

Chapter V. THEORETICAL FOUNDINGS

A. Adaptive Building

Dynamic systems that have the capability of accommodating a changing set of requirements for space, function, and components are classified as adaptable buildings (Adaptable Futures, 2012). When analyzing buildings and its associated components, one of the most important criteria to consider is their long-term viability. It is necessary for a structure to achieve a better balance between its economic, social, and environmental dimensions in order to be termed "sustainable." Economic measurements are primarily concerned with how the building can give more value to its stakeholders than it now does. Social issues are concerned with the general well-being of society, and environmental considerations are concerned with how the building may maximize environmental benefits. But these three considerations are complex, and many of their sub-traits are qualitative and impossible to measure, as is the case with many qualitative attributes.

According to the literature, sustainable buildings have the in-built flexibility to adapt to changing situations and technology without generating excessive waste or causing conflict with their neighbors (Yates, 2003; Kendall and Ando, 2005). Sustainably developed futures are those in which the fundamental means of human subsistence become easier, human opportunity becomes richer, and nature's diversity is more sustained, and not merely limited to the rich portions of the world, in their most basic form (Holling, 2000). According to the literature, incorporating adaptable potentials into new buildings would increase the value of customers' investments while also contributing to long-term sustainability.

Economic Consideration

Flexible buildings increase the lifecycle value (benefits over costs) of buildings while also providing more economic and financial benefits to the stakeholders that rely on these

structures. They are better prepared to adapt to future developments since they provide high levels of flexibility and cost-effective solutions. Adaptable buildings lower the total cost of ownership across their entire lifecycle, particularly during the in-use phase (maintenance and operations). When compared to standard maladaptive structures, the initial cost of adaptable buildings may be higher in some cases since adaptable buildings take into account the durability/quality of the materials as well as their energy performance. Because tenants would want to pay less for upkeep and operations of the buildings, and because they are extremely likely to remain in the same location, this creates favorable market conditions for real estate.

Environmental considerations

Because some materials age quite quickly, the quality of the materials used in adaptable buildings is extremely important. The fact that adaptable buildings encourage the possibility of refit means that they offer a high degree of flexibility in terms of replacing the aging material or component with a new one, depending on the sort of adaption required. High-quality materials may be more expensive to purchase initially, but they may be less expensive to maintain over time.

Social considerations

People's quality of life and comfort, as well as their interaction with their environment, are determined by social sustainability factors. The adaptable elements built into a building optimize the building's use or, in other words, help to reduce the building's functional obsolescence to a minimum. A surveyor who examined the societal implications of adaptable buildings noticed that if a structure is not suitable for its intended use, it will remain vacant until it is put to use for the intended purpose again. This can be a desirable target for criminal activity while also resulting in expensive repair and maintenance costs for the property owner. This will have a devastating effect on social security and well-being.

B. Optimizing Sleep

Sleep is vital for athletes because it helps them recuperate after a training session or after an event, and it also helps them perform better physically and mentally during competition¹⁰. Athlete may suffer variations in the quality and amount of their sleep at different times of day and under different conditions. Athletes at the development stage of their sporting discipline frequently have to work, study, or train at the same time, and/or perform a combination of these tasks. When athletes reach the elite level, extra stressors, such as international travel, may become a factor in their performance. According to research conducted on basketball players, swimmers, American football players, and other sports, receiving more sleep increases playing accuracy, response time, speed, and metabolic parameters, as well as physical and mental well-being in both the short and long term. Aside from that, there is evidence that well-known athletes such as LeBron James, Venus Williams, and Steve Nash sleep 10-12 hours each day, and a couple of recent reports suggest that there may even be a correlation between drowsiness and athlete lifespan.

