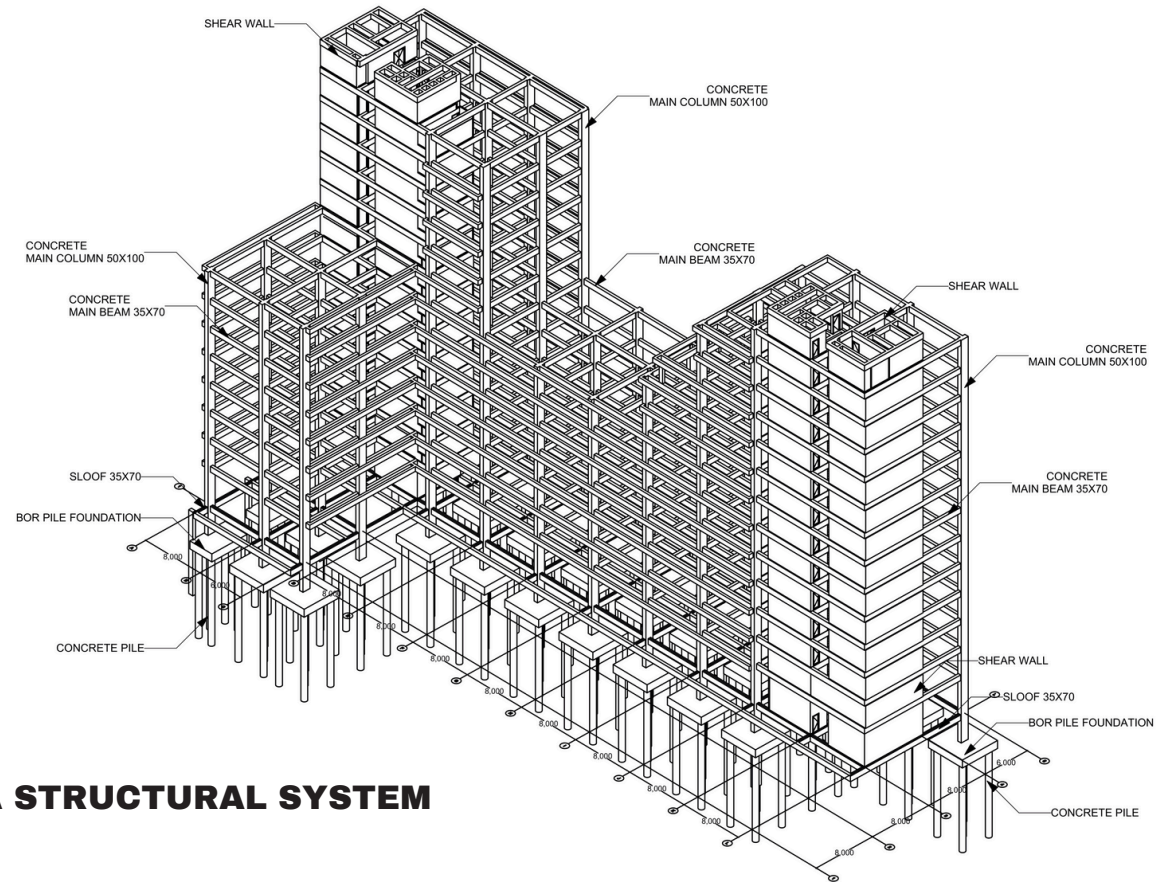
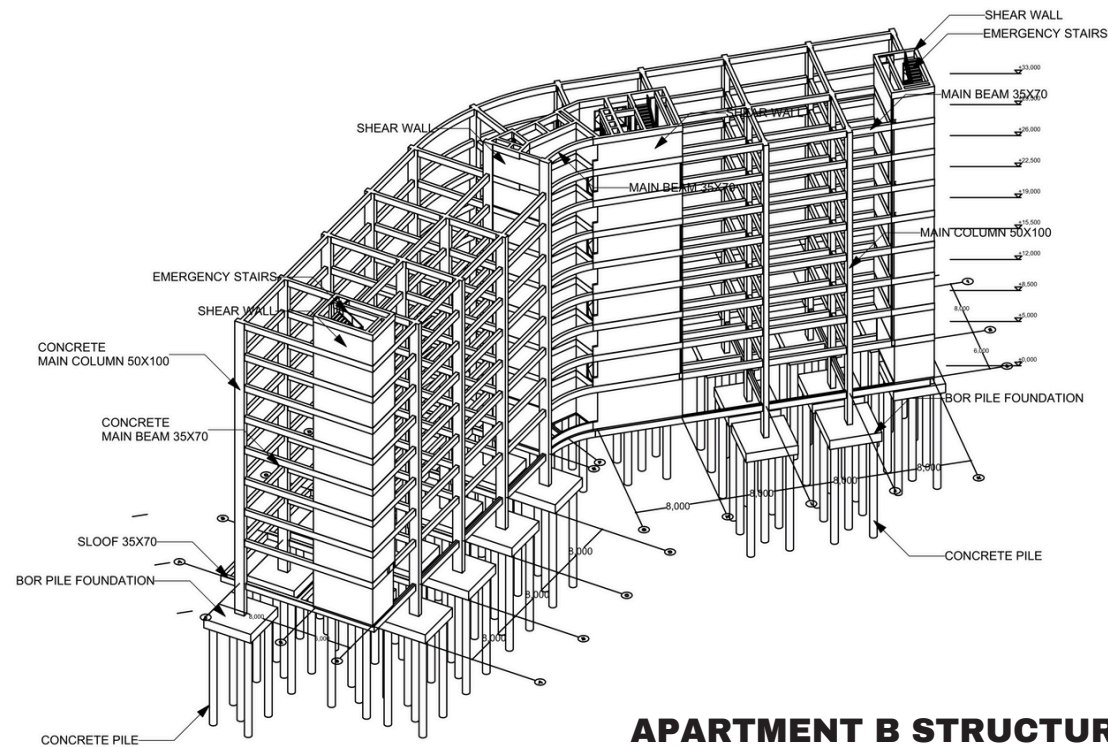


STRUCTURAL SYSTEM DESIGN



APARTMENT A STRUCTURAL SYSTEM

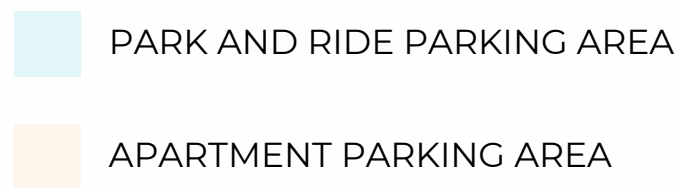
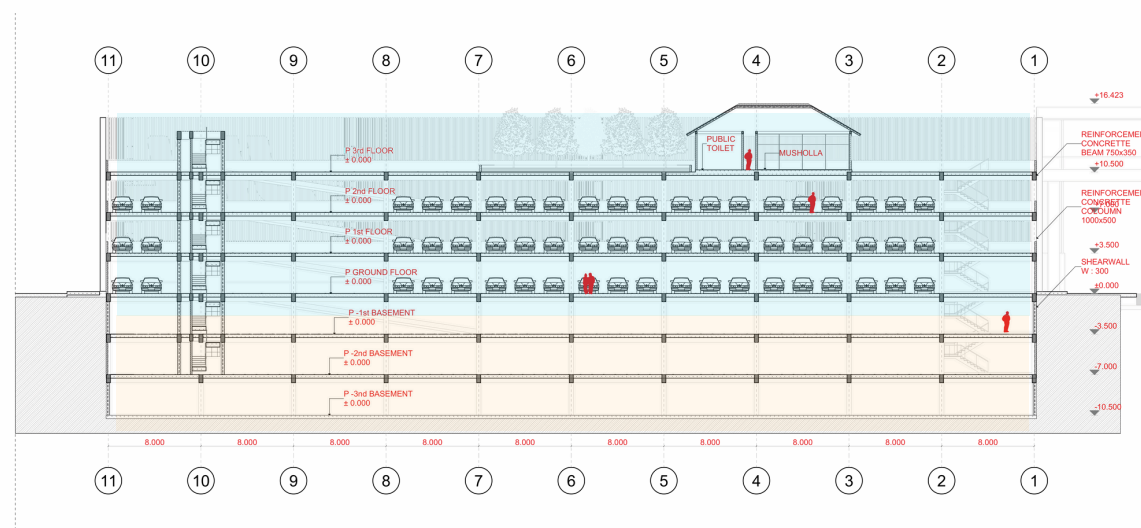
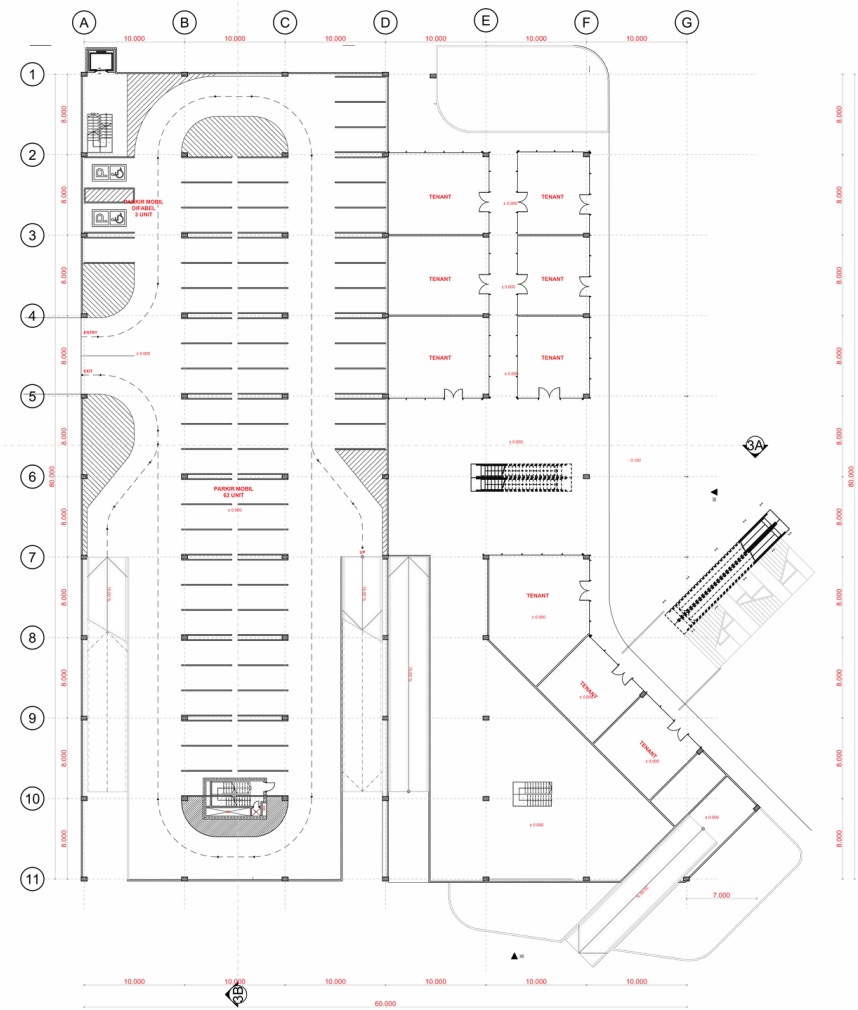


