INTEGRATED BUS TERMINUS

A THESIS

Submitted in partial fulfillment of the requirements for the award of

Bachelor of Architecture degree

By

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DEPARTMENT OF ARCHITECTURE

SCHOOL OF BUILDING AND ENVIRONMENT

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY) Accredited

With Grade "A" by NAAC

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SATHYABAMA
INSTITUTE OF SCIENCE AND TECHNOLOGY

DEPARTMENT OFARCHITECTURE

BONAFIDE CERTIFICATE

This is to certify that this Thesis Report is the bonafide work of V.YOKESH (37210046) who carried out the Thesis entitled “Integrated Bus Terminus” under our supervision from July 2021 to November 2021.

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DECLARATION

I**, V.Yokesh** hereby declare that the Thesis Report entitled "**Integrated Bus Terminus**" done by me under the guidance of **Ar.Vignaeshwar.C** (Internal Guide), **Ar.S.Deepa lakshmi**(Internal Review Member) and Ar**.Meera Chandrasekharan** (External Guide) Sathyabama Institute of Science and Technology is submitted in partial fulfilment of the requirements for the award of Bachelor of Architecture Degree.

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V.YOKESH

THESIS SYNOPSIS

The government of Trichy has proposed a new bus terminus with the integration of market with it at a site area of 100 acres. The proposed site area for the design is in panjappur which is in the outskirts of trichy which inturn reduces the traffic congesion in the city. The main aim of the design is creating a community space serving all kind of people. The main challenge in the design is circulation because there are different modes of transport in the bus terminus, so making it more pedestrian friendly is the main focus of the design.

Identifying the challenges and problems in the existing bus stand, understanding the needs of different kinds of people and creating a comfortable environment for the people. Finding a design solution solving the challenges, problems and satisfying the needs of all kind of people

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Trichy is the center place of Tamil Nadu, we can reach any place in Tamil Nadu from Trichy in few hours

Being a major transit point in the central region of the state and spreading over an area of 4.5 acres (1.8 ha) this terminus is managed by Department of Transport (Tamil Nadu), experiences a heavy traffic of operating about 3100 buses, for about one lakh passengers every day.

The Trichy city corporation has decided to propose a integrated bus terminus in Panjappur, which is on the Trichy - Madurai highway.

1.2 AIM

To design a Bus terminus in panjappur in the outskirts of Trichy to reduce the traffic congestion in the city and Creating a community space serving all types of people

1.3 OBJECTIVE

The objective of the design is integrate some more spaces which adds additional facilities to the surrounding residents and the students of the surrounding college. This can be done by providing food court for the students and recreational space for the residents.

1.4 METHODOLOGY

- Understandingthebasicneedforthedesign.
- Datacollection
- Casestudiesandanalysis
- Framingrequirements
- Designsolution

CHAPTER 2

CASE STUDY

2.1 CHENNAI MOFUSSIL BUS TERMINUS

STATE : TAMILNADU

AREA : 1189 SQKM

POPULATION : 46,81,087 (CEENCUS-2011)

PUPULATION DENSITY : 11,000 persons / sqkm

CLIMATE : WARM & HUMAID CLIMATE AVG.

TEMPERATURE : 35–40 °C (SUMMERS) 15–22 °C (WINTERS)

PRECIPITATION : 1400 MM

SITE AREA : 14.5 HACTARES (36 ACRE)

BUILT-UP AREA : 17,840 SQMT.

F.S.I. : 0.123

GROUND COVERAGE : 10 %

ARCHITECT : MR. KULDEEP SINGH

FOOTFALL / DAY : 2,50,000

PERSONS HANDLING CAPACITY : 3000 BUSES

IDLE PARKING CAPACITY : 60

TOTAL NO. OF FINGERS : 3

EACH FINGER CAPACITY : 60 BUSES AT A TIME THE WHOLE PREMISES IS FRIENDLY TO PHYSICALLY CHELLENGED PEOPLE.

SURROUNDINGS AROUND THE BUS TERMINUS ARE AS FOLLOWS :

NORTH : 30M ROAD

EAST : RESIDENTIAL COLONY

SOUTH : KOYAMBEDU SEWAGE TREATMENT PLANT

WEST : KOYAMBEDU SEWAGE TREATMENT PLANT

NEAR-BY HOSPITAL : KAMALA HOSPITAL (2 KM)

DISTANCES FROM MAJOR LANDMARKS :

CHENNAI INTERNATIONAL AIRPORT : 12 KM

CENTRAL RAILWAY STATION : 13 KM

IIT MADRAS : 18 KM

PROVIDED AT THE BUS TERMINUS AT GROUND FLOOR

DISPENSARY : NEAR THE ENTRANCE

CLOAK ROOM : 1 NO.

RECEFACILITIES PTION/ENQUIRY COUNTER : 2 NOS.

MAINTENANCE SHED : 1 NO. (1400 SQ.MT.)

FUEL FILLING STATION : 1 NO. (855 SQ.MT.)

PARKING FACILITIES : SINGLE ENTRY FOR STAFF AND PUBLIC PARKING CREW

REST ROOM : 2 Nos. (500 SQ.MT.)

PRIVATE DORMITORIES ARE PROVIDED WITH BED FACILITY/AC HALLS

TIME KEEPERS ROOM : 6 NOs.

DRINKING WATER FOUNTAINS WITH COOLER : 7 NOs.

FREE EMERGENCY CLINIC CUM DISPENSARY : M/S APOLLO HOSPITALS (150 SQ. MT.)

POLICE OUT-POST : 1 NO.

SECURITY CABIN : 5 NOs.

FREE WHEEL CHAIRS : 6 NOs.

BANK ATM : 4 NOs.

TELEPHONE BOOTH : 30 NOs.

FACILITIES PROVIDED AT THE BUS TERMINUS AT FIRST FLOOR

OFFICE/COMMERCIAL SPACE : 2300 SQ.MT.

TRADE CENTER : 2 BLOCKS OF 5 SHOPS EACH.

THERE ARE TOTAL 44 SHOPS (600 SQM) IN THE TERMINAL

NO OF SHOPS IN MAIN HALL : 10 NOS.

IN BUS FINGERS : 24 NOS.

IN TRADE CENTRE : 10 NOS.

ACCESS TO THE SITE :

I - ENTRY FOR PARKING AND AUTOS

II - MAIN ENTRY FOR PUBLIC

III & IV - ENTRY & EXIT WAYS FOR BUSES

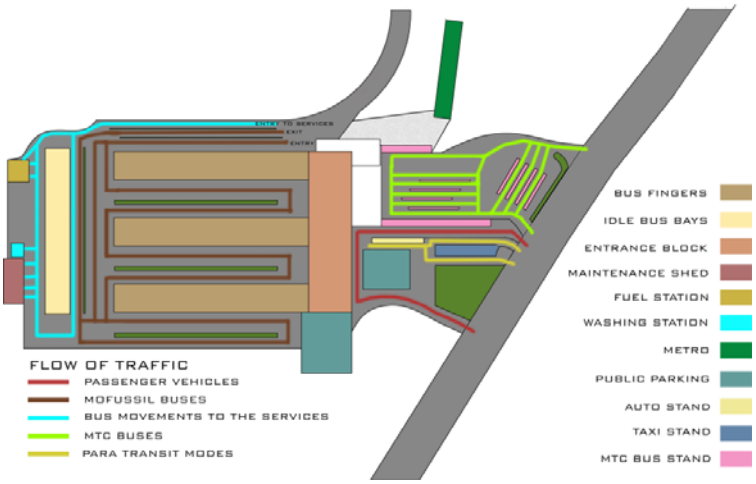


fig 2.2.1 plan of CMBT

INFERENCE

.Separate entry/exit for city buses and for cabs & autos and also for interstate buses

.Huge entrance plaza creating a landmark in the city

.The different entry / exits helps in distributing the traffic of the vehicles

.This bus stand has a direct connect with the metro which inturn helps people more

.The bus stand has the parking bays connected with washing yard, fuel station and maintenance shed which helps the drivers for easy access to these.

2.2 MAHATMA GANDHI BUS TERMINAL

LOCATION : GOWLIGUDA, HYDERABAD

AREA : 19.78 ACRES

ARCHITECT : UPAL GHOSH ASSOCIATED DELHI

PLATFORMS : 5

BUS BAYS : 79

FACILITIES PROVIDED

DRINKING WATER - 9

ENQUIRY - 4

TOILET BLOCKS - 7

DORMITORY - 1

DELUXE LOUNGE - 1

CYCLE / SCOOTER PARKING SPACE - 3

CLOCK ROOM - 2

BOOKING COUNTER - 7

RESERVATION COUNTER - 5

SEATING ACCOMMODATION - 1000

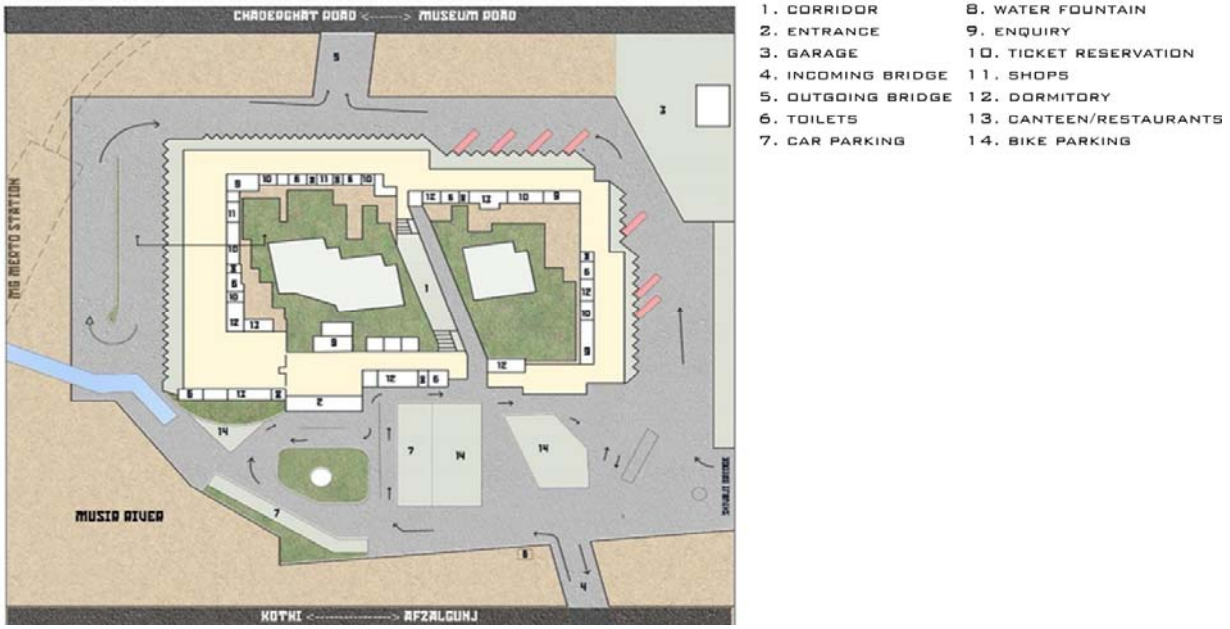


fig 2.2.1 Plan of MGBT bus terminus

fig 2.2.2Satellite image of bus terminus

INFERENCE:

Planning is basically rectangular and the function is in circular mode because the site is an island it is connected with the bridges with the roads on the either side of the river

The platforms are located according to the form around the structure which makes it more pedestrian friendly

2.3BUKIT BATOK BUS INTERCHANGE

Bukit Batok bus terminus is in ground floor and they have gone for multilevel storey parking which reduces the ground cover as well as the congesion of of vehicles at peak hours

