

# BRIDGE as a PUBLIC PLACE

Old Yamuna Bridge, Delhi

Submitted by:  
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39/barch/ssaa/2001

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# Certificate

This is to certify that **Garima Jain** (Roll No. 39/B.Arch/SSAA, Examination roll no. B/SSR/24326) has completed architectural thesis (2005-2006) as per guidance and course requirement of the five year Bachelor of Architecture programme at Sushant School of Art and Architecture

**Ms. Suruchi Kumar**  
Guide

**Professor Ram Sharma**  
(Dean, Thesis coordinator)



# A c k n o w l e d g e m e n t

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Bhagti Hansgulhani \_\_\_\_\_  
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For their initial guidance

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**And above all my family, specially my mother. Thank You.**

## A b s t r a c t

The City of Delhi lacks - not space - but quality **public space**, due to un-utilized opportunities available. While such urban voids are not used, new ones are created each day. Apart from large industrial voids, **River Yamuna** itself has become an accidental void.

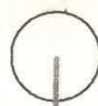
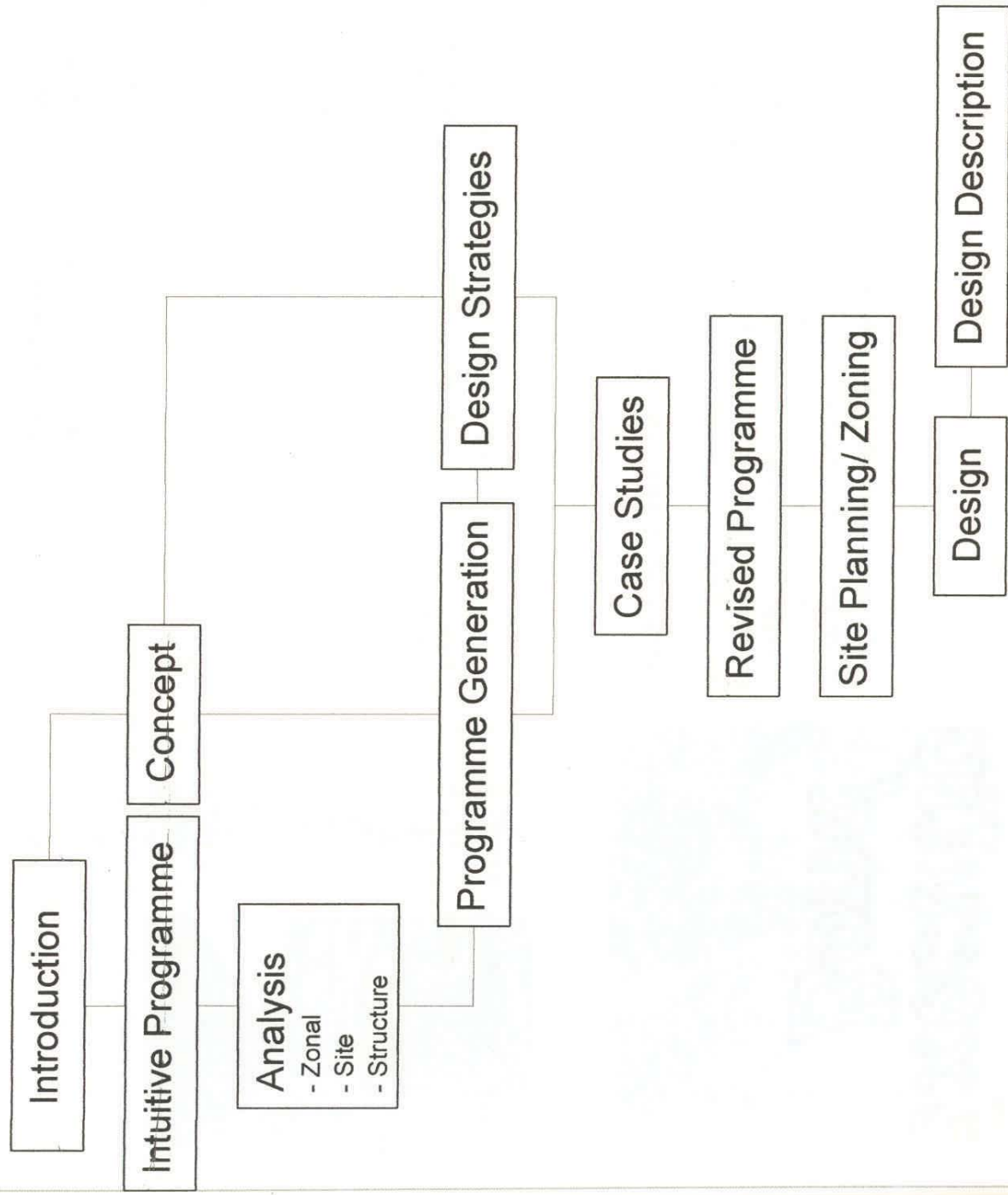
# Around the world, waterfronts are used for a variety of functions ranging from ports to traffic corridors, to recreation and sacred sites. The urban waterfronts have always been admired for their aesthetics - that make for good entertainment and social interaction. Therefore, the need for a developed riverfront as in case of Delhi becomes more vital. Delhi Development Authority (DDA) proposed such development, but only on the land reclaimed after channelisation of the river. Instead of putting all the pressure on the river, some of it could be reduced by using the existing infrastructure available.

# After decades of decay and neglect, it has become imperative that most of the nations infrastructure be rebuilt or replaced. Amongst them is the Old Yamuna Bridge, behind Red Fort in Delhi, which had been built by the British for a term of 100 years as a railway bridge. Now even after 140 years of its service, it is still in a condition to be recovered and reused.

This thesis is to convert one such type of an urban void - BRIDGES - as a public place.



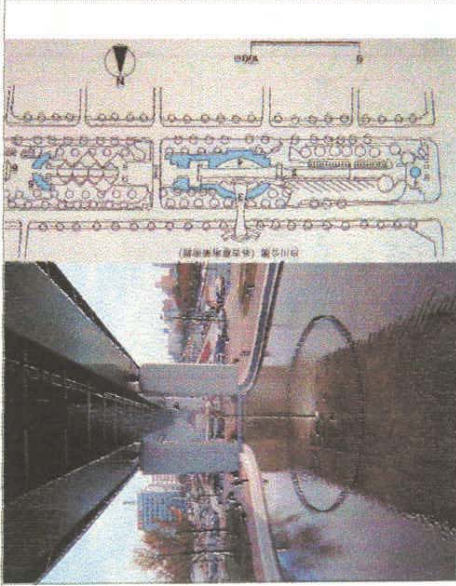
# Order of Study . . .



# Introduction...

## Why Bridges...

Bridges are often considered to belong to the **engineer's realm** rather than the architect's. But the architecture of such a **large infrastructure** has a powerful impact on the environment. And if not treated sensitively can give rise to problems within the existing context, problems which are not just physical but also social and economical, such as disturbing the existing fabric and the interaction between the people of the locality. Whereas, if understood sensitively, they could serve as a medium to bridge not just the distances but also the differences.



Water Plaza, Wakamiya Boulevard Park, Japan

There are different ways by which these problems could be avoided while designing the bridge itself. One of the ways is extending the functions on to the bridge such that it promotes the interaction which otherwise is physically hampered. Visually linking the edges, making the passage from one end to the other more interactive, etc may be other ways for this means. There is an example where a solution is derived via a landscaped recreational space below a bridge at the Wakamiya Boulevard Park in Nagoya, Japan.

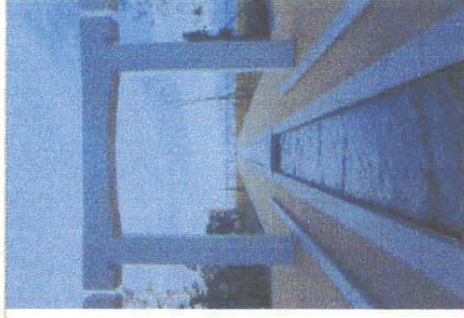
Hence, a new and fascinating building type could emerge in the form of inhabited bridges, which can be broadly defined as bridges which not only provide a link between two points for pedestrian and vehicular traffic, but also support superstructures that can serve residential, commercial, recreational, religious, industrial, or defensive purpose, thereby creating a continuity of the built up area from one edge to the other.



Kamagawa Riverside Development, Japan

## Psychological effect of bridges:

Bridges are often used in private gardens, public parks, etc. as they fascinate the user, so much so they would use the bridge to go across where crossing is possible by other ways as well. On the bridge one gets a feeling of being to nowhere and everywhere at the same time, with an anticipation of getting to some place, a sensation that land cannot offer. This psychological effect that a bridge has over human psyche enhances the reason for such a selection.



Osaka Hokko Marina Yacht Harbor, Japan

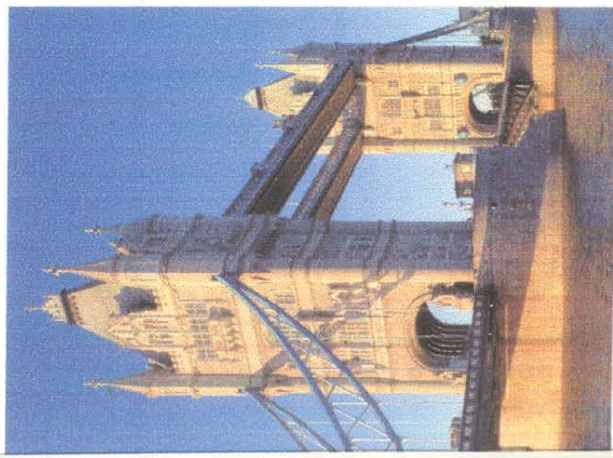
# Background

## History of living bridges:

From the 12th century to the end of 18th, there were many inhabited bridges in Europe, including celebrated examples of Ponte Vecchio in Florence, the Ponte di Rialto in Venice, Old London Bridge and the bridges which once linked Paris' *Ile de la Cite* to both Left and Right banks. In our city, great new projects of lasting value and grand scale should be built that significantly improve the quality of life. An inhabited bridge must be one such case: *an opportunity to create context as well as to respond to it and improve the quality of the city's urban fabric.*



Extension of urban fabric in Ponte Vecchio Bridge, Florence



Tower Bridge on River Thames, London

## Observations:

1. Around the world, there have been a lot of examples where the bridge is looked at with respect to other functions also such as Ponte Vecchio in Florence as a residential, religious and commercial bridge; Garden Bridge in Hiroshima as a recreational garden, Old London Bridge as a street for residences on its either side, etc.
2. In India, transport and other functions are seen together in cases like subways, but not yet in bridges. Some of the subways even act like destinations and not just transit, ex. Palika Bazaar, Tibet market near Yamuna Ghat.

## Bridges as Urban Voids in the city:

- Lacking functions.
- Lacking people.
- Lack of aesthetic experiences.
- Lack of difference.

## Characteristics of URBAN VOIDS

The definition of urban voids includes under-utilized space, vacant land, which are identified as the problems of city beautification (visual quality) and tidiness, in the meanwhile on the more positive side; those spaces are also the potential of re-development project for economic, social, and environmental purpose.

Therefore, the bridges, even after being an integral part of the urban fabric, remain devoid of life, but could still be seen as spaces with high potential for intervention.





## Types of Bridges:

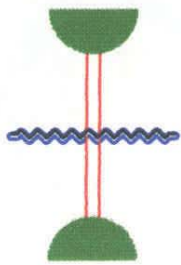
Every place on earth has bridges, from heroic suspension spans to graceful arches over the canals of Venice. There are scary swinging bridges, busy bridges over urban rivers, high arched bridges in Japanese gardens, picturesque covered bridges in the American countryside, bridges that open for shipping, floating bridges, Roman bridges still in use, ancient bridges in China.

Bridges are interesting, in their engineering, their materials, their setting, their history. They are important, providing vital access across rivers and to islands. Some carry huge volumes of traffic, others cross international boundaries. Bridges can be short but complicated, the soaring loops of a freeway interchange, or immensely long like the causeway connecting the Florida Keys. Some cross deep narrow gorges in the mountains, others span turbulent tidal channels. They can be symbolic, like a Chinese nine-turn bridge, or strictly utilitarian, like the ubiquitous Bailey bridges. Taken metaphorically, bridges can be anything that helps us to progress from one place to another, spanning barriers and obstacles. There are social and cultural bridges, economic and business bridges, emotional and psychological bridges.

There are different types of bridges as seen in the cities - Flyovers, Expressways, metro bridges, bridges across natural barriers, etc. These can be divided into two broad categories:

### TYPE 1

**Where the bridge is used to break a natural barrier.**



**EX.:** London Bridge on River Thames, Rialto Bridge on a canal in Venice, Wazirabad Barrage and Delhi-Noida-Direct on River Yamuna, etc. Here, the two ends of the bridge require a designed response to the existing urban fabrics.

### TYPE 2

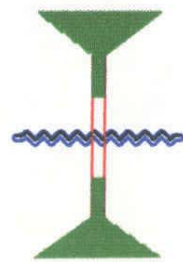
**Where the bridge is needed to decrease distances / for increasing speed of vehicular traffic.**



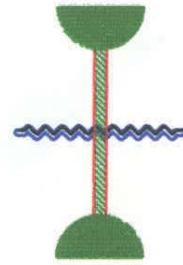
**EX.:** A.I.I.M.S Flyovers and Defense Colony Flyover in Delhi, New Expressway to Gurgaon, etc. the bridges of these kinds should be built in a way the existing fabric continues even below them.

Based on the types, there are different issues :

- As the bridge is purely for the function of transportation, it does not seem to extend the fabric. Hence, there are such great differences on the two banks that they look like different cities all together. The bridge could be used to reduce such differences by the following two methods :

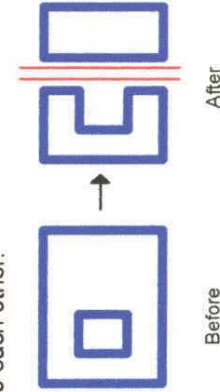


Concentration at the edges and on the bridge itself



Concentration at the junctions with the banks and functions spread evenly on the bridge itself, as is seen on the Ponte Vecchio in Italy

- Bridges in India are considered to be a means for an end: a purely functional purpose of reaching to a place from another. But in the process they have become problem generators themselves, as is seen in the case of the flyover between Defense Colony and Lajpat Nagar. Here, in the process of bridging the distances, it has become a physical divide between the two adjacent colonies which were earlier closely connected to each other.



Before

After

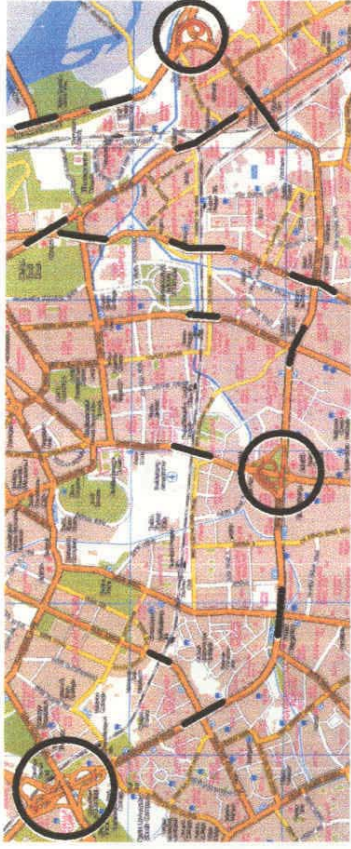
## Bridges in Delhi:

TYPE 1



Plan of Delhi showing the bridges which cross Yamuna, most of them being purely vehicular Bridges. Of these some are permanent bridges like the Vikas Marg, Toll Bridge, etc while some are Seasonal like the one behind Vijay Ghat opens up from November to June. There is a proposal which is under construction of a vehicular bridge to replace

TYPE 2



Plan of Delhi showing the major flyovers which are coming up to increase the average vehicular speed.

### Aim:

This thesis is to see the bridge as a more dynamic and a multifunctional project:

- As an extension of *public realm*
- As *elements of continuation* of urban fabric, the image and intensity of activity from either side of the river.
- As *destination* and not merely transit
- As an *urban landmark*
- As both a source and a receiver of *social and cultural activity*
- As a *self financing* inhabited bridge

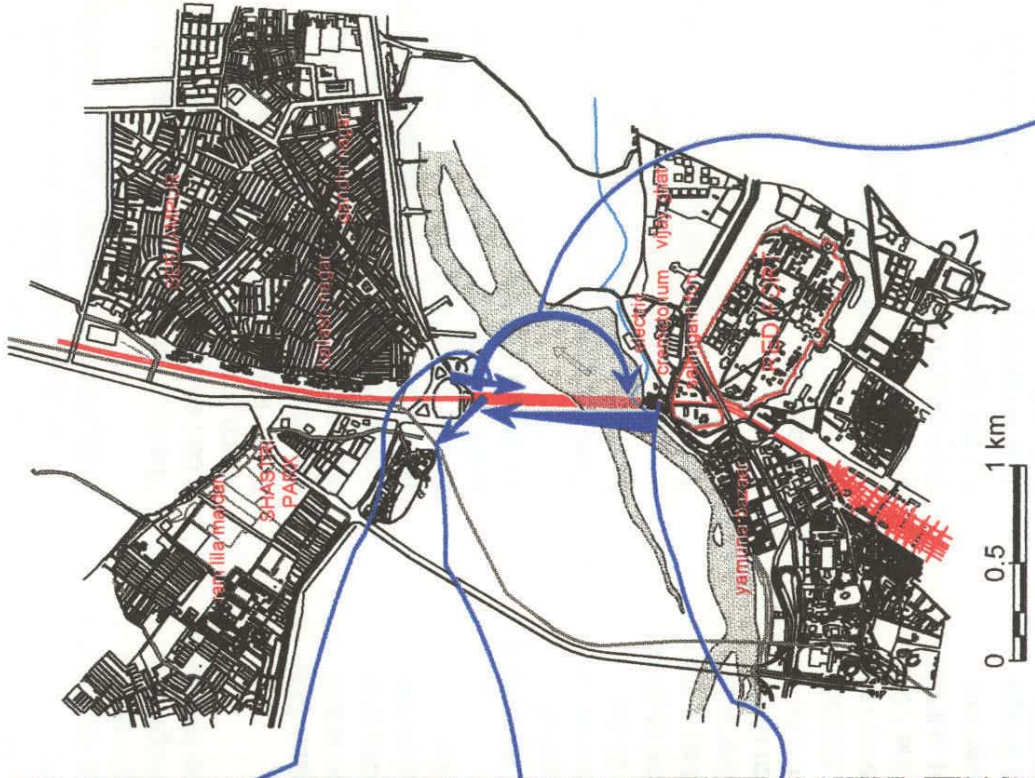
# Site . . .



View of the pedestrian track from east towards west

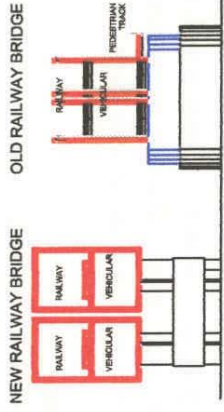
Shastri Park Metro Station as seen from the bridge

View of the bridge with the new railway bridge under construction towards its north



## Brief Description:

Built in 1866 by the Britishers  
 Total length: 738m  
 Width: 5.1m + 1.3m + 4.2m  
 Structure: Steel Truss Girder  
 12 spans of 205' each



Existing Section of the old Yamuna Bridge with the New Railway bridge

## History of the Old Yamuna Bridge:

Year	Development	Pounds
1866	Single line bridge of length 2640' (12 X 202.5' + 2 X 34.6' end spans)	16,16,335
1913	Double line bridge (12 X 202 + 2 X 42' end spans)	14,24,900
1925	Roadway of width 13'6" (downline) 10'9" (upline - regirdered later to 14'6")	6,97,172
1933	Bridge taken over by N.W. Railway Double line regirdered to take heavier loads and roadway widened to 15'	23,31,386



View towards south

### Why this Bridge...

1. There are certain heritage areas that are integral components of a city's fabric which contribute to its image and strengthen its identity. This site fails to do so - not because of any lack of memory behind it - but due to lack of recognition. Here, a small description of the history of this fort becomes necessary.

Salimgarh Fort was built by Islam Shah (1545-54). It was located on an island with Yamuna flowing on all sides of it. Only the walls were completed by the time of his death, after which the construction was abandoned. Nevertheless, several Mughal emperors camped here before the creation of Shahjahanabad. In fact, the location for the Red Fort was chosen due to the presence of this fort. During the reign of Aurangzeb, Salimgarh served as a state prison. After the British rule, river was replaced by the ring road which now lies between this and the Red Fort. The Britishers built the railway line through the fort. The Indian National Army leaders were also imprisoned here in the 1940s. With so many eras behind it, it still fails to capture enough attention of even the local population. Thereby, this bridge could be used to reactivate the Salimgarh Fort.

2. Built in 1866, by the British, it spans 738m (in 12 spans) which is about 150m longer than the World famous Howrah Bridge (3 spans) of Calcutta, this bridge itself deserves a lot more recognition than what it gets presently.

3. The location of the bridge is such that it can enjoy the proximity of the river which in turn is unique to the city of Delhi. Hence, functions related to the river can make this bridge a destination rather than mere transit. Apart from the river, the ghats on the west bank can provide ample amount of attraction (and in turn can help to activate them by acting as a magnet for the rest of the city).

4. This site gives a chance to deal with both type 1 and type 2 issues simultaneously, along its span of 866m on the river and then continuing within the fabric.

### Why reuse...

1. In a city where vehicles are being given priority over pedestrians in more than one instances, finding a proposal for the construction of a new bridge only for pedestrians is quite unlikely, in fact it may be quite unrealistic considering the finances involved with respect to the construction of a new bridge as opposed to the small requirement of pedestrian traffic loads.

2. When this bridge was constructed by the Britishers, they meant to use it for not more than 100 years for vehicular traffic. Now, even after 140 years, it is used in the same way, with probably more dynamic load on it than it was designed for. With its designed life span over, and looking at the decent condition that the bridge still has, it is preferable to convert it into a pedestrian spine by removing the vehicular and railway load from it.

3. With so much of money having gone into it already, apart from the maintenance costs spent on it every 5 years, it is impractical to simply dismantle the structure, which would consume more finances without any returns.

4. According to Conservationist Architect Ratish Nanda, "The Old Yamuna Bridge is not just a bridge, it is a landmark. It is a very significant structure in Delhi and perhaps in India too." A.G.K. Menon, architect with the School of Planning and Architecture, provides yet another perspective to the issue. "From a technical point of view, the railway bridge can be strengthened to be conserved. In fact, it will be much cheaper than constructing a new bridge. Its biggest advantage is the steel in it. Therefore, careful conservation of this historical structure is a must. England would die to save it." Menon said.

# Raj recall: It's end of the road for Old Yamuna Bridge

By Pankhoori Sinha/TNN

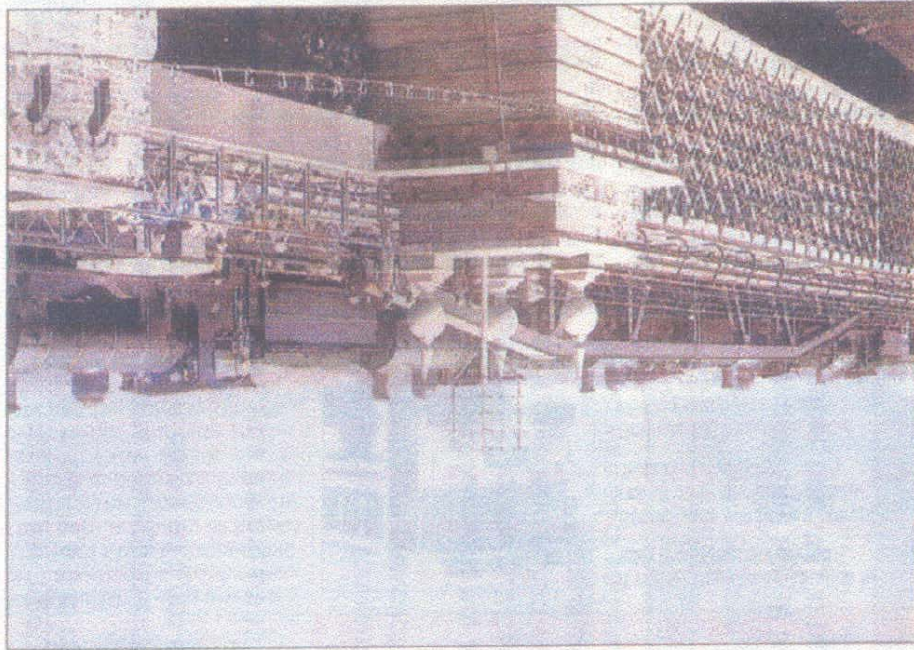
New Delhi: It may not be as grand as Lutyens' Delhi, but the Old Yamuna Bridge is an equally enduring symbol of the Raj. So what if it's past its prime now? The bridge, that once formed the only rail link between the important cities of Delhi and Calcutta during the British times, will soon be decommissioned from railway service by the Northern Railways (NR). "We realised that the bridge had become too old to take so much vehicular load. Therefore, we will be retiring it," said Rajiv Saxena, chief public relations officer of the NR.

A new bridge, running parallel to the Old Yamuna Bridge, is being constructed, which will be ready to carry railway traffic from March 2008 onwards. However, this 139-year-old mammoth steel structure will continue to ferry road traffic from eastern part of the city to central Delhi. Said Saxena: "We do not want to rob the city of a structure with a great heritage value as this bridge. So, there is no question of dismantling the steel structure."

The structure apart, the bridge is deeply rooted in history as well. Not many would know that the bridge, known as Bridge No 249 in railway parlance, was built by the East Indian Railway in 1866. "I don't really know anything about the bridge. For me, it's synonymous with huge traffic jams," said a resident of Shahdara.

Experts beg to differ though. Said conservation architect Ratish Nanda: "The Old Yamuna Bridge is not just a bridge, it is a landmark. It is a very significant industrial structure in Delhi and perhaps in India too. Apart from the eye-catching steel structure, Nanda finds the piers at the two ends of the bridge quite interesting. "The masonry piers at the either end of the bridge have

**BRIDGE ACROSS FOREVER?** The Old Yamuna Bridge, as it looked when it was constructed in 1866. (Below) The bridge, as it looks now, after repeated modifications.



and Architecture, provides yet another perspective to the issue. "From a technical point of view, the railway bridge can be strengthened to be conserved. In fact, it will be much cheaper than A G K Menon, architect with the School of Planning in sandstone. However, the amount of load the bridge is taking needs to be controlled," he said.

Menon said. "Its biggest advantage is the careful conservation of this historical structure is a must. Eng-

# Intuitive Programme

**The viability of the inhabited bridge lies not just in its physical and financial feasibility, but also on the choice of functions which would make it 'come alive'.** One of the objectives of the thesis is to make the bridge self - funding. Therefore suitable functions should be chosen. Two questions need to be answered:

firstly, how will people use this bridge and what kind of experience it might offer to different types of users?

And secondly, given its use can it be viable in terms of costs and returns?

