

THESIS REPORT

ON

“INTER STATE BUS TERMINAL, DRWARKA, DELHI”

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENT FOR THE DEGREE OF:

BACHELOR OF ARCHITECTURE

BY

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THESIS GUIDE

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SESSION

2017-2022

**TO THE
SCHOOL OF ARCHITECTURE AND PLANNING
BABU BANARASI DAS UNIVERSITY
LUCKNOW.**

CERTIFICATE

I hereby recommend that the thesis entitled "INTER STATE BUS TERMINAL, DWARKA, DELHI "under the supervision, is the bonafide work of the students and can be accepted as partial fulfillment of the requirement for the degree of Bachelor's degree in architecture, school of Architecture and Planning, BBDU, Lucknow.

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Recommendation Accepted

Not
Accepted

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9. The thesis has been prepared without resorting to plagiarism: **Yes**

All the sources used have been cited appropriately: **Yes**

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INTER-STATE BUS TERMINAL, DELHI

Project Introduction-

The Delhi Transport Infrastructure Development (DTIDC), which manages the three ISBTs at Sarai Kale Khan, Kashmiri Gat3 and Anand Vihar, has a 27 acre-plot in sector 22 of Dwarka. It is expected to register daily presence of 1.5 lakh passengers.

A large number of Volvo buses come to IGI Airport from Punjab, bringing passengers to catch international flights. The terminal will also have huge multi-level parking with private cars and two wheelers so that the people using buses to commute out of the city and can leave vehicles there. A hotel is also planned in complex to the International Airport, number of passengers may need accommodation for a brief time span.

History and Background-

A multi modular transportation center point is generally a social affair place for individuals to get to nearby and local goals just as giving a spot to individuals to get to neighborhood

enhancement and work openings. Transportation is one of the most significant necessities for the guide of correspondence from one spot to other. Various factors like the accommodation from one spot to the next, advancement of the travel industry for correspondence between places, moving products and so on. It is basic to give composed offices in the framework as transportation is worried about the development among birthplace and goal includes the development of individual and merchandise, there is a requirement for a passageway in the framework for use.

Transportation is not just about highways, shuttle planes, trains and bicycles, it is foremost about the people.

Need of Topic-

The state of the bus terminals has separate bus bays for local and intercity buses, plus waiting areas equipped with book stalls and restaurants, clean and modern rest rooms and even a hotel in the complex for transiting passengers. It is going to develop on a sprawling 10.9 hectares space in Dwarka.

The ISBT is required to take into account over 1.5 lakhs suburbanites' day by day and the arrangement is to have between state transports from Haryana to Rajasthan to end itself to diminish the blockage in the city. The all-out traveler trips everyday cooked by street-based vehicles are 15.97 lakhs out of which is about 9.54 lakhs (60%) are suburbanites. Majority of such trips are by bus. Out of four new Interstate Bus Terminals (ISBT) as proposed in MPD-2001 yet to be developed as a metropolitan Rail Terminal, only one at Anand Vihar in East Delhi has been developed. The terminal at Dwarka (Bhartal) has also been included in Dwarka Project. The remaining two at Okhla (Madanpur Khadar) and Narela (Holambi Kalan) have not been developed.

Aims-

Aim is to explore the urban spaces and the connectivity towards each other and how the problem are tackled through architecture and ISBT is one of the project in which the importance of movement is shown. Moreover, this place will connect to the various places of the outskirts of the city which will reduce the traffic congestion in the city.

Bus terminal also have positive effect on the city development by connecting them with each other and helps to develop and establish more of residential, commercial etc. thus, spreading people all around for work as well as to live.

The aim is to incorporate commercial activities with the flawless circulation with sustainable aspects and keeping in mind the residential and school area around the site

Objectives-

- To improve the transportation system by planning a good flow in circulation and movement.
- To serve transportation facility people living in West Delhi.
- Buses to terminate from entering into the city.
- Separate paths for pedestrian and vehicles which will help in reduce accidents.

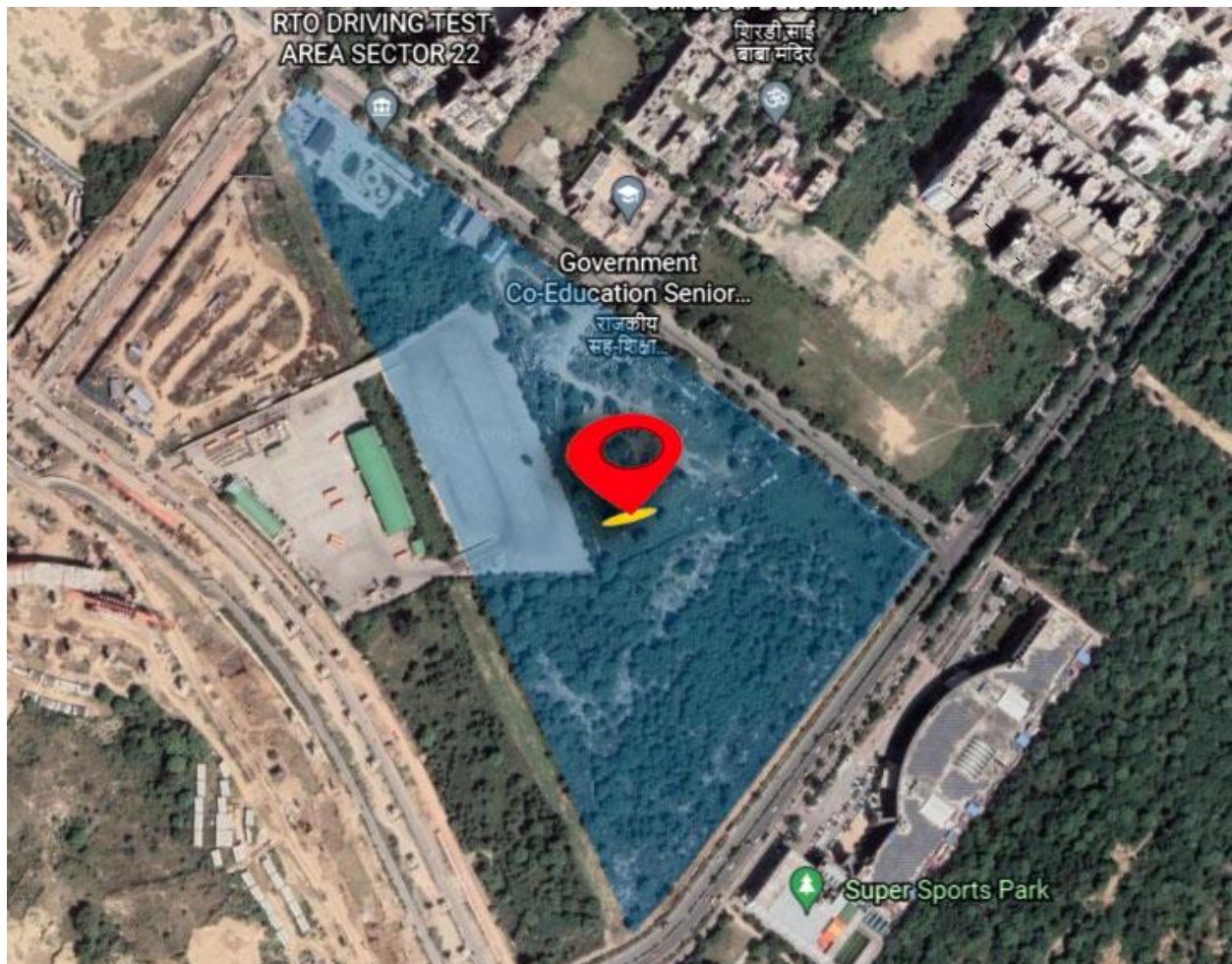
Scope and Limitations-

The scope of study and design for the project are-

- Inter connectivity between various mode of transport (Metro, Airport, Railway Station, etc).
- Requirements for a maximum number of passenger per day in both directions.
- Studying the various technological advancement in the field of surveillance system, communication system, firefighting system, etc.
- Circulation pattern- pattern flow of passengers and buses.
- Entry and exit for private and commercial vehicles.

Land use map

Google image-



Site Details-

Location: The site is located at Dwarka Sec.22, Delhi opposite

Dwarka Sec. 21 Metro Station.

Approach: Site can be easily approached by Dwarka Sec. 22 road and Dwarka Sec. 21 Metro Station.

Site Area- 1,00,000 sq.m.

Tentative requirement and estimated built-up-

Entrance Hall- 1000 sq.m.

Departure and Arrival Hall- 1300sq.m.

Waiting Hall- 3500 sq.m.

Office- 15000 sq.m.

Dormitories- 2000 sq.m.

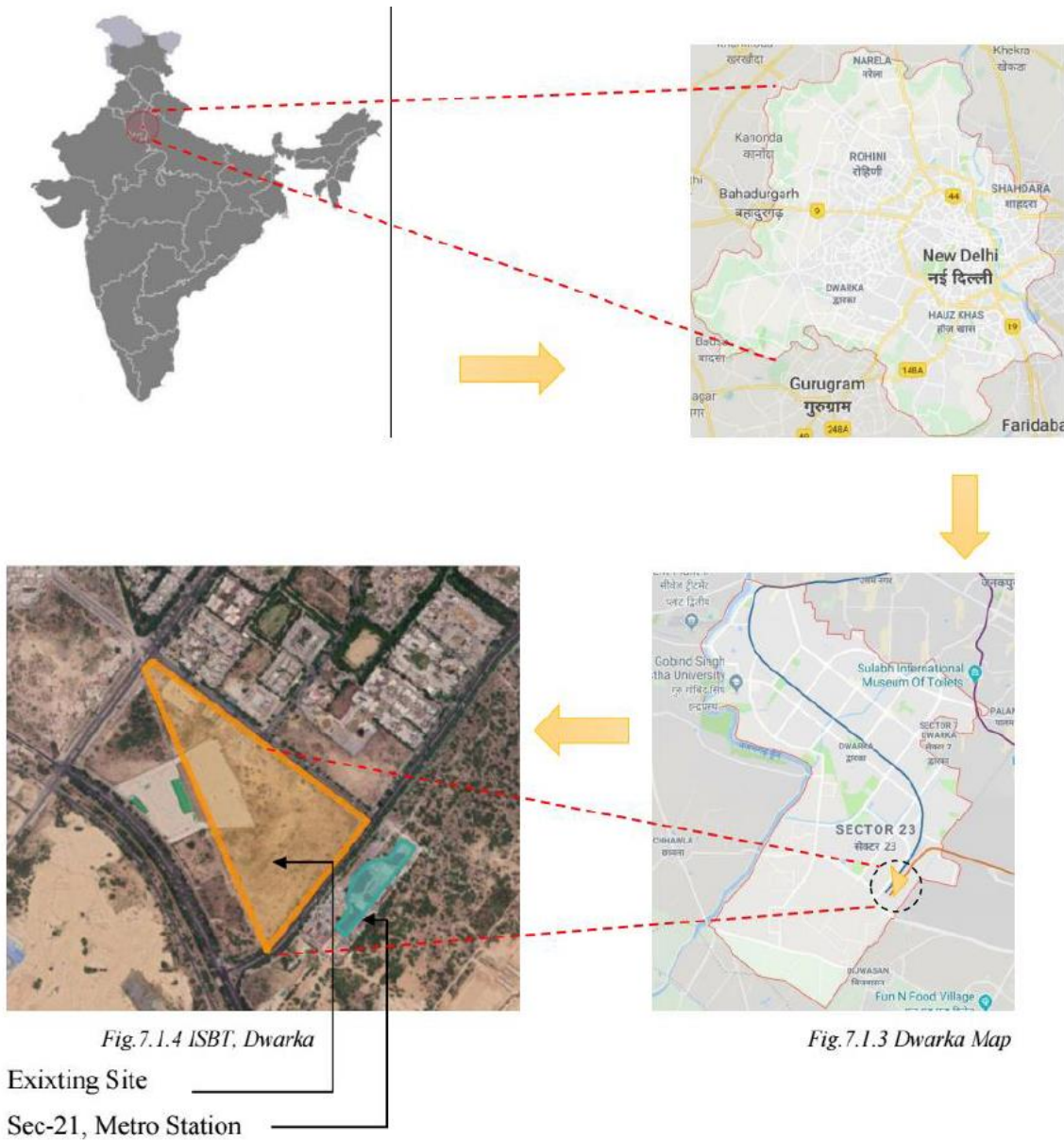
Information Area- 1000 sq.m.

Commercial Area- 8500 sq.m.

Services- 1000 sq.m.

SITE ANALYSIS

Dwarka is a residential neighborhood at the western edge of the Indian Capital, New Delhi. Framed by the winding Najafgarh drain to the west drain river to the west, it's home to sacred sites like the red roofed ISKCON Dwarka Temple and the sprawling Dada Dev Mandir Hindu Temple Complex.



