

# TUGAS AKHIR 146 PERANCANGAN BERBASIS EDGE



## AHMAD YANI OFFICE TOWER @SEMARANG

DIKERJAKAN OLEH:

NABILA HARITA PUTRI - 21020115120019

DOSEN PEMBIMBING:

DR. Ir. AGUNG BUDI SARDJONO, MT

TIM DOSEN:

RESZA RISKIYANTO, ST, MT

Ir. INDRIASTJARIO, MTA

DR. Ir. ERNI SETYOWATI, MTA



## DATA TAPAK

Lokasi	: Jalan Ahmad Yani, Semarang
Luas Tapak	: 3182
KDB	: 60% (1910 m <sup>2</sup> )
Building Footprint	: 840 m <sup>2</sup>
GSB	: 29 meter
KLB	: 5.5 (maksimal 20 lantai)
Lahan Infiltran	: 40% (1272 m <sup>2</sup> )
KDH	: 890 m <sup>2</sup>
Parking	: 382 m <sup>2</sup>
Luas Total Bangunan	: 7000 m <sup>2</sup>
Tinggi Bangunan	: 17 lantai

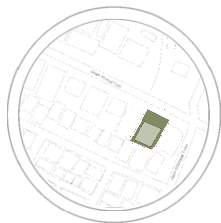


# lokasi tapak

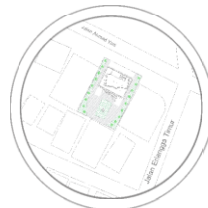
Jalan Ahmad Yani, Semarang



Lokasi terletak di jalan Ahmad Yani, Semarang



KDB : 60%  
KDH : 40 %



Luas Lahan : 3182 m2  
Luas total bangunan : 7000 m2



# building massing



1. Orientasi bangunan menghadap ke arah timur laut



3. Agar tidak terlalu monoton, massa bangunan diangkat setinggi 4,5 meter kemudian digunakan untuk roof garden



2. Untuk memaksimalkan saving energy, orientasi bangunan lantai 5-17 diputar sehingga menghadap ke utara dan selatan



4. Bagian lantai 1, 2, 3, 4 berorientasi menghadap timur laut-barat daya, sedangkan lantai 5-17 berorientasi menghadap utara-selatan

## BUILDING DEPTH

$$\text{Building Depth} = \frac{(16 \times 13) + (24 \times 3)}{14} = 16 \text{ meter}$$