At each given period of the daily 24-hour cycle, there are fundamental physiological elements that influence sleep inclination, as well as levels of alertness and drowsiness (and performance). For the purposes of discussing general sleep requirements, shift work, and travel issues, two of these considerations are particularly significant. They are as follows:

- 1) the amount of time that has elapsed since the last sleep cycle, as well as the quality and length of that sleep
- 2) The point in time inside a 24-hour day is referred to as the "time zone." Each of these elements must be taken into consideration when seeking to comprehend

¹⁰Ian C Dunican and Dr John Caldwell. Managing Sleep & Jetlag for Optimal Performance. A Guide for Business and Athletic Performance.. Access on 30 Sept 2021

how the body is affected by time zone and schedule changes. This is because the effects of each of these aspects are very real, and everyone must contend with them throughout their lives.

The first factor, the amount of time that has passed since the last sleep, is responsible for what has come to be known as the homeostatic drive (or mechanism), and the second factor, the time of day according to the body clock, is responsible for what has come to be known as the circadian drive (or mechanism) (or mechanism).

Even the basic act of traveling abroad, even if it does not require crossing a single time zone, can be stressful and exhausting at times. Seating arrangements that are cramped and uncomfortable. Check-in, baggage-handling, and security problems, unplanned schedule delays, and a mix of high altitudes, dry air, and noisy/boring conditions can all result in a state of fatigue and lethargy that can impair performance. Fortunately, this form of exhaustion lasts just a short period of time and is rather easy to overcome. However, when these elements are paired with time zone changes, additional difficulties linked with jet lag occur.

Typical symptoms of jet lag include sleep interruptions, altered mood, loss of appetite, stomach distress, confusion, and widespread discomfort—all of which can be traced back to the body's internal rhythms becoming out of sync with the external environment when traveling. The greater the number of time zones traveled, the more intense the symptoms. In addition, the direction of travel makes a difference. Because it is always easier to shift the body to a later time than it is to shift the body to an earlier schedule, jet lag is far less of an issue when traveling in a westward direction than when traveling in an eastward route. It's not difficult to imagine: on days off, people have no problem remaining awake for a bit longer than normal (and sleeping a little later than usual), and this is exactly what happens while traveling west, where everything occurs later than it does in the home time zone. Going to bed earlier

than usual does not always result in a better night's sleep, and waking up around 3:00 or 4:00 a.m. is never a pleasant experience while traveling to or from the east. Unfortunately, traveling eastward causes everything to go ahead of schedule, and the body does not appreciate this sudden shift in time. In any instance, the body's internal clock is resistant to being tampered with, and it takes time to resynchronize (at least one day per time zone crossed). In the meanwhile, sleep, mood, motivation, and performance issues manifest themselves.

Solution

A. Proper Time Light Exposure

The amount of time spent in direct sunshine or other strong light should be carefully monitored. Adjustment difficulties will persist or even develop if the light exposure is not properly regulated and monitored. The phase response curve shown in Figure below should be used as a starting point, with the understanding that eastward travel necessitates a phase advance (moving everything earlier in the body clock's day), whereas westward travel necessitates a phase delay (moving everything later in the body clock's day).

