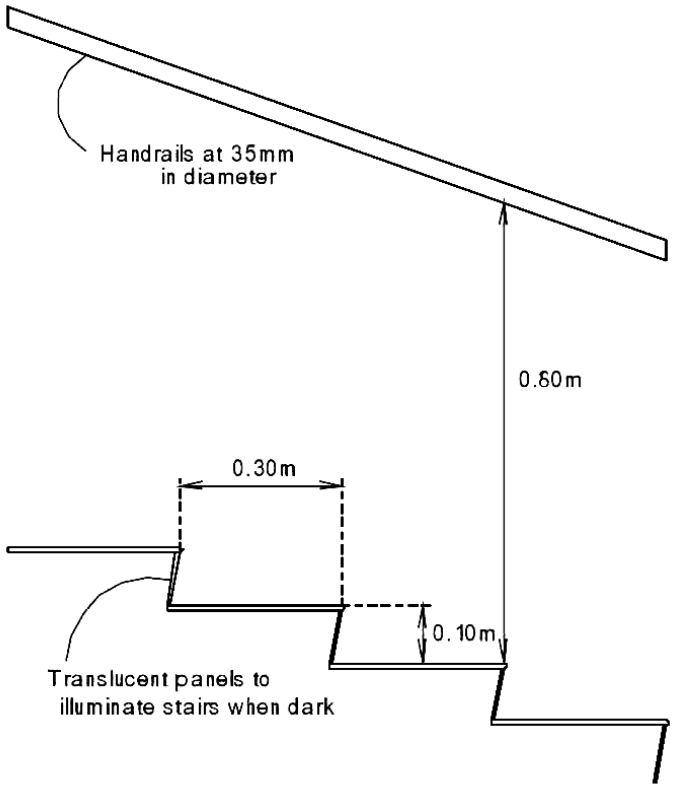


Figure 4.35 Stairs dimension in public areas

Public and Private Access

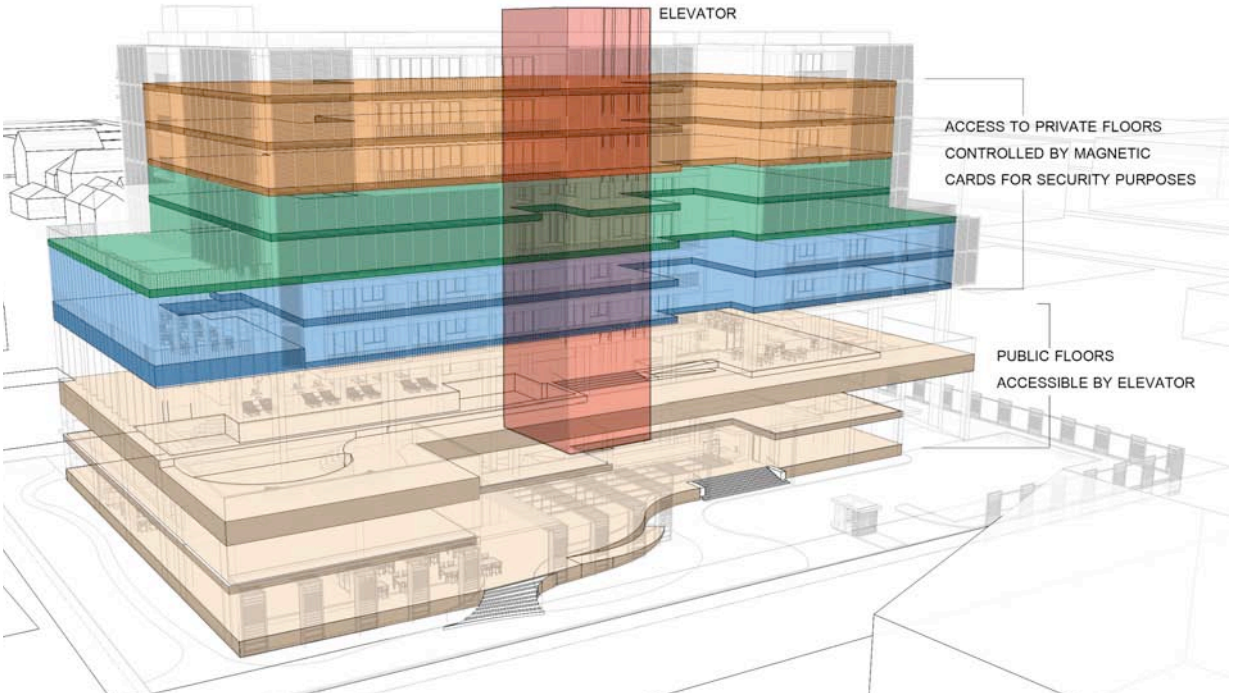


Figure 4.36 Public and private access

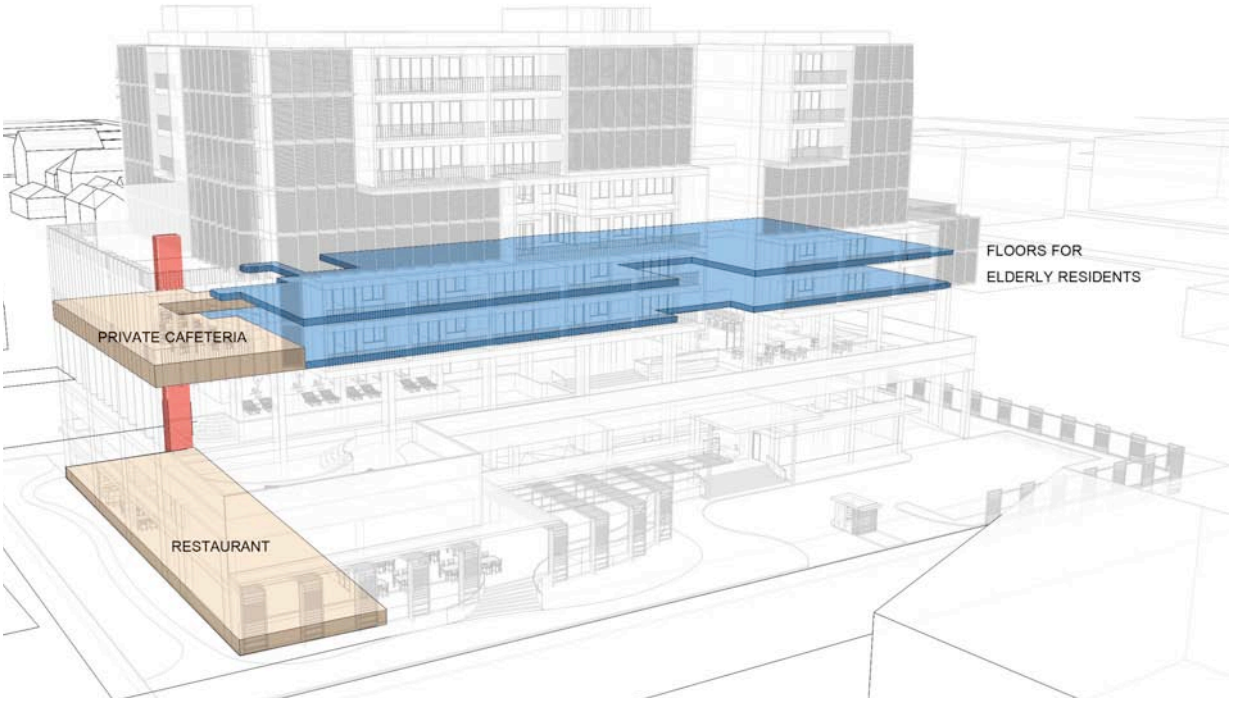


Figure 4.37 Restaurant and private cafeteria

All public areas accessible by non-residents are on the lower floors, while all private residential are on the upper levels as seen in figure 4.36. Public floors are accessible by the main elevator. The elevators and egresses at building core are therefore, facilitated and easily accessed for the elderly (figure 4.38). By opening the facility floor for both the public and residents to use, the elderly will be encouraged to interact with the people form surrounding communities, and not just the co-residents. Between the ground floor and the facility floor, no magnetic card is required. However, magnetic cards are required for elevator to go up to the residential floors, and from the parking floor. As all floors are accessible via elevator, fire egress stairs are at least 1.50m wide to allow aid for elderly's safe exit.

