

# **REVITALIZATION OF BROWNFIELD AREAS:**

**CASE APPLICATION AT  
BARRACKPORE JUTE  
MILLS, WEST BENGAL.**

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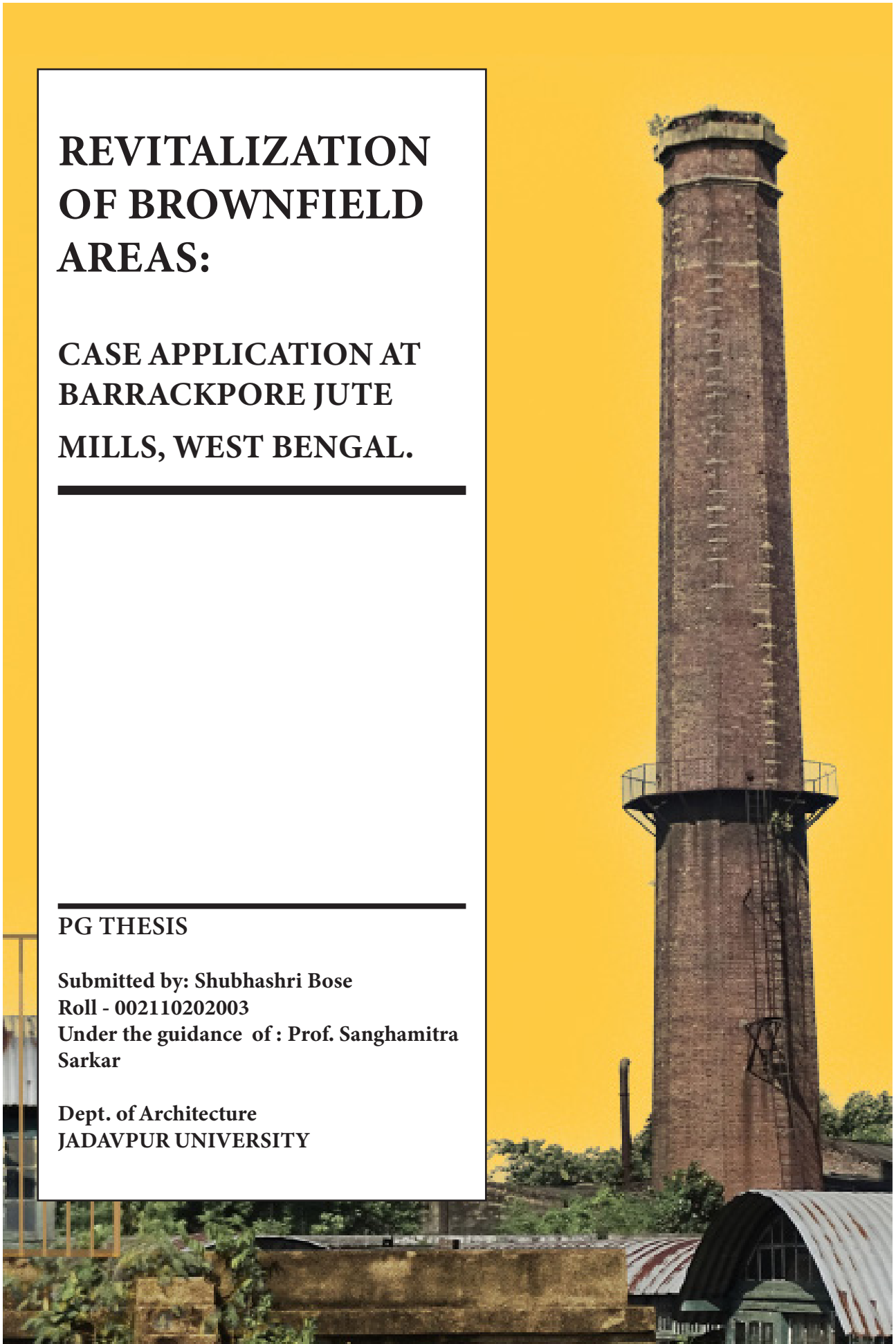
**PG THESIS**

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# **REVITALIZATION OF BROWNFIELD AREAS:**

## **CASE APPLICATION AT BARRACKPORE JUTE MILLS, WEST BENGAL.**

An Urban Design Thesis Report

Submitted in partial fulfillment of the requirement for  
The post-graduation degree of Masters of Architecture (Urban Design)  
Under the Faculty of Engineering & Technology,  
Jadavpur University, Kolkata

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# **Contents**

**Cover**

**Table of Contents**

**Certificate**

**Acknowledgement**

**Abstract**

## **1.0 Introduction**

### **1.1 Background**

1.1.1 Definitions

1.1.2 Relevance / Justifications

### **1.2 Aim**

### **1.3 Objectives**

### **1.4 Scope Of Work**

### **1.5 Limitations**

## **2.0 Literature Study**

### **2.1 Brownfields In India**

2.1.1 Policies and Guidelines

### **2.2 Brownfields In West Bengal**

2.2.1 History & Development - Evolution Of Industrial Belt in WB

2.2.2 History of Barrackpore - Evolution Of Industrial Belt in Barrackpore

2.2.3 History & Development - Industrial Heritage

### **2.3 Theories**

2.3.1 Charles Correa Report on Mill Land

2.3.2 Incremental Transformation of Industrial Building

2.3.3 Adaptive Reuse of Industrial Building

2.3.4 Parameters For Study

### **2.4 Conclusion from Literature Study**

## **3.0 Case Example**

### **3.1 Selection of Case Example**

### **3.2 Inside India - Primary Case Study**

3.2.1 Revitalization Of Mumbai Mill Land

3.2.2 Redevelopment Of Kanpur Development Area

### **3.3 Outside India - Secondary Case Study**

3.3.1 Revitalization Of Adamjee Jute Mill , Narayanganj ;Bangladesh

3.3.2 Redevelopment For Lisbon's Expo 98

### **3.4 Conclusion from Case Example**

## **4.0 Case Application**

### **4.1 Area Level Study**

4.1.1 Selection of the Area , Delineation & Description

4.1.2 Identification of Intervention Zone

## **4.2 Zonal Level Study**

### **4.2.1 Zone 1 -**

#### **4.2.1.1 Survey**

#### **4.2.1.2 Design Guidelines**

#### **4.2.1.3 Identification of Potential Site**

### **4.2.2 Zone 2 -**

#### **4.2.2.1 Survey**

#### **4.2.2.2 Design Guidelines**

#### **4.2.2.3 Identification of Potential Site**

### **4.2.3 Conclusions from Zonal Level Study**

### **4.2.4 Vision Plan**

### **4.2.5 Structure Plan**

### **4.2.6 Zonal Level Proposals**

## **4.3 Site Level Study**

### **4.3.1 Background - Introduction of sites**

### **4.3.2 Intervention Site 1 -**

#### **4.3.2.1 Description & Delineation**

#### **4.3.2.2 Survey**

#### **4.3.2.3 Proposals**

### **4.3.3 Intervention Site 4**

#### **4.3.2.1 Description & Delineation**

#### **4.3.2.2 Survey**

#### **4.3.2.3 Proposals**

### **4.3.3 Conclusions from Site Level Study**

## **5.0 Master Conclusion and Design Guidelines**

## **6.0 Design Implementation**

### **6.1 Site 1**

### **6.2 Site 4**

## **7.0 Conclusion**

### **7.1 Issues**

### **7.2 Contribution**

### **7.3 Future Scope**

## **Reference**

## **Appendix**



# **List of Tables**

- Table 1.      **Conclusions from Case Example.**
- Table 2.      **Conclusions from Zonal Level Study**
- Table 3.      **Conclusions from Site Level Study**
- Table 4.      **Master Conclusion and Design Guidelines**

# **List of Figures**

- Fig. 1 Why Brownfield sites area created.
- Fig. 2 Types of Brownfield depending on its previous use.
- Fig. 3 Locational analysis.
- Fig. 4 Newspaper clipping of The Hindu Bussiness Line.
- Fig. 5 Clossing order of NJMC & Kinnison at Titagarh
- Fig. 6 Newspaper report of the Economic times.
- Fig. 7 Objectives
- Fig. 8 Asset monetization for warehouses.
- Fig. 9 Warehouse contributes to 5% of the total asects.
- Fig. 10 The framework for monetisation of core asset monetisation.
- Fig. 11 Functions of NGT.
- Fig. 12 Map showing the present status of Heavy industry in West Bengal at present time.
- Fig. 13 Chart representing the present status of Heavy Industires in West Bengal.
- Fig. 14 Map of 1947 showing the Titagrh region.
- Fig. 15 Map of Titagarh denoting the Jute mills.
- Fig. 16 Location of mills in Mumbai.
- Fig. 17 Ownership map of mills in Mumbai.
- Fig. 18 Schematic overview for detecting critical connectivity network .
- Fig. 19 Constrution of public or semi public green space aimed at enhancing the social diversity.
- Fig. 20 Example of incremental transformation of industrial building.
- Fig. 21 Huangpu riverfront acting as edge to Shanghai Houston Park.
- Fig. 22 Access potential links, attraction and vista point.
- Fig. 23 Mumbai mill land before redevelopment.
- Fig. 24 Id entrance of Adamjee jute mill from the river side.
- Fig. 25 Expo site before the construction started.
- Fig. 26 Zone 1- Mostly abandoned.

- Fig. 27 Zone 2- Partially developed.
- Fig. 28 Zone 3- Fully developed.
- Fig. 29 Area level map of Mumbai cotton textile mill area,India.
- Fig. 30 Location of mills in Mumbai.
- Fig. 31 Percentage of Vacant , redeveloped and old landuse in zone 1.
- Fig. 32 Percentage of Vacant , vacant but have proposal redeveloped and old landuse in zone 2.
- Fig. 33 Percentage of adaptive reuse and build from scratch in zone 3.
- Fig. 34 Zone 1 - Laxmi mill area; Mostly abandoned. Redeveloped area consist of Recreational spaces like Auditorium, Restaurant , Office spaces etc.
- Fig. 35 Zone 2 - India United Mill 2 & 3, Partially redeveloped . Redeveloped area mainly consist of Museum
- Fig. 36 Zone 3 - Pheonix mall , Todi mill area and Empire mill area , fully redeveloped. Redeveloped area mainly consist of Commercial and Office spaces.
- Fig. 37 Zone 1 - Building facade acting as semi permeable edge - Visually permeable
- Fig. 38 Boundary wall acting as semi permeable edge. Visually permeable
- Fig. 39 Boundary wall acting as impermeable edge. Visually permeable.
- Fig. 40 Laxmi mill area ,Mostly abandoned. Railway track as edge .
- Fig. 41 Zone 2 - India United Mill 2 & 3 Partially redeveloped. Street as edge
- Fig. 42 Zone 3 - Pheonix mall , Todi mill area and Empire mill area , fully redeveloped. Street as edge
- Fig. 43 Road Section of Zone 1.
- Fig. 44 Less traffic density in zone 2. No definite footpath for pedestrian.
- Fig. 45 Congested roads in Zone 3 due to ongoing infrastructural work.
- Fig. 46 Movement in Zone 1 - Laxmi mill area ,Mostly abandoned.
- Fig. 47 Movement in Zone 2 - India United Mill 2 & 3. Partially redeveloped.
- Fig. 48 Movement in Zone 3 - Pheonix mall , Todi mill area and Empire mill area , fully redeveloped.
- Fig. 49 Old residential activity has been retained.