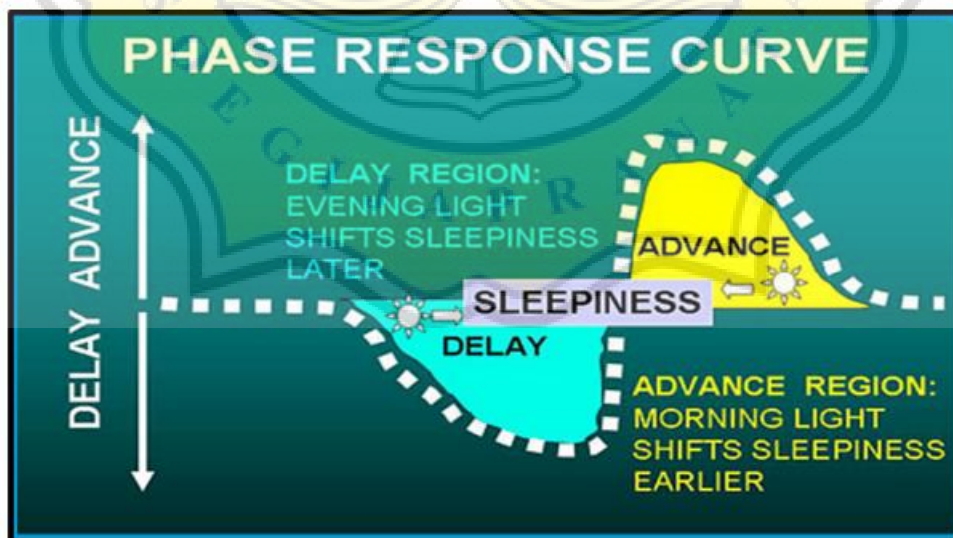


Figure 5.1 Phase Response Curve, Kripke DF

Source: <http://www.brightenyourlife.info/pdf/brighten.pdf>

A regularly entrained individual's body is reset by light exposure in the morning around dawn, while light exposure in the evening around sunset is reset by light exposure in the evening around dusk. In the case of an eastward shift, this entails maximizing light exposure as early as feasible in the time zone prior to departure, and then continuing with this early morning light exposure upon arrival at the destination. It also entails limiting light exposure throughout the middle of the pre-departure night upon arrival in the new time zone to a minimum. When traveling with a 6 or 8-hour time-zone advance, this can be challenging because it will require avoiding sunlight first thing in the morning upon arrival and then maximizing sunshine exposure in the early afternoon upon departure. Use bright artificial lighting (blue light is preferable) or spend time in the sun during the afternoon hours of your destination to ensure that you are getting enough light exposure for your adjustment. If you have to go outside in the morning and can't avoid it, you might want to consider wearing special light-blocking glasses. Once you've determined the best time for light exposure on the first day in a new time zone, you should gradually advance the start time by 30-60 minutes each day until you're in sync with the local schedule and schedules are no longer a problem. Traveling west is a little less difficult because the goal here is to maximize light in the pre-departure evening midnight to 04.00 am—this may necessitate the use of artificial bright light prior to the trip—and decrease light in the home-based morning period (from about 05.00 to 09.00).

B. Optimizing Sleeping Environment

Sleep deprivation and accumulation of sleep debt are significant contributors to both cognitive and mental weariness. When it comes to sleeping and relaxing, the setting in which we do so can have a significant impact on the amount and quality of sleep we get. Noise, light, temperature, and comfort are all aspects that might have an impact on sleeping habits. It is

also influenced by an individual's routine (for example, having the same room, being in a familiar surroundings, going to bed and waking up at the same time, among other things). When we travel, we may find ourselves in a variety of different sleeping arrangements. The quality of the sleeping environment, as well as other aspects such as noise and light, may differ from one person to the next. When it comes to altering sleeping surroundings, the following factors should be taken into consideration in order to maximize sleep and recovery:

- The windows have been blocked out so any visible light coming through the windows while all of the doors are closed. If there are visible lights coming through the windows, use opaque materials (such as aluminum foil and tape) to darken the room. Use caution around any sources of distracting light. Tape over or turn off the standby lights, direct the light from the phone, and keep digital clocks and radios out of sight.
- Set the temperature to a cool setting to make it easier to fall asleep. The temperature of the air conditioner should be set between 18°C and 24°C (preferably 21°C). Air conditioner have subjected to regular maintenance to ensure proper operation.
- Room insulation must be effective in reducing external noise in order to allow for restful sleep. It can be used as a solution for external building noise barriers (for example, a high fence). There must be as little noise from other sources as possible in the room (e.g. vibration from fridge motors)

C. Healing Architecture

Healing architecture is

A. Natural Light

Natural light is essential for the growth, reproduction, and positive behavior of all biological organisms, including the human species. In his remarks, Hobday pointed out that throughout history, entire civilizations have been based on the sun (2006). Patient depression, agitation, tension, and discomfort are all reduced, as are vitamin inadequacies, as a result of this treatment (Joseph, 2006). With this information in hand, we are now able to include natural light into our healing environments. This information underlines the necessity for designs that take advantage of as much natural light as possible.