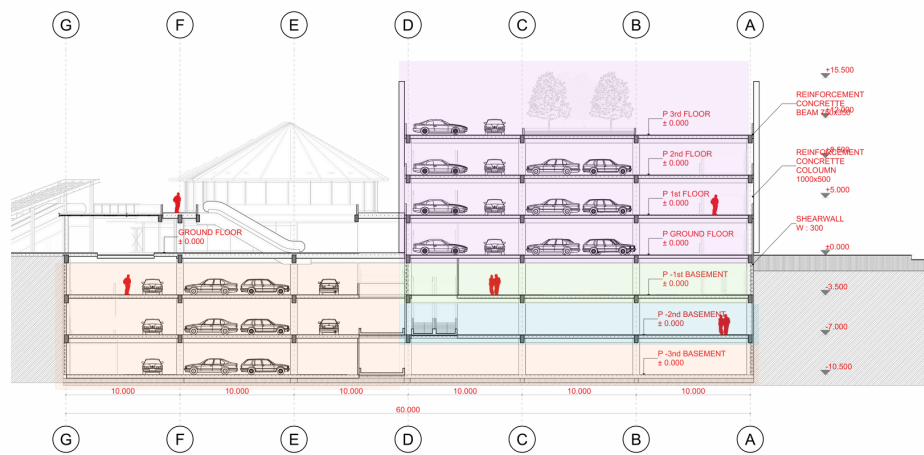
APARTMENT B STRUCTURAL SYSTEM

3.4 PARK AND RIDE DESIGN CONCEPT

By integrating the park and ride facility with commercial areas, the operational costs of the park and ride facility can be financed through revenue generated from the rental of kiosks and sports venues located in the commercial area. This model provides a dual benefit: first, the commercial area generates income that can cover the operational costs of the park and ride, thus preventing it from burdening the company's cash flow or the regional government budget (APBD) of DKI Jakarta. Second, the rental income from kiosks and other facilities helps ensure the financial sustainability of the project without relying on public funding or regional budgets.

For example, kiosks rented in the commercial area can house various businesses such as food, beverages, or daily necessities, attracting visitors who also use the park and ride facility. Meanwhile, sports venues such as futsal courts or fitness spaces that are rented out can add extra income. Thus, this concept optimizes space usage and provides a more independent financial solution, reducing the cost burden for both the government and the managing company.

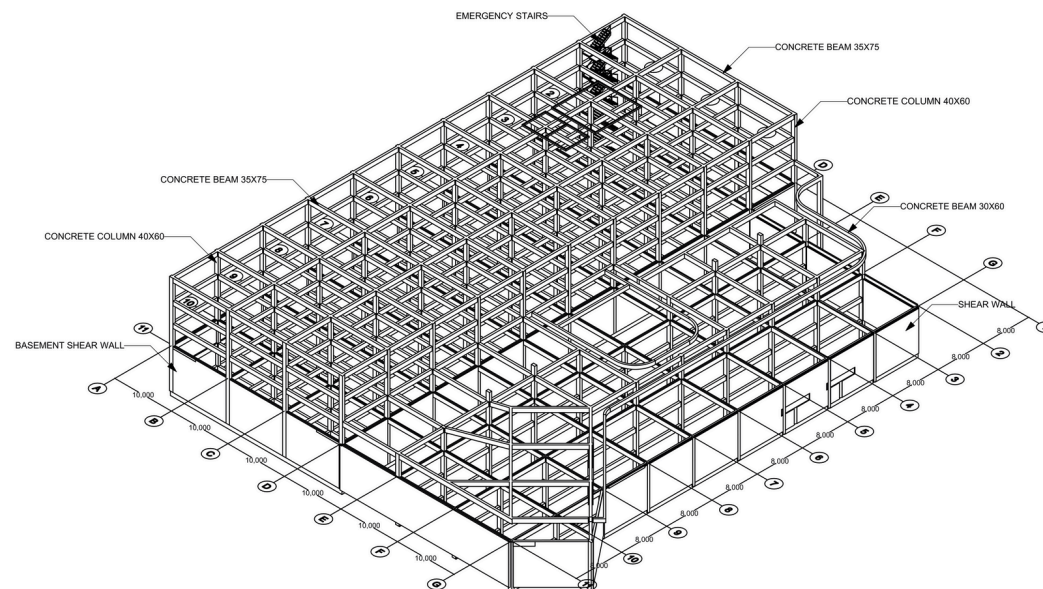
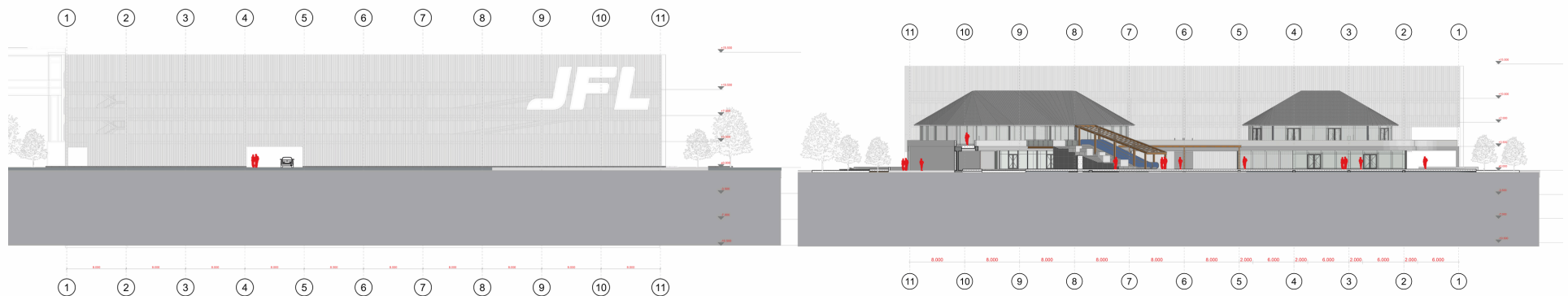




- PARK AND RIDE CAR PARKING AREA
- PARK AND RIDE MOTORCYCLE PARKING AREA
- APARTMENT MOTORCYCLE PARKING AREA
- APARTMENT CAR PARKING AREA