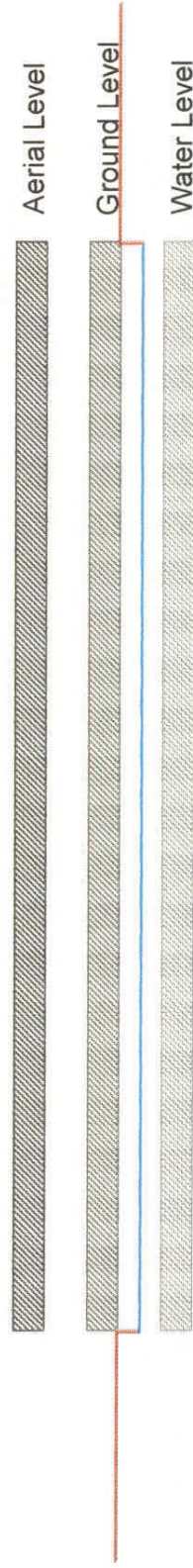
There are a number of limitations of the project, *only* according to which the functions can be chosen:

## LIMITATIONS

Due to vastness of the project, it may not be probable to explore all possibilities or detailing the intricacies to a very large extent, though a sincere effort will be made. Apart from this, the following may hinder the possibilities further:

1. The width of the bridge reduces the choice of functions.
2. The load bearing capacity of the structure for dynamic load is low.
3. The presence of the new railway bridge on the north face reduces the chances of the bridge being open from that face.
4. The social gap on the two banks is great.
5. The historic value of the structure has to be maintained.

This multilevel and multifunctional Bridge (recreational, commercial, cultural, infrastructural, etc.) would not take the load of the built (to be avoided as far as possible), only the dynamic load of LMV and pedestrian traffic.



As the levels suggest different accesses by different types of people, and also such levels have advantages of their own which should be exploited, functions should be placed accordingly.



**Water Level:** (Functions related to water)

Since the bridge spans across Yamuna, which is quite unique to the City of Delhi, functions which can be made to attract more attention towards it are required. Fascinating functions which give the River more prominence on the city map, hence, making it a city level destination. Also, this is in an attempt to make the water accessible and thereby leading the authorities to take steps to clean the river. This can serve as an *Active Recreation* level.

*Under water Activities*

- **Aquarium / Aqua World**
- Over Water Activities*
- **Ghats**
- **Water Sports**
- **Floating plazas**

Here, the western bank showcases the religious ghats, which can be further extended on to the bridge, thereby extending the existing fabric of the city. On the east bank, jetties present a type where water is reached via platforms which reach the river laterally, a type which may be used on the bridge to reach Yamuna.

**Ground Level:** (Functions related to ground)

Most immediate and spontaneous functions, maybe more flexible and changing functions which save it from monotony). This being the access level - therefore attractive functions for passers by such as *Commercial (shops, food plaza, exhibition areas, handicraft bazaar, etc.)* and recreational. These functions could be divided into two types:

- Need based Functions
- Leisure based Functions

**Aerial Levels:** (Functions related to views; ones which do not necessarily need a covering)

*Passive recreation* such as **Open air galleries** and **Parks**, etc.

**Node at Salimgarh Fort (western end):**

Regulating the traffic flow for making the way clearer from Red Fort to the Ghats and the bridge. Open land under the Archaeological survey of India may be used as an asset for a landscaped route to the bridge. Apart from this, new construction may not be required.

**Node at Gandhi Nagar (eastern end):**

East Delhi lacks a cultural hub and has only fragments of open spaces. Street life at the westwrm end terminates in a destination: The red fort. But the street life at the Eastern end needs a similar termination, a destination, in the form of a cultural hub. Studying the existing street life of places like Gandhinagar, etc. shows the relevance of a street as a hub for the people of this area. Thus, **street like cultural and commercial space** such as Dilli Haat can be viable.

**Water reservoir:**

Use the bridge to recharge and maintain the water level of the river. Water treatment plant, which could treat the water regularly such that the water and the residue, both could be used for the functions on the bridge, is needed. Egs. The treated water could be used in the aquariums and and the residue could be used as a manure in the flora walk.

# Concept...

Delhi presents a grandeur of history along with the pomp and pretensions, life outside the drawing rooms pulsating on the streets, with gymkhana club members and rag-pickers all in one place - and this is what is *Dilli*... full of things which we might love or loathe... but the city as an anthology we are all proud of...

## west bank

CONSTANT -  
what it was ... it is



there exists a life which is centuries old ... as if time stopped after a while... with age old medicines and god - all available in one place

## east bank

NEW -  
preceded by almost nothing

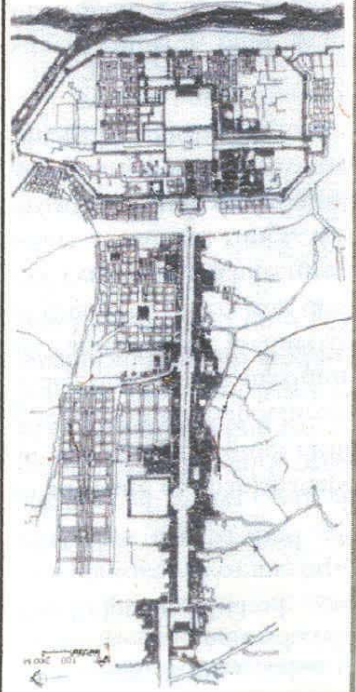
striving to earn a better living...running too fast to realise how long it has been...in search of an **IDENTITY**



**CoNcept...** OLD + NEW = NEWER  
Amalgamation of the old and new coherently.

1. Traditional market street + Contemporary Malls = MULTIPLEX

2. Traditional Indian Forts → Contemporary Fort



STREET

COVERED MARKET STREET



function extending within the 'fort'



# Translation of old into new...

## Transformation

Fort built by Islam Shah on an island over Yamuna

Location for Red Fort chosen next to the existing fort

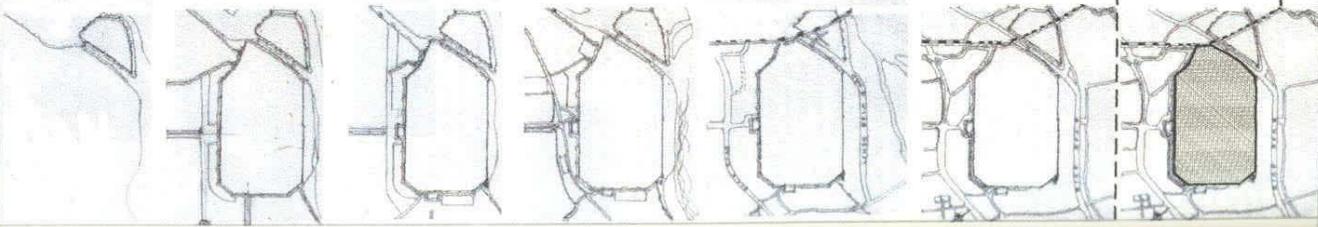
Addition of gates and fort completion

Addition of routes and change of direct access at the Lahori gate

River diverted and converted into Lower Bela Road by the Britishers and the railway line laid cutting right through the Salimgarh Fort

Lower Bela Road converted into the Ring Road

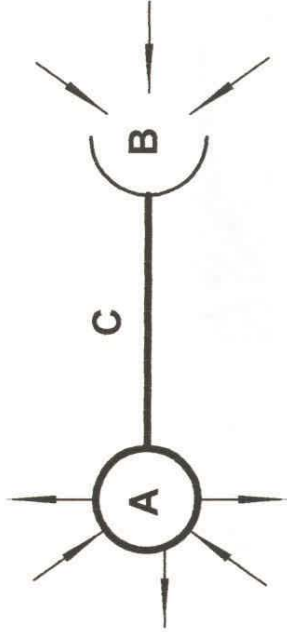
Positioning of a new collector for revitalizing the Salimgarh Fort and using the Railway line to pull the essence out of Old Delhi.



contemporary fort

market street like chandni chowk

- A Salimgarh as the destination
- B East end as a collector of people
- C Bridge as a tool



West and the East meet in the centre

HISTORIC CONTEMPORARY



mirror

where the old and the new meet after a gradual transition

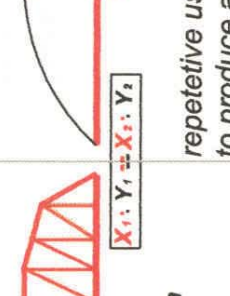
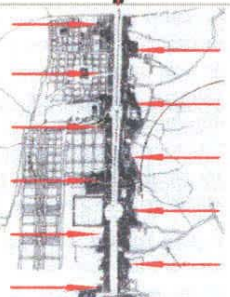
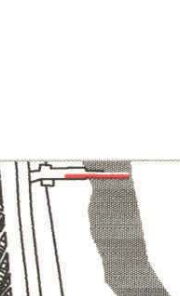




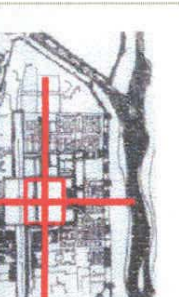

CULTURAL COMMERCIAL

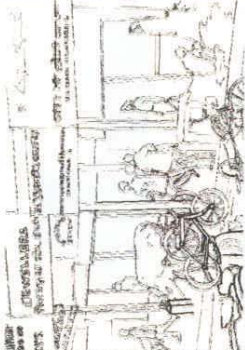

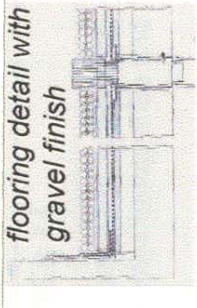


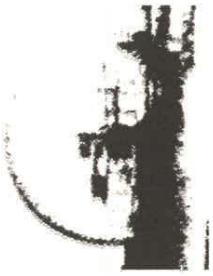
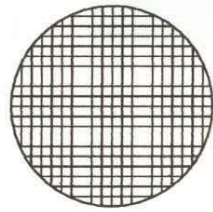

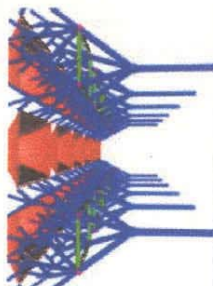


DENSE RESIDENTIAL

Broad landuse on either side to merge on the bridge as an extension of the image

- in terms of urban fabric
- in terms of the activity patterns

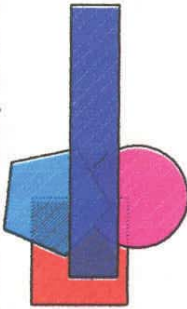
ELEMENT	OLD	ELEMENT	TRANSL.
<b>FORM</b> <b>- street form</b>	 <ol style="list-style-type: none"> <li>spaces in the form of nodes</li> <li>movement toward the street from the neighbourhood</li> </ol>	<b>- bridge form</b>	 <ol style="list-style-type: none"> <li>spaces in the form of nodes</li> <li>movement from the street towards the river</li> </ol>
<b>- fort form</b>	 <ol style="list-style-type: none"> <li>typical street section with residential on top accessed from the back lane and shop on ground accessed from the main street</li> </ol>	<b>- context of river response</b>	 <ol style="list-style-type: none"> <li>city (public) side and service (private) side</li> </ol>
<b>OLD</b>	 <p>63m: 9m</p>  <ol style="list-style-type: none"> <li>jetties on the west bank cut the river across</li> </ol>  <ol style="list-style-type: none"> <li>ghats on the east bank interact with the river</li> </ol>	<b>TRANSL.</b>	 <p>repetitive use of this arch to produce a harmony with the existing structure</p>  <ol style="list-style-type: none"> <li>lateral movement towards the river</li> <li>projections on water</li> </ol>

ELEMENT	OLD	TRANSL.	ELEMENT	OLD	TRANSL.
<b>FUNCTION</b> <b>- street functions</b>	<ol style="list-style-type: none"> <li>1. market</li> <li>2. recreation</li> <li>3. open space recourse</li> </ol> 	<ol style="list-style-type: none"> <li>1. market</li> <li>2. recreation</li> <li>3. open space recourse</li> </ol> 	<b>VALUES</b> <b>-sense of touch</b>	TEXTURE of a stone	flooring detail with gravel finish 
<b>- fort functions</b>	<ol style="list-style-type: none"> <li>1. security</li> <li>2. symbol of authority and power</li> </ol>  	<ol style="list-style-type: none"> <li>1. shelter from climate</li> <li>2. importance of public realm and freedom</li> </ol>  	<b>-sense of smell</b>  <b>-sense of taste</b>  <b>-sense to see</b>  <b>-sense of hear</b>	FRAGRANCE of a flower  DELICACIES in food  COLOUR of clothes  MUSIC of a fountain	flora walk  food courts and local cuisine plazas  spice bazaar, aquariums (colours of fishes, etc.)  river itself
<b>- bridge functions</b>	rail road bridge used maximum by Paratransit system 	recreational spaces for pedestrians : both during transit and as destination 			

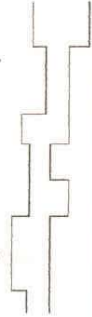
# Architectural Interpretation... 1

## Traditional market street

● **Symbiotic functions:** Residential complements the commercial and vice versa by keeping the street busy at all times of the day.



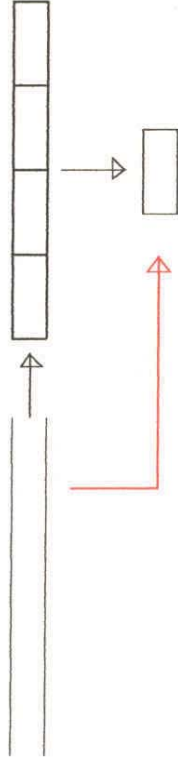
● **Interaction spaces:** Small human scaled spaces are used for different spontaneous activities which make the street vibrant and fresh. These also break the monotony of the linear space.



## Contemporary Mall

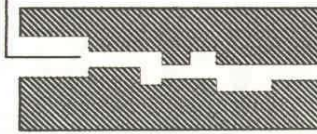
● **For the new way of life:** Malls 'represent' progress in terms of global standards and have introduced a new structuring of life and culture.

● **Space utilisation:** Layered blocks reduce the ground coverage and the street typology is reduced to a box typology.



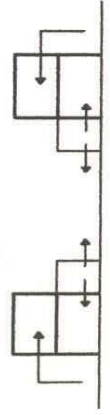
## Traditional Streets

nodes and niches between buildings act as open space recourse



semi covered verandahs activate the market street on one side and the residential accesses on the other side

residential areas increase the viability of commercial activity and their inter relation forms a close workspace - living space relationship

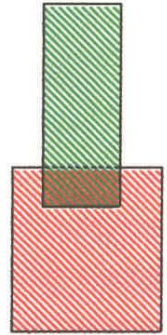


## Malls



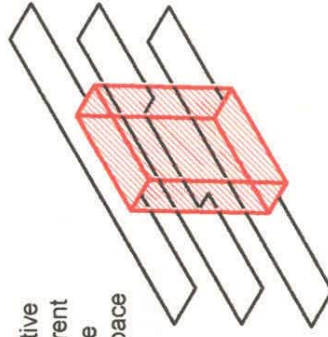
central atrium as the open public space

a commercial complex incorporating recreational activities such as food and theatre

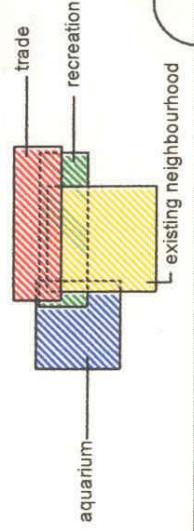


## Multiplex

smaller interactive spaces at different levels with large open central space



functions interrelated to each other to produce a symbiotic relationship such as : institutional function makes reco- commercial more usable and reco commercial is closely related to residential



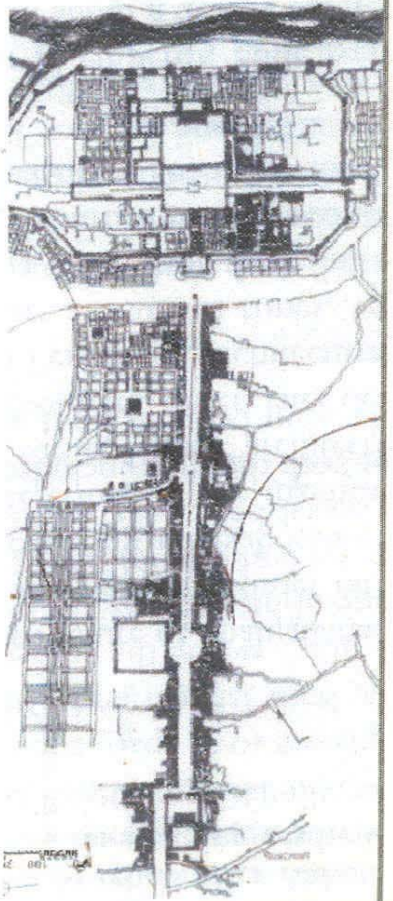
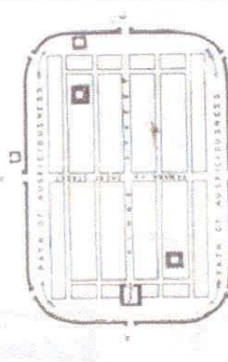
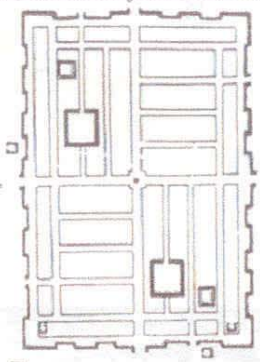
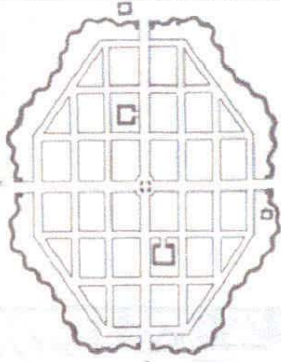
FORM

FUNCTION

# Architectural Interpretation . . . 2

## Common characteristics of Traditional Indian Forts

- Symbol of **Authority**
- Strong wall or moat for **security** spanned by a drawbridge
- Importance of **Gateways**
- **Market street** before entry because viability of commercial activity
- Pleasure **gardens** and **water bodies**
- Distinction in the **public** and **private** domain
- **Tower of Victory** as a symbol of achievement
- **Site planning**: Two major axial roads aligned with four cardinal points, parallel subsidiary roads dividing the rest into wards, a continuous path around as a ceremonial path, centre for the Gods and north for the King.
- **Pavillions** : Usually multi storied with upper levels containing living quarters, often arranged in apartments walled only with lattices and jalis.



## Contemporary Fort

In a contemporary scenario, most of the traditional functions have been replaced by new, thereby the expression of certain building parts has to be redefined.

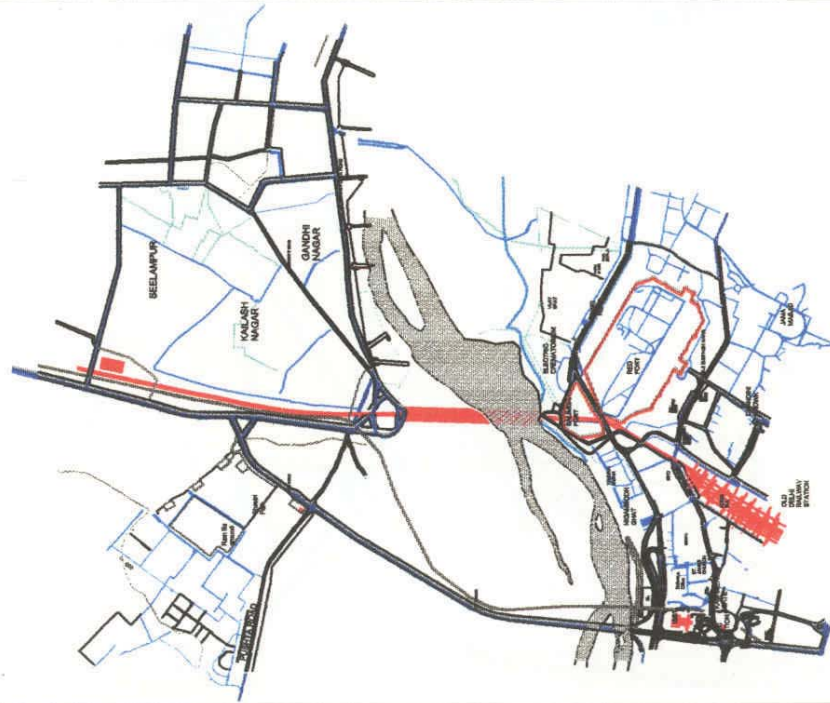
- Authority of a single force has been replaced by that of the **public realm**
- Security is needed against the natural forces like sun, wind, rain, climate, etc. : **SHELTER**
- Gateways important to mark the entry into a **civic space**
- Market street before entry as an **activity generator**
- **Public Parks** more for need than leisure
- Symbols of Freedom and Identity
- Site planning according to the climatic conditions, topography, context and functional requirements.
- Structures :
  - Providing shelter
  - Providing work spaces
  - As a symbol of Contemporary and comfortable life

## Architectural Interpretation for Translation

- |  |                                  |  |
|--|----------------------------------|--|
| 1. Symbol of <b>Authority</b>                      | 1. Public realm                  | Community functions                                  |
| 2. <b>Security</b>                                 | 2. <b>Shelter</b>                | Climatic protection                                  |
| 3. <b>Gateways</b>                                 | 3. <b>Civic space</b>            | Public infrastructure                                |
| 4. <b>Market street</b>                            | 4. <b>Market street</b>          | BRIDGE   |
| 5. Pleasure <b>gardens</b> and <b>water bodies</b> | 5. Public parks                  | Accessible open spaces                               |
| 6. Symbol of <b>power</b>                          | 6. Symbol of <b>independence</b> | Buildings independent of the structure on top        |
| 7. <b>Axial planning</b>                           | 7. <b>Contextual planning</b>    | Social Response to the immediate west and east banks |



# Zonal Analysis: movement



City Level	Neighbourhood Level
Primary Vehicular Road	—
Secondary Vehicular Road	Primary Vehicular Road
Tertiary Vehicular Road	Secondary Vehicular/ Pedestrian Road
Node	

## Accessibility

Considering the fact that it is physically very close to the Red Fort, its accessibility is quite poor on the west bank. Its legibility is low due to :

- High walls of Salimgarh fort
- Lack of destinations on or near it.

On the east bank, it is very well connected to the Pushta Road. Hence, most of the traffic of this side which is LMV uses this bridge to traverse across.

Due to this reason, people on the east are more aware of the presence of this structure than the people on the west bank.

**West** 25%      **East** 85%

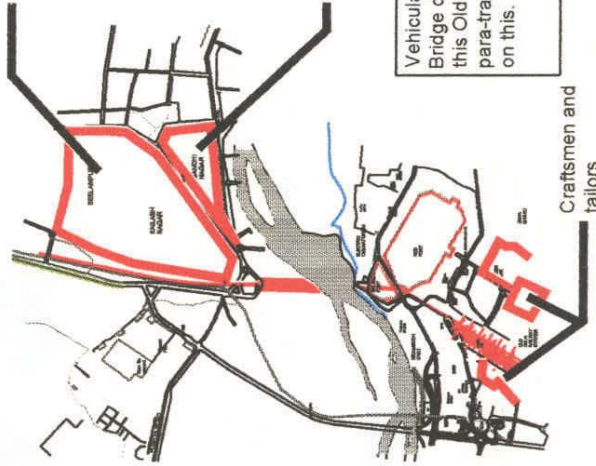
Hence, making the west bank more accessible is a priority, while on the east bank good accessibility should be exploited by giving more accesses on that side.

## Modes of Transportation

The economic and social status of people on either side of the bank and the working population profile dictate the various modes of transportation.

Small scale industries producing ready made goods such as cloth, dyes, lubricants, etc.

Whole sale cloth market



Vehicular Traffic uses mainly the ISBT Bridge due to low speed conditions on this Old Yamuna bridge. Though the para-transport makes the major load on this.

Readymade cloth batch made on the East Bank

Shop owners and industrial workers generally travel by **two wheelers, or on foot.**

Small Trucks, Rikshaws Tailored on the West Bank

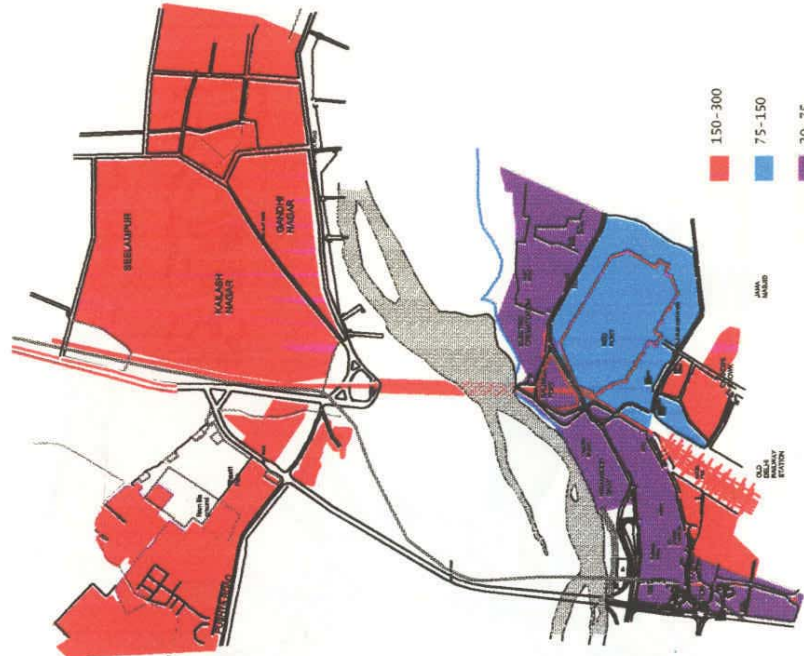
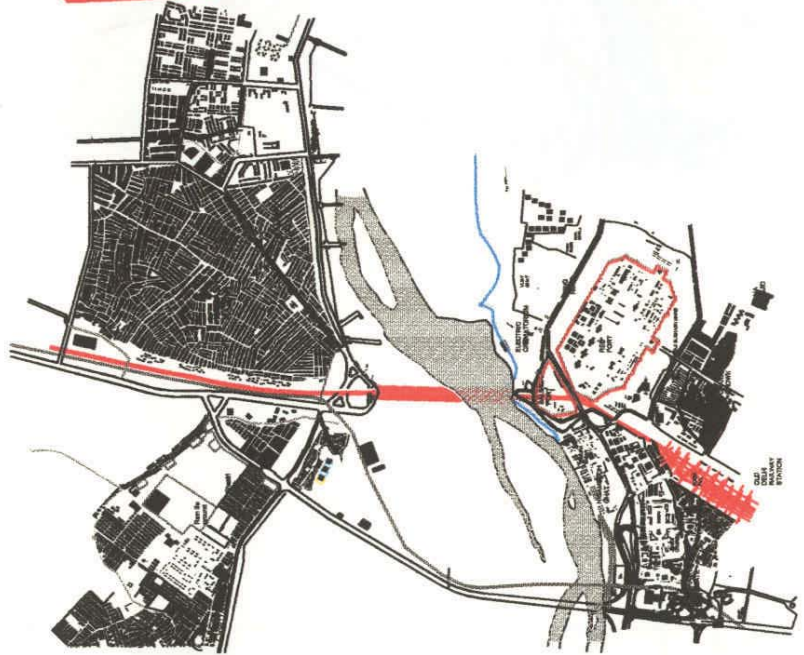
Rikshaws/ Carts Sold on the East bank at the cloth market.