- Fig. 50** Few road side activities like car repairing , parking etc has grown organically.
- Fig. 51** Zone 1 - Laxmi mill area ,Mostly abandoned.
- Fig. 52** Zone 2 - India United Mill 2 & 3. Partially redeveloped.
- Fig. 53** Zone 3 - Pheonix mall , Todi mill area and Empire mill area , fully redeveloped. No informal or roadside activity has developed in this zone.
- Fig. 54** Keyplan for Zone 1.
- Fig. 55** Keyplan for Zone 3
- Fig. 56** Keyplan for Zone 2.
- Fig. 57** View from point A.
- Fig. 58** Zone 1 - Mostly abandoned site. Tall tower far behind constitute to the skyline of this place . View from point B.
- Fig. 59** View from point C.
- Fig. 60** Zone 2 - Partially developed .The old city skyline is kept in mind while proposing the new structures and redevelopment in the place
- Fig. 61** View from point E.
- Fig. 62** Zone 3 - Fully developed .Drastic change in city skyline in an existing mill complex caused due to adaptive reuse and rebuilding from scratch. View from point D.
- Fig. 63** Area level map of Kanpur tannery area,India.
- Fig. 64** Proposed Views of Kanpur Tannery Area.
- Fig. 65** Proposed landuse breakdown.
- Fig. 66** Proposed recreational facilities like dedicated hawkingvending zone , food court & gaming area etc.
- Fig. 67** Old landuse of Jajmau riverfront.
- Fig. 68** Proposed landuse of Jajmau riverfront.
- Fig. 69** Proposed Edge .
- Fig. 70** Detailed view of parking and vehicular pathway connecting to the bridge.
- Fig. 71** Proposed Edge with skyline .
- Fig. 72** Detailed view of pedestrian pathway.
- Fig. 73** Nightview of proposed Edge.

- Fig. 74 Proposed Edge.
- Fig. 75 Road detail of pedestrian trail.
- Fig. 76 Detailed Section of pedestrian trail along with ghat
- Fig. 77 Non-motorised transport track & short connection via green linear parks .
- Fig. 78 Site Zoning - Street Hierchy.
- Fig. 79 Ganga ghat aarti sthal ; existing conventional landmark. Ghats are completely shifted to other location in the proposed masterplan.
- Fig. 80 Proposed deck as landmark for recreational facility. There is a conflict between existing and proposed landmark.
- Fig. 81 All the nodes are formed by the intersection of local roads with arterial roads.
- Fig. 82 Jajmau Tila ; existing conventional landmark.
- Fig. 83 Existing and Proposed landmarks .
- Fig. 84 Proposed 3d view of Zone 1 Recreational space .Private recreational activity zone for the High End Group Housing.
- Fig. 85 Proposed 3d view of Private recreational activity zone for the High End Group Housing. (Zone 1).
- Fig. 86 Space mapping .
- Fig. 87 Proposed aerial 3d view od Zone 2 Recreational space .2 different promenade for pedestrian and vehicular movement are proposed around the proposed commercial block.
- Fig. 88 Early and present condition .
- Fig. 89 Early entry gate from river side, 1954.
- Fig. 90 Present entry gate
- Fig. 91 Narayangunj locational map.
- Fig. 92 Adamjee EPZ.
- Fig. 93 Adaptive reuse of the mill structures for the production purpose.
- Fig. 94 Old Adamjee Jute mill landuse map.
- Fig. 95 Present Narayangunj EPZ landuse map.
- Fig. 96 Sitalakya River acting as edge.
- Fig. 97 Narayangunj EPZ map highlighting routes and pathways.

- Fig. 98 Road width insufficient for two way heavy vehicle. Adamjee Epz is highlighted.
- Fig. 99 Road inside EPZ .
- Fig. 100 Vacant mill no 2.
- Fig. 101 Wetland area inside the EPZ.
- Fig. 102 Industrial activities inside the EPZ. Old mills are revitalized without changing the landuse.
- Fig. 103 Activity mapping inside the EPZ.
- Fig. 104 Residential area within EPZ area.
- Fig. 105 Residential area within EPZ area.
- Fig. 106 Key map
- Fig. 107 Vacant mill no 2. View from point A.
- Fig. 108 Residential area. View of point D.
- Fig. 109 Skyline view from notun bazar. View from pont C .
- Fig. 110 Skyline view from notun bazar.View from point B.
- Fig. 111 Aerial view of Narayanganj EPZ with the adjacent pond .
- Fig. 112 The location of Park of Nation (Parque das Nações).
- Fig. 113 Detailed location.
- Fig. 114 An aerial view of the industrial area on the riverfront of Tagus before intervention.
- Fig. 115 Present landuse distribution
- Fig. 116 Portugal pavelion for Expo 98
- Fig. 117 Open green space - Tagus urban park.
- Fig. 118 Transport Hub.
- Fig. 119 PP 6 - District (Landuse) map .
- Fig. 120 Public axis or the main square 'Rossio dos Olivais' .
- Fig. 121 Main axis or 'Avenida D. João II '
- Fig. 122 Secondary axis or 'Alameda dos Oceanos'.
- Fig. 123 Leisure axis or 'Passeio Ribeirinho'.
- Fig. 124 River Tranco as the edge in the north.
- Fig. 125 The four organizing axis of the Expo '98 plan acting as edges .

- Fig. 126 Detail plan of leisure axis.
- Fig. 127 Pedestrian road acting as an edge.
- Fig. 128 Arterial road acting as an edge.
- Fig. 129 Pedestrian promanade acting as an edge.
- Fig. 130 Nation's Park (Parque das Nações) Road Network.
- Fig. 131 Major node .
- Fig. 132 Nodes also acting as landmark.
- Fig. 133 Nodes.
- Fig. 134 PP 6 - Tagus urban park - green urban open space.
- Fig. 135 PP 1 - Transport Hub
- Fig. 136 Proposed zones Park of the Nation - Proposed Plan.
- Fig. 137 Kennison Jute Mill ghat .
- Fig. 138 Jute Mill ghat .
- Fig. 139 Site location.
- Fig. 140 Selected stretch of Land .
- Fig. 141 Mathkal Jute Mill + National Jute Mill Corp Ltd .
- Fig. 142 Effect of migration in present day scenario.  
(Madras & Bihari population respectively)
- Fig. 143 Area level map denoting the Zones.
- Fig. 144 Map of zone 1 denoting the Districts
- Fig. 145 Landuse of zone 1. \*Others include recreational, institutional etc.
- Fig. 146 Residential chowk.
- Fig. 147 Identified riverfront brownfield site.
- Fig. 148 Map of Zone 1 denoting the Edges.
- Fig. 149 Untreated water canal act as unprominent edge.
- Fig. 150 Local road acting as edge.
- Fig. 151 Schematic sectional detail of the riverfront edge.
- Fig. 152 Map of zone 1 denoting the pathway & routes.
- Fig. 153 Road section of the local road.(8.5m wide).
- Fig. 154 Road section of the sub arterial road. (10m wide).

- Fig. 155 Road section of arterial road - BT road (40m wide).
- Fig. 156 Map of zone 1 denoting Nodes & Landmark.
- Fig. 157 Only landmark present in the zone.
- Fig. 158 Only major node within in the zone.
- Fig. 159 Map of zone 1 denoting the activities.
- Fig. 160 Recreational activity at Rani Rahmoni ghat .
- Fig. 161 Newly opened jetty service at Rani Rashmoni ghat.  
(only few months old).
- Fig. 162 Different kind of seasonal activity at Rani Rashmoni ghat.
- Fig. 163 Chimney of Kinnison Jute mill constitute to the vista & skyline of the zone. View from point B.
- Fig. 164 Key plan.
- Fig. 165 The skyline is homogeneous & continuous. View from point C.
- Fig. 166 Skyline of the selected site. View point A.
- Fig. 167 Present situation - Narrow road.
- Fig. 168 Present situation - Open drain and open sewage disposal should be avoided.
- Fig. 169 Present situation - Recreational spaces should be provided to avoid playing on street.
- Fig. 170 Map of Zone 1 denoting proposals.
- Fig. 171 In-situ rehabilitation of mazdoor colony. Inspired by Aranya housing by BV Doshi.
- Fig. 172 Interaction between the river edge , promenade and users.
- Fig. 173 Map of Zone 1 denoting selection of potential site.
- Fig. 174 Present photographs of Kinnison Jute Mill.
- Fig. 175 Map of zone 2 denoting the Districts.
- Fig. 176 Landuse of zone 2.
- Fig. 177 Abandoned Industrial area.
- Fig. 178 Map of Zone 2 denoting the Edges.
- Fig. 179 Waste water canal acting as a non - prominent edge between industrial and residential area.
- Fig. 180 Local roads acting as a prominent edge between industrial and residential area.



- Fig. 181 Map of zone 2 denoting the pathway & routes.
- Fig. 182 Sketch depicting the section of the road leading to Laxmi ghat. (10m wide).
- Fig. 183 Roads are not shaded.
- Fig. 184 Map of zone 2 denoting Nodes & Landmark.
- Fig. 185 Glass kal mill act as the seasonal landmark during chhat puja , the above building commonly known as 'Bhootiya bungalow' among the locals the zone.
- Fig. 186 Node 1
- Fig. 187 Node 2
- Fig. 188 Map of zone 2 denoting the activities.
- Fig. 189 Children playing on vehicular road.
- Fig. 191 No recreational spaces present adjacent to the ghats. (In pic : Jute mill ghat).
- Fig. 192 Only playground for kids present in the entire site.
- Fig. 193 Chimney of Loomtex Jute mill constitute to the skyline of the zone. View from point B.
- Fig. 194 Key plan.
- Fig. 195 The skyline is homogeneous & continuous. View from point C.
- Fig. 196 Skyline of the selected site. View point A.
- Fig. 197 Map of Zone 2 denoting interaction of the edge as proposed guidelines
- Fig. 198 Pedestrian trail by the edge of river Ganga present only at Glass kal mill. Uniform vista along the promenade to be maintained.
- Fig. 199 Map of Zone 2 denoting selection of potential site.
- Fig. 199 Site 2 - NJMC.
- Fig. 200 Site 4 - Glass Kal Mill (Factory land) .
- Fig. 201 Site 3 - CESC.
- Fig. 202 Site 4 - Glass Kal Mill (Warehouse land) .
- Fig. 203 Requirement of mill owners.
- Fig. 204 Industrial city.
- Fig. 205 Colonial buildings.
- Fig. 206 A city for all : Informal Sectors.