ACCESSIBILITY

The site is in triangular shape surrounded by 30m and 45m Right of Way (RoW)



DEVELOPMENT NORMS

- Plot Area: 113129 sqm = 28 Acres
- Permissible Ground Coverage 25%: 28282 sqm = 6.9 Acres
- Permissible F.A.R. 70%: 79190 sqm built-up
- Permissible Height: 22m
- Parking: @ 2 ECS per 100 sqm of builtup

URBAN CONTEXT

On the right side of the road, there are residential multistoried apartments, secondary school and on the other side across 45m RoW, Dwarka Sector 21, metro station is there on th existing site a HP petrol pump and government vehicle impoundment pit are present.



- ISBT
- LAW COLLEGE
- PROPOSED MULTI LEVEL PARKING
- HOTEL



- HP PETROL PUMP
- BUS DEPOT
- METRO STATION, DWARKA 21
- GOVERNMENT SCHOOL
- GOVERNMENT SCHOOL
- VIVANTA HOTEL

TOPOGRAPHY

- Relatively flat land
- The slope is very gentle sloping towards the west
- Ground water at 21m

VEGETATION

- The site mainly contains the deciduous trees and shrubs

CLIMATOLOGY

SUN PATH DIAGRAM

SUMMER SOLSTICE- 21st June

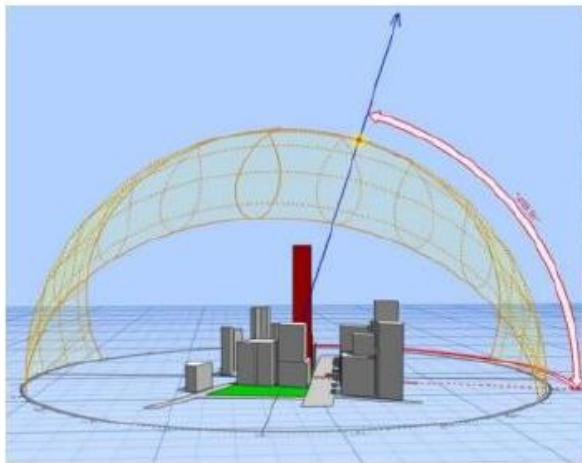


Fig.7.7.1 Summer solstice

SOLAR INFORMATION	
AZI / ALT	103.50° / 72.85°
RISE / SET	04:54 / 18:52
DAYLIGHT	13:58 hrs

AUTUMN EQUINOX- 23rd September

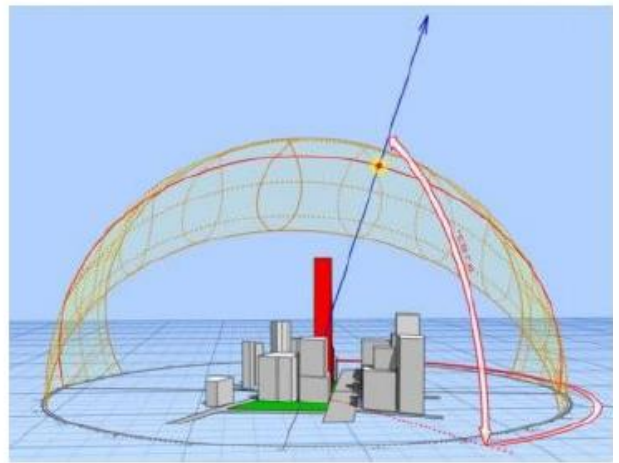


Fig.7.7.2 Autumn Equinox

SOLAR INFORMATION	
AZI / ALT	149.37° / 57.63°
RISE / SET	05:39 / 17:47
DAYLIGHT	12:08 hrs

WINTER SOLSTICE- 22nd March

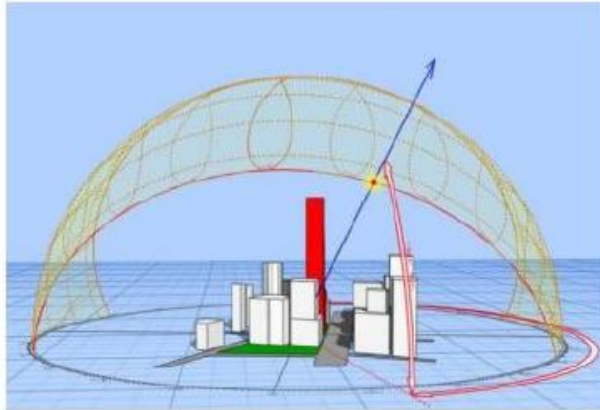


Fig.7.7.3 Winter solstice

SOLAR INFORMATION	
AZI / ALT	160.43° / 35.32°
RISE / SET	06:40 / 16:59
DAYLIGHT	10:19 hrs

SPRING EQUINOX- 21st March

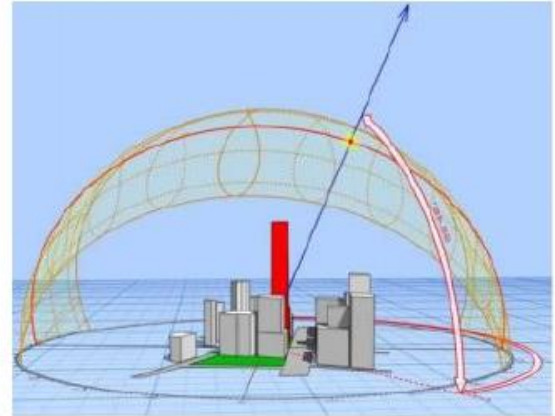


Fig.7.7.4 Spring Equinox

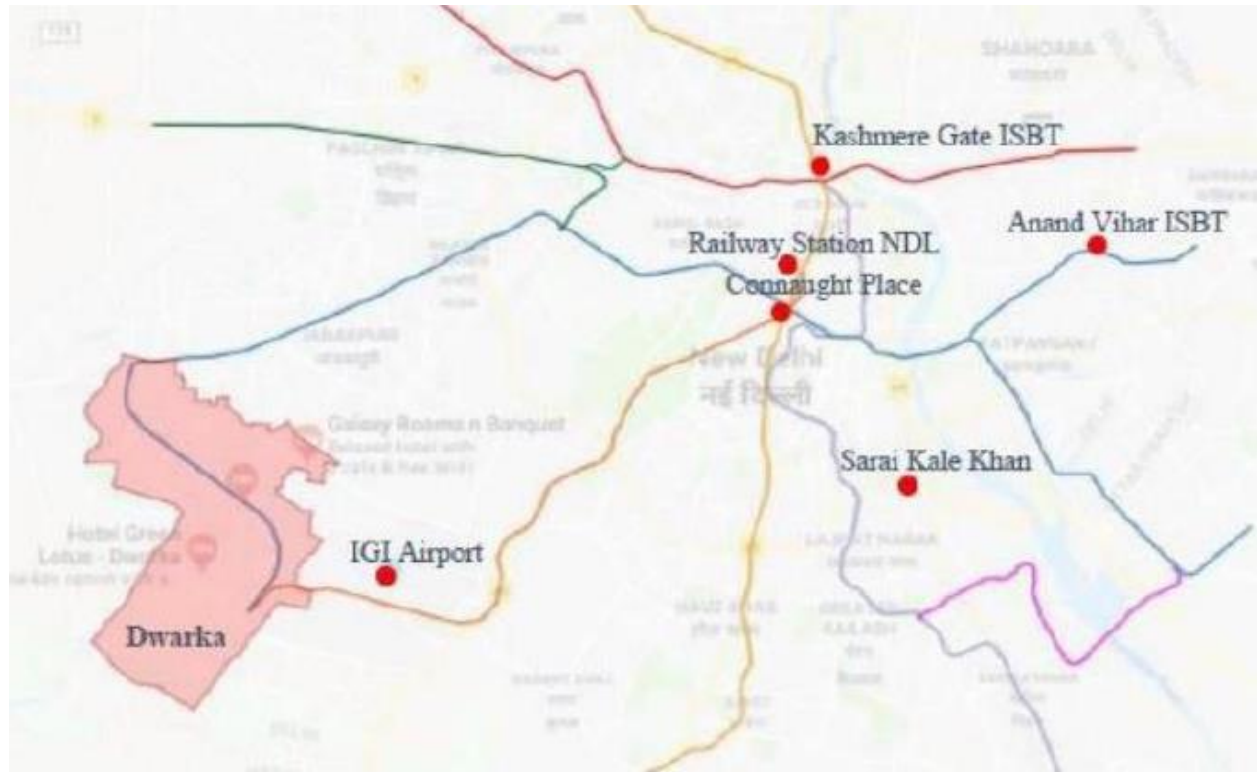
SOLAR INFORMATION	
AZI / ALT	143.39° / 55.46°
RISE / SET	05:56 / 18:02
DAYLIGHT	12:06 hrs

WIND CHART



TRAFFIC STUDY AND MOVEMENT PATTERNS

METRO CONNECTIVITY

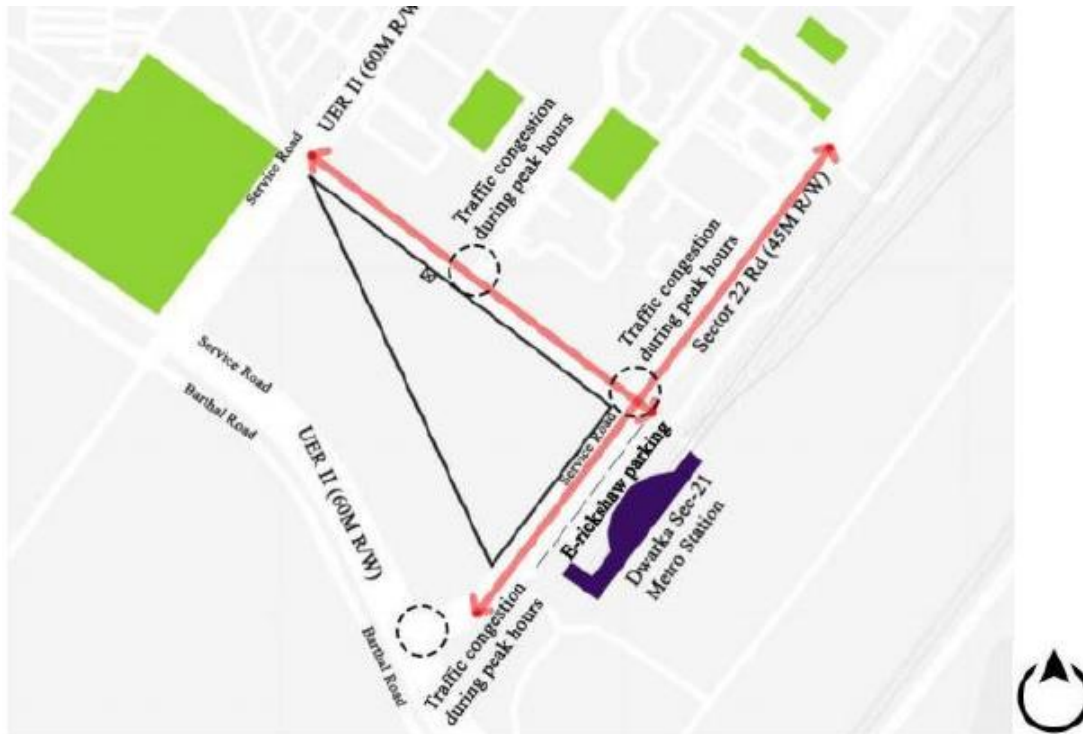


IMPORTANT PLACES NEAR THE SITE

IMPORTANT PLACES	DISTANCE (in km)
IGI Airport	3
HH 8	6
Dhaura Kaun	15
Connaught Place	18
ISBT Kashmere Gate	29
New Delhi Railway Station	23
ISBT Sarai Kale Khan	30

VEHICULAR MOVEMENT

The major vehicular movement is on the road adjacent to metro station as it serves as only catchment area for drop off and pick-ups from the metro station, major e-rickshaw, autos and private parking is directed by this road.