- 2-Wheelers
- 3-Wheelers
- 4-Wheelers
- Trucks
- Small Buses
- Cycle Rikshaws
- Bicycles
- Cattle Carts
- Carts
- Metro
- Train

People coming or going to the railway station located on the West bank generally traverse by **3-wheelers or 4-wheelers**. But coming up of the **metro station**, which connects directly the New and the Old Delhi Railway Stations, has highly reduced their numbers, which in a course of time is expected to reduce even further with increasing awareness and acceptance of this mode.

Craftsmen and tailors

# Zonal Analysis: built fabric



## Building Heights

The immediate context of Shahjahanabad is a special zone for the Delhi master plan, whereby, no alterations are allowed on the built volume. The existing buildings are generally more than a 100 years of age, which follow a certain building typology. **The colonnades in front of the buildings increase the effective width of the street and promote the street character.**



## Figure Ground

**BROAD CLASSIFICATION OF FIGURE-GROUND ALONG YAMUNA RIVER FRONT:**

1. CONSOLIDATED BIG SIZED POINT BLOCKS : primarily along west bank
2. DISAGGREGATED BUILT TYPE : primarily along east bank

Building block, a result of pattern of streets and squares. Hence, a priority is given to open spaces over built, which intertwine shapes the latter. **Has a potential of small but interactive spaces.**

Built is decided according to the plot division and the collection of such built up areas leaves small scope for open spaces to come up. Hence, there is a lack of large open spaces on the east bank. Though, such a fabric makes streets the important open spaces which in turn characterise the public realm.

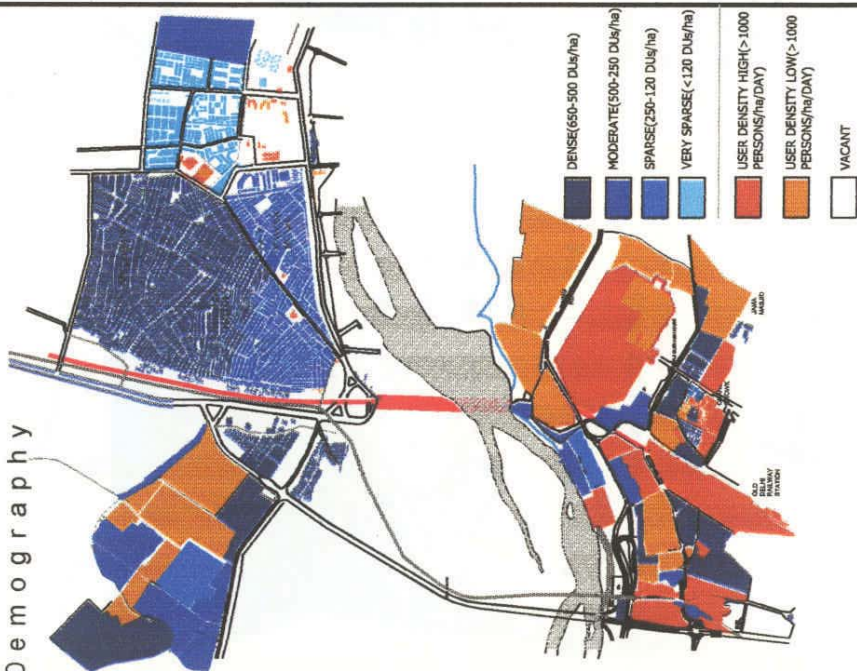
## Floor Area Ratios

Though the building heights on both the banks are about the same, it is due to the building footprints and the proportion of built and open, that the FAR on the east bank is much higher than that on the west bank. Also, due to the presence of large landscaped samadhis on the west bank, the total built up on the west is very low.

**This gives an idea of the achievable FAR of the land for which it is not decided by the authorities.**

# Zonal Analysis: people

## Demography



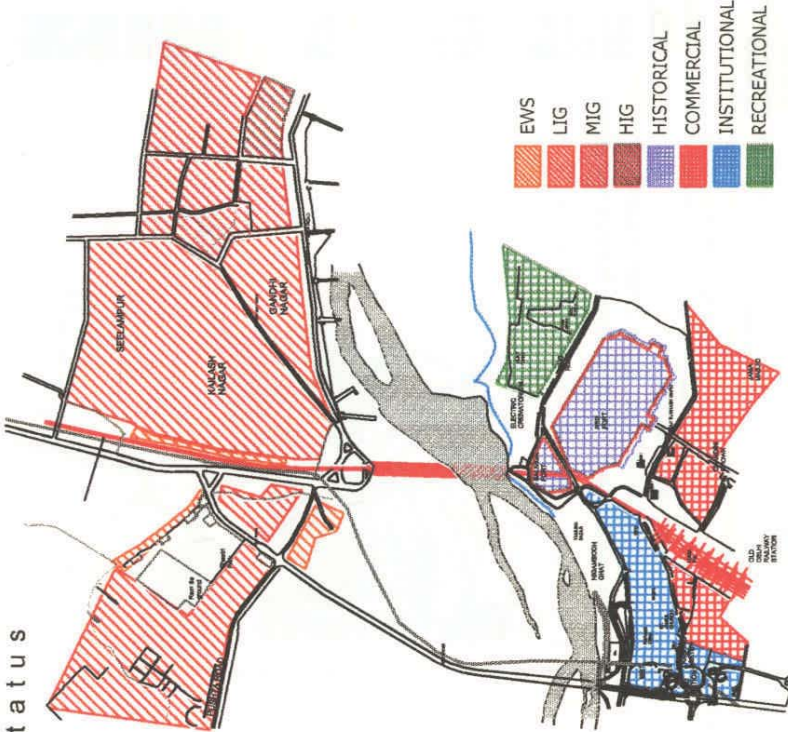
- lack of recreational spaces on the east bank
- under-utilised large recreational spaces (passive)
- high floating population due to **transit** and not **destination**
- movement generated is away from the river which should be directed towards it.
- under utilised flood plains disconnect from the river, therefore illmaintained

INTRODUCTION OF COMMERCIAL AND RECREATIONAL FUNCTIONS ON THE FLOOD PLAINS

MOVEMENT TOWARDS THE WEST BANK TO BE GENERATED WHERE THERE IS AN AVAILABILITY OF LARGE OPEN SPACES

INTRODUCTION OF EMPLOYMENT/ COMMERCIAL TOWARDS THE FLOOD PLAIN TO ENHANCE MOVEMENT

## Socio Economic Status

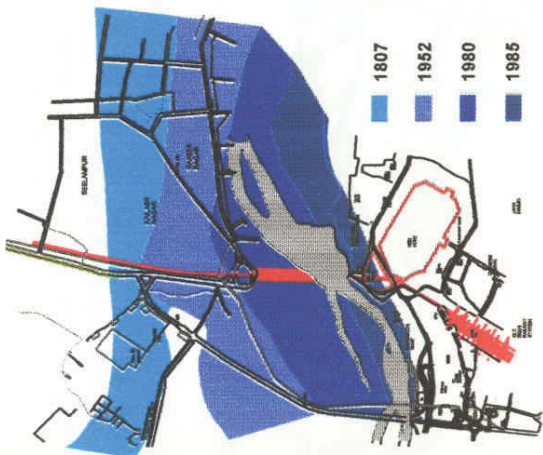


THE CHARACTER OF THE AREA GIVES IT THE POTENTIAL TO ACT AS A BINDING ELEMENT FOR PEOPLE OF ALL TYPES ALL OVER THE CITY.

- The river acts as a **major divide** between the rural immigrant population and the natives of the city, this needs to be diluted at city level scale.
  - **The character of the area gives it the potential to act as a binding element for people of all types all over the city.**
  - Immigrants from rural areas around Delhi settled on the then outskirts of the city, living in unhygienic, highly dense and congested fabric lacking basic infrastructure.
  - A function which would increase the land value by improving the infrastructure of the place. This may lead to resettlement of these people away from the bank replaced by a planned development. Egs. A Hotel/ Mall
  - Majority commercialised area with people mainly engaged in small scale industries and trading.
  - The reason for a major traffic of Rikshaws carrying raw materials and ready goods.
  - **Though dilution of such a socio-economic divide is not possible, activation of flood plain on both sides by placing functions dictated by the corresponding requirements.**
- THE CHARACTER OF THE STREETS ON EITHER SIDE OF THE RIVER INCREASES THE POSSIBILITY OF A STREET TYPE TO BECOME LOCALLY SUSTAINABLE.



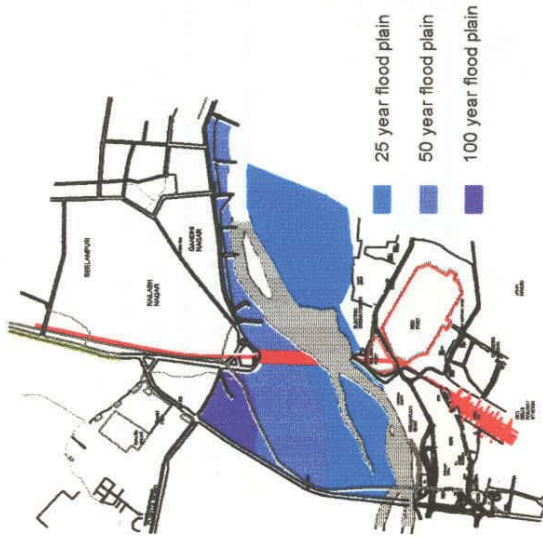
# Zonal Analysis: ecology



## Migration of River Yamuna

(Source : Geological Survey of India)

To get clues for the future shifting and therefore get help in Zoning.



## Flood Frequency

(Source : Delhi Development Authority)

**25 year** : active recharge areas; seasonal activities promoted with temporary structures; no built or impermeable paving.

**50 year** : paved @30%grd cov.; small scale built structures.

**100 year** : built propagated @60% grd cov.; 30% left for recharge;

Beyond embankment: built propagated as land is reclaimed

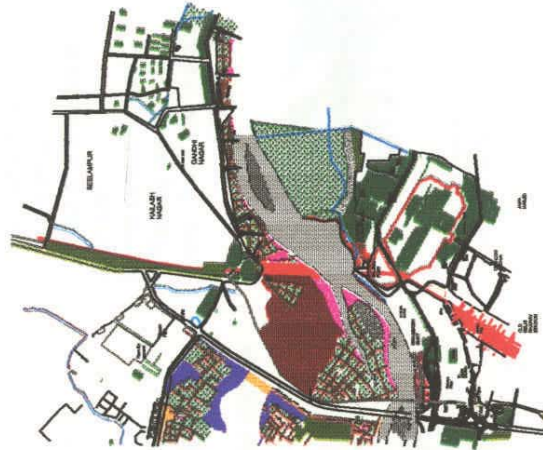
- 199.5-200
- 200-200.5
- 200.5-201
- 201-201.5
- 202-202.5
- 202.5-203
- 203.-203.5
- 203.5-204
- 205-205.5
- 205.5-206
- 210-210.5

## Ground Levels

(Source : Irrigation and Flood Department)

**Lowlying areas** : exclusion recommended ; **potential for recharge or water retention**.

**Elevated areas** : recommended for human activity with **visual resources; vantage points**.



## Landscape Elements

While there are abundant open greens available on the west bank, east bank suffers from fragmented open spaces.

- SSNL WATER
- DRAIN
- LAWNS
- AUTHI.PARKS
- TREES
- SHRUBS
- HYACINTH
- LANDFORM
- DEBRIS
- BARREN LAND
- BIO-DEG. WASTE
- PLASTIC WASTE
- AGRICULTURAL
- NURSERY
- REEDS
- NATURAL VEG.
- MUDFLAT
- FIELD DIV.

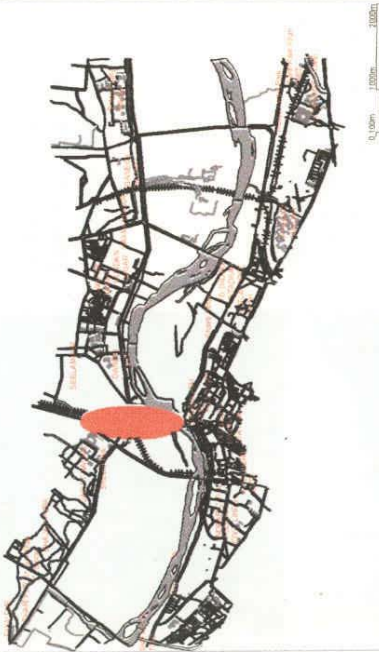
## High Flood Levels in Different Years

Date	Feet	Meters
15.10.56	677.3	206.44
10.08.71	676.8	206.34
23.09.76	677.5	206.55
06.09.78	681.25	207.45
27.09.88	678.70	206.88
08.09.95	678.86	206.97
05.08.97	675.43	205.88
21.10.98	676.41	206.18
21.07.00	674.51	205.60
17.07.01	672.93	205.12
16.09.02	672.99	205.14

# Site Analysis

## 1. Location

**Old Yamuna Bridge** connecting the Salim Garh fort and Yamuna Bazaar on the West with the Seelampur - Gandhinagar Area on the East.  
**Latitude:** 28°5'  
**Longitude:** 77°12' North of Tropic of Cancer



## 4. Topography

### Sub-soil Rock Grading



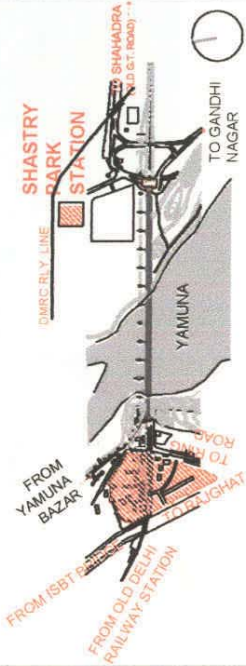
### Soil Bearing Capacity

The strata are mainly fine alluvial and sand silt quartzilites. The rock is mainly quartzite and relatively higher on the western bank and very deep in the middle eastern bank.  
 1. SBC varies from 9.0t/sqm upstream to 0.4t/sqm.  
 2. Loose and swampy soil during high discharge is subjected to differentiated settlement.

## 2. Site and The City

The site is located adjacent to places of city level importance :

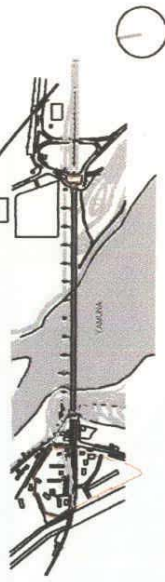
- River Yamuna** : Unique to the city
- Salimgarh Fort** : Carries layers of history
- Landscaped Memorial Ghats** : Provide ample open space on the West bank
- Shastri Park Metro station and yard** : Makes the site highly accessible.



## 3. Site Statistics

### Area Breakup

- Track tow wall (west) : 1630sq.m.
  - Bridge : 12457 x 2sq.m.
  - Intersection Island : 2000sq.m.
  - Railway land : 16550sq.m.
- incl. Track tow wall (east) \_\_\_\_\_  
**TOTAL** : 45094sq.m.  
**4.5 HA**



### Area policies and bye-laws

- Any area within 100m of Protected Monument => No change in built volume.
- Construction not allowed on either side of a High Tension line.
- FAR**
- Ground Coverage**
- Max. Ht.**

## 5. Site Section



## 6. Climatic Conditions

### Composite Climate

- Hot dry** : April to June  
**Warm Humid** : June to September  
**Cool Dry** : November to March

### Temperatures

- Summers **Max. : 40.4° C**  
 Min. : 26.0° C  
 Winters **Max. : 22.0° C**  
 Min. : 02.3° C

### Precipitation

- Maximum precipitation** from S-W Monsoon  
**Wet months** : July, August, September  
**Total Av. annual rainfall** : 635mm

### Humidity

- High **80%** during August  
 Low **68%** during January

### Monsoon Wind Movement

- North, North-West To South and South-east  
 Westerly winds in the mornings

### River Conditions

- Peak Flow** : August  
**Lean Flow** : July  
**Direction** : North to South  
**Surface Water Turbulance** : Steady

**7. Site Surroundings**



Old Tow wall Constructed by Britishers

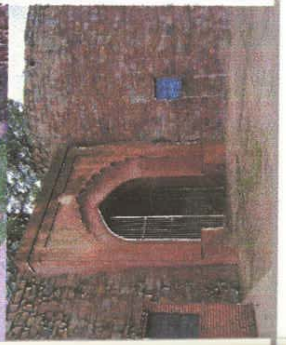
Shastri Park Metro Station as seen from the Bridge itself



View of the Old Yamuna Bridge with the New Bridge towards its north



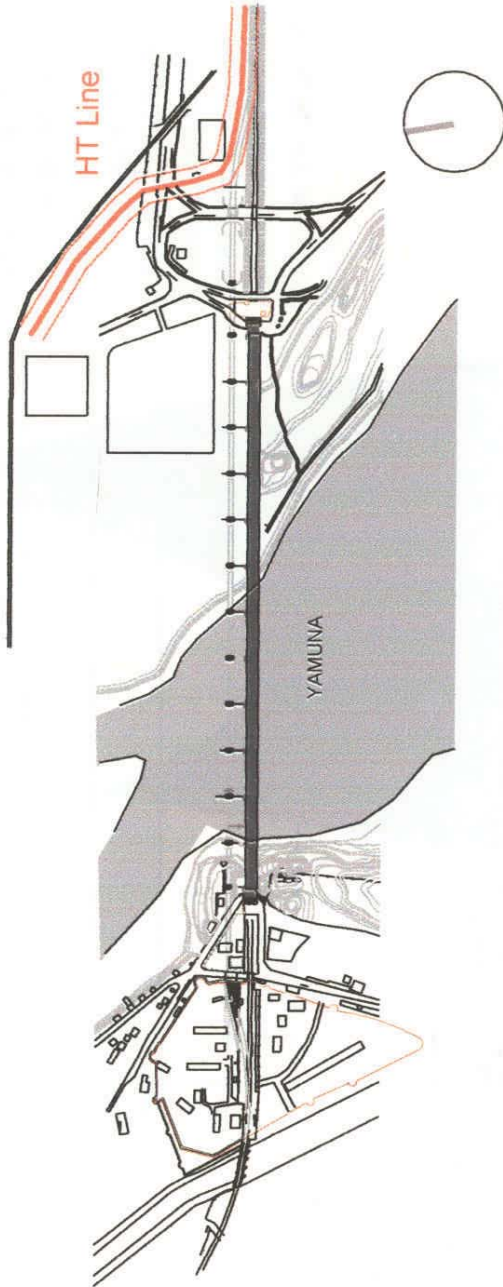
Pump House (1908- still functions)



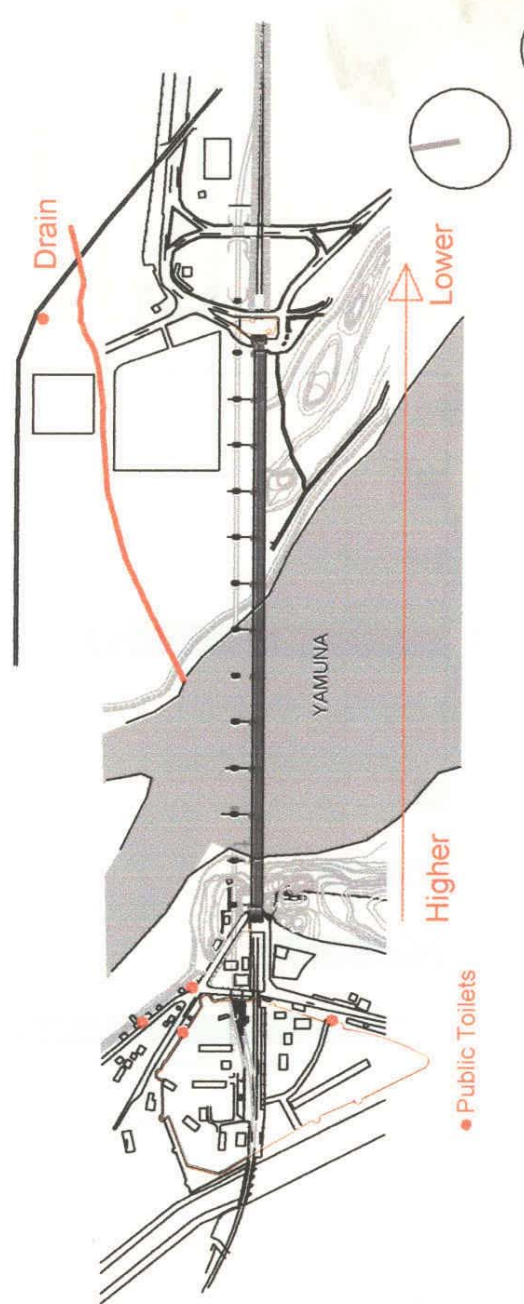
Salimgarh Fort

**8. Services**

Electrical Lines



Sewage Disposal and Drainage



### 9. Traffic Closure Days in the past

DAYS	LEVEL
06.09.95 TO 12.09.95	205.83
04.08.97 TO 07.08.97	205.10
19.10.98 TO 22.10.98	205.13
19.07.00 TO 22.07.00	205.15
16.07.01 TO 17.07.01	205.10
15.09.02 TO 16.09.02	204.86

### 11. Structural Analysis

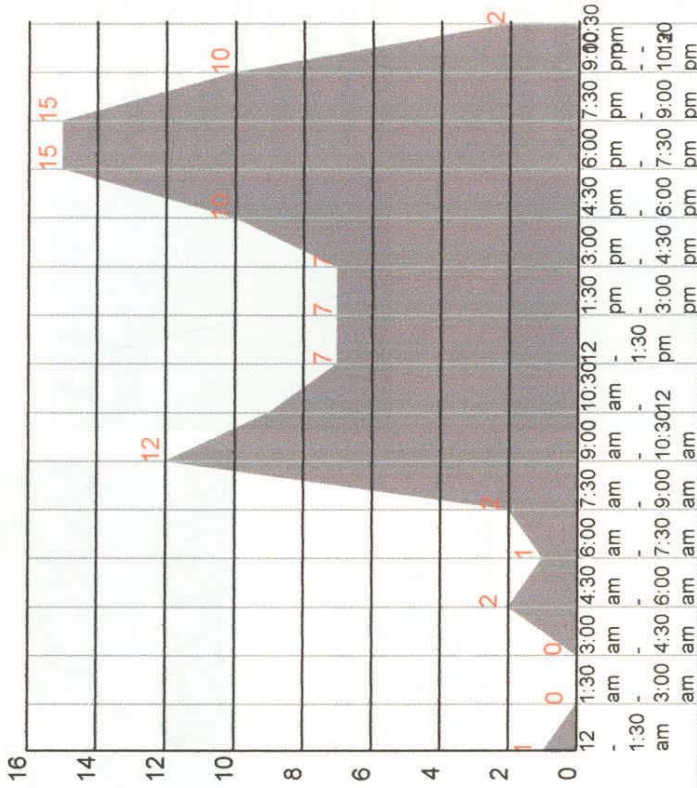
Salient Features	
Vital Levels	Metres
Rail Level	214.3
Top of Pier Level	206.4
Bottom of Girders	207.45
Danger Level	204.83
Highest Flood Level	202
Lowest Flood Level	195.5
Bottom Levels of Piers	
Pier No.	Metres
No. EA	192.17
No. 1	190.25
No. 2	190.47
No. 3	192.3
No. 4	192.38
No. 5	188.95
No. 6	187.65
No. 7	187.73
No. 8	187.96
No. 9	188.19
No. 10	195.5
No. 11	196.19
No. WA	204.36

**Total length of 2640'.**  
 12 spans of 202.5' each and two end spans of 34.6' each, downline girders of 12 spans of 202' with two end spans of 42'. The roadway over the bridge is 14'6" wide on the up line and 15' on the down line.

The load that the roadway is capable of taking is **B.S. 1X12 units.**

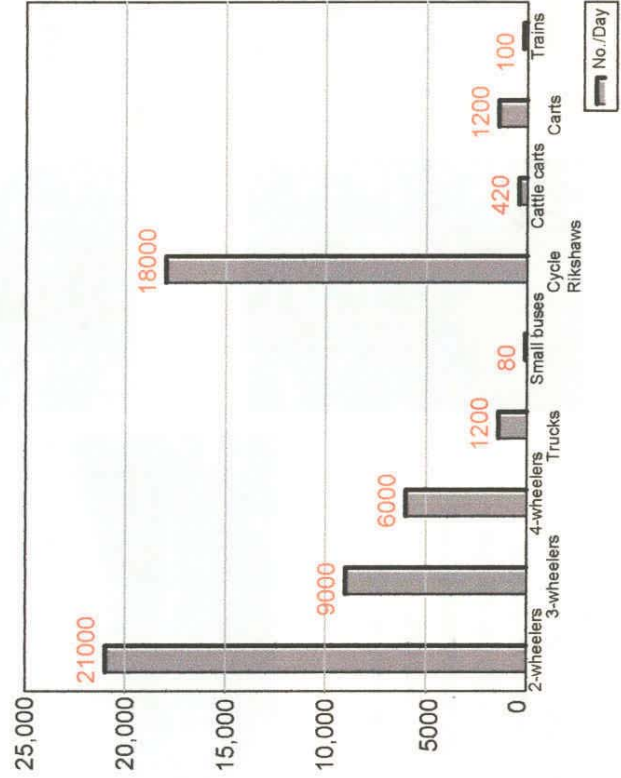
Initially pier no. 6 and 7 were considered to be critical as they were founded on sand, but a change in the direction of flow, now the main flow of Yamuna river is between span no. 10 and 11 and there is considerable attack of water on pier no. 10 and also the scour between the piers no. 9 and 10 goes below the bottom of pier no. 10 and in heavy floods, it goes upto the rock level also. Protection around pier no. 10 should be given special attention and be made good before the flood season.