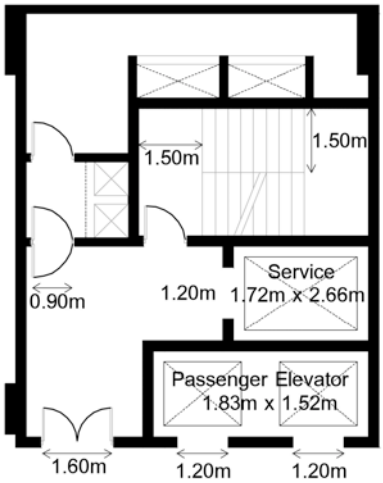


Figure 4.38 Dimensions in building core

A restaurant with bar area is provided for the residents and the public on the ground floor. Drinks and entertainment is available to encourage a social and an active life for the elderly. To provide elderly residents with more conveniences, a private cafeteria is located between the 4th and 5th floors for elderly units. The space is not fully enclosed, and therefore, is highly ventilated. With a near double height ceiling, the cafeteria hall has a breezy and relaxing atmosphere. The cafeteria is a meeting place for the elderly residents. Kitchen is included within the cafeteria for elderly to cook. Food can also be sent through the food lift from the restaurant's kitchen, shaded in red in figure 4.37.

Private Bathrooms

Many home designs for the elderly paid much attention to the designs for safety of the private bathrooms. Due to elderly weakened physical strength and ability to balance, elderly are prone to falls, especially in bathrooms where floors can be wet. Figure 4.39 and figure 4.40 shows design options of bathrooms for the elderly. Doors to bathroom swing open for the convenience of elderly with mobility equipment such as wheelchairs. The bathroom is arranged to allow 1.5m clearances in diameter for wheelchairs. Shower stalls include seat and flexible showerhead. In detail, the floor is designed so water in the shower stall can easily be drained through the planks and into the drainage below. Instead of having elevated steps at the bathroom entrance, floors between the bathroom and the interior living unit are leveled. Steps are then replaced by an evenly covered drainage, which now keeps the interior floor dry. As a result, bathroom floor is dry and steps are avoided, reducing the possibilities of slip, trips and falls in elderly residents.