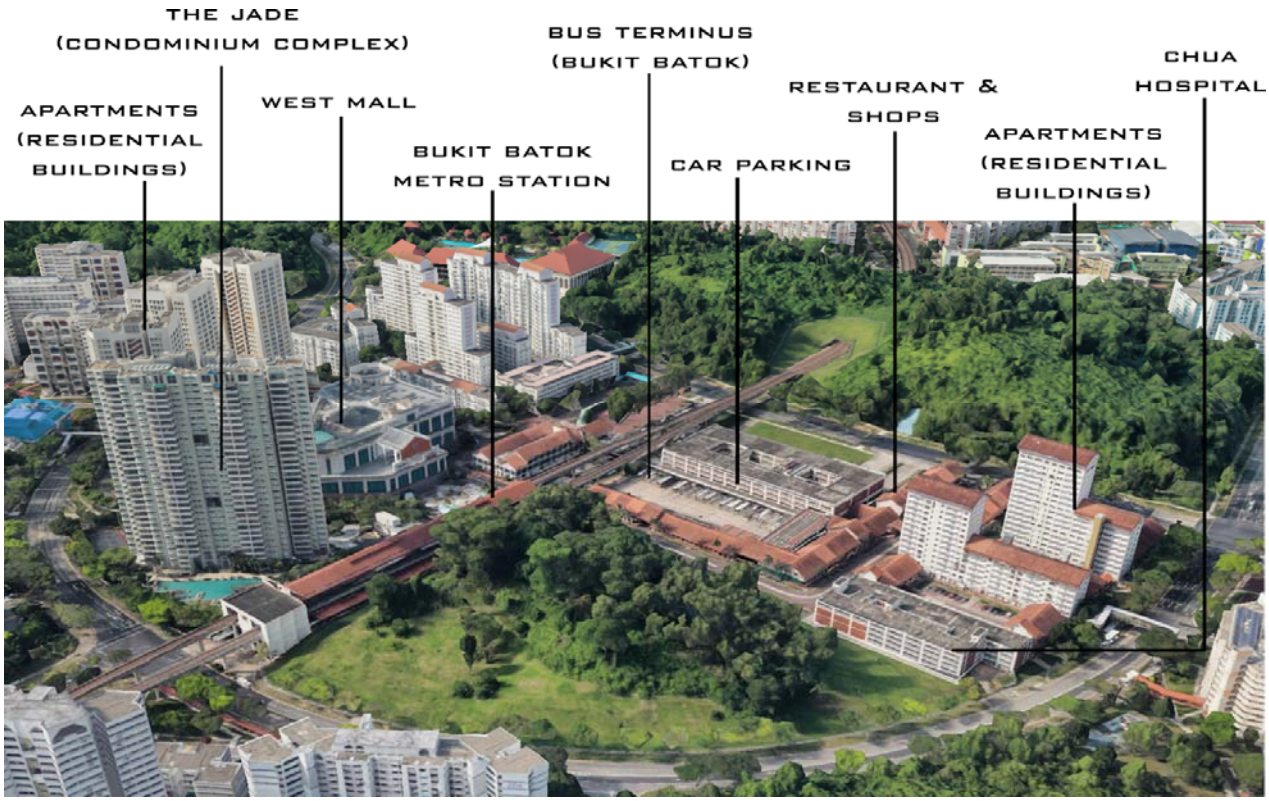


fig 2.3.1 3d view of the bus terminal

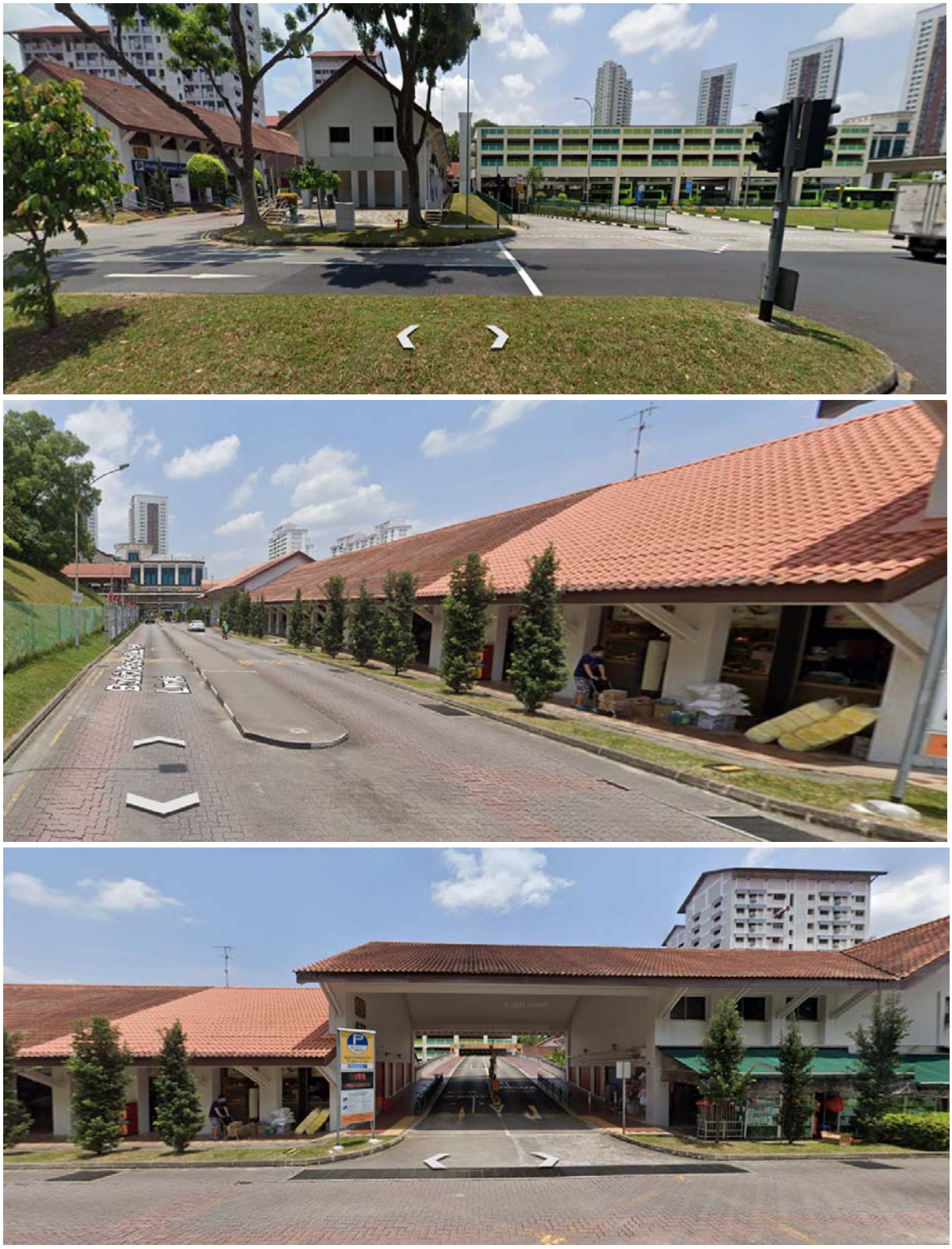


fig 2.3.2 views

INFERENCE:

In this design all the buildings can be accessed by both exterior and interiorroads and connecting two major transportation of metro and bus terminus

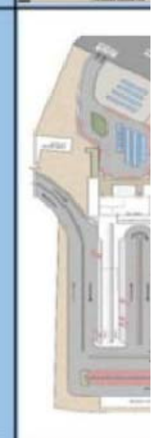
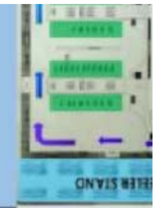
TERIA	CHENNAI MOFFUSIL BUS TERMNUS	MAHATMA GANDHI BUS TERMINUS	MATTUTHAVAN
	INTERSTATE BUS	INTERSTATE BUS	INTERS
	36 ACRES	19.78 ACRES	18 A
T	MR.KULDEEP SINGH	UPAL GHOSH DELHI	----
	2,15,000	1,00,000	1,1
ATED	7000/ DAY	3600/ DAY	400
	BIKE PARKING	BIKE / CAR PARKING	BIKE I
RS	3	5	
	60	79	
ING AREA	500SQM	NO	
NCE SHED	1100SQM	NO	
BAYS TYPE	SEMI COVERED	SEMI COVERED	SEMI C
ATION	YES	NO	Y
S PROVIDED	CLOAK ROOM, DISPENSARY DRINKING WATER, DORMITORY , POLICE OUT POST, SECURITY CABIN, ATM, TELEPHONE BOOTH	CLOAK ROOM, DRINKING WATER, DORMITORY, DELUXE LOUNGE, ATM	CLOAK ROOM, I ATM, FEEDIN CA
			

Table 2.1

CHAPTER 3

3.1 DATA COLLECTION AND STANDARDS

A bus terminus is a structure where a number of buses stop to pick up and drop offpassengersandstopformaintenanceornextdaydeparturestodifferentdestinations.It is larger than a bus stops, which is usually simply a place on the roadside, wherebusescanstop.Itmaybeintendedasaterminalstationforanumberofroutes,orasatra nsfer station where theroutes continue.

Terminals serve as a point

of1.Concentration

2. Dispersion

3. Loading/unloading of passengers and

goods4.Facilitiesandamenities for crew

5.Integrationofvarioustransportation.

Need for a terminal arises with increase in demand. An organized bus terminalshouldmeetthefollowing requirements

1. Accessibility

2. Comfortandconvenience

3. Safety

4. Easyprocessing

PRINCIPLESOFTERMINALPLANNING&DESIGN

Access and approach: Traditional bus terminal facilities fail to provide convenientaccess to public buses, their closed confines make access extremely difficult forpassengers. Current attempts to improve bus-based public transport access are onlyconcernedwithimprovementofstreetinfrastructure,andfocusedmainlyonpedestrianfacilitiesand bus stops.

Location: Locational characteristics make for the key factor attracting passengersusing the bus terminal. Centrally located (core city areas) bus terminals are desirableforoperationalefficiencyandpassengerconvenience,astheyprovideampleinterchangeopportunities.Additionally,theyarepotentialcandidatesforusingterminals as a vibrant city space. Peripheral terminals, when integrated with depotfunctions,workbest inminimizing deadmileage.

Enhancedlevelofservice: ThebasicpremiseoftheLevelofService(LOS)frameworkisthatpassengersaresensitivetotheamountofspacesurroundingthem.When this space is compromised by crowding, they perceive it as a deterioration ofservice.

Crime prevention through environmental design Passenger safety is fundamental totheattractivenessandincreaseduseofpublictransport.Acommutershouldfeelsafeusing publictransportatanytime(ofdayandnight)andatanylocation.Thisincludesbetter urban planning, including effective lighting, barrier-free circulation, enhancedvisibility,signageandwayfinding,integratedcommercialactivities(formalorinformal)toavoiddarkorin-activecomersetc.IntegratingCPTEDshallensurebetterconnectivityas wellasenhanced andattractive us-age.

Integratingsustainabledevelopmentpractices:Infra-structureplansanddevelopmentpractices should consider green building technologies to reduce the overall carbonfootprint and adverse impact on the environment, both during the development andoperational phase. Construction practices may employ material and techniques) withlowembodiedenergy,whileenergyrequirementsfortheterminal'soperationsmaybemet through sustainable means and use of efficient technologies. This may includeuse of solar energy. efficient LED lighting, passive cooling/heating measures, higherreliance on natural lighting etc. Additionally, techniques for noise control, solid wastemanagement,wastewaterrecycling,use/re-useofwastewater,andrainwaterharvestingshouldbe integratedintheproposalduringtheplanningstage.

SIZE

Itdependson

1. Flow of

traffic2.Characteristic of the

terminal3.Usercharacteristics

TYPES

1. Busdepots

2. Busstopsandshelters

3. Intercitybusterminus

4. Airport-citybusterminus

5. Interstatebusterminus

LOCATIONOFTHETERMINAL

1. Placewhichcanreducetraffic.

2.Point of coordination of inter and intra city transport3.Easytochangemodeoftransport.

DESIGNCONSIDERATIONS

1. Segregationofbusandnon-bus traffic

2. Segregationofvehicularandpedestrianmovement

3. Segregationofpedestrianflow

4. Linkingoftransportand non-transportactivities

5. Minimumprocessingandsafety.

MAINREQUIREMENTS

Primaryelementstobeconsideredwithregardabusterminalinfrastructuredevelopmentcanbeclassifiedforthreedifferentusertypes.Theseincludepassengers,terminal staffandbusstaff.

Passengerareas

a. Ticketingandqueuing

b. Passengerwaitingarea

c. Passengerconveniences(drinkingwaterfacilitiesandtoilets)

d. Passengercirculation

e. Boarding/Departingareas

f. Facilityentry

g. Touristinformation

h. Security,includingCCTVcameras

i. Retail,concessionsandleasespace

j. Dormitoriesandlodging(ifrequired)

k. Cloakroom

l. Railwayreservation

Areasforterminalstaff

m.Revenueoffice

n. Securityandinformation

o. Ticketingbooth

p. Restingroom

q. Staffconveniences(drinkingwaterfacilitiesandtoilets)

r. Canteen

s. Maintenancestaff(chairsandlockers)

t. Controlroom(CCTVsurveillance)

Areasfor busstaff

u. Canteen

v. Restingareas

w. Loggingareas(ifrequired)

x. Busstaffconveniences(drinkingwaterfacilitiesandtoilets)

SupportingInfrastructure

Supporting infrastructure refer to the additional facilities which aid in enhancing userexperience,efficiency,andattractivenessofbusterminal.Theseincludepro-visionforfeederinfrastructure,seating,landscaping,lighting,wayfinding(PassengerInformationSystems(IS),signageand marking),publicart,andbreakdownservices.

Feeder infrastructure: The infrastructure which connects the bus terminal with thecity is referred to as supporting access (or feeder) infrastructure. It includes provisionfor various modes that provide access and act as feeder to the bus terminal. Theseinclude parking for private vehicles; drop-off and pick-up bays for private vehicles,taxis, auto rickshaws cycle rickshaw, shared vehicles such as vans/jeeps etc.; andbays and/or stops for local bus services. Integration of all these modes makes forhigherpassengerconvenienceand increasedintermodalaccessibility

Seating: Seatinginandaroundthebusterminalcomplexshallbeplannedtocatertoa minimum of 30% of all passengers in the facility. Seating is required so as to avoidobstructiontotheflowofpassengertraffic throughthecomplex;itshouldbedesignedto combinecomfort, caseofmaintenanceandresistancetovandalism.

Hardscapeandlandscaping: Itisimportanttoensurethatlandscapingcomplementsthespatialdesignandenhancesthevisualappealofthe terminal.

Outdoor and indoor passenger areas should be smoothly hardscaped, to facilitateeasyconnectionbetweensiteperipheryandtheterminal.Thepaving'ssurfacequality should ensure durability as well as resistance against wear, walking comfort andusabilityby wheel-chairs, pramsand baggage trolleys.

Lighting: Lightingshouldbedesignedtomeetminimumilluminationlevelsandqualitystandards for both indoor and outdoor application. Natural lighting elements such asskylightsshallbeusedtoenhancelightinglevelwithoutincreasingtheenergyloadoftheterminalfacility.Lightingfixturesshouldbeenergyefficient,requirelowmaintenance,andminimize lightpollutionandglare.

Signage: PIS including both dynamic and fixed sign-age constitute an integral part oftheterminalwayfindinginfrastructure,andplayanimportantroleinregulatingvehicularandpedestrianmovement.Theyproviderelevantinformation,warningsanddirections, thus facilitating ease of access, convenience and safety. They should bestrategically placed, consistent and easy to interpret. Public address system shouldbe integrated into the design, at all terminal facilities. The aim is to provide a robust,functional, and visually discrete system that can provide communicative informationandalsobelinkedtothe securitysystem for warning (incase ofemergency).