PEDESTRIAN MOVEMENT

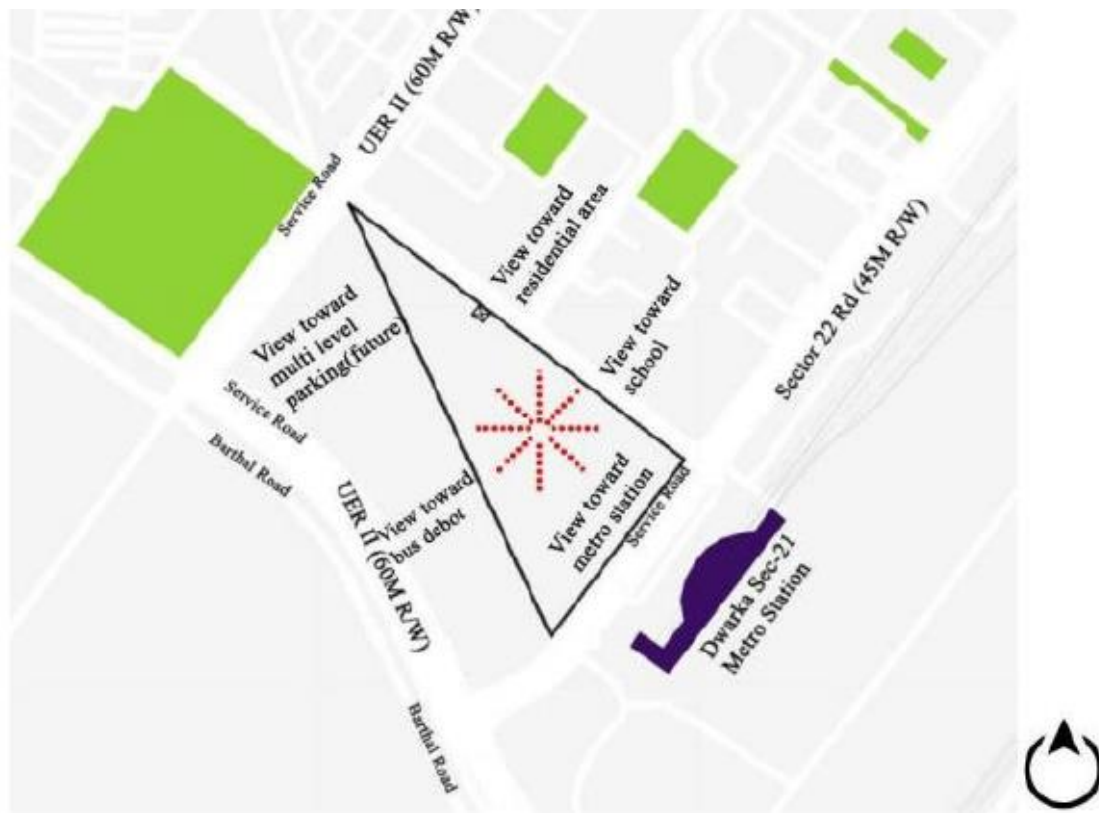
Movement along the two sides of the site, used by the resident and the metro users, even the street hawkers also participate on the pedestrian movement.



EXISTING PUBLIC TRANSPORTATION MOVEMENT



VIEWS FROM THE SITE



SITE SURROUNDING PICTURES



METRO STATION



RESIDENCE



GOVERNMENT SCHOOL

SITE PHOTOGRAPHS

VIEW FROM 30 M WIDE ROAD



VIEW FROM 45 M WIDE ROAD



CASE STUDIES AND LITERATURE STUDIES

1. MAHARANA PRATAP ISBT, KASHMEERI GATE, DELHI

INTRODUCTION:

THE MAHARANA PRATAP INTER-STATE BUS TERMINUS (ISBT) POPULARLY KNOWN AS KASHMIRI GATE ISBT, LOCATED IN DELHI IS THE OLDEST AND ONE OF THE BIGGEST INTER STATE BUS TERMINALS IN INDIA.

SPREAD OVER AN AREA OF ABOUT 13.8 ACRES, IT HANDLES OVER 4000 BUSES A DAY. IT OPERATES BUS SERVICES BETWEEN DELHI AND 7 OTHER REGIONS:

- HARYANA
- JAMMU AND KASHMIR
- PUNJAB
- HIMACHAL PRADESH
- UTTAR PRADESH
- RAJASTHAN
- UTTARAKHAND

ARCHITECT- AR. RAJINDRA KUMAR
COMPLETED- 1971
RENOVATED- 2013
SITE AREA- 56,126 SQ.M.
CAPACITY- 4000 BUSES



PER DAY DISTRIBUTION:

- NO. OF PASSENGERS- 2 LAKHS
- OTHER USERS- 18,000-22,000
- BUS TRIPS- 25,000-30,000
- OCCUPANCY IN PEAK HOURS- 50/BUS
- INCOMING PASSENGERS- 66,000
- OUTGOING PASSENGERS- 1,34,000
- PEAK HOUR LOAD- 20,000

SITE PLAN:



- PLOT AREA- 53,127 SQ.M.
- EXISTING GROUND COVERAGE- 1067 SQ.M.
- PERMISSIBLE GROUND COVERAGE- 25%
- EXISTING BUILT UP- 30,169 SQ.M.

LOCATION:

KASHMIRI GATE IS LOCATED IN NORTH DELHI IN THE OLD DELHI AREA, IT IS IN CLOSE VICINITY TO THE RED FORT AND THE OLD DELHI RAILWAY STATION



CONNECTIVITY THROUGH METRO:

THE KASHMIRI GATE IS A DELHI METRO STATION IN DELHI, ON THE RED LINE (DILSHAD GARDEN-BITHALA), YELLOW LINE (SAMAYPUR BADLI-HUDA CITY CENTER) AND VIOLET LINE (TO RAJA NAHAR SINGH). IT IS A TRANSFER STATION BETWEEN THE RED LINE ON THE HIGHEST UPPER LEVEL, THE YELLOW LINE ON THE LOWEST UNDERGROUND LEVEL AND VIOLET LINE ON THE PARALLEL UNDERGROUND LEVEL. KASHMIRI GATE ALSO SERVES AS THE HEADQUARTERS OF DELHI METRO.



DESIGN PRINCIPLES:

- SEGREGATION OF DIFFERENT MODES OF TRANSPORT AND ACTIVITIES
- SEGREGATION OF ALIGHTING AND BOARDING PLATFORMS
- SEGREGATION OF INCOMING AND OUTGOING PASSENGERS AT TWO LEVELS

CIRCULATION:

- AN EFFICIENT CIRCULATION IS FOLLOWED IN THE ISBT. THERE IS SEGREGATION IN CIRCULATION OF BUSES AND OTHER LIGHT VEHICLES TRAFFIC DUE TO DIFFERENCE IN MOVEMENT CHARACTER.
- THERE IS A SEPARATE ENTRY AND EXIT POINTS FOR INTER-CITY AND INTRA-CITY BUS SERVICES.
- THERE IS A PROPER SEGREGATION FOR VEHICULAR AND PEDESTRIAN MOVEMENT



- THE PEDESTRIAN MOVEMENT CAN BE ALLOWED IN FOUR WAYS-
METRO STATION
VIA TAXI AND AUTO

VIA PRIVATE TRANSPORT
PEDESTRIAN ENTRY TO ARRIVAL BLOCK



PEDESTRIAN ENTRY



RECEPTION

- BUSES ARRIVES AT ARRIVAL BLOCK THEN LEAD TO THE IDLE OR DEPARTURE BAYS.
- TO EXIT THEY TAKE A FULL ROUND OF THE COMPLEX TO EXIT
- FOR EXIT, TWO LANES ARE PROVIDED BUT ONLY ONE IS FUNCTIONAL



BUSES ENTRY



BUSES EXIT



BUS TURNING RADIUS

FEATURES:

PASSENGERS AT KASHMIRI GATE IBS IN DELHI CAN NOW ENJOY BETTER AMENITIES WITH THE INAUGURATION OF THE RENOVATED FACILITY HAVING AN AIR CONDITIONED WAITING LOUNGE, FOOD COURT, GLASS ELEVATOR AND ESCALATORS. IT HAS BEEN DESCRIBED BY DELHI GOVERNMENT AS 'AIRPORT LIKE' IN ITS FACILITIES



THE REDEVELOPED IBS IS DESIGNED AS A STATE OF THE ART. MODERN INTEGRATED BUS TERMINAL. WHILE MODERN IN ITS DESIGN AND APPEARANCE, THE DESIGN CAREFULLY INCORPORATES FUNCTIONAL REQUIREMENTS

THE REFURBISHED IBS HAS STATE-OF-THE-ART FACILITIES, INCLUDING ESCALATORS, GLASS ELEVATORS, A CENTRALLY AIR CONDITIONED DEPARTURE AND WAITING AREA, A HIGH SPEED WI-FI ZONE, LED SCREENS, CCTV SURVEILLANCE, PARKING, HI-TECH PUBLIC, CONVENIENCE, INFORMATION KIOSKS, AN RO PLANT AND A SEWAGE TREATMENT PLANT



CLEARLY MARKED AND WELL CONSTRUCTED BUSES ROUTES AND WALKWAYS WHICH MAKES THE MOVEMENT PLEASANT AND SAFE

STRUCTURE:

- THE STRUCTURE IS INSPIRED WITH THE LE CORBUSIER WORKS THAT IS THE CONCRETE STRUCTURE AND THE EGG CRATE FAÇADE.
- IN THIS STRUCTURE THE FAÇADE IS INSTALLED WITH THE VERTICAL LOUVERS AT A CERTAIN ANGLE TO ENTER ONLY THE DIFFUSE LIGHT
- THE BEAM AND THE COLUMN STRUCTURE ARE HEAVY TO BALANCE THE MASSIVE STRUCTURE.
- EGG CRATE STRUCTURE ALL OVER THE ELEVATION AT 45° ANGLE TO AVOID DIRECT SUNLIGHT IN THE BUILDING.
- BRACING WITH STEEL MEMBER TO SUPPORT LONG SPAN BRIDGE.



- COFFER SLAB FOR LARGER SPAN SLABS TO AVOID COLUMN
- SKYLIGHT TO ENTER DAY LIGHT INSTEAD OF ARTIFICIAL LIGHT AND SAVES ELECTRICITY.



RCC AND STEEL COLUMNS TO SUPPORT THE HEAVY STRUCTURE

ARRIVAL BLOCK:

GROUND FLOOR-

- IT IS ARRIVAL BLOCK 19 UNLOADING PLATFORMS, ANGULAR BAYS FOR THE UNLOADING OPERATION.
- THERE ARE SUFFICIENT NUMBERS OF PUBLIC AMENITIES PROVIDED IN THIS AREA.

FIRST FLOOR-

- THE MAIN ENTRANCE LEVEL OF THE FIRST FLOOR LINKS THE OUTGOING PORCH TO THE ENTRY.
- LOUNGE AND FACILITIES LIKE POST OFFICE, ENQUIRY AND BANK ARE PROVIDED AT THIS LEVEL.

SECOND TO FOURTH FLOOR-

- MAINTENANCE AND ADMINISTRATIVE STAFF IS ACCOMMODATED ON THE SECOND FLOOR AND VARIOUS TRANSPORT COMPANY.
- OFFICES AND OTHER TERMINAL STAFF ON THE THIRD AND FOURTH FLOOR.

FIFTH FLOOR

- FIFTH FLOOR WAS DESIGNED TO ACCOMMODATE THE TRANSIT ORIENTED HOTEL FOR OVERNIGHT STAYING PASSENGERS, BUT NOW THE COMPLETE FLOOR IS USED AS OFFICERS OF DELHI ADMINISTRATION FOR EARNING REVENUE.

SIXTH FLOOR-

- SIXTH FLOOR HAS BEEN DESIGNED FOR RESIDENTIAL USE BY FULL TIME STAFF AND SOME ADMINISTRATIVE.
- STAFF WITH THE FACILITIES AND DOUBLE BEDROOM FLAT AND SINGLE BEDROOM FLAT.
- LOUVERS HAVE BEEN PROVIDED FOR BETTER LIVING ACCOMMODATION.

LINK BLOCK:

- IT IS A CONNECTING BLOCK BETWEEN ARRIVAL AND DEPARTURE BLOCK AT FIRST FLOOR LEVEL.
- THIS BLOCK WAS DESIGNED FOR TICKET BOOTHS FOR EACH PARKING BERTH.
- SMALL ENQUIRY OFFICES OF DIFFERENT STATE TOURISM AND SMALL SECURITY CELL ARE PROVIDED IN THE CENTER AROUND A LARGE DIAMETER.
- THIS BLOCK HAS A LARGE WAITING AREA TO FACILITATE PASSENGER.
- THE WAITING AREA IN THE LINK BLOCK IS NOT USED AS MUCH BECAUSE PASSENGER HAVE TENDENCY TO WAIT NEAR THE DEPARTURE PLATFORM OF THE BUS

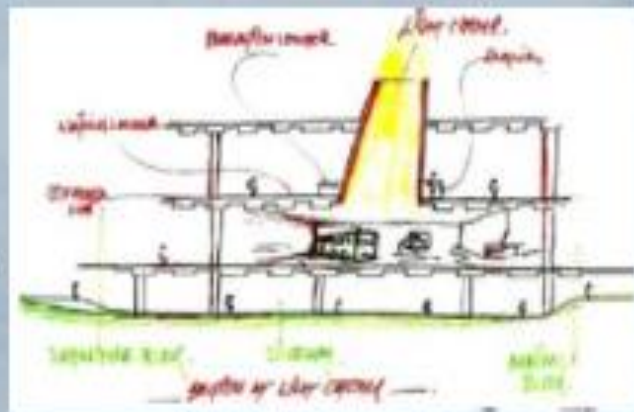
THERMAL COMFORT AND DAY LIGHTING:

THE ENTIRE BUILDING IS QUITE COOL IN THE SUMMER BECAUSE IT IS HEAVILY LOUVERS ON ALL SIDES WHICH PREVENT THE DIRECT SUNLIGHT, PREVENTING DIRECT HEATING OF INTERNAL AREAS. THE MASSIVE ROOF LIGHTS OVER DEPARTURE AREA AID IN NATURAL LIGHTING