TOTAL PARKING CAPACITY FOR PARK AND RIDE:
 CAR: 310 CAR
 MOTORCYCLE: 488 MOTORCYCLE

TOTAL PARKING CAPACITY FOR APARTMENT:
 CAR: 255 CAR
 MOTORCYCLE: 488 MOTORCYCLE







ELEVATED PEDESTRIAN PATH



ROOF GARDEN



BEDROOM INTERIOR



BIRDVIEW PERSPECTIVE



4 DESIGN EVALUATION

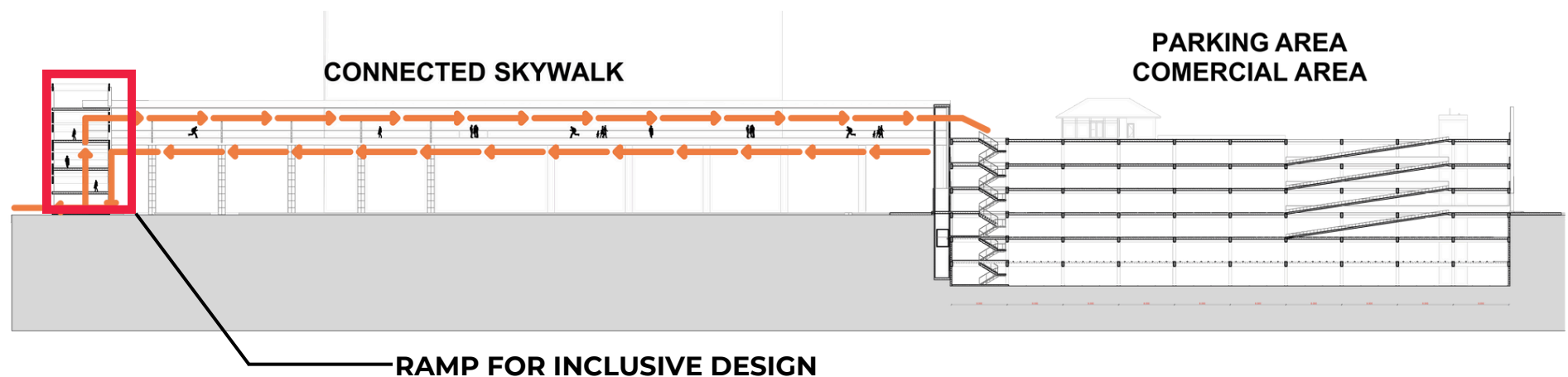
4.1 TOD CRITERIA - WALK

TOD Criteria	Design Application	Solution
Walk	Pedestrian Facility - Elevated Pedestrian Path - Pedestrian path on every side of the building - ramp for more inclusive design	Elevated pedestrian paths connected to buildings enhance safety and convenience. Integrated into a seamless pedestrian network, they improve connectivity between spaces, making the environment more functional, walkable, and sustainable.
	Crossing Facility - Elevated Pedestrian bridge with barrier free access	Integrating an elevated pedestrian bridge with barrier-free access and narrowing roadways improves safety, accessibility, and comfort. This design promotes safe pedestrian movement, encourages cautious driving, and creates a more pedestrian-friendly, inclusive urban environment.

PEDESTRIAN FACILITY

Connectivity Between Park-and-Ride Areas, Commercial Zones, and Public Transport Stations via Skywalks

A skywalk is a pedestrian bridge that provides safe, elevated access between different functional areas, such as park-and-ride facilities, commercial zones, and public transport stations. This integration ensures seamless movement for users while maintaining efficiency and convenience within a transit-oriented development (TOD).



CROSSING FACILITY

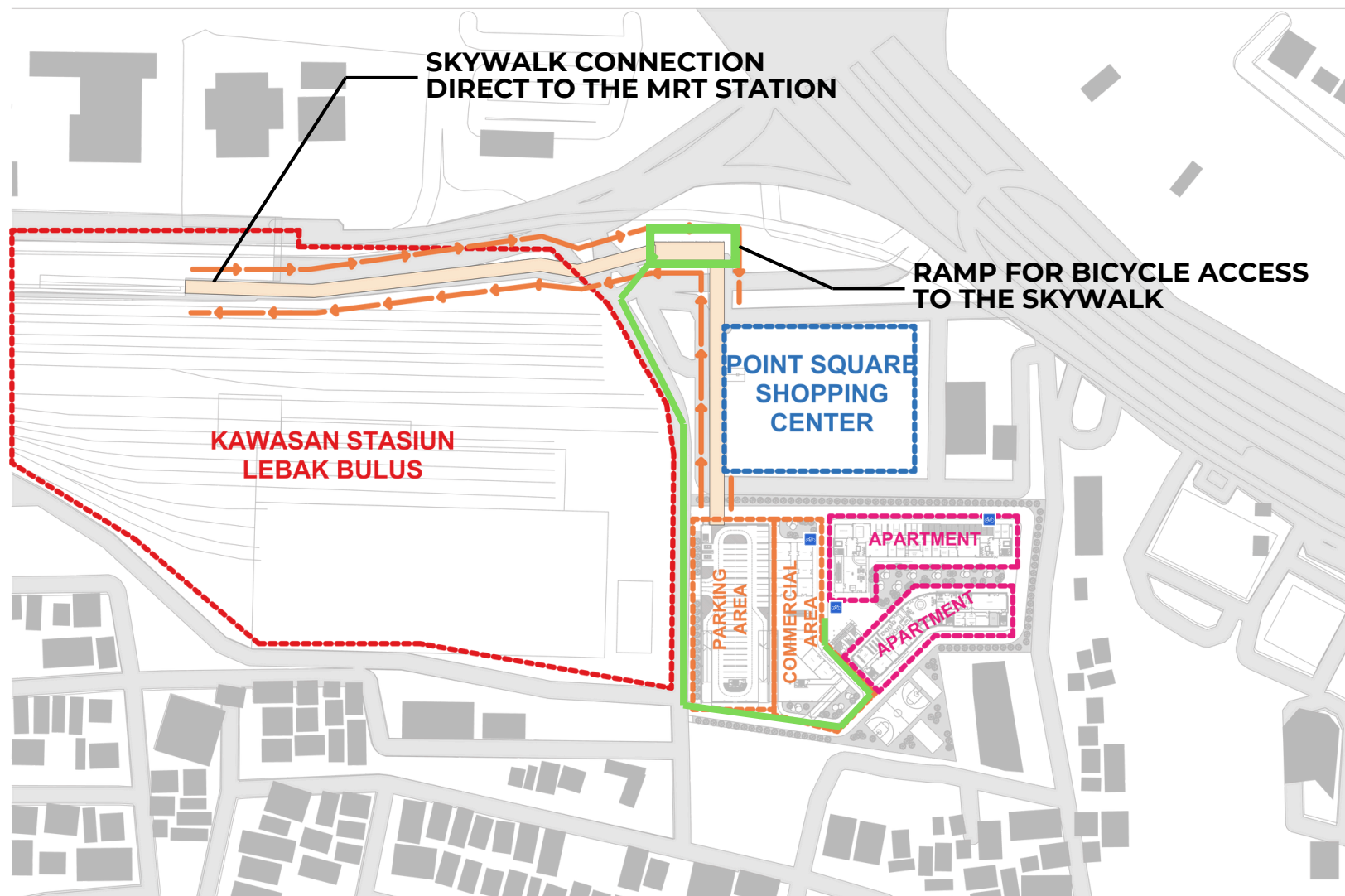
An elevated skywalk integrated with travelator access (moving walkways) is a pedestrian pathway system designed to enhance mobility for people of all ages and abilities, ensuring universal design. Universal design refers to the concept of creating environments that are accessible, usable, and welcoming to everyone, regardless of physical abilities or age. Combining elevated skywalks with travelators makes urban spaces more inclusive, improving accessibility while maintaining efficient and safe movement within the built environment.

TRAVELATOR FOR INCLUSIVE DESIGN



4.2 TOD CRITERIA - CYCLE

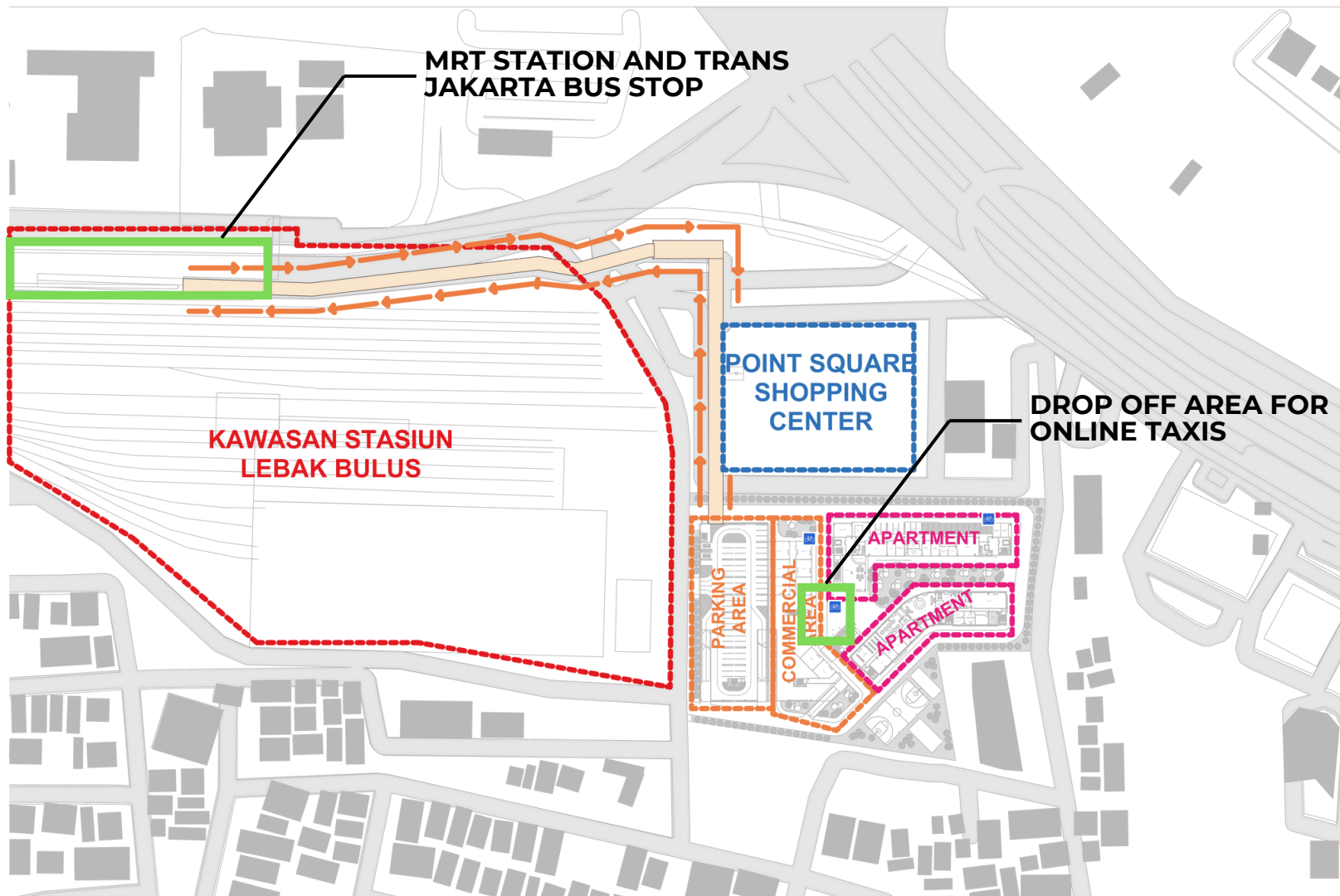
Cycle	Cycling Facility	<ul style="list-style-type: none"> -Bicycle Parking -Bicycle Path - Bicycle access to the bridge and skywalk 	Integrating bicycle parking boosts functionality, promotes sustainable transportation, and benefits individuals, businesses, and the environment, creating a healthier, eco-friendly, and accessible urban space.
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- BICYCLE PATH
- 🚲 BICYCLE PARKING