## BUILDING ORIENTATION

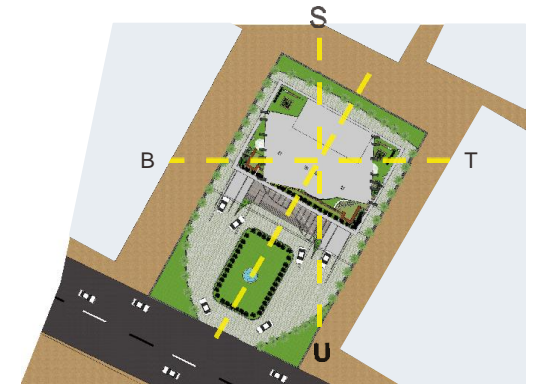


DIAGRAM AIR BERSIH

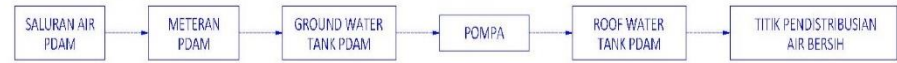


DIAGRAM GREY WATER DAN RAIN WATER HARVESTING

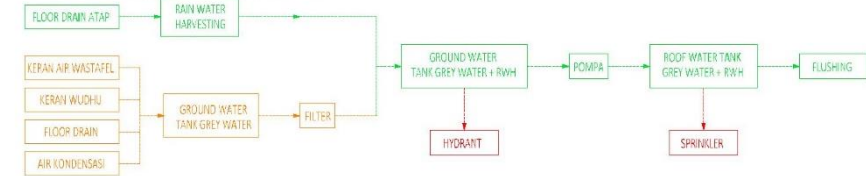
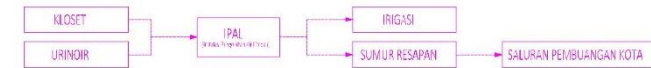
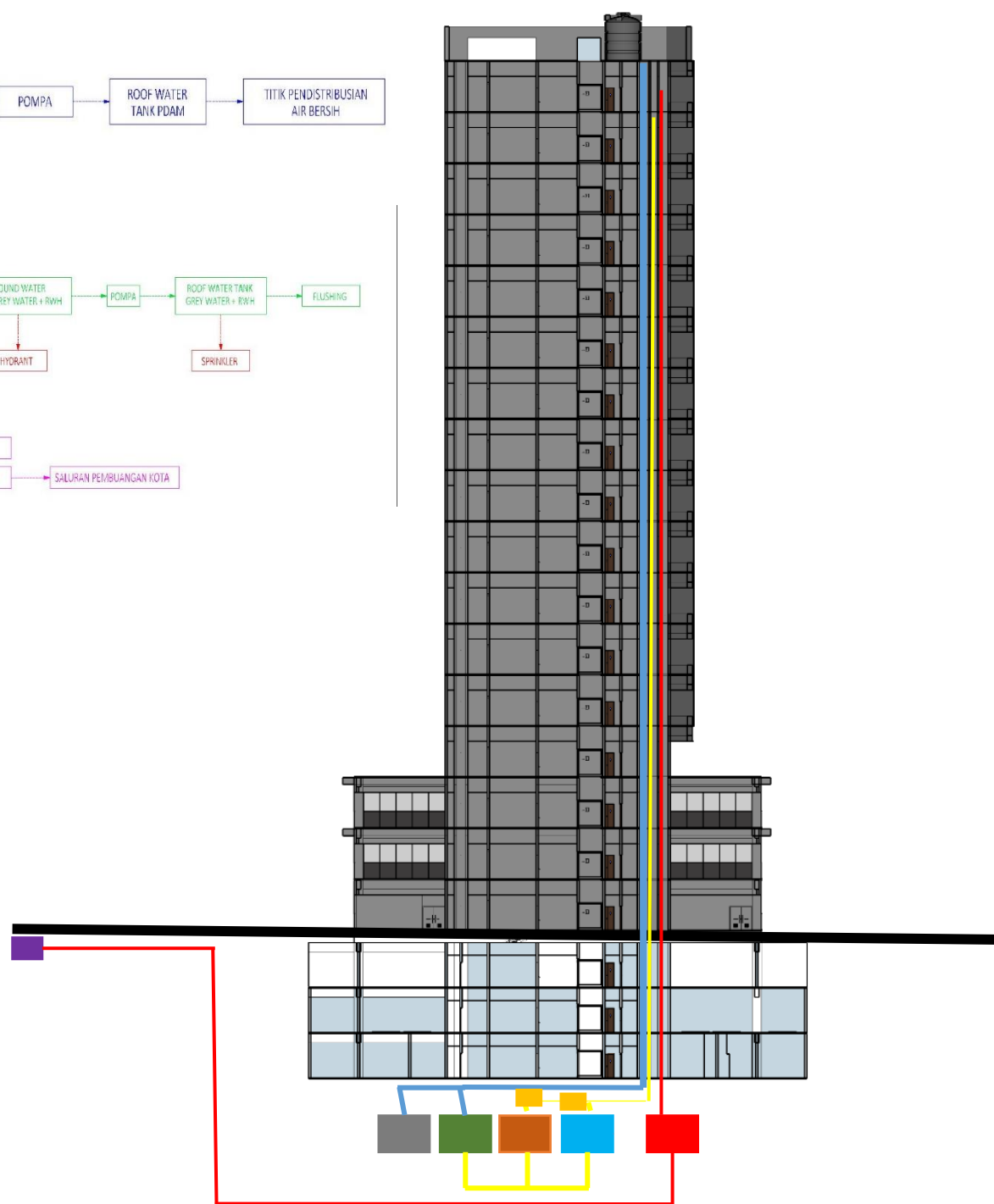