DEPARTURE BLOCK:

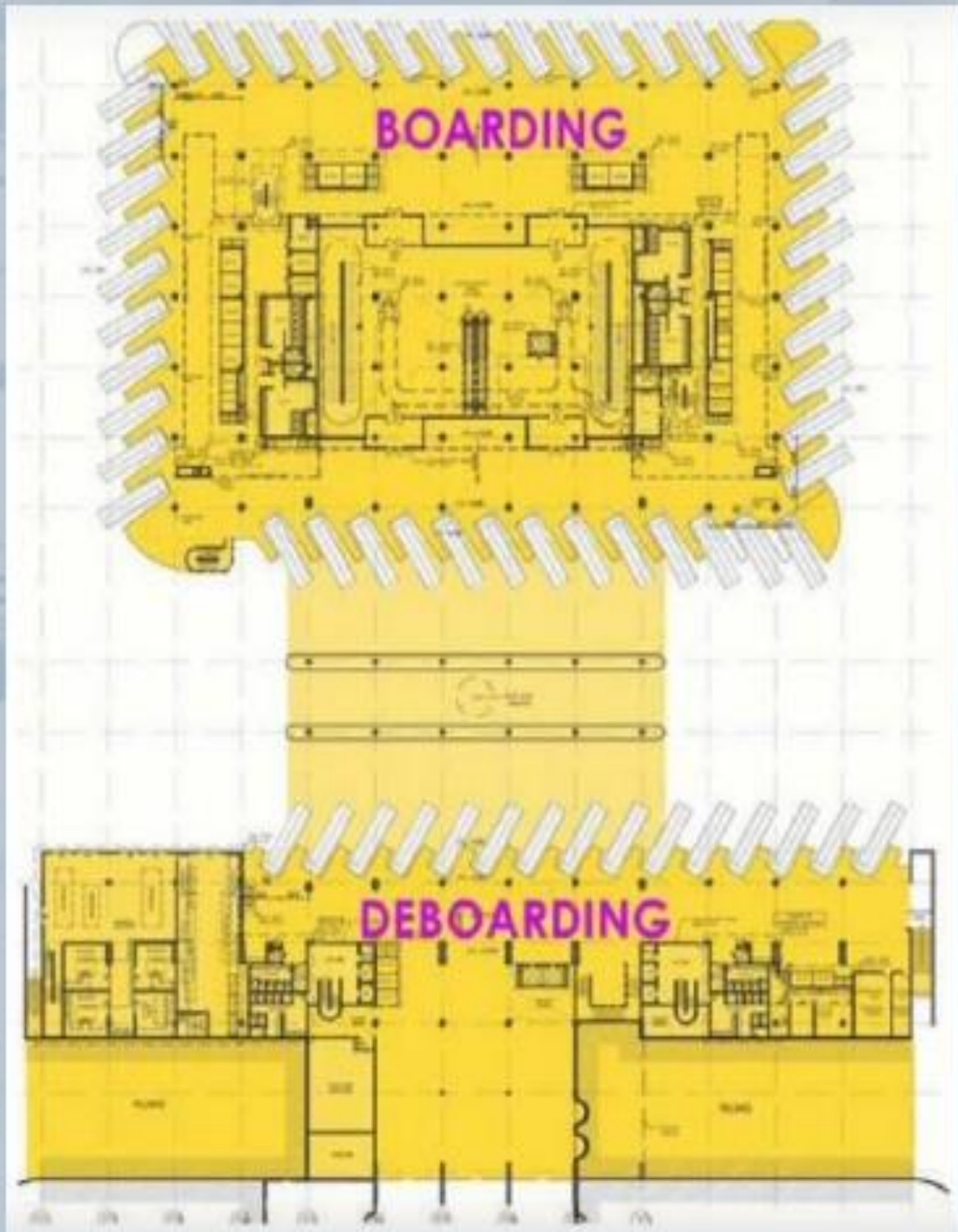
- DEPARTURE BLOCK IS DIVIDED INTO TWO LEVELS.
- THE LOWER ONE FOR USE OF OUTGOING PASSENGERS AND BUSES.
- THE UPPER LEVEL FOR WAITING OUT SEATING PURPOSES. A MEZZANINE IS ALSO PROVIDED TO THE HOUSES, OFFICES, RESTROOMS OF BUS CREW. THE UPPER LEVEL IS NOT BEING USED TO ITS FULL EXTENT HENCE CREATING CONGESTION AT LOWER LEVEL.
- KIOSKS AND STALLS HAVE BEEN LOCATED BETWEEN THE BUS BAY AND THE WAITING AREA TO ATTRACT LOTS OF PASSENGERS TO COME.



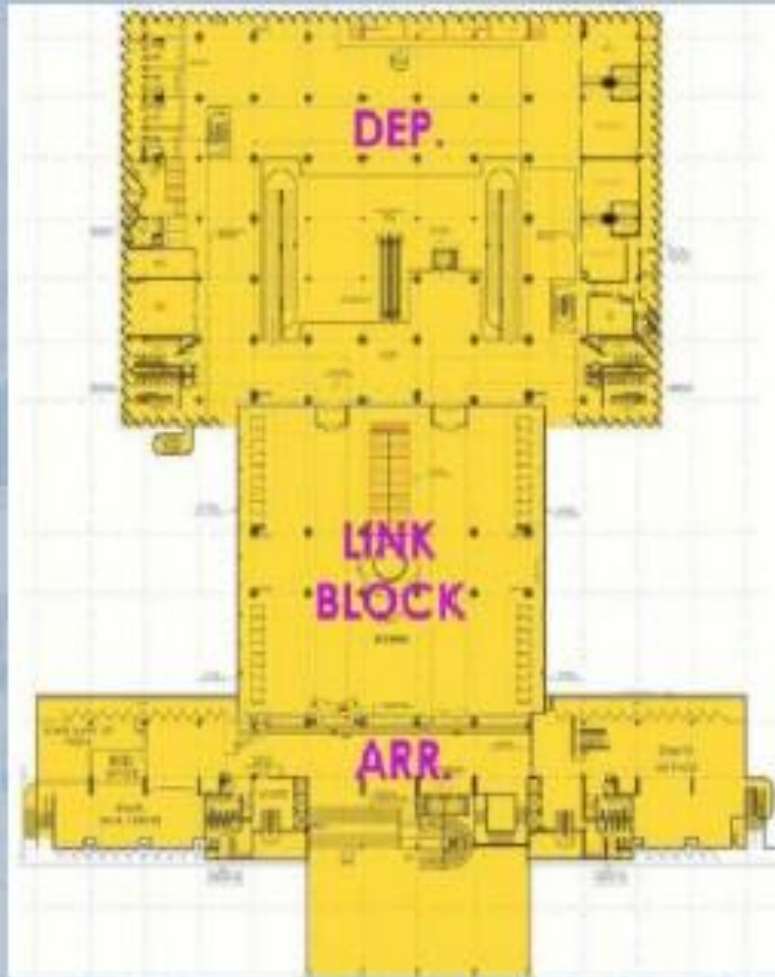
PUBLIC FACILITIES:

TOILET	GENTS- 74NOS. LADIES- 64NOS.
WATER POINTS	75NOS.
PUBLIC ADDRESS SYSTEM	1 NO.
POLICE POST	1 NO.
CLOAKROOM	1 NO.
ENQUIRY AND BOOTH	2 NO.
DELUXE TOILET	GENTS- 3NOS. LADIES- 2NOS.
WATER COOLERS	10NOS.
DIESEL GENERATOR SET	2NOS.

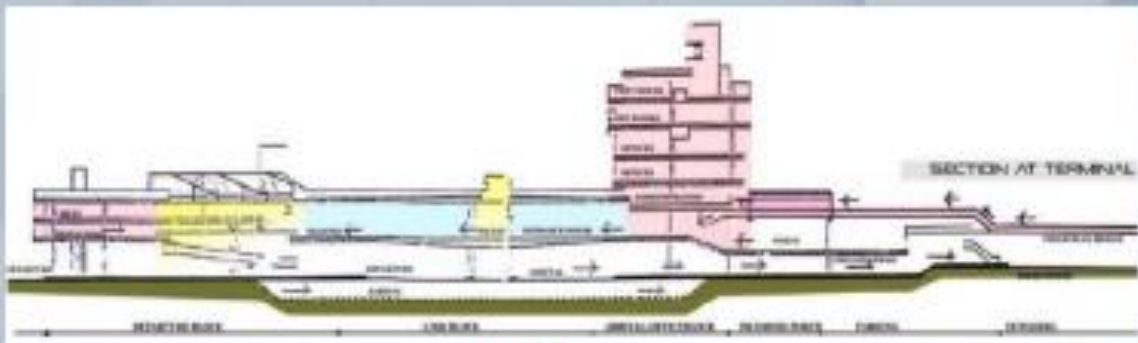
PLANS:



TERMINAL BLOCK LAYOUT



SITE BLOCK LAYOUT



SECTION

1. VIVEKANAND ISBT, ANAND VIHAR, DELHI

INTRODUCTION:

- ANAND VIHAR TRANSMIT HUB IS LOCATED IN ANAND VIHAR LOCALITY OF EAST DELHI WHERE THE THREE MODES OF TRANSPORTATION (RAILWAYS, METRO AND BUS TERMINAL) MEET WITHIN A DISTANCE OF 50 M.
- THE ISBT AT ANAND VIHAR IS A CITY'S CLOSEST LINK TO THE NEIGHBORING STATES LIKE UTTAR PRADESH AND UTTARAKHAND. THE LOCAL DTC AND CLUSTER BUSES ALSO PLY FROM ANAND VIHAR ISBT, WHERE AROUND 1800-2000 LOCAL BUSES EVERYDAY.
- BUILT IN 1993, THE INTER STATE BUS TERMINUS IS ONE THE MOST BUSIEST TRANSPORT HUB IN THE AREA, CONNECTING EAST DELHI WITH THE REST THE CITY AND THE NCR THROUGH METRO.



CONNECTIONS:

- DELHI METRO
- DELHI TRANSPORTATION CORPORATION
- UTTAR PRADESH ROADWAYS
- UTTARAKHAND TRANSPORT CORPORATION

PROVISIONS:

- PARKING FOR 207 BUSES, 171 AUTO RICKSHAWS, 27 TAXIS, 438 TWO WHEELERS AND 143 CARS.
- SEPARATE ENTRANCES AND EXITS WILL BE PROVIDED FOR BUSES, AUTO RICKSHAWS AND TAXIS IN ORDER TO AVOID CONGESTION.
- APART FROM THIS A WELL PLANNED NETWORK OF FOOT OVER BRIDGE WITH ESCALATORS AND ELEVATORS WILL BE CONSTRUCTED. THIS WILL ALLOW EASY AND SAFE MOVEMENT OF PEDESTRIANS BETWEEN THE TERMINALS, METRO AND RAILWAY STATION.
- THE RELEASE SAID ISBT ANAND VIHAR WILL BE A "GREEN BUILDING" AND ALL MODES OF ENERGY CONSERVATION LIKE HEAT PROOF DESIGN, PROPER LIGHTING AND VENTILATION WILL INCORPORATED IN DESIGN ITSELF. THE TERMINAL WILL BE SECURED WITH CCTV AND BUILDING MANAGEMENT SYSTEM.

LOCATION:

- ANAND VIHAR ISBT IS LOCATED BESIDES ANAD VIHAR METRO STATION AND ANAD VIHAR RAILWAY STATION
- IT CAN BE REACHED FROM KAUSHAMBI METRO STATION NOT MORE THAN 500 M
- IT IS LOCATED AT A DISTANCE OF 1.2 KM FROM DAY PUBLIC SCHOOL.



APPROACH:

- YOU CAN ALSO BOOK A TAXI OR AN AUTO FROM DIFFERENT PLACES IN DELHI TO ANAND VIHAR ISBT. THE LOCAL DELHI STATE BUSES ALSO PROVIDE SERVICES TO ANAND VIHAR ISBT.
- YOU CAN GET TO ANAND VIHAR ISBT VIA METRO. THE ANAND VIHAR METRO STATION IS ADJACENT TO THE BUS STATION. THE ANAND VIHAR METRO STATION IS AN INTERCHANGE METRO STATION LOCATED ON THE BLUE & PINK LINE OF THE DELHI METRO.



