

Chapter-II

Study Area - Ghaggar River

2.1 Background of Study Area: Ghaggar

The Ghaggar is an intermittent river in India, flowing during the monsoon season. The Ghaggar River originates in Shivalik Hills in Solan district then flowing through Panchkula (Haryana), Mohali and Patiala (Punjab) and this seasonal river feeds two irrigation canals that extend into Rajasthan. The present-day Saraswati River originates in a submontane region (Yamuna Region) and joins Ghaggar near

Shatrana in Punjab. Saraswati originates in Yamunanagar district of Rajasthan. A dried out channel of the Sutlej, joins the river Ghaggar near Sadulgarh (Hanumangarh), the Naiwal channel. The Ghaggar then joins with the dried up Drishadvati (Chautang) river. The wide river-bed (paleo-channel) of the Ghaggar suggests that the river once flows full of water, through the entire region, in the presently dried channel of the Hakra River, possibly emptying into the Rann-of- Kutch. It supposedly dried up due to the capture of its tributaries by the Indus and Yamuna rivers and the loss of rainfall in much of its catchment area due to deforestation and overgrazing.

The geographical extent of the Ghaggar and others sub-basin lies between $72^{\circ} 20'$ to $77^{\circ} 22'$ East longitudes and $27^{\circ} 29'$ to $30^{\circ} 54'$ North latitudes of the country. Ghaggar and

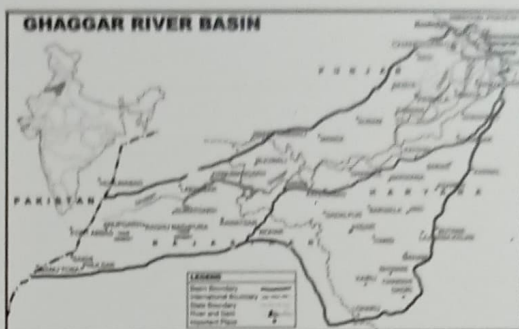


Figure No. 34: Ghaggar and other sub-basin which covers part of Punjab, Rajasthan and Haryana states forms the largest sub-basin of Indus basin

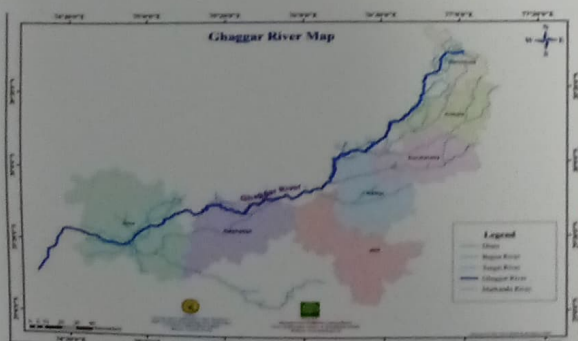


Figure No. 35: Ghaggar river in Haryana

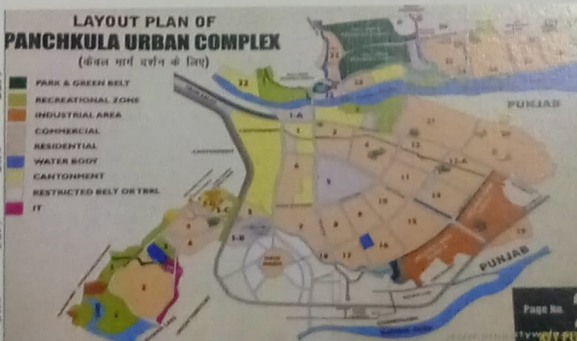


Figure No.36: Layout Plan of Panchkula Urban Complex

other sub-basin which covers part of Punjab, Rajasthan and Haryana states forms the largest

sub-basin of Indus basin with total catchment area of 49978 Sq. Km. apart from 26235 Sq. Km. of sub basin lying in Haryana spread over 45 watershed.

The Ghaggar River rises in Shivalik hills in Solan district of Himachal Pradesh. enters Haryana in Panchkula district. Hereafter, the river flow making border between Punjab and Haryana for more than 100 Km. After, Sirsa district the river leaves Haryana State and reaches Sri Ganga Nagar district, Rajasthan where after a certain length its course becomes untraceable. Once a perennial river, it is now seasonal at best. But during the monsoons, its tributaries are found to be in flood.