DIAGRAM BLACK WATER



AIR BERSIH  
AIR KOTOR



- GWT
- GWT GREY WATER + RAIN WATER
- RAIN WATER HARVESTING
- GREY WATER
- IPAL
- FILTER
- SALURAN KOTA



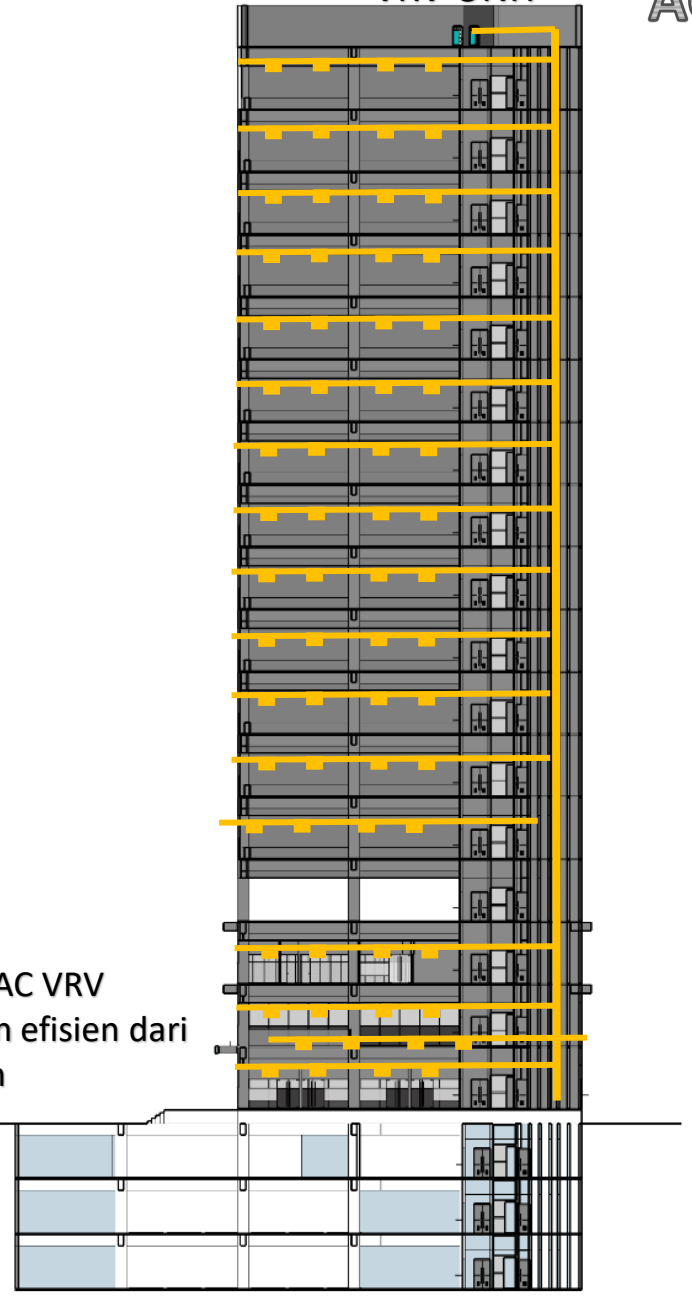
# LIGHTING SENSOR



SDP

# VRV UNIT AC

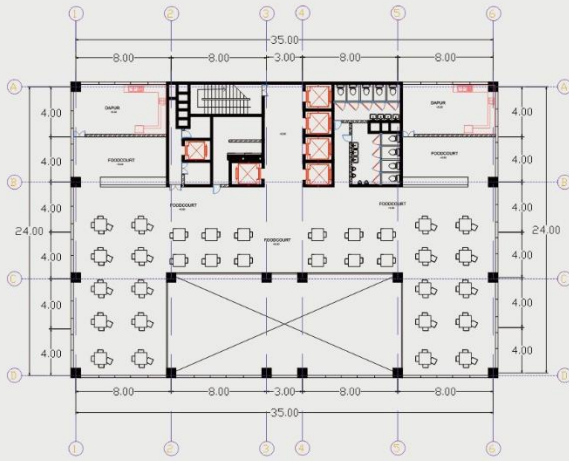
Menggunakan system AC VRV  
Dikarenakan lebih efektif dan efisien dari  
jenis AC yang lain