### 10. Traffic volume analysis



Graph shows the peak **Traffic hours of a day** which range from 9:00a.m. to 10:30a.m. in the morning and from 5:30p.m. to 9:30p.m. The speed ranges from 20km/hr at a normal traffic time and about 5km/hr at the peak traffic times. **Reduction or removal of traffic is thus required to achieve either speed of the vehicles still left on the bridge or a safer track for pedestrians.**

█ %



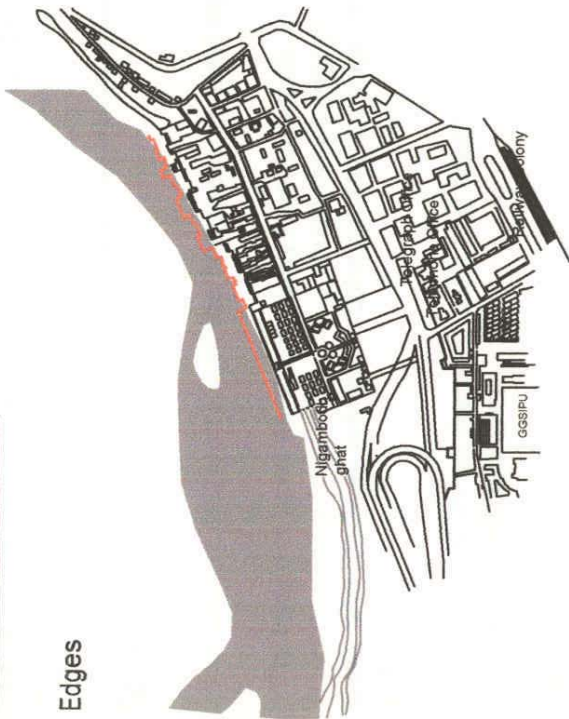
Graph shows the **Classified Traffic Volume Count.** It explains that the bridge is predominantly used by two wheelers and rikshaws, apart from the railways which passes by in every 15 mins.

**Maximum dynamic load on it is due to Rikshaws carrying heavy goods, and the train on the upper level, removing which can lead to the increase of the life span of the bridge.**

█ No./Day

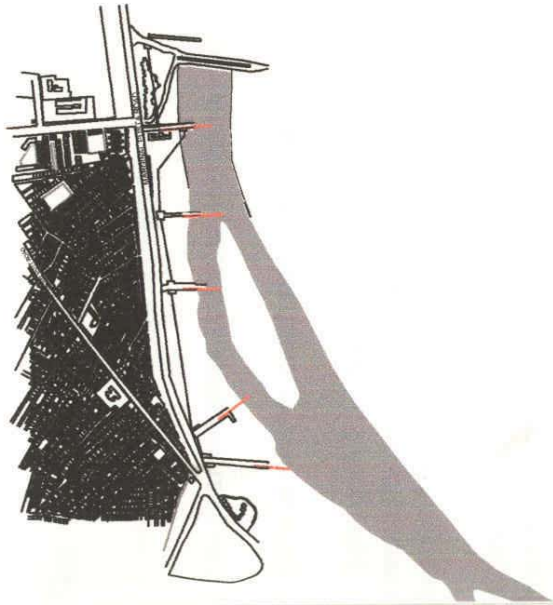
## 10. Response to the River

### Edges



### West Bank

Ghats extend onto the river, but as they are privately owned, they are redundant for public access. Primarily, religious ghats



### East Bank

Jetties are used for car parks, and act like recreational spaces for the locals. Though, once the pushta road is widened, the pedestrian access to them might reduce.



### Functions



Banks are used for washing 'kafans' to be used at Nigamboodh Ghat. They provide livelihood to washers, who have apparently started living on the bank itself.



Coin divers generate a livelihood by collecting coins thrown into the river. Fishing on the east bank is quite prevalent.



Bridge a shelter and pier a bed.



A diving board for the locals during monsoons.



# Inferences of Zonal and Site Analysis

## Challenges

### Zonal

1. **Accessibility** and **legibility** of the bridge on the west bank is poor
2. The bridge is used as a secondary level Vehicular route, **used predominantly by para transport**. Though new bridges to accommodate railway and roadway are under construction, no such importance is given to LMVs.
3. 25 yr flood plain on the west bank and predominantly a 50yr flood plain on the east bank, reduces **scope of buildability**.
4. People on either side of the river are Socio-economically very different. Dilution of such a **socio-economic divide** is possible by activation of both sides by placing functions dictated by the corresponding requirements, activities by which people from both sides interact.

### Site

1. **Linearity** of the bridge is overpowering
2. 140 year old steel structure, therefore **load bearing capacity** is low.
3. **River** is neither clean nor directly accessible
4. Salimgarh Fort being a **protected monument** restricts permanent construction within the radius of 100m. Unrecognised importance of Salimgarh Fort by general public
5. City face of the bridge is Toward the **cardinal South**, therefore gets direct sun throughout the day.
6. The **character of lightness** to be retained even when functions are incorporated on to the bridge.

## Opportunities

### Zonal

1. **Accessibility** of the bridge on the East bank is better
2. East bank has an **available flood plain** a part of which can be reclaimed
3. **Way of life** on both sides suggests the viability of recreation on streets

### Site

1. With the removal of rail track and dynamic loads of vehicular traffic, **the capacity of dead load** that the bridge can take increases considerably
2. **River is** still a **unique** feature for the city
3. **Salimgarh Fort** stands for layers of history and provides a number of clues for the site development.
4. Proximity of **Shastri Park metro station** makes the site easily accessible for the rest of the city.

# Programme Generation

## West Bank

Clue Generators / Functions	History	Culture	Topography	Built form	Function	TOTAL	PRIORITY
Housing / Residential		●			●	0	VI
Transportation	●	●	●	●	●	6	II
Institutional		●			●	4	III
Cultural	●	●	●	●	●	6	II
Recreational	●	●	●	●	●	8	I
Public Facility		●			●	4	III
Commercial	●	●			●	3	IV
Religious	●	●	●	●	●	1	V

●	EXISTING	1
●	NEED (IN CASE OF LACK)	2
●	NEGATIVE (IN CASE OF EXCESS PRESENCE)	-1

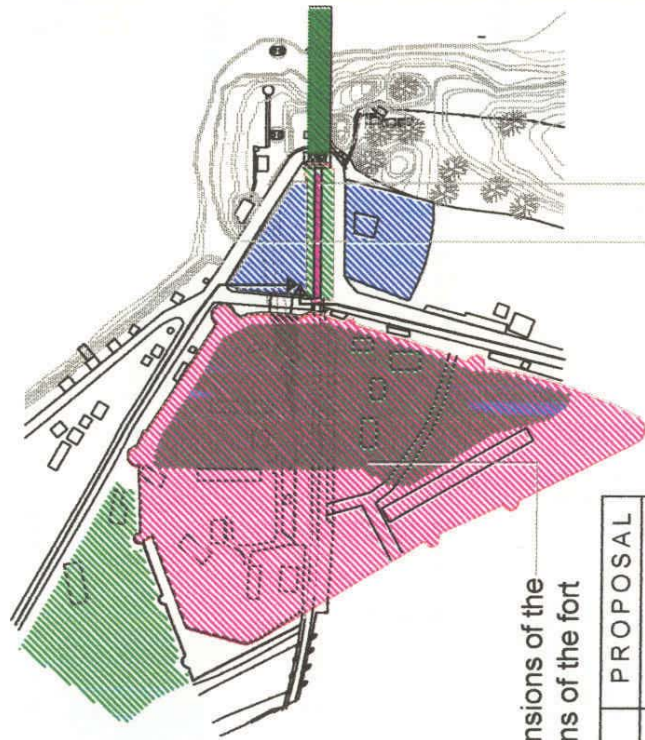
## East Bank

Clue Generators / Functions	History	Culture	Topography	Built form	Function	TOTAL	PRIORITY
Housing / Residential	●	●	●	●	●	-1	VI
Transportation	●	●	●	●	●	5	III
Institutional		●	●		●	5	III
Cultural	●	●			●	6	II
Recreational		●	●	●	●	8	I
Public Facility	●	●		●	●	6	II
Commercial	●	●	●	●	●	5	III
Religious		●	●			3	V



# Design Strategies

## I Strategy for A : Salimgarh Fort



● Function : Extensions of the existing functions of the fort

EXISTING	PROPOSAL
- a morning walkers park	- jogging tracks
- Swatantrata Sainani Sangrahalaya	- preserves and displays

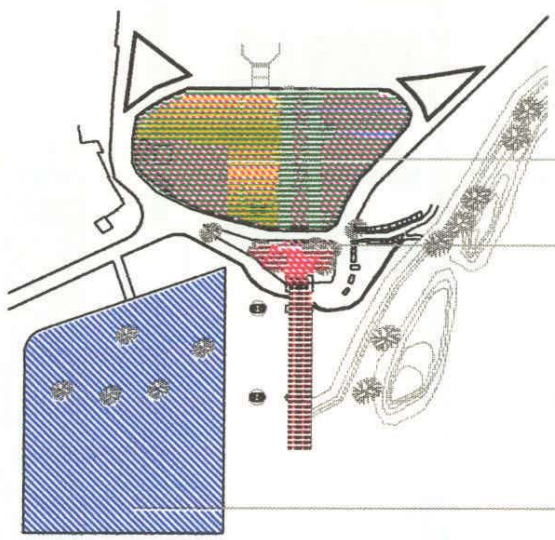
● Movement and access :

- Parking spaces
- Multiple/ Legible accesses

● Building Form : As per the laws for an ASI protected monument only **temporary structures** can be built inside the fort and within a radius of 100m from the monument.

## II Strategy for B : East End Node

Situated at the junction of the major roads (Arterial and collectors)



● Function : A

Contemporary Fort  
Open recreational Space to serve the East bank residential areas.

● Movement and Access :  
Parking made available at suitable walking distances.

● Development of the surrounding area to make it a part of everyday life (Fruit and Vegetable Market, public facilities, etc.)



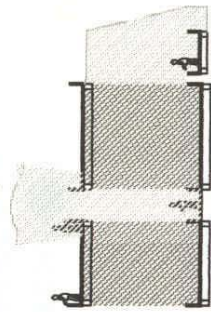


# III Strategy for C : The Bridge

## a) Open Space Strategy

Tools :

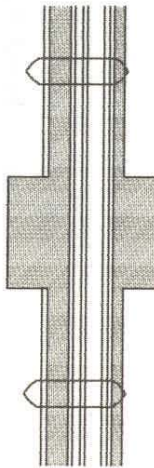
Covered/Semi-covered/ open



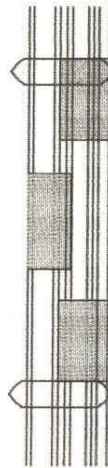
Floor Space



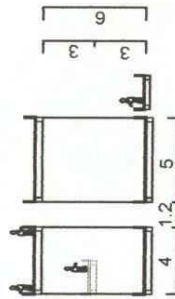
combining tracks by removing railings and introducing a false floor



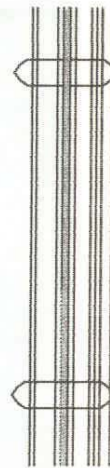
cantilevered platforms to decrease monotony of linearity



breaking the linear form into square like spaces - psychologically look bigger

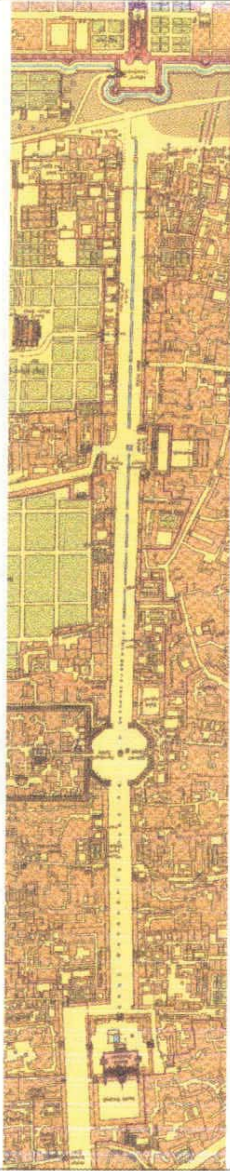


carving in the existing volume to get more floor area



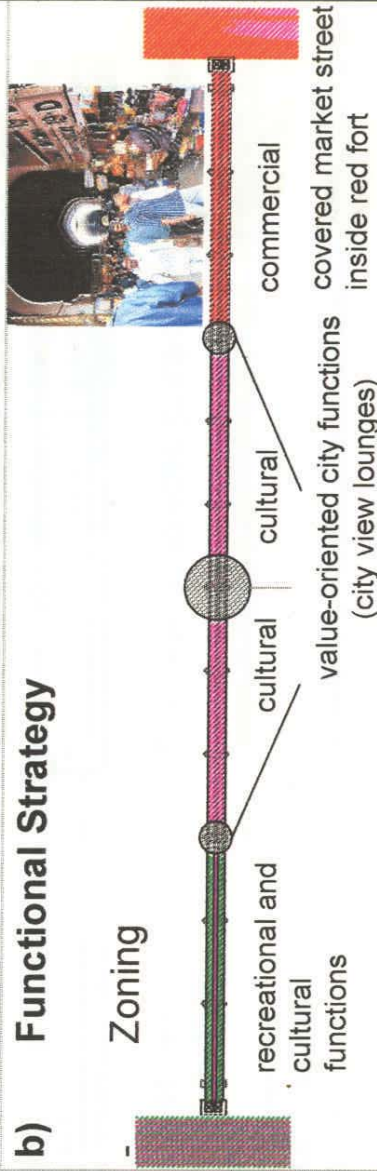
utilising the 1.3 m wide gap between the two tracks as circulation

Street node relationships



## b) Functional Strategy

Zoning



Strategy for Destitutes

- i) Re-Use of old Railway Coaches
- ii) Space Resource ( Day=> Hawkers  
Night=> Shelters for the homeless)

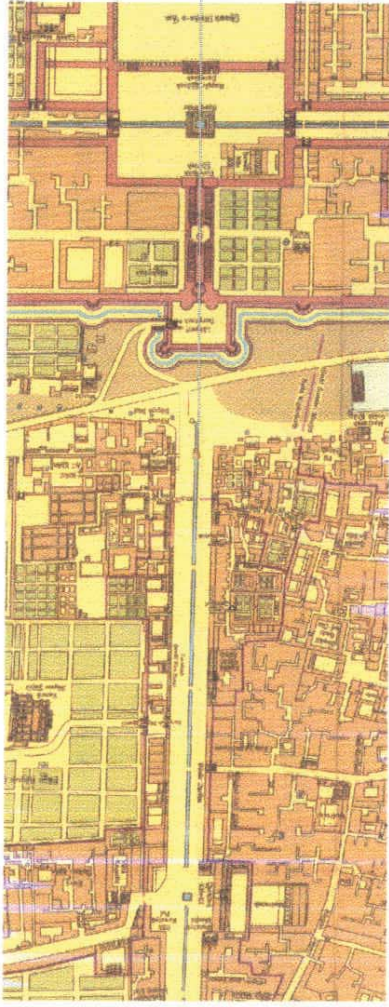
Self Funding Strategy

- i) Commercially viable functions to generate for civil functions
- ii) Water Recharge



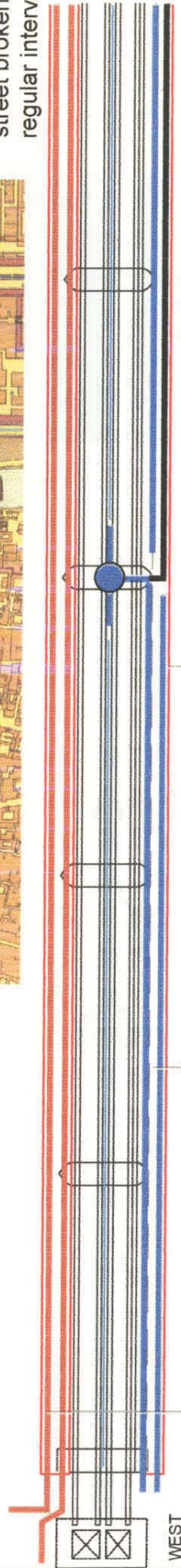
### c) Circulation Strategy

- Service lane —
- Para-transportation —
- Pedestrian —
- Check points for various functions and vertical circulation ●



water channel in the middle of the market street broken at regular intervals

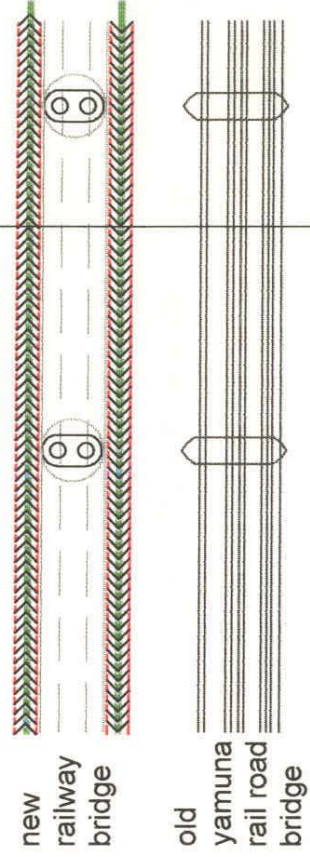
circulation channel in the middle of the street broken at regular intervals



existing bridge is symmetrically loaded for more stability and used as a service track on the side facing the new railway bridge

existing 2m wide track to be extended by 3m to accommodate pedestrian movement using conveyor belts in both the directions

For heavily loaded para-transport carriers



tracks suspended from the new railway bridge, keeping the centre of gravity in the centre

Old and physically challenged



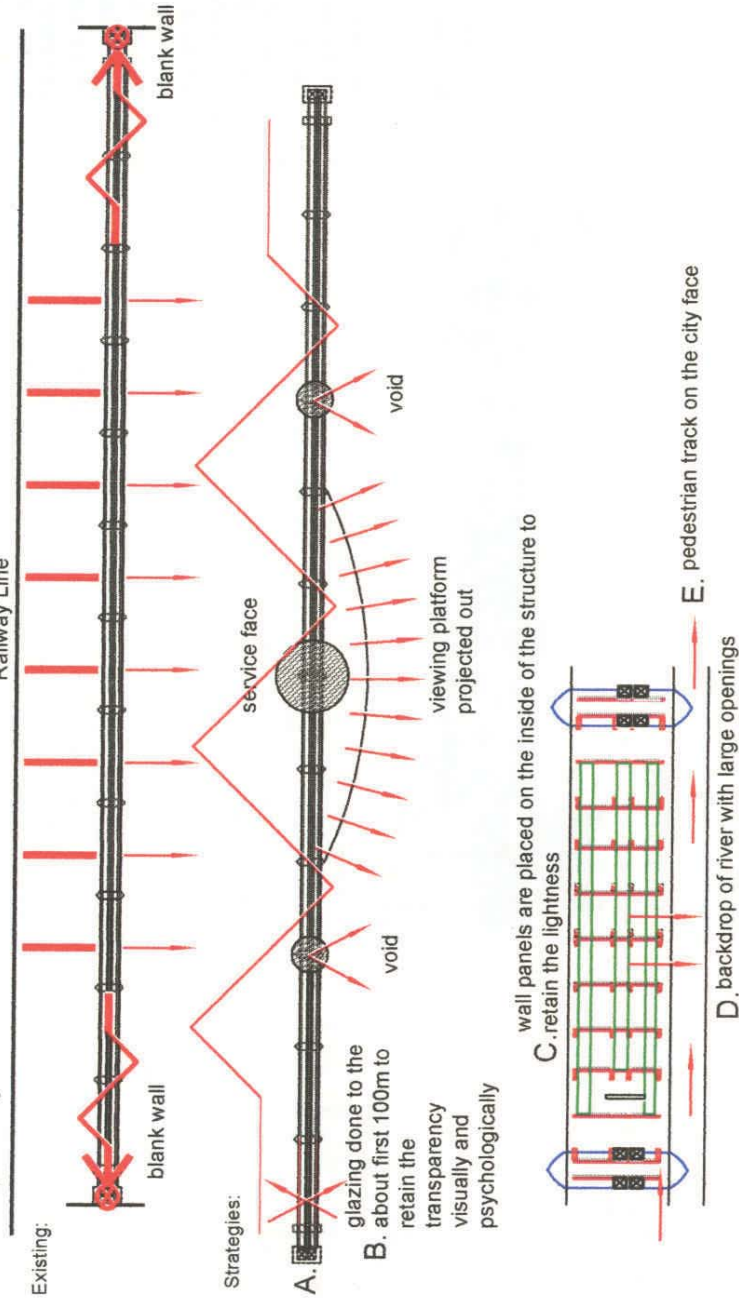
using elements like ramps for vertical movement with shallow slopes

## e) Visual Strategy

### OF THE BRIDGE

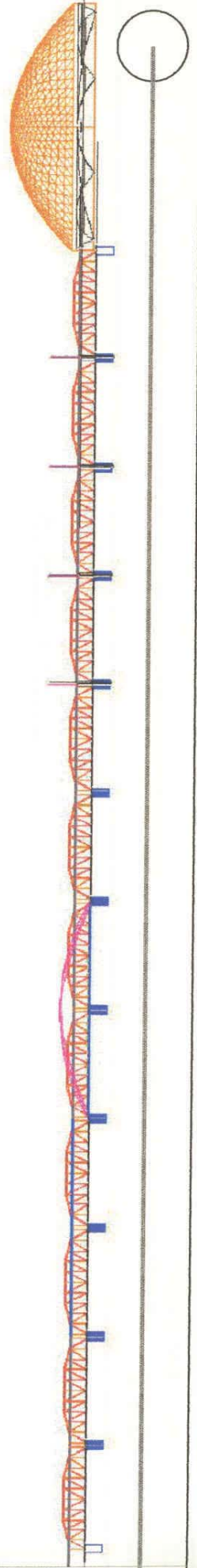
#### Internal

#### 1. Transparency



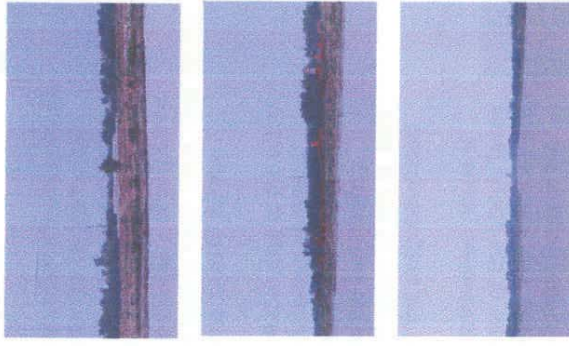
#### Elevation

Elevation is designed to represent the new with curves over the old edgy industrial structure. The arches are derived from the proportions of the existing structure.

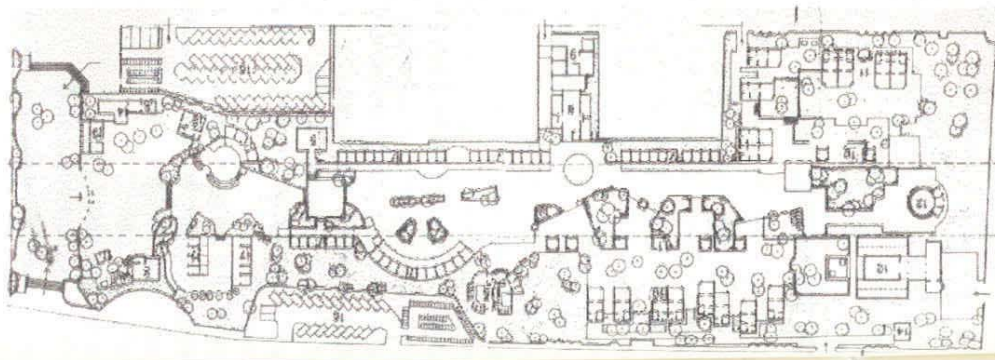


## FROM THE BRIDGE

Views of the River city face



Unique views of the city views of the red fort and city beyond from the top floor of the bridge



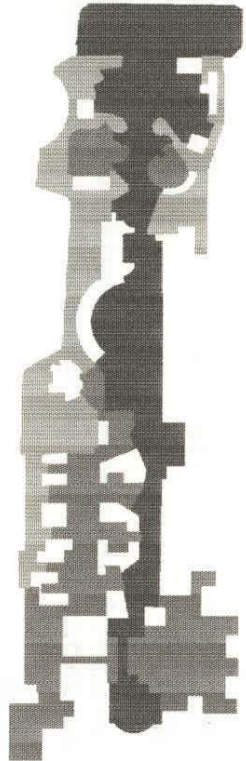
## Positives

Dilli haat is one of the most successful urban spaces for the Capital.

**Design:** The Dilli Haat is based on the concept of an ethnic mall. The design is based on an interiorized pedestrian street where all the activity faces each other. The shops have been constructed along a verandah like arcade using low cost materials. The haat is based on the concept of a traditional Indian Bazaar and has been patronizing the craftsmen from different parts of the country by holding exhibitions and crafts fairs.

The linear form of the haat has been broken down organically into smaller spaces to achieve a human scale and make it more interesting.

**Ground Details:** It is one of the first examples in which a redundant area like a drain has been covered to provide a recro - commercial space. The total area of the site is 32,000 square feet. The mall has fairly low ground coverage of around 12%.



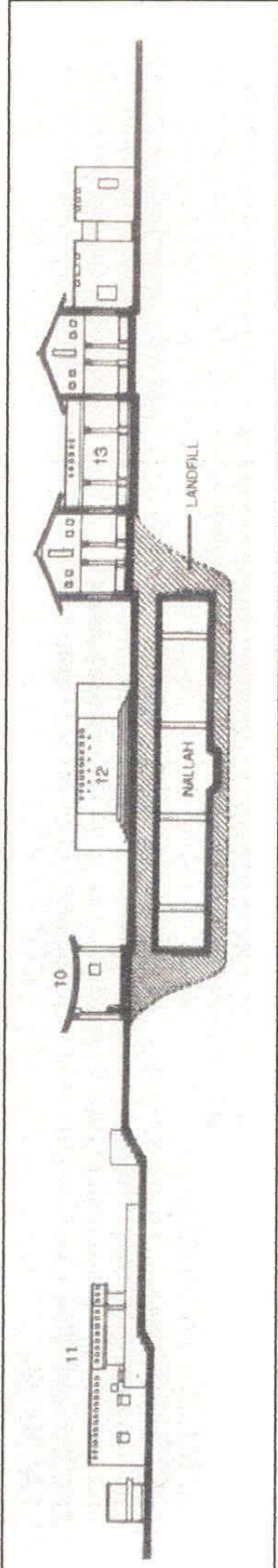
## conclusion

**Typology :** Organic commercial street as a space for recreation.

**Spatial organisation :** Long linear space broken down into smaller spaces.

**Material :** Brick, stone, terracotta, wood, etc. respond to the functions of handicrafts housed in the haat.

**Edge :** More openings on the sides of the neighbourhood to make it locally sustainable.



## Negatives

Though the mall is a commercial success it presents some limitations.

- The haat was originally designed as an open space for the residents but it has become a city level space attracting people from all over the city. As a result, there is a provision of only 65 car parking, but the load is much more. This creates a parking hazard for the residents.
- Instead of responding to the edges, it responds to the urban corridor of Aurobindo Marg, as there is no connection from the surrounding neighborhood. Reason for this is lack of openings at the neighbourhood level.
- Due to the introverted nature of activities, the rear of the shops faces the neighborhood. The presence of the boundary wall further negates the connection with edges. Due to the absence of any cross connection, it acts as a barrier between the neighborhoods.



## Design philosophy of the construction for considered for planning

The structure should look architecturally nice matching with the surroundings.

The external face of the building would be of natural building materials and should be maintenance free.

The height upto 2.1m should be darker in colour so that stains are not left on the surface within the reach.

The road surface within the main site complex shall be of rigid pavement and the balance road surface will be of flexible pavement. Due to filled up soil, all the area of the depot shall be either paved or provided with grass.

