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ORGAN DONATION CENTRE IN CYBERJAYA, SELANGOR

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ABSTRACT

This study aims to propose an Organ Donation Assistance Centre that focuses on providing comprehensive support throughout the organ transplant process, considering the physical environment healing, and offering educational programmes to increase awareness and eradicate misconceptions. By establishing such a centre, we can effectively increase the transplant rate, promote a healthy lifestyle, and ultimately save more lives. The project is to provide a comprehensive environment that encourages awareness, education, and coordination of organ donation procedures, with an emphasis on developing a purpose-built facility suited to the particular requirements of organ donation. The design concept highlights the integration of sustainable design principles and human-centred approaches to create a transformative space for individuals and families affected by organ donation. The Organ Donation Centre seeks to promote cooperation among medical professionals, organ donors, organ recipients, and the wider community by acting as a light of hope, healing, and compassion through a multidisciplinary design approach. Studies and researches throughout the literature review, precedent studies and case studies, and in-depth interview have guided the design process to come out with the final design. The Organ Donation Centre consists of three main components which are, the public amenities, organ recipient facilities, clinical spaces, and organ donor accommodations. Confidentiality is the main concept to keep the secrecy of organ donor and organ recipients' identities hence the zonings for organ donors and organ recipients are separated including their flow from registry to the operation theatre and towards recovery. The layout of operation theatre designated for organ transplant living donation was focused on as special studies.

Keywords: Organ donation, Organ transplant, Organ living donation, Organ transplant centre

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1.0 INTRODUCTION

Organ donation is the process of surgically removing an organ or tissue from one person (the organ donor) and transplant it into another person (the recipient). Transplantation is necessary because the recipient's organ has failed or has been damaged by disease or injury. In Malaysia, the Health Ministry Dr. Zaliha told the rate for organ transplant is among the lowest compared to other countries. Malaysia's rate is at 0.7 per million people in 2022 (Bernama, 2023). IRODaT 2023 recorded the top countries in the rank show a huge difference from Malaysia such as Spain at 46.3 per million people (p.m.p.), United States at 44.5 p.m.p. in and Belgium at 29.4 p.m.p. in 2022 (Ashamuddin & Rahim, 2024).

In 1975, Hospital Kuala Lumpur (HKL) carried out the first-ever living kidney donation in Malaysia. Even though the first organ transplant was performed more than 45 years ago, the number of patients in Malaysia who need transplant surgery due to end-stage organ failure still outweighs the country's organ and tissue donation and transplantation rates. Giving is a kind deed that has the power to transform countless lives.

The key study of the paper is based on several issues. Firstly, demand for organs are expected to increase as the factors contributing to organ failure are worrying. The rate for adult obesity is increasing and Malaysia already rank in top 1 in Asia for adult obesity and at top 2 in ASEAN for children obesity. In addition, kidney failure and liver failure related to Hepatitis B and Hepatitis C endemic in Malaysia are also increasing.

A few studies in Malaysia suggest that cultural and religious factors are the main barriers to organ donation, while others argue that the public's mistrust of the medical system is another reason why people are reluctant to donate Makmor et al (2014). According to Husin et al. (2018), knowledge about permissibility of organ donation is the first step to raise awareness because this shape the willingness of Muslims to support organ donation.

The mental state to accept the news of the organ failing, cooperate with the pain and physical limitations, and lifestyle changes to be dependent on dialysis and medications to treat the physical symptoms is challenging. In addition, these patients also facing anxiety thinking of someone has to die for them to receive an organ is quite common among patients. Li et. al. (2012) stressed on how crucial it is to give these individuals awaiting organ transplants extra psychosocial care. A study by Baharuddin and Nawawi (2024), suggested that the integration of a therapeutic garden within the hospital environment would assist in patient well-being as it would provide connection to greeneries and outdoors.

Organ transplant surgery in Malaysia is held in a number of specialised hospitals mainly in Kuala Lumpur and Selangor due to availability of the specialists. As for organ donation, the organs of deceased donors are harvested at the Organ Procurement Units which are the state hospitals of every state in Malaysia and deliver the organs to the recipients at the specialised hospitals. The transportation for the organs donated are managed by the National Transplant Resource Centre organisation, either by helicopter or airplanes, and ambulance. However, according to Naghavi et. al. (2020), logistic difficulties are one of the main factors for an organ transplant to be declined. This is because the most important measure in transplant is the timeframe for the organ to be kept preserved in a static cold storage before the transplant surgery.

1.1 RESEARCH FRAMEWORK

issue	questions	objectives	solution	architectural solution
lack of organ donation awareness, misconception and fear	how to educate public about organ donation?	to create programme that integrate public education of organ donation	positive socialization	provide spaces for exhibition, informative talk, interactive gallery for organ donation campaign
organ recipients facing anxiety and stress waiting for organ	what is the proper environment for the waiting organ recipients?	to define the environment principles that calm organ recipients	stress-free environment	provide care and space according to healing architecture to offer tranquillity
no organ donation centre in Malaysia	how to design comprehensive organ donation centre?	to design a comprehensive organ donation centre	comprehensive organ donation centre	well-designed comprehensive organ donation centre

Figure 1: Research framework

1.2 AIM

The aim of this study is to propose the creation of an organ donation assistance centre that focuses on providing comprehensive support throughout the organ transplant process, considering the physical environment healing, and offering educational programmes to increase awareness and eradicate misconceptions. By establishing such a centre, we can effectively increase the transplant rate, promote a healthy lifestyle, and ultimately save more lives.

1.3 RESEARCH OBJECTIVES

1. To implement architectural solution that cater to the requirements of organ transplant procedures, organ donors and organ recipients.
2. To integrate healing environment into the centre as to offer tranquillity as therapeutic experiences for both organ donors and organ recipients.
3. To promote healthy lifestyle and raise public awareness of organ donation through architecture.

1.4 RESEARCH QUESTIONS

1. How to design a comprehensive organ donation centre?
2. What is the preferred environment for the waiting organ recipients and the organ donors?
3. How to educate public on organ donation through architecture?

1.5 RESEARCH STATEMENT

The establishment of an organ donation centre that offers comprehensive assistance to donors and recipients, including education on the organ transplant process and continuous support from pledging to recovery, while monitoring the organs and patient's health with a physical environment that influence on the healing process, we can enhance the effectiveness and success of organ donation, ultimately save more lives and improve the overall transplantation outcomes.

1.6 RESEARCH LIMITATIONS AND SCOPES

Characteristics of an organ donation centre that includes potential building programs, zoning, functions, spaces, target users and architectural style and identity. Requirements for a transplant centre as tertiary healthcare that includes health department required, spaces of treatments and its suitable dimension, public amenities, facilities and services. The idea application of sustainable approaches, human-centric design and healing environment in the transplant centre. Due to lack of similar typology of transplant centre, the precedent studies and case studies for this project are chosen among the specialised hospital. The planning and design considerations are analysed from the studies including the flow of the transplant process.

1.7 SIGNIFICANCE OF THE STUDIES

This research will assist decision-makers in developing any measures based on findings to disseminate ideas for an organ donation centre that are based on the constructed theoretical framework. It stresses the importance of human-centric design and healing environment as an approach of awareness for organ donation. Due to the sensitivity of the subject matter, the importance of architectural design is highlighted as an indirect strategy to help promoting organ donation in Malaysia while showing appreciation to the donors.