Publicart: Visualspaceperception(mentalcopyingofobjectsandeventsoftheouterworld) helps people recognize spaces within a particular environment, such as a busterminalcomplex.Itincreasestheimage-ability,culturalidentity,andsocialattractivenessofenclosedspaces.Assuch,publicartinstallationsandotheraestheticelements in the complex are likely to contribute to its visual appeal and overallattractive-ness,andmustbeintegratedintotheterminalbuildingdevelopment.Contemporarily,'publicart'hasalsocometoincludevariousotherelementslikeurbanfurniture, lighting, multimedia, graffiti and commercial art. Public art is by the people.and for the people, and as such should also be sourced from them. Therefore, it isimportant to allocate planned spaces for such installations, and make appropriatefundingavailablefor integration of thesame.

Private Vehicle Parking: This relates to the type of parking arrangement for privatevehicles at the bus terminal. It is influenced by the parking demand and spaceavailabilityin theterminal, andis classified into four categories:

• Structured parking: Parking on multiple floors (multilevel parking), usually aboveground

• At grade parking: Parking arranged only at ground level • Shared parking: Parkingnot exclusive to bus terminal private vehicles, such as public parking in a districtcateringto visitorstothearea,includingthoseaccessingthebus terminal

• On street parking: Parking arranged along the street, not planned on a land parcelsetoff the street,usually outside theterminalcomplex.

Passenger amenities: This relates to the facilities provided in the terminal, forpassengers'convenience, including:

- DrinkingWater
- Toilets(Odorless&Waterless)
- Concourse
- FreeWi-Fifacilityinwaitingarea
- Eateries
- TouristInformation
- Cloakroom
- Ticketing
- Dormitory
- Baggagetrolleys

Terminal staff amenities: This relates to the facilities dedicated for staff. Theyinclude:

- DrinkingWater
- Toilets(Odorless&Waterless)Restingrooms
- Canteen
- RevenueOffice

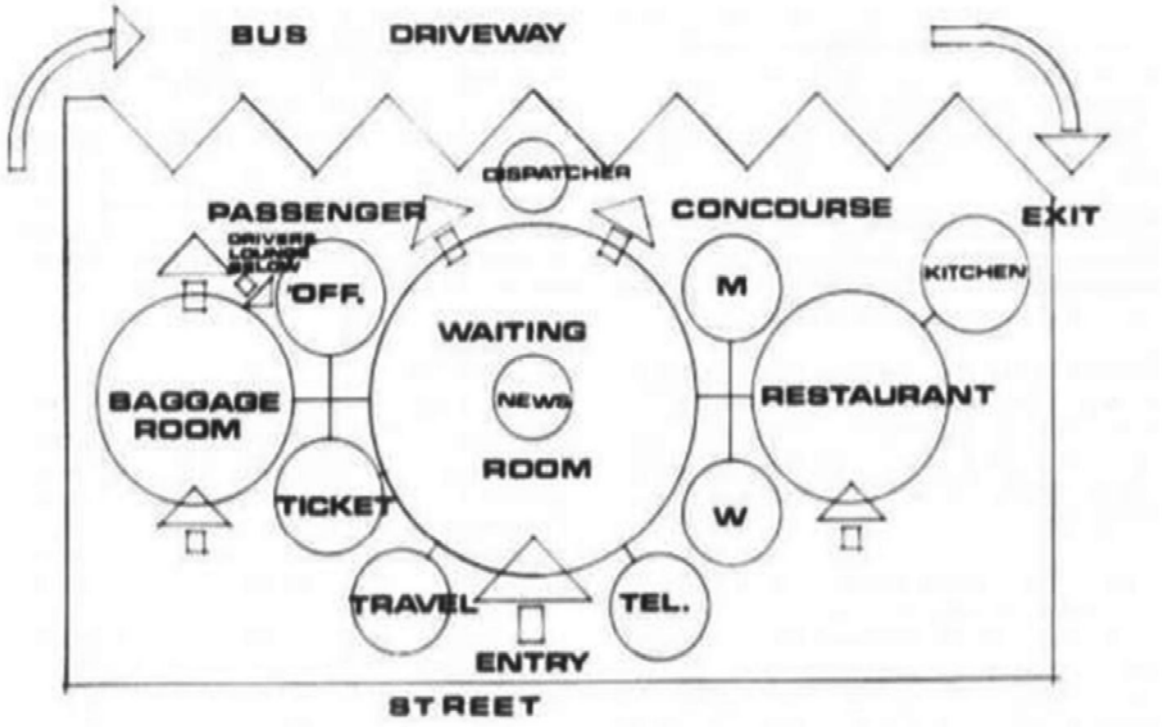


fig 3.1 Proximity of the bus terminal

LUGGAGEROOM

1. Requirementsvarysignificantlywithterminaltypeandoperation.

2. In the intercity terminal the baggage handling problems more severe. The baggageroom should be accessible from both the public area and the concourse and have anareaequaltoabout10percentofthetotalbuildingorcontainabout50sq.Ftforcoachbus loading berth, whichever is higher. The luggage room should also be equippedwith standardmetal racksaboutfourorfive tiershighfor baggagestorage.

PUBLICLOCKERSANDTELEPHONES

Lockersandtelephonesarerevenueproducing,andthequantitiestobeprovideddependtoagreat degree ontheirpotential earningcapacity.

RENTALSPACE

Theamountofrentalspacetobeprovidedforstores,shops,concessions,etc.Dependsprimarily on theamountof spaceavailable.

DISPATCHOFFICE

Thedispatchofficecontrolsallbusmovementandconsequentlyshouldbelocatedonthecon coursesothatitcanobserveallloadingberths.Thesizeofthedispatchofficemay vary anywhere from 50 to 150 sq. Ft. Offices all terminals regardless of typerequireacertainamountofofficespace.Thespecificareatobeprovideddependsonthet erminalsizeandtype.Althoughusuallyofficesfortheterminalmanager,passenger agent, and switchboard are sufficient, in larger terminals more elaboratefacilitiesare required.

CORRIDORDESIGN

Minimumcorridorwidthsarebasedonthepedestriantrafficflowvolumelessappropriate allowances for disruptive traffic elements such as columns, newsstands,stairways,windowshoppers,etc.Wherethecorridorisalsousedasawaitingar eatoaccommodate standing pedestrians, the maximum potential accumulation and safehuman occupancy of the corridor should be determined. The maximum practical flowthrough a corridor is approximately 25 persons per foot width of corridor per minute(pfm). In a commuter terminal, the more stringent standard of 10 to 15 pfm may beused. This standard allows the attainment of near-normal walking speed but doesresultinmorefrequenttrafficconflicts withother pedestrians.

ENTRANCES

The criteria utilized for corridor design can be roughly applied to the design of doors.The maximum capacity of a free-swinging door is approximately 60 persons perminutebutthiscapacityisobtainedwithfrequenttrafficdisruptionsandqueuingattheentrance section. A standard of 40 persons per minute would be representative of abusy situation with occasional traffic disruptions. Where free-flowing traffic is desiredastandardof20personsperminuteshould beadopted.

QUEUINGSITUATIONS

Occur in terminal which affect their functional design. Linear queues will occur wherepassengers line up to purchase tickets or board buses. The length of a lincar queuemay be estimated on the basis of an average per person spacing of 20 in. Thepresence of baggage has little effect on this spacing because baggage is placed onthe floor either between the legs or at the sides. Where no circulation through thequeuing space is required, area occupancies as low as 5 sq. Ft per person may betolerated for short periods. Where movement through the queuing space is required,such as in a passenger waiting concourse, an average area of 10 or more sq. Ft perperson is required.

SPACESTANDARDSANDSERVICES

TOILETS

Area	NoofWater closet	NoofWash basin	NoofUrinal	Noofdrinkingwater fountain
Arrivalblock	2for20men	2for20men	1for20men	1tapfor25person
	2for15women	2for15 women	……	
Departure block	1for25men	1for25men	1for7-20men 2for21-45men	1tapfor50person
	1for15women	1for25 women	……	
Administrative offices	1for25men	1for25men	1for7-20men 2for21-45men	1tapfor50person
	1for15women	1for25 women	……	
Foodcourts	1per50people. Over200add1 per100person formen	1perWC	**1**for50person	1tapperkitchen And1tapperrestaurant
	2per50people. Over200add1 per100person forwomen	1perWC	……	

Table 3.1

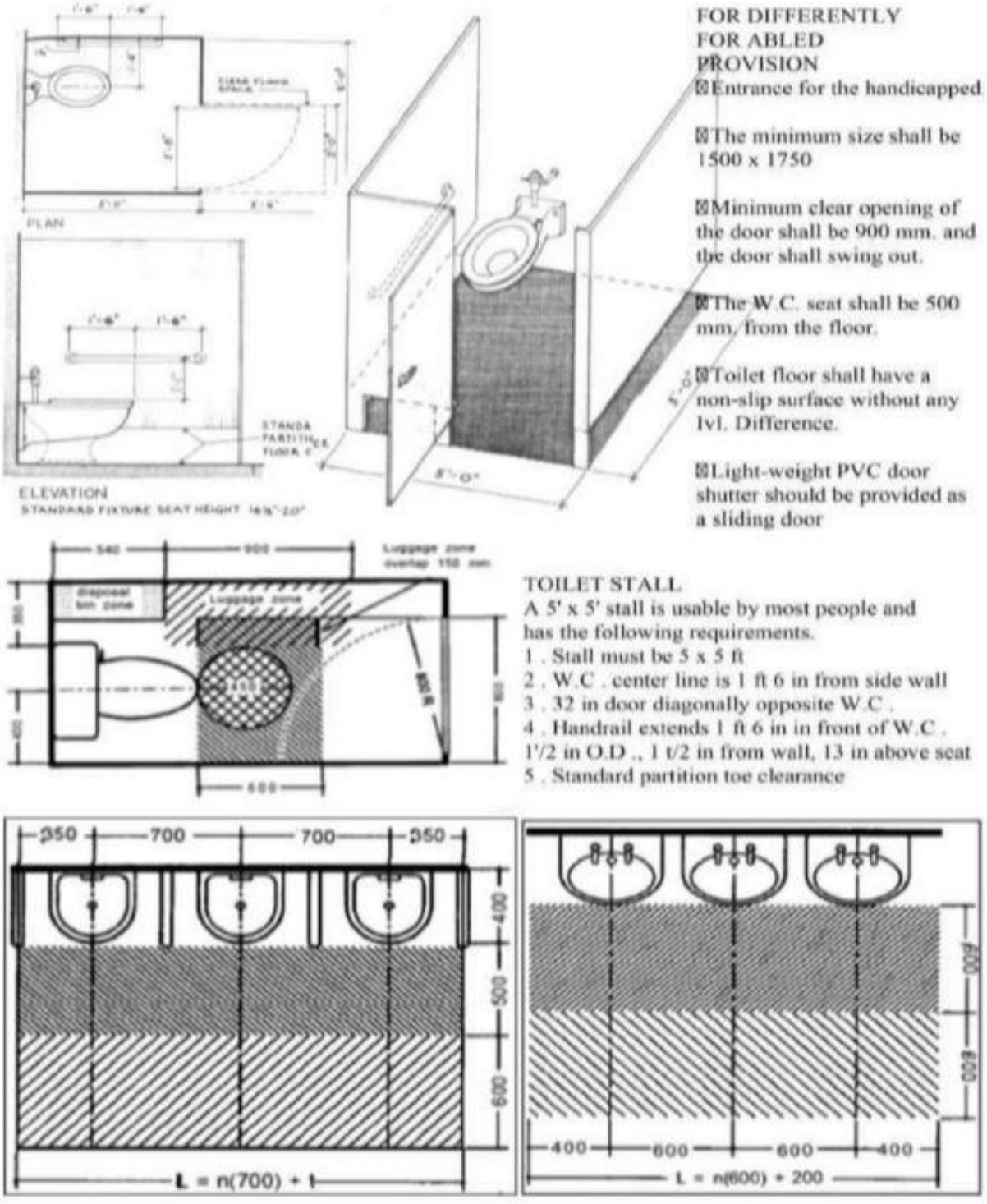


fig 3.2 Standards for toilet size

RAMPBREAKOVERANGLE

Therampbreakoverangleisthemeasureofabilityofthecartobreakoverasteepramp,cither climbingor descending, withoutscraping.

RAMPSLOPE

The maximum ramp slope should be 20 percent. For slopes over 10 percent, atransitionatleast8ft.longshouldbeprovidedateachendoftherampatonehalftheslopeof the ramp itself.

ANGLEOFDEPARTURE

Areasonableminimumvalueisnecessarytoreducetheincidenceoftailpipeandrearbumpe rdragging.Thestandardcallsforaminimumof10degrees,violatedonlyinthe1957-1959period.Onlyone1970car,mercury,mettheminimumstandard.Mostcarsare substantially above 10 degrees. The most critical condition is at driveways wheretheapronis steep,or acombinationof excessive crowntogutter andapronslope.

ANGLEOFAPPROACH

The trend of approach angle of domestic cars from 1948 to 1962 indicates a drop inthe 1957-1959 periods below 15 degrees. The standard developed in 1960 by thesocietyof automotiveengineers calls foraminimumvalueof 15 degrees.

PARKINGLOTLAYOUTCONSIDERATIONS

The objective of the layout design is to maximize the number of stalls, while followingtheguidelinesbelow.Thelayoutoftheparkingfacilitymustbeflexibleenoughtoadaptto future changes in vehicle dimensions. The stall and aisle dimensions must becompatible with the type of operation planned for the facility.The critical dimensionsare the width and length of stalls, the width of aisles, the angle of parking, and theradius of tums. All of these dimensions are related to the vehicle dimensions andperformancecharacteristics.Inrecentyearstherehavebeenanumberofchangesinvehicledimensions. Thepopularityofminivans andsportutilityvehicles.