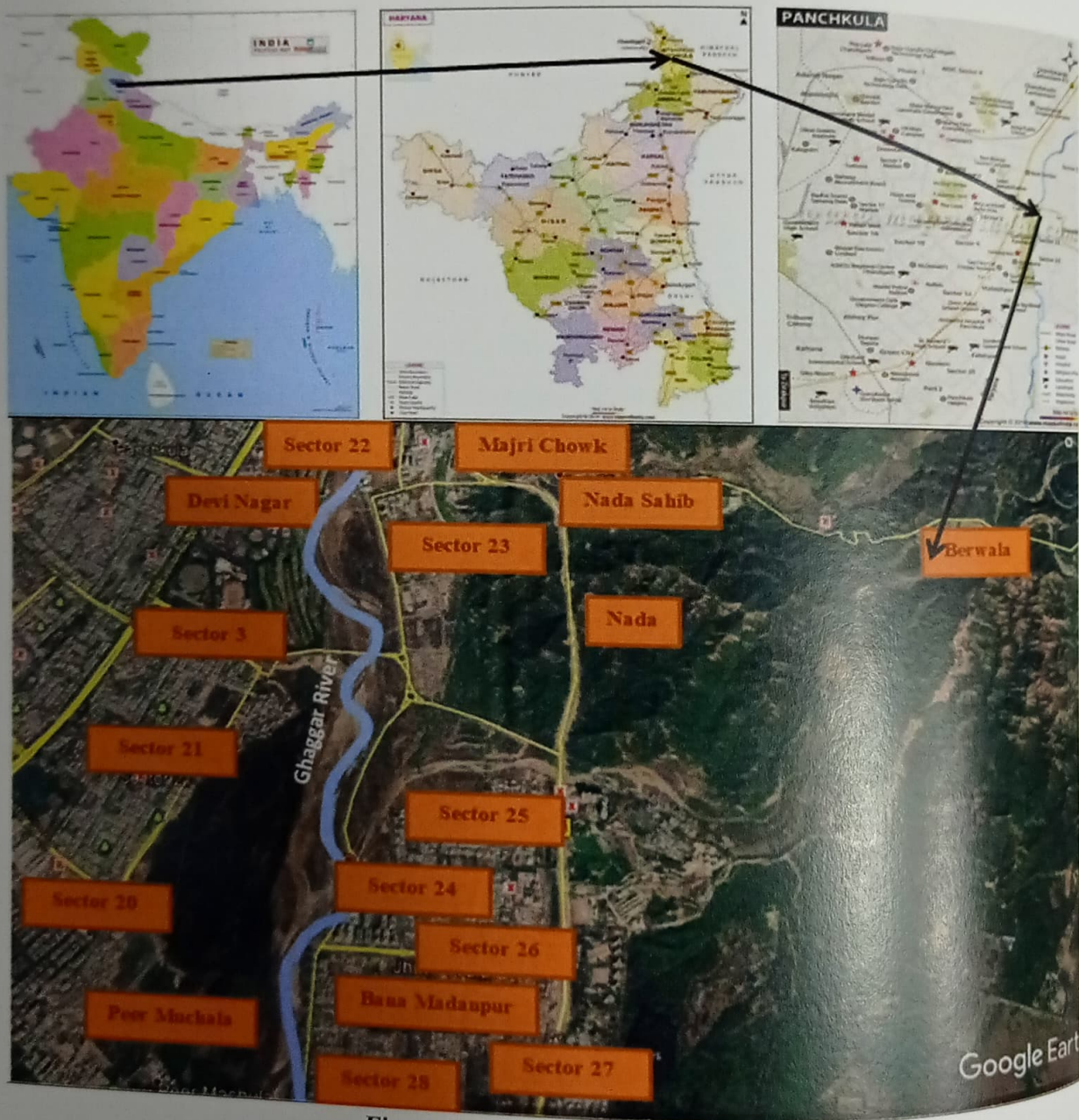


Figure No. 37: Site & Surroundings

2.2 Site Selection

The stretch selected for river front development of the river Ghaggar starts from sector 22 and ending point is near sector 28, covering the total length of 7km as shown in figure No. 38. There are many residential sectors (Sector- 22 to 28) in the vicinity of the site selected as shown in the figure:.

37 The site selected for river front development is easily accessible and is in close proximity of the three national highways as shown in figure No. 38 i.e. Chandigarh-Shimla Highway, Delhi- Chandigarh Highway and Chandigarh-Dehradun Highway which will act as a potential.

The site selected for river front development also has many tourist attractions in the vicinity which will act as a potential. The tourist attraction in the region are pinjore garden, Bhima Devi Temple, Chattbir Zoo, Mansa Devi and various hill stations such as Morni Hills, Kasauli, Chail, Nature Park, Peer Muchala etc. which are 20-10 km away from the site as shown in figure No. 39. Also Chandigarh which has many tourist attractions is in the vicinity.



Figure No. 38: Site Selected (Stretch 7Km)

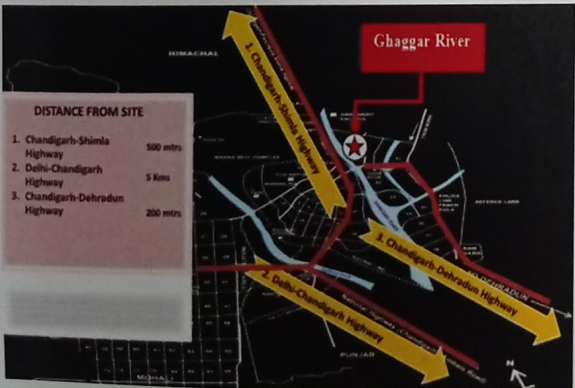


Figure No.39: NH in the vicinity of site

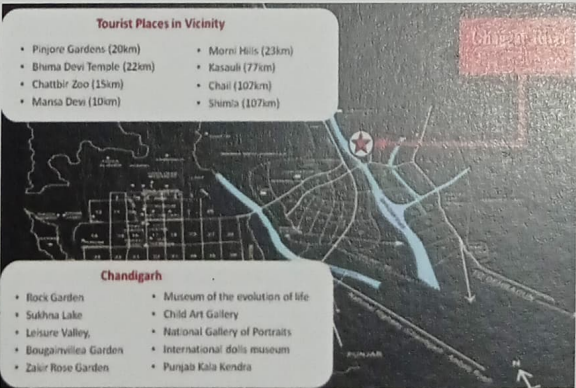


Figure No.40: Tourist attractions in the vicinity of site

The site selected for R.F.D site is situated in the urbanized area of Panchkula and around 150 acres of land of riverbed stood already acquired by HSVP.

2.3 Area Potential & Feasibility

1. Even in Chandigarh a Choe namely N-Choe which merges into Attawa Choe in Mohali passing through Chandigarh has been developed as leisure valley which has become one of the main features of the Chandigarh master plan. Even most a dry nalha namely N-Choe has been developed as a wonderful leisure valley using the same concept, we can develop the Ghaggar River Front which have more potential then N-Choe.
2. The site has a magnificent setting. The river forms an excellent opportunity to provide for an active public space as shown in the figure No. 41.
3. Social infrastructure like festival grounds, religious places attracting city residents to the riverfront. The site has an existing 'Chhath Ghat' which is extensively used during the 'Chhath Puja' festival. Nada Sahib Gurdwara and other temples are also in the vicinity of the site, people gather here in large numbers during the festival. These also bring economic benefits to the city.



Figure No. 41: Ghaggar River



Figure No.42: Chhath Ghat



Figure No.43: Shiv Temple

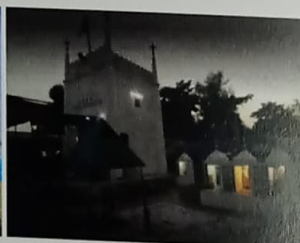


Figure No.44: Gogamedi Devinagar



Figure No.45: Nada Sahib

4. A developed & vibrant riverfront enhances the city as the "next destination". Expression of interest from entrepreneurs & new economic ventures like IT sectors, NIFT etc.
5. Revival of the river leads to environmental benefits. A live river feeds the city; a better river will ensure a better life for the city residents.
6. A city with a high quality of living attracts people from other congested urban Centres leads to balanced development at regional levels.



Figure No.46: IT Park



Figure No.47: NIFT

2.3 Need For Riverfront Development of Ghaggar River

This study focuses on the current problems being faced by the people living in the surroundings of the river Ghaggar. The untreated sewage flowed into the river through storm water outfalls and dumping of industrial waste posed a major health and environmental hazard. As there is a landfill site in proximity of the river Ghaggar, which is less than 800 meters away from the residential sectors 23 to 27 of the city, which continues to contribute to severe environmental and health hazards. The worst affected groups of people are the elderly and new-born babies by the diseases like asthma. The landfill often catches fire during the summers due to the methane gas production by the waste. The dumping ground receives tonnes of garbage every day. It includes wet waste that mixes with the water collected around the site. This contaminated water leaches into the ground or flows into the Ghaggar. The river bank settlements were disastrously prone to floods and lacked basic infrastructure facilities. The present condition of the river gives wild and shabby look, and is prone to encroachment by jhuggi dwellers leading to slums and adding to the pollution. And, hence needs immediate plan for its front development.