1.8 RESEARCH METHODOLOGY

In order to accomplish the research goal, this research methodology combines qualitative and quantitative data collection techniques. This guarantees the synchronisation of the data obtained. Information were gathered from primary as well as secondary sources. As part of the literature review, research journals, publications, and news articles were gathered as part of the data collection procedure. The components of the study, including the research questions, aims, and technique, are correlated. A more thorough description of the research approach is provided in diagram below.

questions	objectives	thesis methodology	architectural solution
how to educate public about organ donation?	to create programme that integrate public education of organ donation	literature review	provide spaces for exhibition, informative talk, interactive gallery for organ donation campaign
what is the proper environment for the waiting organ recipients?	to define the environment principles that calm organ recipients	case study literature review	provide care and space according to healing architecture to offer tranquillity
how to design comprehensive organ donation centre?	to design a comprehensive organ donation centre	case study in-depth interview literature review	well-designed comprehensive organ donation centre

Figure 2: The research methodology approach

2.0 SITE

2.1 SITE INTRODUCTION

Situated in Malaysia's Multimedia Super Corridor, Cyberjaya is a city centred around a science park. It is situated in Selangor Sepang District. Putrajaya, the government seat of Malaysia, is next to Cyberjaya and was established alongside it. The goal of this metropolis is to become Malaysia's Silicon Valley. Cyberjaya was officially opened on May 17, 1997, with Prime Minister Mahathir bin Mohamad leading the ceremony. The city is home to numerous data centres and major corporations. The Hulu Langat (Kajang) district was in charge of Cyberjaya, Putrajaya, and Dengkil. There formerly stood an estate called Prang Besar (Great War) on the location of Cyberjaya. With an approximate land area of 7,000 acres, the city forms the core of the Multimedia Super Corridor (MSC), which is currently referred to as MSC Malaysia. Plantations of oil palm predominated largely on the undeveloped territory that would eventually become Cyberjaya. Since then, a lot of construction has taken place there, including the construction of a community club, a boutique hotel, a number of commercial buildings, offices for MSC Status firms, universities, and the local council's headquarters. Its purpose was to build a future city.

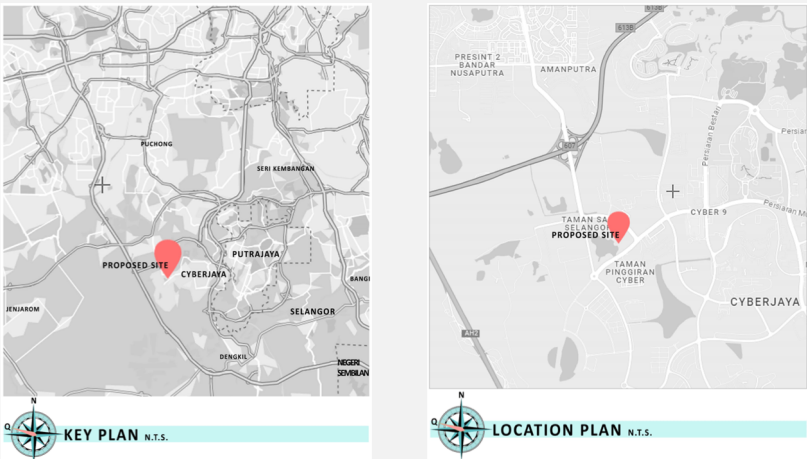


Figure 3: Key and location plan

The proposed site located at the state of Selangor, Malaysia. Situated at Southwest of Cyberjaya city, 30km from Kuala Lumpur and 33km from Kuala Lumpur International Airport (KLIA). The location chose based on several criteria as shown in Figure 4.

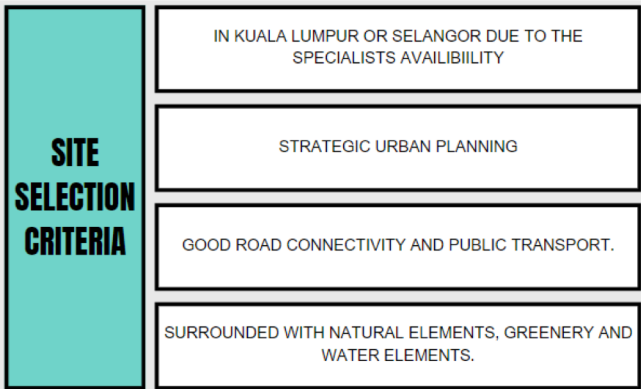


Figure 4: Criteria for a site selection

2.2 SITE INFO

Cyberjaya is a district subdivision in Sepang, Selangor. The population reaches 100,000 people where majority are knowledge workers and students. Other than that, huge percentage of the population are Malays, followed by Chinese, Indians and others.

The proposed site is located at 2°55'06"N 101°37'44"E in Cyberjaya, Selangor. The area of the proposed site is located 33 km from Kuala Lumpur and 30 km from Kuala Lumpur International Airport (KLIA). Located approximate 500 metres from Cyberjaya Hospital and by a small pond, this proposed site has good view of natural elements of greeneries and water elements.

Land Area: 6.76 acre
Land use: Multi-development
Plot Ratio: Floa1:4
District: BPK 1.4 Selangor Cyber Valley

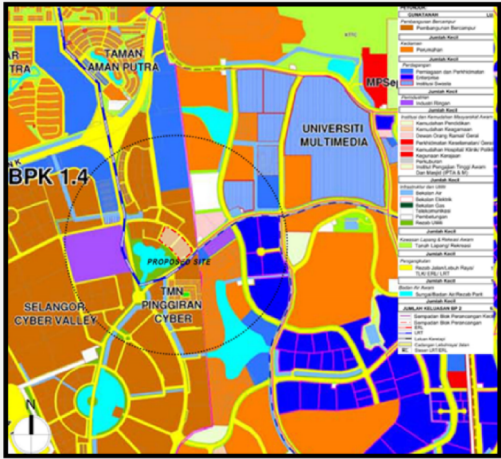


Figure 5: The land use and zoning in Cyberjaya, Selangor. (Source: RTK BP 1.4, 2021)

The zoning for the proposed site is multi-development zone, however based on the RTK BP 1.4 (2021), other typology such as healthcare can be built on the site. The site are surrounded with residential area, commercial zone and institutional zone within 1 kilometre radius. Thus, it is suitable for the transplant centre to be located there due to the well-developed city, and near to the local community.

2.3 SITE ANALYSIS

The proposed site location in Cyberjaya presents as a strategic setting for the centre, offering panoramic views as the site consists of natural green element and water element at the south side of the site. Its strategic placement in well-developing city coupled with easy accessibility, high visibility, pleasant climate conditions and natural ventilation, enhances its value. The site's accessibility by various mode of transportations eases the journey for both organ donors and organ recipients to come to the site. The connectivity to the proposed site is an important consideration due to the urgency of organ transplant procedures and ease the users travel experience. The criteria of the proposed site meets the initial goals of the project which is healing environment, so the natural water element and green area is vital to ensure the sense of belonging in the site.

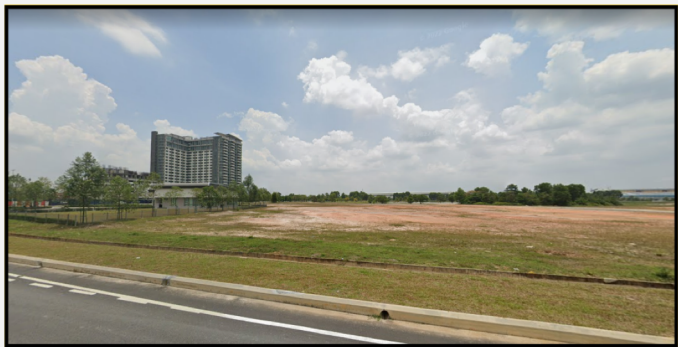


Figure 6: West view of the proposed site.