4.3 TOD CRITERIA - TRANSIT

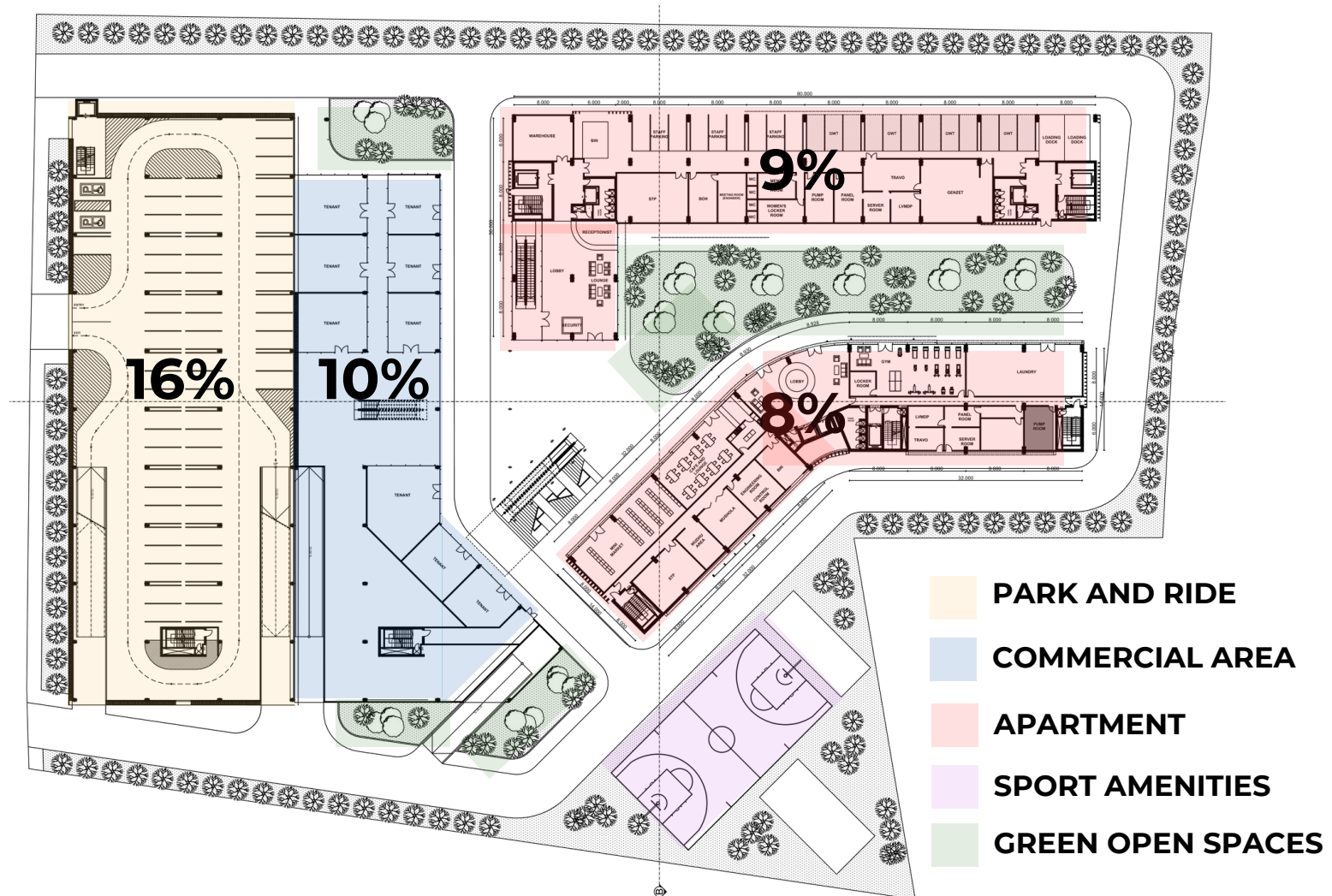
Transit	Number of Transportation Mode	<ul style="list-style-type: none"> -Drop Off for online taxis -MRT Station -Transjakarta Bus Stop 	<p>A well-connected pedestrian path from a building to a train station enhances accessibility, encourages walking, and supports sustainable transportation. It can serve as a transportation hub for people who prefer a combination of walking and using trains for longer commutes.</p>
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4.4 TOD CRITERIA - MIX

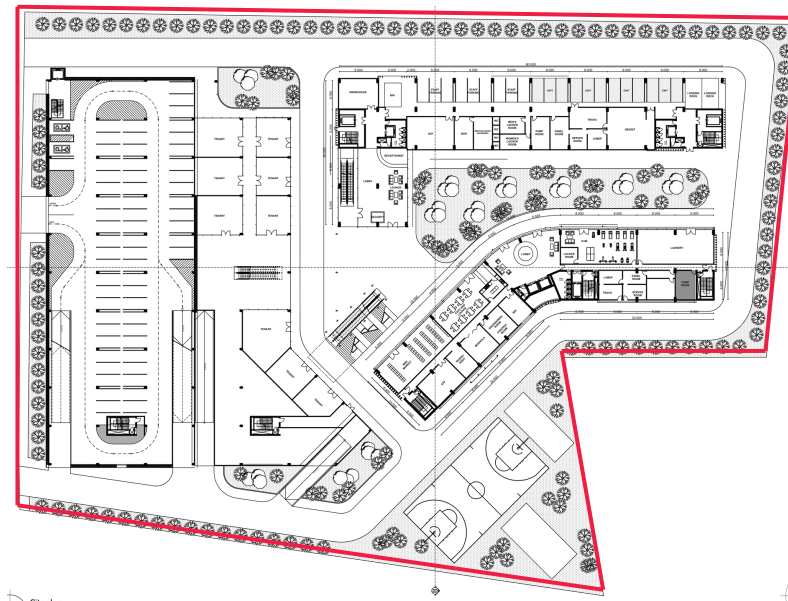
Mix	Number of Land Used Type	<ul style="list-style-type: none"> - Apartment - Park and Ride - Commercial Area - Green Open Space - Sport Amenities 	<p>A well-designed mixed-use complex integrates a variety of functions seamlessly, creating a vibrant, sustainable, and inclusive environment.</p> <p>By carefully considering site context, accessibility, flexibility, and community needs, the complex can enhance urban livability while promoting economic, social, and environmental benefits.</p>
	Non-Residential and Residential Ratio	- Residential Area <50% of the total Area	<p>Vertical housing effectively balances residential and non-residential areas in mixed-use developments. By stacking residential units above commercial or office spaces, it maximizes land use, creates an active streetscape, and ensures efficient coexistence of both functions. This approach promotes sustainable, compact urban development while maintaining strong community connections.</p>

The residential area is only 16% of the total area, but can provide 455 rooms. This makes the development of the TOD area effective



4.5 TOD CRITERIA - DENSITY

Density	Population Density	People/ha >400	To maximize TOD development, increasing population density is crucial, focusing on vertical housing within the area. This approach optimizes land use, reduces urban sprawl, and supports a walkable, transit-oriented environment while enhancing public transit viability.
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TOTAL SITE AREA : 15,983 SQM / 1.59 ha

TOTAL APARTMENT BEDROOM : 455

Population Density = 455 People ÷ 1,5983 ha = 303 people/ha.