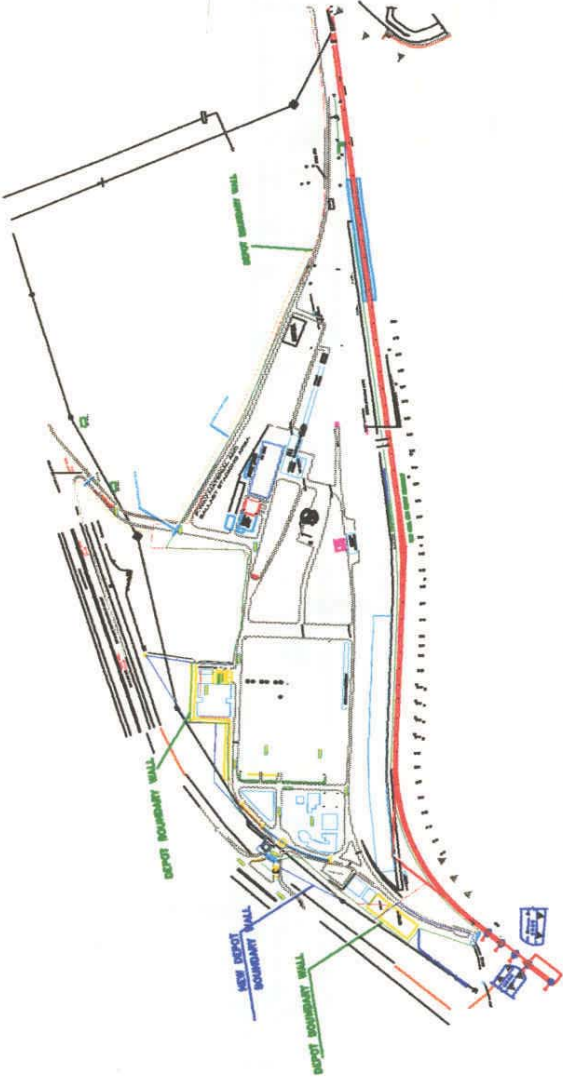
The pathway shall be provided in interlocking blocks.

The structure shall be designed as a masonry structure in seismic zone with an importance factor of 1.5 and foundation factor of 1.2.

The copings of roof shall be provided with Agra sand stone.

### Peak and Off-peak hours -

Peak Flow/ hr.	10%
Peak Duration	4 hours
Off Peak Duration	15 hours
Total Metro transport	19 hours



## Schedule of external finishes

1. Upto 2.1m height above plinth - Brick Work with 150mm Delhi Quartzite stone masonry.
2. Beyond 2.1m height - terracotta tile cladding (Dovetex) over brickwork.
3. Workshop and inspection shed - Metal cladding on steel frame and aluminium glazing with louvers



## Parking

Translating the demand into their corresponding land area requirements by the use of the following inputs has assessed the parking requirements for the station:

### 1. Modal split -

S.No.	Modal Split	% share
1	Car	1
2	Cycle	2
3	2 wheeler	1
4	Walk	65
5	Public Transport	30
6	Hired	1
	TOTAL	100

### Ratio of demand for public transport to Total

### 3. Average occupancy -

S.No.	Mode	Occupancy
1	Car	2.5
2	Cycle	1.1
3	2 wheeler	1.5
4	Public Transport	40
5	Hired	1.5

### 2. Parking Turn Over -

S.No.	Mode	Peak hour
1	Car	4
2	Cycle	1
3	2 wheeler	1
4	Public Transport	6
5	Hired	10

### Rate of usage of the available parking space

S.No.	Mode	Area(sq. ft.)
1	Car	270
2	Cycle	22
3	2 wheeler	46
4	Public Transport	600
5	Hired	50

### 4. Parking Area / Vehicle - Minimum parking space / mode

## conclusion

Elevational treatment with materials to follow the guidelines as described here.

Parking can be calculated on the same guidelines and formulae considering the macro level traffic details to be similar.

Building height to be followed according to the FAR guidelines which is 125.



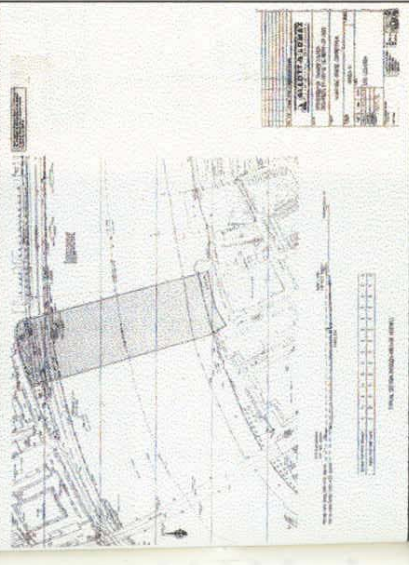
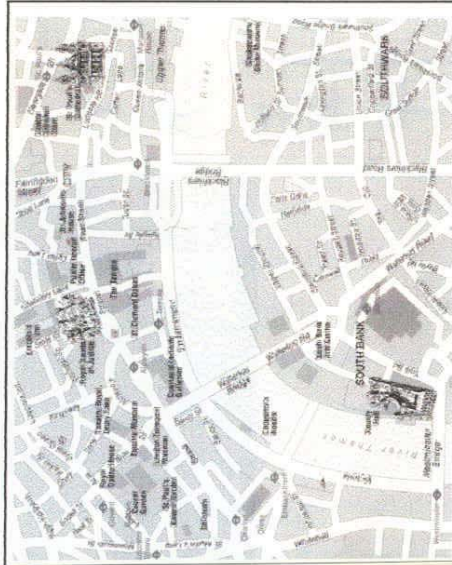
## Introduction to the Competition

The Royal Academy of Arts held an International Competition to design an Inhabited bridge across the River Thames, to span 250m, between Temple underground Station on the north Bank and the London Television on the South. This forms the part of the "cultural crescent" which runs along the southern edge of the River Thames. It is called so as it consists of a chain of cultural and tourist facilities.

## Similarities with the Old Yamuna Bridge Site

- Location at the **Cultural Crescent** of the City
- Presence of a large **transportation node** at one end ( Shastri park Metro Station and Temple underground station)

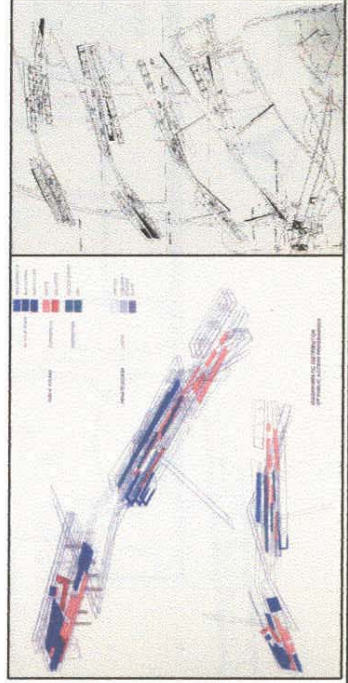
Seven Architects of International standing representing a broad spectrum of approaches were invited to enter the competition. Out of them two, which relate closest, can be taken up as case studies to understand the approaches.



## I Entry by Zaha Hadid

The bridge is arranged as a series of **cantilevered volumes** linked in the centre by **light pedestrian walkways**. Public activities take place on the lower levels of the bridge and private accommodation is contained within the 5 separate building volumes above. Flexible, multifunctional **loft spaces** are designed to be used as **residential and office spaces**, **artist studios** and workshops. They are constructed within the **space of the structural trusses**. Each truss forms one building volume physically separated from each other, so that all the lofts are naturally lit and ventilated.

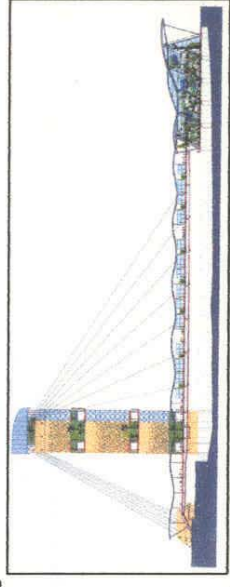
The trusses are lifted high above the water to allow the formation of the **suspended public space below**. The bridge would be open 24 hours a day and accommodate a mixture of commercial, cultural, entertainment and recreational functions.



## II Entry by Antoine Grumbach : The Garden bridge

In the bend of River Thames, the Garden Bridge links the two banks with a series of gardens placed on either side of a covered arcade. It is conceived as a structure able to accommodate a variety of **functions which can change over time**. It consists of three elements:

1. **Worlds Culture green house** : a vast covered public space for protecting plants and tropical trees and providing space for restaurants, shops and flexible spaces for live concerts and other public activities.
2. **The Garden Arcade** lies between the Green house and the towers. Hedges running at right angles to the bridge's axis provide divisions between the shops and restaurants situated on the bridge.
3. **The Hanging Garden Towers** which support the cables for the suspended portion of the bridge contain a hotel and apartments, with restaurants and meeting spaces conceived as green houses within and at the top of the towers. Their facades are covered with a double metal skin which supports the vertical gardens.



## Case Studies

Context and function: Thames water habitable bridge competition, London

Scale



## Facts and Figures

1. Total Site Area : 1 acre  
Ground Cov. : 2300 sq. m => 50%  
Carpet Area : 5175 sq. m.
2. No. of visitors / annum. : 70,000
3. No. of Staff : 12
4. No. of Species :

Fish - 55  
Invertebrates - 50

No. of Specimens :

Fish - 250  
Invertebrates - 1000

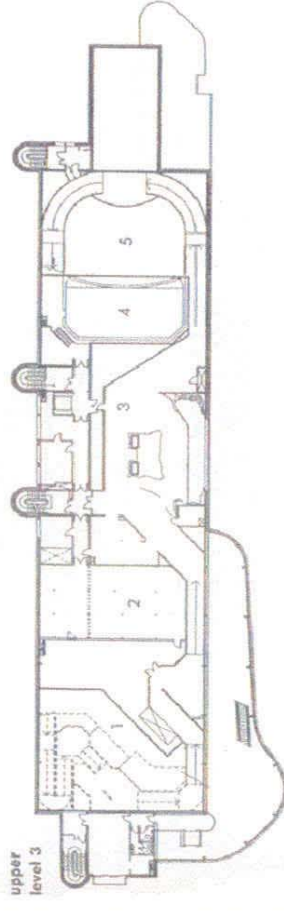
## conclusion

1. Area requirements for different types of fishes and aquatic plants.
2. Service requirements :  
Air preparation  
Filters and Quarantine Units  
AC plants  
Mechanical Rooms  
Food storage

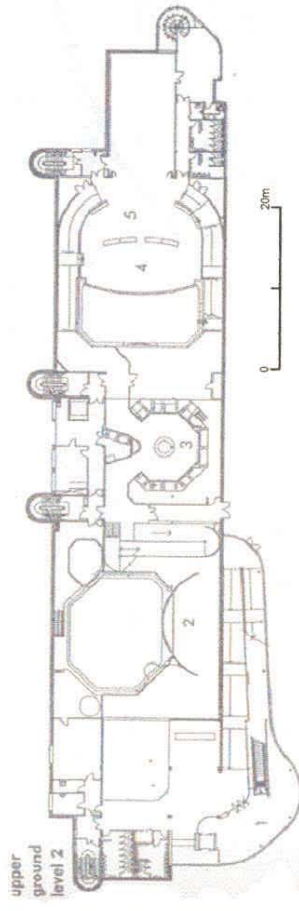
- 1 mountain and estuary exhibit
- 2 office
- 3 shop and concourse
- 4 shark tank and viewing area
- 5 plant and curatorial
- 6 coral reef exhibit
- 7 temperate reef exhibit
- 8 shore and shallow sea exhibit
- 9 lecture room



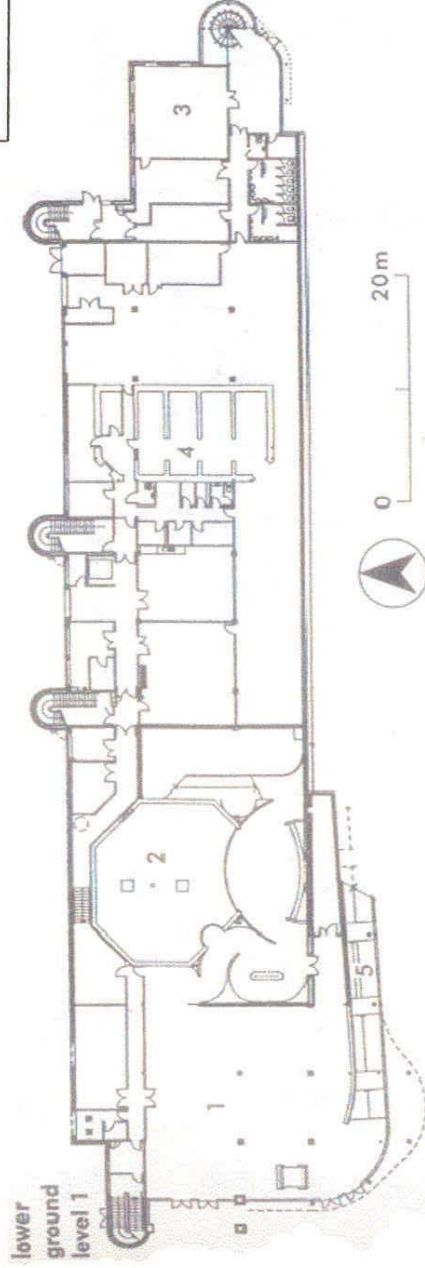
- 1 mountain and estuary exhibit
- 2 plant and curatorial
- 3 shore and shallow sea exhibit
- 4 temperate reef tank
- 5 viewing gallery



- 1 concourse viewing area
- 2 shark viewing theatre
- 3 coral reef exhibits
- 4 temperate reef exhibit
- 5 lecture theatre



lower ground level 1



- 1 shop
- 2 shark tank
- 3 schools' facilities
- 4 plant and workshops
- 5 ramp up to ticketing area



## Case Studies

design: national marine aquarium, plymouth

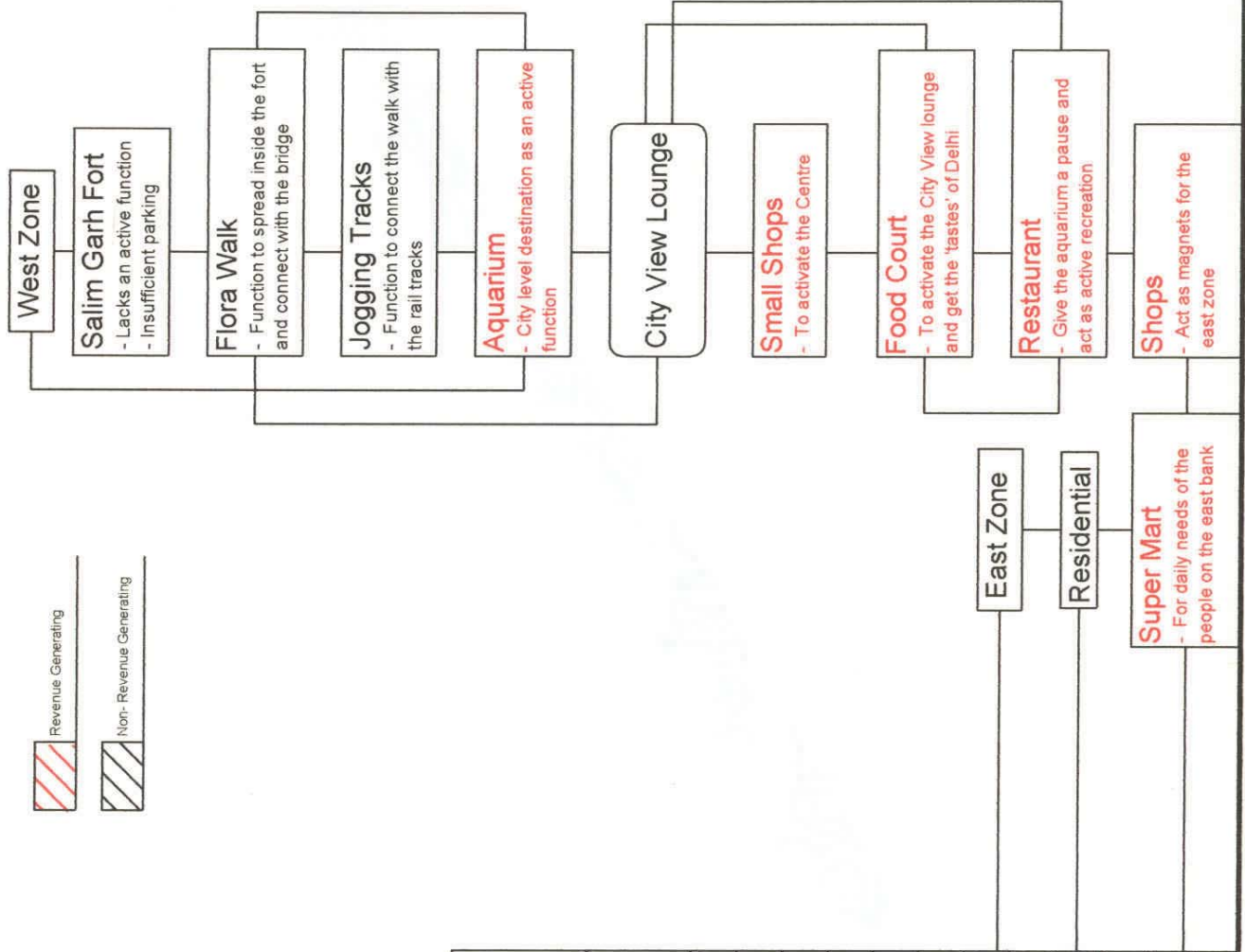
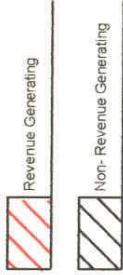


# Programme Area Statement ( Sq. m. )

1. Aquarium		2. Restaurant		4. Shopping		7. Flower Market	
<b>I</b>	<b>Entrance Block</b>					<b>I</b>	<b>Flora Walk (ex. Fort)</b>
	Foyer	75	<b>Kitchen</b>	150	Medium Size Shops	110 X 8	<b>Whole sale market</b>
	Information Booth	10	Cooking	30	Service Yards	80	Flower Stalls (72 in no.)
	Lockers	190	Service Yard	40	Storage		Flower shops (60 in no.)
	Security	15	Storage	75	Shopping Area		<b>Auctioneering area</b>
	Ticketing	145	Pantry	550	Rest Area	75 X 16	Physical Auction
	Toilets	150	<b>Seating</b>	500	Small Shops	Shared	Sample + video auction
<b>II</b>	<b>Administration</b>		Open Air	50	Service Yards		Cold Storage
	Reception and seating	70	Covered	50	Storage		Floriculture Rec. Centre
	Director's room	50	<b>Furniture Store</b>		Shopping Area		Exhibition area
	General office	380	<b>Washrooms</b>	25			<b>7. Trade and Fair centre</b>
	Maintenance Staff	110	Ladies	25	<b>5. Super Mart</b>		
	Scientists' rooms	200	Gents	10			
	Laboratories	200	<b>A C Ducting/Units</b>		<b>I</b>	350	<b>Trade Halls</b>
	Engineer rooms	300	<b>Admin. Area</b>	5	<b>II</b>	50	<b>Service areas</b>
	Researchers Cabins	85	Cash Counter	10	<b>III</b>	40	<b>Open fair ground</b>
	Conference Room	45	Rest Spaces		<b>IV</b>	35	<b>Admin. areas</b>
	Snack Bar	40			<b>V</b>	10	<b>Stalls and kiosks</b>
	Storage	40	<b>3. Food Court</b>		<b>VI</b>	35	<b>Offices and commercial space</b>
<b>III</b>	<b>Display</b>					45	
	Fresh Water Display	450	<b>I</b>	130	<b>6. Flora Walk</b>	120	
	Endangered Species	340	<b>Kitchen</b>	75			
	Photo Gallery	50	Cooking	30	<b>I</b>		<b>9. Parking</b>
<b>IV</b>	<b>Retail</b>		Storage	550	<b>II</b>	180	<b>1. Aquarium</b>
	Curio Shops	60	Serving Counter	500	<b>III</b>	3700	<b>2. Restaurant</b>
	Store	10	<b>Seating</b>	20		340	<b>3. Food Court</b>
<b>V</b>	<b>Services</b>		Open Air	40	<b>Flora Walk (ex. Fort)</b>		<b>4. Shopping</b>
	Food Store (for fishes)	35	Covered	10	<b>Jogging Track (500m)</b>		<b>5. Super Mart</b>
	Air Preparation	35	<b>Furniture Store</b>		<b>Exercising Equip.</b>		<b>6. Flora Walk</b>
	Filters and units	35	<b>Service Yard</b>				<b>7. Trade centre</b>
	AC plant/units	35	<b>Cash Counter</b>				
	Mechanicals	70					

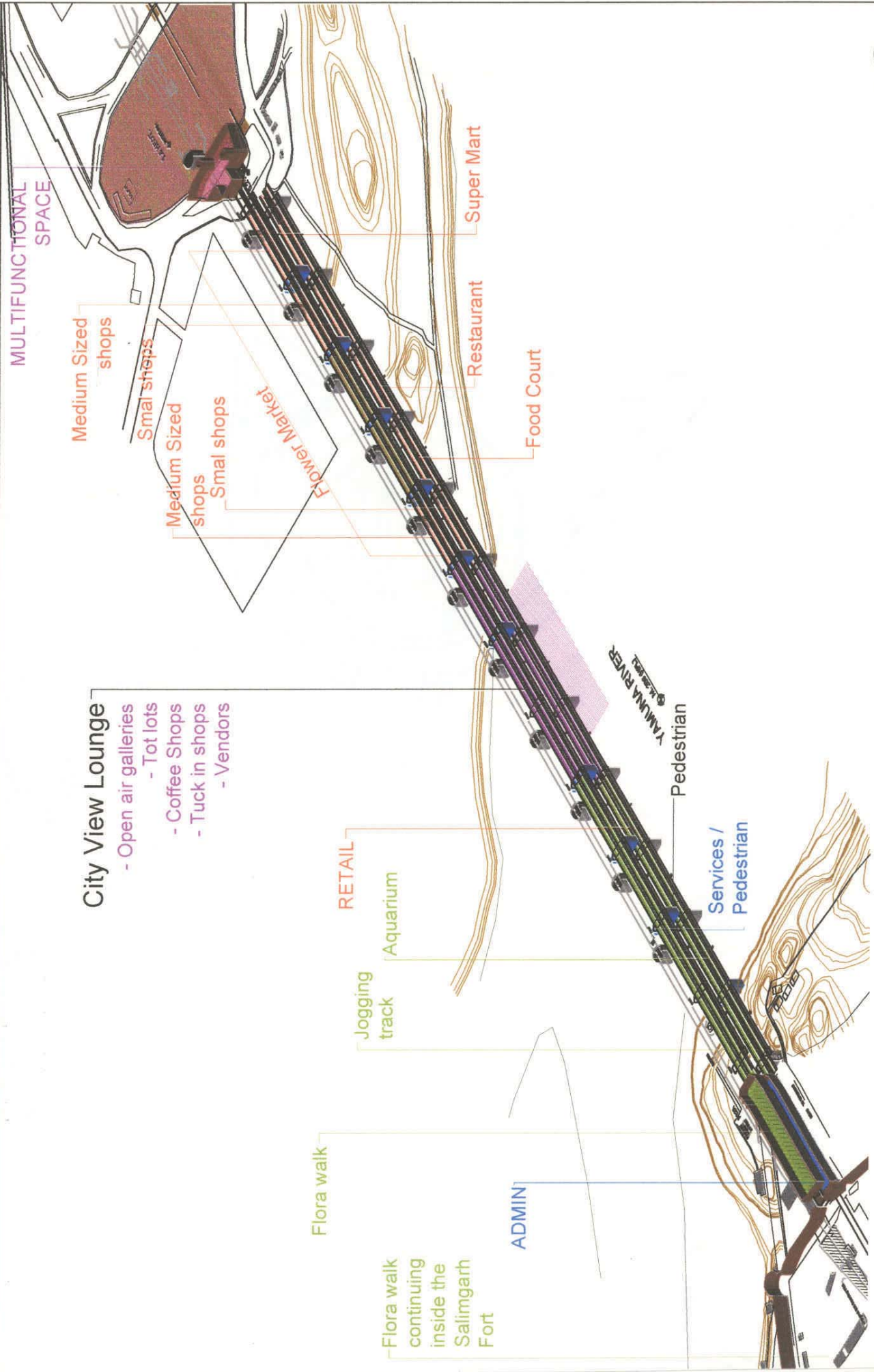


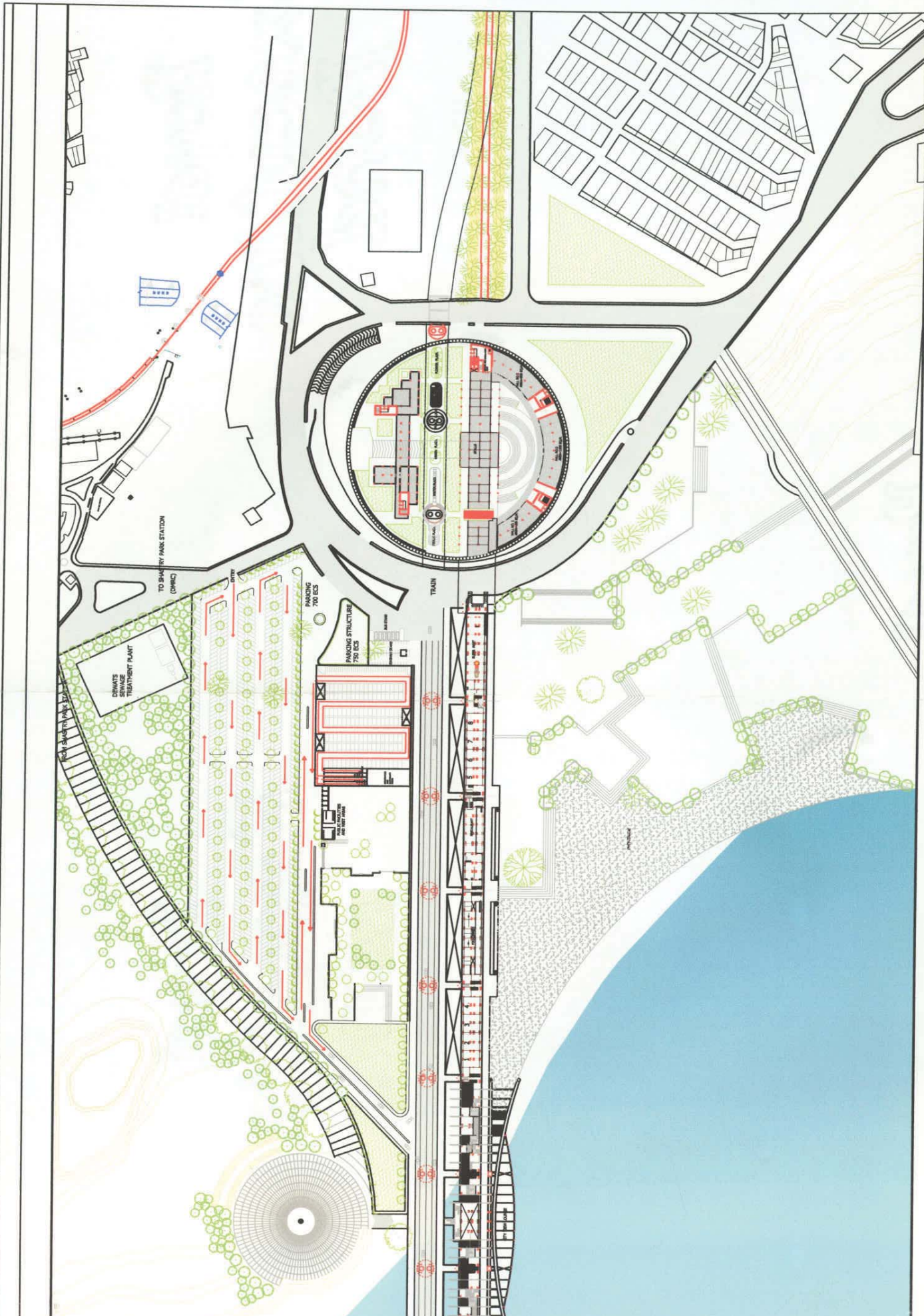
# Functional Relationships



<b>Community Recreation Centre</b>		- For daily needs of the people on the east bank	
<b>Density</b>		<b>1200/hect.</b>	
<b>Total Population</b>		<b>2,54,850</b>	
	STRENGTH	AREA	Req. / Exist.
District parks	9sq. m/per.	200 Ha.	- / -
Neighbourhood parks	15000	1.5 Ha.	1 / 1
Primary School	500	.40 Ha.	20 / 5
Sn. Sec. School	1000	1.6 Ha.	14 / 3
Integrated School	1500	3.5 Ha.	1 / -
Int. School (Hostel)	1000	3.9 Ha.	1 / -
College	1500	4 Ha.	1 / .3
Community room	-	660 Sq.m	20 / 1
Comm. hall & Library	-	2000 Sq.m	6 / 1
Recreation Club	-	10000 Sq.m	1 / 1
Art Centre	-	1000 Sq.m	1 / -