Figure 7: East view of the proposed site.



Figure 8: West view of the proposed site.



Figure 9: South view of the proposed site.
(Source: Tideschart.com)

2.4 SITE SYNTHESIS

The proposed site is considered to have a strategic placement considering the accessibility from the city centre of Kuala Lumpur and the KLIA. According to site microanalysis studies, the building orientation adheres to the sun direction where the longer penetrations of the building are facing the North side and the South side. Other than that, the public, private and semi-private zoning are determined together with internal circulation of the site. Most openings are facing the best view which is towards the South where the small pond located. Other than that, thick greeneries are to be integrated into the design especially at the East side of the site buffering the traffic noise form the main road, Persiaran Multimedia. Moreover, a welcoming elevation and façade facing towards the main road creating an inviting vista.

2.5 DESIGN BRIEF

The Organ Donation Centre design thesis aims to address the critical need for dedicated spaces and a therapeutic environment to bolster the Gift of Life Programme in Malaysia. With a focus on raising awareness about organ donation, particularly living organ donation, the project endeavors to facilitate education, coordination, and support for Malaysians considering organ donation. The target client for this project is the National Transplant Resource Centre (NTRC), operating under the Ministry of Health, Malaysia.

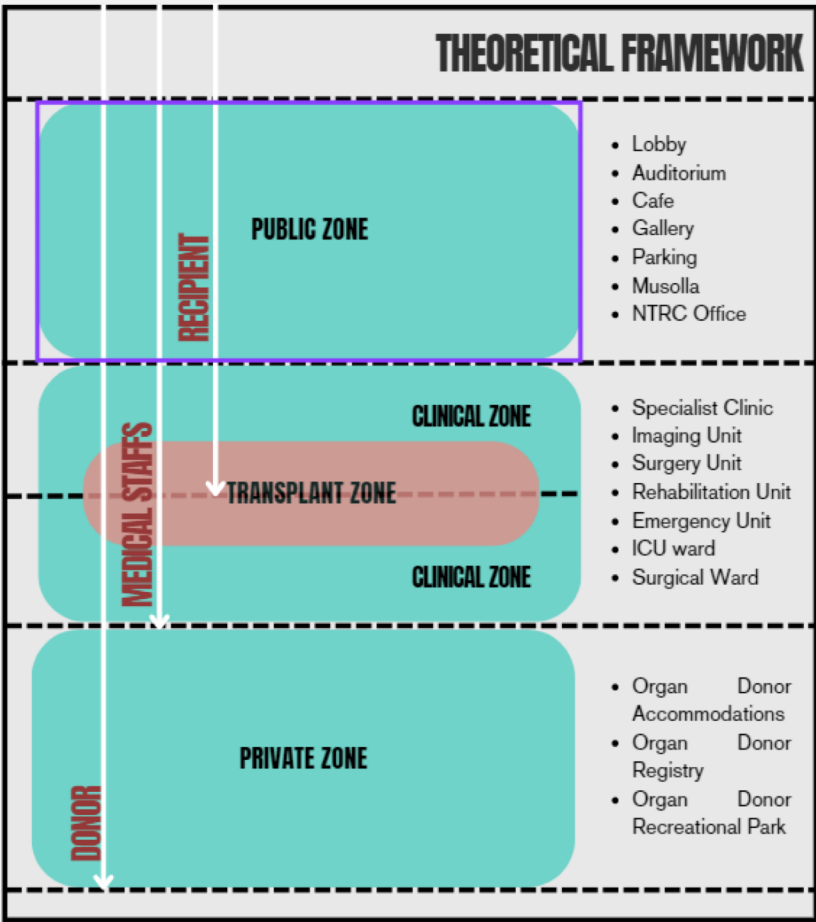


Figure 10: Theoretical framework.

2.6 USERS AND PROGRAMME FRAMEWORK

Confidentiality in living organ donation refers to the practice of protecting the privacy and anonymity of both the organ donor and the organ recipient, ensuring that their identities remain undisclosed to each other. This approach is implemented to respect the wishes and preferences of individuals involved in the donation process and to mitigate potential ethical, social, and psychological concerns that may arise from direct contact between donors and recipients. Here is the programme flow for both organ donor and organ recipient in the organ donation centre from registration until recovery.

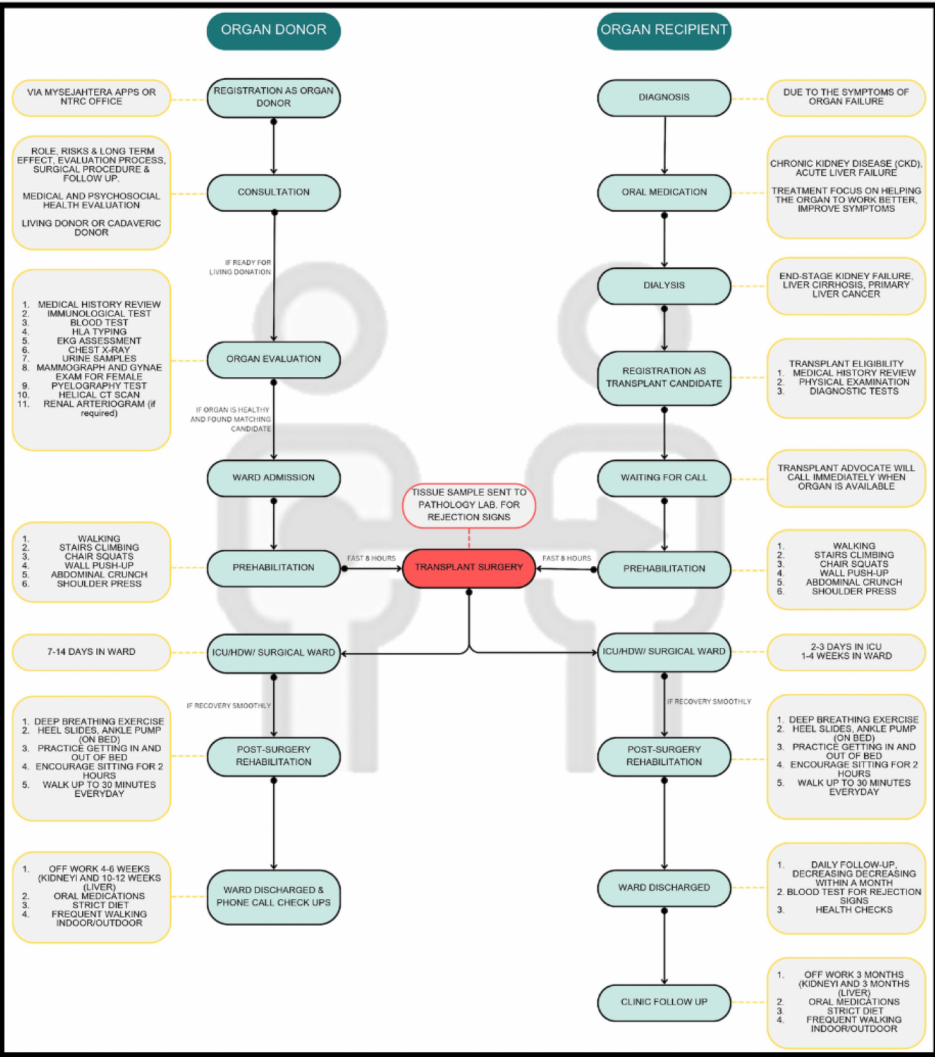


Figure 11: Programmed framework

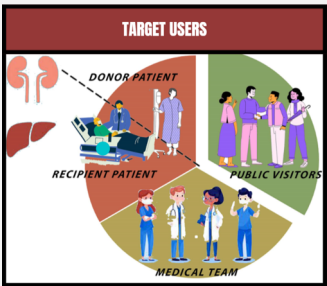


Figure 12: Target Users

2.7 DESIGN CONCEPT

2.7.1 THE HIDDEN DEED

The initial concept design for the architectural thesis focuses on establishing a clear separation between donor patients and recipient patients within the proposed facility, in accordance with ethical guidelines outlined by the Malaysian Medical Council (2006). By prioritising privacy, confidentiality, and respect for individual autonomy, the design aims to create supportive and healing environments for individuals involved in the organ donation and transplantation process while upholding ethical standards and principles.