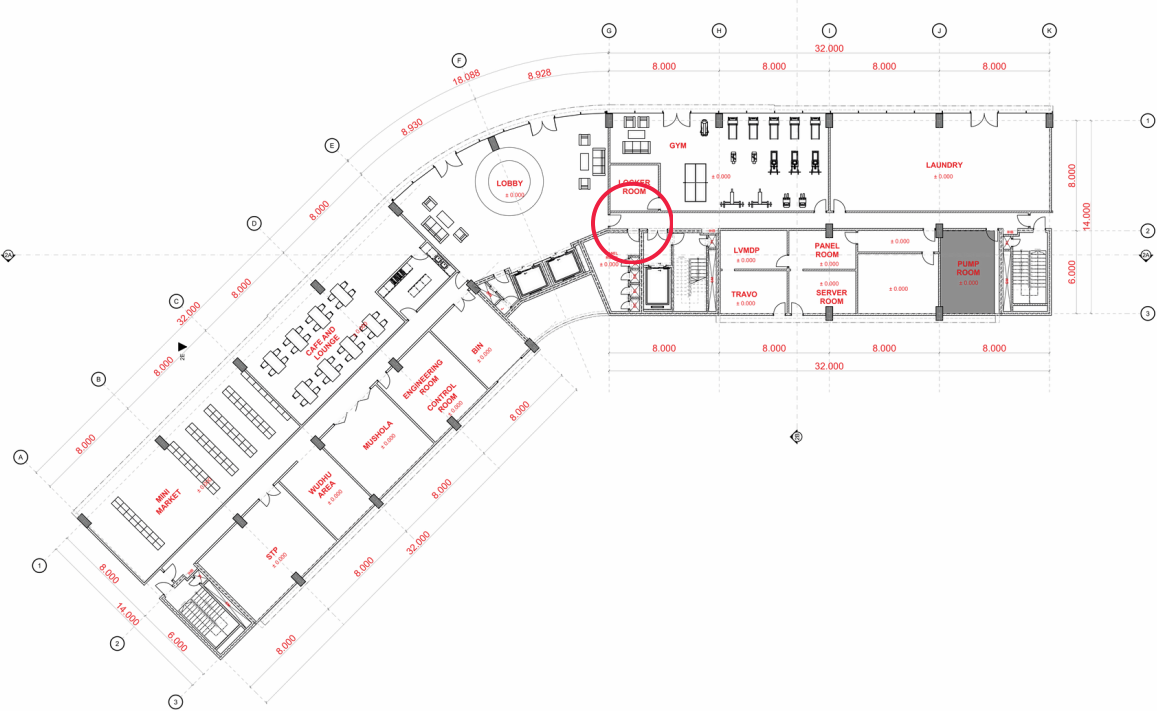
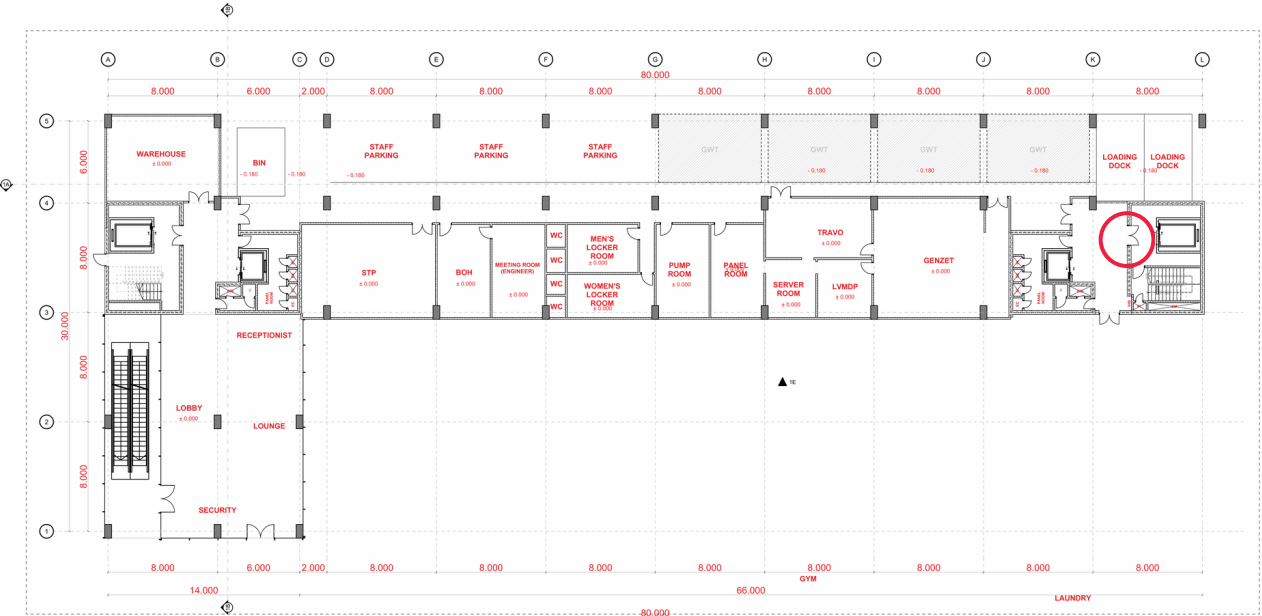
This residential design provides an opportunity to increase population density by 303 people/ha in the Lebak Bulus MRT area. The existing population density is 154 people/ha, so the following apartment design has successfully met the TOD criteria.

This design with its density level supports sustainable TOD development by ensuring connectivity, transportation efficiency, and an enhanced quality of life for residents.

5 FINAL DEFENSE EVALUATION

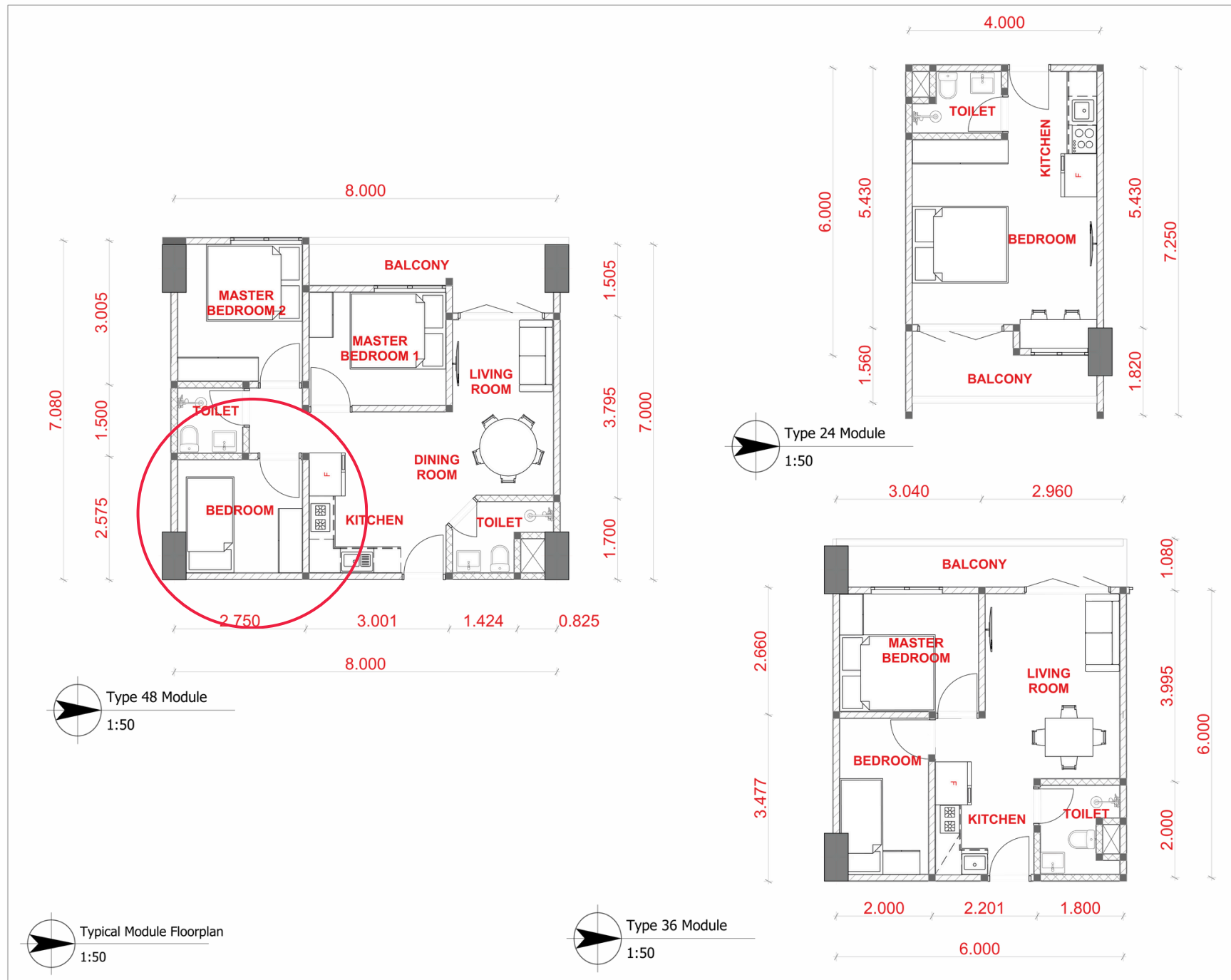
EVALUATION FROM EXAMINER 1

“The direction of the emergency door opening on the ground floor is still wrong, because it will be a death trap while in the middle of emergency situation”



EVALUATION FROM EXAMINER 2

“There is a room that does not have an opening in unit 48, even though this room is the most luxurious room.”



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7 ATTACHMENT

PLAGIARISM CHECK



Direktorat Perpustakaan Universitas Islam Indonesia
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SURAT KETERANGAN HASIL CEK PLAGIASI

Nomor: 2512266575/Perpus./10/Dir.Perpus/IX/2024

Bismillaahirrahmaanirrahiim

Assalamualaikum Wr. Wb.

Dengan ini, menerangkan Bahwa:

Nama : Ghazy Abduljabar Novannail
Nomor Mahasiswa : 19512161
Pembimbing : Ir. Wiryono Raharjo, M.Arch., Ph.D.
Fakultas / Prodi : Teknik Sipil dan Perencanaan/ Arsitektur
Judul Karya Ilmiah : JAKARTA LIFELINE: Design of Vertical Housing and Park and Ride Facility Based on Transit Oriented Development (TOD) MRT Lebak Bulus, Cilandak, Jakarta Selatan

Karya ilmiah yang bersangkutan di atas telah melalui proses cek plagiasi menggunakan **Turnitin** dengan hasil kemiripan (*similarity*) sebesar **20 (Dua Puluh) %**.

Demikian Surat Keterangan ini dibuat untuk dapat dipergunakan sebagaimana mestinya.