- Fig. 207 Requirement of city authority.
- Fig. 208 Requirement of local residents
- Fig. 209 Applying the recommendations given by Charles Correa study group in the context of Barrackpore Jute mills - Ideal situation.
- Fig. 210 Area level map denoting the the proposals.
- Fig. 211 Area level map denoting the the proposals.
- Fig. 212 Existing Sec A-A' through NJMC
- Fig. 213 Proposed Sec A-A' through NJMC.
- Fig. 214 Proposed Sec E-E' through Titagarh Wagons.
- Fig. 215 Existing Sec B-B' through Jute Mill Ghat.
- Fig. 216 Proposed Sec B-B' through Jute Mill Ghat.
- Fig. 217 Existing Sec C-C' through Vijaylaxmi Ghat.
- Fig. 218 Proposed Sec C-C' through Vijaylaxmi Ghat.
- Fig. 219 Existing Sec D-D' through Glass kal Ghat.
- Fig. 220 Proposed Sec D-D' through Glass kal Ghat.
- Fig. 221 Existing Sec F-F' through Kinnison Jute Mill.
- Fig. 222 Proposed Sec F-F' through Kinnison Jute Mill.
- Fig. 223 Proposed Figure ground map.
- Fig. 224 Proposed Foreground map.
- Fig. 225 Proposed map for typology of residential landuse.
- Fig. 226 Proposed map for typology of commercial landuse.
- Fig. 227 Proposed map for typology of institutional landuse.
- Fig. 228 Proposed map for typology of industrial landuse
- Fig. 229 Proposed map for typology of recreational space, open space and waterbodies
- Fig. 230 Proposed map for movement pattern.
- Fig. 231 Proposed housing landuse distribution.
- Fig. 232 Proposed commercial landuse distribution.
- Fig. 233 Proposed institutional landuse distribution.
- Fig. 234 Proposed industrial landuse distribution.
- Fig. 235 Proposed recreational landuse distribution.

- Fig. 236 Map denoting the intervention sites.
- Fig. 237 Map of intervention site 1 - delineation.
- Fig. 238 River Hoogly act as East boundary.
- Fig. 239 Sub arterial road through the Titagarh bazar region act as the South boundary of the site.
- Fig. 240 Local road between Kinnison and Kelvin Jute mill.
- Fig. 241 Landuse of site 1.
- Fig. 242 Map of zone 2 denoting the Districts.
- Fig. 243 Institutional use - Telegu library.
- Fig. 244 Mazdoor colony block.
- Fig. 245 Presence of open sewage disposal system.
- Fig. 246 Map of Zone 2 denoting the Edges.
- Fig. 247 Road section of the local road.(8.5m wide).
- Fig. 248 River Hoogly acting as edge in the east.
- Fig. 249 High boundary wall acting as edge.
- Fig. 250 Map of site 1 denoting the pathway & routes.
- Fig. 251 Road through the bazar area.
- Fig. 252 Map of site 1 denoting Nodes & Landmark.
- Fig. 253 Pid ghat act as landmark to the site.
- Fig. 254 Sri Muktishwari Devi temple and Karbala and Narkuli Shah Baba Majar act as landmark to the site.
- Fig. 255 Node 2.
- Fig. 256 Map of site 1 denoting the activities.
- Fig. 257 Mazdoor colony block.
- Fig. 258 Abandoned industrial space.
- Fig. 259 Used as occassional picnic spot.
- Fig. 260 The skyline is homogeneous & continuous.View from point C.
- Fig. 261 Chimney of Loomtex Jute mill constitute to the skyline of the zone.  
View from point B.
- Fig. 262 Key plan.
- Fig. 263 Chimney of Loomtex Jute mill constitute to the skyline of the zone.  
View from point B.

- Fig. 264** Skyline of the selected site. View point A
- Fig. 265**
- Fig. 266**
- Fig. 267**
- Fig. 268** Map of intervention site 4 - delineation.
- Fig. 269** River Hoogly act as East boundary.
- Fig. 270** Sub-arterial road leading to Raw pumping station act as the Northern boundary.
- Fig. 271** Sub-arterial road leading to Vijaylaxmi ghat act as the Southern boundary.
- Fig. 272** Map of site 4 denoting the Districts.
- Fig. 273** Landuse of site 2.
- Fig. 274** Abandoned mill shed which is being used as shooting spot.
- Fig. 275** Unused swimming pool complex.
- Fig. 276** Commercial activities in the selected site.
- Fig. 277** Map of site 4 denoting the Edge.
- Fig. 278** Local roads acting as edge.
- Fig. 279** Damaged embankment posing threat.
- Fig. 280** High embankment of the mill acting as edge.
- Fig. 281** Skematic sectional detail of the riverfront edge.
- Fig. 282** Map of site 4 denoting the Pathway & Routes.
- Fig. 283** Road section of elevated path.
- Fig. 284** Intra mill tramways.
- Fig. 285** Pedestrian trial by the edge of river Ganga.
- Fig. 286** Map of site 4 denoting the Nodes & Landmark.
- Fig. 287** Vijaylaxmi ghat ferry service.
- Fig. 288** Glass kal mill acts as an seasonal landmark.
- Fig. 289** Glass kal ghat acts as anlandmark.
- Fig. 290** Map of site 4 denoting the Activity and Space.
- Fig. 291** Seasonal recreational activity - Chhat puja.

- Fig. 292 Clip of popular Bengali web series Bomkesh bakshi being shot at Glass Kal mill.
- Fig. 293 Fishing serves as the main activity during the time of low tide.
- Fig. 294 Navy ship building at Glass kal ghat.
- Fig. 295 Wild vegetation contributes to the skyline. View point B.
- Fig. 296 Chimneys contribute to the verticle element of the skyline. View point B.
- Fig. 297 Key plan.
- Fig. 298 Skyline of the selected site. View point A
- Fig. 299 Map of site 4 denoting the buildings to be Demolition /Restoration / Partial restoration /Façade restoration.
- Fig. 300 Building 1. To be partially restored.
- Fig. 301 Building 2. To be partially restored.
- Fig. 302 Part of old boundary wall. To be demolished .
- Fig. 303 Gate leading to building 6. To be restored.
- Fig. 304 Building 4. To be demolished.
- Fig. 305 Building 8. To be restored.
- Fig. 306 Building 6. To be partialy restored.
- Fig. 307 Building 7. To be restored.
- Fig. 308 Building 9. To be restored.
- Fig. 309 Map of site 4 denoting the proposed Zones
- Fig. 310 Proposed landuse distribution.
- Fig. 311 Map of site 4 denoting the proposed movement pattern.

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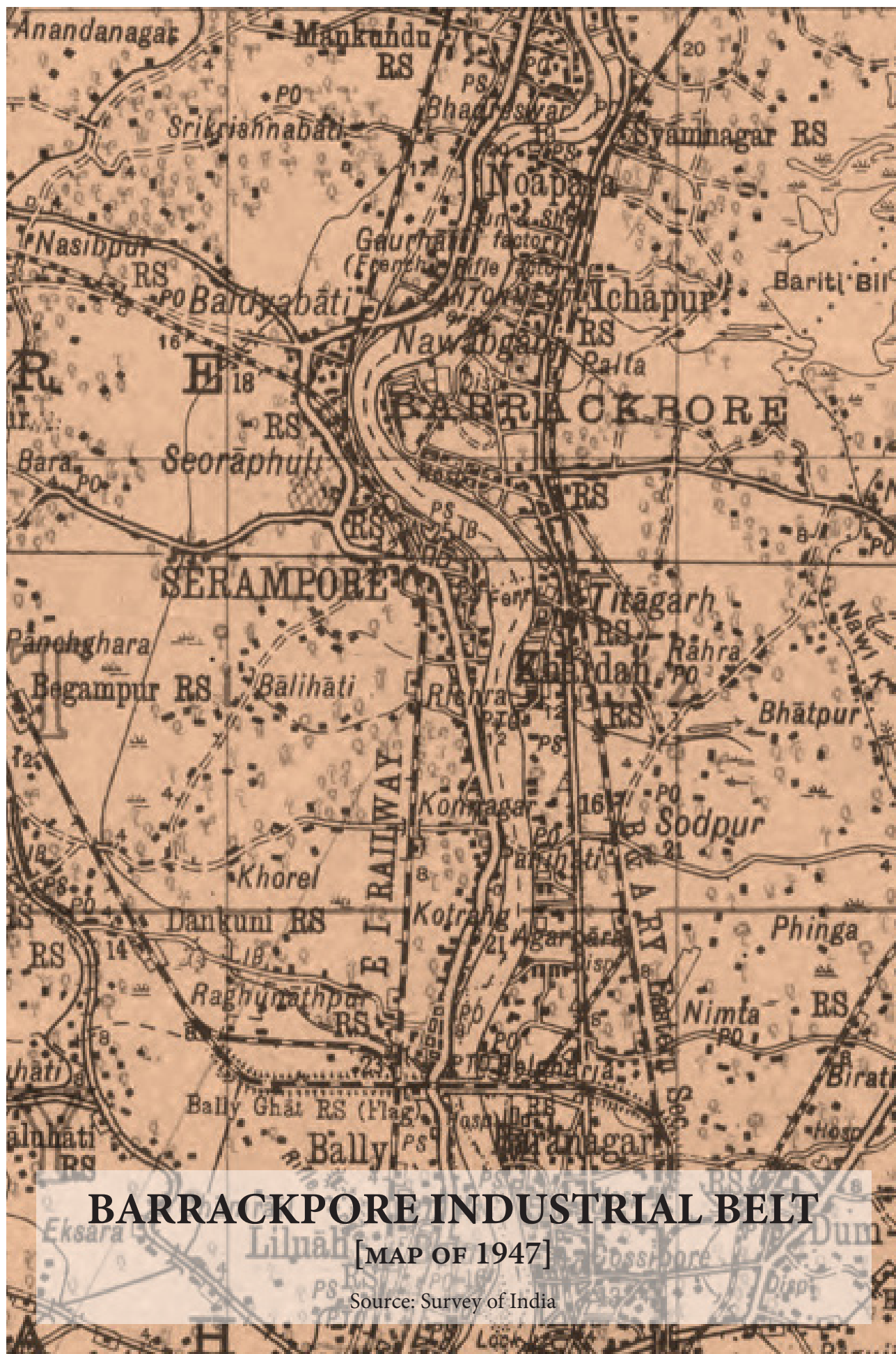
I am humbled and privileged to have had the opportunity to undertake this thesis, and I am grateful to everyone who has played a part in its successful completion.

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# **Abstract**

Brownfield revitalization is a crucial technique for repurposing abandoned and contaminated areas to benefit local economies, societies, and the environment. This thesis offers a case study of brownfield restoration in West Bengal, India's Barrackpore Jute Mills area. The historical background of the location is analysed, the environmental contamination is described, and the economic and social advantages of the regeneration effort are assessed. The study shows that the Barrackpore Jute Mills area's brownfield restoration activities have significantly benefited the local economy and society, particularly by boosting property values, creating jobs, and enhancing quality of life.