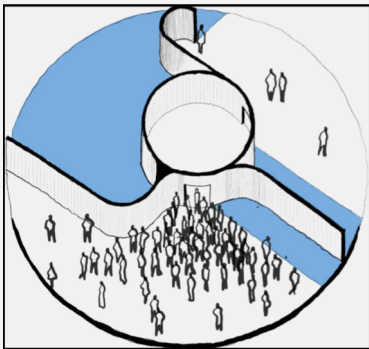


Figure 13: The interconnectedness between organisms and ecosystems.

2.7.2 ISLAMIC VALUE

From an Islamic standpoint, organ donation is a complicated matter that needs to be carefully considered in light of numerous moral, legal, and religious precepts. Although Islamic teachings do not have a single, definitive position on organ donation, numerous academics and religious authorities have offered counsel and interpretations based on the fundamental principles of Islam.

Charity and Compassion (Sadaqah):

Islamic beliefs promote deeds of generosity, kindness, and sympathy for other people. Donating an organ can be seen as a charitable gesture that uplifts society and satisfies the need to assist the underprivileged. The Prophet Muhammad (peace be upon him) said, "The best of people are those that bring most benefit to the rest of mankind" (Hadith), emphasising the value of easing suffering and aiding others.

Intention and Assent:

In Islam, the purpose (niyyah) of a deed is very important. Both the donor and the recipient of an organ must really intend to save life and practise compassion for organ donation to be accepted.

Islamic jurisprudence holds that organ donation should only take place with the voluntary and informed consent of the donor or their family. Consent is fundamental to Islamic ethics.

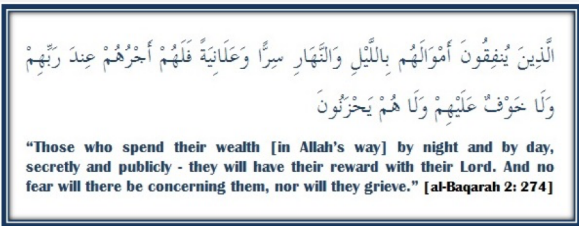


Figure 14: Surah Al-Baqarah, Verse 274.
(Source: Al-Quran)

3.0 SITE PLAN

Building is orientated based on the site synthesis, where the longer side of the building are facing North and South. Every block is arranged on its zonings. The zoning for recipient areas and donor areas are determined, with clinical block connecting both donors and recipient. Services zoning to be hidden at the back of the building.



Figure 15: Site Plan

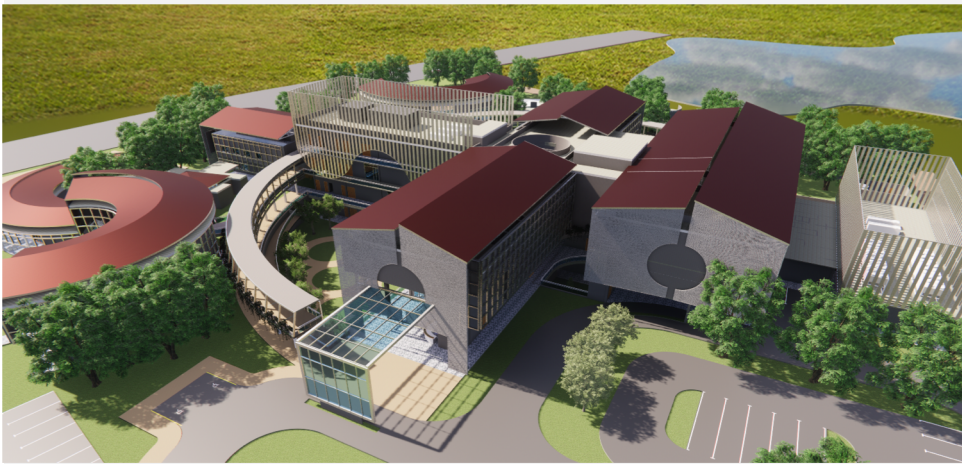


Figure 16: Perspective

3.1 LOWER GROUND FLOOR PLAN

The lower ground level has three main spaces. Firstly, the rehabilitation unit consists of indoor rehab gym and outdoor rehab park for both organ donors and organ recipients. This unit separates both organ donor and organ recipients to not meet each other due to confidentiality matter. Other than that, is the imaging unit, facilitating x-ray rooms and CT scan room. This unit only separate organ donor and organ recipients at the waiting area and reception, then enter the rooms by appointment. Lastly, services bay for water pump room, sprinkler tank and hose reel tank are located on this floor. This lower ground level designed with a lot of openings for natural ventilation.