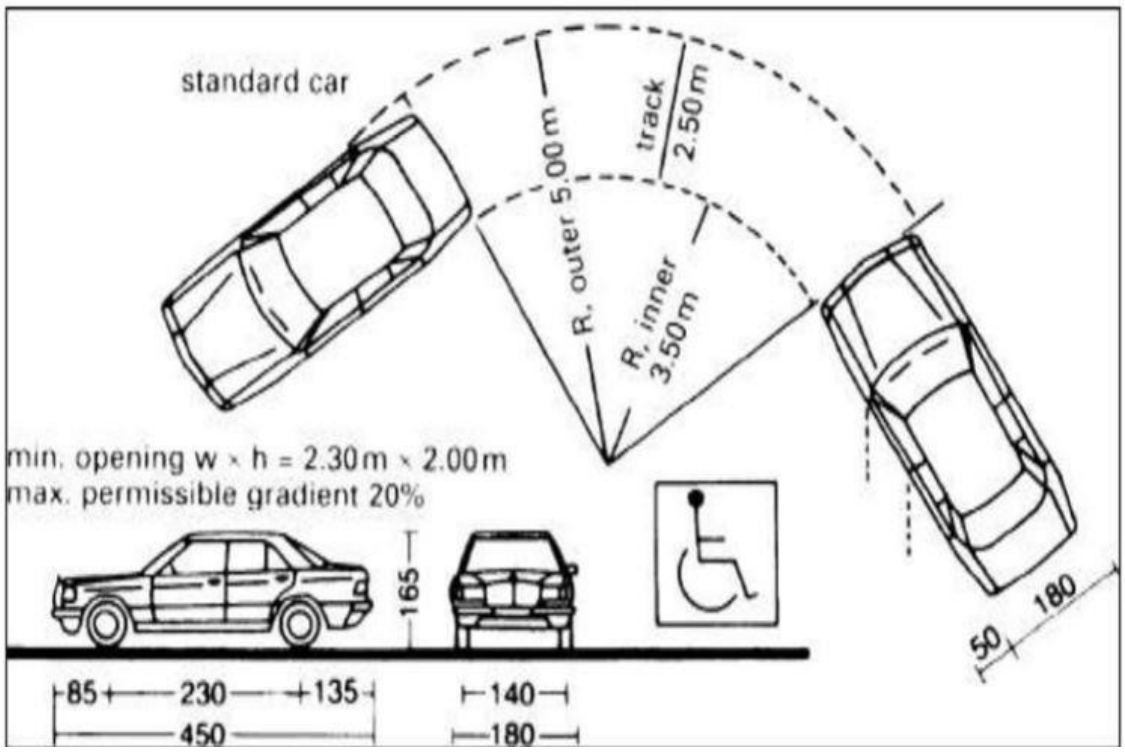


Fig 3.3 turning radii for car

BUSGEOMETRICS

BUSDATE

Busgeometrics,orthephysicaldimensionsandmaneuverabilityofthebus,determinethewidthofroadways,shapesofplatforms,columnspacingceilingheights,andotheraspectsofbus-leveldesign.Theapparentlyinsignificantdetailoftheright-sideloadingofbusesoften restrictsterminaldesignpossibilities

SWEPTPATH

When a bus turns normally, it always turns about a point which is somewhere on thecenter line of the rear axle. This is true whether motion is forward or backward. Theturnsrequiredtoaccomplishthemovementandpositioningofbusesarevariableanddiffer considerably with the equipment encountered. The turning template provides aconvenientgraphicmethodtodetermineminimumclearancesrequired.

PLATFORMTYPES

PARALLELLOADING

1. RequiresExcessiveAmountOfSpace.

2. BusesMustUsuallyWaitUntilFirstBusExits.

3. Large Terminal Requires Pedestrian Under/Overpass Facilities To ProtectPassengersWhile CrossingLanes.

RIGHT-ANGLELOADING

DisadvantagesInclude:

1. Out swinging Bus Door Which Forms a Barrier around Which Passenger MustPass

2. BusManeuveringDifficult.

STRAIGHTSAW TOOTHLOADING

1. Efficient-EmployedWhereLotIsComparativelyNarrowandDeep

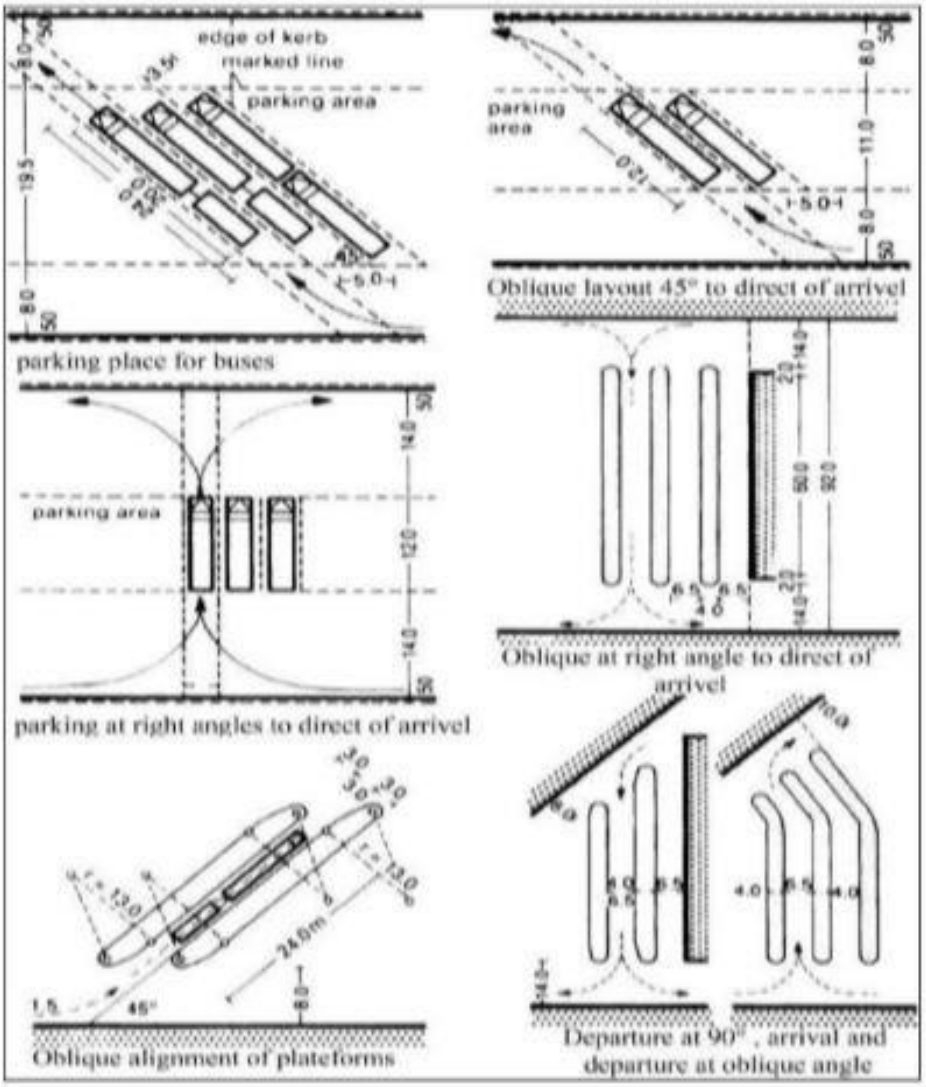
2. PassengerHasDirectApproachToLoadingDoor

3. Baggage Truck Can Operate Between Buses For Side LoadingRADIALSAWTOOTHLOADING

1. Mostefficientbusesswingintopositionalongnaturaldrivingare.

2.Spacerequiredatfrontisminimum-widespaceat rearmakingmaneuveringeasy

BAYS,PARKINGANDCIRCULATION OFTHEBUSES



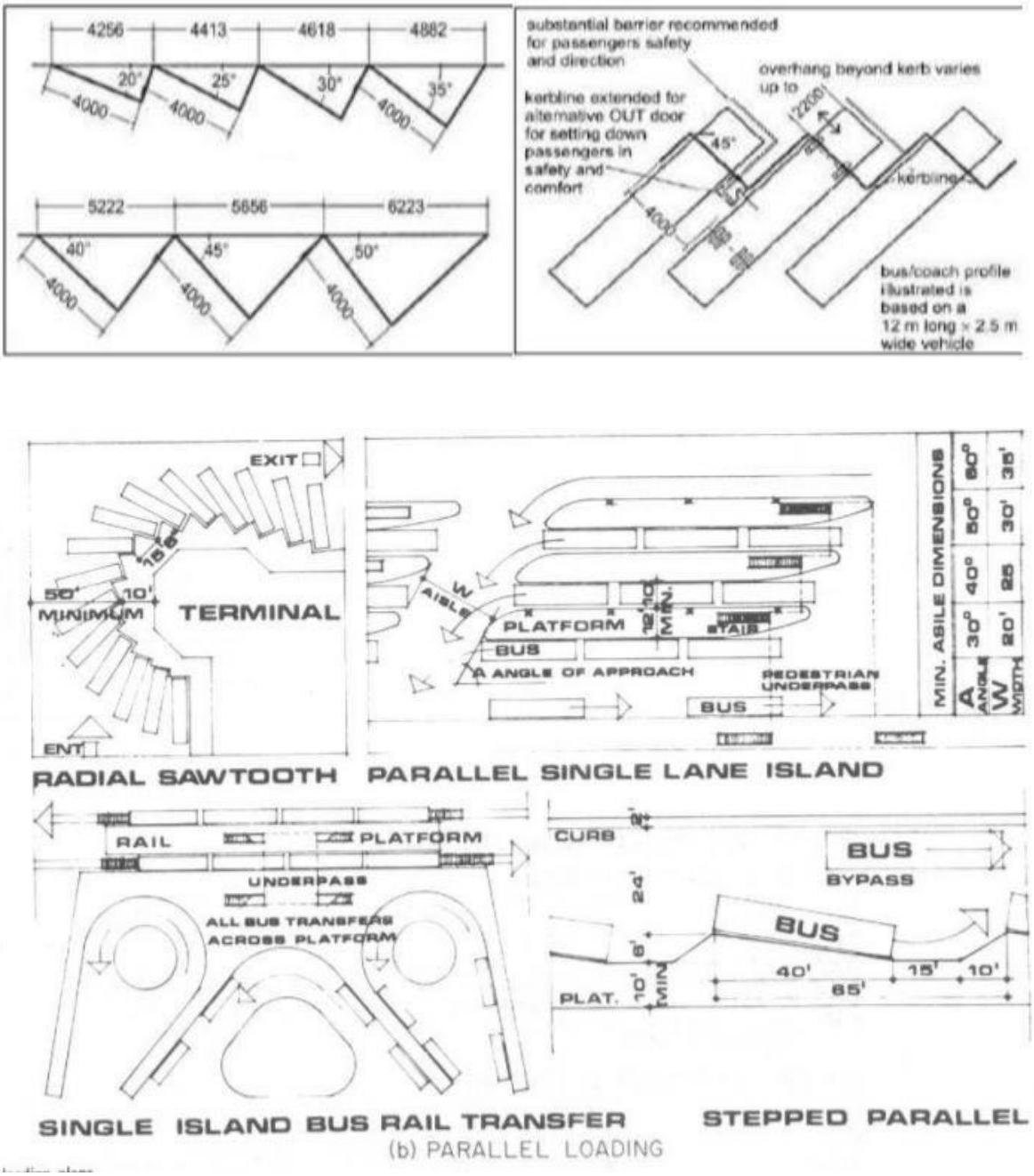


Fig 3.4 bus bays

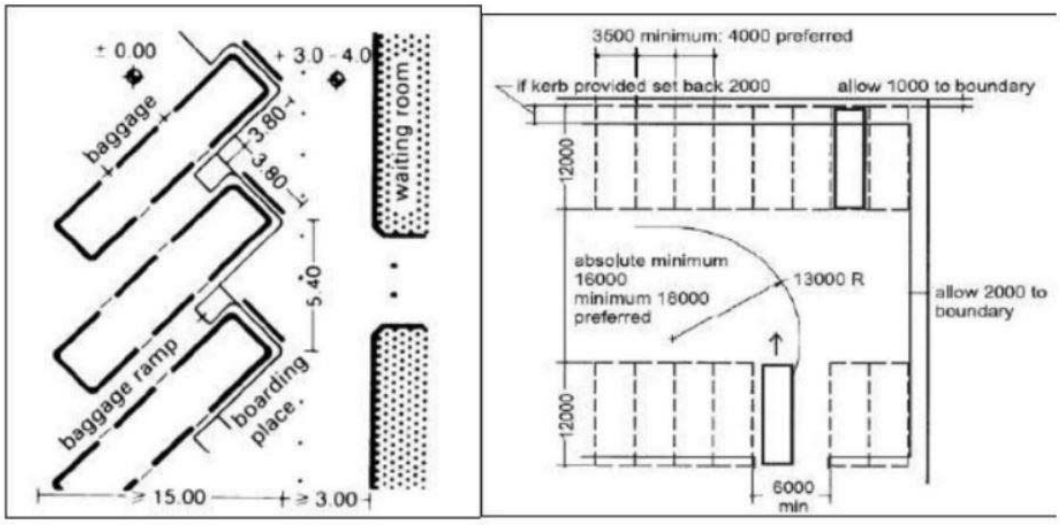


Fig 3.5 standards for parking bays

platform shape	without passing lane			with passing lane		
	Aa	Ab	Ac	Ba	Bb	Bc
layout of arrival line	parallel	at 45°	at 90°	parallel	at 45°	at 90°
platform length (m)	24	24	24	36-60	36-60	36-69
platform width (m)	3	3	3	3.5-4	3.5-4	3.5-4
number of loading points a) for buses	2	2	2	2-3	2-3	2-3
b) artic. buses	1	1	1	1-2	1-2	1-2
area of platform, roadway and arrival spur in m² a) for buses	138	176	189	293	296	313
b) artic. buses	276	340	378	439	444	470