CIRCULATION:

- BUSES CIRCULATION



BUSES ENTRY



BUSES EXIT



METRO CONNECTIVITY



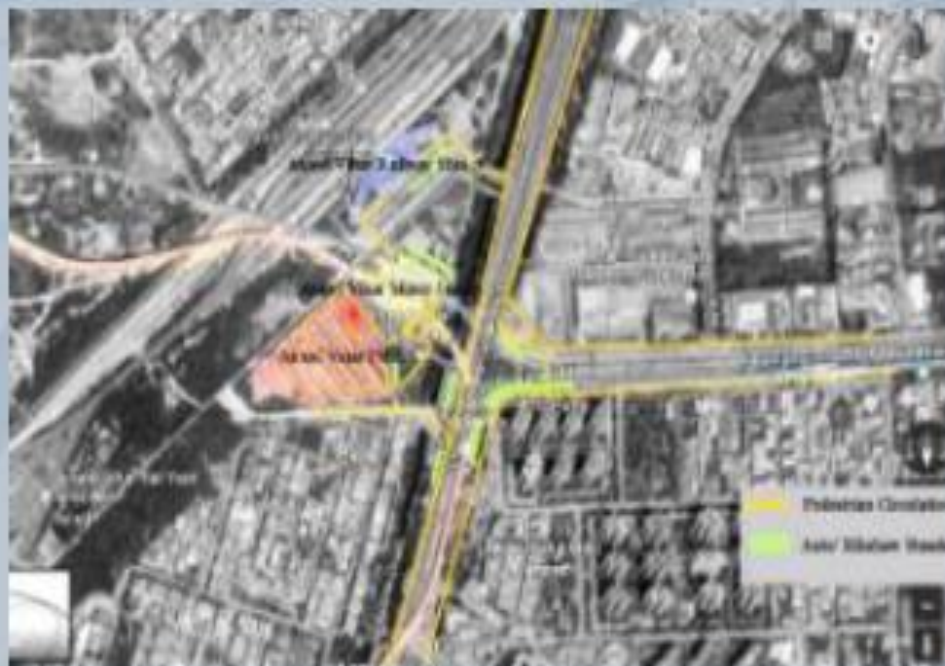
AUTO DROP OFF



ROUND ABOUT

REDESTRIAN CIRCULATION:

- THERE WERE AS SUCH NO PEDESTRIAN PATHWAYS TO MOVE AROUND. FOOTPATHS WERE THERE FOR THE DROP AREAS WHERE PEOPLE COULD STAND BUT NO SEGREGATIONS BETWEEN THE ROADS WHERE BUS AND PEDESTRIAN IS HAPPENING.
- DRAINS WERE OPEN AND UNHEALTHY CONDITION NEAR THE SITTING AREA AND BUS BOARDING BAYS.



DESIGN INFERENCES:

THERE ARE FOUR PLATFORMS-

- PLATFORM A: 36 BAYS FOR LOCAL BUSES
- PLATFORM B: 36 BAYS FOR INTERSTATE AND LOCAL BUSES
- PLATFORM C AND D: 46 BAYS FOR UP AND UTTARAKHAND



LOCAL BUSES



INTERSTATE BUSES

TICKET COUNTERS ARE THE PLATFORMS WHICH WERE CONGESTED AT PEAK HOURS DUE TO LACK OF MANAGEMENT

OPEN DRAINS CAUSE TO UNHYGIENIC CONDITION ALL AROUND.



TOILETS ARE PROVIDED NEAR THE DROP OFF AREA OF E-RICKSHAWS AND AUTO RICKSHAWS



TOILETS

SHOP UNITS ARE ON PLATFORM ARE MORE THAN HALF WIDTH OF THE PLATFORM WHICH AFFECT THE PEDESTRIAN CIRCULATION.

PASSENGERS HAVE TO WALK ON THE ROAD TO ACCESS THE PLATFORMS



SHOP UNITS



ROADS



BOARDING BAY



IDLE BOARDING BAY

FEATURES:

- DRINKING WATER TAPS AND COOLERS.
- SEPARATE TOILET FACILITIES FOR MALES AND FEMALES.
- POLICE POST, BANK, AND POST OFFICE.
- SITTING CHAIRS, LIGHTS AND FANS FACILITY ON EVERY PLATFORM WITH THE AUTOMATIC GENERATE SYSTEM.
- PUBLIC ADDRESS SYSTEM.
- CLOAKROOM, PORTER, PCO/STD/ISD, PARKING OF TAXI SCOOTER TONGA STAND
- CABINS FOR DISTRIBUTION OF TICKETS
- SHOP/ COUNTERS/ TROLLEYS HAVE BEEN ALLOTTED FOR ALL GENERAL ITEMS SUCH AS TEA, JUICE, FRUITS, EATABLES, NEWSPAPERS, AND MAGAZINES.

2. SLOUGH BUS STATION, ENGLAND

INTRODUCTION:

SLOUGH BUS STATION IS CONCEIVED AS A FUNCTIONAL URBAN SCULPTURE. THE CURVED FORM AND TEXTURED ALUMINIUM SKIN CHANGES CHARACTER UNDER DIFFERENT LIGHT CONDITIONS. THE DESIGN FEATURED IN 'THE WORLD'S 10 BEST-DESIGNED BUS STATIONS' - DESIGN CURIAL AND IN 2009 WAS CHOSEN FOR EXHIBITION IN THE ROYAL ACADEMY SUMMER EXHIBITION



PROJECT DESIGN TEAM:

CLIENT: SLOUGH BOROUGH COUNCIL

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PROJECT MANAGER: FITTON ASSOCIATES

STRUCTURE & M&E ENGINEER: BUDO HAPPOLD

LANDSCAPE: SPACEHUB

QUANTITY SURVEYOR: GARDINER & THEOBALD

PLANNING CONSULTANT: DELOITTE DRIVERS JONAS

• THE CURVED STRUCTURE PROVIDES A SHELTERED ROUTE FOR PEDESTRIANS WALKING BETWEEN THE ADJACENT RAILWAY STATION AND THE TOWN CENTRE.

• THE 130 METRE-LONG CANOPY FOLDS DOWN AT ONE END TO WRAP A GLAZED TWO-STORY BUILDING THAT ACCOMMODATES BUS DRIVER FACILITIES, A CAFE, A NEWSAGENT, TOILETS, A WAITING ROOM AND A TICKET OFFICE.



- THE BUS STATION IS PART OF A MASTERPLAN FOR THE AREA AND WILL EVENTUALLY BE SURROUNDED BY FIVE NEW OFFICE TOWERS OF BETWEEN EIGHT AND FOURTEEN STOREYS.
- THE TUBULAR STRUCTURE OF THE STATION WRAPS A TWO STOREY BUILDING AND COVERS THE PUBLIC ROUTE FROM THE RAIL STATION THROUGH TO THE CENTER OF SLOUGH



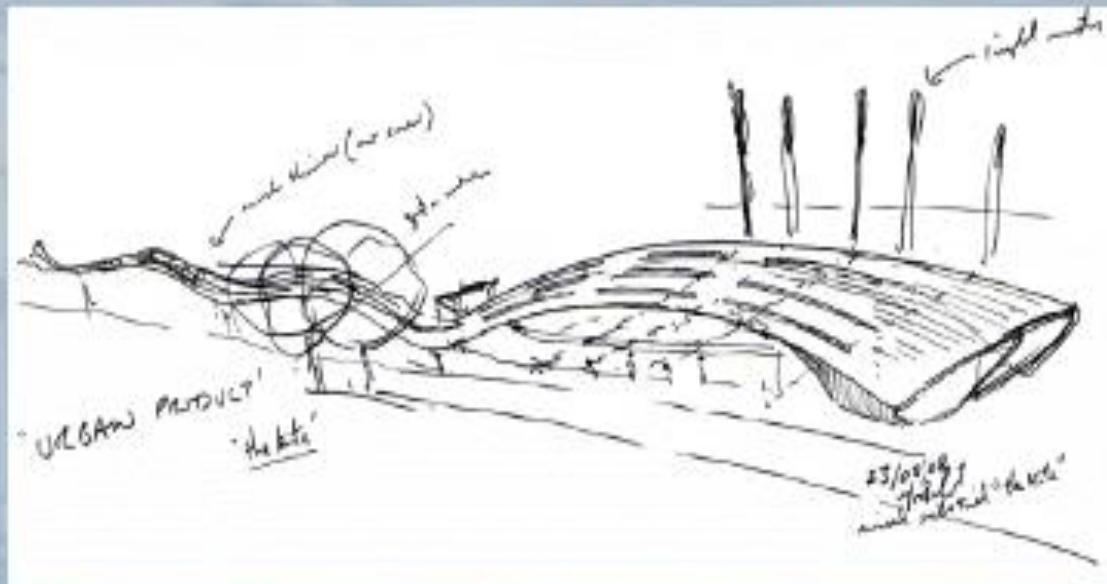
LOCATION:

THE NEAREST STATIONS TO SLOUGH BUS STATION, SLOUGH TOWN CENTRE ARE: BRUNEL WAY, SLOUGH TOWN CENTRE IS 27 METERS AWAY, 1 MIN WALK. SLOUGH RAILWAY STATION, SLOUGH TOWN CENTRE IS 61 METERS AWAY, 2 MIN WALK. WELLINGTON STREET, SLOUGH TOWN CENTRE IS 93 METERS AWAY, 2 MIN WALK. SLOUGH IS 274 METERS AWAY, 4 MIN WALK.



CONCEPT:

- THE ARCHITECTURAL SOLUTION FOR THE NEW BUS STATION PROVIDES AN UPLIFTING, POSITIVE AND MEMORABLE FIRST AND LAST IMPRESSION OF SLOUGH.
- THE SITE FOR THE BUS STATION LIES ON A NEW, KEY NORTH-SOUTH PEDESTRIAN ROUTE. THE SCHEME CONCEPT ENVISAGES THE CREATION OF A NEW TOWN SQUARE, AND SO THE STRUCTURAL FORM HAS TO FULFIL AN IMPORTANT ROLE AS A PLACE MAKER.



- THE STRUCTURES OF BUS ACCOMMODATION BUILDING AND CANOPY ARE DESIGNED TO MEDIATE BETWEEN PEDESTRIANS USING THE NEW NORTH-SOUTH ROUTE AND THE NEEDS OF WAITING PASSENGERS.
- THE SINGLE STRUCTURAL FORM HAS TO ENCLOSE THE WAITING AREA, WHILE ALSO PROVIDING A CLUTTER FREE PASSENGER ENVIRONMENT.
- STRATEGIC COLUMN LOCATIONS AND ARCH SPRING POINTS ENSURE SEPARATION FROM THE BUS MOVEMENT AREA AND PROVIDE CLEARANCE FOR BUSES.
- VISUAL IMPACT IN TERMS OF SCALE AND RELATIONSHIPS WITH SURROUNDING AREAS WAS A KEY CONSIDERATION
- THIS REQUIRED A DESIGN THAT IS LIGHT AND ELEGANT.
- THE WAVE-SHAPED FORM WAS CONCEIVED SO AS TO RESPOND TO THE DIFFERING LEVELS OF WEATHER PROTECTION REQUIRED BY PASSENGERS AND BUSES.
- IN PARTICULAR THE SCHEME SEEKS TO ADD A QUALITY MODERN BUILDING THAT WILL COMPLIMENT THE NEIGHBORING LISTED BUILDINGS.



LOUGH RAILWAY STATION



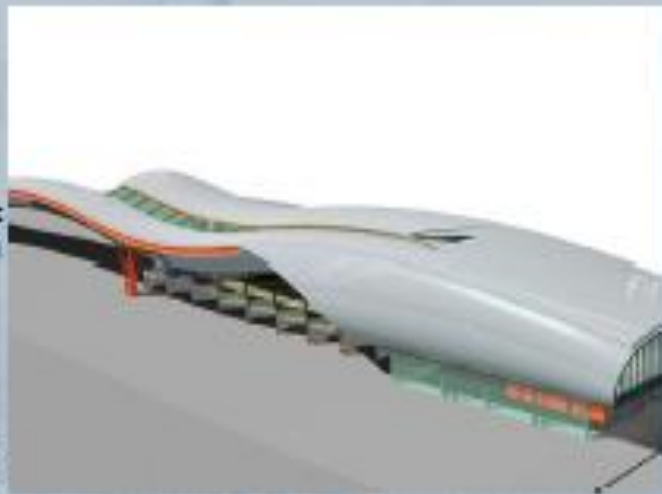
NEW LIBRARY



ST. ETHELBURT'S CHURCH

DESIGN FEATURES:

- **SCULPTURE AS DESIGN**
WELL-PROPORTIONED AND MODERN METALLIC CONFIGURATION HIGHLIGHTING A PROGRESSION OF DELICATE UNDULATING ROOF TOP SHELTERS AND JOINING A 140M SINCE QUITE A WHILE AGO SECURED PERSON ON FOOT WALKWAY THAT STRETCHES INTO TOWN.



- **LARGE SPAN OF GLASS**
THE ONLY STRAIGHT LINES IN THE PROJECT ARE IN THE GLAZED FACADE WHICH WAS CREATED USING LARGE GEODE-MX62

- **MX62 CURTAIN WALLING**
THE FRAMEWORK TRAVERSES THE FULL STATURE OF THE PRIMARY FLOOR ON THE NORTH AND SOUTH HEIGHT OF THE SETTLEMENT BUILDING. IT INCLUDES BESPOKE HEAD AND LEDGE, AND SPLIT MULLIONS TO INTERFACE WITH THE ALUMINUM CLADDING FRAMEWORK THAT BENDS IN TWO WAYS.
GEODE-MX62 WINDOW ORNAMENT DIVIDER, WHICH WAS CREATED TO SUIT BIGGER MEASUREMENTS AND AUGMENT COMMON LIGHT, PERMITTED CLEAR RANGES OF 6M.