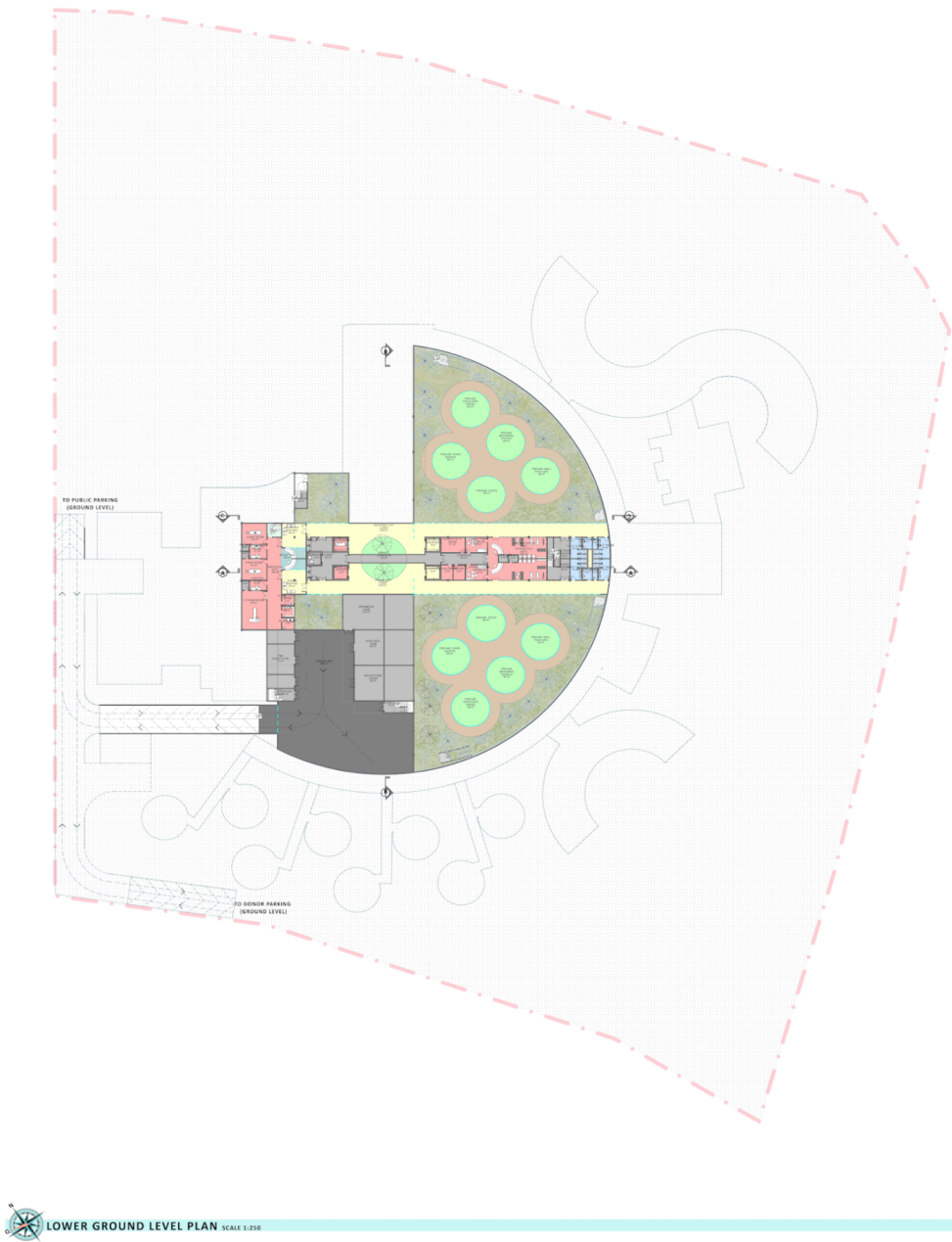


Figure 17: Ground Floor Plan

3.2 GROUND FLOOR PLAN

On the ground floor of the centre, there are two drop offs which are the main drop off and the emergency drop off for emergency cases. As the main drop off connected to main lobby with a receptionist. There are three main components, the public amenities building facilitates café, auditorium, *musolla* and gallery to the public. The clinical building serves dialysis unit for organ recipients in waiting and the centre is where the pharmacy and admission located. Another component is the organ donor accommodations with a clubhouse that facilitates indoor gym, library, café, remote cum office and more for organ donor as incentives for pledging as organ donor. Only organ donor can enter this area, Moreover, loading bay and services located at the back of the building which is the West side of the plan.



Figure 18: Ground floor plan

3.3 FIRST FLOOR PLAN

Clinical spaces are located on the first floor. The main one is the organ transplant operation theatre, consists of four operation rooms which, and separated the zoning and flow of organ donor patient and organ recipient patient. Adjacent to that unit, is the ICU and HDW wards. The north wing is organ recipients ICU & HDW wards, while organ donor's one is at the south wing. The specialist clinic for doctor's consultation appointments is at the centre, provided two separate entrance for organ donor and organ recipient. The east wing is where the National Transplant Resource Centre (NTRC) office.

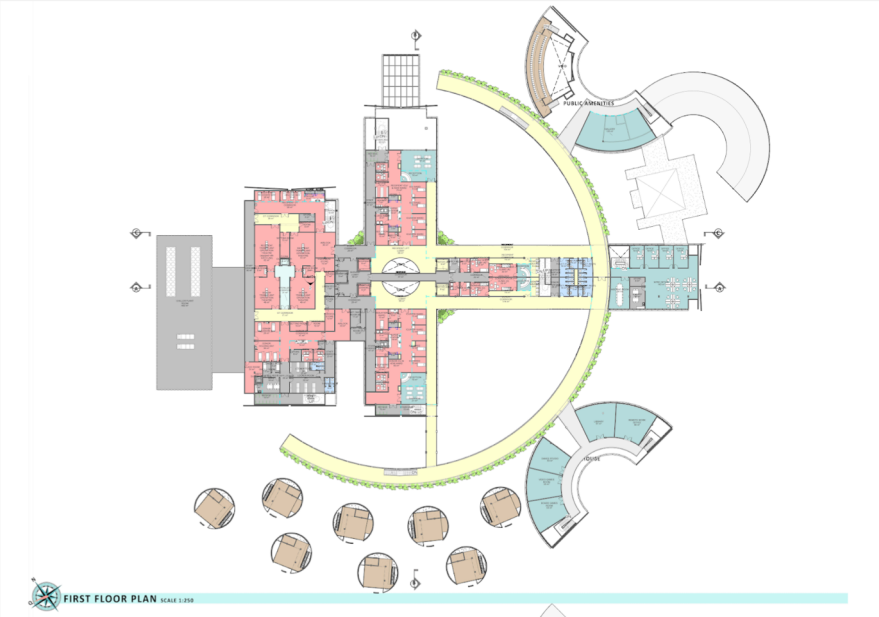


Figure 19: First floor plan

3.1 SECOND FLOOR PLAN

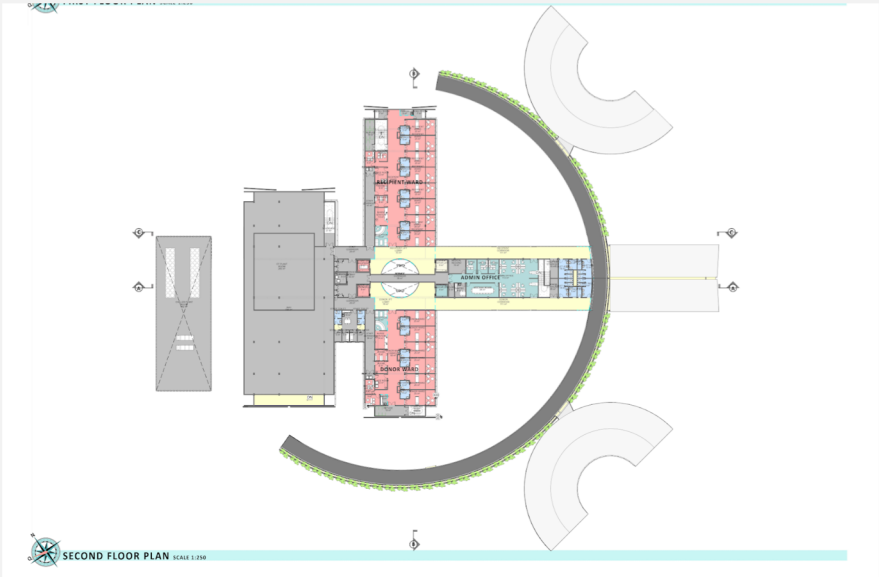


Figure 20: Second floor plan

On the second floor, the administration office is located at the centre. The North wing is where the organ recipient surgical wards and the South wing is the surgical wards for organ donors, post-transplant to be admitted here for several days.