Wassalamualaikum Wr. Wb.

Yogyakarta, 11/8/2024

Direktur



Muhammad Jamil, SIP.

JAKARTA LIFELINE



ABSTRACT

Jakarta faces significant urban challenges, including land scarcity and urban sprawl. This study proposes a design for vertical housing and a park-and-ride facility at the Lebak Bulus MRT station based on the principles of Transit-Oriented Development (TOD). The project aims to optimize land use, enhance accessibility, and promote sustainable urban growth by integrating the housing with efficient public transit systems.

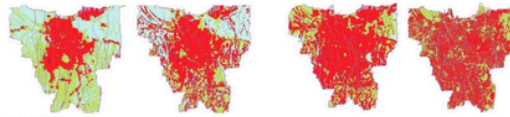
The vertical housing component addresses land constraints by providing high-density residential units that cater to diverse socio-economic groups. These units incorporate sustainable features such as natural lighting, ventilation, and modular construction for cost efficiency. In addition, the design includes plazas that serve as vibrant public spaces, fostering social interaction and supporting local businesses. The park-and-ride facility encourages a shift from private vehicles to public transportation, reducing congestion and environmental impacts.

By concentrating development around transit hubs, this design mitigates urban sprawl, improves mobility, and ensures equitable access to housing and urban amenities. The project demonstrates how a TOD-based approach can provide practical, inclusive, and sustainable solutions to Jakarta's urban challenges, creating a model for resilient urban development.

Keyword : Vertical Housing, Transit-Oriented Development (TOD), Sustainable Urban Growth

BACKGROUND

1) Urban Sprawl Phenomenon in Jakarta



Source: (Suharto, 2009)

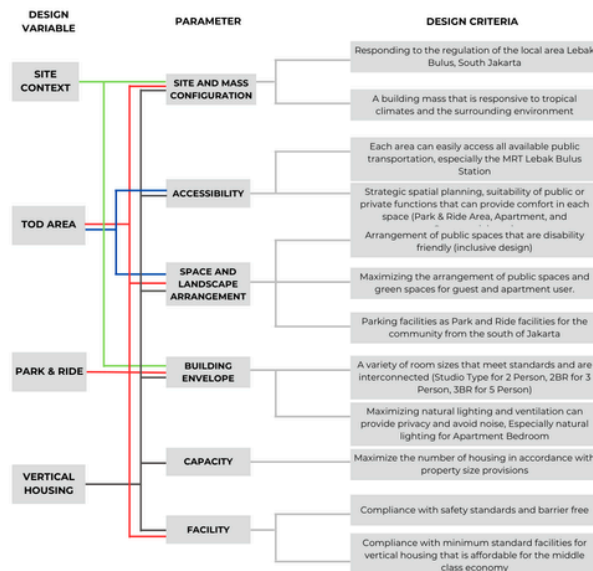
Jakarta is rapidly developing, with over 24.3 million private vehicles expected by 2023, while only 34% of residents use public transport. Around 88 million people move within Jabodetabek, where uncontrolled urban expansion has increased transportation costs, decreased mobility, and lowered quality of life. Most of this expansion consists of low-rise residential areas (64% of Jakarta's total area), leading to a land shortage.

Relying on horizontal growth and private vehicles results in inefficiency, waste, and urban sprawl, which marginalizes the middle class and increases social inequality. Open spaces are disappearing, and infrastructure can't keep up, reducing public service quality.

In response, PT MRT Jakarta has developed transit-oriented development (TOD) at several stations along the south-north corridor. TOD integrates transit with buildings, activities, and public spaces to optimize access to transportation and increase capacity. However, development around MRT stations remains underutilized. Expanding vertical housing near transit points could prevent urban sprawl, reduce pollution, energy consumption, and travel costs.

PROBLEM FORMULATION

	Non Architectural Issue	Architectural Issue	Objective
Short Term	Lack of parking space for park & ride as an MRT facility for the people of southern Jakarta	Create a park & ride area that can turn into a commercial area over time	Creating a sustainable park & ride area, over time the public transportation network expands thereby reducing dependence on private vehicles
Long Term	The TOD area has not been maximized with a population only 154 people/hectare The phenomenon of urban sprawl on the edge of Jakarta, traffic jams and pollution.	Vertical housing for the middle class that is integrated with existing city facilities and infrastructure based on Transit Oriented Development (TOD)	The middle class can have affordable and strategic housing. The high population in TOD areas can increase the use of public transportation. Cities with a transit orientation are more sustainable because they prevent urban sprawl and reduce pollution.



General Problem
How to design vertical housing and plazas using a pattern based design approach in the Lebak Bulus MRT Transit Oriented Development area, Kec. Kby. Old, South Jakarta, DKI Jakarta?

Specific Problem
1) How to design vertical housing for the lower middle class to maximize the number of residential spaces in the TOD MRT Lebak Bulus area, Kec. Kby. Old, South Jakarta, DKI Jakarta?
2) How is the plaza designed to facilitate the people of southern Jakarta with a sustainable park and ride area, providing public and commercial space so as to maximize the potential of the TOD area?

Objective
Increasing the population in the Lebak Bulus TOD area with a vertical housing design and providing supporting facilities for a park and ride plaza to increase the sustainable use of public facilities in the TOD area.

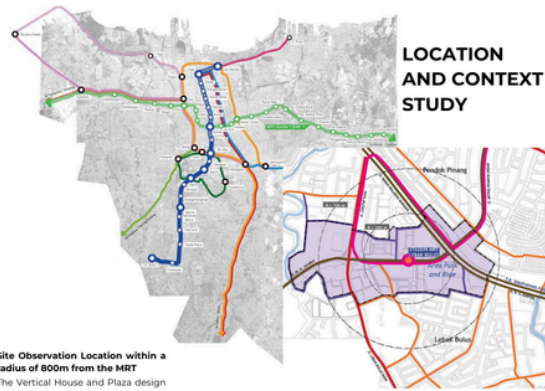
DESIGN CONCEPT
This design adopts the concept of Transit-Oriented Development (TOD), with a focus on vertical housing integrated with park-and-ride facilities at the Lebak Bulus MRT station in Jakarta. The goal is to create an efficient, connected, and sustainable urban environment that addresses issues such as limited land, traffic congestion, and the need for affordable housing in strategic locations.

The vertical housing approach maximizes the use of limited land, providing high-density housing while maintaining open spaces. By positioning the housing near public transit, it reduces dependence on private vehicles and encourages the use of mass transportation. The integration of park-and-ride facilities further supports this by offering convenient parking spaces connected directly to the MRT station.

Affordable housing for the lower-middle class is a key focus, with units designed for various household sizes and budgets. This allows residents to live in a well-connected area at a more affordable cost compared to city-center housing.

Additionally, the design includes public spaces like plazas and green areas to foster community interaction and improve quality of life. Sustainable design features, such as natural lighting, ventilation, and eco-friendly materials, are incorporated to reduce energy consumption and support environmental goals.

Located in South Jakarta, near office and entertainment hubs, the design offers an urban lifestyle that allows residents to live and work efficiently in the city, reducing commuting time and costs. This integrated approach creates a sustainable, inclusive, and convenient urban environment that addresses Jakarta's growing challenges.

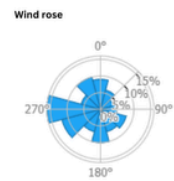
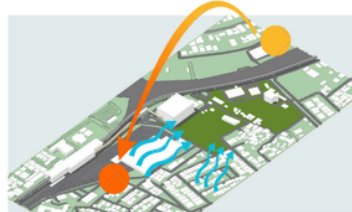


South Jakarta Temperature and Humidity

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Record High °C (°F)	35.0 (95.0)	34.0 (93.2)	33.0 (91.4)	32.0 (89.6)	31.0 (87.8)	30.0 (86.0)	29.0 (84.2)	28.0 (82.4)	27.0 (80.6)	26.0 (78.8)	25.0 (77.0)	24.0 (75.2)
Average High °C (°F)	30.5 (86.9)	29.5 (85.1)	28.5 (83.3)	27.5 (81.5)	26.5 (79.7)	25.5 (77.9)	24.5 (76.1)	23.5 (74.3)	22.5 (72.5)	21.5 (70.7)	20.5 (68.9)	19.5 (67.1)
Daily Mean °C (°F)	26.5 (79.7)	25.5 (77.9)	24.5 (76.1)	23.5 (74.3)	22.5 (72.5)	21.5 (70.7)	20.5 (68.9)	19.5 (67.1)	18.5 (65.3)	17.5 (63.5)	16.5 (61.7)	15.5 (59.9)
Average Low °C (°F)	22.5 (72.5)	21.5 (70.7)	20.5 (68.9)	19.5 (67.1)	18.5 (65.3)	17.5 (63.5)	16.5 (61.7)	15.5 (59.9)	14.5 (58.1)	13.5 (56.3)	12.5 (54.5)	11.5 (52.7)
Record Low °C (°F)	16.0 (60.8)	15.0 (59.0)	14.0 (57.2)	13.0 (55.4)	12.0 (53.6)	11.0 (51.8)	10.0 (50.0)	9.0 (48.2)	8.0 (46.4)	7.0 (44.6)	6.0 (42.8)	5.0 (41.0)
Average precipitation mm (inches)	180.0 (7.09)	170.0 (6.70)	160.0 (6.30)	150.0 (5.91)	140.0 (5.51)	130.0 (5.12)	120.0 (4.72)	110.0 (4.33)	100.0 (3.94)	90.0 (3.54)	80.0 (3.15)	70.0 (2.76)
Average precipitation days (≥ 0.2 mm)	12.0	11.0	10.0	9.0	8.0	7.0	6.0	5.0	4.0	3.0	2.0	1.0
Average relative humidity (%)	78.0	76.0	74.0	72.0	70.0	68.0	66.0	64.0	62.0	60.0	58.0	56.0
Mean monthly sunshine hours	160.0	170.0	180.0	190.0	200.0	210.0	220.0	230.0	240.0	250.0	260.0	270.0

The average temperature in South Jakarta is around 30.5 degrees Celsius with an average humidity of 74.60.