## BARRACKPORE INDUSTRIAL BELT

[MAP OF 1947]

Source: Survey of India



# 1.0 Introduction

## 1.1 Background:

### 1.1.1 Definition - Revitalization

*“Revitalization is instilling new life and vitality into a community through enhancing local assets, such as reusing or renovating building facades, or streetscaping to beautify an area.”*

Source: Maryland sustainable growth commission

### Significance of Revitalization:

- Way of ensuring that all available land in urban areas is developed and redeveloped to its full potential.
- Reduction of urban sprawl.
- Reduction of health and environmental risks by encouraging site cleanup.
- Full utilization of existing infrastructure and traffic systems.
- Greenfields remain usable for open space or agricultural use.

### 4 R strategy of Urban Design:

- Redevelopment - Improve living environment and raise quality of life by replacing old and dilapidated areas by new development.
- Preservation - Preserve buildings of historical or cultural values.
- Rehabilitation - Prolong the life span of old buildings.
- Revitalization - Connect redevelopment, reconstruction and preservation as dots, lines and faces in 3D way.

Source : Frontiers of Architectural Research Volume 7, Issue 2, June 2018, Pp 197-210

### 1.1.1 Definition - Brownfield

*“A Brownfield is a parcel of land has been previously developed (usually for commercial or industrial use) and likely has contaminants which need to be remediated before it can be redeveloped.”*

Source: EPA

*“An area of land in a city that was used by industry or for offices in the past and that may now be cleared for new building development.”*

Source: Oxford dictionary

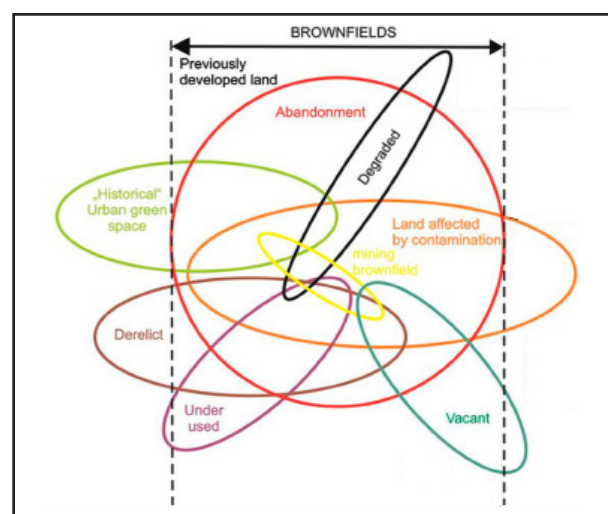


Fig. 1 :Why Brownfield sites area created.

Source : Transforming Brownfields as Tourism Destinations and Their Sustainability on the Example of Slovakia











Past Property Use	Example Sources	Past Property Use	Example Sources
<b>Housing and Residential Areas</b> 	Single/multifamily housing areas, apartment buildings and other structures built before 1978; garages, sheds or barns.	<b>Manufacturers and Power Generation</b> 	Textile mills, factories and power plants; industrial operation boiler houses and power systems.
<b>Gas Stations and Fuel Storage</b> 	Gas station buildings, structures/signs; underground storage tanks and piping; storage areas for oil, fuel, or solvents.	<b>Agricultural Land and Facilities</b> 	Single family homes, barns, outbuildings and fencing, farm equipment.
<b>Railroad Facilities</b> 	Railroad lines, rail yards, rail spurs; roundhouse, rail car repair/maintenance facilities; train stations/depots.	<b>Mines and Mining Operations</b> 	Mines, extraction and processing structures/equipment; tailing and waste spoil areas.
<b>Automotive Repair Metal Salvage and Recycling</b> 	Structures and properties associated with automobile, truck and bus body repair; radiator and muffler repair. Metal recycling, plating and scrap metal yards.	<b>Public and Commercial Buildings</b> 	Schools, hospitals, libraries, courthouses, jails, post offices and other governmental, community and commercial buildings built before 1978.
<b>Dry Cleaners and Industrial Laundry</b> 	Small commercial and larger industrial laundry and dry cleaners.	<b>Illegal Dumping</b> 	Unregulated solid waste, construction debris, tire and illegal dumping areas.

Fig. 2 :Types of Brownfield depending on its previous use. Source : EPA 5,September 2019

### 1.1.1 Definition - Barrackpore

- Barrackpore is a city and a municipality of North 24 Parganas district in the Indian state of West Bengal. It lies just east of the Hooghly River and is part of the Kolkata urban agglomeration.
- Its major economic activities include jute mills , paper mills and many more.
- A special feature of the Jute industry in pre-independence days was that although the mills were in the hands of British entrepreneurs and management, raw jute and the manufactured articles were under control of the Indian Businessmen.

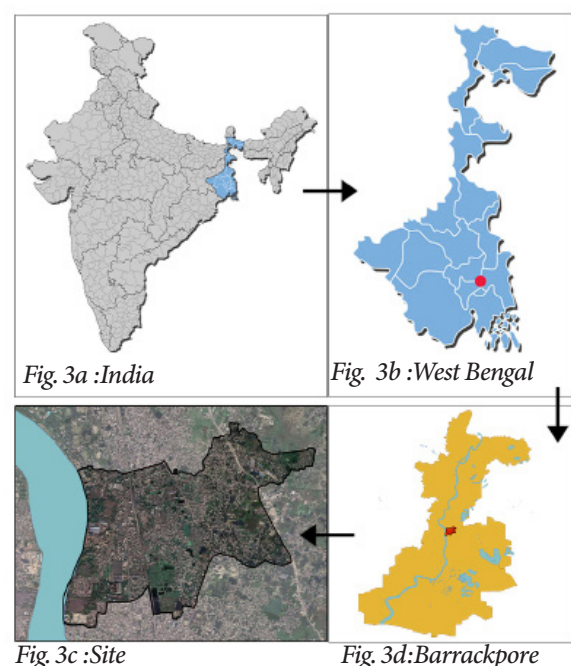


Fig. 3 :Locational analysis. Source : Google Image & Author

### 1.1.2 Relevance / Justification

- A large number of Jute mills have permanently closed down in last few years.
- The Government is looking for alternate ways to monetize those assets.
- In recent times state government of West Bengal has proposed Jute parks in different region. Eg - Cochbehar Jute Park.
- Industries that are hallmark to the state should be revived.
- One of the way government has taken to showcase the rich heritage of jute industries in Bengal is by introducing jute museums.

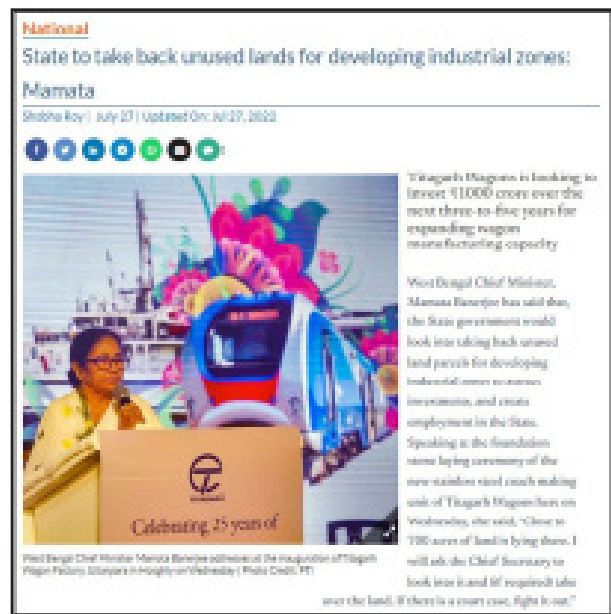


Fig. 4 :Newspaper clipping of The Hindu Bussiness Line.

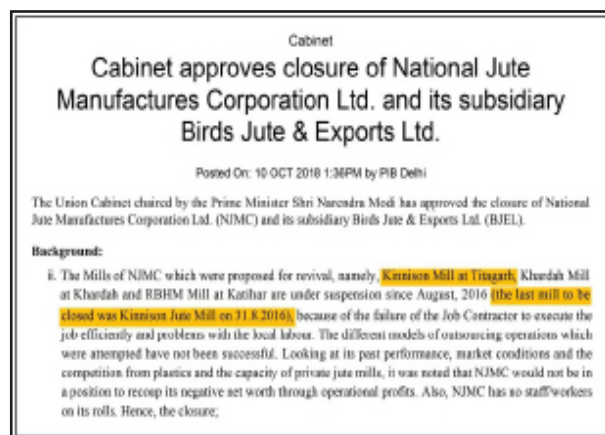


Fig. 5 :Closing order of NJMC & Kinnison at Titagarh



Fig. 6 :Newspaper report of the Economic times.

## 1.2 Aim:

Revitalizing the industrial brownfields to suggest the appropriate land use for the betterment of the community.

## 1.3 Objective:

- To study literature related to Revitalization and Brownfield.
- To identify the issues related to brownfield in Barrackpore Industrial Area.
- To define strategies for revitalization of brownfield in Barrackpore Industrial Area.
- To provide urban design solution for revitalization of Brownfield at Barrackpore.

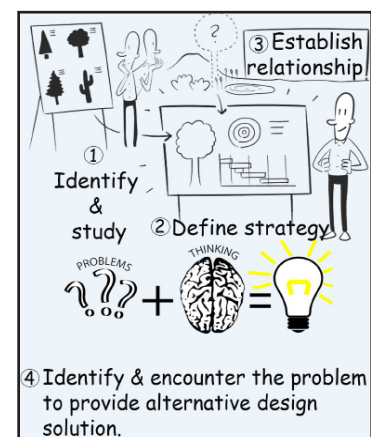
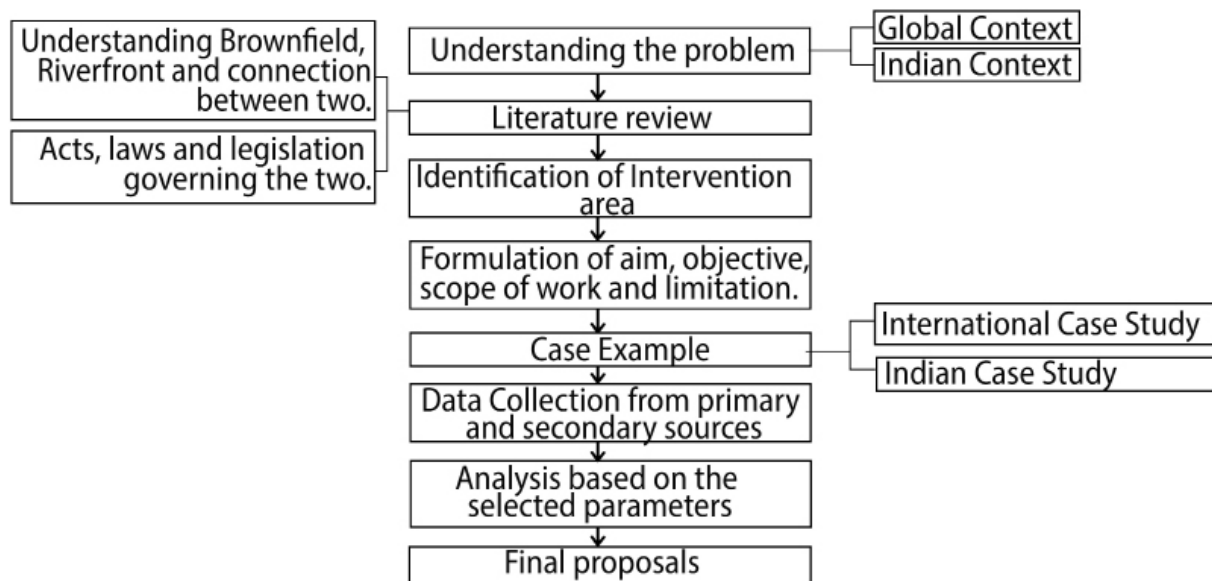