3.2 ELEVATIONS

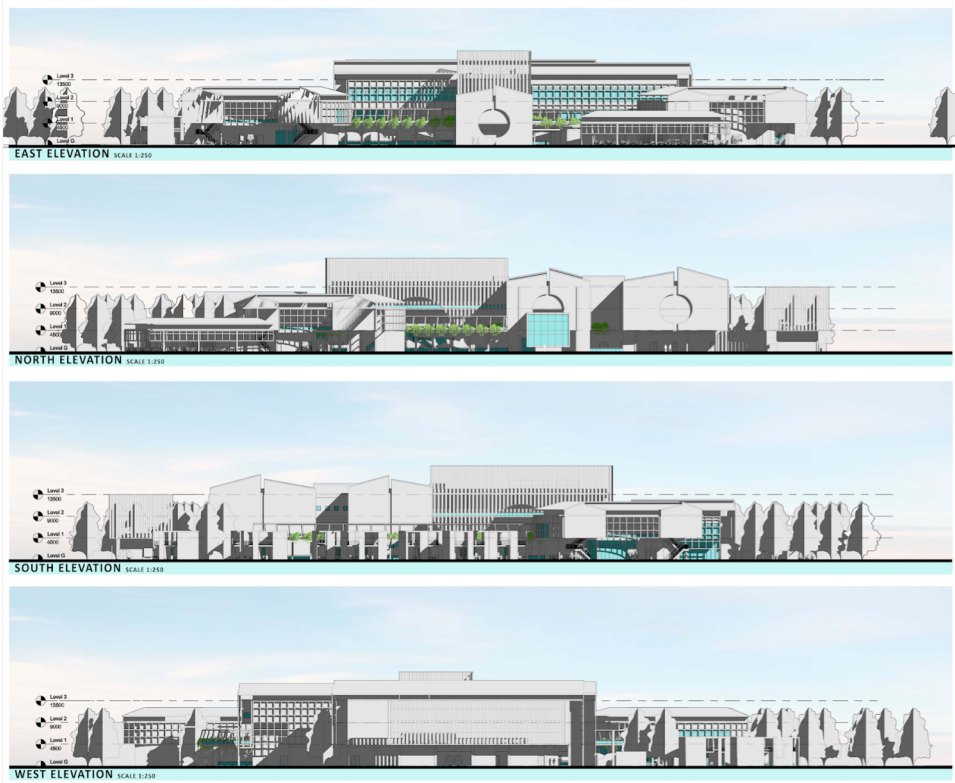


Figure 21: East, North, South, and West building elevation

3.3 SECTIONS

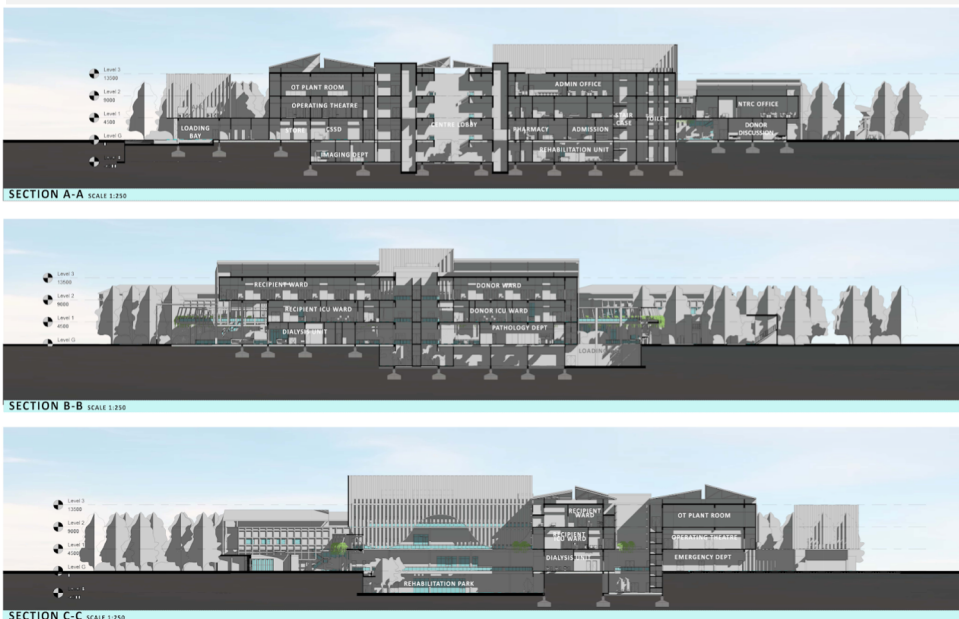


Figure 22: Section A-A, B-B and C-C of the building

3.4 PERSPECTIVES



Figure 23: Perspective view of the front building elevation

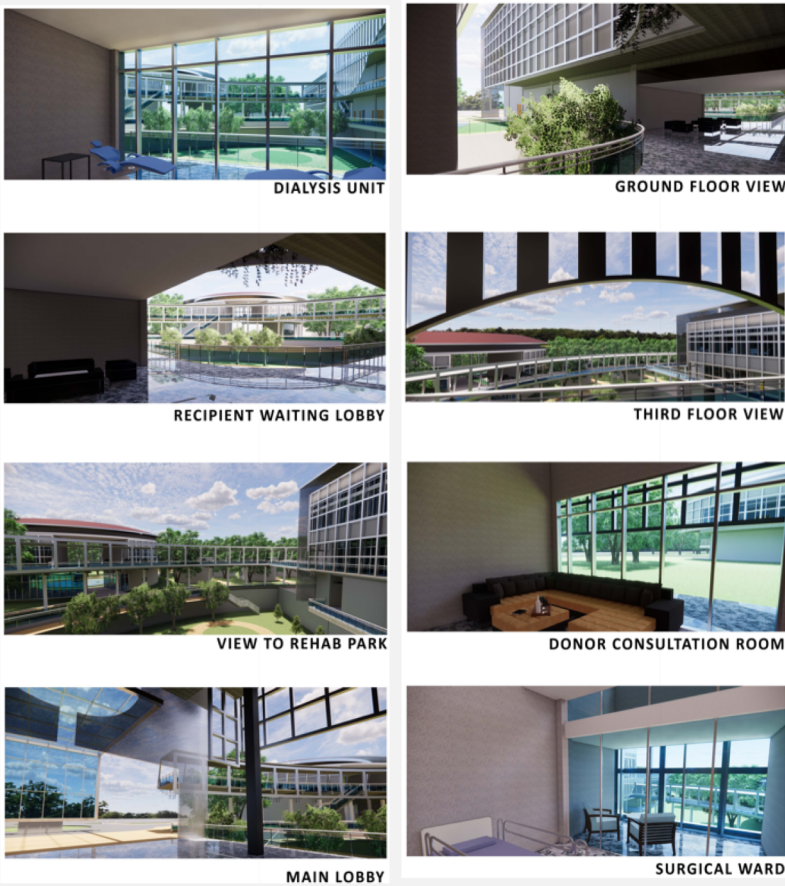


Figure 24: Compilation of Interior perspectives

4.0 SPECIAL STUDY

4.1 OPERATION THEATRE FOR ORGAN LIVING-DONOR TRANSPLANT

An organ transplant centre is a medical facility that specialised in organ transplantation procedures. It performs procedures, provides aftercare, and evaluates both donors and recipients. These facilities make it possible for patients with end-stage organ failure to get life-saving transplant procedures, which greatly enhances their quality of life. It is impossible to overestimate the significance of research and analysis in creating a special operating room for organ transplants involving living donors and recipients while maintaining the idea of secrecy.

It is imperative to construct an operation room specifically intended for organ transplants involving living donors and recipients while keeping anonymity in mind. Throughout the transplantation procedure, it protects the patients' autonomy, dignity, and privacy. Healthcare facilities uphold legal duties, ethical standards, and patient trust by enforcing stringent confidentiality regulations and physical separations. Patient well-being is promoted, and the overall healthcare experience is improved by providing a secure and encouraging atmosphere where confidential medical information is kept private. Respecting confidentiality also upholds the integrity of the organ transplantation process within the medical community, fosters professionalism, and fortifies the bonds between patients and providers.