Space Requirement for Platform

relation to line of arrival	parallel	at 45°		at 90°	
length of parking space (m)	32	12	24	12	24
parking options	1 artic. bus or 2 buses	1 bus	1 artic. bus or 2 buses	1 bus	1 artic. bus or 2 buses
width of parking space (m)	3.5	3.5	3.5	3.5	3.5
width of arrival lane (m)	4.0	8.0	8.0	14	14
parking area incl. roadway area in m² a) per bus	88	135	89	140	91
b) artic. bus	176		178		182

Space for Parking

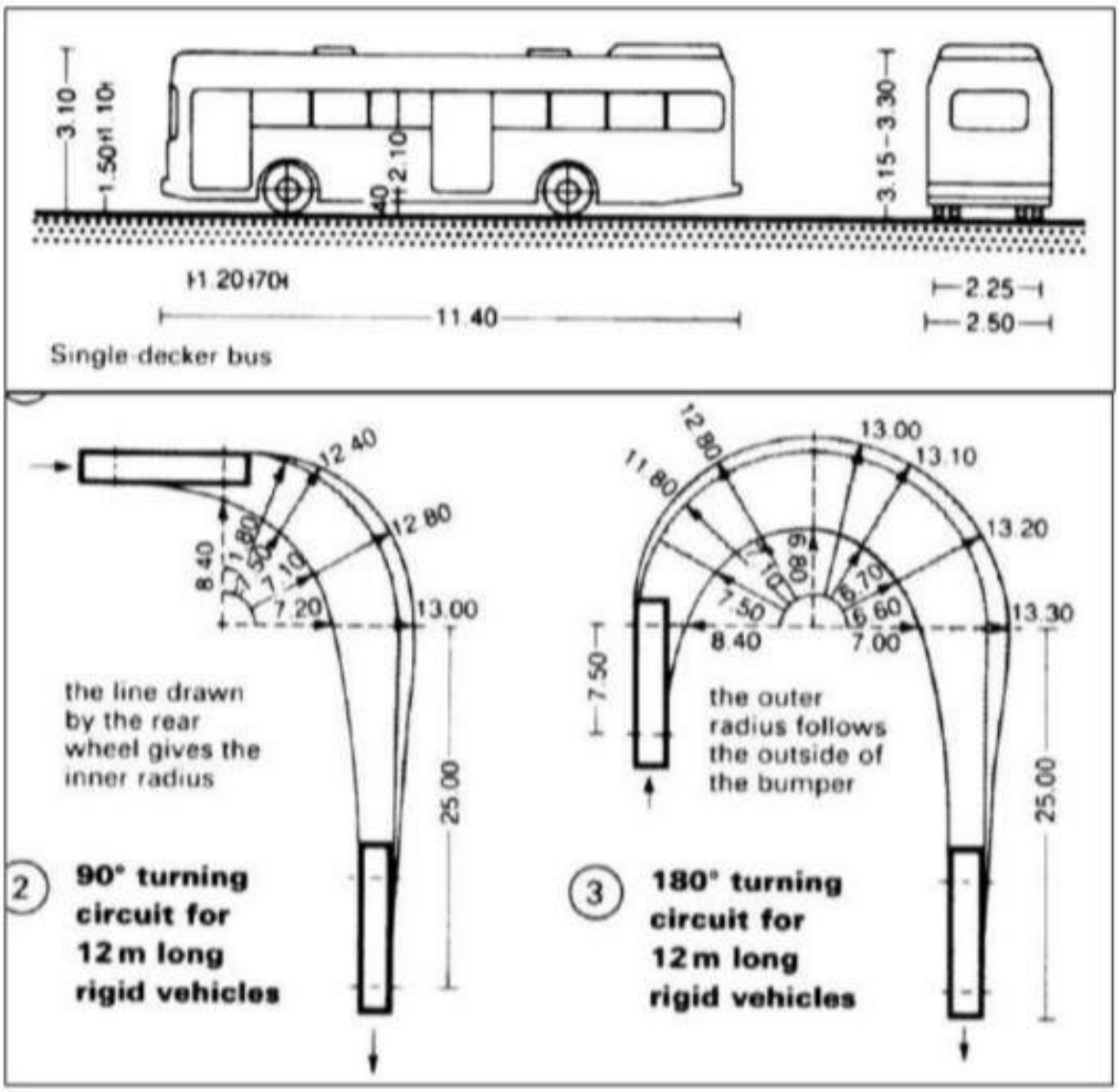


Fig 3.6 turning radii for buses

SERVICES:

1. Inabuilding,theservicesplayamajorroleinthefunctioningofthebuilding.Thebuilding services should beoffollowing character.

2. Theyshouldfunctionefficiently.Theservicesshouldbecost-effectivenotonlyintheinitial setupbutalsoduring the long run.

3. Theyshouldutilizeminimumenergyresourcesandshouldbeenergyefficient.

4. Theservices shouldbe socalculatedthatthey catertothemaximumpeakloads.

5. Themaintenanceofalltheseservices shouldbeeasyandefficient.

6. The services should be adequately protected and should not pose a threat for thebuildingor its inhabitants.

7. Inamulti-storybuilding,greatcareshouldbetakeninzoningtheservicesappropriately.

The services should cater not only to the present needs but should beinaccordancewithfuturepredictedrequirementstopreventanyunnecessaryalterationsi n thebuilding inthefuture.

TheServicesIncorporatedAre:

1. Waterstorageandsewagetreatmentplant.

2. Water supply and sewerage board provides reliable water supply. A main waterstoragetank shouldbeprovidedatthe park holdingacapacityequalto aweek's.

3. Consumption at the park. Water quality should be regularly checked in compliancewith who standards,ensuringclean watersupply atalltimes.

4. Asewagetreatmentplantthatmeetspollutioncontrolregulationsrecycledwaterforlands capinguses,maintainingtheparksconceptofagreencultureshouldbeprovided.

ELECTRICALROOMS

Theseroomsareusedtodistributeelectricitythroughconduitsrunningverticallyinthebuildingand alsoasapanelfor controllingthe electric supply

DGROOMORGENERATOR ROOM

Theseshouldbeinanareawherethenoisecomingfromdgroomdoesnotaffecttheworkingof theoffice.Itshouldalsobeneartheserviceentryfortheeaseofrepairandmaintenanceofthe machines.

UPSROOM

Foruninterruptedstablepowersupplytothecomputersintheparkisprovided.Theyshouldbenear theserviceentryinthebasementorgroundfloorforeasymaintenance

AHU

These are for distributing conditioned air from the ac plant to each floor and filteringthereturnair

Landscapinguses, maintainingthe parksconceptofagreencultureshouldbeprovided.

One ahu of 10 set caters to 500 sq.m. Of area type fans that pump air through ductsThe air is made to pass through filters to remove dust particles and then over thechilledwatertubeswhereit'sheatistransferred.Thiscooleddehumidifiedairisdrawnbac k through the suction side and pumped to the rooms through ducts. All the ahusare provided with tap and floor drain also. Ducts are provided throughout the buildingto transfer conditionedairfrom theahu's tothe spaces.

The ducts are rectangular sections made of galvanized sheet steel. The ducts aremade to run above the false ceiling Ducts used in the building are generally of depthof300mm.ThewidthofductvariesdependingonitsdistancefromtheahuTheductsclo se to the ahu may be of 900mm width and these ducts branch out into narrowerducts.

FIREFIGHTING

Fire is supported by three essential ingredients, fuel, heat and oxygen The absenceof any of these causes fire to be extinguished. The fire fighting system must beappropriate to the location of the fire and preferably limited to the area in order tominimize damage to plants and building structure. Radiation from fire may provecombustion to combustible material at some distance. Fire fighting implies the abilityof building element to fulfill their assigned functions under condition if maximumseverityofexposuretoheatexpected tooccur inthebuilding

Itis ameasureof:

1. Resistancetocollapse
2. Resistancetoflamepenetration
3. Resistancetoexcessivetemperatureriseontheunexposedface

FIRECONTROL

DetectionandAlarmSystem:

1SmokeDetectors

2. HeatDetector

3. ManualSystem

4. AutomaticAlarm

HEATSENSITIVEDETECTIONSYSTEM

Heatsensitivedetectionsystemprovidesautomaticsprinklers,alarmandcontrol.Itisbasically a nozzle with an orifice fitted with a flow control device and a deflector thatwill distribute water over a green area. When the bulb is heated, the liquid expands,absorbingthebubbleof airandbreakingthebulb,releasingthesprinklercap.

Sprinklersaredesignedtorealeaseatvarioustemperaturesrangingfrom57degreescto260 degreec.Maintenanceofwaterpressurewaterfromappropriatesupplyisfedto anautomatically controlledpump andtomaincontrol valveof the

system.Abovethisisthealarmvalve,whichiskeptclosedbythetrappedpressureofwater When sprinkler operates this pressure falls and the valve opens and excesswaterflows up avertical riser toamain distributorpipeateachceiling.

SMOKESENSITVEDETECTIONSYSTEM

- The system detects the fire with the help of smoke and then alarm automaticallyinitiated control of fire is done manually. Detector to be sited at highest parts ofenclosed area, so mounted that sensitive area is not less than 25mm or morethen600mmbelow theroof ceiling.
- Inlet of each return air duct shall have a detector on its center, if continuous inletdetectoratevery roomof its length.

FIREALARMSYSTEM

ThereAreTwo TypesOf FireAlarmSystem:

- MANUAL SYSTEMS- Manual call point is manually operated device to initiate analarm. They are made of sturdy enclosure and provided with a hammer to breaktheglass to initiate asalarm.
- AUTOMATICFIREALARMSYSTEM- Theseareconnectedtodetectorswhichonsensing some exposure to heat or smoke direct the alarm system to initiateautomatically.

FIXEDFIREFIGHTINGINSTALLATION

- AUTOMATICSPRINKLERS

Automatic sprinklers protect high fire risk public and manufacturing buildings. Thesemay be a statuary requirement if the building exceeds the volume of 7000 cum.Sprinkler water outlets are located at about 3m centers, usually at ceiling level andspraywaterinacircularpattern.Adeflectorplatedirectsthewaterjetoverthehazardoron to walls or the structure.

Each sprinkler has a frame containing a colored liquid for leak detection, which sealsthewaterinlet.Uponlocaloverheatingthequartzexpandsthefractures,releasingthes prayWaterflowisdetectedandstartsanalarm,pressureboostingsetandautomaticlinkto the firebrigademonitoringstation.

SPRINKLERSSHOULDBEINSTALLEDIN

1. Basements used as car parks or storage occupancy, if the area exceeds 200sq.m.
2. Multi-level basements, used as car parks and housing essential servicesancillary to a particular occupancy or for storage occupancy, excluding any tobeusedfor sub-station, ac Plantanddgset.

FIREESCAPESTAIRCASE

Thesearestairsusedforescapingduringfire.Theycanbeusedforgeneralpublicasvertical circulationor asservice stairsotherwise inthebuilding

ACCORDINGTONBC:

1. No space in an office building should be more than 30mts from the fire escapestairs.

2. Fireescapestairscouldbeeitheropentoairorshouldhaveblowersystemtosuckout airfromthestairs areain caseof fire.

3. Allfireescapesshouldterminateinanopenareaorneartheentranceinthegroundfloor.

MEANSOFESCAPE

The only sound basis for designing means of escape from first is to attempt to locatethepositionofallpossiblesourcesofoutbreakoffireandtopredictthecourseswhichmight thereafter be allowed by the fire as it develops Following are some of theobservations. The main stairways were developed in smoke at the end of sevenminutes.Allcorridorswere impassable after16minutes