Several studies have been published suggesting that increasing exposure to natural and artificial light can help people with depression and seasonal affective disorder (SAD) to feel better. Depression is a major issue in today's industrialized society. It affects one in every five people. According to Hobday (2006), it is estimated that 340 million individuals suffer from depression, with 40-80 percent of those suffering from depression opting out of seeking treatment altogether. When it comes to treating mood disorders and depression, bright light therapy has been shown to be just as successful as medicine according to a research published in the American Journal of Psychiatry (2005). According to a study undertaken by Golden (2005) (as quoted in Hobday, 2006), a team of researchers conducted a statistical analysis of 20 experiments in bright light treatment that were conducted over a 20-year period. These combined trials indicated that bright light treatment was a highly successful strategy for reducing depression in a significant number of patients.

B. Experiencing Nature

A number of additional research have been conducted on environmental psychology and the influence that nature has on people who are participating in

the healing process in various ways. Marcus and Barnes (1995) published a landmark study that documented the therapeutic effects of adding gardens into hospital settings. In order to conduct the study, researchers conducted patient and staff surveys at four case study hospitals that had implemented garden programming into their facilities. The investigation included consideration of seating typology, traffic flow patterns, levels of privacy, levels of diverse vegetation, human companionship, aesthetic attractiveness, religious and spiritual ties, as well as a variety of other elements. The geographical analysis of the case study garden was documented with the use of detailed blueprints.

According to the findings of this study, Marcus and Barnes questioned 143 garden visitors and asked them to select one of ten possible reasons for visiting the garden as their primary reason for doing so (1995). Almost 94 percent of visitors said they came to the garden to relax, while more than half said they came to dine, converse, stroll, or use the park for other reasons such as general outdoor treatment. In addition, 95% of those who visited the garden stated that they "felt different" as a result of their visit to the garden. Reduced stress, calmer, refreshed, and stronger, as well as greater ability to deal, increased levels of positivity, and spiritual connection were all reported as degrees of mood alteration. When asked to identify the characteristics that were most beneficial in achieving a change in mood, the vast majority stated that trees and plants were extremely important. A greater emphasis was placed on natural phenomena such as the wind/fresh air, the light/sun, and good diversions such as animal sounds. In addition, the garden was well-liked by its users since it gave a tranquil respite from the stresses of daily life and the opportunity to socialize with others. In general, positive elements such as emotional changes in patients and staff contributed to a better healing

environment, allowing for rejuvenation and stress release when patients and employees returned to their respective hospitals. This boost in staff morale contributes to a positive clinical outcome for patients and the hospital community as a whole.

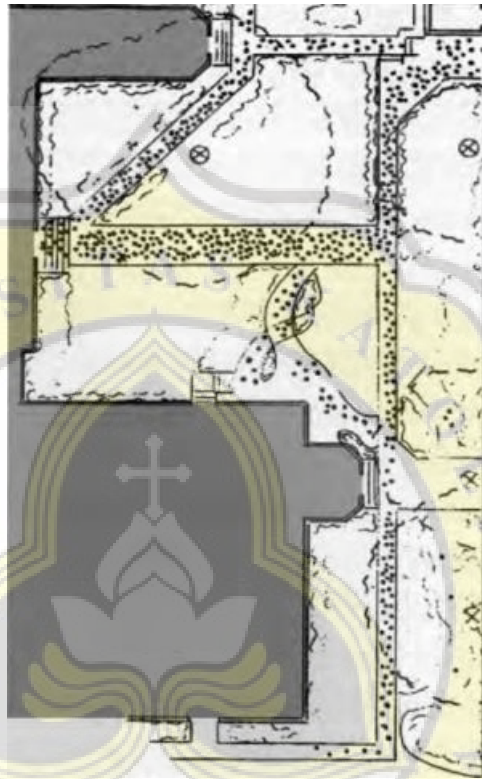


Figure 5.2 Over an eight-hour period, a hospital garden is crowded with pedestrians.