SITEPLAN



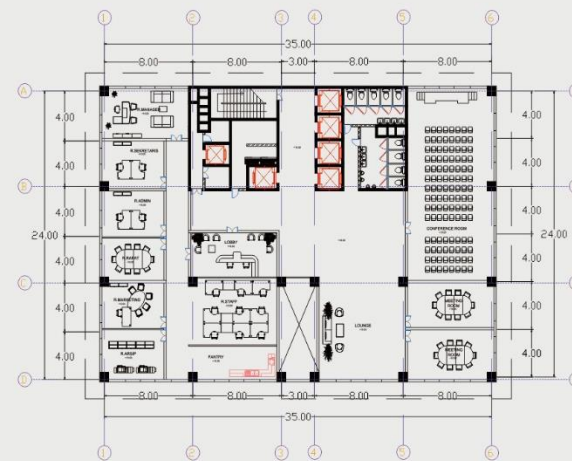
# DENAH



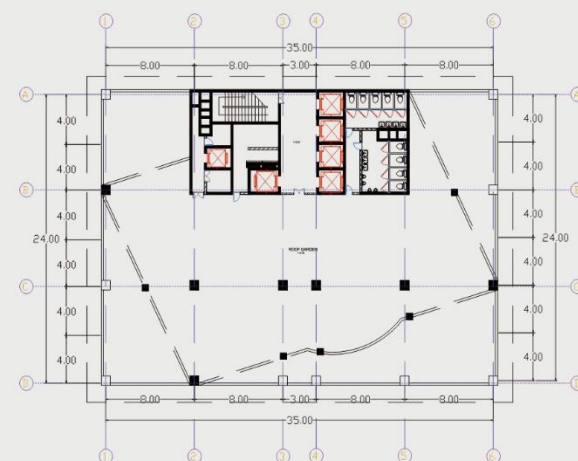
LANTAI 1



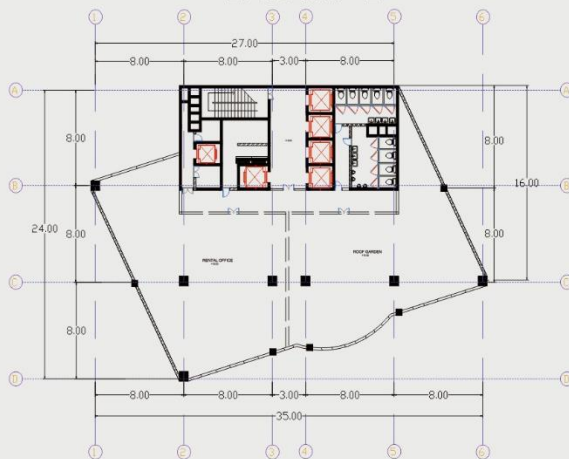
LANTAI 2



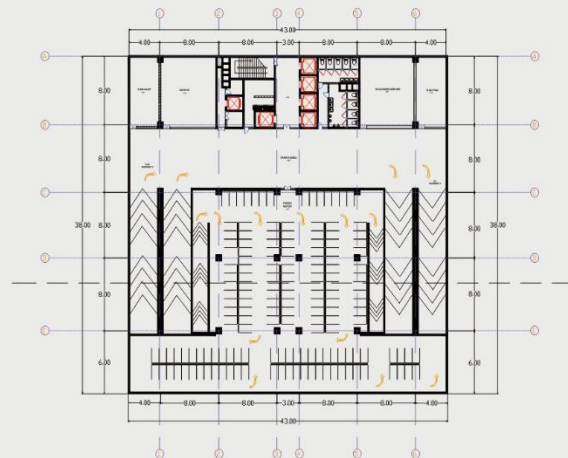
LANTAI 3



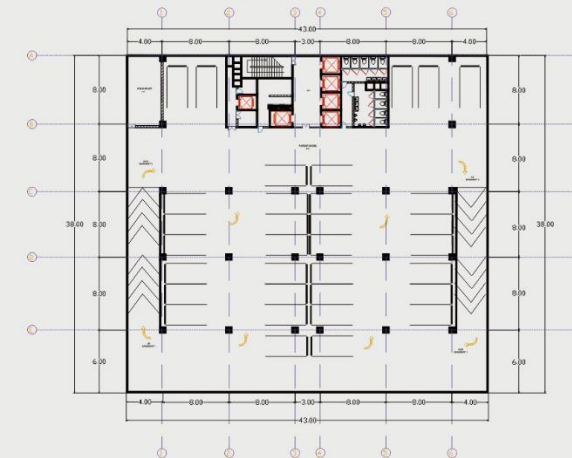
LANTAI 4



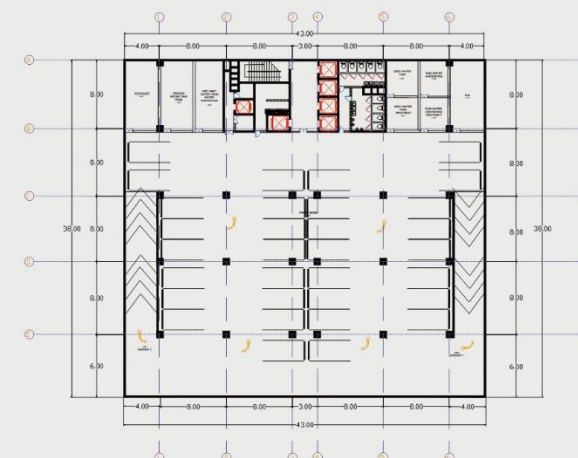
LANTAI 5-17



BASEMENT 1



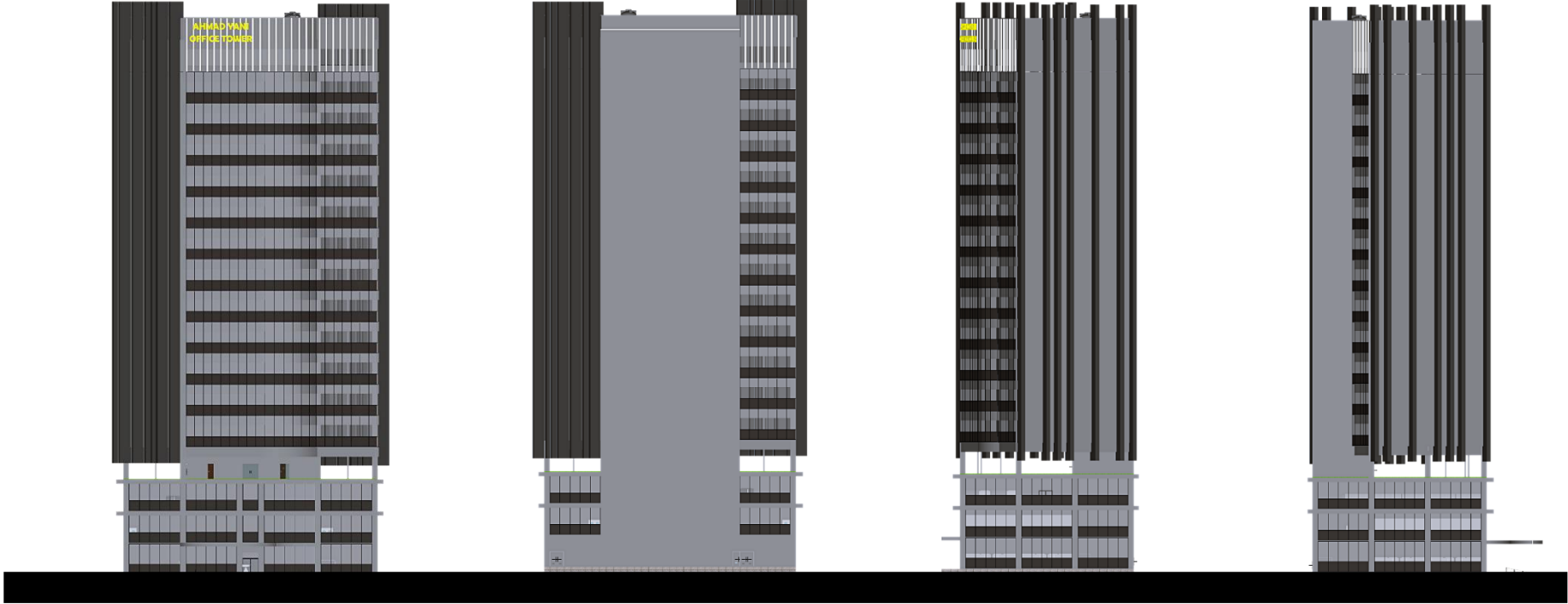
BASEMENT 2



BASEMENT 3







DEPAN

BELAKANG

KANAN

KIRI



LANDMARK HOTEL  
DUBAI

AUTO PLAZA









# EDGE

## Building Data

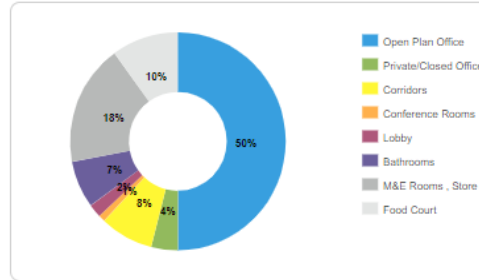
Gross Internal Area Excluding Car Parking	<input type="text" value="7,000"/> m <sup>2</sup>
Floors Above Grade	<input type="text" value="17"/> no.
Floors Below Grade	<input type="text" value="3"/> no.
Floor-to-Floor Height	<input type="text" value="4.5"/> m

- Food Court
- Cellular Office

	Default	User Entry
Open Plan Office	<input type="text" value="4,248"/>	<input type="text" value="3,500"/> m <sup>2</sup>
Private/Closed Office	<input type="text" value="643"/>	<input type="text" value="256"/> m <sup>2</sup>
Corridors	<input type="text" value="468"/>	<input type="text" value="560"/> m <sup>2</sup>
Conference Rooms	<input type="text" value="398"/>	<input type="text" value="64"/> m <sup>2</sup>
Lobby	<input type="text" value="536"/>	<input type="text" value="128"/> m <sup>2</sup>
Bathrooms	<input type="text" value="488"/>	<input type="text" value="510"/> m <sup>2</sup>
M&E Rooms, Store **		<input type="text" value="1,294"/> m <sup>2</sup>
Food Court	<input type="text" value="488"/>	<input type="text" value="688"/> m <sup>2</sup>
<b>Gross Internal Area</b>		<input type="text" value="7,000"/> m <sup>2</sup>