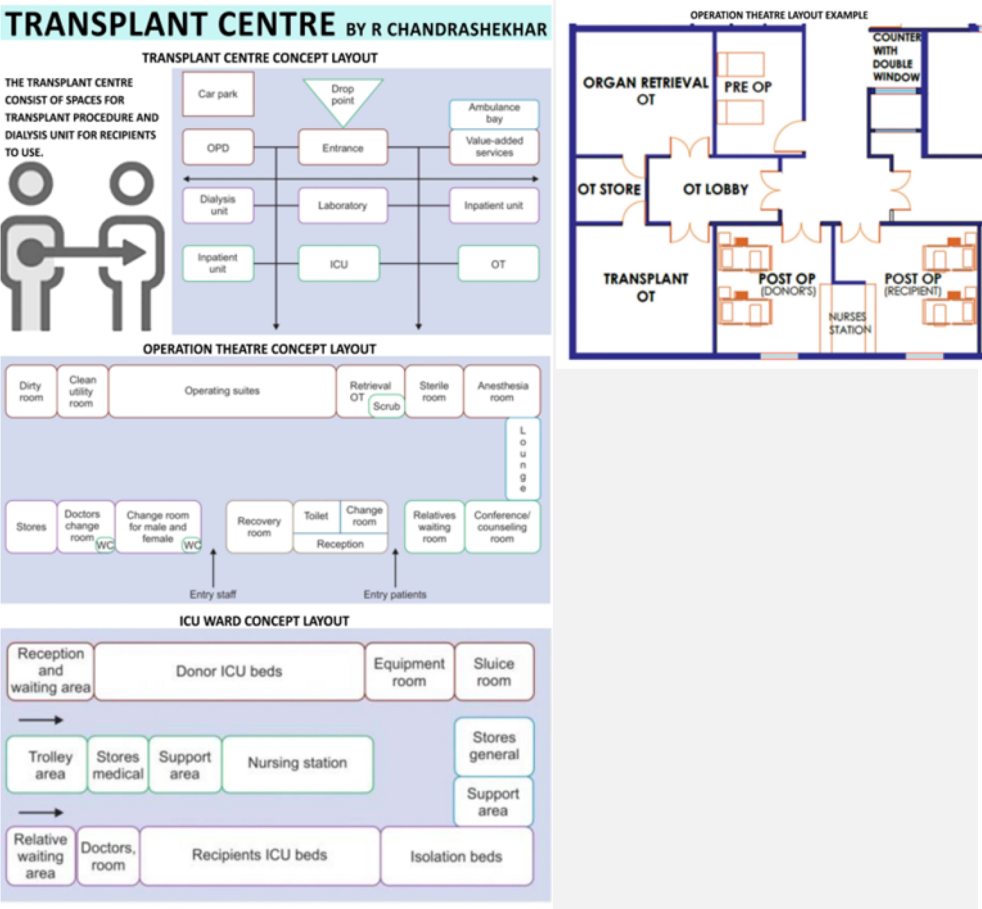


Figure 25 shows on spaces and flow concept of organ transplant ventre, focusing on operation theatre. (Source: Thimmappa et al., 2021)

4.2 CONNECTED OPERATING ROOMS

It is essential for efficient communication, well-coordinated care, and quick access to medical resources for organ transplants involving living donors and recipients to have adjacent or connected operating rooms. Being close together makes it easier for surgical teams to consult in real time, which guarantees smooth coordination throughout complicated surgeries. Patient outcomes are improved when shared resources, including imaging centres and support personnel, are easily accessible. This also cuts down on delays and increases efficiency. Furthermore, being close by makes it possible to react quickly to unanticipated problems, guaranteeing timely treatments and lowering risks. All things considered, adjoining or linking operating rooms foster collaboration, improve patient safety, and enable a unified approach to organ transplantation, which in turn raises the standard of care given to both donors and recipients.

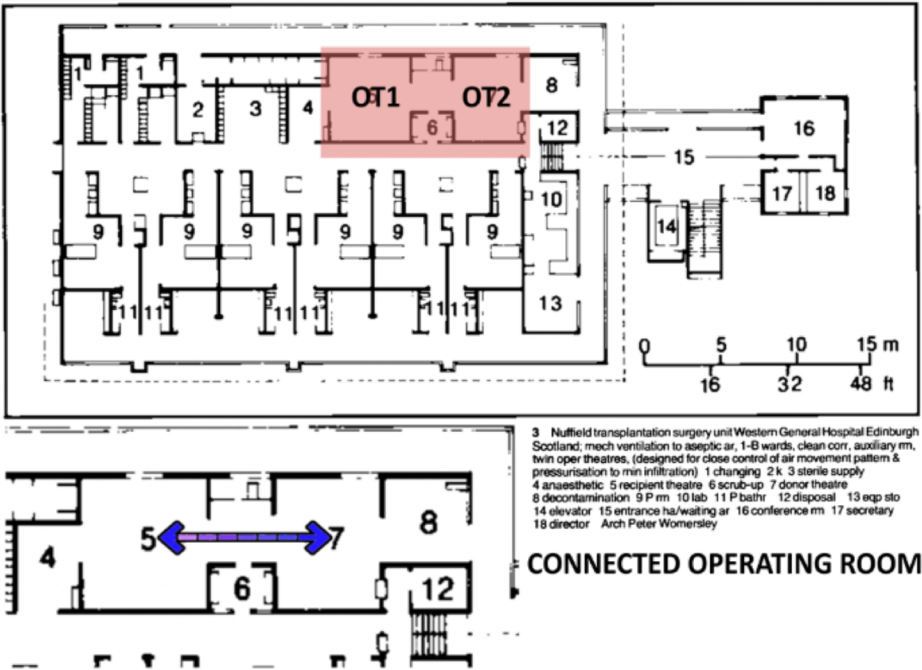


Figure 26: Organ transplant operating rooms connection. (Source: Neufert, 1980)

Typical operating theatre layout, which the operating rooms are not connected.

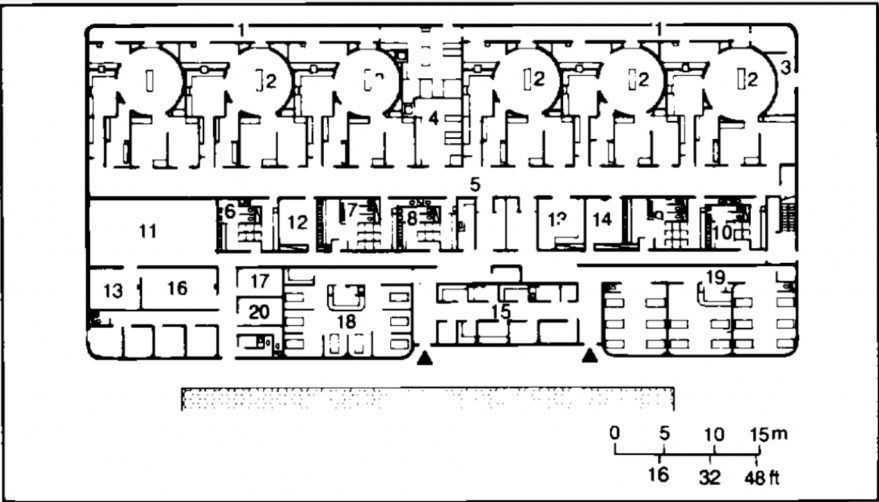


Figure 27: Organ transplant operating rooms not connected. (Source: Neufert,1980)

4.3 TYPICAL OPERATION THEATRE LAYOUT

4.3.1 CENTRALISED STERILE CORRIDOR

The operating theatre suite's central sterile hallway is situated in this arrangement. The sterile hallway is surrounded by surgery rooms, making it simple to go from the sterile area to any operating room. Ancillary facilities like scrub rooms, equipment storage areas, and post-anesthesia care units (PACUs) are usually connected to the corridor. This design maximises the use of available space and streamlines workflow because it allows medical personnel to travel between operating rooms without having to leave the sterile area. Furthermore, materials and equipment can be collected in one area of the sterile corridor for easy access during surgery. All things considered, this arrangement works great for bigger operating rooms that do several surgeries at once.