- **REDUCING ARTIFICIAL LIGHTING**
LARGER SIZES OF GLASS TO HELP REDUCE THE RELIANCE ON ARTIFICIAL LIGHTING. A MAXIMUM WEIGHT OF 600KG PER TRANSOM IS TO UP TO 400KG FOR STANDARD VISIBLE GRID SYSTEM.

- **SUSTAINABILITY CREDENTIALS**
IT HAS A BREEAM 'VERY GOOD' RATING, IS HEATED AND COOLED USING AN ENERGY-EFFICIENT HEAT EXCHANGE SYSTEM WITH PIPES BURIED UNDERGROUND, AND THE CLADDING TILES ARE MADE FROM ALUMINUM THAT IS 97% RECYCLED.
THE CANOPY CLADDING SITS ON LAYERS OF RECYCLED PLASTIC.
THE BUS STATION INCORPORATES GROUND SOURCE HEAT PUMPS, GREY WATER COLLECTION, AND LOW ENERGY LIGHTING USED THROUGHOUT THE SCHEME.

STRUCTURE:

- **BLENDER COLUMNS**
RANDOM FOREST OF BLENDER COLUMNS SUPPORTS EACH OF THE TRUSSES. THESE WERE DESIGNED TO ACT AS A SINGLE-PINNED SUPPORT AT BOTH THEIR HEAD AND BASE, AND WERE PORTALISED IN THE ORTHOGONAL DIRECTION TO PROVIDE LATERAL STABILITY TO THE TRUSSES. SOME ALSO ACT AS RAINWATER DOWNPIPES.
- **FAÇADE**
THE BUILDING IS CLAD IN ALUMINUM SHINGLES CREATING A SOFTLY TEXTURED METALLIC SURFACE WHICH CONSTANTLY CHANGES CHARACTER WITH THE VARYING LIGHT CONDITIONS. THIS FINISH ALSO ECHOES THE ROOF TILES OF THE NEARBY LISTED GREAT WESTERN RAILWAY STATION.



BLENDER COLUMNS



FAÇADE

- **CIRCULAR SECTION**
THE DESIGN PROCESS CONSIDERED FABRICATING THE TRUSSES IN BOTH OPEN SECTION AND IN TUBE, TO ENSURE THE OPTIMUM SOLUTION WAS SELECTED. THE CIRCULAR HOLLOW SECTION CHOSEN WAS SLIGHTLY LIGHTER, AND IT WAS SIGNIFICANTLY EASIER TO DETAIL THE CONNECTION FOR THE CLADDING BRACKETS WHICH DEFINE THE EXTERNAL SURFACE.
- **CANOPY**
THE SCHEME CONSISTS OF A 130M CANOPY AND PEDESTRIAN WALKWAY ANCHORED AT ITS NORTHERN END WITH A 660M² ACCOMMODATION BUILDING WHICH LOOKS OUT ONTO THE AIR STATION.

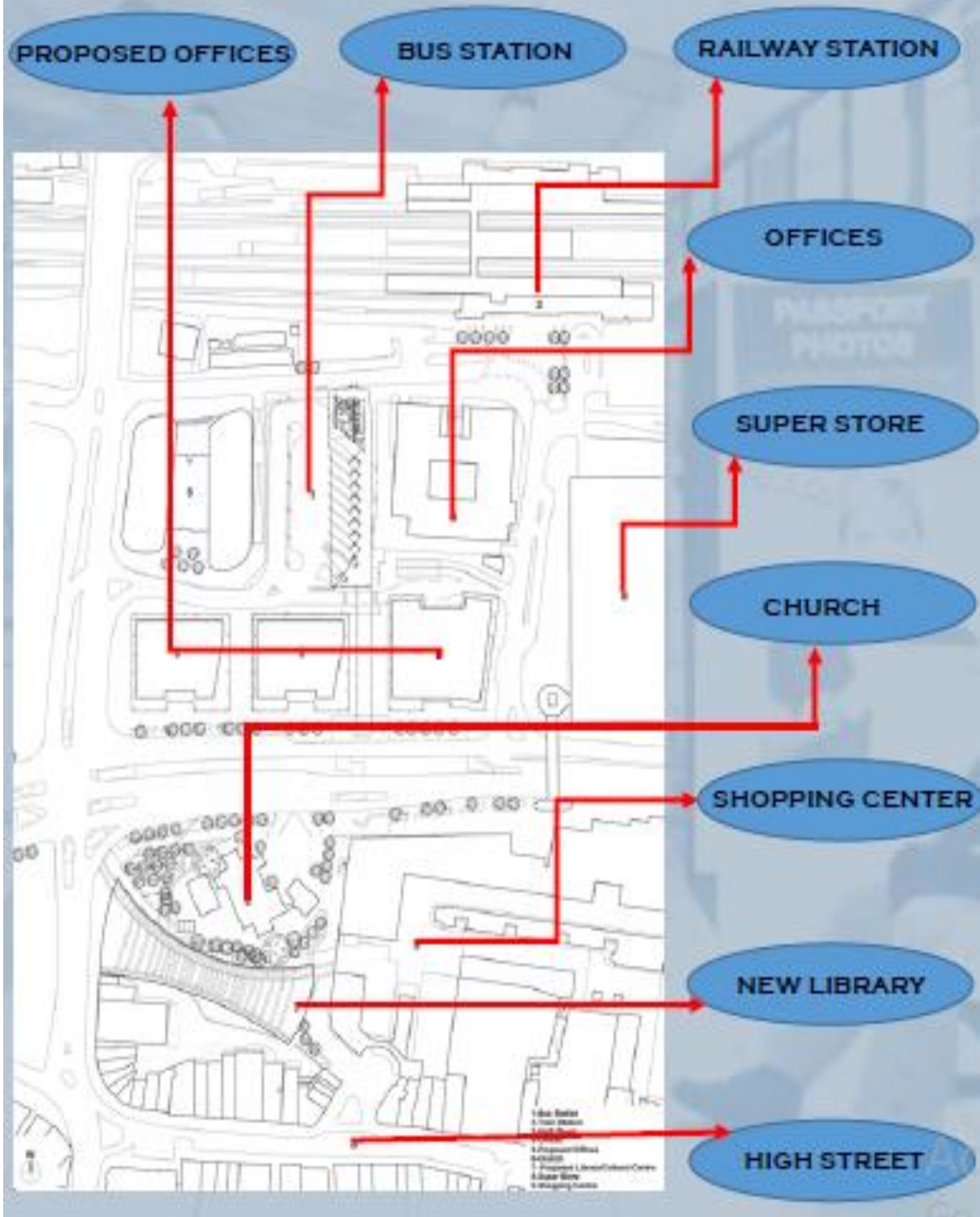


CIRCULAR SECTION

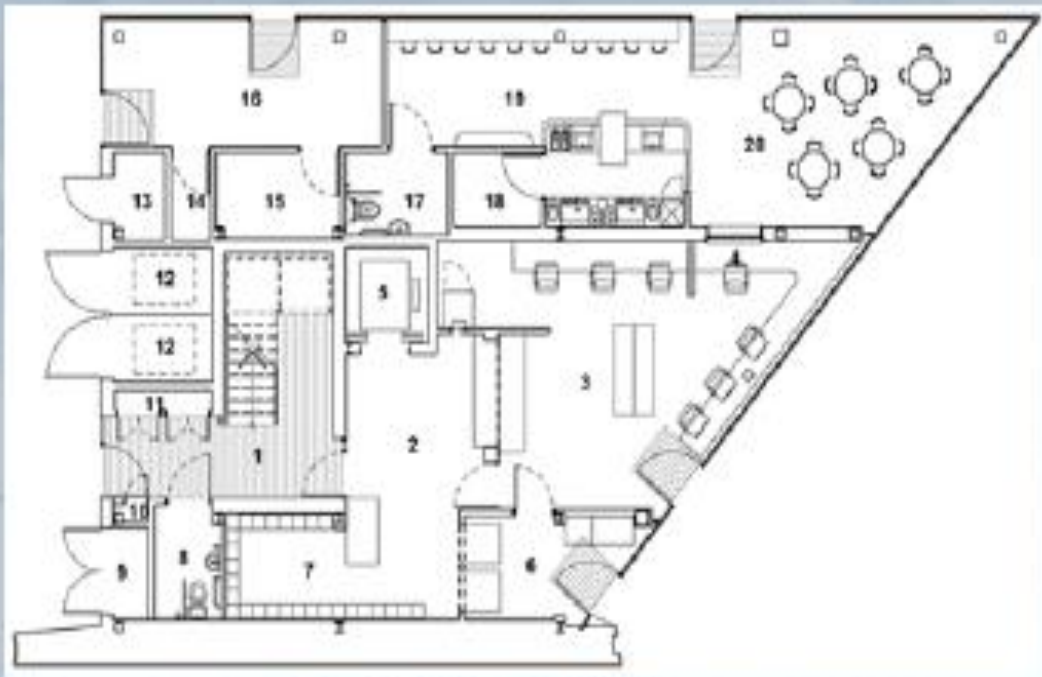


CANOPY

PROJECT DETAILS:



PLANS :



GROUND FLOOR PLAN

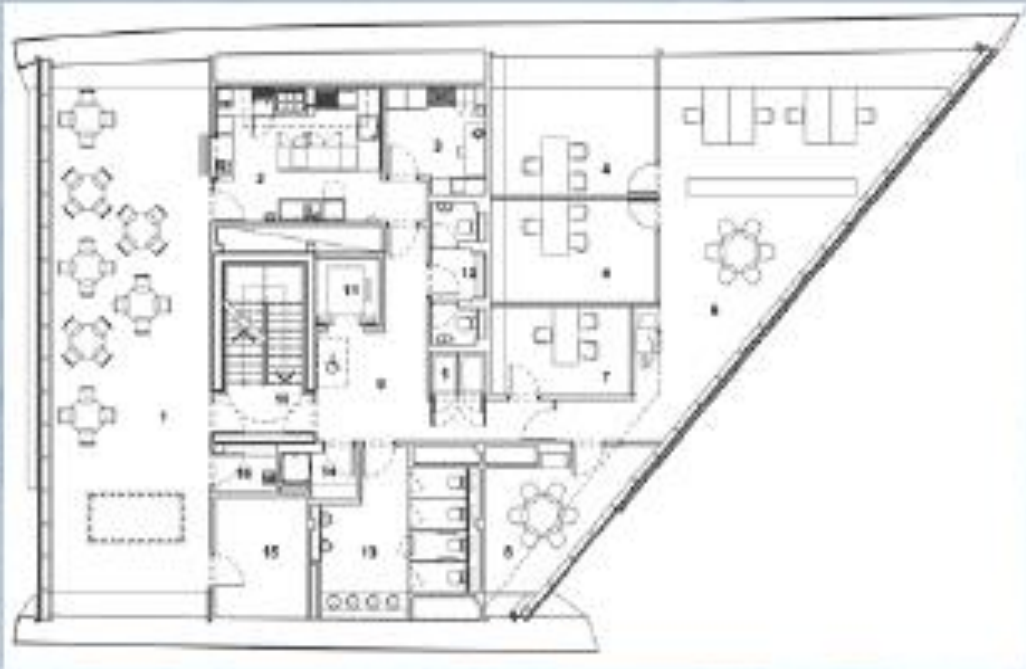
SECTION AND ELEVATION :



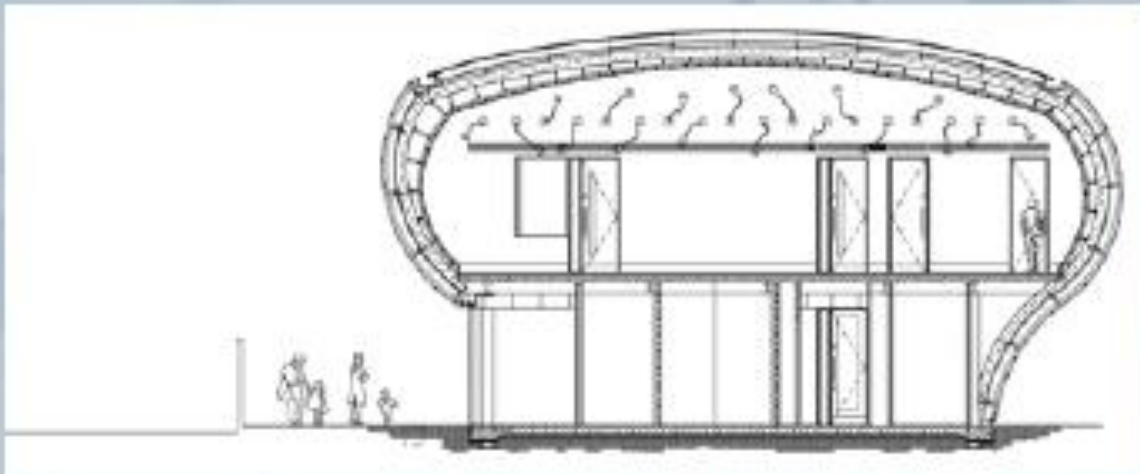
BUILDING ELEVATION



BUILDING SECTION



FIRST FLOOR PLAN



CANOPY SECTION

CONCEPT

The key of a successful ISBT is to create a better circulation for heavy vehicles, light vehicles and pedestrian movements.