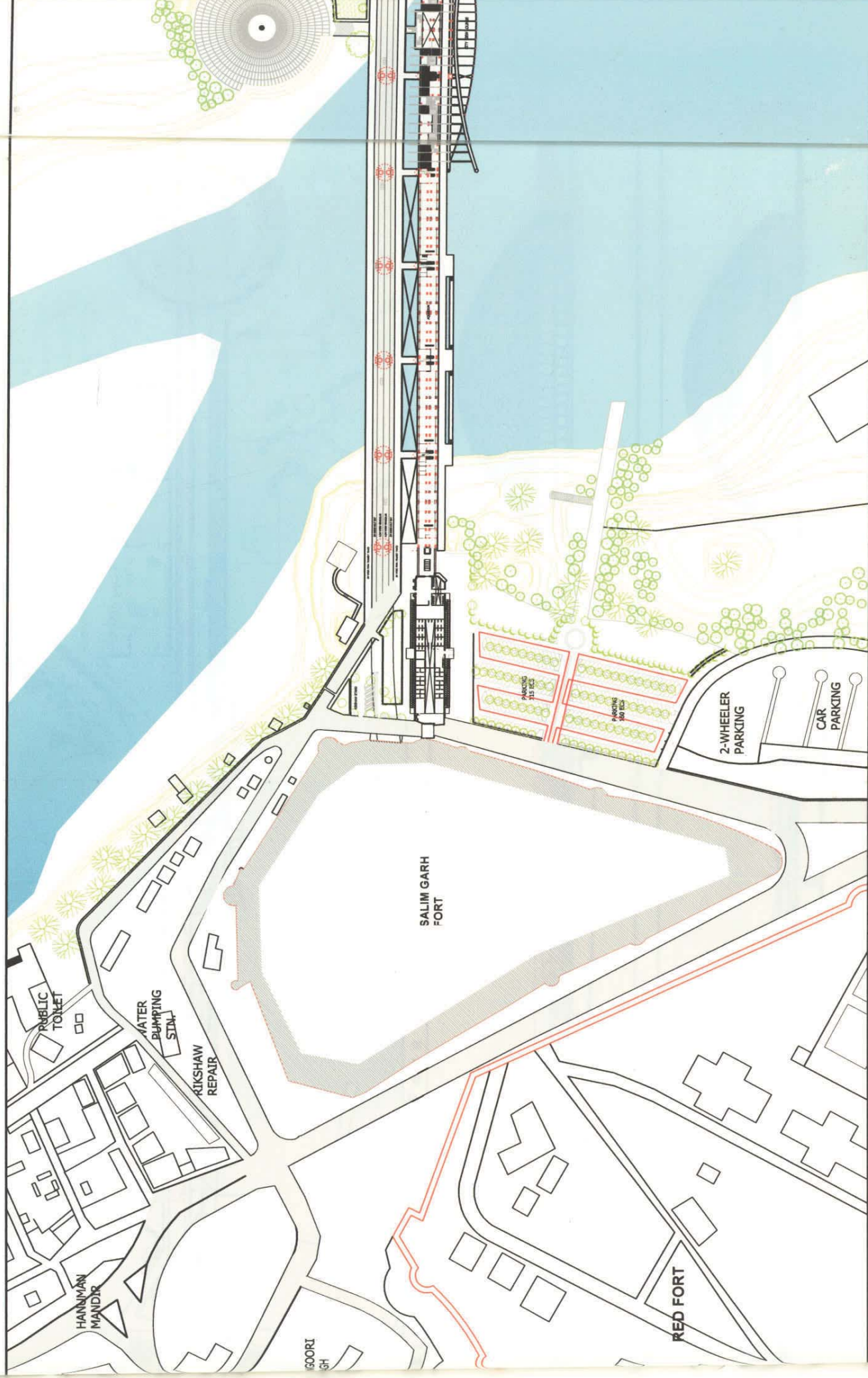
# Zoning



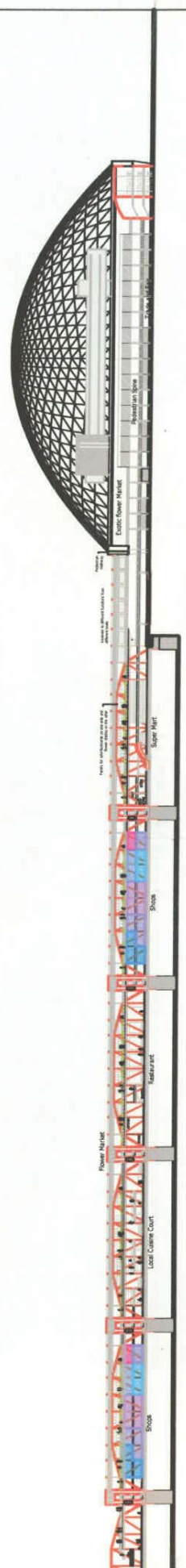
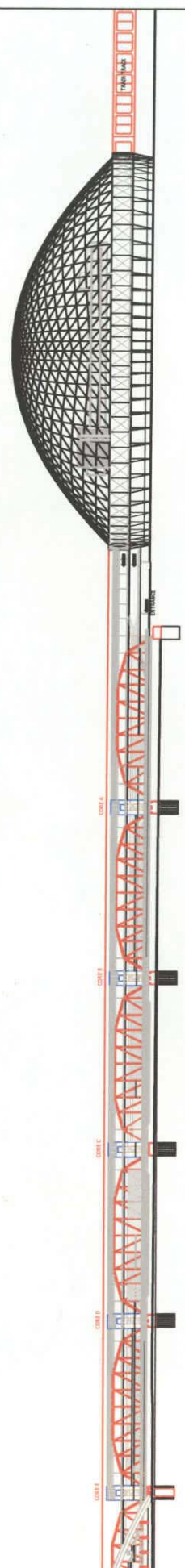
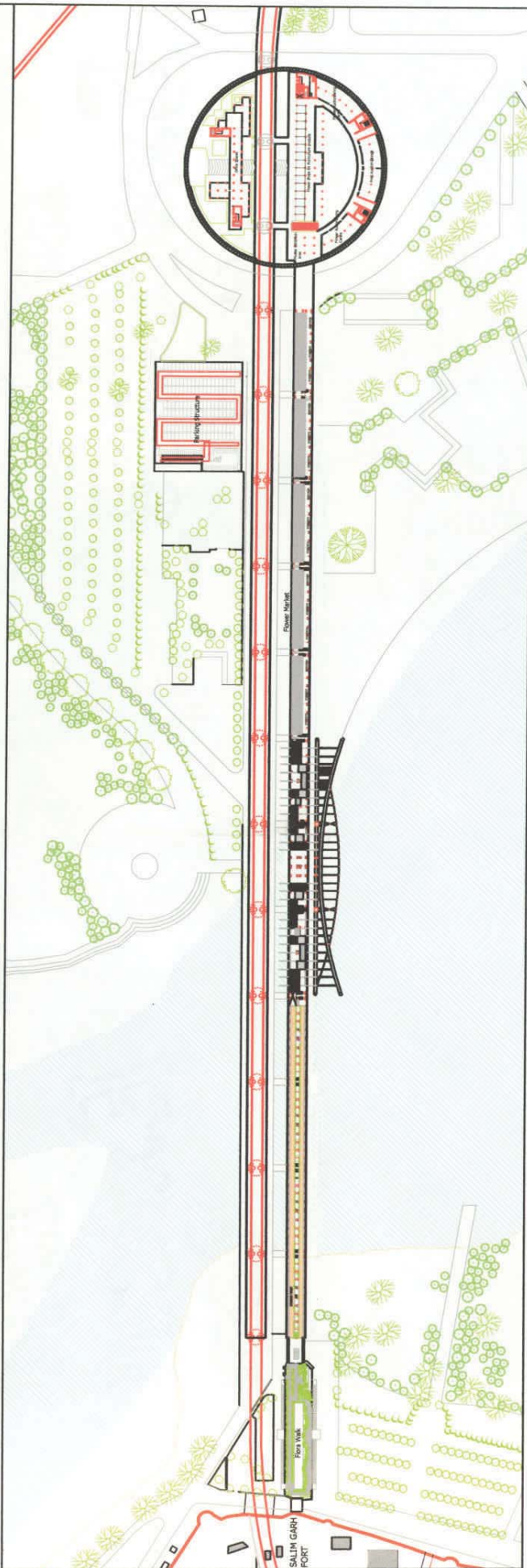


Scale  
1:750

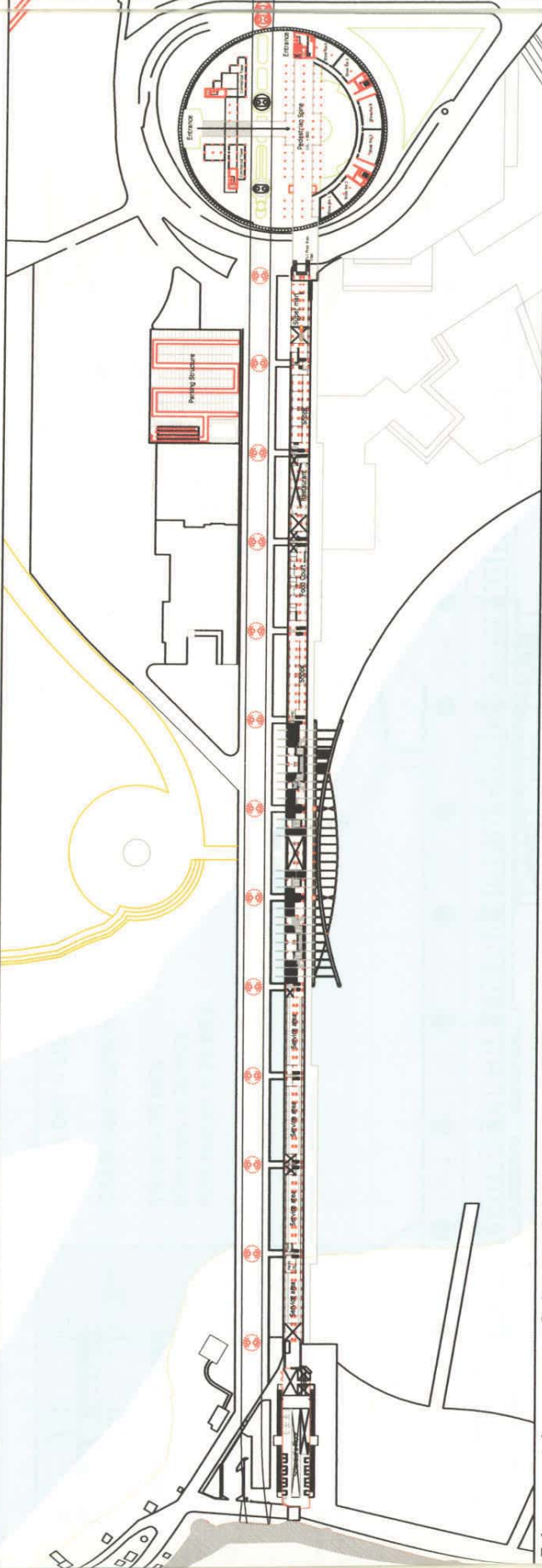
Ground Floor Plan



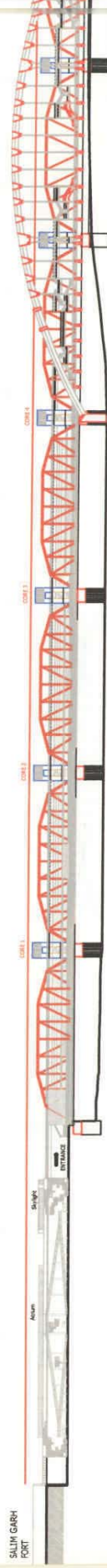
First Floor Plan



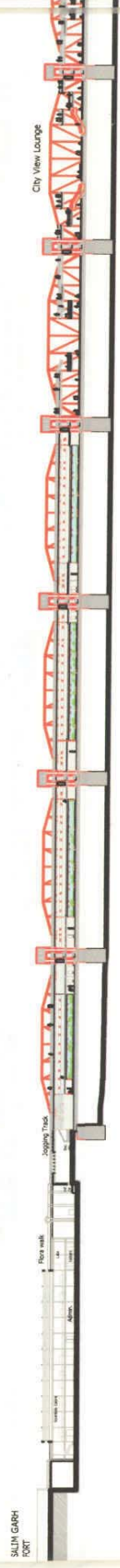
Intermediate Floor Plan



Elevation : City Face



Sectional Elevation



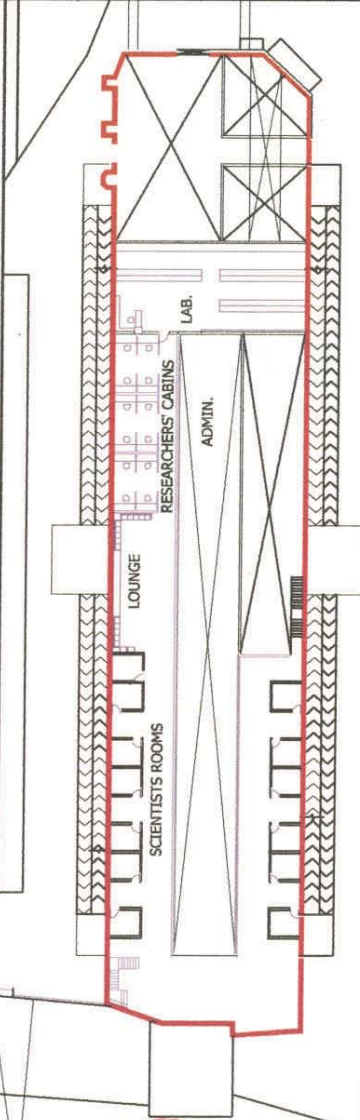




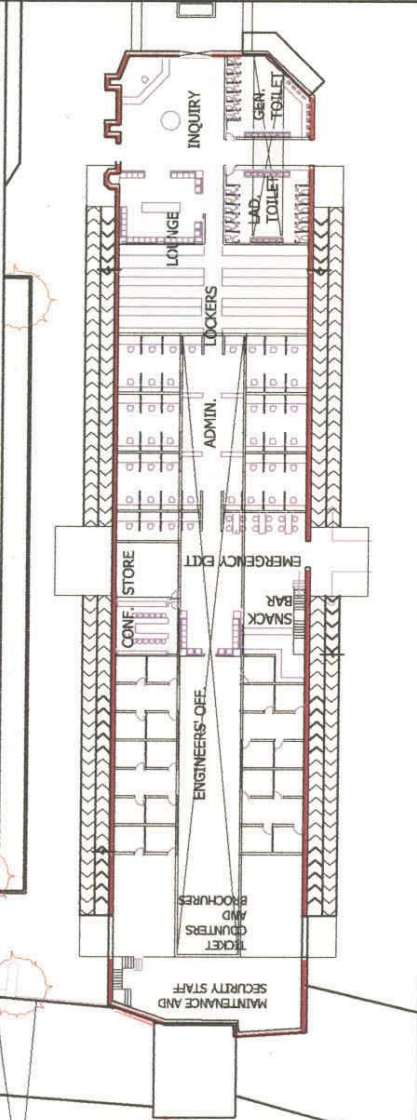
# Aquarium Administration Block



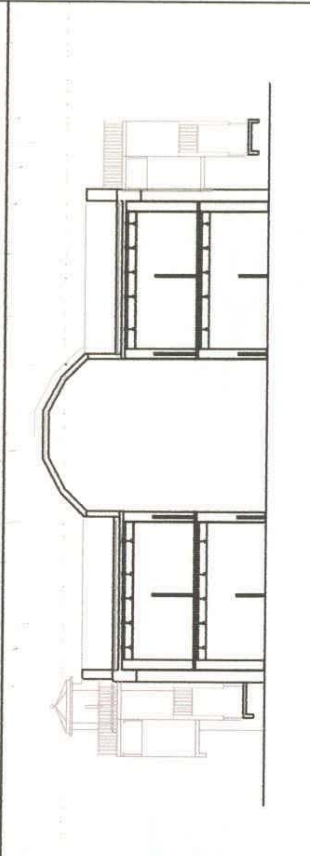
first floor plan



intermediate plan

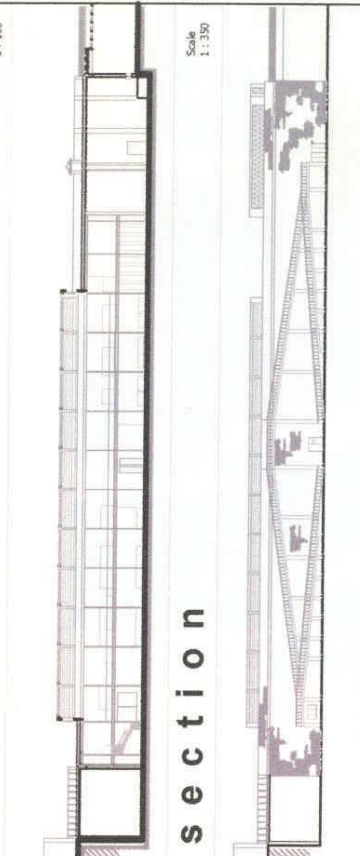


ground floor plan



section

Scale 1:100

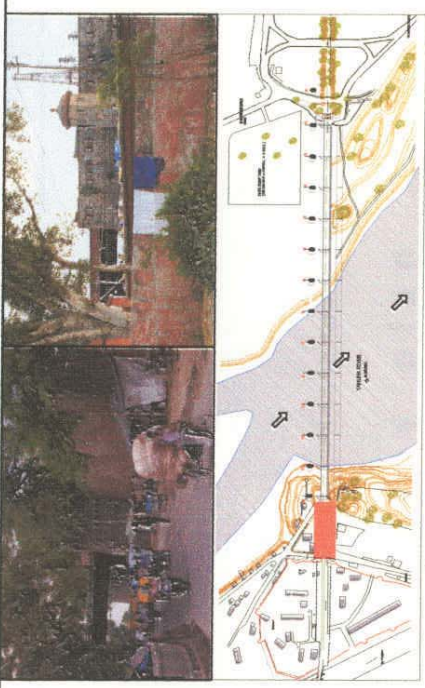


section

Scale 1:350

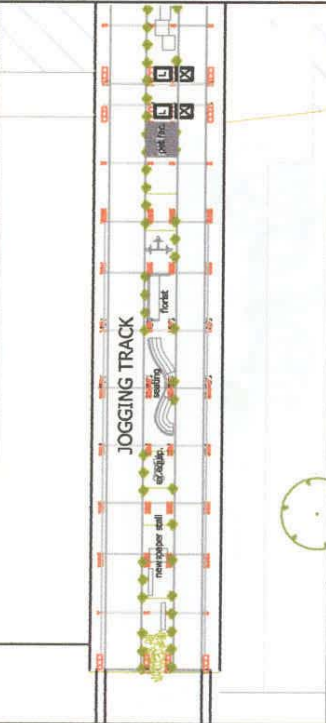
elevation

Scale 1:350

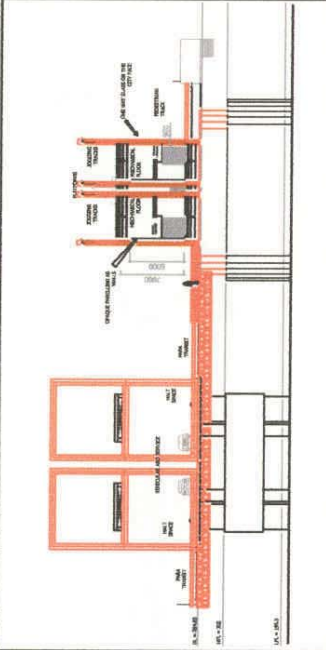


key plan

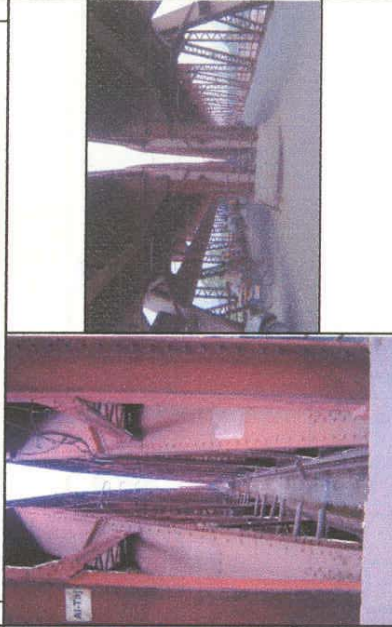
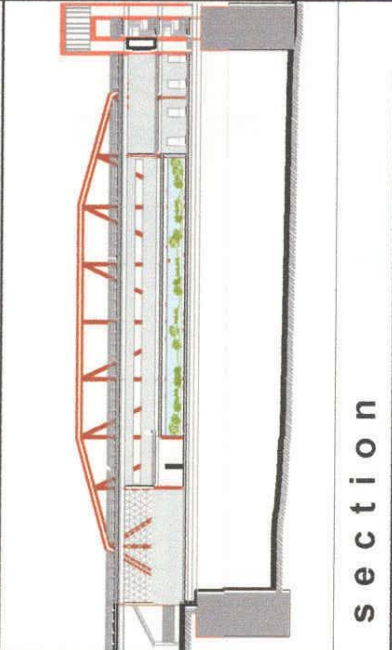
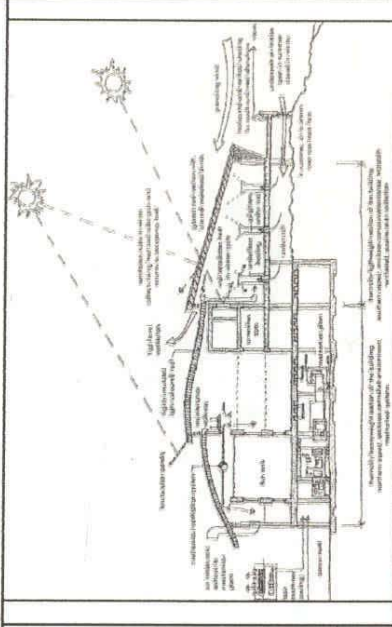
# Aquarium



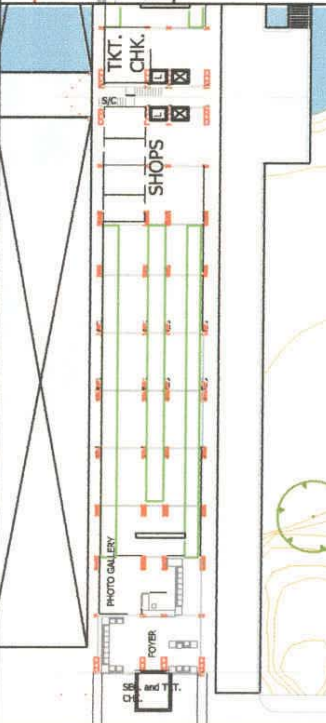
first floor plan



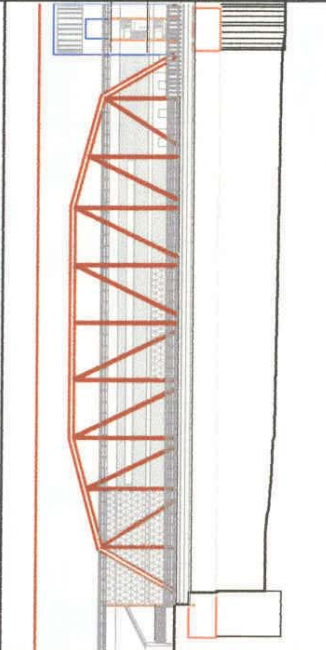
section



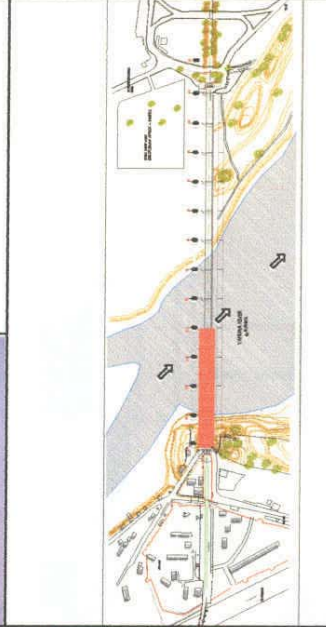
intermediate plan



ground floor plan



elevation



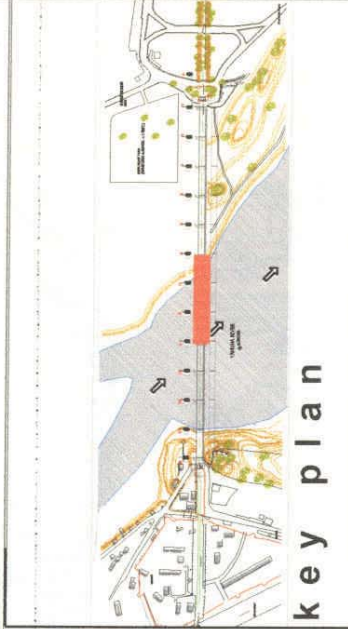
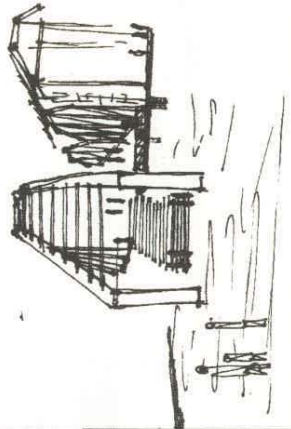
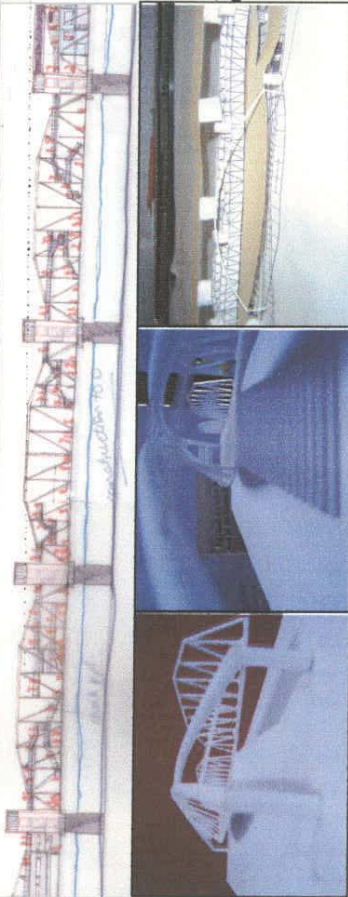
key plan