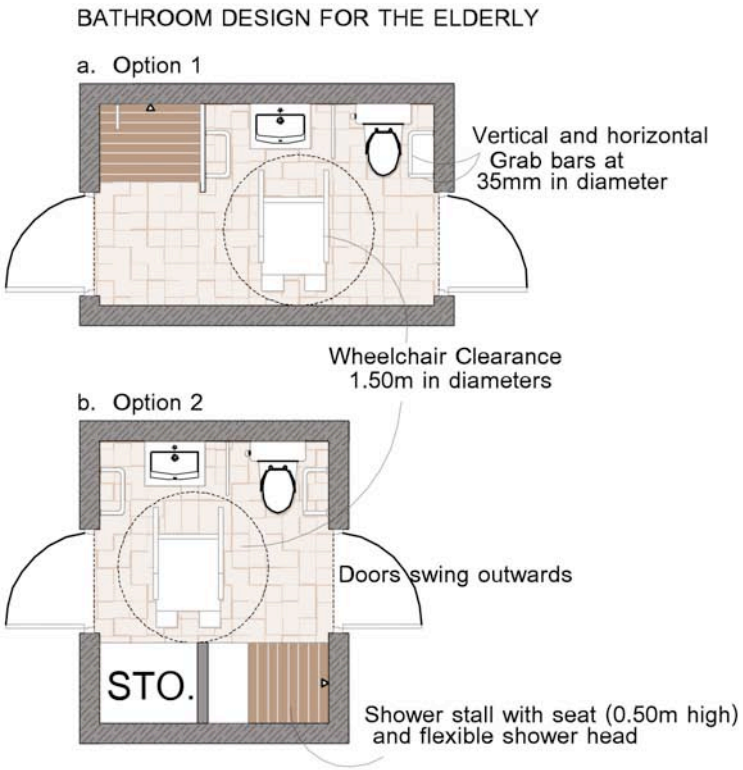


Figure 4.39 Private bathrooms catered to the elderly

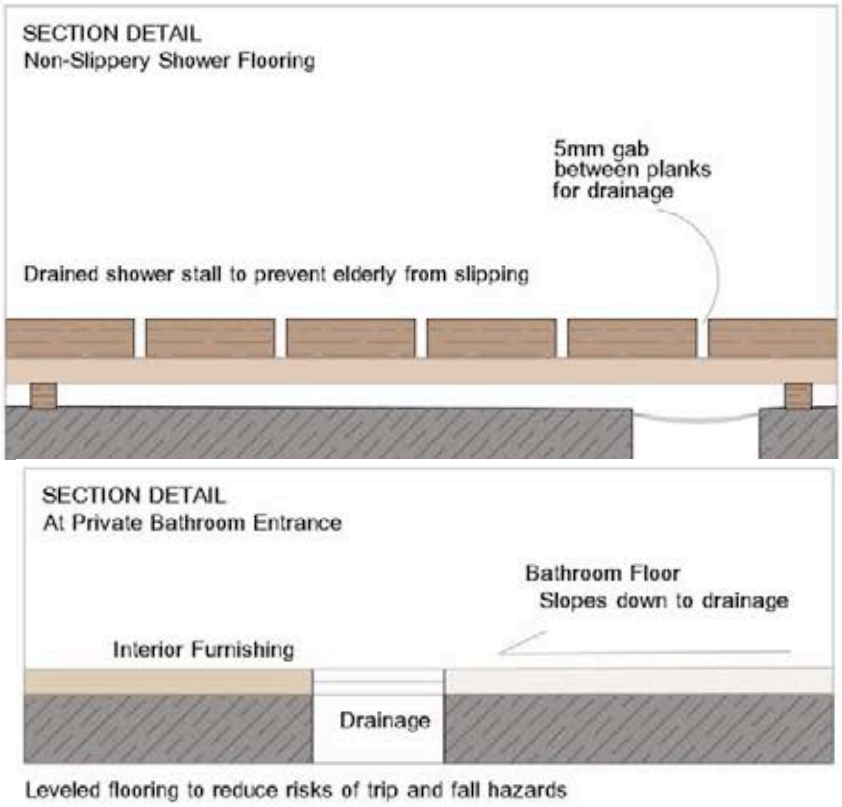


Figure 4.40 Sectional details of bathroom floors

Parking

The condominium is classified as a grade B residential according to research done by the Colliers International. Residents will be provided with the total of 85% parking space. The 6 duplexes will be illegible to secure 2 parking spaces per unit, and 1 parking stall will be provided for 2-3 bedroom units. As the studio units on the 4th and 5th floor will only be available for elderly residents, parking spaces are limited to 50% of the total number of studio units. According to the laws and regulations that facilitate the elderly, 1 handicapped parking stall must be provided for parking lot size of 10-50 cars. 3 handicapped parking stalls are available.

Technical Details

Electrical Systems: During electrical black out or emergencies, the diesel generator will automatically generate electricity.

Elevator Systems: Electric elevators will be used, as it is more suitable for mid-rise buildings. The elevator consists of a car that is mounted on guide rails, supported by the hoisting cables, and driven by electric hoisting machinery in the penthouse (mechanical room above the elevator core). The penthouse mechanical room holds a motor-generator set, traction machine, speed generator, brake, driving sheave, and gears, as well as a control panels. The height of the elevator space on the top floor has to be 487.5m–609.6cm high, and 152.5m-350.5m extra heights under the floor of the bottom floor. Passenger elevator car specifications: capacity of 1150kg, with a minimum hoist way of 2501x2108mm (from Mitsubishi Electric).

Plumbing Systems: Water supply will be pumped and stored in tank at rooftop. Water will then flows downwards to supply each living units. The 3rd floor will be the main transfer floor due to its high ceiling, leaving space available to run pipelines. Pipes will be transferred to either the two egress cores.

Air Conditioning Systems: Split type system will be used for all areas. Residents will be able to individually control the temperature and power when not in use.

Security And Safety Systems

Magnetic card will be provided to all owners. Residential areas will not be accessible to outsiders for privacy and security. Security camera will also be installed throughout the project.

Fire Safety: Automatic fire and smoke detector will be installed, as well as the automatic sprinkler system. Apart from the automatic fire safety systems, fire extinguishers will be placed throughout the project, as well as water hosts.