Figure No.48: Pollution of the Local Environment



Figure No.49: Leaching into Ghaggar



Figure No.50: Unsegregated waste causing water pollution

Therefore, Riverfront Development Plan defines that vision, provides a framework that allows us to capitalize on the energy, interest and goodwill that has integrated around the river. Adding to its value with greenways and other amenities and attracting public attention.

A river attracts people; hence riverfronts have emerged as lively Urban Cores of cities - their sociocultural, intellectual and economic centers. We are thus presented with a unique set of opportunities to generate quality urban spaces for the people.

Most importantly, a vital and vibrant waterfront will serve to unite residents and visitors in a shared experience of the city, just as the city public places and streets. The, Ghaggar rightly proposed the riverfront development through infrastructure provision to provide good quality of life to the citizens in an integrated, equitable and sustainable manner.

2.4 Aim, Objectives & Methodology of the Project

Project: Aim

The aim of this project would be transforming Ghaggar as a unique cultural platform with recreational and entertainment facilities serving the city and its region, its people and tourists with new dimension, meaning and scale of development. The riverfront development is proposed to be as a city's identity on its waterfront.

Vision of this project is to transform the waterfront side into a series of sustainable, mixed (use, urban precincts integrated with green parks, waterfronts activity, employment and recreation).

The project would look into the ways to rejuvenate the urban life and the space through improved quality of life, facilitating recreational and cultural activities, organizing informal businesses and designing better public spaces with creative amenities. The goal is to plan a development that would be oriented towards creating an urban form that is wholly consistent with the physiographic feature of the area. The urban form integrated with the natural landscape would create an enriching experience by responding to the context of water and existing diversity of activities thereby, create a visually dominant landmark.

Project: Objectives

Objective 1: Ecological preservation:

- Identify and implement environmental protection priorities to protect water quality and other sensitive natural features.
- Stop the flow of sewage, keep the river clean and pollution free
- Revitalize riverfront neighborhoods, rejuvenate Ghaggar

Objective 2: Create Social/ Public space:

- Take the riverfront accessible to the public
- Create riverfront parks to enjoy the water.

Objective 3: Designing Development that is in harmony with the natural character of the area"

- The urban form integrated with landscape, thereby, creating an enriching experience by responding to the context of water, existing diversity of activities, and forming a visually dominant landmark. Encourage development of appropriate design and use to improve the utilization of public lands and to improve resident's quality of life.

- Create a memorable identity for the Ghaggar
- Improved Riverside infrastructure and healthy environment to the nearby community.
- Create beautiful landscape, parks, sports and recreational facilities within the area and integration of the existing features such as Golf Ground, Stadium etc.
- Various activities like, yoga center, kid park, open gym, library and sitting spaces for senior citizens, jogging, cycle track can be planned under the development with proper and efficient safety, security, lighting, basic infrastructure services and facilities.
- Create Social/ Public space and make the riverfront accessible to the public and the neighborhoods.
- Designing Development that is in harmony with the natural character of the area.
- Encourage development of appropriate design, scale, and use to improve the utilization of public lands and to improve residents' quality of life.

Project: Methodology

- To carry out present study, first literature review on riverfront development in general. The information and data offered in this research study are based on literature concerning waterfront studies discussed above. Case studies of successful riverfronts with significant features of public open spaces: Sabarmati riverfront development, On the basis of study, formulation of our study objectives has been done.
- Data has been collected from DTP office, Panchkula and Survey of India, Chandigarh to analysis the need for riverfront development along Ghaggar River including the area potentials and feasibility for developing a successful waterfront.
- Identification of study area and its geographical setting covers the topographic data based on the Topo sheets and Google map. Also, the study focuses on existing infrastructure, buildings and their interrelationships.
- The findings from this analysis and derived guiding principles for the riverfront are important to understand the behaviour of public spaces in order to attract and meet public expectations. It would contribute in the process of developing proposals for future development.

Methodology

Literature study & background study of the area



Formulation of Project Objectives



Primary & Secondary data collection



Data Analysis & Area potentials



Topographic/Locational Setting

- Ecological sensitive (Based on Google map and Topo sheet collected from Survey map of India)
- River boundaries

Urban form

- Integrations with the existing natural landscape diversity of activities thereby, creates a visually *dominant landmark*.

Infrastructure

- Existing features such as Herbal Garden, parks, Benches, Ground, Stadium etc.
- Public space creation
- Amenities/Level services improvement



Recommendations/Proposals/Conclusion

2.5 Issues & Site challenges

Limitations

i. Disconnected Waterfront

Challenge:

The volume of water flowing in the river is very low and not too much visible as the stream of river changes its path at various locations. Also there is absence of Visual Linkages and Physical Linkages with Riverfront (Bushes and Plantation acting as obstacle) as shown in **figure No. 51**.

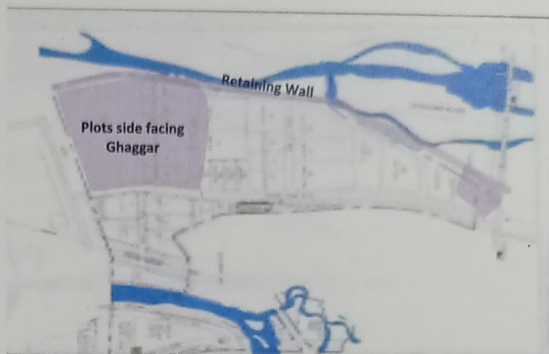


Figure No.51: Absence of Visual Linkages and Physical Linkages with Riverfront

Consequences:

The riverfront is poorly connected in terms of pedestrian links, functions, views and vistas, the waterfront itself could be much more vibrant and interesting. The waterfront's potential has been underutilized.

Solution:

Construction of small 2 feet high check dams at regular intervals can be done to visually enhance the marine character of the current flow of water.

ii. Limited Scope for development

Challenge:

In layout plan of IT Park, Panchkula by HSIIDC landuse along the Ghaggar area has already been fixed leaving no more scope for giving any proposal opposing a limitation in development of riverfront in this part (Figure No. 52). As shown in figure planning has been done in such a way that the plots side is facing Ghaggar River which is acting as obstacle in the view.

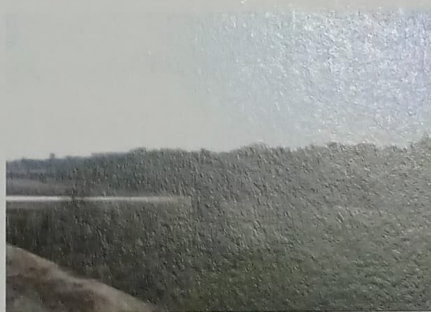


Figure No.52: Absence of Visual Linkages

Consequences:

This will lead to underutilization of the natural beauty and view of the Ghaggar River.