Source: Marcus & Barnes

The presence of the natural environment has been shown to have a direct impact on the recovery of those who are suffering from illnesses. It has been demonstrated in studies that individuals admitted to hospitals who are exposed to nature, whether through views or direct participation, benefit from their experience. These include shorter recuperation times, lower levels of stress and blood pressure, as well as decreased physical discomfort and levels of depressive

symptoms (Schweitzer, Gilpin & Frampton, 2004; Ulrich, 1984). In addition, research indicates that naturally shaped constructed form has beneficial psychological benefits on our mental health and well-being (Joye, 2007).

C. Sound, Music, and Art Therapy

The sounds in the care environment have a significant impact on the individual's healing process. Excessive noise in a health environment must be avoided, however playing music for therapeutic purposes appears to be beneficial. The importance of sound in environments cannot be overstated. Noise, speech privacy, and speech intelligibility are all different characteristics of sound that affect personnel, patients, and visitors. According to a research published by the Centre for Health Design, Joseph and Ulrich (2007), hospitals globally continue to be highly noisy, reaching as high as 85 decibels (A). The World Health Organization recommends that the background noise level in hospital patient rooms be 35 dB (A) during the day and 30 dB (A) at night (Joseph & Ulrich, 2007). According to Joseph and Ulrich, sound levels in hospitals are 100.000 times higher than what is considered tolerable. This disruption has a direct effect on patient annoyance, blood pressure, sleep apnea, heart rate, and respiration.

Art in the care context has led to conclusions comparable to those of music therapy. Florence Nightingale recognized that patients require some form of sensory stimulation in order to maintain a high quality of life (Rapp, 2008). Along with incorporating art into the care environment, art therapy has been integrated into a variety of health care settings. Group psychotherapy programs have been established to immerse a group of individuals in the arts under the supervision of

a professional. These sessions of creative art therapy have been shown to help patients relax, boost their self-esteem, and promote social engagement.

D. The Home-Like Environment

Create as much of a homelike environment as feasible within the building. The advantages of establishing a home environment accrue to both personnel and patients. Defining a home-like environment for people appears to be a difficult task. According to Colucci (2008), the building's programmatic requirements included the ability to function as a huge community with shared services. Common services have to operate on a smaller, more repetitious scale as well. Each cluster has shared spaces/services such as a living room, dining room, and kitchen. Each resident cluster would be visually connected to the others via the corridors and courtyards. Involvement of visiting family was also deemed critical for each family cluster. Residents were able to visit in the open or in the seclusion of their resident rooms through the use of common areas.