Staffs

Professionals will be hired to aid residents.

1. Service Department: Total of 12 staffs
    a. 1 manager
    b. 1 secretary
    c. 10 committees
2. Administrator Department: Total of 2 staffs
    a. 1 accountant
    b. 1 clerk
3. Maintenance Department: Total of 9 staffs
    a. 1 manager
    b. 4 maids
    c. 2 gardeners
    d. 2 technicians
4. Security Department
    a. 2 full-time securities at main entrance
    b. 2 full-time securities at residence's entrance
5. Medical Services: Total of 2 staffs
    a. 2 nurses (6:00-22:00 hrs.)
6. General: Total of 19 staffs
    a. Facility: 1 Pool staff, and 1 fitness room staff
    b. 2 café staffs
    c. 2 laundry personnel
    d. Restaurant: 2 cooks, and 4 waiters/waitresses
    e. Commercial: 2 Salon workers, and 5 retail owners

4.3. Physical Model

Figure 4.41 Image of physical model, 1

Figure 4.2 Image of physical model, 2

Figure 4.3 Image of physical model, 3

CHAPTER V

LESSON LEARNT

The objective of the thesis is to redesign and reconfigure living space suitable for elderly in intergenerational families in Bangkok. As a solution, an elderly-friendly condominium is designed to accommodate intergenerational families.

In order to understand the issues of elderly in intergenerational families in Bangkok, past literatures on the topic were reviewed. Studies on the physicality of the elderly were reviewed to understand risks and where cautions need to be taken. Laws and regulations concerning the well-being and conveniences of the elderly were translated into the condominium design, putting emphasis on the physical safety. Past literatures on the perspectives of the elderly on intergenerational living were reviewed to understand issues in intergenerational living. Conflicts between the family members is the most concerned issue within the intergenerational family. Understanding the issues within the intergenerational family benefits towards redesigning the living units so the family can live together in harmony.

In addition, observations of existing elderly residences and intergenerational families were completed to understand the suitable living environment.

As for the project's site selection, to accommodate families living in Bangkok, proximity to the transportation line is emphasized. Adult children in intergenerational families have the need to commute to work conveniently. Sites near public transportation lines are mostly developed, and therefore, will provide amenities and conveniences in proxemics distance. Therefore, a site in Soi Bearing, which is conveniently located around the end of Bangkok's public transportation line, was selected.

An elderly-friendly condominium for intergenerational families in Bangkok is designed, regarding the literature reviews and case studies. The residential is a 10-story condominium for intergenerational families. The condominium has a large building footprint to keep the number of floors low for the convenience of the elderly during emergencies.

Unlike other condominiums in Bangkok, the designed residential units follow the guidelines of elderly residences. Facilities provided within the complex aims to enrich the lives of the elderly, by facilitating areas for activities and encourage social interactions. For example, other than the standard facilities provided such as the swimming pool and playground, a reading area and game room is also featured for the elderly. A private cafeteria is located on the elderly residential floor, facilitated with ramps for their conveniences. The cafeteria is not only for the elderly's conveniences, but also promotes interactions and gathering. Spaces for social interactions and gatherings were incorporated into the residential design. This will encourage elderly with similar views and mutual interests to gather at areas around the residential, promoting an active lifestyle.

According to literature reviews, the main issue in intergenerational families is family conflict. Family conflicts can be avoided by providing privacy, as well as maintaining the balance between privacy and intimacy. The residential gives the users alternatives for intergenerational living; to either live as neighbors on different floors, or together in a duplex unit.

In the final design, the 4^{th} and 5^{th} floor are designated for the elderly. In these floors, studio and 2-bedroom units are provided. There are no transfers of ownership on these two residential floors, so only elderly candidates will be eligible. This follows the residency system of Sawangkanives, an elderly residence in Bangkok. Standard rooms for the adult families are on the top floors (8^{th} – 10^{th} floor), consisting of 2-3 bedrooms. This gives alternatives for intergenerational living; as neighbors on different floors.