Fig. 7 :Objectives. Source : Author



## 1.4 Methodology:



## 1.5 Scope of work:

<b>Incorporating environmental friendly design</b> <ul style="list-style-type: none"> <li>Following CRZ norms.</li> <li>Waste water treatment plant to be made for the area.</li> </ul>	<b>Improve Urban mobility</b> <ul style="list-style-type: none"> <li>Enhance the existing and surrounding Street Network , Pedestrian Network and Non- motorised Transit along with ferry connections.</li> </ul>	<b>Increasing recreational area</b> <ul style="list-style-type: none"> <li>Increase open green space to avoid playing on streets.</li> </ul>
<b>Provide long term policy for economic rejuvenation</b> <ul style="list-style-type: none"> <li>Government along with other stakeholders should work on policies and guidelines for the return of investment.</li> </ul>	<b>Try incorporate Charles Correa rule of third in the context of Barrackpore Jute mills</b> <ul style="list-style-type: none"> <li>Brownfield area should be equally divided among recreational activity, housing and commercial activities.</li> </ul>	<b>Deal with Pre-existing and improve the condition of local residents</b> <ul style="list-style-type: none"> <li>In-situ rehabilitation of the mazdoor colony.</li> <li>Community involvement is crucial to the success of any redevelopment project.</li> </ul>

## 1.6 Limitation:

<b>Community Resistance</b> <ul style="list-style-type: none"> <li>Brownfield revitalization can face opposition from community groups and other stakeholders who may have concerns about displacement, or changes to the character of the neighborhood.</li> </ul>	<b>Generation of new income sources</b> <ul style="list-style-type: none"> <li>Sufficient number of income sources should be created to attract population for the proposed housing and commercial to survive.</li> </ul> <p>( Titagarh has the potential to act as a satellite town to Barrackpore.)</p>	<b>Stakeholders also plays a major role</b> <ul style="list-style-type: none"> <li>A huge amount of initial investment, long term policy and economic rejuvenation is required for the project to be successful in long run.</li> </ul>
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## 2.0 Literature Study

### 2.1 Brownfields in India:

#### 2.1.1 Policies and Guidelines

##### National Monetisation Pipeline (NMP) :

- This policy mandate Asset Monetization under Union budget 2021-2022.
- NMP aggregate the monetization potential of Rs 28,900 crore through core assessments of the Central Government , over four year plan from FY 2022-2025.

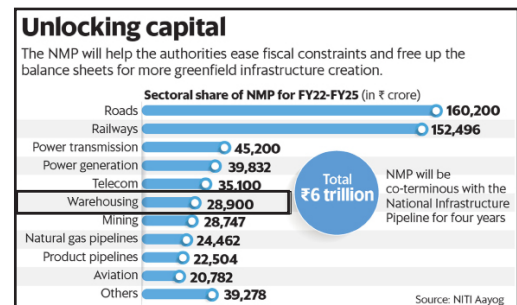


Fig.8 : Asset monetization for warehouses.

Source : NITI Aayog

##### Industrial and Investment Policy of West Bengal 2013:

- Revive the industries that were the hallmark of the state, like Jute and Tea.
- Creation of 'State Manufacturing Zones' in line with National Industrial Manufacturing Zones (NIMZ) to capitalize the locally available resources and promotion of Industrial Corridors.
- Encouraging private sector participation in infrastructure projects under Public Private Partnership (PPP) .
- Development of NS-EW Industrial Corridor running across from South Bengal to North Bengal and thereafter East to West to North-eastern States .

##### Industrial Policy experience from various countries :

- India: The Implementation of Industrial Parks.

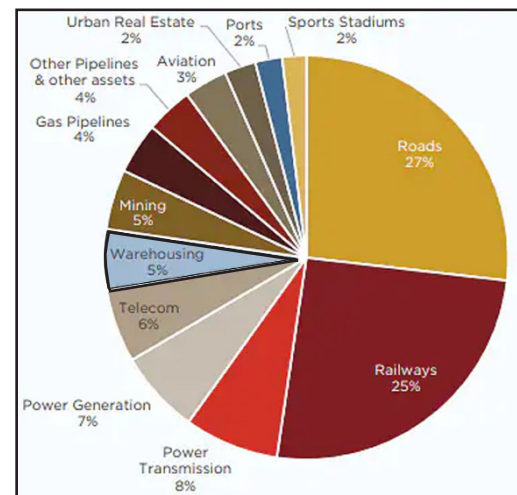


Fig.9 :Warehouse contributes to 5% of the total assets. Source : NITI Aayog

##### National Brownfield Redevelopment Programme (NBRP) , 2008:

- Promotes the sustainable redevelopment of contaminated sites in India.
- Provides financial assistance to state governments and private entities for cleaning up and redeveloping contaminated sites.

##### Environmental Impact Assessment (EIA) Notification, 2006:

- Evaluation of the potential environmental impacts of the project and measures to mitigate these impacts.

##### National Green Tribunal (NGT):

- Specialized court that handles environmental disputes and violations.
- Plays a key role in enforcing environmental laws related to brownfield revitalization and ensuring compliance with environmental standards.

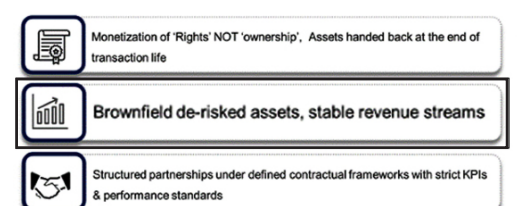


Fig.10 :The framework for monetisation of core asset monetisation. Source : NITI Aayog



Fig.11 :Functions of NGT.

Source :Universal group of institutions.

## 2.2 Brownfields in West Bengal:

### 2.2.1 History & Development - Evolution of Industrial Belt in West Bengal

#### Jute in Ancient times :

Jute has been used in Africa and Asia for its versatile properties, providing fibers for cordage and weaving, as well as food from its leaves. Poor villagers in India wore clothing made of jute, and weavers in Bengal used handlooms and spinning wheels to create jute fabrics. Chinese papermakers have a rich tradition of using different plants, including jute, hemp, silk, and cotton, to produce paper. Research suggests that Jews produced coarse jute paper used for designing “jiaozi”. A fragment of jute paper dating back to the Western Han Dynasty has been discovered in Dunhuang, China.

Produced for domestic consumption in the villages of East Bengal and exported to American markets.

**Upto 18th Century**

#### Establishment of Jute Industries -

The first jute mill was established at Rishra, on the bank of river Hoogly near Calcutta in 1855.

**1800-1860**

#### 17th century - 1855

The British East India Company was the first to engage in jute trading, primarily in raw jute. In the early 20th century, they established trade connections with the Jute Industry in Dundee, Scotland, which held a monopoly. Margaret Donnelly I, a jute mill landowner in Dundee, played a pivotal role in setting up the first jute mills in India. In 1793, the East India Company exported its initial shipment of jute, consisting of 100 tons, to Dundee, Scotland, where flax spinners were interested in exploring the mechanical processing of jute. The growth of the jute industry in Dundee led to increased production and export of raw jute from the Indian subcontinent.

#### Growth & expansion under British rule

By 1939 a total of 68,377 mills were established on the bank of river Hoogly.

**1860-1947**

#### Post Independence-

Jute barons evacuated India, leaving behind the Industrial setup which were later taken up by Marwari businessman.

**1947-1965**

#### 1855 - 1947

The jute industry in Calcutta was established in 1855 due to its proximity to jute-growing regions in Bengal. It experienced rapid growth, with five mills operating 950 looms by 1869. By 1910, 38 companies with 30,685 looms exported more than a billion yards of cloth and over 450 million bags. Calcutta's jute mills became world leaders in producing burlap and bagging materials, while other countries specialized in a variety of jute products.

#### Decline & Closure-

Indo-pak war 1965 put a stop to raw material supply from East Pakistan. Jute exporters diversified to other commodities.

**1965-1990**

#### 1947 - Present

After the fall of the British Empire in 1947, most of the Jute Barons evacuated India, leaving behind the industrial setup of the Jute Industry. In East Pakistan, Pakistani families set up their own Jute Industry, which the government of Bangladesh later took over. built up Bangladesh Jute Mills Corporation (BJMC).

Current Status -  
(Refer to the chart on pg - 12)