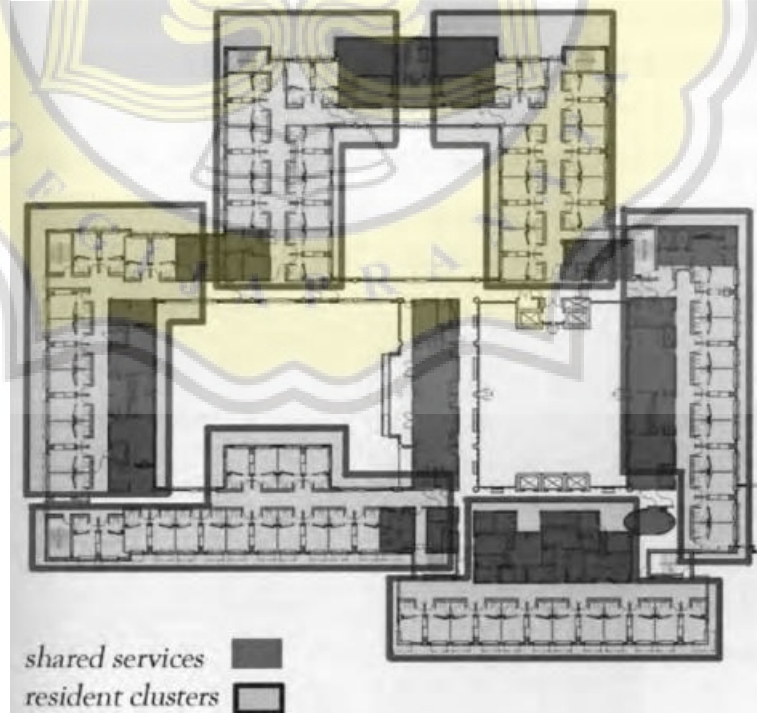


Figure 5.3 Clusters of families that comprise the greater Apotex community

Source: Diamond + Schmitt Architects

E. Create Place to Heal

Prior to the advent of modern science and technology, man coexisted with nature in a symbiotic partnership. Maintaining a healthy relationship with the environment was a barometer of an individual's health. Environmental psychology research has demonstrated the undeniable benefits of natural surroundings and alternative types of rehabilitation. Evidence-based design is the practice of designing in response to research findings such as these.

As a result, future healing spaces should incorporate these beneficial kinds of natural therapy. Future care facilities may be able to minimize the institutionalized sentiments caused by technology. They will be more oriented on our intrinsic connections to nature, in order to create actual healing spaces.

D. Color as Therapy and Energy

Color is one of the most important architectural components that affects the quality of surroundings, and it also has significant effects on the psychology and physiology of people. It is one of the most important architectural elements that affects the quality of environments. Its application in architecture and the built environment has the potential to significantly alter perceptions of architectural space and perspective. When color is introduced into these fields, however, the highly subjective quality of color is also emphasized, which is a good thing. Its application has historically been one of the most unpredictable areas of architectural decorating; each individual's experiences are unique, and no amount of analysis can successfully anticipate how different people will respond to the same color. It is possible to put almost any color generalization into practice and have it be proven incorrect (Linton, 1999).

Color has a significant impact on our lives, as it produces the appearance of spaciousness, richness, warmth, and coolness in our surroundings. “According to Birell (1967), to speak of colors is to speak of the drama of one's own existence.” Color has an impact on our emotions, actions, and responses to a wide range of people, things, and ideas. A significant influence on our decorating, furnishing, and wardrobe decisions is the color palette we use. Many of the things we see around us are represented and distinguished by color, and color plays an extremely essential part in our understanding of our surroundings. Color has the ability to influence thinking, modify actions, and elicit reactions. Increased blood pressure and appetite suppression are all possible side effects of using it.

The use of primary colors is popular among¹¹ children because they stimulate their senses with vibrant colors. Teenagers are drawn to brighter, more stunning colors, which explains their love for neon colours, deep reds, and the darkest blacks, among other hues. Adults want tones that are a little softer. Even people's educational degrees and degree of sophistication appear to have an impact on their color preferences. The vast majority of highly educated and sophisticated individuals prefer complex colors, whereas those with less knowledge and lesser income choose low intensity, plain colors.

The use of color in the design of the spaces is an important consideration in the creation of the spaces¹². Color is being employed to perform more vital purposes than simply providing aesthetic enjoyment, as both the designer and the client are becoming more aware of the significance of color. In general, the emotional response to color is seen, but it is possible to study it scientifically. The hue is being used in a variety of public and private venues, including schools, industry, hospitals, hotels, and private residences. It offers a

¹¹ Sarjoo Himanshu Patel. Colours preferred by Today's Youth in their Rooms. Access on 30 Sept 2021

¹² Zeynep Başoğlu. A Comparative Study on Color Preferences of Children for Their School Environments: Two Private Schools in Ankara.. Access on 30 Sept 2021

significant amount of significance when dealing with human moods and emotions. It is used to promote more comfort while also reducing neurotic tension and anxiety.

The concept of progression describes how to move through an area, either literally or visually. It establishes a sense of order or succession in an area. The way you move around a location is influenced by the color you use. It directs you in the right direction and tells you when to turn or halt. When there is a comparative color change, such as moving from dark to light, from one color to another, from tints to shades, or from one point of interest to another, the impression of progression occurs. All of these depict a continuous succession of changes that take place as one moves through space.

Aesthetics is the use of light and color to elicit a response from the viewer that is based on historical or creative sources. The aesthetic attributes of a color describe its relationship to culture, style, and design, as well as its relationship to other colors. Because of their familiarity, culture provides color associations that are comfortable and reassuring to the observer. Color choices are governed by the current fashion and art trends, and are referred to as "style." When it comes to design, color choices are made based on the contrast between non-specific hues for certain effects. All three of these aspects can be used to produce an individual's aesthetic preference.