1. Theemergencystaircaseremainpassableduetoselfclosingfiredoors.

2. Toremovesmoke,freshairshouldbeintroducedateachlevel.

3 Acorridor10mlengththatisfilledwithsmokecannotbeusedtogettoanenclosedstairway.

CHAPTER 4

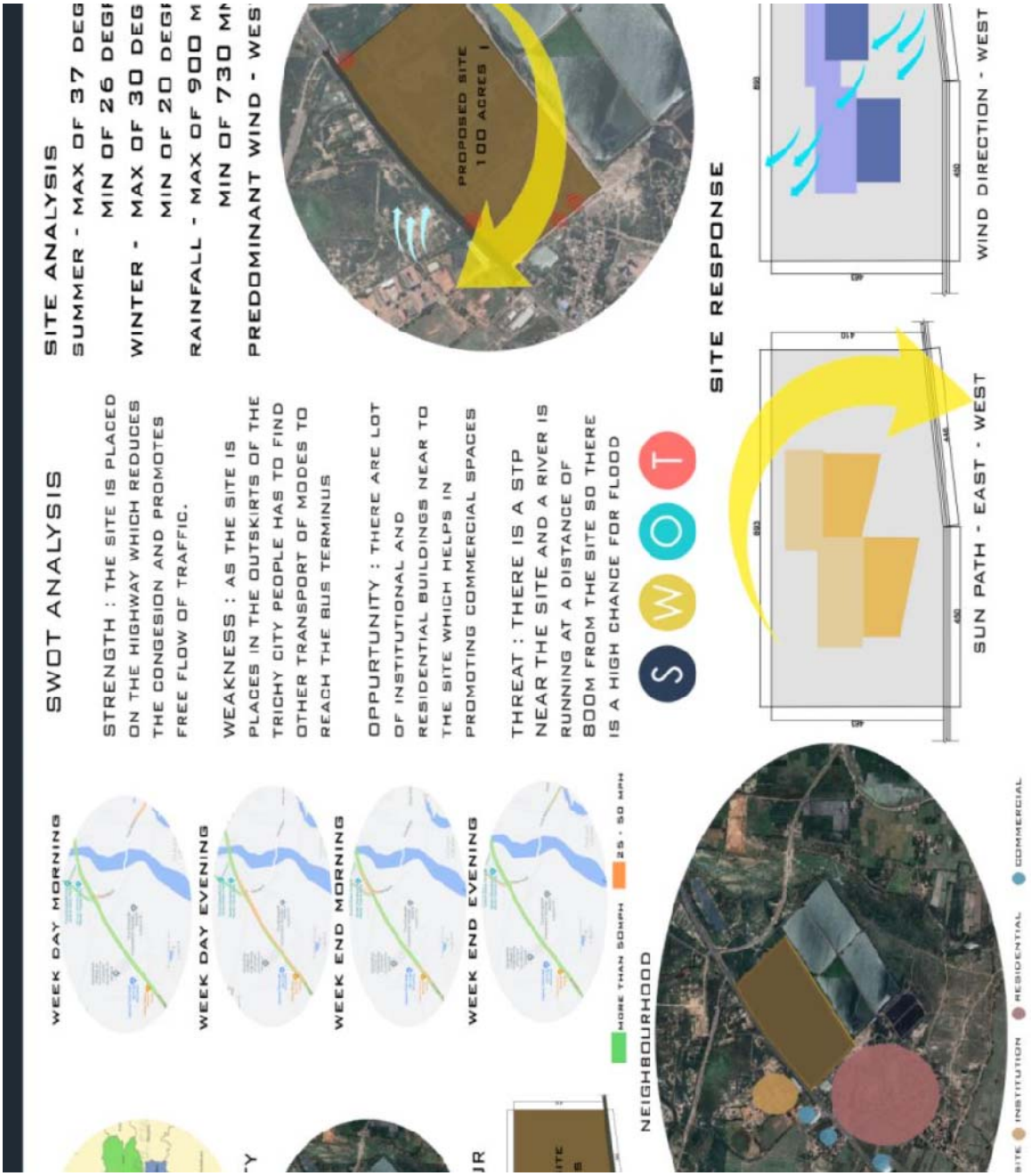


Plate 5.1

CHAPTER 5

Plate 5.2

ENTRANCE HALL

SPACE	NO. OF PEOPLE	AREA PER PERSON	AREA (sqm)
et Counter	20	20	400
ng Area	37.5	20	750
mation Desk	3	2.5	7.5
ic toilet (M)	26	1.5	39
ic Toilet (F)	20	1.5	30
M	1	20	20
y area	100	2	200
e Out- Post	2	2.5	5
		TOTAL	1451.5

DEPARTURE BLOCK

SPACE	NO. OF PEOPLE	AREA PER PERSON	AREA (sqm)
ing lobby	1000	2	2000
iire Area	2	2.5	5
ic toilet (M)	26	1.5	39
ic Toilet (F)	20	1.5	30
k Room	1	100	100
s	20	25	500
aurant	1	200	200
M	1	20	20
ing Room	1	50	50
Court	250	2	500
		TOTAL	3444

BUS BAYS

SPACE	NO. OF BUSES	AREA PER BUS (sqm)	AREA (sqm)
ernment Bus Bays	100	52.5	5250
i Bus Bays	60	52.5	3150
		TOTAL	8400

ARRIVAL BLOCK

S.NO	SPACE	NO. OF PEOPLE	AREA PER PERSON (sqm)	ARE (sqm
1	Arrival Lobby	200	2	4
2	Help Desk	2	2.5	[illegible]
3	Public toilet (M)	26	1.5	[illegible]
4	Public Toilet (F)	20	1.5	[illegible]
5	A.T.M	1	20	[illegible]
6	Prepaid Taxi Booth	2	2.5	[illegible]
7	Restaurant	1	100	1
			TOTAL	5

ADMINISTRATION AREA

S.NO	SPACE	NO. OF PEOPLE	AREA PER PERSON (sqm)	ARE (sqm
1	Meeting Room	15	4	[illegible]
2	S.E.T.C Office	10	5	[illegible]
3	K.S.R.T.C Office	10	5	[illegible]
4	A.P.S.R.T.C Office	10	5	[illegible]
5	T.N.S.T.C Office	10	5	[illegible]
6	Toilet	20	1.5	[illegible]
7	Telecommunication Room	5	5	[illegible]
8	CCTV Room	1	50	[illegible]
			TOTAL	3

PARKING

S.NO	SPACE	NO. OF VEHICLES	AREA PER VEHICLES (sqm)	ARE (sqm
1	Bus Parking	250	52.5	131
2	Bike Parking	1500	2.4	36
3	Car Parking	200	12.5	25
			TOTAL	192

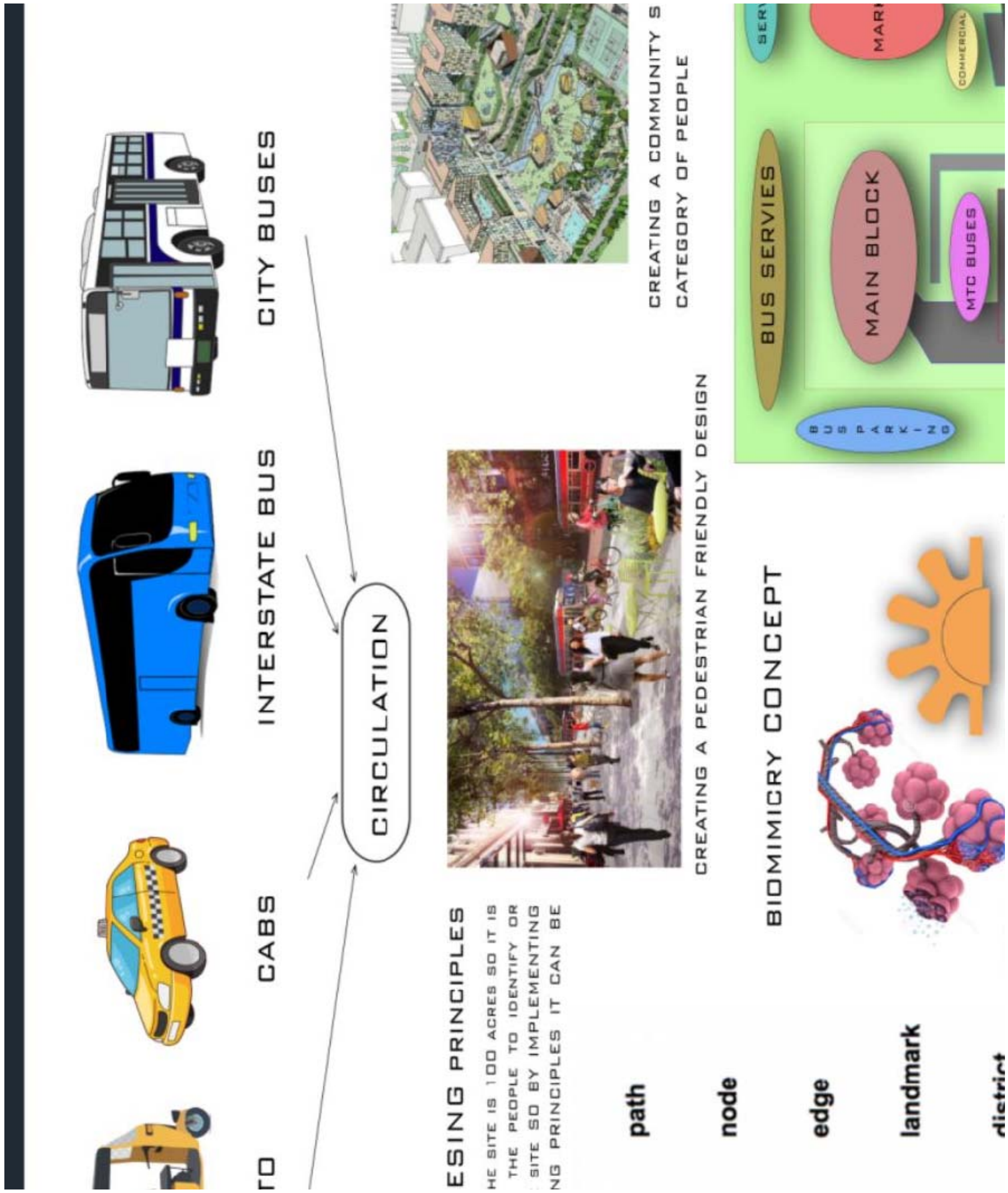

CABS
INTERSTATE BUS
CITY BUSES
CIRCULATION
CREATING A PEDESTRIAN FRIENDLY DESIGN
CREATING A COMMUNITY S
CATEGORY OF PEOPLE
BIOMIMICRY CONCEPT
BUS SERVIES
MAIN BLOCK
MTC BUSES
COMMERCIAL
path
node
edge
landmark

Plate 5.3


892,7
SERVICE YARD
TRUCK PARKING
FRUITS STORAGE
FLOWER STORAGE
VEGETABLE STORAGE
MTC BUS TERMINUS
IDLE BUS PARKING
SCALE BAR 1:1000
0
20
50
100

Plate 5.4

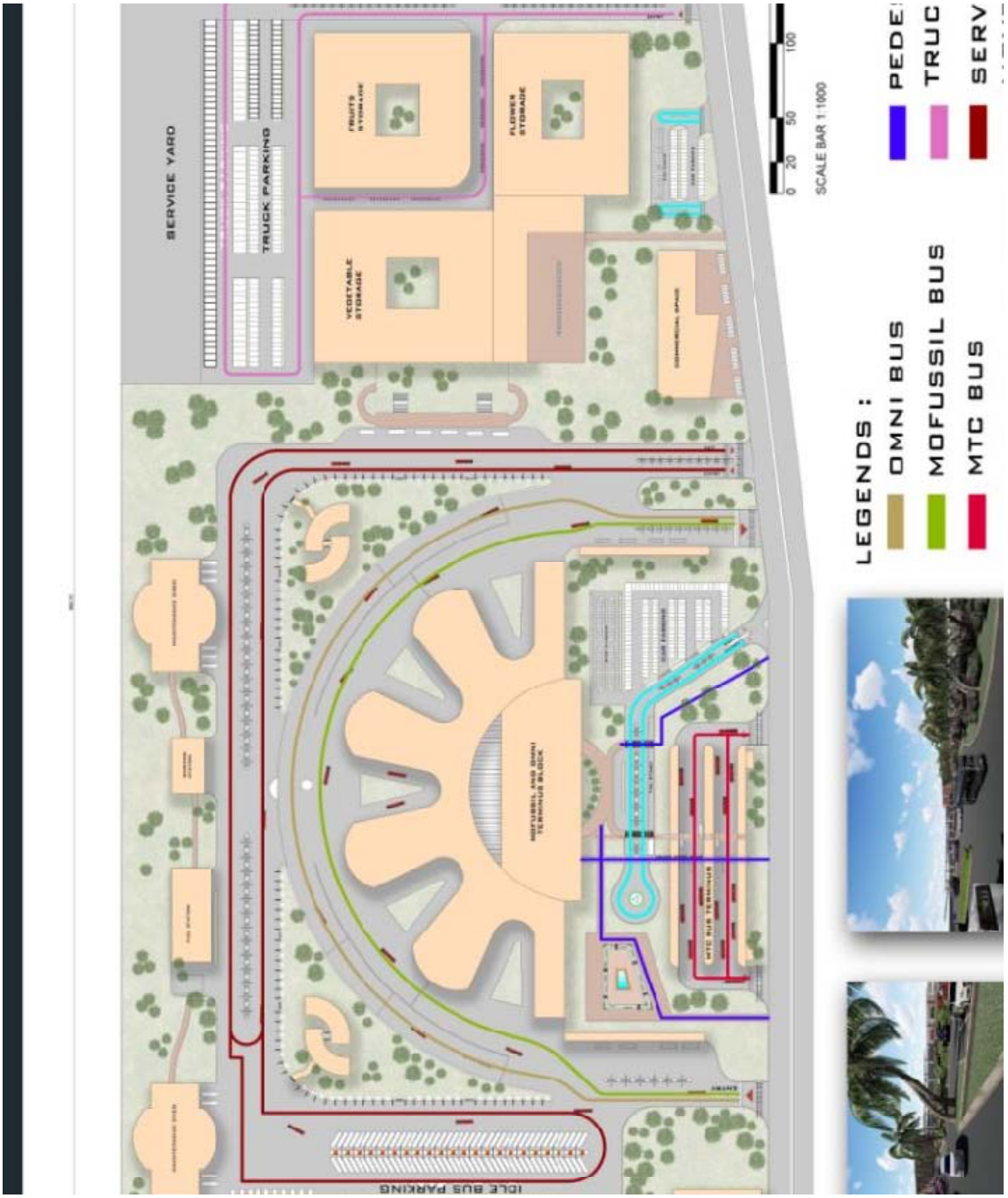

SERVICE YARD
TRUCK PARKING
VEGETABLE STORAGE
FLOWER STORAGE
IDLE BUS PARKING
SCALE BAR 1:1000
0 20 50 100
LEGENDS :
OMNI BUS
MOFUSSIL BUS
MTC BUS

Plate 5.5


892,7
SERVICE YARD
TRUCK PARKING
FRUITS STORAGE
FLOWER STORAGE
VEGETABLE STORAGE
IDLE BUS PARKING
SCALE BAR 1:1000
0 20 50 100
SITE SECTION