4.3.2 LINEAR STERILE CORRIDOR

The operating rooms are positioned in this configuration in a straight line down a sterile hallway. The operating rooms are surrounded by a sterile corridor that gives access to each one separately. The arrangement facilitates a more systematic movement of patients, personnel, and apparatus within the operating room. Additionally, it makes it easier to zone various portions of the suite effectively, creating places specifically for pre-operative planning, cleaning, and post-operative recuperation. Smaller operating rooms or institutions with constrained space typically choose this arrangement since it makes the best use of the available space while upholding sterility and productivity. Furthermore, the operating theatre suite's linear layout makes it simple to expand or alter as needed.

4.4 THE USERS FLOW IN THE OPERATION THEATRE FOR ORGAN LIVING-DONOR TRANSPLANT

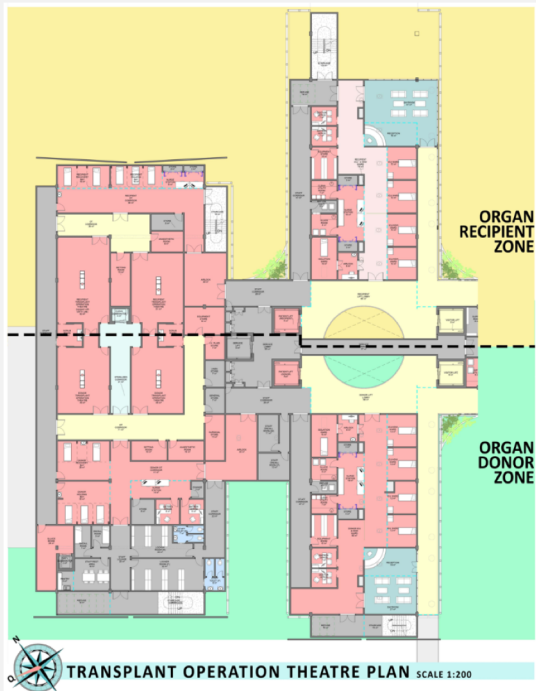


Figure 28: The operation theatre in the organ donation centre.

Organ transplantation is a very private and delicate procedure that frequently involves living donors and recipients who might want to keep their identities private. In addition to protecting patient privacy and individual autonomy, designing a dedicated operating room that maintains rigorous segregation between donors and recipients may also allay ethical worries about direct donor-recipient interaction.

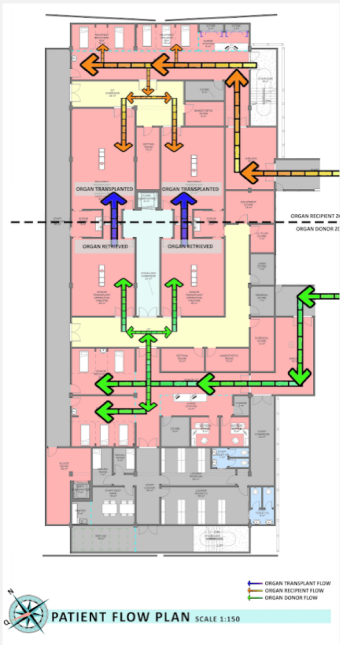


Figure 29 shows separation patient flow layout of organ donor and organ recipient.

To reduce the risk of postoperative problems and graft rejection, organ transplant procedures require strict adherence to sterile standards and infection control measures. Creating a special operating room guarantees that the surroundings are well-maintained, which lowers the risk of surgical site infections and guarantees the best possible results for donors and recipients.

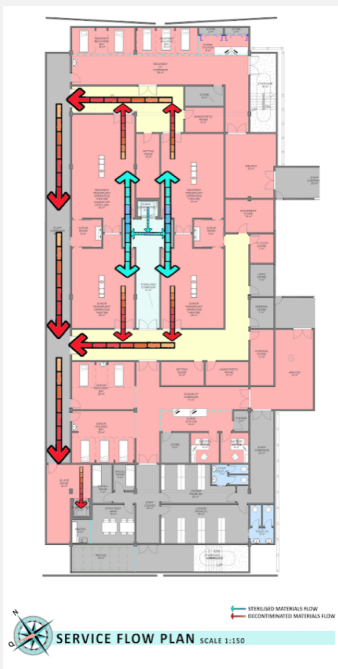


Figure 30 shows sterile equipment flow and decontaminated equipment flow layout.

Due to organ transplant surgeries require specialised care, staff members need a dedicated operating theatre. It offers a sterile atmosphere that is optimised for control, reducing the chance of infection and guaranteeing the security of patients and medical staff. Dedicated facilities also improve patient outcomes by streamlining workflow, increasing efficiency, and enabling staff members to get familiar with the special procedures and tools required for an organ transplant to be effective.

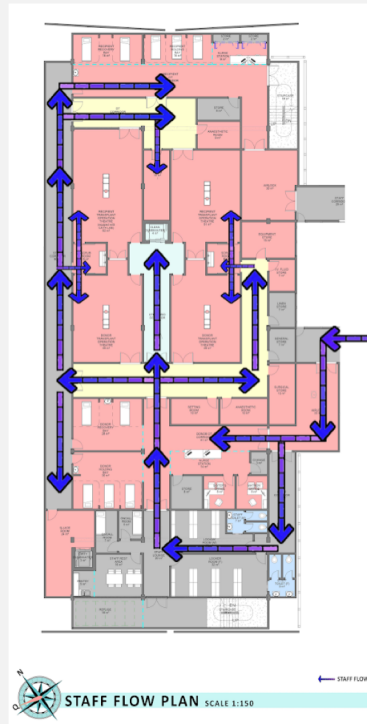


Figure 31 shows the organ transplant team flow layout.

CONCLUSION

To sum up, the architectural design thesis project that centred on building an organ donation centre marks a key turning point in addressing the pressing demand for establishments specifically designed to support organ donation and transplantation. With careful planning, careful investigation, and a dedication to moral values, the suggested Organ Donation Centre realises the goal of offering a comprehensive and encouraging setting for people and their families impacted by organ donation. The design idea places a high priority on the dignity and well-being of both donors and receivers by including the concepts of patient-centered care, confidentiality, and sustainability. The Organ Donation Centre is a communal symbol of compassion, healing, and hope because of the specialised locations, and interdisciplinary teamwork. The Organ Donation Centre also acts as a mobilising force for education, awareness-building, and cooperation amongst medical experts, donors, recipients, and the general public. The Organ Donation Centre has the capacity to inspire positive change, promote organ donation and transplantation as a culture, and save lives through its inventive design and transformative potential. In conclusion, the Organ Donation Centre's architectural design thesis project offers a comprehensive strategy for tackling the many opportunities and difficulties associated with organ donation and transplantation. The planned Organ Donation Centre reflects the values of compassion, and decency by fusing architectural innovation with ethical considerations and patient-centered care.

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