Duplex units are designed for the intergenerational families with elderly parents. The unit is clearly divided into three main quarters; the elderly quarter, the children's family quarter, and the shared space. Elderly quarter is located on the lower level of the duplex unit for their safety and conveniences, while the family quarter is on the upper level. The two private quarters are located separately to maximize the level of privacy for both the elderly and the adult children's family. To maintain the balance between privacy and intimacy, shared living space is provided on the lower level. This includes the dining and the living area, where family members can interact and participate in family activities when desired.

To conclude, the designed elderly-friendly condominium and redesigned living units aim to provide intergenerational families a suitable living environment in Bangkok. The condominium is designed in considerations to both the elderly and the adult children's needs.

Recommendations

The issues concerning the elderly and the intergenerational family are complex. With limited time and resources, only the issues on the physical living environment were studied. The physical living environment includes the public areas and the private living areas. Life enrichment factors and safety for the elderly in the intergenerational environment were emphasized.

As Bangkok is an eclectic city with different ethnic groups, further studies on the elderly in intergenerational families of different ethnics can be completed. By choosing a specific district and ethnic groups in Bangkok, the cultural and characteristics of the users can also be defined. For example, the study can focus on observing and understand a few families living in Chinatown. Intergenerational families with the same number of members can be chosen for observations.

Further studies on the elderly in intergenerational family will certainly benefit the Thai society. As intergenerational families are commonly found in Thailand, and especially in the ageing population, designs for the elderly is needed.

REFERENCES

Thai

กฎกระทรวง. กำหนดสิ่งอำนวยความสะดวกในอาคารสำหรับผู้พิการหรือทุพพลภาพและคนชรา พ.ศ. ๒๕๔๘ [Online]. 2005. Available from: www.mahatai.org/kodkra_singam.pdf [2012, June 15]

English

Azur Corporation. Senior health-care residence; designing premium medical assisted living for the elder. Tokyo, Japan: Rikuyosha, 2006.

Beckett, M., Noreen, G., Weinstein, M., Lin, I. F., and Chuang, Y. L. Social environment, life challenge, and health among the elderly in Taiwan. Social Science and Medicine 55 (2002) : 191-209.

Bhasson Limmanonda. Family in Thailand: Beliefs and realities. Journal of Comparative Family Studies 1(26) (1995) : 67-83.

Cheng, H.I., Lee, K.H., and Lee, H. Color preference of the Korean Elderly. In International Association of Societies of Design Research, 1-15. 12th-15th November, The Hong Kong Polytechnic University, 2007.

Chermayeff, S. and Alexander, C. Community and Privacy: towards a new architecture of humanism. Garden City New York: Doubleday & Company, 1963.

Colliers International. Bangkok condominium market report, 4th Quarter [Online]. 2009. Available from: http://www.colliers.co.th/images/agency/CondoQ42009_w.pdf [2011, April 20]

Department of Mental Health. Disaster of depression: Aback news of Thais suicide – a person an hour [Online]. 2006. Available from: http://www.dmh.go.th/stydepression/news/view.asp?id=200 [2011, August 25]

Durand, Y. M. Living arrangements of the elderly in Bangkok, Thailand: Impacts of low fertility, life-courses, and non-marriage. Doctoral dissertation, Department of Anthropology, Graduate School, Pennsylvania State University, 2007.

Fobker, S., and Grotz, R. Everyday mobility of elderly people in different urban settings; The example of the city of Bonn, Germany. Urban studies 43(1) (2006) : 99-118.

Giles, H., Noels, K. A., Williams, A., Ota, H., Lim, T. S., Ng, S. H., Ryan, E. B. and Somera, L. Intergenerational communication across cultures: young people's perceptions of conversations with family elders, non-family elders and same-age peers. Journal of Cross-Cultural Gerontology 18 (2003) : 1–32.

Jayarin Chitranukroh and Vorasun Buranakarn. Sentiment in traditional Thai architecture. Naharas (2006) : 117-132.

Kahana, B. and Kahana, E. Changes in mental status of elderly patients in age-integrated and age-segregated hospital milieus. Journal of Abnormal Psychology 75(2) (1970) : 177-181.

Kahana, E., Lovegreen, L., Kahana, B., and Kahana, M. Person, environment, and person-environment fit as influences on residential satisfaction of elderly. Environment and Behavior 35 (2003) : 434-453.

Kalay, Y. and Shaviv, E. A method for evaluating activities layout in dwelling units. Building and Environment 14 (1975) : 227-234.