\*\*The M&E Rooms, Store field is equal to the remaining space required to total the gross internal area excluding car parking.

	Default	User Entry
Occupancy Density	<input type="text" value="10"/>	<input type="text" value=""/> m <sup>2</sup> /Person
Operational Hours	<input type="text" value="10"/>	<input type="text" value=""/> Hours/Day
Working Days	<input type="text" value="5"/>	<input type="text" value=""/> Days/Week
Holidays	<input type="text" value="12"/>	<input type="text" value=""/> Days/Year



## Building Orientation

Floor Plan Depth***	<input type="text" value="16"/> m
Main Orientation***	<input type="text" value="Equal"/>

\*\*\* These parameters will be used to estimate building dimensions. If the exact details of the dimensions and orientation are available, then complete the User Entry fields in the Building Lengths section. The orientation of the building will have a direct effect on energy consumption.

	Default	User Entry
North	<input type="text" value="9.5"/>	<input type="text" value="24.5"/> m
South	<input type="text" value="9.5"/>	<input type="text" value="24.5"/> m
East	<input type="text" value="9.5"/>	<input type="text" value="16"/> m
West	<input type="text" value="9.5"/>	<input type="text" value="16"/> m
Northeast	<input type="text" value="9.5"/>	<input type="text" value="35"/> m
Northwest	<input type="text" value="9.5"/>	<input type="text" value="24"/> m
Southeast	<input type="text" value="9.5"/>	<input type="text" value="24"/> m
Southwest	<input type="text" value="9.5"/>	<input type="text" value="35"/> m

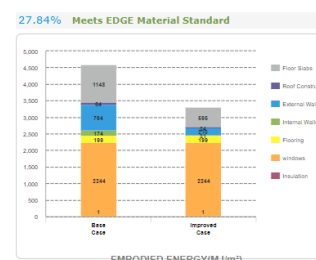
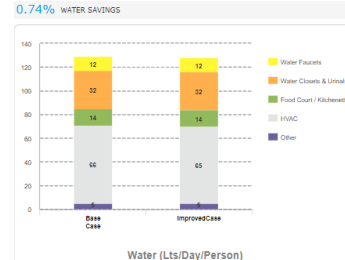
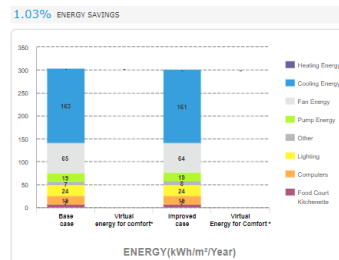
# SAVING ENERGY, WATER, MATERIAL