Solution:

However, area between retaining wall and Ghaggar bed is proposed to be developed as Eco Green zone and also hanging out area can be proposed in the river bed area along the

retaining wall. The location of the river have an advantage and scope of creating recreational spaces which covers a large area of residential sectors and are in close proximity to the site. But at present it does not translate into a place where you just spend time in the public spaces. The open space has lost its important role.

iii. Weak Public Life Pattern

Challenge:

The site is well connected with the areas developed by HSVP and HSIIDC, yet there is a fragile pattern of urban life with no informal recreational activities taking place. Most of the activities taking place are considered necessary activities, such as offices (IT Park), institutions (NIFT) and Religious sites (Shiv Temple, Nada Sahib & Hanuman Mandir).

Consequences:

The site does not have a distinct character, and is poorly denied. There is a great deal of important destinations on-site, but they are lacking physical and visual linkages connected and fail to generate public life activities. It is not a place that succeeds in inviting people to go to for informal or recreational activities such as strolling, biking or hanging out and other picnic spots.

Solution:

Identification of key points along the Ghaggar is needed to be done, and further beautification and provision of other recreational green infrastructure is required.

iv. Linkages and Connectivity

Challenge:

The site is well connected with the areas developed by HSVP and HSIIDC but it lags behind in connecting in regional context as there is no direct linkage with SAS Nagar, Punjab and other environmental recreational spots like Chattbir zoo and Nature Park, Peer Muchala which attracts good number tourists. As shown in figure No. 53 the site needs to be connected by Airport road (proposed as PR-7) on priority basis by constructing the unconstructed portion in Punjab and also



Figure No.53: Showing PR-7 yet to be constructed

bridge connecting sector-20 & 21 with sectors across Ghaggar River with dividing road of sector-24 & 26, Panchkula.

Consequences:

This proposed road needs to be constructed on priority basis in order to tap the hidden potential of the area, as the site will have good access in both regional and local context which will boost the tourism and economic viability of the area by attracting good threshold.

Solution:

To enhance the quality and efficiency of road connectivity of the site by completing the unconstructed portion of proposed road named PR-7 and the proposed bridge connecting sector-20 & 21 and with sectors across Ghaggar River with dividing road of sector-24 & 26, Panchkula (Figure No.53) along with construction of clover-leaf flyovers at Zirakpur on Ambala-Chandigarh national highway (NH-22) and Patiala-Chandigarh road should be taken up for construction on priority basis is recommended.

v. Minimal Open Space Identity

Challenge:

The public space network is unclear, since the site lacks interesting, inviting and varied public spaces. The public space hierarchy is unclear. There are several religious monuments in close proximity to the site. But it does not translate into a place where you just spend time in the public spaces. The open space has lost its important role as a preferred meeting place.

Consequences:

The poor public spaces and the office/institution focused activities in this area cause fragile user patterns. A strong public life culture demands a place that is more inviting throughout the day, week and the year.

The public spaces seem underutilized (Many parks at site are underutilized which can be converted into good recreational spaces such as Herbal/Meditation parks). Few public spaces in and around the site manage to invite people to spend time for informal recreational purposes and leisure. Lack of public life is a self-perpetuating process. Higher levels of public life tend to generate more life while lack of public life has the opposite effect.

Solution:

In order to enhance the quality of public life, the existing parks such as Herbal/Meditation parks and other green spaces needs to be integrated with the Ghaggar

riverfront, besides adding more spaces by reclaiming from the Ghaggar bed without tempering the natural shape of the river and to make the project cost effective (i.e. economically viable).

vi. Institutional and Office Focused Area

Challenge:

Overall, the site is dominated by offices (IT Parks), residential (Sector- 20-28) and institutions (Proposed NIFT).

Consequences:

The lack of diversity and mix in functions has a number of side effects. There are generally fewer attractions and unique experiences in each area leading to a lack of mixed user groups. In terms of public life, the site is only highly active during office and college hours. This leads to a perceived lack of safety in the evenings and weekends, and also impacts the use of public spaces in the area adjoining the IT Park and NIFT.

Solution:

Therefore to enhance the safety and living quality of the area, such activities and functions should infuse which will not only enhance the safety but will also boost the economy and underutilized natural beauty of the area.

2.6 Immediate Context

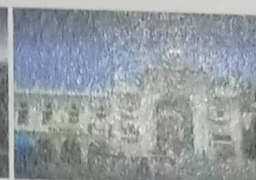
The site precinct has number of mixed-uses. The predominant ones being professional institutes and offices such as NIFT which is under construction and offices such IT Park in the vicinity of the Ghaggar. It has numerous parks located in close proximity. Major sports activity buildings, namely Tau Devi Lal Stadium and Panchkula Golf Club.

Two parks namely Herbal Park and Meditation Park are in the vicinity of the Ghaggar. There is residential area in the site precinct other than also few religious site prevails in the vicinity such as Gurdwara Nada Sahib, Gogamedi Devinagar, Hanuman Mandir, Sector-25 and Shiv Temple.

Figure No. 54: Immediate Context



a. Panchkula IT Park



b. Gurdwara Nada Sahib



c. Panchkula Golf Club



d. Gogamedi Devinagar



e. Tau Devi Lal Stadium



f. Shiv Temple



g. NIFT



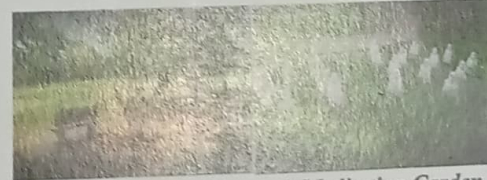
h. Dumping site



i. Chhat Puja Ghat



j. Hanuman Mandir, Sector-25



k. Park, Sector-24



l. Meditation Garden



m. Herbal Garden, Sector-26



n. Muslim Kabiristan

Residential

Agriculture/O.S./Forest Area

Public Semi Public

Vacant Land

Religious Significance

Chhath Puja Ghat which is located on-site is used extensively during the Chhath Puja festival. Chhath Puja is an annual event and the site remains un-utilized for the rest of the year, therefore this



Figure No. 55: Chhath Ghat



Figure No. 56: Nada sahib

ghat/facility needs to be put to multi uses like Murti Visargan and other recreational cur religious uses. Thus, there is need to create activity to bring people to the site. Also fe religious sites prevail in the vicinity such as Gurdwara Nada Sahib, Gogamedi Devinaga Hanuman Mandir, Sector-25 and Shiv Temple.

Office/Institutional

Proposed important government institutional building (NIFT) are located in this area. This institution should have a better access to the riverfront site. Offices in the with IT Park are located in the immediate context of the site.

Residential

The residential area of sector 22-28 is located adjacent to the Ghaggar River. One of the sector-22 with IT Park is adjacent to the site.