Kaya, N. and Erkip, F. Satisfaction in dormitory building: the effects of floor height on the perception of room size and crowding. Environment and behavior (2001) : 33:35.

Kittipong Trisarnwathana. Factors effecting buying decision, attitude and satisfaction residents of medium cost residential condominiums in central Bangkok. Master's Thesis, Housing Development, Architecture, Chulalongkorn University, 1995.

Knodel, J. Is intergenerational solidarity really on the decline? Cautionary evidence from Thailand. Family Support Networks and Population Ageing (2009) : 29-31.

Knodel, J. and Napaporn Chayovan. Intergenerational Relationships and Family Care and Support for Thai Elderly. Ageing International 33 (2009) : 15–27.

Knodel, J., Napaporn Chayovan, Siriwan Graiurapong, and Chutima Suraratdecha. Aging in Thailand: An Overview of Formal and Informal Support. Population Studies Center 99-53 (1999)

Knodel, J., Chanpen Saengtienchai, and Werasit Sittitraj. Living arrangements of the elderly in Thailand: Views of the populace. Journal of Cross-Cultural Gerontology 10 (1995) : 79-11.

Lawton, M.P. Planning and managing housing for the elderly. University of Michigan: A Wiley-Interscience, 1975.

Newell, P. B. Perspectives on privacy. Journal of Environmental Psychology 15 (1995) : 87-104.

Niphon Darawuttimaprakorn and Sureeporn Punpuing. Living arrangements and elderly depression: Kanchanaburi DSS, Thailand. Master's Thesis, Program in Population and Social Research, Institute for Population and Social Research, Mahidol Univeristy, 1999.

Puntip Jongkroy. Urbanization and Changing Settlement Patterns in Peri-urban Bangkok. Social Science 30 (2009) : 303-312.

Rechavi, T. R. A room for living: Private and public aspects in the experience of the living room. Journal of Environmental Psychology 29 (2009) : 133–143

Saruwono, M., Zulkinflin, N. F., and Mohammad, N. Living in living rooms: furniture arrangement in apartment-type family housing. Social and Behavioral Sciences 50 (2012) : 909-919.

Siriwan Siriboon and Knodel, K. Thai elderly who do not coreside with their children. Journal of Cross-Cultural Gerontology 9 (1994) : 21-38.

Sung, K. T. Elder respect exploration of ideals and forms in East Asia. Journal of Aging Studies 15 (2001) : 13-26.

Temelova, J. and Dvorakova, N. Residential satisfaction of elderly in city center: The case of revitalizing neighborhoods in Prague. Cities doi: 10.1016 (2011).

Thirawan Wannotai. A new agenda for developing housing for elderly in Thai society. Nakhon Nayok: Rajamangala University of Technology Thanyaburi, 2009.

Virajada Buasri, Steggeli, C. D., and Burns, L. D. Innovativeness and acceptance of retirement housing in Thailand. Housing and Society 32(1) (2005) : 53-69.

Wattana Boonjub. The study of Thai traditional architecture as a resource for contemporary building design in Thailand. Doctoral dissertation, Program of Architectural Heritage Management and Tourism, Graduate school, Silapakorn University, 2009.

APPENDIX

Building Classification by Colliers International

BUILDING CLASSIFICATION	GRADE A	GRADE B	GRADE C
Location	Close to BTS line	Close to BTS / MRT line and BTS extension line	Reasonable proximity to BTS / MRT line, BTS extension line
Surrounding	Easily accessible Tranquil atmosphere Peaceful surroundings	Easily accessible Good atmosphere Good surroundings	Hardly accessible Poor atmosphere Poor surroundings
Unit specification	Peaceful surrouGood building design, layout and decoration Luxury materials and specifications	Good building design and decoration Moderate building specification	Basic design
Facilities	Comprehensive range of facilities	Limited facilities	No/limited facilities
Parking space per unit	≥100%	60 - 80%	< 60%
Property Management	Professional Management	Professional / Non Professional Management	Non Professional Management

BIOGRAPHY

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2010 – 2013	Master of Architecture: International Program (I+March) Majoring in Architectural Design Faculty of Architecture, Chulalongkorn University
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