My concept is to create a space which will be able to provide the circulation without any obstruction between vehicles and pedestrian movements. An appropriate space should be provided for the heavy vehicles to avoid any congestion and providing feasible terminals.

Basically the pedestrian and vehicular movement should be segregated to create a safe space for pedestrians and obstruction less movement for the heavy vehicles.

OBJECTIVE

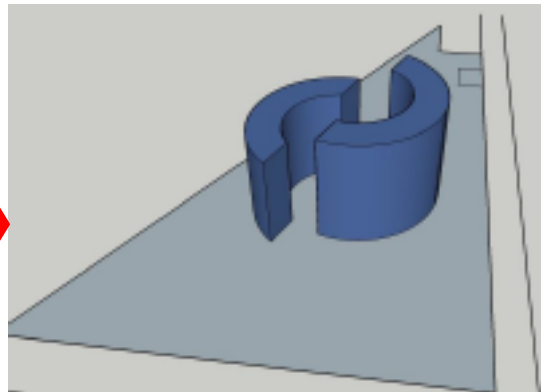
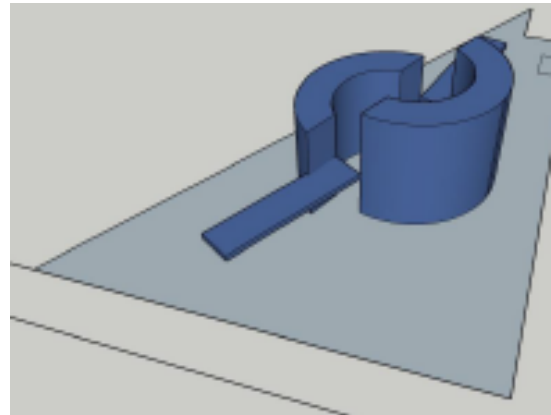
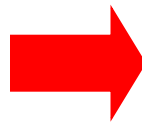
- No conflict in traffic movements. Easy flow of passengers. Areas for respite signage.
- Responding to the existing environment. Responding to the architectural design.
- Comfort for passenger movement, meeting, convenience places for all age groups, economic brackets and sensitive to disables.
- Creating the aesthetics playing with the grandeur like earlier while keeping the design futuristic.

FORM EVOLUTION

The form of the ISBT is evolved from the logo of Delhi Transportation Corporation by curving both the arrows of the logo and adding platforms to each side of the building which separates arrival and departure block

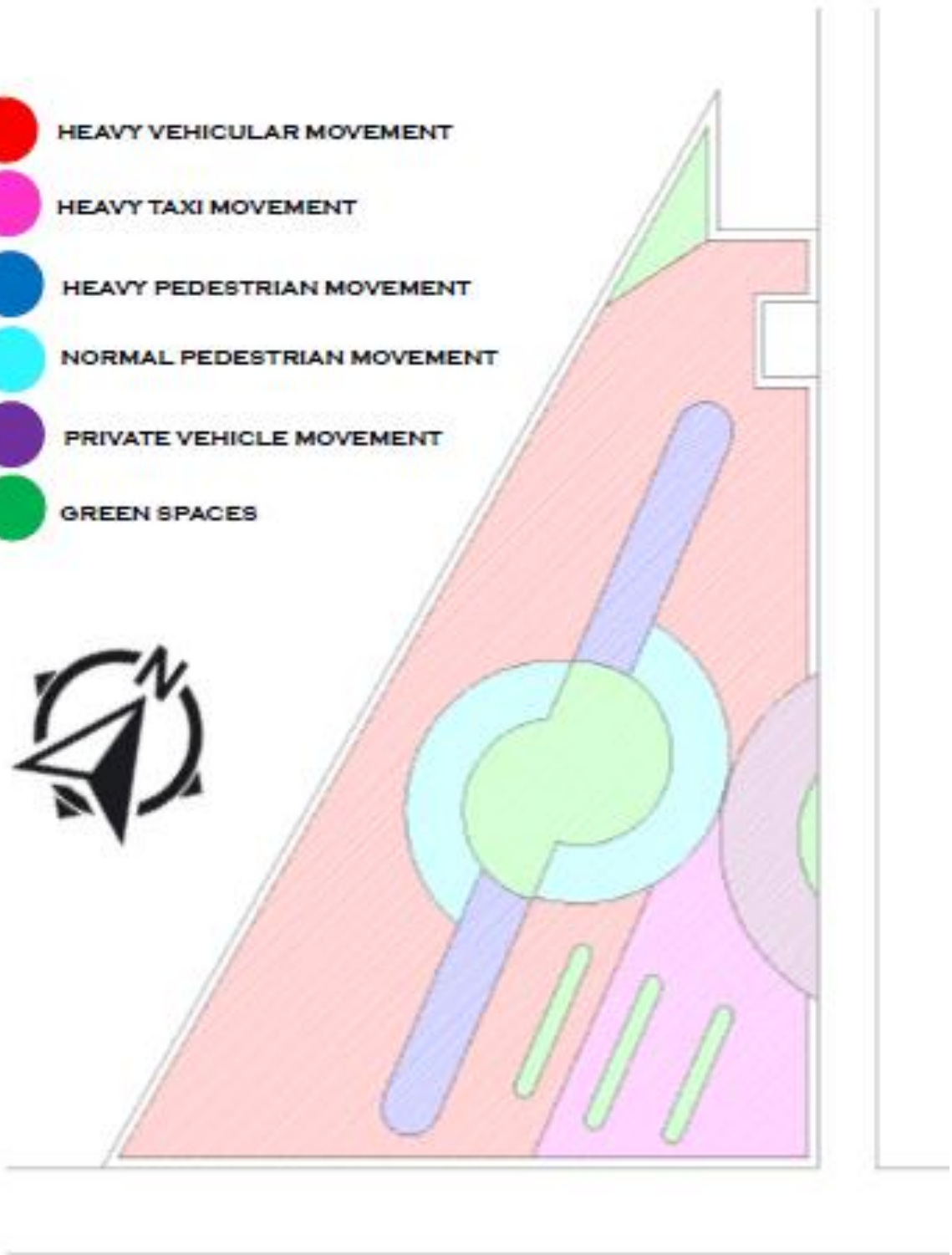


Delhi Transport Corporation

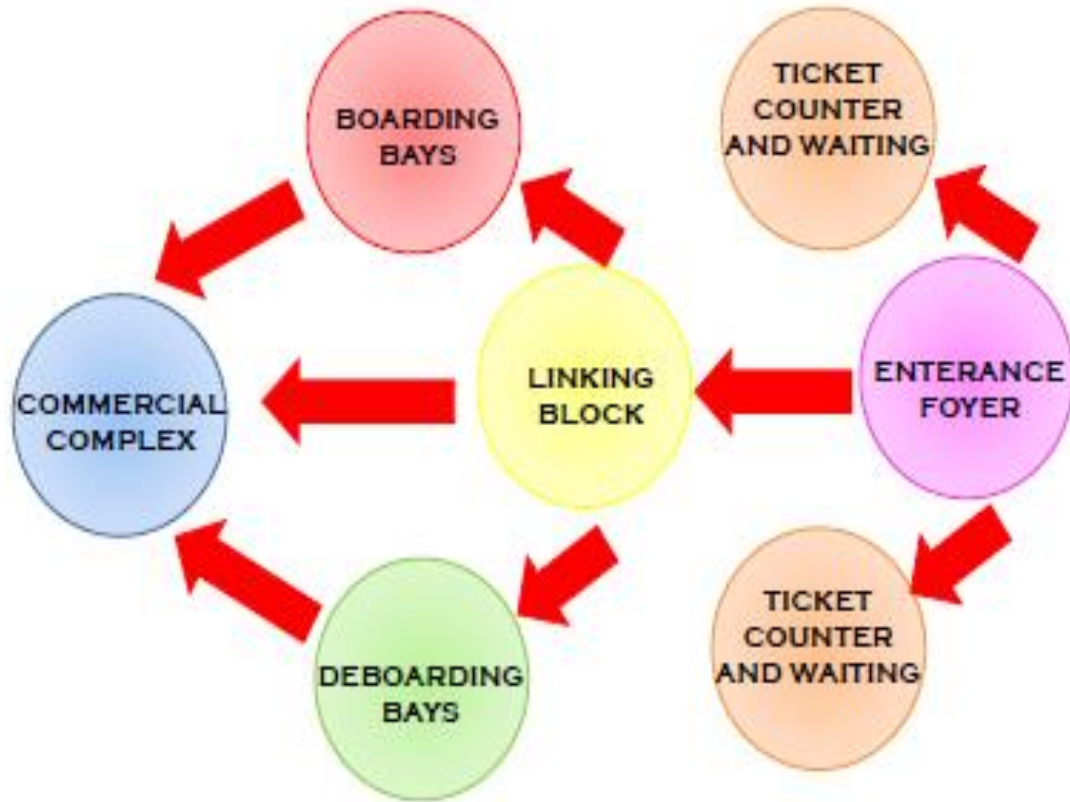


SITE ZONING

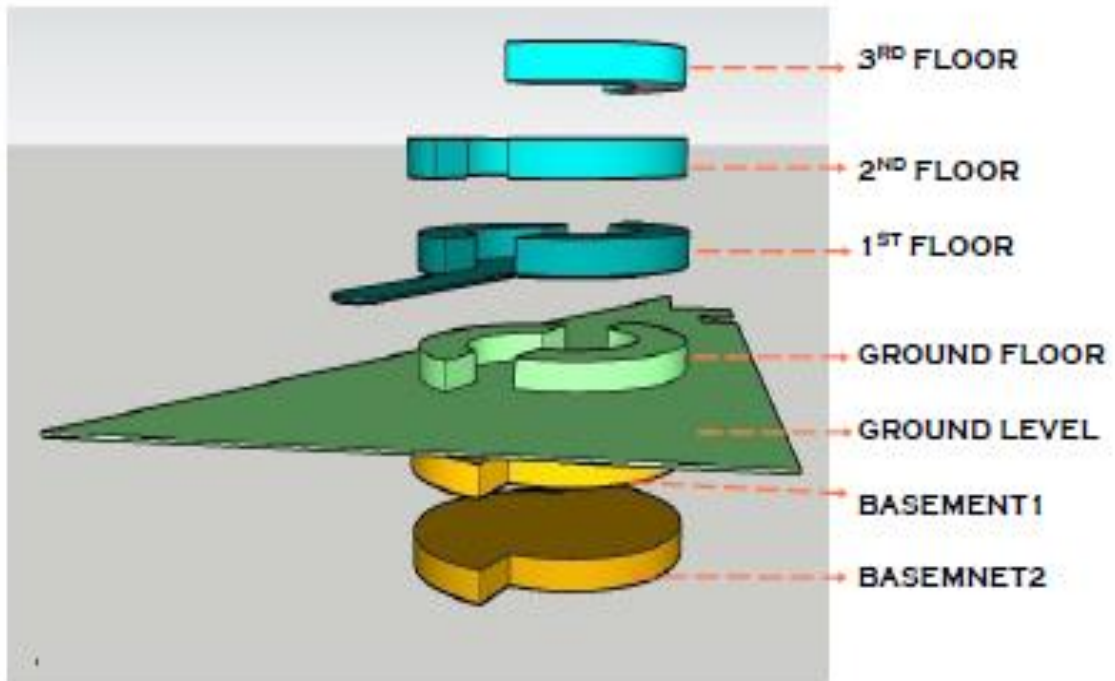
-  HEAVY VEHICULAR MOVEMENT
-  HEAVY TAXI MOVEMENT
-  HEAVY PEDESTRIAN MOVEMENT
-  NORMAL PEDESTRIAN MOVEMENT
-  PRIVATE VEHICLE MOVEMENT
-  GREEN SPACES