Design

Energy: 1,03%

Water: 0,74%

Materials: 27.84%

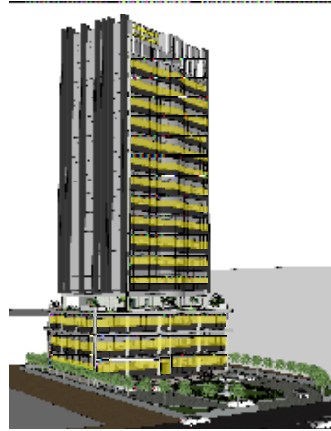




# SAVING ENERGY

## 1. WWR (Window to Wall Ratio)

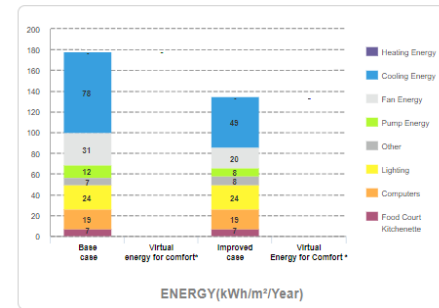
Orientation	Wall Area (m <sup>2</sup> ) Example: 120	Glazing Area (m <sup>2</sup> ) Example: 60	Ratio in %
North	1433.25	541.45	37.78
South	1433.25	132.60	9.25
East	936.00	0.00	0.00
West	936.00	0.00	0.00
Northeast	472.50	178.50	37.78
Northwest	324.00	122.40	37.78
Southeast	324.00	122.40	37.78
Southwest	558.00	204.50	36.65
Total	6,417.00	1,301.85	
			WWR
			20.28%



OFE01\*  Reduced Window to Wall Ratio - WWR of 20.28%

North	37.78 %	South	9.25 %
East	0.00 %	West	0.00 %
Northeast	37.78 %	Northwest	37.78 %
Southeast	37.78 %	Southwest	36.65 %

24.92% Meets EDGE Energy Standard



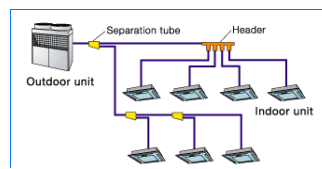
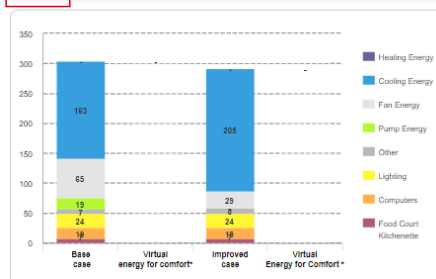
## 2. VRF System

OFE11\*  Variable Refrigerant Flow (VRF) System - COP of 3.5

COP

[Upload Document\(s\)](#) | [Calculator](#)

4.27% ENERGY SAVINGS

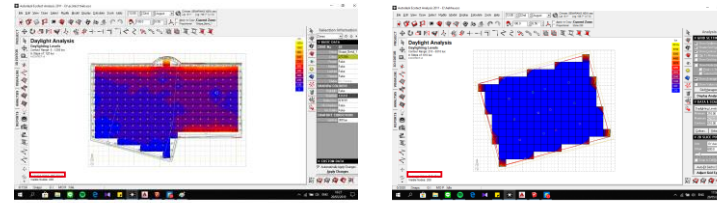


Yellow = kaca (glass)  
Grey = dinding (wall)



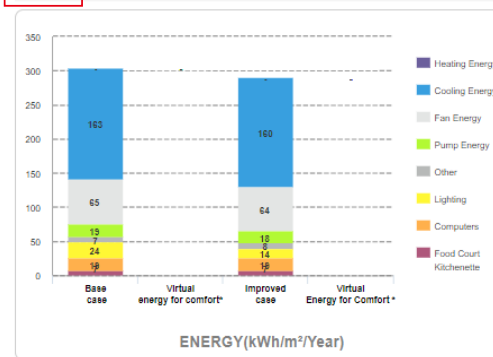
## 3. Daylight Photoelectric Sensors

OFE29  Daylight Photoelectric Sensors for Internal Spaces  
[Upload Document\(s\)](#)



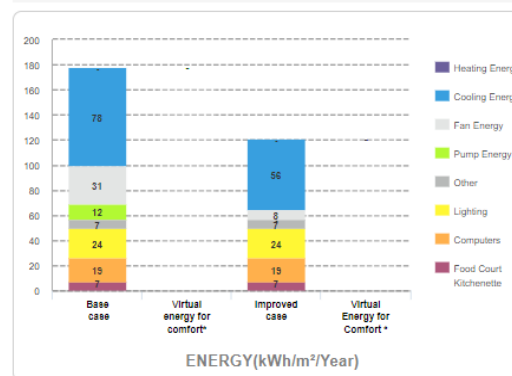
Average Daylighting levels : 426,819 lux

4.95% ENERGY SAVINGS



**SAVING ENERGY TOTAL : 32,04%**

32.04% Meets EDGE Energy Standard



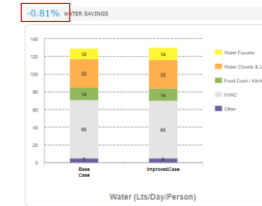
# SAVING WATER

## 1. Low-Flow Faucets

OFE01\*  Low-Flow Faucets in All Bathrooms - 7 L/min

L/min

[Upload Document\(s\)](#) | [Calculator](#)



Keran Tembok	(diluar keran wudhu)	L/menit	L/menit
T30AR13V7N		8	7

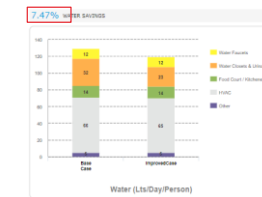
## 2. Dual Flush for Water Closets

OFE02\*  Dual Flush for Water Closets in All Bathrooms - 6 L/first flush and 3.3 L/second flush

1st - L/flush

2nd - L/flush

[Upload Document\(s\)](#)