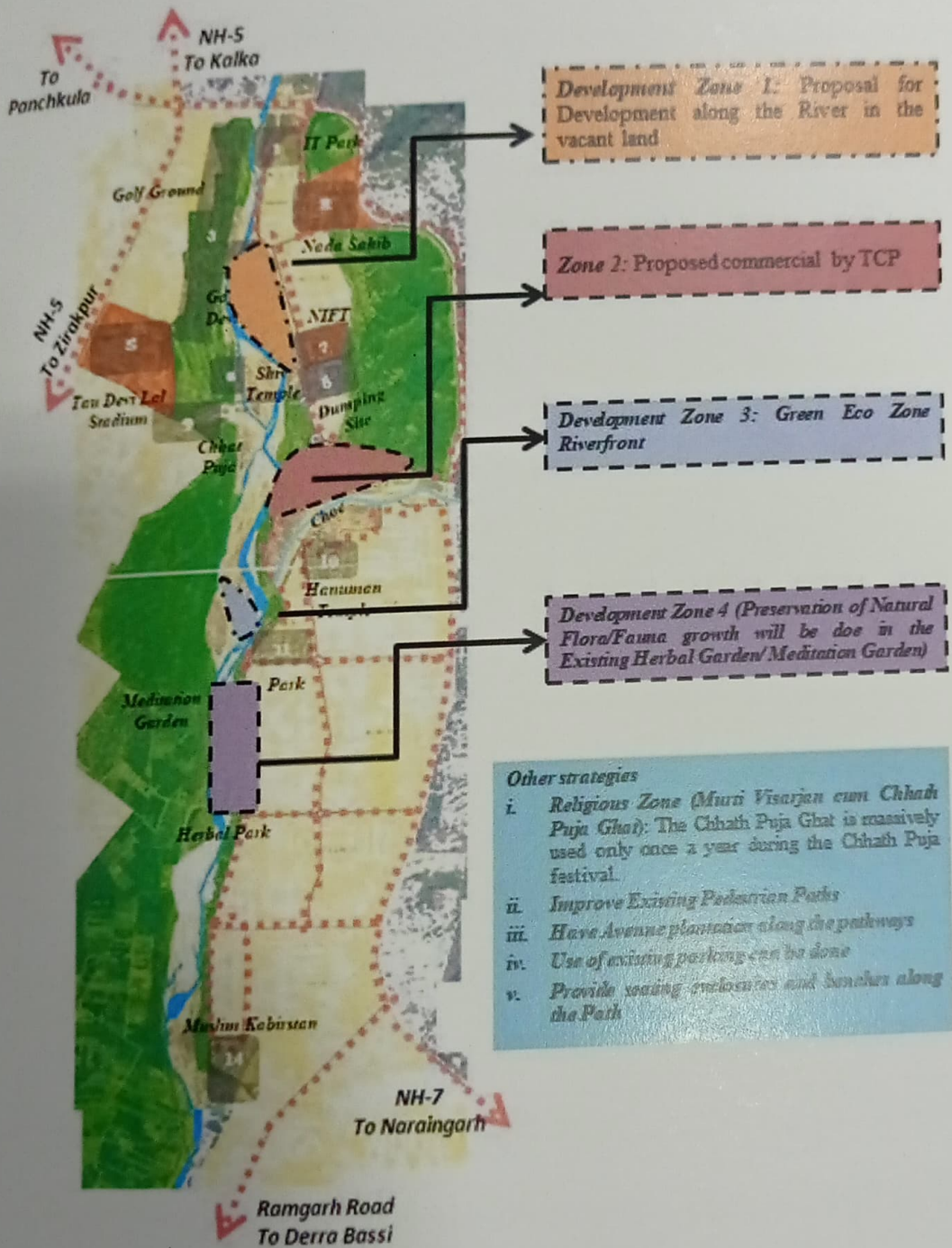
Sports Facility

Tau Devilal Stadium and Panchkula Golf Club are located within 5–10 minutes walking distance from the site. The stadiums act as activity generators and this activity can be dispersed to the riverfront site, creating an active area. Also, the parking lots which are used occasionally for stadium and golf ground can be used for the proposed site.

Open Spaces

Most of the public 'open spaces' are located around the site – such as Herbal Park and Meditation Park are in the vicinity of the Ghaggar. The open spaces are not easily accessible. They need to be well connected to the adjoining areas and roads.

Figure No. 57: Design Concept



As shown in the figure No. 57 (Design Concept), Strategic locations have been identified for development as shown in the **figure** No. 58 given below followed by the Development Zone 1 near Sector-22, 2nd zone is Proposed as commercial by Town and Country Planning department near existing dumping yard, 3rd is proposed as Green Eco Zone

Riverfront and 4th Development Zone would be developed by integrating the Existing Her Garden / Meditation Garden with the Ghaggar. ⁸

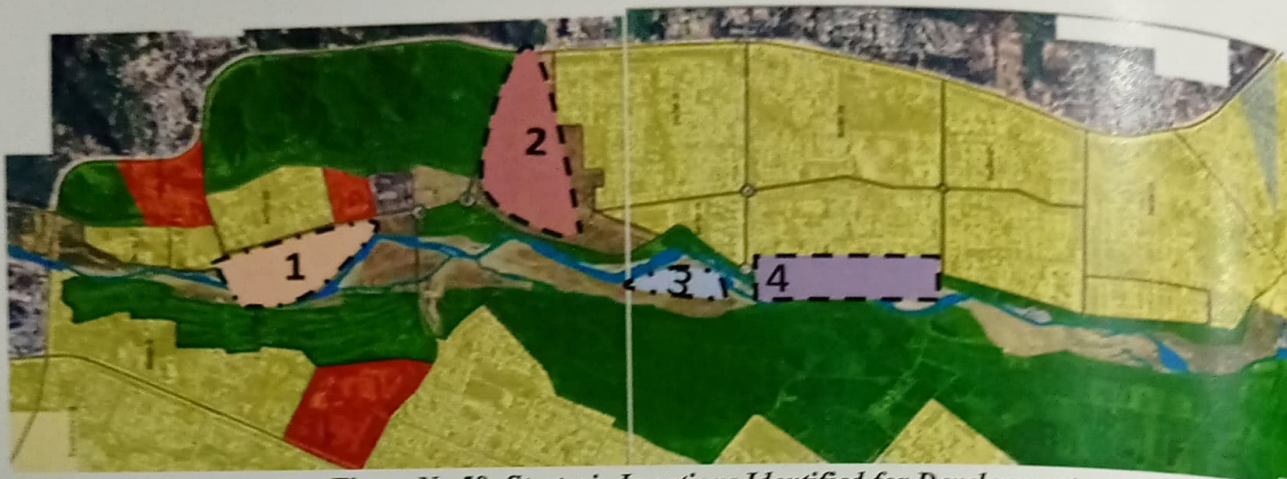
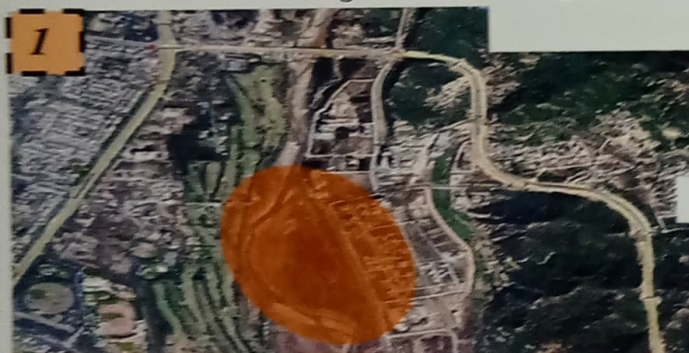