**1990-Present**

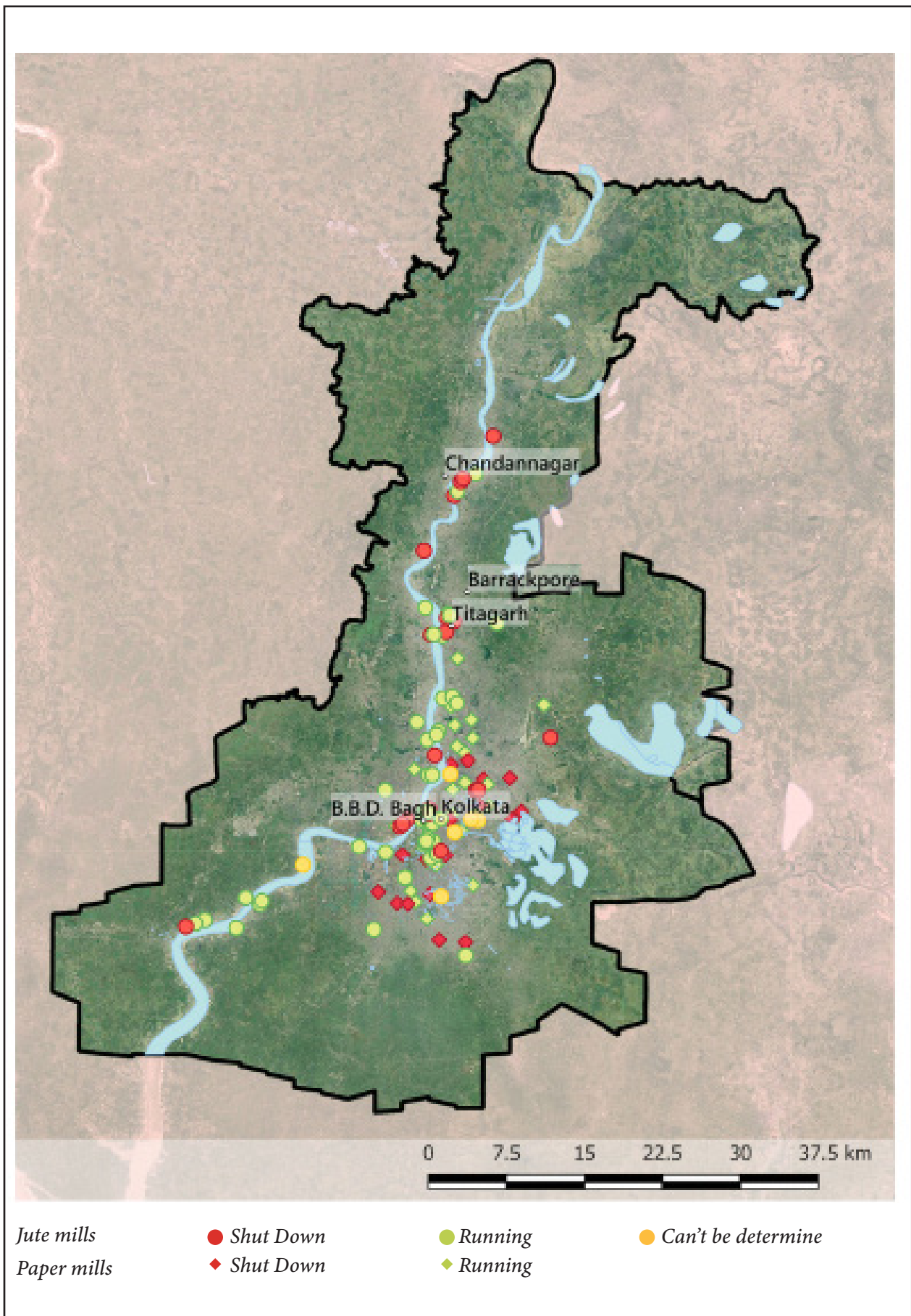


Fig.12 : Map showing the present status of Heavy industry in West Bengal at present time. Source : Author



### Present day status of industries in West Bengal :

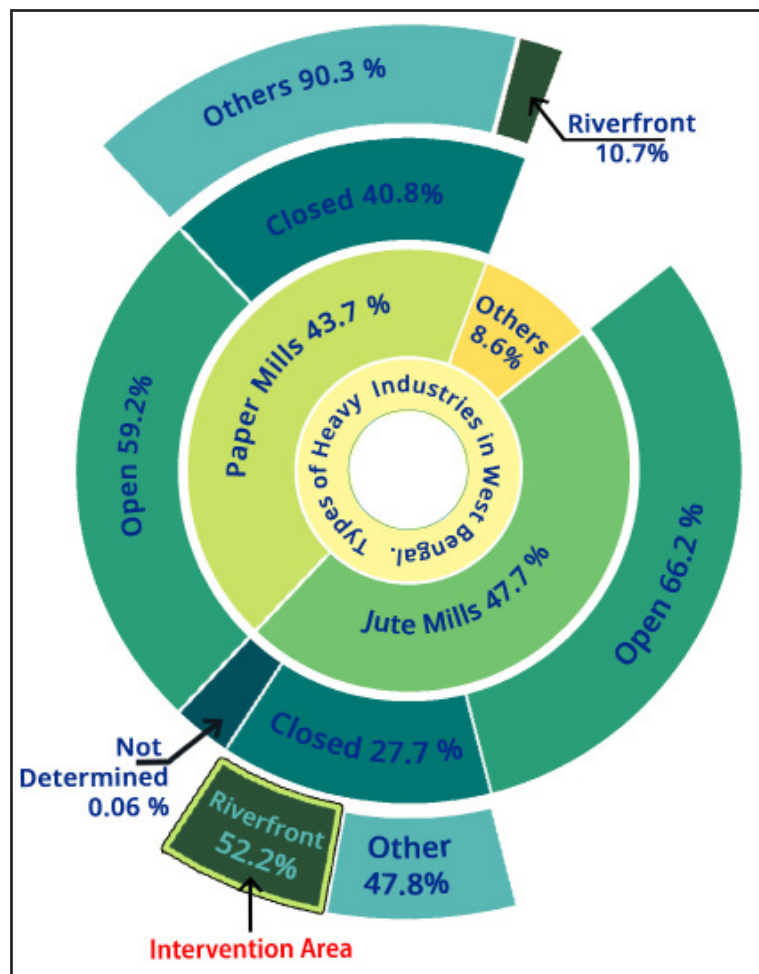


Fig.13: Chart representing the present status of Heavy Industries in West Bengal. Source : Author

### 2.2.2 History & Development - Evolution of Industrial Belt in Barrackpore

Since pre-independence era, the industrial growth of West Bengal was centred around Howrah, Kolkata, Asansol and Barrackpore due to :

- Road and rail connectivity
- Nearness to raw materials
- Availability of labour nearby

**Ownership** - State Government & NJMC (National Jute Mill Corp).

#### **Reason for downfall of Jute Industry :**

Once the British left and the mills changed hands, the decline set in. Supplies of raw material from Bangladesh stopped, gunny bags fell out of favour as synthetic material became the rage, and labour militancy finally rang the death knell of industry in this state.

#### **STATUS OF MAJOR JUTE MILLS ALONG THE RIVER HOOGLY**

Agarpara Jute Mill  
Victoria Jute Co. Ltd  
Loomtex Engineering Pvt. Ltd  
Naihati Jute Mills  
Auckland Jute Mills  
Kelvin Jute Co. Ltd  
Baranagar Jute Factory Plc.  
Premchand Jute Mills.  
Empire Jute Co. Ltd  
Hastings Jute Mill  
Kinnison Jute Mill  
Wellington Jute Mill  
Mathkol Jute Mill  
National Jute Mfg. Corp. Ltd.

Operational      Barely Operational      Closed



### 2.2.3 History & Development - Industrial Heritage

- **1897** Kinnison Jute mill was established. (2 mills; 1 in present day Titagarh)  
Proprietor – FW Heilgers & co.
- **1917** Kelvin Jute mill and Empire Jute mill were established.  
Propiters – McLeod & Co.  
Titagarh Jute mill 1 & 2 were established.  
Proprietor – Bird & Company (previously F W Heilgers & Company).  
Standard Jute Mill was established.  
Proprietor– Bird & Company.

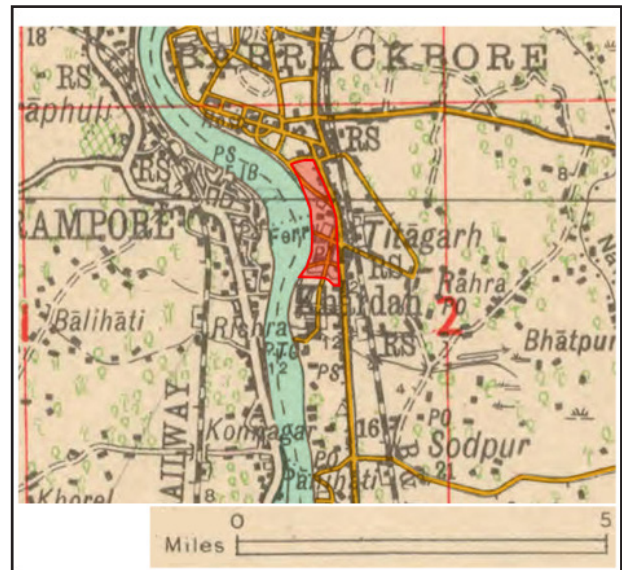


Fig.14 : Map of 1947 showing the Titagrh region.  
Source : Survey of India.

#### Present Status of the mills:

- Kinnison Jute mill closed down on 31.08.2016.  
Present proprietor - NJMC & Govt. of India.
- Titagarh Jute mill 1 closed down before 1982.  
Present proprietor - Goenka group.  
Used as CESC power plant in till 2021.
- Titagarh Jute mill 2 has been divided into 3 parcel of land .  
Present proprietor - Loomtex Enginerring Pvt. Ltd.
  - ◇ One parcel of land is running as jute mill.
  - ◇ One parcel of land is under warehouse usage, which are mostly abandoned and few are leased.
  - ◇ One parcel of land is abandoned and used as film shooting spot.
- Standard Jute mill presently known as NJMC Titagarh is closed down on 31.08.2016.
- Present proprietor - NJMC & Govt. of India.
- Kelvin Jute mill & Empire Jute mill - Running  
Proprietorship - Private.

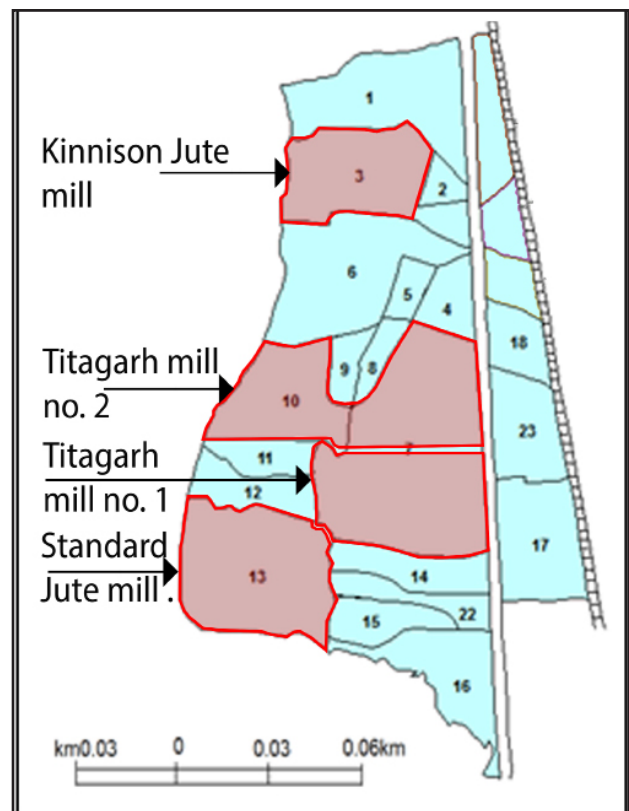


Fig.15: Map of Titagarh denoting the Jute mills.  
Source : Author.

## 2.3 Theories:

### 2.3.1 Charles Correa Report on Mill Land

#### DESCRIPTION

The Government of Maharashtra on 29th Feb. 1996 setting up a study group to prepare an integrated development plan for the textile mill land.

Essentially, these includes:

- Prepare an overall development plan and strategy to create coherent urban form.
- Provide housing for low income groups.
- Allocate land for civic amenities and infrastructure.
- Generate new employment opportunities for the workers displaced by the closure of mills.