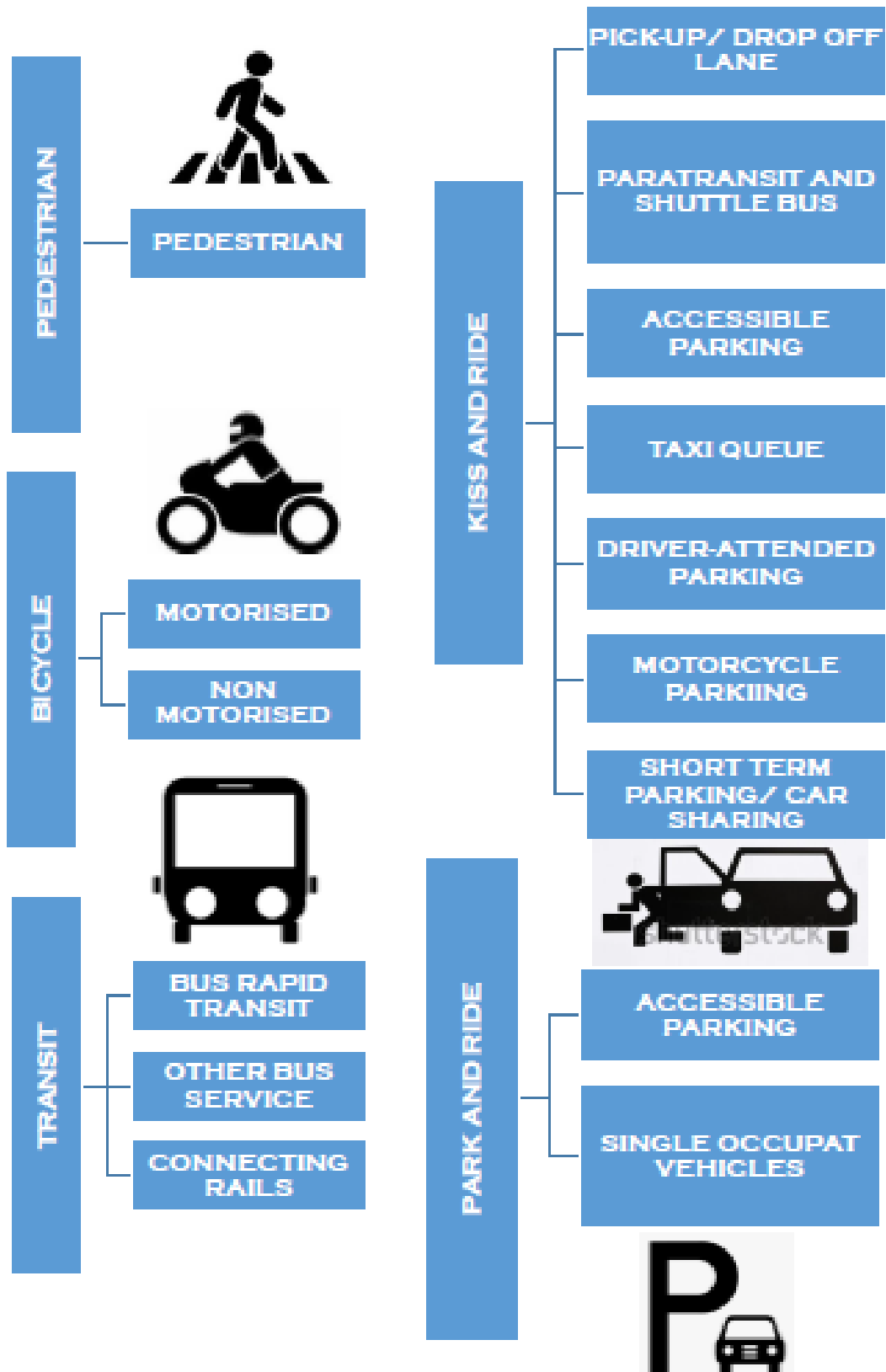
BUBBLE DIAGRAM







VERTICAL STACKING

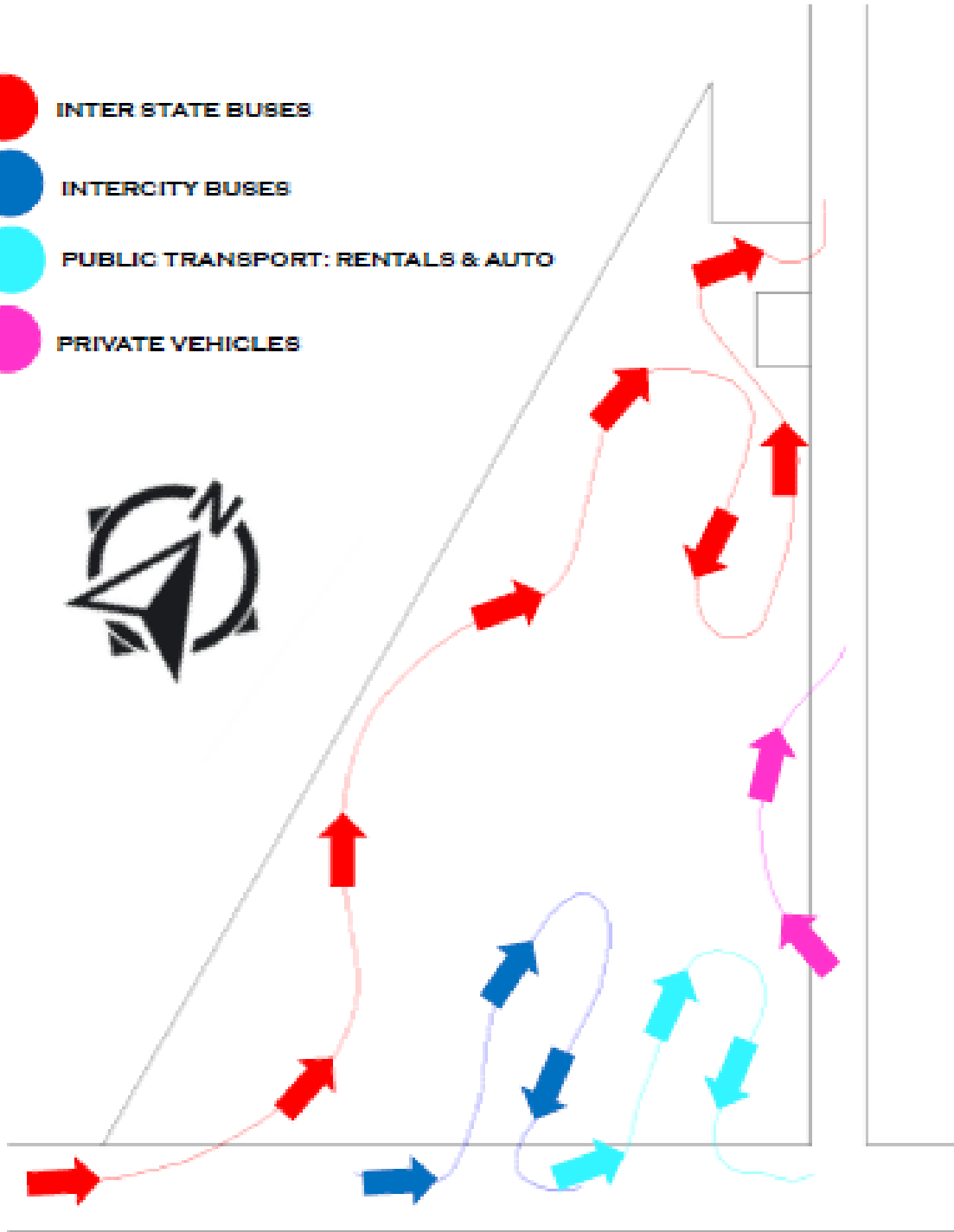


ACCESS HIERARCHY



TRAFFIC FLOW DIGRAM

-  INTER STATE BUSES
-  INTERCITY BUSES
-  PUBLIC TRANSPORT: RENTALS & AUTO
-  PRIVATE VEHICLES



DESIGN CONSIDERATION

- GLASS FAÇADE

Modern building designs and constructions use extensive amount of glass facades. This is mainly due to simplicity of the materials and invention of modern construction methods.

AVG COST-450/SQ.FT.



- TERAZZO FLOORING

Terrazzo flooring is composed of composite material. It contains any variety of mixture of aggregate chips like stone or marble and either epoxy resin or concrete. Floors done with terrazzo are comparatively light and durable as they come.

AVG COST-35-1000/SQ.FT.

AREA ANALYSIS

S.NO.	ACTIVITY	QUANTITY	TOTAL AREA
BUS CREW			
1.	REST ROOMS	1	225
2.	CANTEEN	1	150
3.	DORMITORIES	1	200
4.	TOILETS	1	30
TOTAL			605

S.NO.	ACTIVITY	QUANTITY	TOTAL AREA
OFFICE			
1.	I.S.B.T OFFICES	2	1800
2.	CANTEEN	1	2250
3.	TOILETS	6	300
4.	SERVICES		500
TOTAL			4850

S.NO.	ACTIVITY	QUANTITY	TOTAL AREA
SERVICES			
1.	GENRATOR ROOM	1	300
2.	A/C PLANT ROOM	1	500
3.	PUMP ROOM	1	150
4.	FIRE HYDRANT ROOM	3	240
TOTAL			1190

S.NO.	ACTIVITY	QUANTITY	TOTAL AREA
ENTERANCE HALL			
1.	TICKET COUNTER	20	100
2.	QUEUING AREA	20	750
3.	INFORMATION DESK	1	7.5
4.	PUBLIC TOILETS (M)	1	28.5
5.	PUBLIC TOILETS (F)	1	30
6	CAFETERIA	1	30
7.	A.T.M.	3	7.5
8.	LOBBY AREA	1	300
9.	SERVICES	1	300
TOTAL			1553

S.NO.	ACTIVITY	QUANTITY	TOTAL AREA
DEPARTURE BAY			
1.	PLATFORM	1	4000
2.	ENQUIREY AREA	1	5
3.	PUBLIC TOILETS (M)	1	28.5
4.	PUBLIC TOILETS (F)	1	30
5.	KIOSKS	3	36
6.	SERVICES	1	200
TOTAL			4299

S.NO.	ACTIVITY	QUANTITY	TOTAL AREA
WAITING HALL			
1.	GENERAL	1	1600
2.	LADIES	1	500
3.	DELUX	1	600
4.	PUBLIC TOILETS (M)	1	28.5
5.	PUBLIC TOILETS (F)	1	30
6	FOOD COURT	1	250
6.1.	KITCHEN AND STORAGE	1	36
8.	KIOSKS	5	60
9.	A.T.M.	3	7.5
10.	SERVICES	1	300
TOTAL			3412

S.NO.	ACTIVITY	QUANTITY	TOTAL AREA
ARRIVAL BAY			
1.	PLATFORM	1	4400
2.	ENQUIREY AREA	1	5
3.	PUBLIC TOILETS (M)	1	28.5
4.	PUBLIC TOILETS (F)	1	30
5.	KIOSKS	3	36
6.	SERVICES	1	200
TOTAL			4699

S.NO.	ACTIVITY	QUANTITY	TOTAL AREA
DORMOTORIES			
1.	RECEPTION / LOBBY	1	6
2.	MEN ROOMS	1	320
3.	MEN TOILETS	1	16.5
4.	LADIES ROOMS	1	200
5.	LADIES TOILETS	1	20
6.	FAMILY ROOMS	10	200
7.	FAMILY TOILETS	10	50
8.	EATING ROOM	1	150
9.	KITCHEN AREA	1	24
10.	STORAGE	1	60
11.	MISCELLANEOUS		200
TOTAL			1246

S.NO.	ACTIVITY	QUANTITY	TOTAL AREA
COMMERCIAL AREA			
1.	SHOPS	50	
2.	RENTABLE OFFICES	10	
3.	ENTERANCE LOBBY	1	
4.	PUBLIC TOILETS (F)	3	
5.	PUBLIC TOILETS (M)	3	
6.	SERVICES	1	
TOTAL			7000

S.NO.	ACTIVITY	QUANTITY	TOTAL AREA
TOURIST INFORMATION AREA			
1.	LOBBY & INFO DESK	1	300
2.	ADMIN AREA	1	10
3.	CYBER CAFE	2	450
4.	MONEY EXCHANGE	3	12
5.	A.T.M.	3	7.5
6	PUBLIC TOILETS (M)	1	28.5
7.	PUBLIC TOILETS (F)	1	30
TOTAL			838

S.NO.	ACTIVITY	QUANTITY	TOTAL AREA
COMMUTER FACILITIES			
1.	BANK	1	600
2.	FIRST AID ROOM	1	70
3.	FIRE CONTROL ROOM	1	37.5
4.	CLOAK ROOM	4	240
5.	POLICE POST	2	100
6	CAFETERIA	1	500
TOTAL			1547

REFERENCES

Links-

- <http://www.dwarkawala.com/dwarka-to-get-its-own-isbt-and-much-more/#:~:text=The%20project%20will%20be%20the,reach ing%20their%20offices%20on%20time.>
- <https://timesofindia.indiatimes.com/city/delhi/for-now-a-smaller-version-of-dwarka-isbt/articleshow/66901777.cms>
- <https://www.dimts.in/tenders/Inter120608.pdf>
- [http://119.226.139.196/planning/docs/Zone-K%20\(part\)%20Dwarka%20subsity.pdf](http://119.226.139.196/planning/docs/Zone-K%20(part)%20Dwarka%20subsity.pdf)
- <https://dda.org.in/planning.aspx>
- https://issuu.com/smritigupta04/docs/thesis_report

Thesis-

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