Plate 5.6

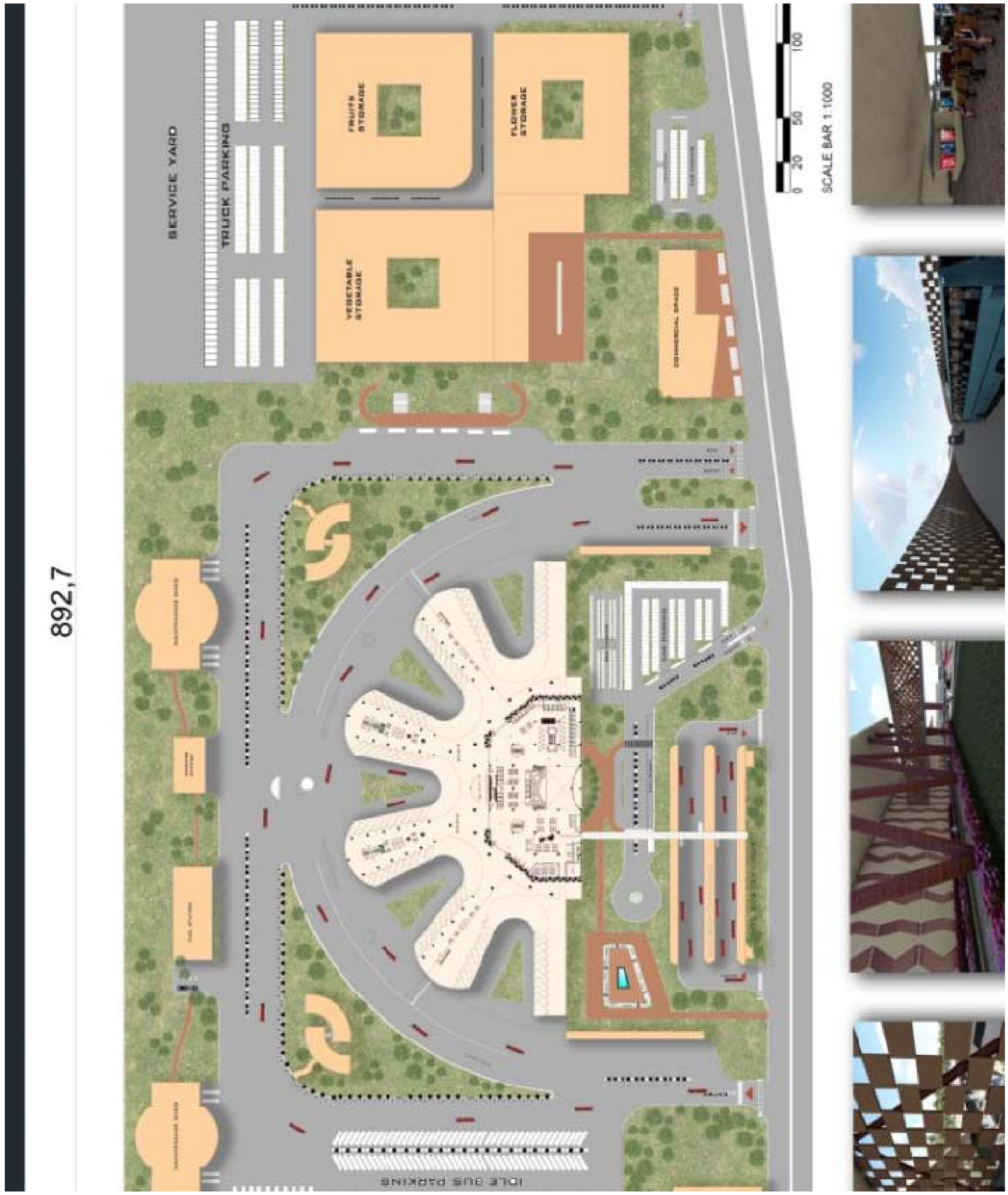

892,7
SERVICE YARD
TRUCK PARKING
FRUITS STORAGE
FLOWER STORAGE
VEGETABLE STORAGE
COMMERCIAL SPACE
IDLE BUS PARKING
0 20 50 100
SCALE BAR 1:1000