Figure No.58: Strategic Locations Identified for Development



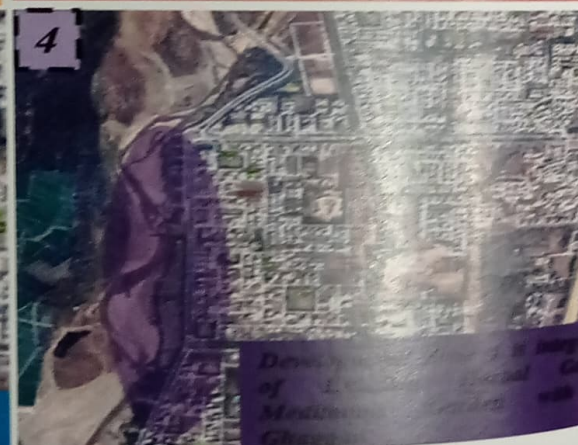
Development Zone 1 near Sector-22



2nd zone is Proposed commercial by TCP near existing dumping yard



3rd is Green Eco Zone Riverfront



Development Zone 4 is near of Existing Her Garden / Meditation Garden Ghaggar

2.7 Planning Considerations and Proposals for RFD

Ghaggar River have narrow stream which extends upto 60m during monsoons which is seasonal in nature and changes its path at various locations, which can be channelized using various innovative techniques and strategies. An embankment and steps along the river needs to be improved. Innovative ideas can be opted such as integration of existing parks

⁸ Primary Survey and Google Earth.

garden with the Ghaggar riverfront development like in case of RFD in Kankaria Lake, Ahmedabad. Also zip line & ropeways can be proposed in the nearby hilly terrain. Specialized Ghats can be proposed and existing Ghats can be integrated with the proposals. Walkways are important as they define the movement pattern on the site. The building layouts and structures should be designed in a way so as to not block views of the river. The presence and view of the river from various locations on the site not only help in achieving a successful project but also help in developing the surroundings.

Newer developments should be done keeping in mind the ongoing activities which provides a character to the river. New activities should be incorporated to have a fresh mix of tasks which can attract tourists as well as regular crowd.

In order to have a successful riverfront development, a city must work with the private sector to make the development economical and feasible. The riverfront is one of the amenities in a city that spurs economic development. The more diverse the land use on or near the riverfront, the more thriving it is.

The Strategies and Design Approach

The main strategies to achieve is to understand the river flows, identifying preferred activities, defining edge conditions and levels to manage water flows, identifying phases that can be implemented now, raising awareness, interest and sense of ownership.

The activities and uses along the River have number of mixed-uses. The predominant ones being professional institutes and offices such as NIFT which is under construction and offices such IT Park in the vicinity of the Ghaggar. It has numerous parks located in close proximity. Major sports activity buildings, namely Tau Devi Lal Stadium and Panchkula Golf Course also exists in the vicinity. Two parks namely Herbal Park and Meditation Park are in the vicinity of the Ghaggar. There is residential area in the site precinct other than also few religious site prevails in the vicinity such as Gurdwara Nada Sahib, Gogamedi Devinagar, Hanuman Mandir and Shiv Temple. Along the whole length of the river there could be foreseen cycling, walking, tracking and play area.

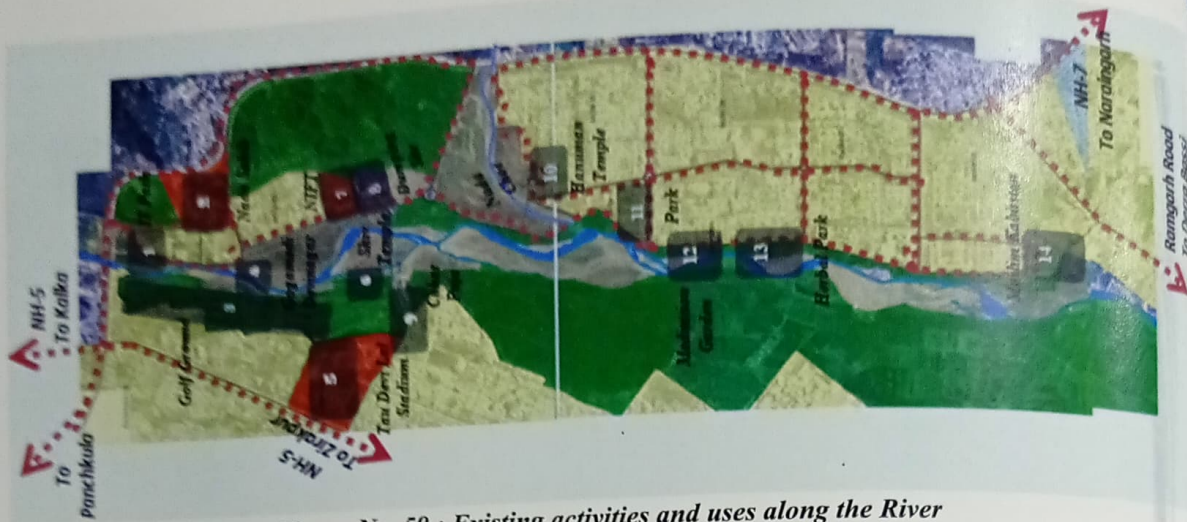


Figure No. 59 : Existing activities and uses along the River

Some of the planning considerations and **Major components of development zones** to be considered while developing the Riverfront Development are **as given below:**

- i. **Create an active space along the Ghaggar:** Create beautiful landscape, Fitness and recreational facilities within the area by proposing various activities like yoga center, kid park, open gym, library as shown in the figure: and sitting spaces for senior citizens, jogging, cycle track needs to be planned under the development with proper and efficient safety, security, lighting, basic infra services and facilities.



Figure No.60: Yoga center



Figure No.61: Zip Line



Figure No.62: Ropeway

- ii. Locate public entrances to vending street (moving kiosks, booths, food trucks, vegetable/fruit venders, sidewalk cafes or any other informal vendors) uses along the riverfront facade of the building. Create riverfront addresses, particularly with regard to publicly oriented uses. This vending zone would comprise of temporary structures as per standards designs issued by HSVP.