The focal point of an object or space is defined in terms of its proximity to other objects or its surroundings. It specifies the relative size and importance of the various elements. Color has the ability to change both time and measurement in a location. The dimensions effects of a location or environment have an impact on how long a person can comfortably remain in that space or environment. Color has an effect on measurement because it creates an illusion. The color of a distant object is lighter than the color of an object up close. If a warm color is placed next to a cool color, the warm color will move forward while the cool color will

move backward. Aside from that, colors appear more powerful when applied to a broad surface as opposed to a small one. Color has the ability to significantly alter the physical dimensions of a room when employed correctly (Ladau, 1988).

Color Stimulation for Youth

The color red increases the amount of energy in a room¹³. It's a wonderful choice if you want to get people excited about something. Colors such as red and orange bring people together and spark conversation in a living room or dining area. It makes a great first impression when placed in a doorway. The color red has been demonstrated to increase blood pressure, respiratory speed, and heart rate. Red, the most vivid color, stimulates the release of adrenaline like no other.

Yellow encapsulates the delight of sunshine and conveys feelings of well-being. It's ideal for brightening up kitchens, dining areas, and bathrooms, where the cheerful color is both invigorating and uplifted. Yellow may make a space feel more open and welcome when used in halls, entrances, and tiny spaces. Despite the fact that yellow is a cheerful hue, it is not a smart choice for the primary color scheme of a space. If you're in a yellow room, people are more inclined to lose their temper. Babies also appear to cry more when they are in a yellow room. People who are exposed to this color are more likely to experience feelings of annoyance and rage. This is the color that is the most taxing on the eyes. Yellow was used in chromotherapy because it was believed to activate nerves and detoxify the body.

Blue has a calming effect on the body, lowering blood pressure and slowing respiration and heart rate. As a result, it is believed to be tranquil, relaxing, and serene, and it is frequently recommended for use in bedroom and bathroom décor. Consider using a light

¹³ Sarjoo Himanshu Patel. Colours preferred by Today's Youth in their Rooms. Access on 30 Sept 2021

blue as the primary color in a room and incorporating warm tones into the furnishings and fabrics to make it more inviting. In order to promote calm in areas where people congregate such as family rooms, living rooms, and large kitchens, consider using warmer blues such as periwinkle or brighter blues such as cerulean or turquoise. When blue is utilized as the primary hue in a room, it is thought to create a relaxing impact. When choosing a blue color, opt for gentler hues of the color. Dark blue has the inverse effect of light blue. Dark blue is associated with feelings of melancholy. Lighter colors of blue should be used in order to achieve a more relaxing effect.

Green is widely regarded as the most relaxing color for the eyes. Green is a versatile color that can be used in practically any room in the house because it combines the refreshing nature of blue with the cheerfulness of yellow. Sage or a medium green helps to keep things cool in the kitchen; in a family room or living room, it encourages unwinding while still providing enough warmth to inspire comfort and togetherness. It is calming and enjoyable to be in one's bedroom. When employed as the primary color in a room's decor, green has a relaxing impact as well. It is supposed to help people relax, which in turn relieves tension.

Purple, especially in its darkest hues (such as eggplant), is a rich, dramatic, and classy color. It is connected with both elegance and ingenuity, and when used as an accent or secondary hue, it adds depth to a design scheme. Using lighter shades of purple in bedrooms, such as lavender and lilac, can have the same calming effect as blue, but without the risk of feeling frigid.

Orange is a color that elicits feelings of pleasure and enthusiasm, and it is also a vibrant and dynamic color. While this color is not recommended for use in a living room or a bedroom, it is ideal for use in an exercise area. Getting into a fitness regimen will bring out

all of the emotions that one needs to go through the process. Orange was traditionally utilized to treat the lungs and enhance energy levels in ancient cultures.