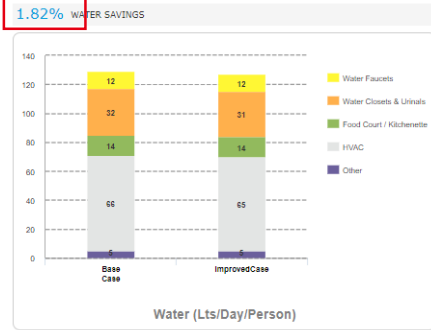
WC Flush Tank	L/flush	L/flush
CW638J Close coupled Toilet, 4.5/3L Dual Flush	6	3,3

### 3. Water Efficient Urinals

OFW03\*  Water-Efficient Urinals in All Other Bathrooms - 3.3 L/flush

L/flush

[Upload Document\(s\)](#)

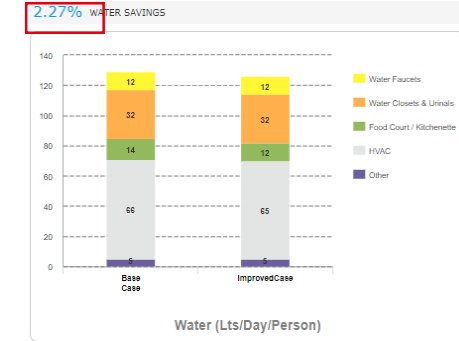


### 4. Water Efficient Faucets for Kitchen Sinks

OFW04\*  Water-Efficient Faucets for Kitchen Sinks - 5 L/min

L/min

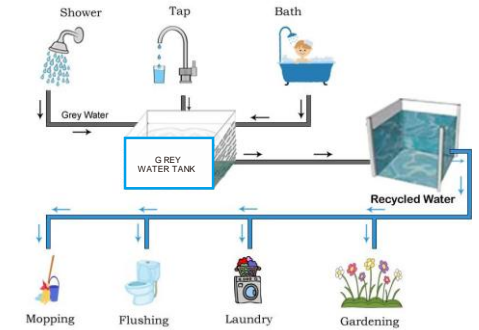
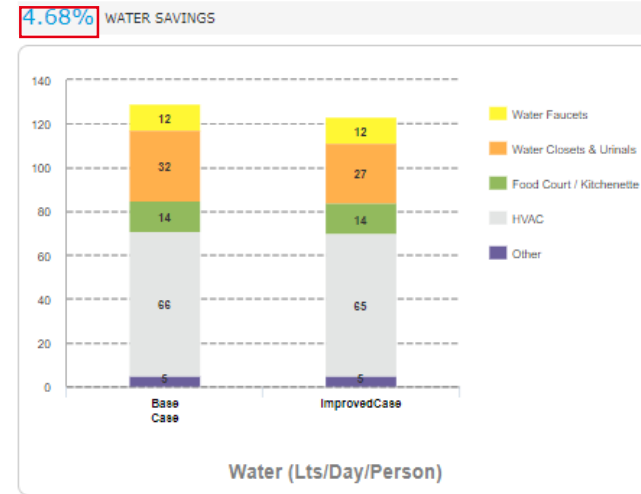
[Upload Document\(s\)](#) | [Calculator](#)



### 7. Grey Water Treatment

OFW07  Grey Water Treatment and Recycling System

[Upload Document\(s\)](#)



#### Peturasan Flush Valve

TX501U Urinal Flush Valve Flow Rate 15lpm

	L/flush	L/flush
	4	3,3

#### Keran Wastafel

Toto TX115LP 5lpm

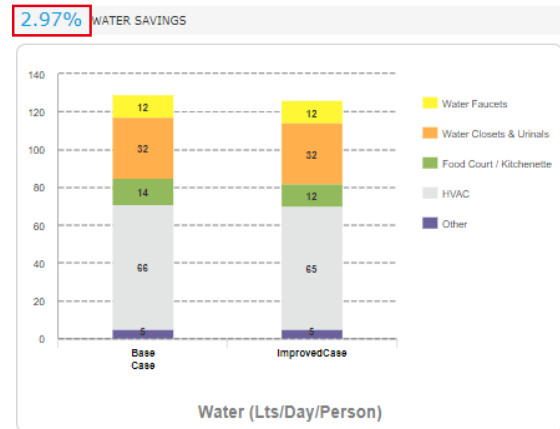
	L/menit	L/menit
	8	5

### 5. Rain Water Harvesting

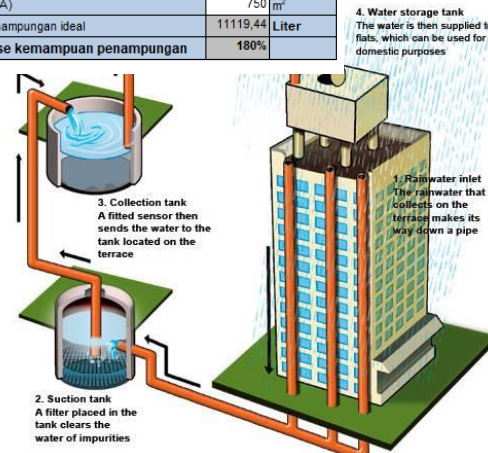
OFW06  Rainwater Harvesting System - 100% of Roof Area Used for Collection