Plate 5.7

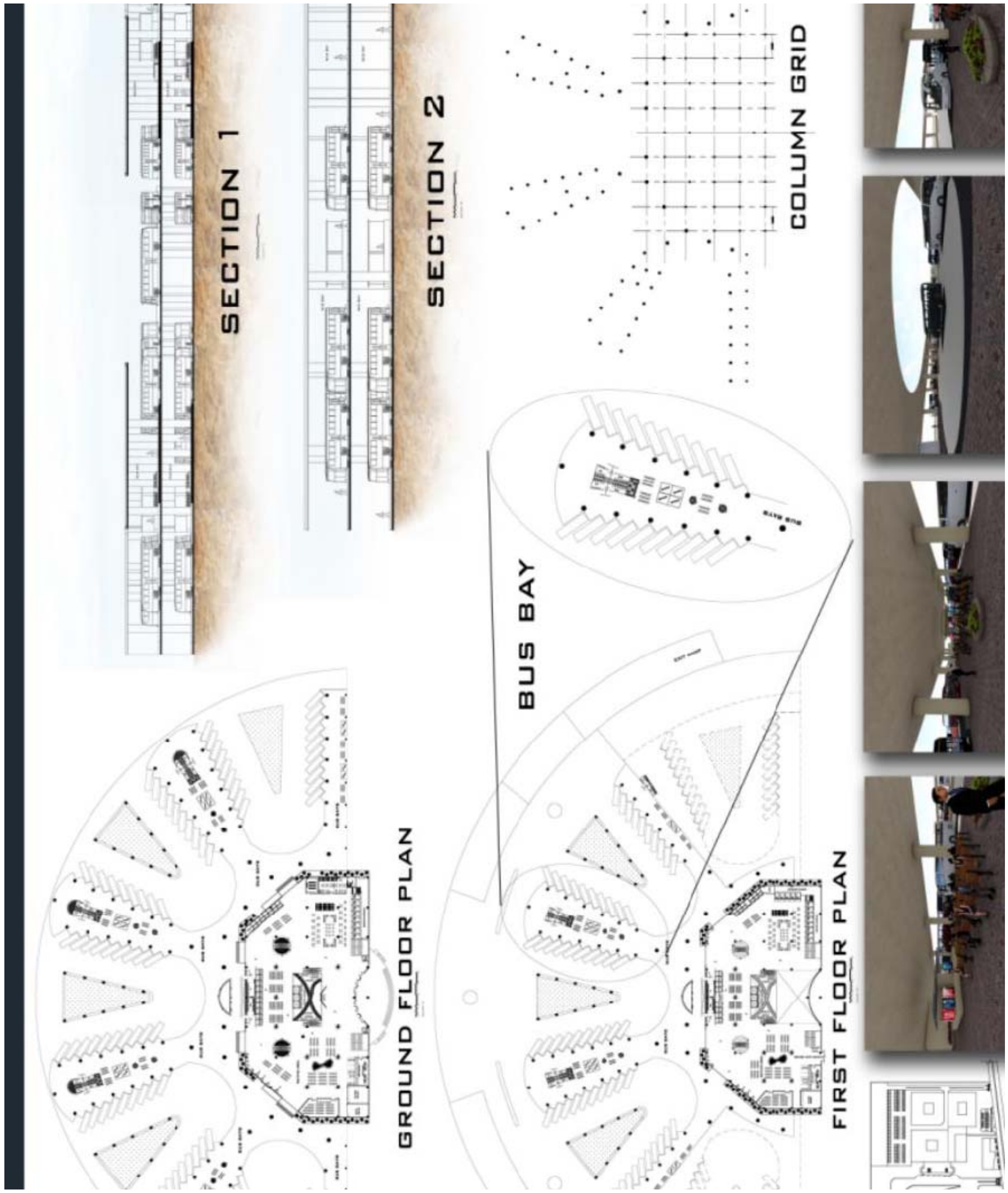

SECTION 1
SECTION 2
COLUMN GRID
BUS BAY
GROUND FLOOR PLAN
FIRST FLOOR PLAN

Plate 5.8

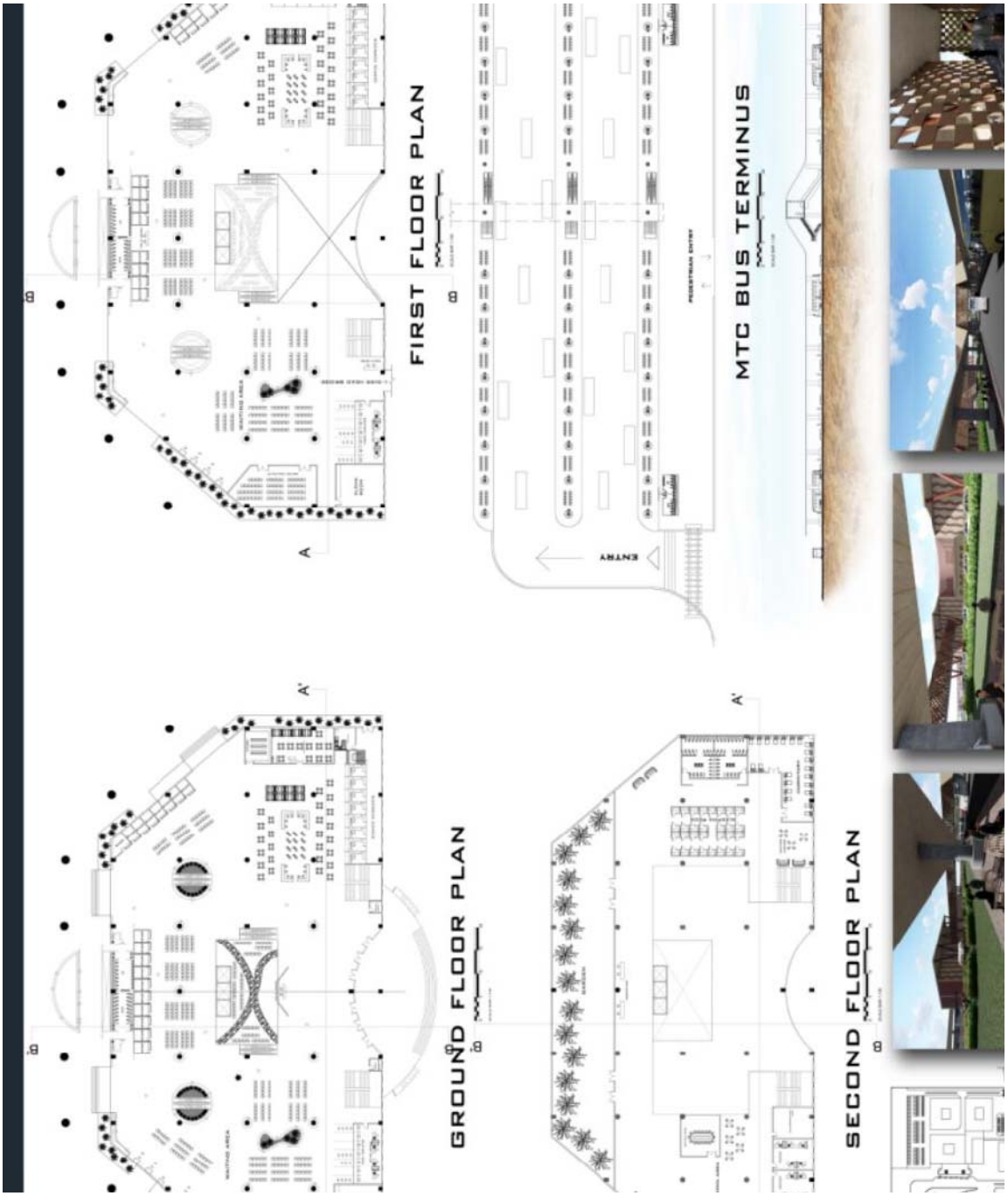

FIRST FLOOR PLAN
MTC BUS TERMINUS
GROUND FLOOR PLAN
SECOND FLOOR PLAN

Plate 5.9

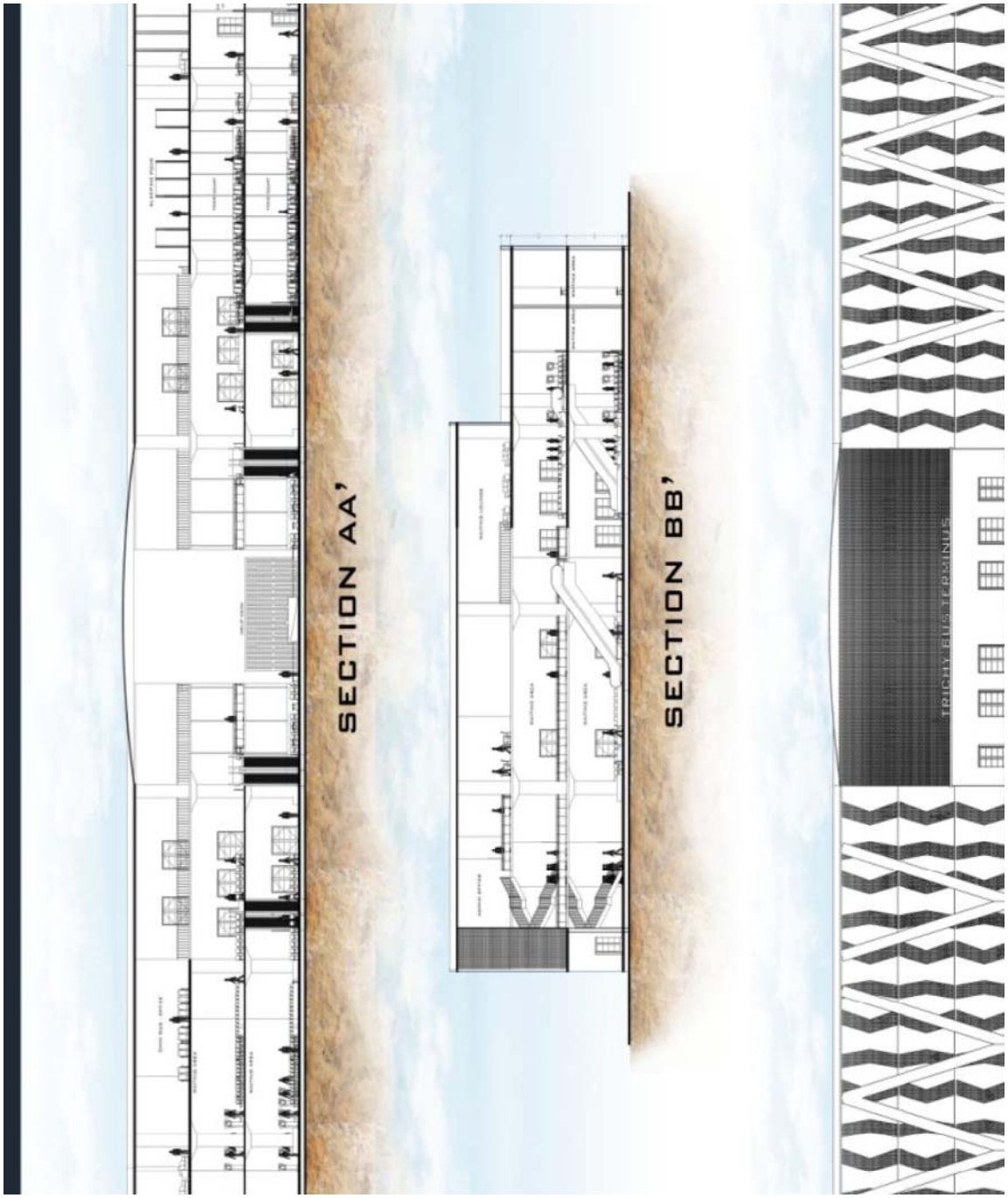


Plate 5.10

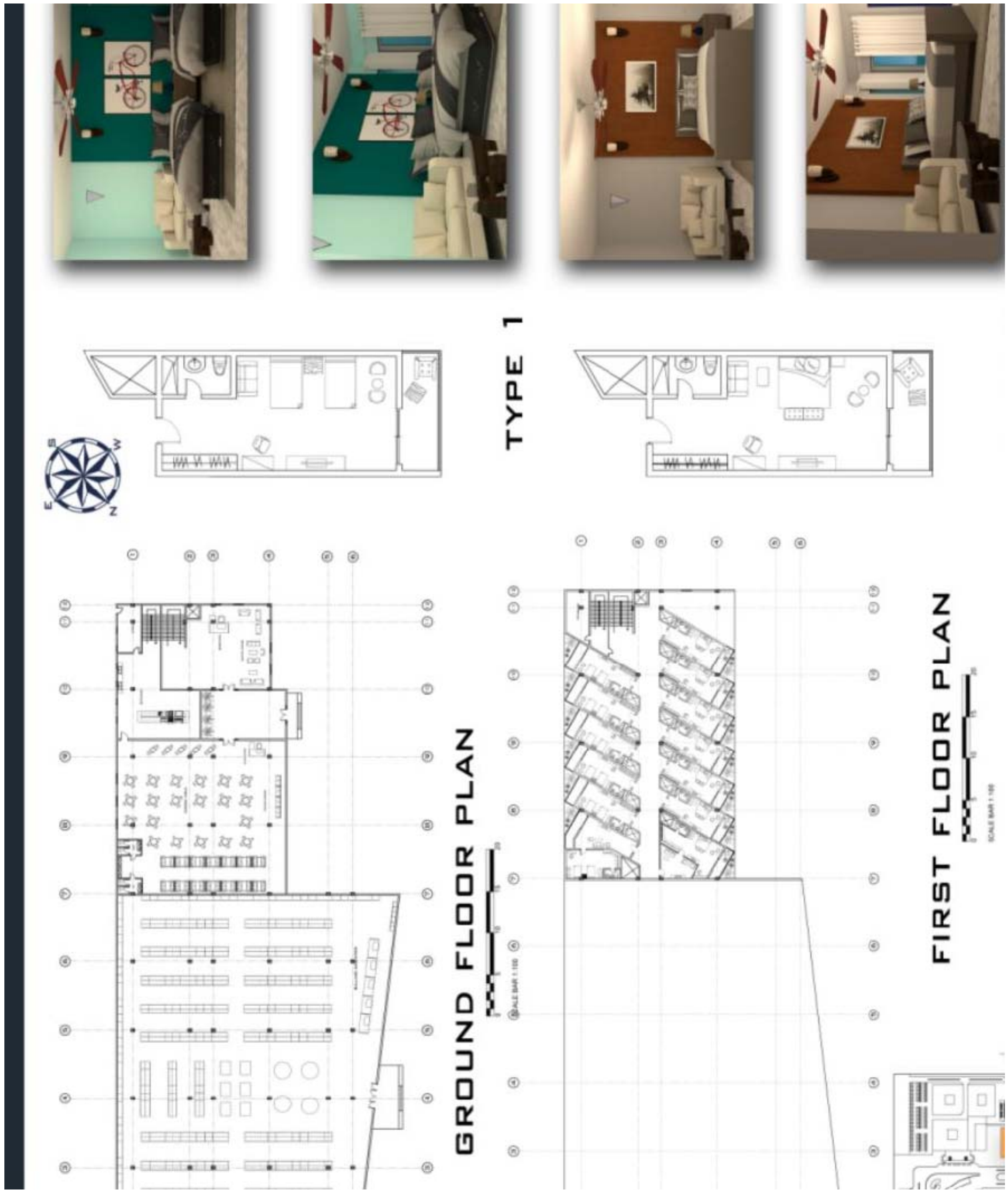


Plate 5.11

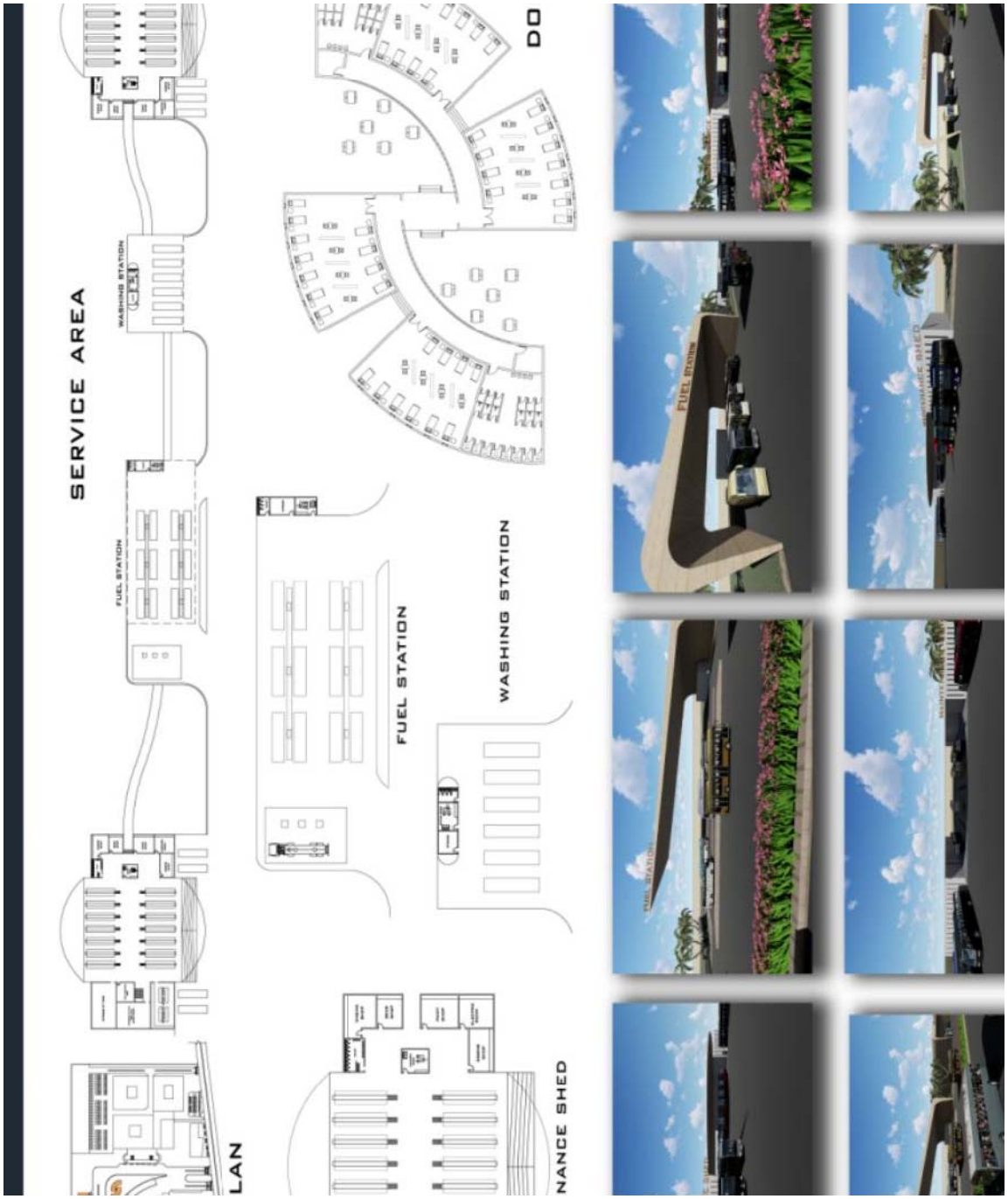

SERVICE AREA
WASHING STATION
FUEL STATION
FUEL STATION
WASHING STATION
NANCE SHED
DO
LAN

Plate 5.12

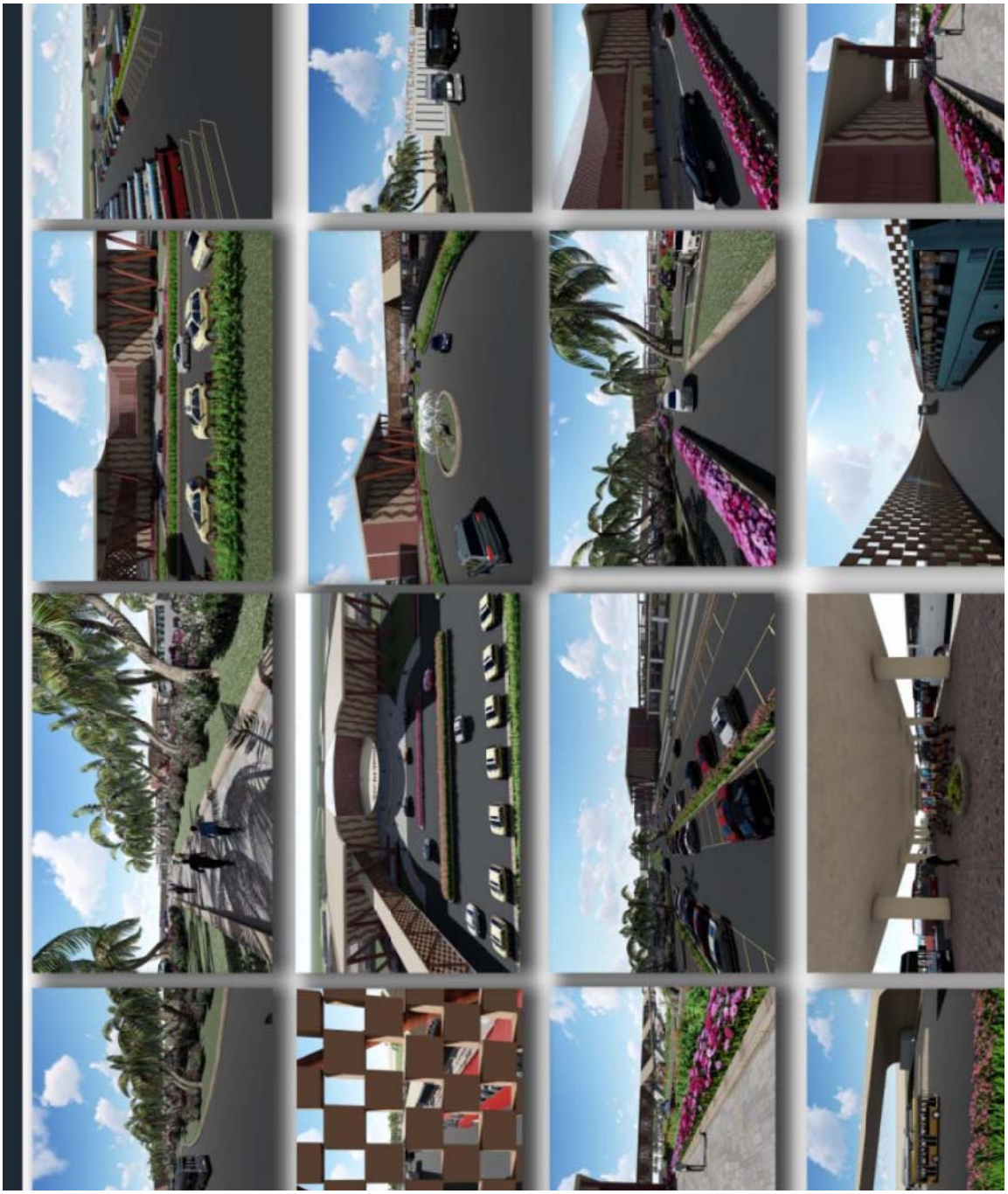


Plate 5.13

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