Neutrals (such as black, gray, white, and brown) are essential to the decorator's tool box. Even if all-neutral schemes come and go in popularity, they have a certain appeal because of their adaptability: Color may be used to brighten up a space, or it can be used to quiet it down. Black is best utilized in small quantities as an accent hue; in fact, some design experts believe that every room should have a touch of black to level the color scheme and give it depth, while others disagree. Walls that are dark make a space appear smaller, whereas walls that are light make a room appear larger.

E. Defensive Space

In the context of housing, defensible space refers to the physical space outside of a house that people see as their own private space, which they are free to occupy and interact with. Newman stated that the physical architecture of a housing community is a critical factor in determining whether outdoor private spaces are defensible. Defensible space theory is based on a large-scale knowledge of defensible space, but it also takes into consideration small-scale physical characteristics of a community. Lighting, benches, and green spaces, among other things, encourage inhabitants to use their external spaces, which in turn results in a reduction in criminal activity. However, the presence of obstacles or other things may create potential hiding places and discourage residents from extending their influence into the areas outside of their dwellings, on the other hand. Furthermore, the availability of these potential hiding places makes surveillance more difficult, resulting in a more suitable atmosphere for criminal conduct to take place in.

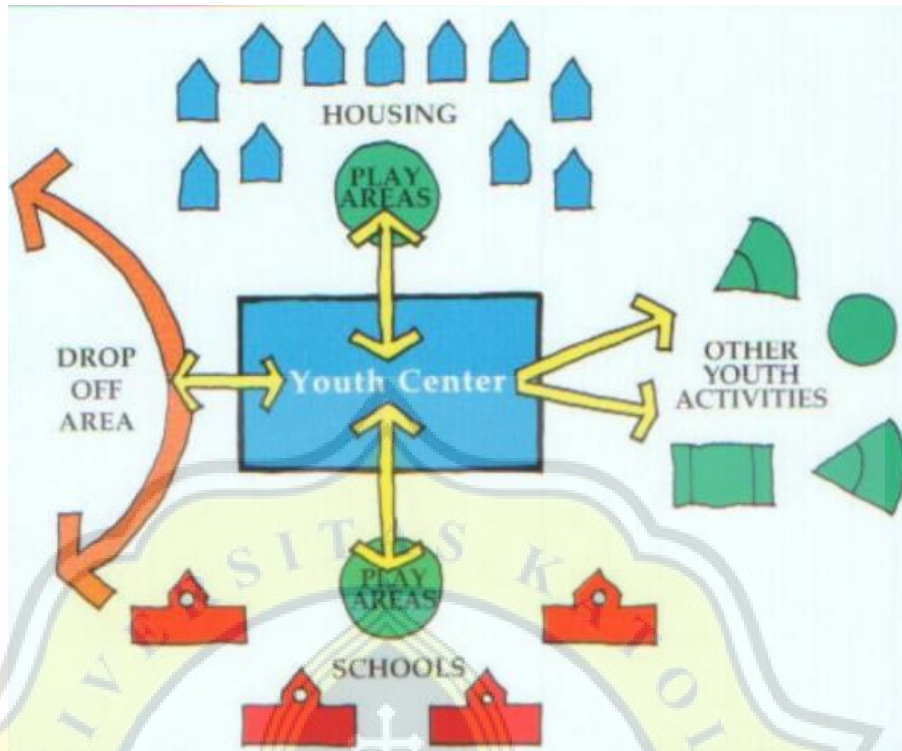


Figure 5.4 Location Diagram

Source: Air combat command youth center standards and facilities guide

The aesthetics of the facility as well as the visitor's safety should be considered when creating the first impression. Keeping the drop-off area separate from the parking lot, situating bicycle racks away from traffic, and offering an easily recognized and secure building entrance all contribute to increased safety. Sites and facilities for youth centers that are close to housing areas, schools, and other youth activities have been identified. You should avoid situating a youth center near a noisy or hazardous place, such as a busy intersection, a flight path, or an industrial region. Select facilities for renovation that are large and flexible enough to accommodate the complete spectrum of youth activities are being considered for consideration.