% of Roof Area Used

[Upload Document\(s\)](#)



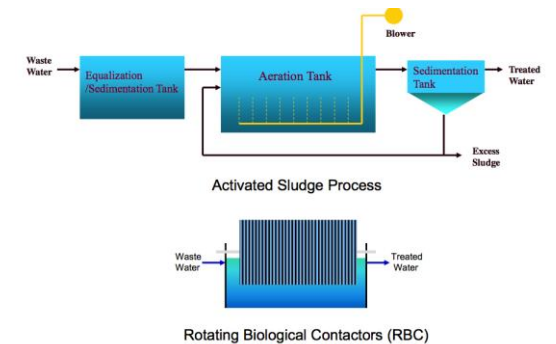
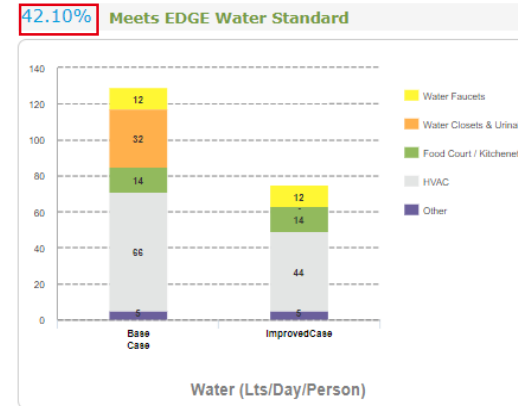
Rainwater Harvesting		
Kapasitas tanki yang direncanakan	20000	Liter
Curah Hujan (l)	15,61	mm
Koefisien Limpasan (C)	0,95	
Luas atap (A)	750	m <sup>2</sup>
Volume penampungan ideal	11119,44	Liter
Persentase kemampuan penampungan	180%	



### 8. Black Water Treatment

OFW08  Black Water Treatment and Recycling System

[Upload Document\(s\)](#)



Disclaimer: EDGE is designed as comparative software and is not a design tool. Therefore predicted results for energy, water and materials may vary from actuals.



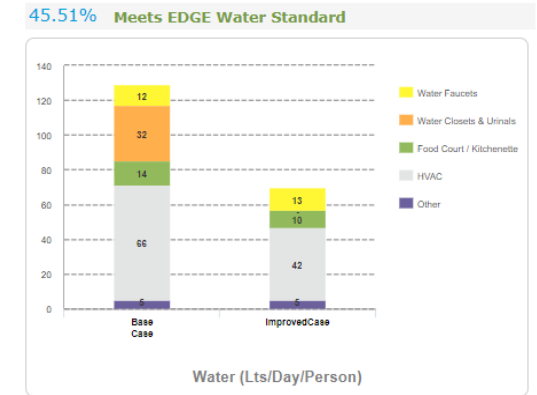
# SAVING MATERIAL

Ref	Building Material	Improved Case Selection	Proportion %	Thickness	Steel Rebar
OFM01*	Floor Slabs <a href="#">Upload Document(s)</a>	In-Situ Concrete with >25% GGBS		100 mm	kg/m <sup>2</sup>
OFM02*	Roof Construction <a href="#">Upload Document(s)</a>	Type 1 In-Situ Concrete with >25% GGBS	100 %	100 mm	kg/m <sup>2</sup>
OFM03*	External Walls <a href="#">Upload Document(s)</a>	Type 1 Curtain Walling (Opaque Element)	70 %	100 mm	
		Type 2 Ferrocement Wall Panel	30 %	200 mm	
OFM04*	Internal Walls <a href="#">Upload Document(s)</a>	Type 1 Ferrocement Wall Panel	70 %	200 mm	
		Type 2 Cement Fibre Boards on Metal Studs	30 %		
OFM05*	Flooring <a href="#">Upload Document(s)</a>	Type 1 Finished Concrete Floor	80 %		
		Type 2 Ceramic Tile	20 %		
OFM06*	Window Frames <a href="#">Upload Document(s)</a>	Type 1 UPVC	100 %	Single Glazing	

\*A selection must be made for each measure with a thickness entered for floor, roof, and walls.



**SAVING WATER TOTAL : 45,51 %**

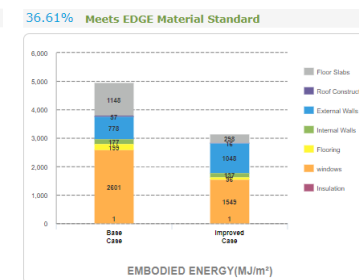
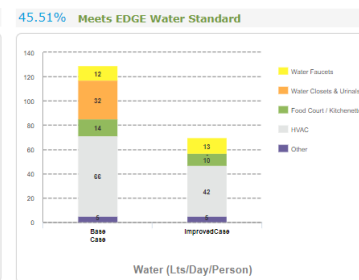
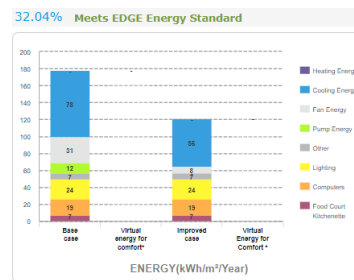


# TOTAL SAVING

32,04%

45,51%

36,61%



**SAVING MATERIAL TOTAL : 36,61 %**