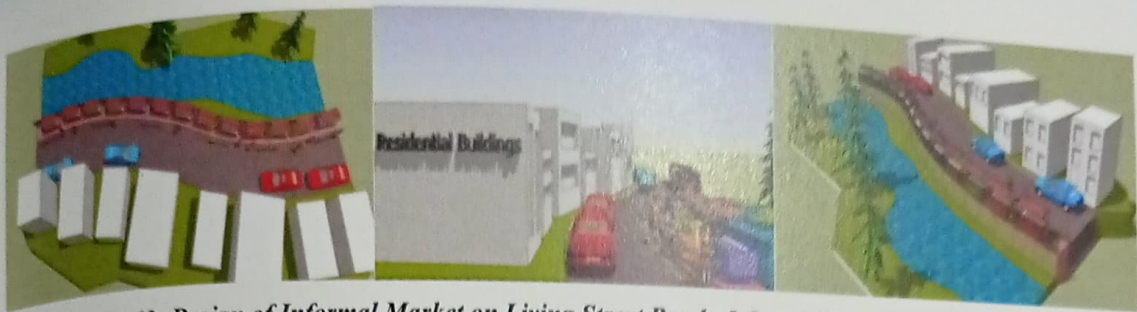


Figure No.63: Design of Informal Market on Living Street Roads & Local Street Roads (Vending Zone)

- iii. Tap into tourism potential to improve the economic wealth of the city by giving Proposals such as Bio-Diversity Themed Park, Water Sports, Audio Visual Show & Amphitheatre, Heritage Walk, Landscape Park, Zip line, Rope Way, Tourist Plaza & Information Centre etc.

iv. **Preservation of activities**

- a) Preserve the existing activities like Herbal Garden in sector 26 as shown in figure No.65 and other Parks, temples such as Shahni Temple in Sector-3 as shown in Figure No.67, markets, etc. along the Ghaggar.
- b) Existing retaining wall will be used to protect the natural waterfront as per the Layout Plan of HSIIDC.
- c) Alternate should be given to slum dwellers in order to improve River side development to vacate the encroached area from slum dwellers.



Figure No.64: Scenic Beauty of Ghaggar



Figure No. 65: Herbal garden, Sector-26



Figure No.66: Park, Sector-24



Figure No.67: Shiv Temple, Sector-3

v. **Marine development, other recreational activities and Walkways along the Ghaggar**

There is wild growth and encroachments along and in the Ghaggar bed as shown in the figure No.68: showing section of the existing marine character of Ghaggar giving shabby looks hiding the natural scenic beauty of the area. Therefore, proposals such as walkways, plantation, children parks, Ghats and stud wall etc. to enhance the marine character and scenic beauty of the area has been given as shown in the figure No.69.

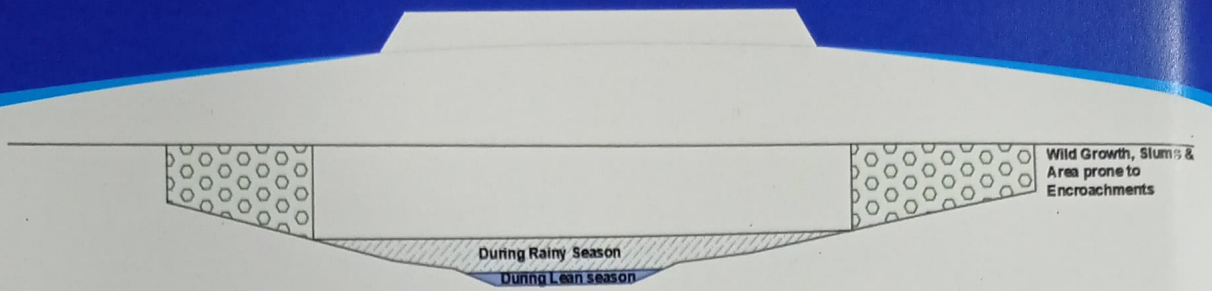


Figure No. 68: Section of Existing Marine Character of Ghaggar

*Not to scale

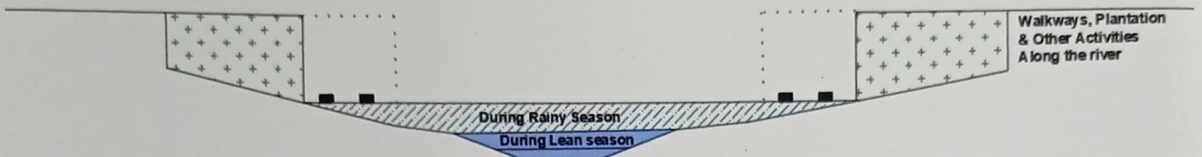


Figure No. 69: Section of Proposed Marine Character of Ghaggar

*Not to scale

vi. Gateways

Gateways as shown in Figure No.70 can serve as the entrance for pedestrians, cyclists and vehicles. They can be located at key points with similar design language. Connected to the existing movement network, they offer information and directional signs for the places to go or things to do.

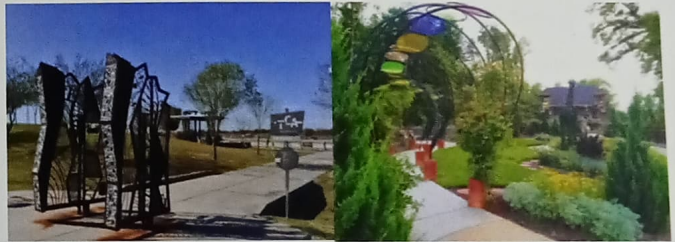


Figure No. 70: Gateways to the park

vii. Key nodes

The key nodes are structures positioned at junctions of the area that serve as accelerator for generating interest, awareness, investments and income, such as: restaurants, pavilion cafes, information Centres, toilets, etc. The pavilions have direct connection with the entrances, lightning for the evening use, outdoor seating and distinctive paving. The play areas for smaller children are clearly divided from those for older ones. Apart from this timber adventure play equipment, play tunnels, climbing walls, performance areas and places for the citizens to sit and watch, multi-use games area, such as basketball courts, football, netball etc.



Figure No.71: Information Centres



Figure No.72: Pavilion cafes at entrance



Figure No.73: Multi-use games area

viii. *Walkways*

Walking in the river, by the river and in the woodland are the three categories established for pedestrians and cyclists, to promote the most enjoyable experiences.

a) *Walking in the river (Figure No.77)* is made possible by safe and inspected

pedestrian access on walkways, into, across and alongside the river. Mainly it will follow the line of river, north and south, providing

different experiences during each season as shown in **Figure No.74**. Along the walk, the pedestrian can stop at some points by seating under viewing kiosks as shown in

Figure No.75 and admiring some artwork. Along the paths there would be provided information and signing.