Design

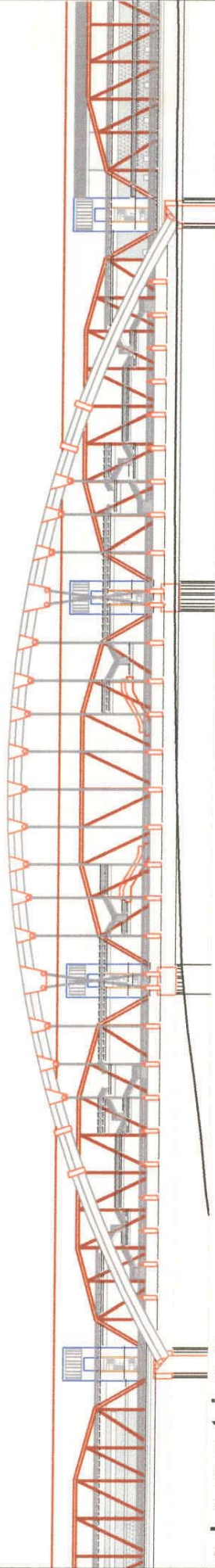


Scale  
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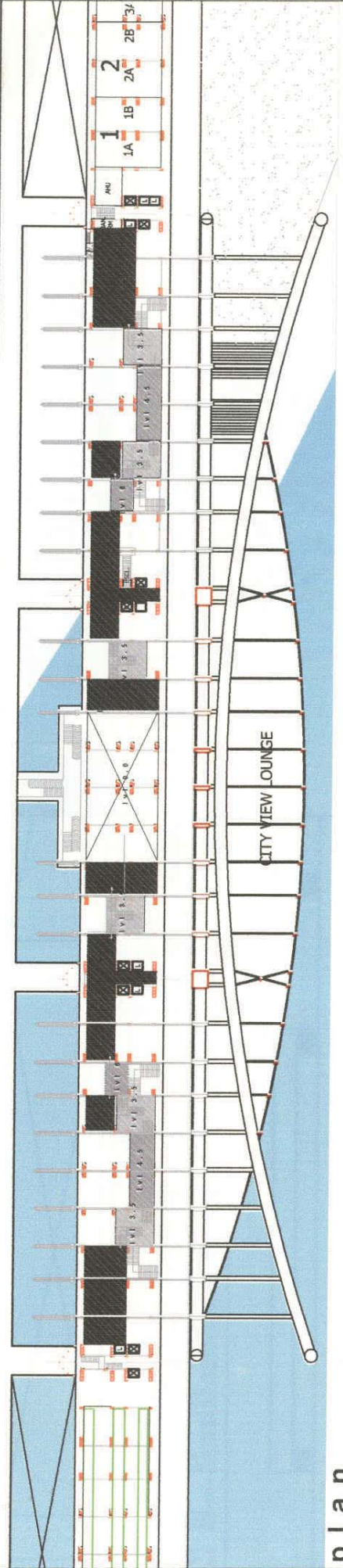
# City View Lounge



key plan



elevation



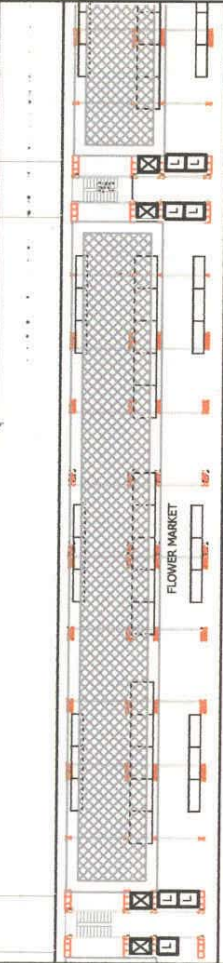
plan

Design

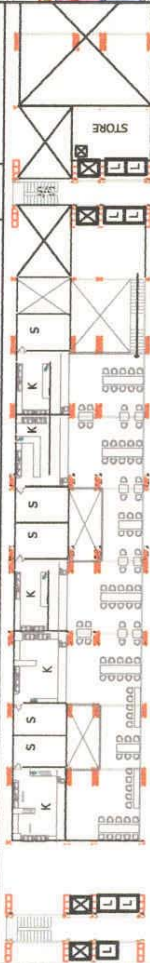


Scale  
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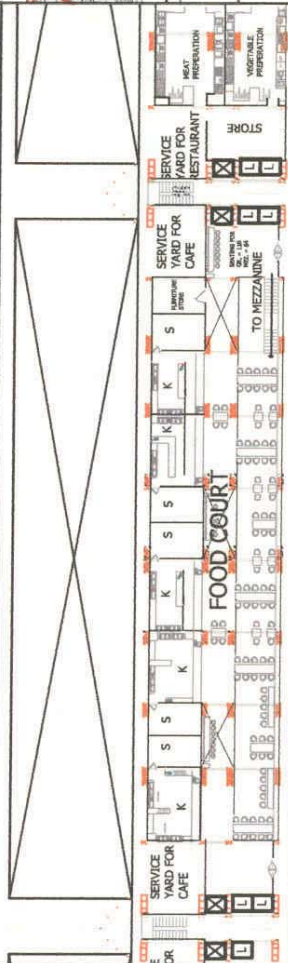
# Local Cuisine Court



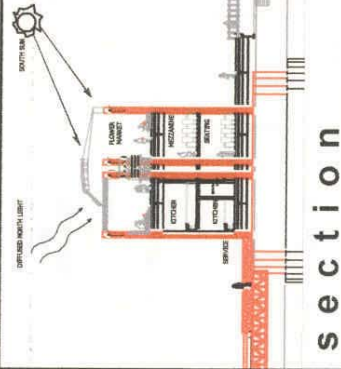
first floor plan



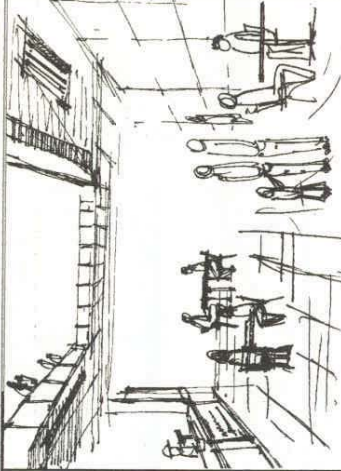
intermediate plan



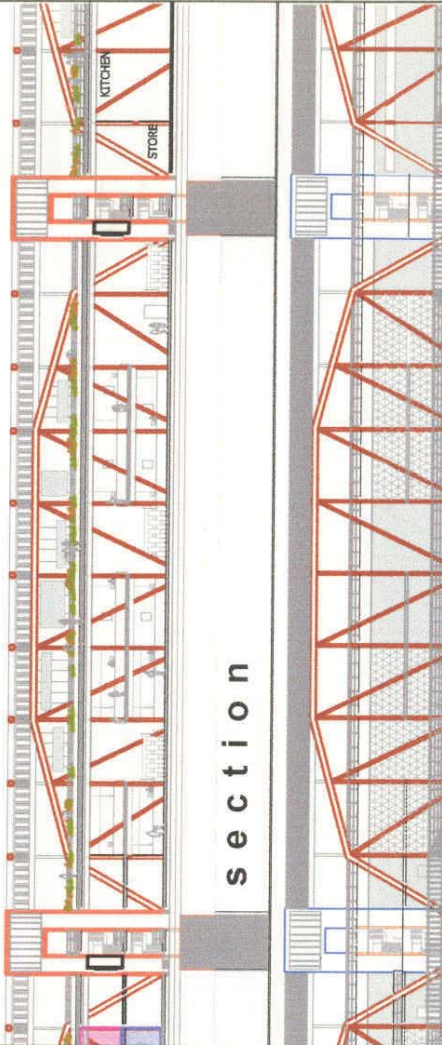
ground floor plan



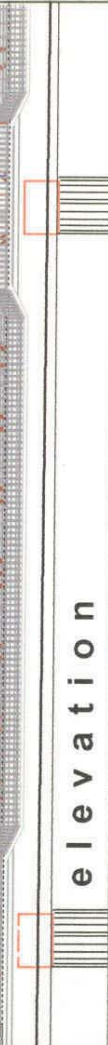
section



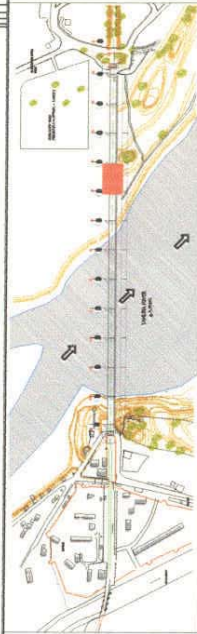
buildings details



section



elevation

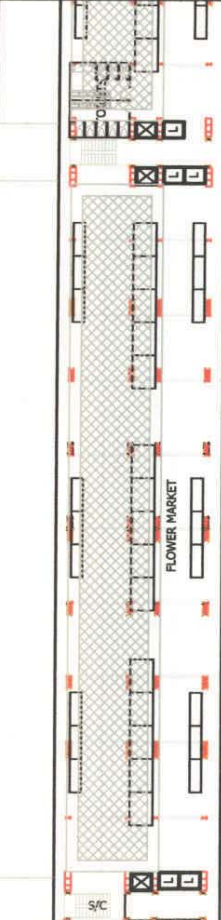


key plan

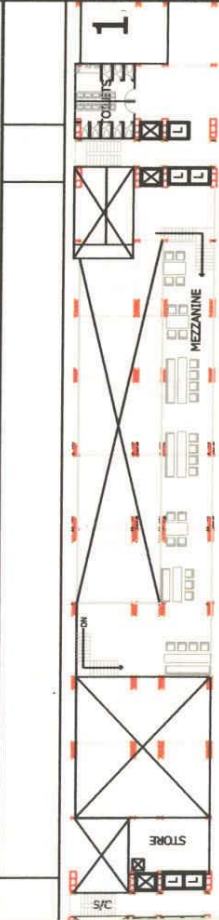
Design

Scale  
1 : 200

restaurant



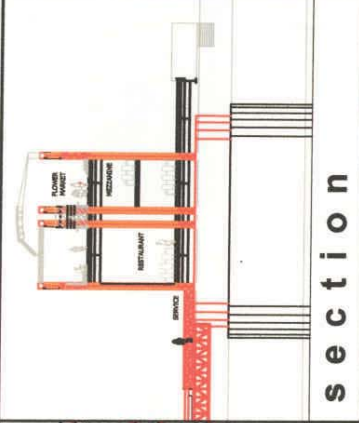
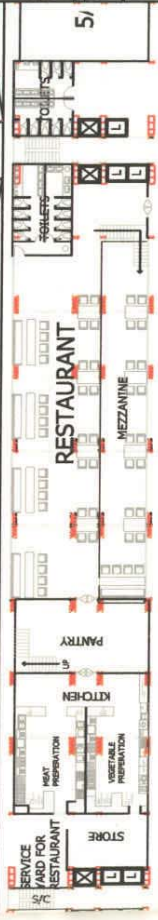
1st floor plan



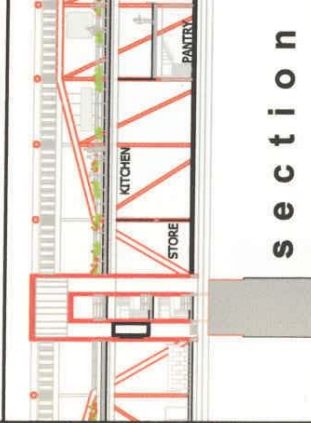
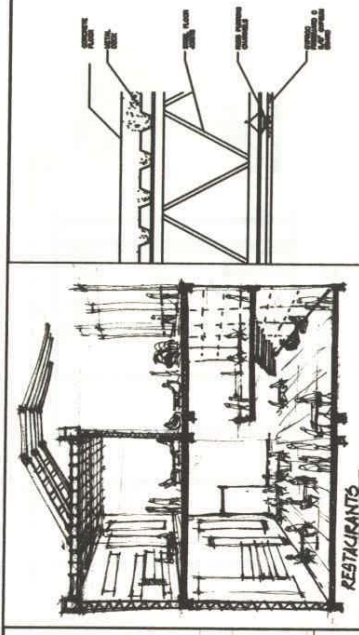
intermediate plan



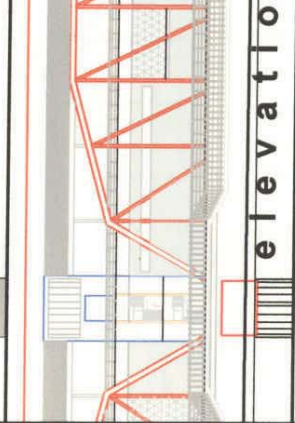
ground floor plan



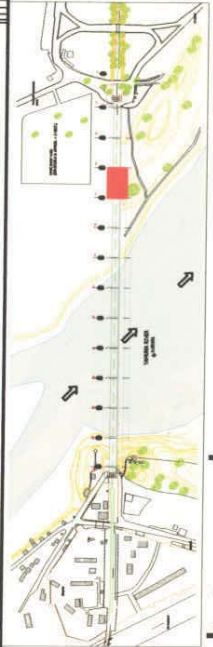
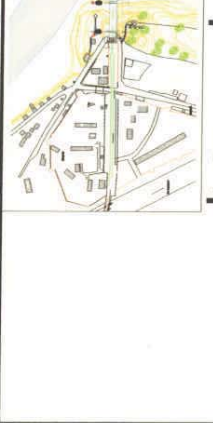
section



section

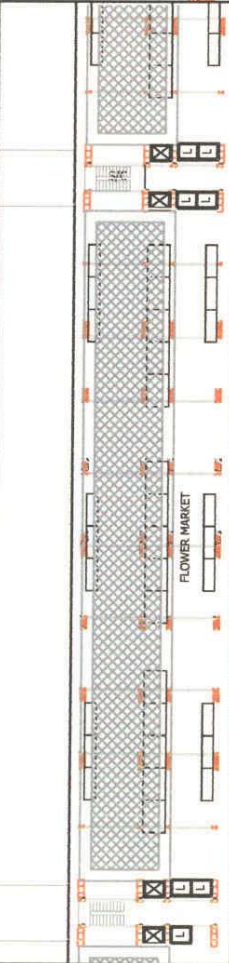


elevation

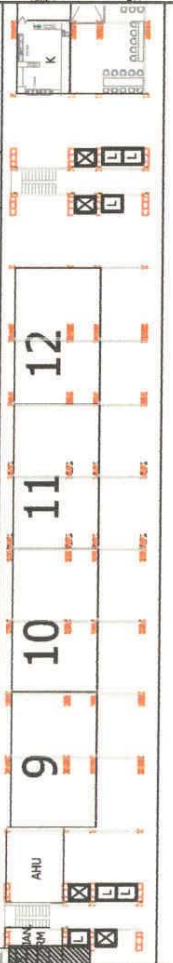


key plan

# Shops



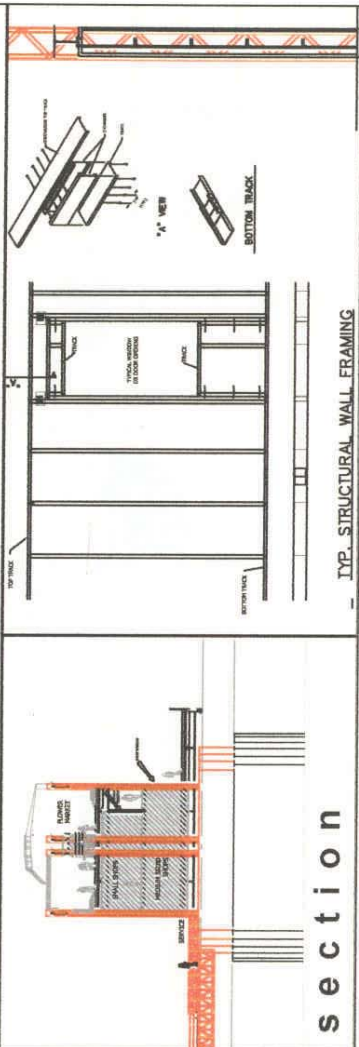
first floor plan



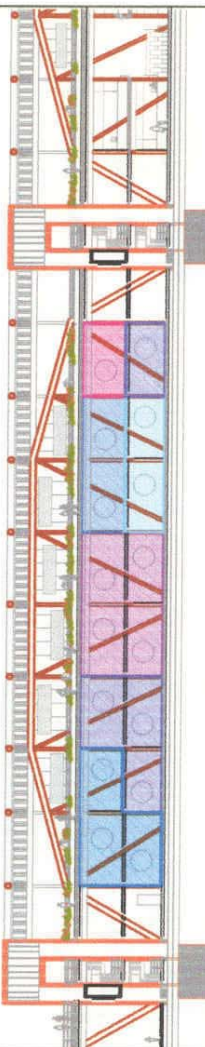
intermediate plan



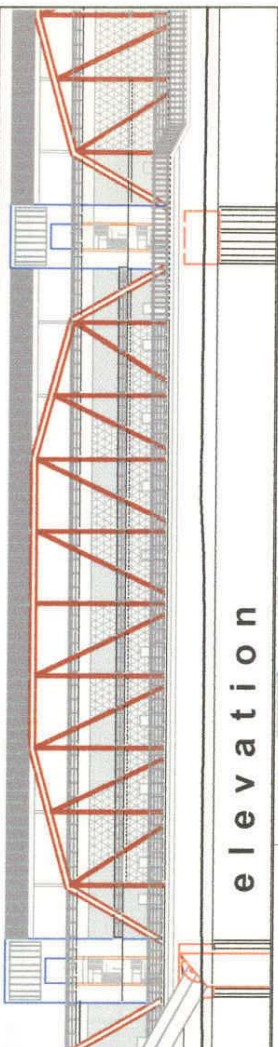
ground floor plan



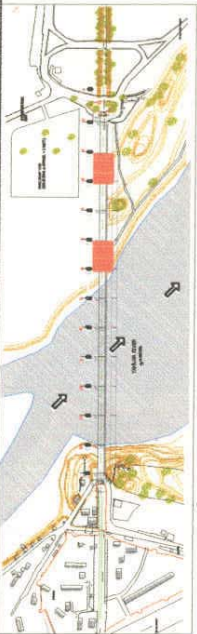
section



section



elevation

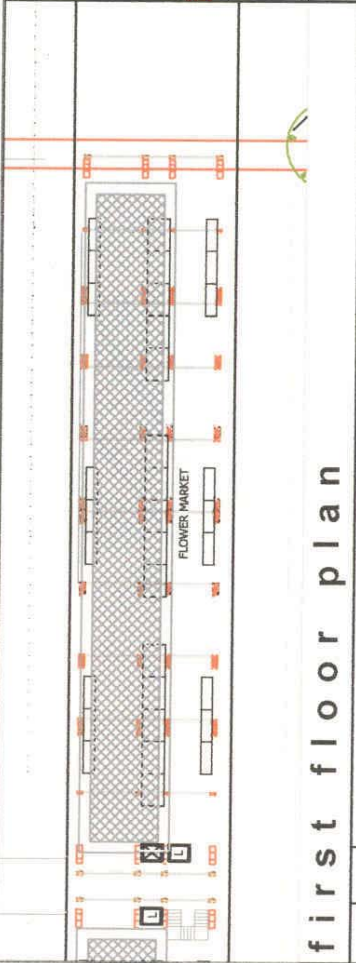


key plan

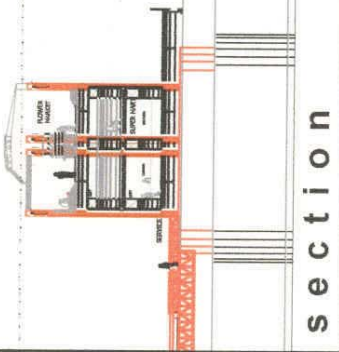
Design

Scale  
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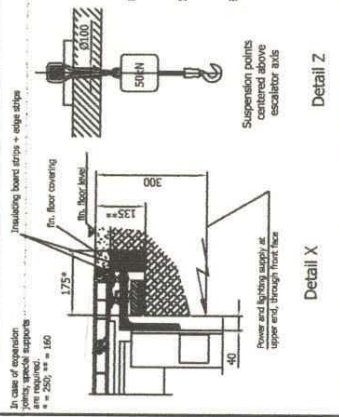
# Super Mart