Sun Path



USER PROGRAMMING

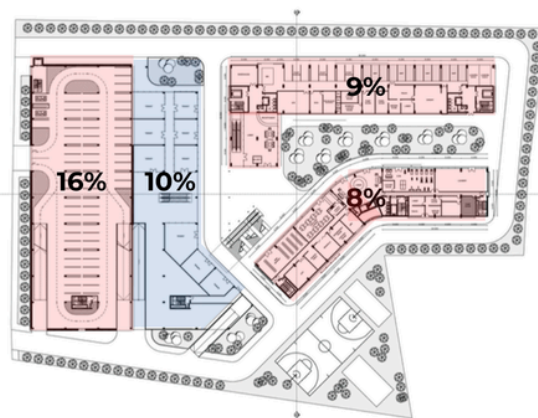
This apartment caters to the housing needs of southern Jakarta residents, especially office workers facing high housing costs in the city center. Located strategically with easy access to public transport, it offers an affordable alternative for those seeking efficient housing without living in the city center.

Target users include three groups with a monthly income of 7 to 20 million rupiah:

Singles: Young professionals who value time efficiency, convenience, and quick access to public transport, with amenities like gyms and co-working spaces.

Married Couples: Young couples seeking modern, affordable housing with good access to the city center and nearby shopping, dining, and entertainment.

Young Families: Families with children needing safe, spacious housing near educational and recreational facilities, with easy access to public transport and reduced reliance on private vehicles.



Building Code	Actual Size
SITE AREA : 15,983 sqm	SITE AREA : 15,983 sqm
BCR <55% : 8,790 sqm	BCR 43% : 6,926 sqm
FAR 6.84 : 60,123 sqm	FAR 6.84 : 39,492 sqm
KDH >20% : 3,197 sqm	KDH >23% : 3,676 sqm
KTB <60% : 9,590 sqm	KTB <60% : 9,433 sqm
Building Height: Max 32 Floor	Building Height: Max 32 Floor

Site Context



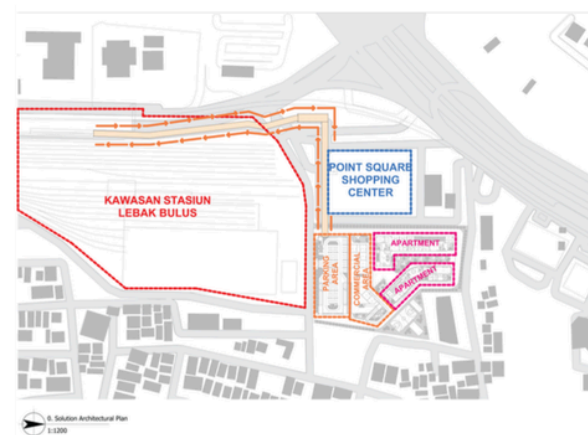
LEGEND:

- LEBAK BULUS MRT STATION
- MRT AREA SKYWALK
- APARTMENT & SHOPPING CENTRE POINTS SQUARE
- LEBAK BULUS MRT OFFICE
- CAREFOUR FURNITURE
- HOTEL MERCURE
- RESIDENTIAL AREA
- PT KAI PONDOK INDAH
- GREEN AREA
- RESIDENTIAL AREA
- FIRE FIGHTER OFFICE



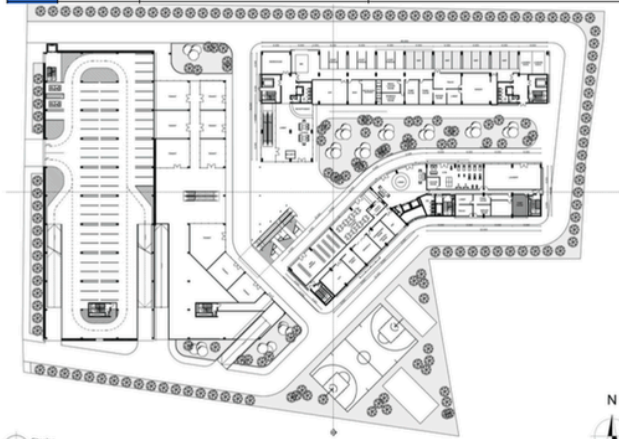
TOD Criteria	Design Application	Solution	
Walk	Pedestrian Facility	The pedestrian paths applied to the area create a good connection between building functions, so that one flower and another building are integrated with each other.	Elevated pedestrian paths connected to buildings enhance safety and convenience. Integrated into a seamless pedestrian network, they improve connectivity between spaces, making the environment more functional, walkable, and sustainable.
	Crossing Facility	By narrowing the roadway, the space available for vehicles is reduced, which forces drivers to slow down. This helps to make the environment safer for pedestrians and cyclists, as it reduces the chances of high-speed accidents. The narrower road also gives pedestrians a shorter crossing distance and may encourage more cautious driving behavior as vehicles navigate through tighter lanes.	Integrating an elevated pedestrian bridge with barrier-free access and narrowing roadways improves safety, accessibility, and comfort. This design promotes safe pedestrian movement, encourages cautious driving, and creates a more pedestrian-friendly, inclusive urban environment.

MASTER PLAN



TOD Criteria	Design Application	Solution	
Transit	Number of Transportation Mode	There is a train station which can be reached in 10 minutes on foot.	A well-connected pedestrian path from a building to a train station enhances accessibility, encourages walking, and supports sustainable transportation. It can serve as a transportation hub for people who prefer a combination of walking and using trains for longer commutes.

TOD Criteria	Design Application	Solution
Cycle	Cycling Facility - There is Bicycle parking and cycling path along the street	Integrating bicycle parking boosts functionality, promotes sustainable transportation, and benefits individuals, businesses, and the environment, creating a healthier, eco-friendly, and accessible urban space.



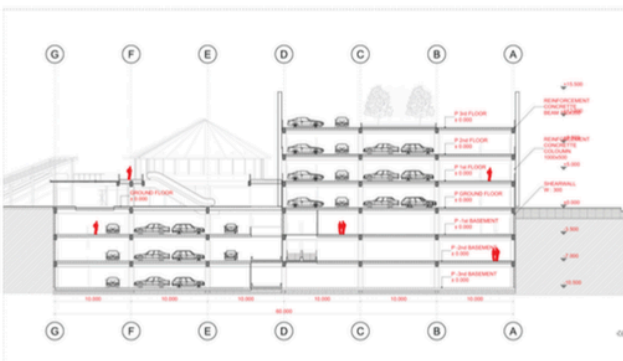
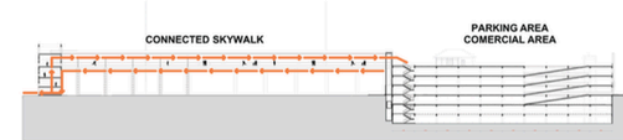
Skala 1:300

TOD Criteria	Design Application	Solution
Transit	Number of Transportation Mode There is a train station which can be reached in 10 minutes on foot.	A well-connected pedestrian path from a building to a train station enhances accessibility, encourages walking, and supports sustainable transportation. It can serve as a transportation hub for people who prefer a combination of walking and using trains for longer commutes.

ELEVATED PEDESTRIAN PATH

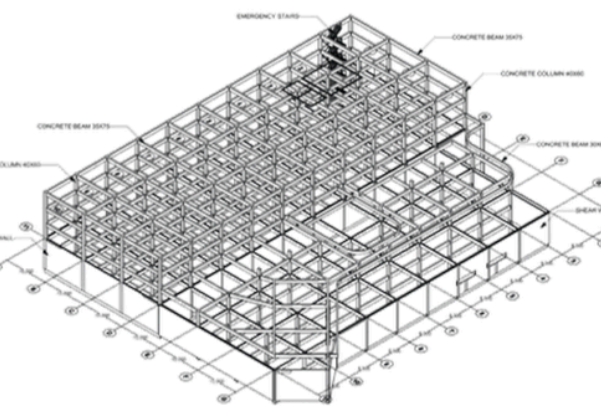
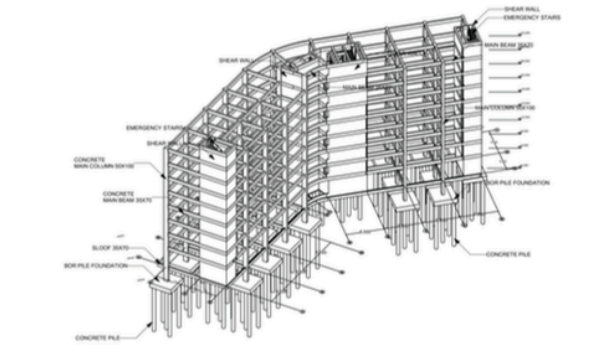


PARK AND RIDE FACILITY



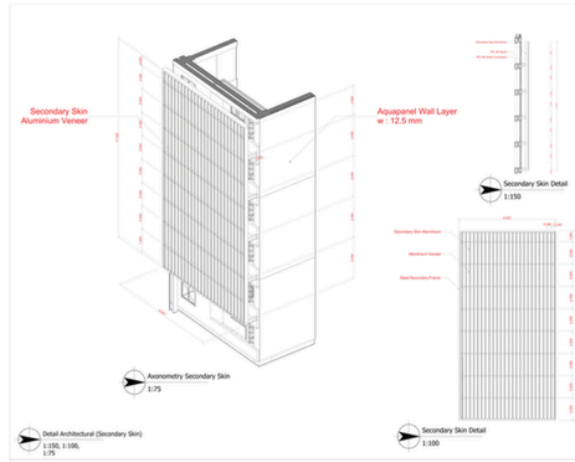
TOD Criteria	Design Application	Solution
Number of Land Used Type	There is 4 Function Type: 1. Commercial use: Shopping Center, Restaurant, and Hotel 2. Apartment 3. Public Space 4. Green Open Space	A well-designed mixed-use complex integrates a variety of functions seamlessly, creating a vibrant, sustainable, and inclusive environment. By carefully considering site context, accessibility, flexibility, and community needs, the complex can enhance urban livability while promoting economic, social, and environmental benefits.