#### ANALYSIS

- Few mills were selected to be retained for adaptive reuse.
- Buildings which need to be conserved for their historic value and character.
- The buildings which could be demolished.

#### CONCLUSION

- Demonstrates how surplus industrial land can be effectively used to create a socially, culturally and economically rich and lively area.
- The plan also demonstrates how to clear living spaces in densely populated cities.

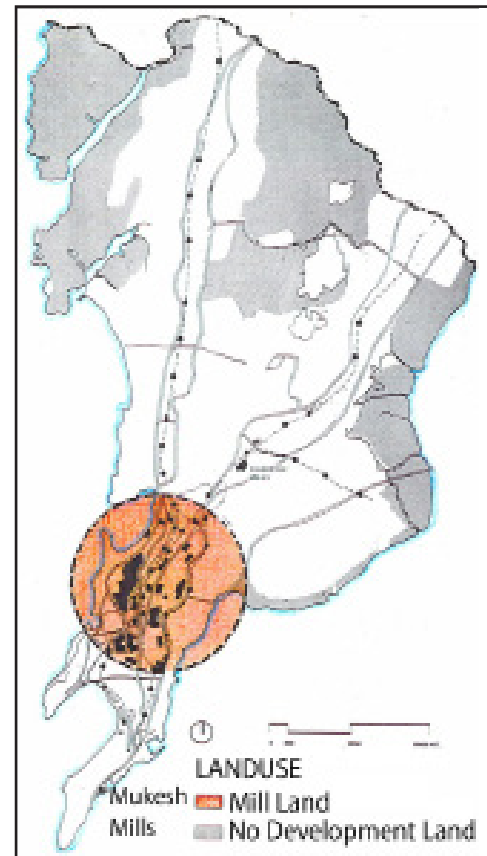


Fig. 16 :Location of mills in Mumbai.

Source : Charles Correa report on mill land.

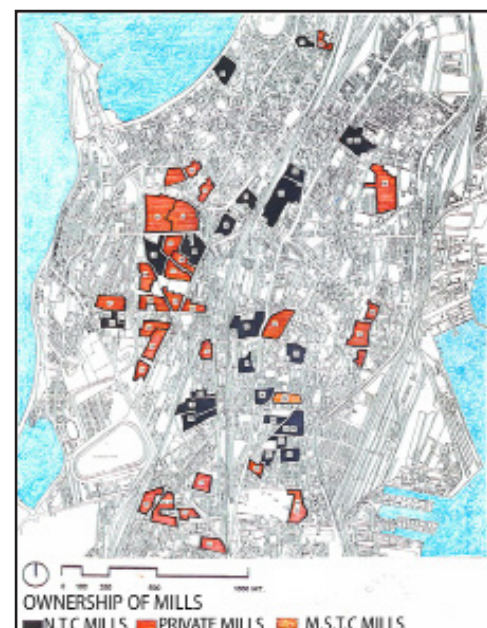


Fig. 17 :Ownership map of mills in Mumbai.

Source : Charles Correa report on mill land.

### Nodes

In the paper 'The Role of Brownfields and Their Revitalization for the Functional Connectivity of the Urban Tree System in a Regrowing City' the authors Manuel Wolff, Dagmar Haase, Jörg Priess and Tobias Leander Hoffmann has stated the importance of nodes in increasing the connectivity of a place and increase the potential of assets monetization of a particular area.

### Pathway & Routes

In the paper 'Sorting Out the Connections between the Built Environment and Health: A Conceptual Framework for Navigating Pathways and Planning Healthy Cities' the authors Mary E. Northridge, Elliott D. Sclar, and Padmini Biswas has stated transportation as fundamental factor that effects of land use mix.

### Landmark

In the paper 'The Sustainable Viability of Adaptive Reuse of Historic Buildings: the experiences of Two World Heritage Old Cities; Bethlehem in Palestine and Visby in Sweden' the Akram Ijla and Tor Broström has stated old buildings can act as historical landmarks and can be revitalized in adaptive reuse technique.

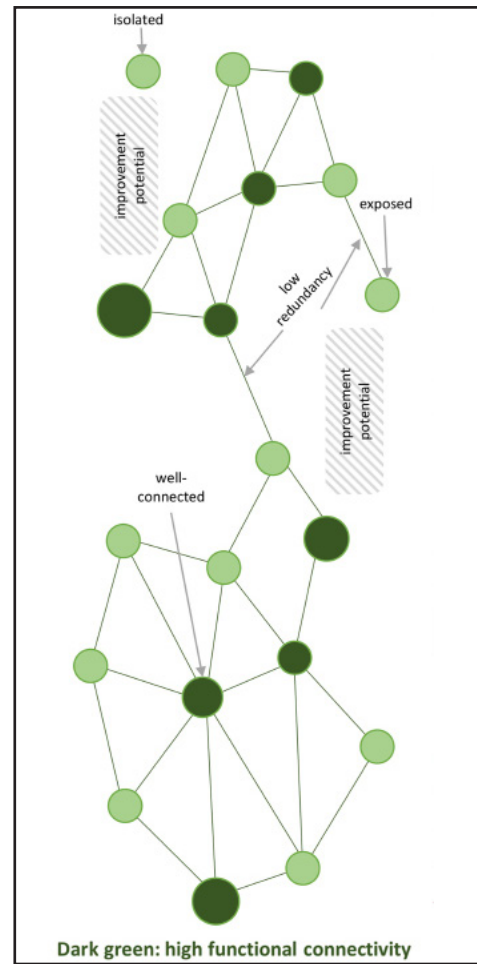


Fig.18 : Schematic overview for detecting critical connectivity network

Source : The Role of Brownfields and Their Revitalisation for the Functional Connectivity of the Urban Tree System in a Regrowing City

## 2.3.3 Parameters For Study - Image Parameter

### Activities

In the paper 'Sorting Out the Connections Between the Built Environment and Health: A Conceptual Framework for Navigating Pathways and Planning Healthy Cities' the authors Mary E. Northridge, Elliott D. Sclar, and Padmini Biswas has stated if the proposed landuse is heterogenous in nature it allows different landuses to locate in close proximity and hence decrease the travel distance between activities.

### Spaces

In the paper 'A Methodological Approach for Evaluating Brownfield Redevelopment Projects' the authors Francesco Cappai, Daniel Forgues and Mathias Glaus stated that construction of public or semi-public green spaces aimed at enhancing the social diversity of the impacted districts frequently follows the replacement of the industrial purpose.

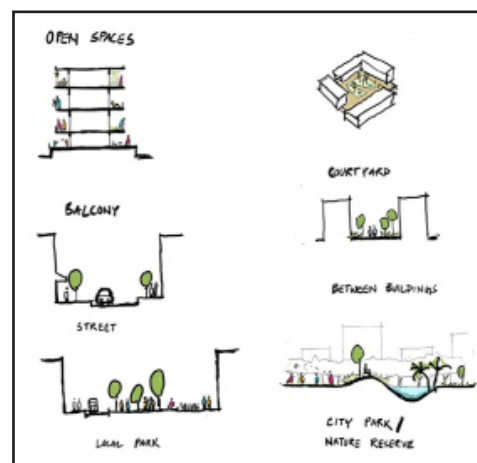


Fig.19: Constrution of public or semi public green space aimed at enhancing the social diversity. Source : Google Image



### 2.3.2 Incremental Transformation of Industrial Building

#### Description

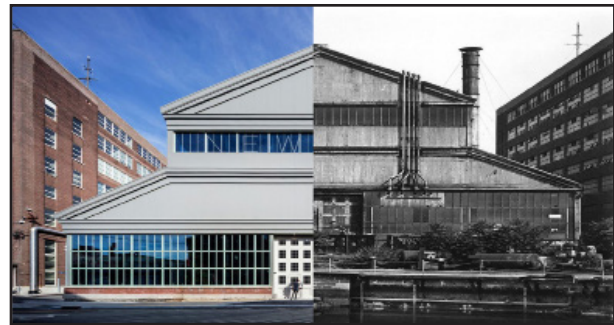
Industrial buildings can be revitalized in a way that keeps their previous use and function while also including new applications through new construction. This is known as incremental transformation of industrial buildings.

#### Analysis

Industrial property transformation results in a neighborhood of its own, which establishes a new spatio-economic interaction with the regeneration effort.

#### Conclusion

Serves as essential components of urban collective memory. Therefore, any plan for their control and exploitation must respect their personality and past.



*Fig. 20 :Example of incremental transformation of industrial building. Source : Google Image*

### 2.1.3 Parameters For Study - Image Parameter

#### District

In the paper 'Transforming Brownfields as Tourism destinations and Their Sustainability on the Example of Slovakia' the authors Bohuslava Gregorová, Pavel Hroncek, Dana Tometzová, Mário Molokác and Vladimír Cech has stated selected definitions of brownfields from post socialist countries of Central and Eastern Europe like Czech Republic, Slovakia etc. The most consistent factor which define a development as brownfield is its prior land use or the parameter 'District'



*Fig.21 : Huangpu riverfront acting as edge to Shanghai Houston Park.*

*Source : Constructed Wetland Parks: A Pathway to Sustainability For Cairo*

#### Edge

In the paper 'Socio-economic revitalization through brownfield reclamation ' the author Corrin James Breeding stated how Huangpu riverfront act as an edge to Shanghai Houtan Park which is a 35 acre park was constructed on top of a former industrial site located on Shanghai's riverfront.

**Form**

In the paper 'A Methodological Approach for Evaluating Brownfield Redevelopment Projects' the authors Francesco Cappai, Daniel Forgues and Mathias Glaus has stated when "Brownfields have a great social impact when they are part of a system of open spaces that act to structure the urban form".

**Vista & Skyline**

In the paper 'Revitalization of an Urban Riverfront to Revitalize the Socio-Economic Conditions of Springfield, MA' the authors Sneha Rasal has focused mainly existing movements, potential access, and point of vistas. The study identifies the key challenges to action implementation while assessing potential links, attractions, and vista points that will drive them through.