first floor plan

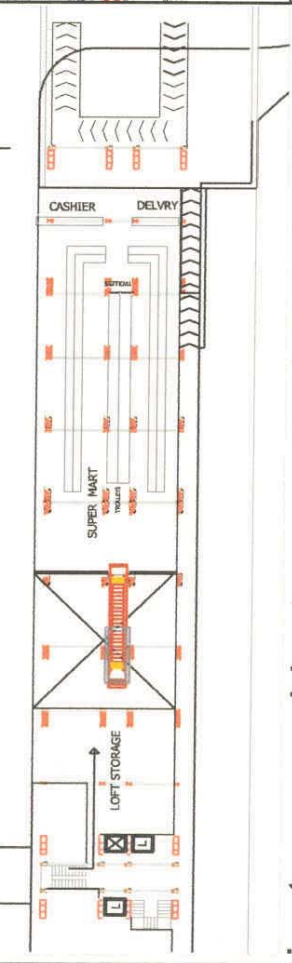


section

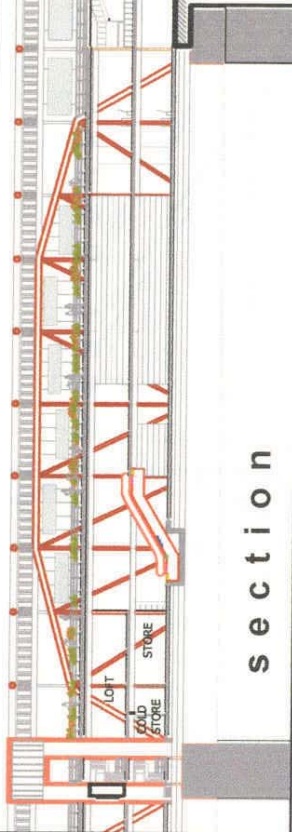


Detail X

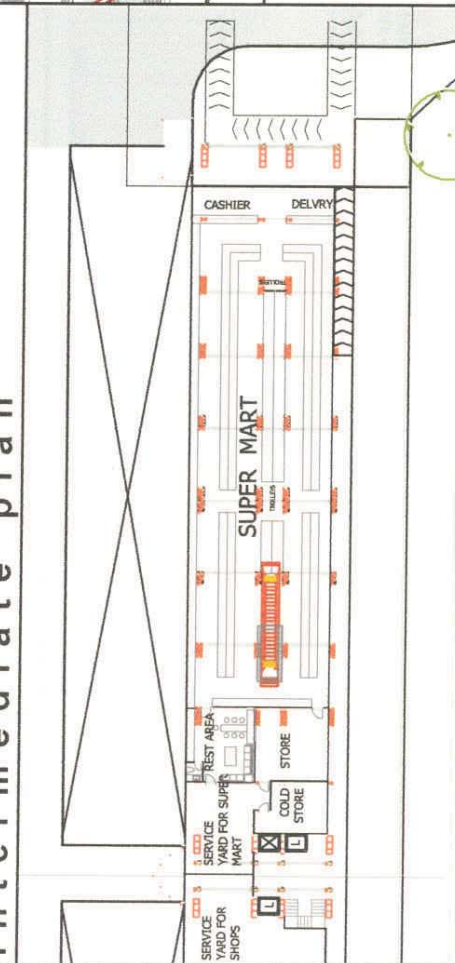
Detail Z



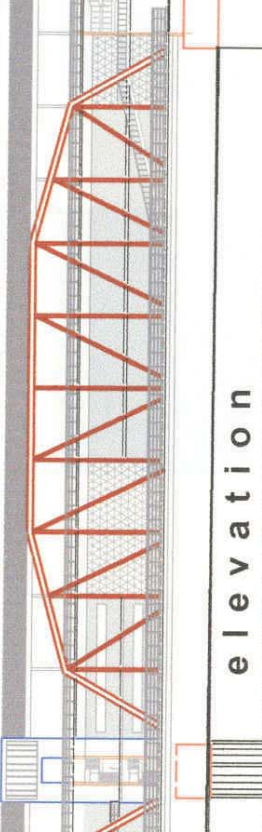
intermediate plan



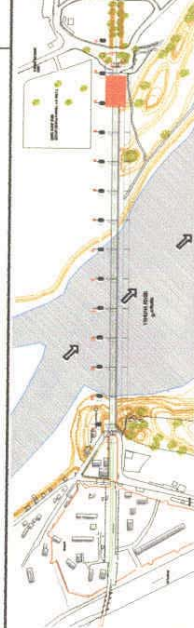
section



ground floor plan



elevation

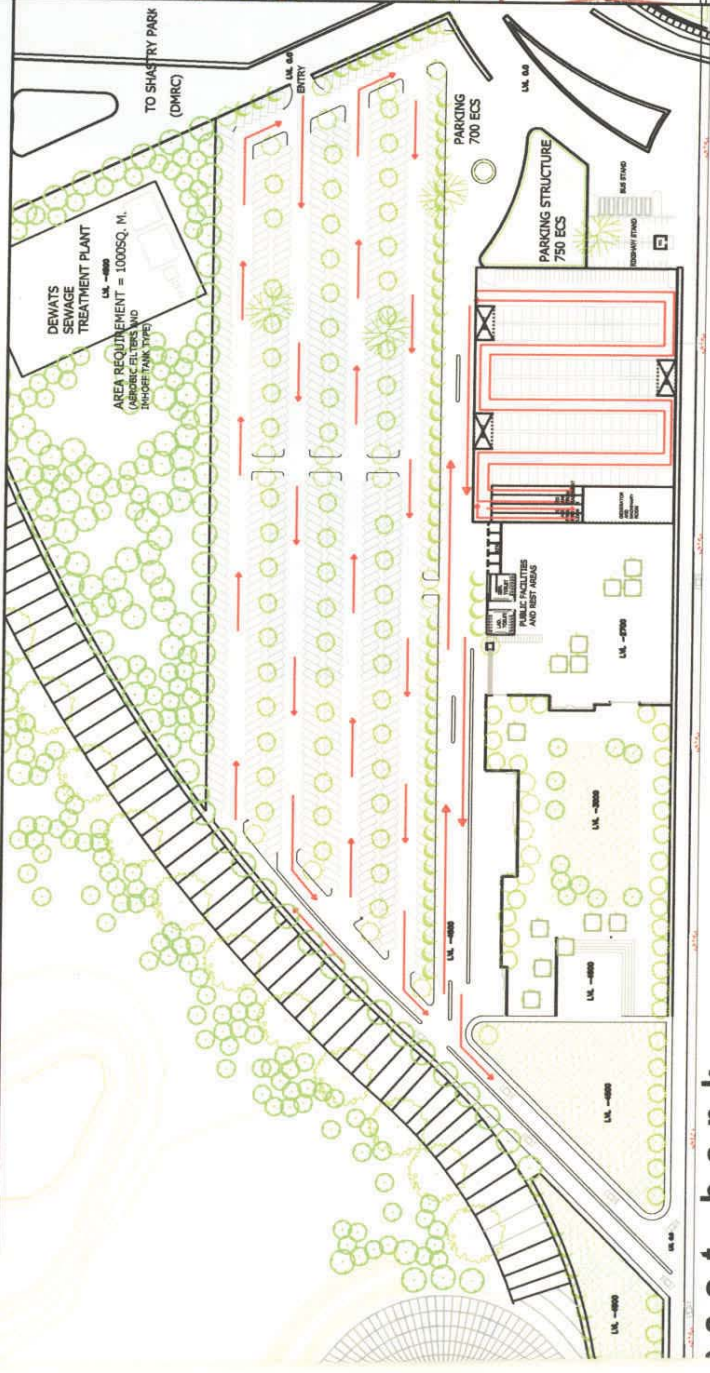


key plan

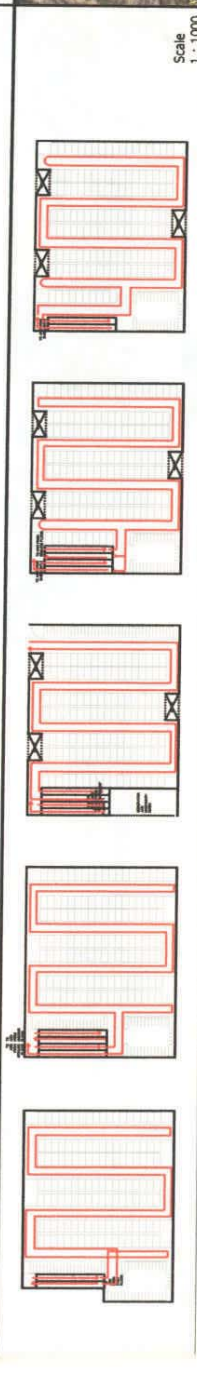
Design

Scale  
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# Parking

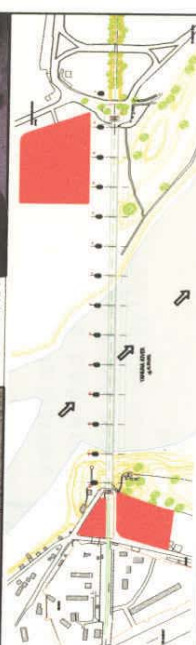
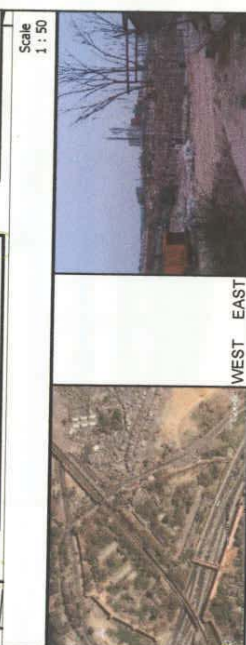
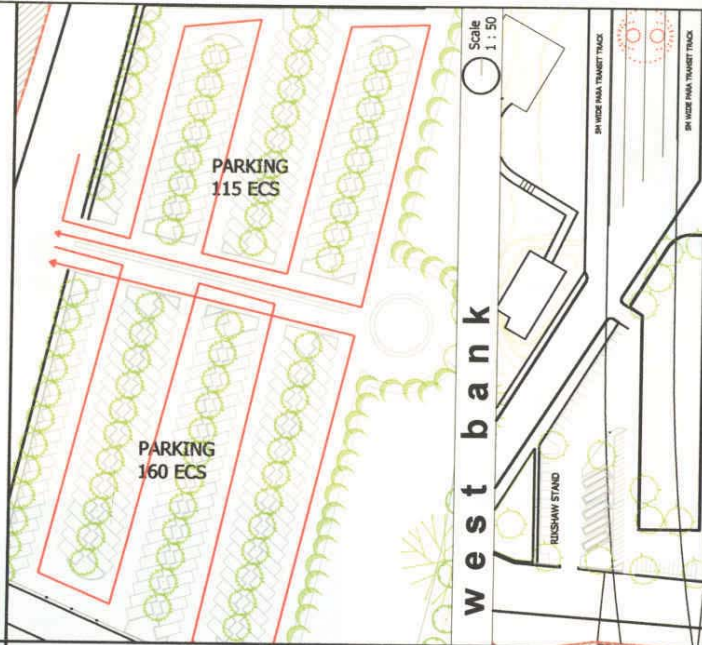


# east bank



<b>SECOND FLOOR PLAN</b> CARS = 144 TWO WHEELERS = 55 TOTAL ECS = 177.5	<b>FIRST FLOOR PLAN</b> CARS = 126 TWO WHEELERS = 49 TOTAL ECS = 160.5	<b>GROUND FLOOR PLAN</b> CARS = 126 TWO WHEELERS = 36 TOTAL ECS = 145	<b>BASEMENT 1 PLAN</b> CARS = 135 TWO WHEELERS = 28 TOTAL ECS = 149	<b>BASEMENT 2 PLAN</b> CARS = 135 TWO WHEELERS = 28 TOTAL ECS = 149
--	---	--	--	--

<b>TOTAL PARKING (WEST):</b> CARS = 115 + 160 = 285 TWO WHEELERS = 30 TOTAL ECS = 290	<b>TOTAL PARKING (EAST):</b> CARS = 1250 TWO WHEELERS = 186 TOTAL ECS = 1360	<b>TOTAL:</b> CARS = 1515 TWO WHEELERS = 300 TOTAL ECS = 1665
<b>OTHER INFORMATION:</b> Rikshaw = 60 Bus = 5 TDR AND MECHANICAL ROOM AREA = 350 SQ.M. FACILITIES = 750 SQ.M.	<b>OTHER INFORMATION:</b> Rikshaw = 26 Bus = 5 Two Wheelers = 36	<b>OTHER INFORMATION:</b> RIKSHAWS = 90 BUSES = 12



# key plan



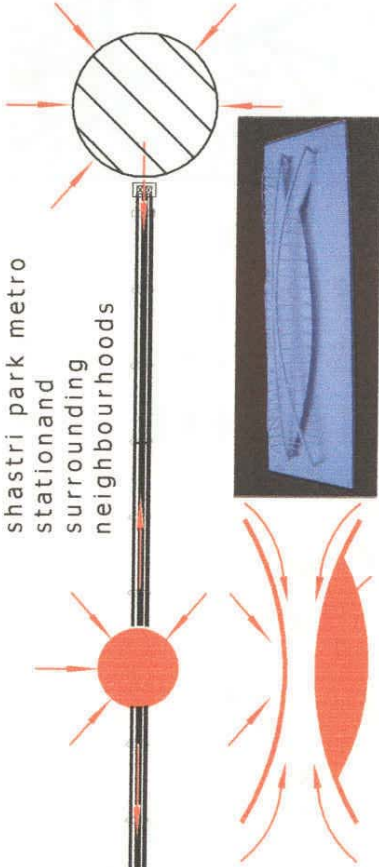


# Movement

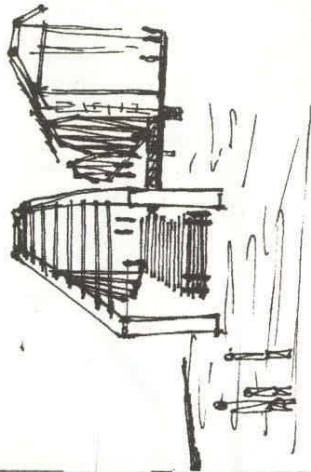
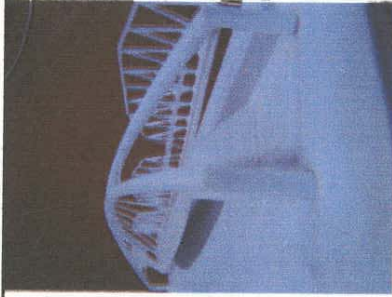
## Concept

entering at the centre to break the linearity of the movement pattern

collector from shastri park metro station and surrounding neighbourhoods

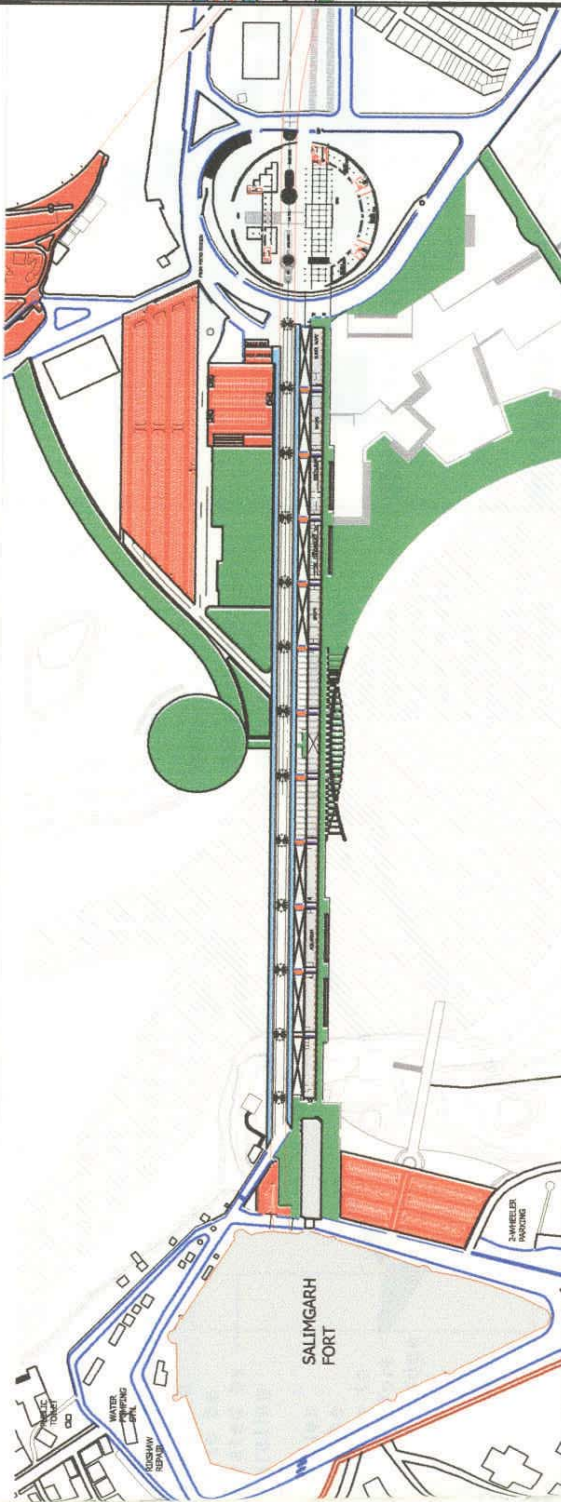


funnel shaped structure for directing movement towards the central space and larger floor space to accommodate larger number of people



connection of the central space with the flood plains

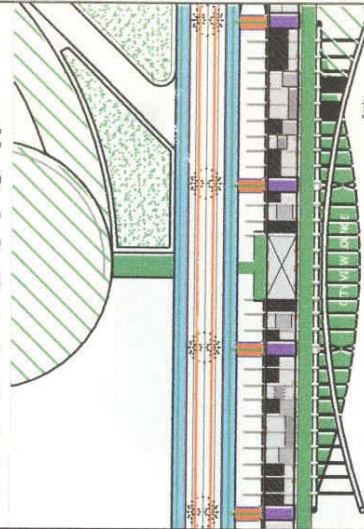
## Connections



separation of vehicular, pedestrian and para-transitby using the new railway bridge  
nodes of modal change are provided at both the ends which connect at both local and city level.

Vehicular	Services
Pedestrian	Nodes for Transportation exchange
Para Transit	Internal Cores

## Internal Circulation



vertical circulation cores provided at a distance of 60m from each other such that no point is farther than 30m from one

service entry from the new railway bridge side

## Design Description

### Structure Plans



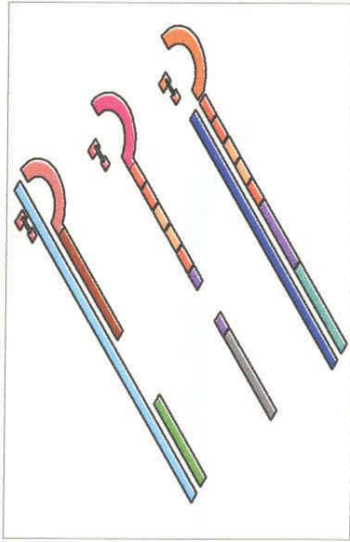
# Function

## concept

market street + mall = **Recro commercial street**

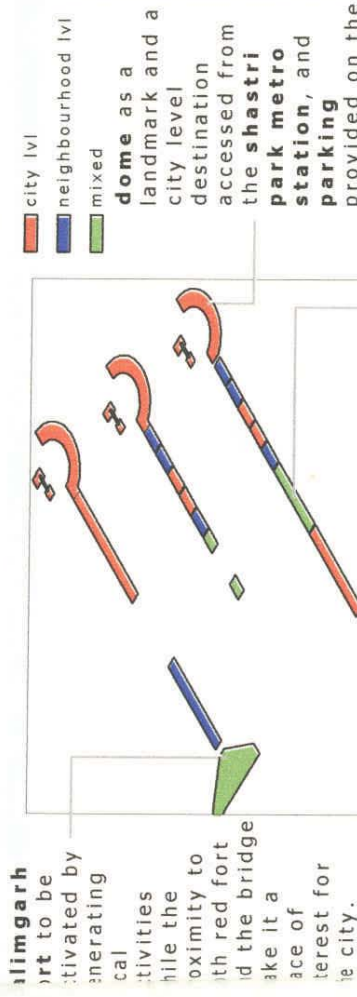


- aquarium
- jogging track
- city view lounge
- shops
- showrooms
- recro-commercial
- trade fair
- offices
- flower mkt whl.sale
- flower mkt exotic
- services
- vehicular
- train



**neighbourhood level** : for sustenance of the bridge and making it 'come to life'

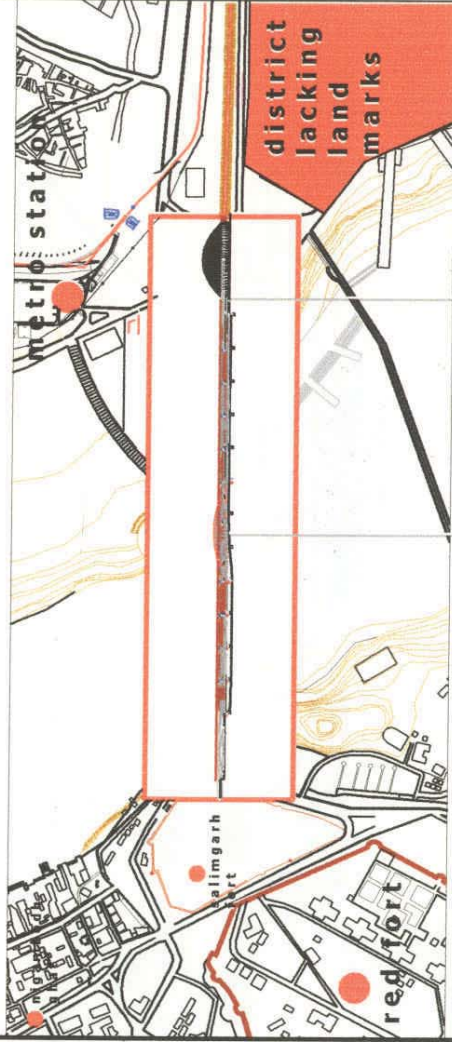
**city level** : for making the bridge a destination



**accessibility** : City level transportation modes such as metro station, ring road(west), and pushtha road(east) are made easier by the vision of car parking at both ends. Neighbourhood level access using rikshaws and buses for which suitable stands are provided on either side of the river.

# Image

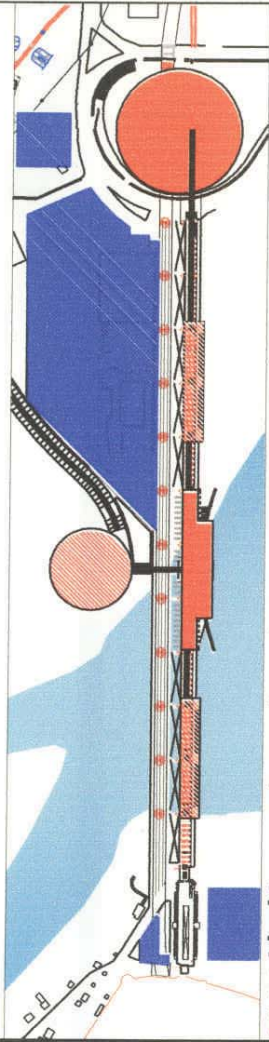
## landmark



**tensile arched structure** to enhance the city level importance of the bridge

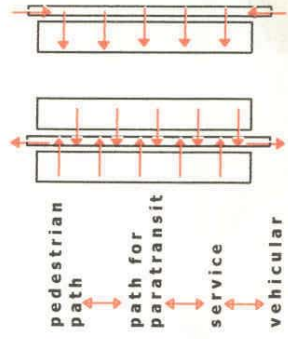
**geodesic dome** as a landmark. the east bank lacks visual identity provided only by the metro station.

## node and path



**activity nodes**: breaks provided on the linear path become activity generators for spontaneous as well as pre designed activities.

**transportation nodes**: at both the ends transportation interchange nodes for buses, rikshaws, and private vehicles is provided, apart from the existing metro station on the east bank



# Design Description

## structure plans

# Open space

linear space broken by large open nodes

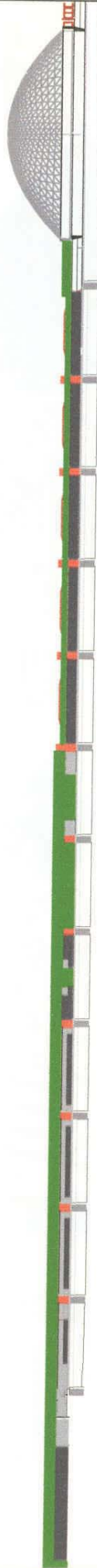


narrow passage broken by large volumes of space

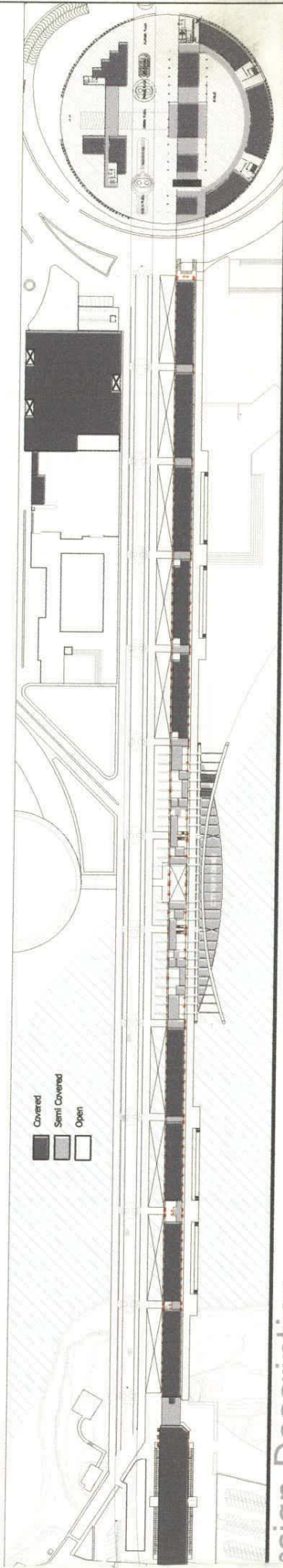


access to the flood plain from the bridge

heirarchy of open built in volume



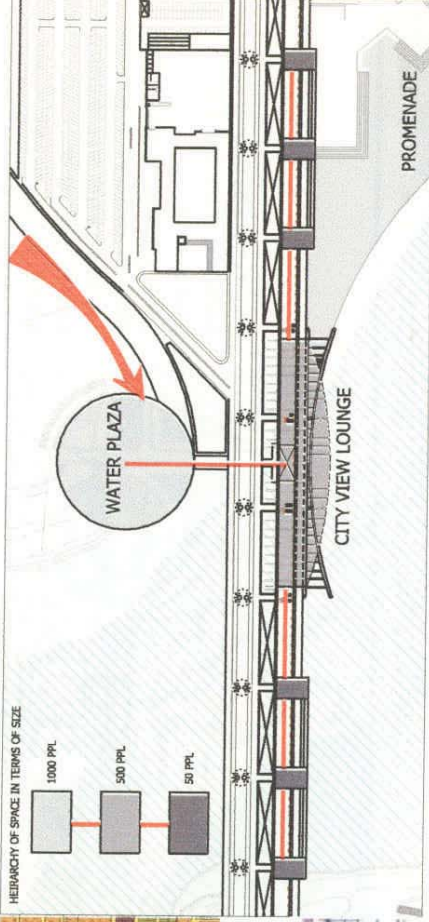
open and built relationship



Design Description

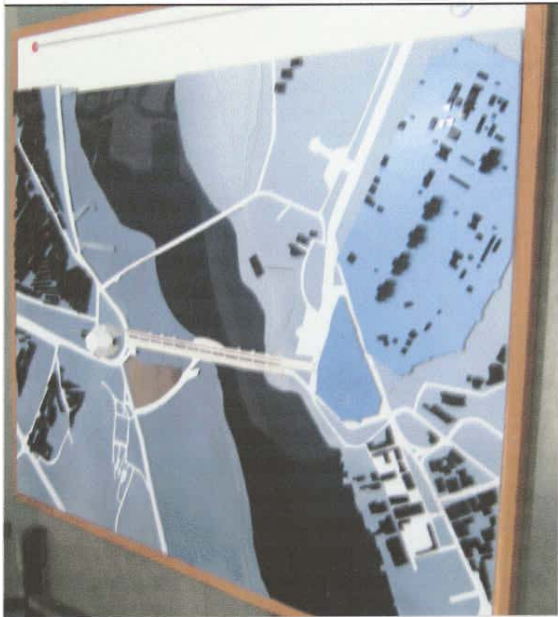
Structure plans

2 entering at the centre to break the linearity of the volume





# Models

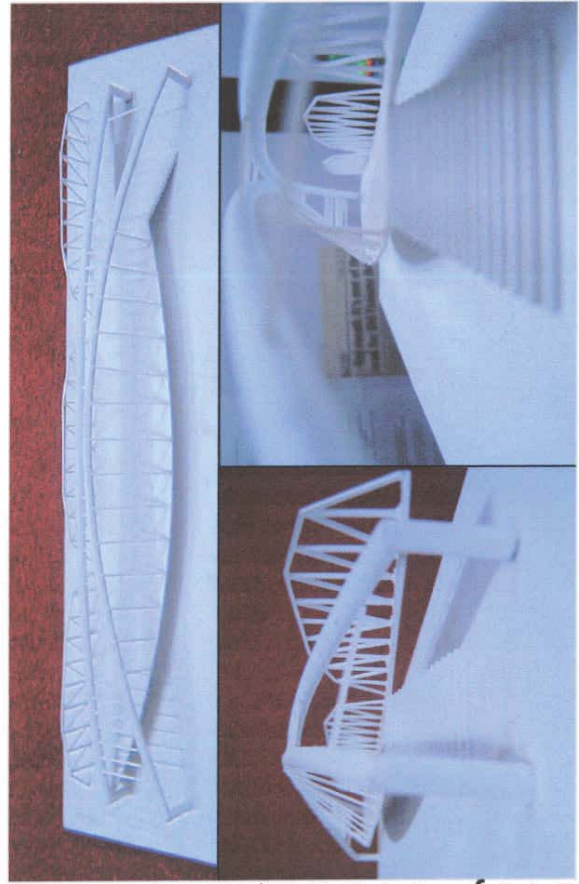


Site Model (1:2000)

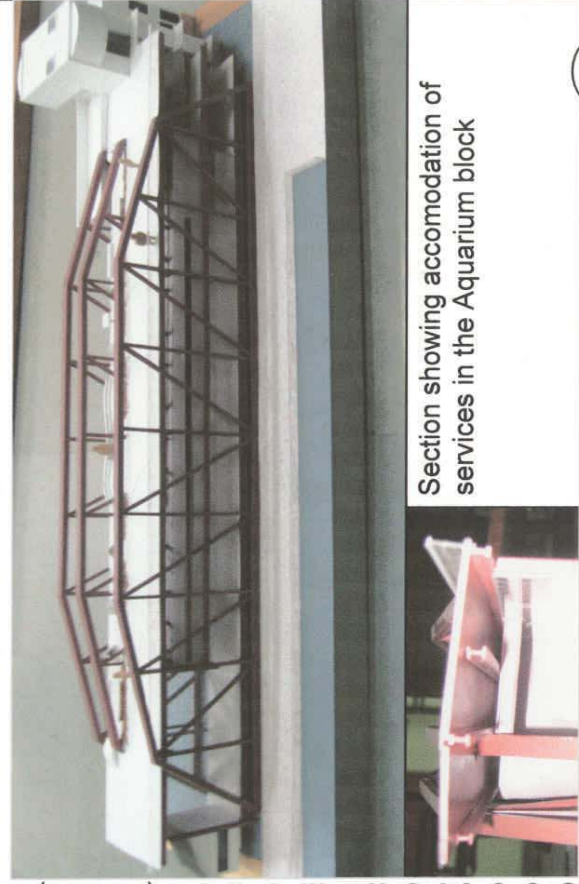
Showing the site surroundings including Red Fort and Nigambodh Ghat on the West Bank and the built fabric and Shastrri Park Metro station on the East bank.



Detail Model (1:500)



City View (1:500)



Section Model (1:100)

Section showing accomodation of services in the Aquarium block