Mix	Non-Residential and Residential Ratio	Solution
	The area is used by combining 4 functions, but for the apartment function, it only uses around 25% of the total site.	Vertical housing effectively balances residential and non-residential areas in mixed-use developments. By stacking residential units above commercial or office spaces, it maximizes land use, creates an active streetscape, and ensures efficient coexistence of both functions. This approach promotes sustainable, compact urban development while maintaining strong community connections.



APREB

BUILDING FACADE



BEDROOM TYPE



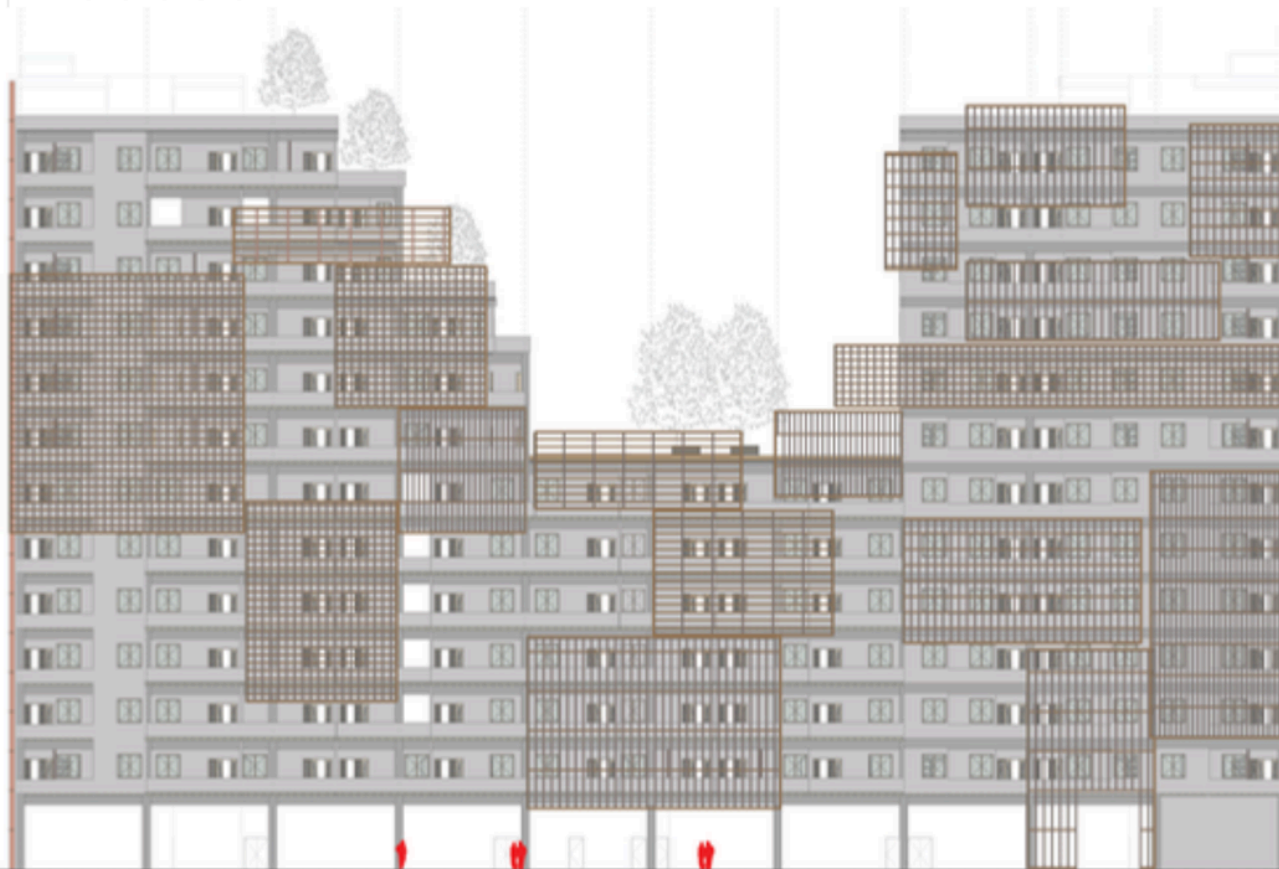
NATURAL LIGHTING



VERTICAL TRANSPORTATION



NATURAL VENTILATION



PARK AND RIDE FACILITY



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FINAL ARCHITECTURE
DESIGN STUDIO

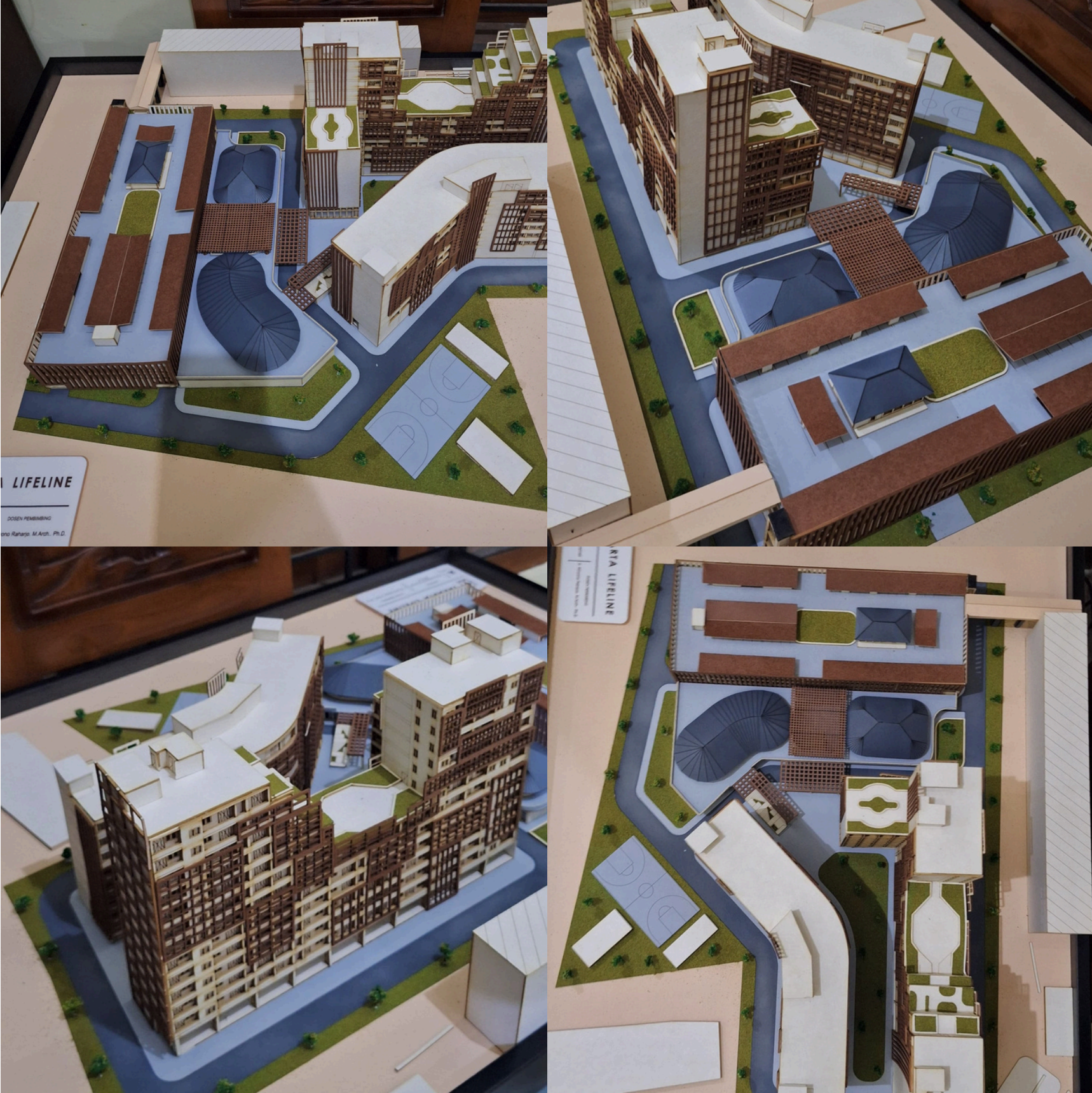
JAKARTA
LIFELINE

Laboratorium
Pemodelan
Arsitektur &
Perkotaan

TECHNICAL DRAWING



3D MODEL





한국건축학교육인증원
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**CANBERRA
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