Before

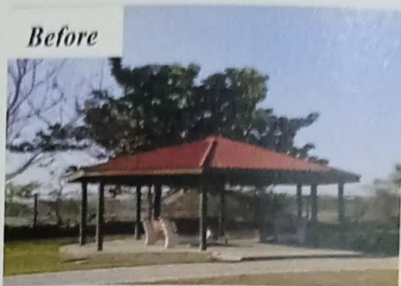


Figure No. 74: Existing viewing kiosks along the Ghaggar

After



Figure No. 75: Reuse of Existing viewing kiosks along the Ghaggar

Before



Figure No. 76: Showing Ghaggar Changing the path

After



Figure No. 77: Paths tracking for walking in the river

b) *Walking by the river (Figure No. 79&80)* is accomplished by central network of pedestrian and cycle routes which connect the length of the park and encompass river, meadows, glades and woodland edge. This pedestrian network is completed by social spaces at key nodes for sitting, orientation, shelter, by fire pit or barbeque areas, places to socialize, places to view, places to inform.

Before

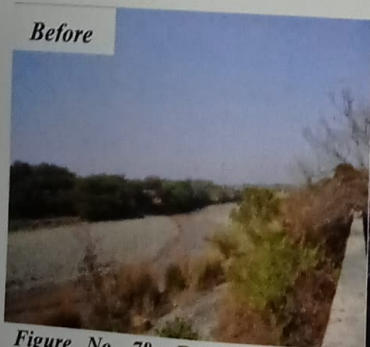


Figure No. 78: Existing Retaining Wall along the Ghaggar

After



Figure No. 79: Creating steps along the river

After



Figure No. 80: Creating river walk along the river

c) *Walking in integration with the park (Figure No.83)* is seen as a transition from built edge to park world, for pedestrians and cyclists. This will connect routes from gateways to nodes and river paths. It does have access for vehicles service. The plants will be composed in a matrix planting, with denser edge mix of shrubs, protected by fences. Existing parks namely herbal garden and meditation garden can be integrated with the Ghaggar as shown in the figure No.83.



Figure No. 81: Existing Herbal Park



Figure No. 82: Existing Meditation Garden



Figure No. 83: Integration of Existing Parks with Ghaggar

ix. Public Facilities and Easy Accessibility

- Human interaction with water is foremost feature that calls for riverfront development. People have a strong desire to feel it, reach it; and thus it becomes very important that accessibility to water should be given. Obstacles to be curtailed and connect to the river. To achieve these walkways, trails, cycle trails and benches are provided as they give people an opportunity to be either in the river or near it.



Figure No.84: Cycle trails



Figure No.85: Benches



Figure No.86: Walkways

- Accessible waterfronts, Luminous pave tiles and benches, Steps to touch water and secured multiple entrance plazas to have an effective riverfront with dynamic uses.
- A particular paving material tiles (Figure No.87) throughout a series of spaces would provide continuity and sometimes used to define the direction and hierarchy of spaces. It will also create an image of two connections.

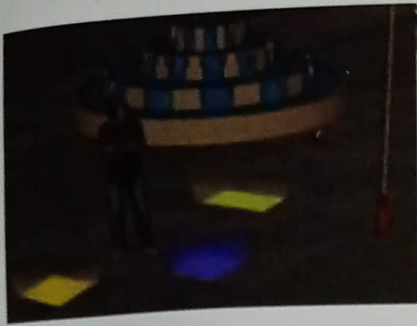


Figure No. 87: Luminous Pave Tiles



Figure No. 88: Luminous Benches



Figure No. 89: Steps to touch water

- x. Hoarding as per the standard design for advertisement can also be installed along the walkways to generate income.
- xi. **Gaming zone:** It will be children attraction zone, profit/revenue earning and it will be active recreational area.
- xii. **Local informal bazaar/kiosks:** It is a local bazaar for vegetables/fruits and vendors.
- xiii. **Public convenience:** All designs will be for all types of users i.e. children, old aged, disabled person etc.⁹
- xiv. **Open-Space Planning and Design**
 - Utilize landscaping, rather than walls and fences, to create semipublic/ private buffers.
 - Maximize the use of pervious materials and green infrastructure.

2.8 Conclusion

As such study requires detailed engineering surveys of the river bed and its fronts, as cutting and filling, remodeling is required to implement the proposals. Therefore, this needs to be taken as special project and outsourced to specialized agency which can undertake the detailed study/surveys and prepare the comprehensive project report and implement the same.

⁹ <https://www.slideshare.net/nitish12/thesis-report-nitish-kumar>

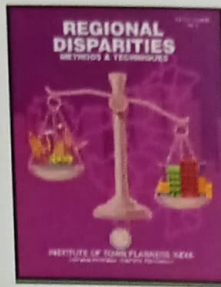


SERIES 1, PLANNING



Transit Oriented Development

This study aims to understand the intricacies of TOD concept. It also gives specific recommendations vis-à-vis TOD policy of Haryana.



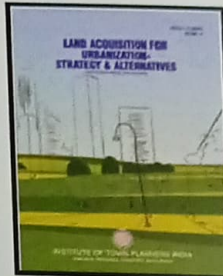
Regional Disparities: Methods & Techniques

The study explains the concepts and elaborates the efforts made in attaining balanced development and also prevails upon the methodology and techniques which can be used to identify the level of development.



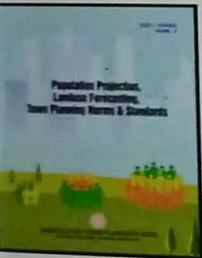
Affordable Housing: Challenges & Solutions

The objective of this study is to understand the challenges and solutions of affordable housing.



Land Acquisition for Urbanization - Strategy and Alternatives (Partnership Model for Haryana)

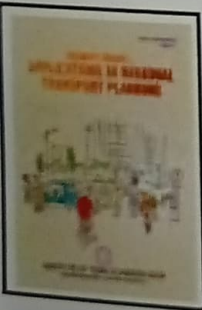
The objective of this study is to understand the land acquisition alternatives for public purposes in order to suggest a balanced framework which caters to the concerns of both demand side players as well as supply side.



Population Projection, Landuse Forecasting, Town Planning Norms and Standards

The study examines and proposes, methods of population projection, land use forecasting and rationalization of town planning norms, their relation with each other, with a view to arrive at greater objectivity in urban planning.

SERIES 2, TRANSPORTATION



Gravity Model- Applications in Regional Transport Planning

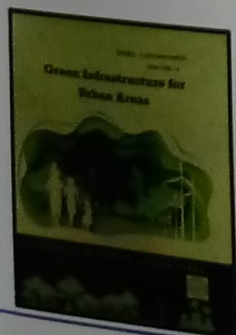
The objective of the study is to quantify the pattern of interaction between A Class towns of Haryana in terms of road linkage, to identify the traffic load on roads for augmentation purposes and to suggest the inter town public private transportation requirements.



Planning for Pedestrian and Cycle Movement

This study covers the need, importance problems solutions and planning aspects relating to pedestrians and cycle movement with their application to Indian studies.

SERIES 3, ENVIRONMENT



Green infrastructure for Urban Areas

The study encompasses the need, importance, principles, concept & examples and recommendations of green growth including international case studies.