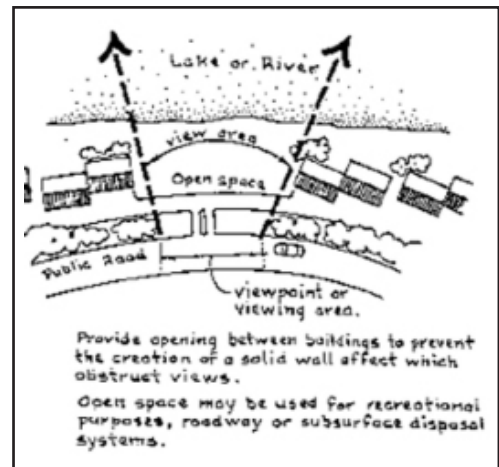
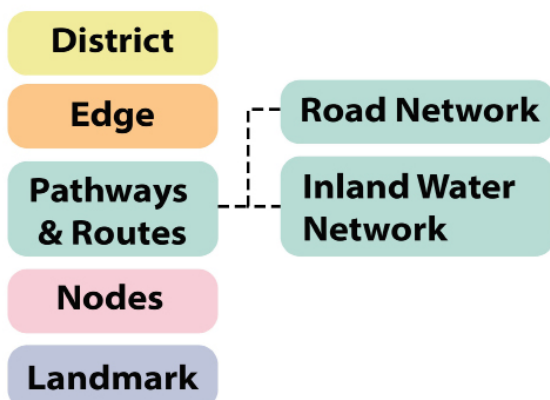
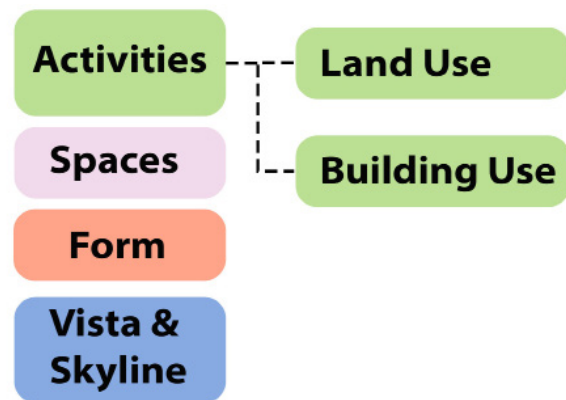


Fig.21 :Access potential links, attraction and vista point. Source : Google Image

**Hence the derived Parameters for Study are :****Image Parameters -****Physical Parameters -****2.4 Conclusion from Literature Study**

- Landuse should be based on mill owner's requirement, City requirement and Requirement of local people.
- Road network form the main backbone for the entire deign proposal and activity mapping.
- There should be a change in activity and space due top the result of adaptive reuse.
- Original city skyline should be respected.

## 3.0 Case Example

### 3.1 Selection of Case Examples:

Four Case Examples has been selected :



**Inside India :**  
**Primary Case Study -**  
**Redevelopment of**  
**Mumbai Textile Mill**  
**land. (India)**



Fig.22: Mumbai mill land before redevelopment.  
Source : Google images.

**Inside India :**  
**Secondary Case**  
**Study - Kanpur**  
**Riverfront**  
**Development of**  
**Tannery area. (India)**



Fig.23: Proposed 3d overview of the kanpur tannery area.  
Source : Studio Symbiosys.

**Outside India :**  
**Secondary**  
**Case Study -**  
**Redevelopment of**  
**Adamjee Jute Mill**  
**(Bangladesh).**

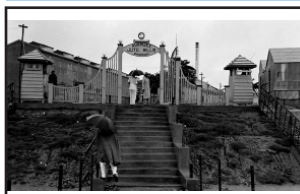


Fig.24: Old entrance of Adamjee jute mill from the river side.  
Source : Google images.

**Outside India :**  
**Secondary Case Study**  
**- Redevelopment of**  
**Lisbon's Olivais Dock**  
**(Portugal) for Expo**  
**98 .**

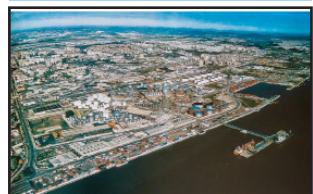


Fig.25 : Expo site before the construction started.  
Source : Retrieved from <http://www.skyscrapercity.com>

#### Case Example Selection:

**Redevelopment of**  
**Mumbai Textile Mill**  
**Land (India) :**

Only redevelopment project in India which has shown progress in execution over last 20 years. Though it was in planning scale.

**Kanpur Riverfront**  
**Development of**  
**Tannery area (India) :**

Only proposed Industrial brownfield development in India in recent times which have shown some advancement in design development stage.

**Redevelopment of**  
**Adamjee Jute mill**  
**(Bangladesh) :**

This redevelopment project has the similar pre conditions and site context as the seleted site context.

**Redevelopment of**  
**Lisbon's Olivais Dock**  
**(Portugal) for Expo**  
**98**

The bank of river Tugus was revitalized to Park of the Nation for organazing the Expo 98 programe which was previosly contaminated Industrial sites.



## 3.2 Inside India :

### 3.2.1 Revitalization of Mumbai mill land ( Primary Case Study)

- Location- Mumbai, India
- Early use - Central Mumbai was a hub of cotton textile mills till 1960s. Out of 58 cotton textile mills 26 were termed as 'sick' and taken over by the government for redevelopment purpose.
- Design Team - Charles Correa Foundation.
- Present Proposal -
  - ◇ 1/3rd of the land allotted for public open space.
  - ◇ 27% to 37% (depending on the area of the site) is given to MHADA & PSU's for housing.
  - ◇ The owners can then redevelop the remaining land for either residential or commercial use, depending on the need.
- 3 zones are selected on the basis of their developmental stage viz mostly abandoned, partially developed and fully developed.

#### Three selected zones :



Fig.26: Zone 1- Mostly abandoned. Source : Author



Fig.27: Zone 2- Partially developed. Source : Author



Fig.28 : Zone 3- Fully developed. Source : Author

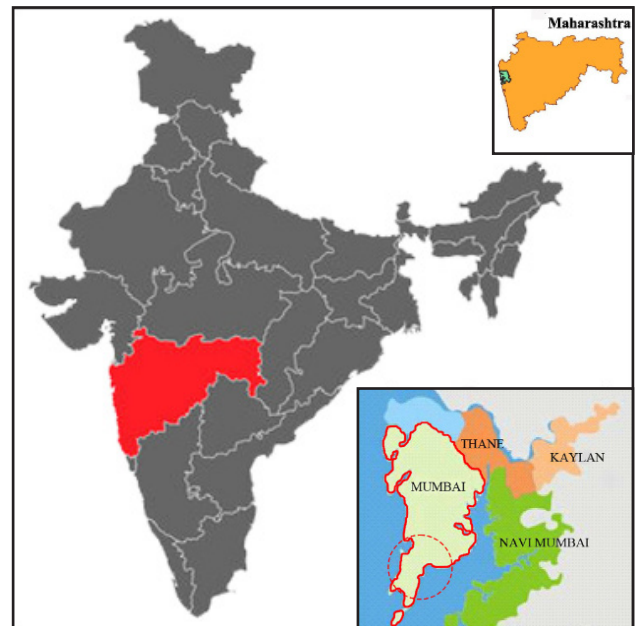


Fig.29: Area level map of Mumbai cotton textile mill area, India. Source : Journal of Coastal Research, Special Issue No. 85, 2018.



Fig.30: Location of mills in Mumbai. Source : Charles Correa Foundation.

## Survey Based On Image Parameter - District(Landuse) :

### Description

- Part of Laxmi mill has been revitalized as Auditorium for Cultural events.
- Indian United mill complex has been partially redeveloped into museum and public toilet.
- Todi mill complex has a variety of commercial activities like cafe , Design center , Silk mills etc.

### Analysis

- Most of the brownfields are converted to commercial towers.
- Reconstruction from scratch is more popular than revitalization.
- Chawls which were once for the mill workers are properly maintained and used as low cost housing.

### Conclusion

- Landuse type have majorly changed from industrial to commercial with very little urban green open space.



Fig.31 : Percentage of Vacant , redeveloped and old landuse in zone 1. Source : Author



Fig.32 : Percentage of Vacant , vacant but have proposal redeveloped and old landuse in zone 2. Source : Author

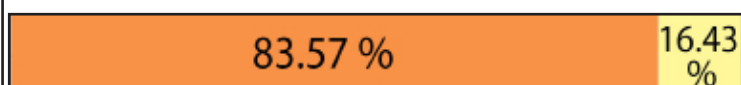
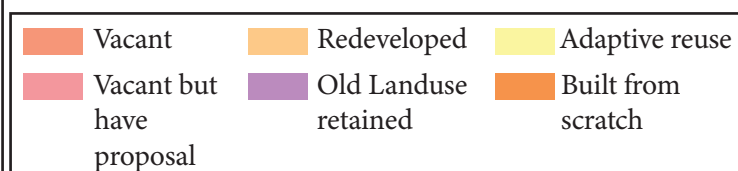


Fig.33 : Percentage of adaptive reuse and build from scratch in zone 3. Source : Author



### **LEGEND**

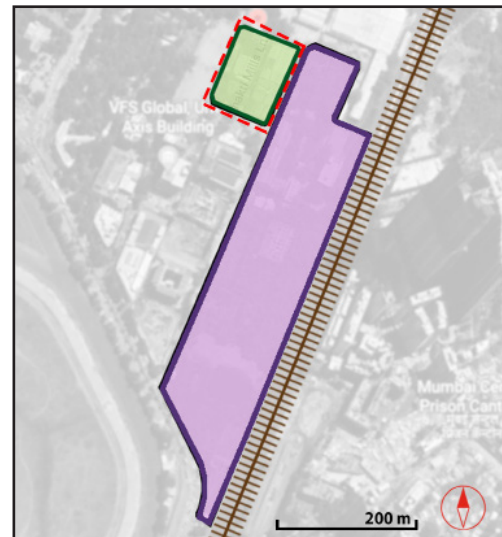


Fig.34 : Zone 1 - Laxmi mill area ; Mostly abandoned. Redeveloped area consist of Recreational spaces like Auditorium, Restaurant , Office spaces etc. Source : Author

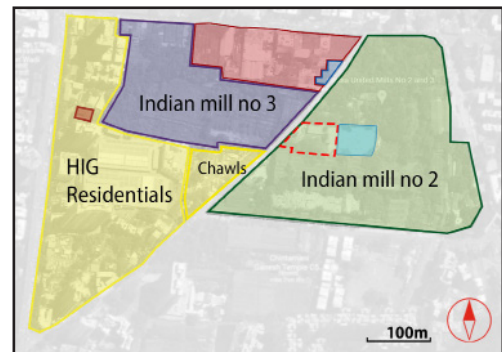


Fig.35 : Zone 2 - India United Mill 2 & 3 , Partially redeveloped . Redeveloped area mainly consist of Museum . Source : Author.

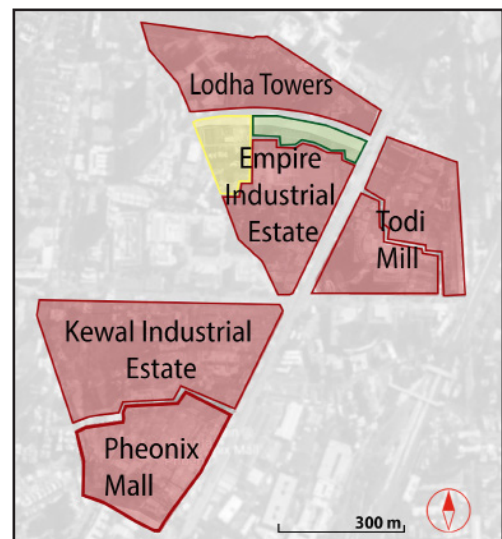


Fig.36 : Zone 3 - Pheonix mall , Todi mill area and Empire mill area , fully redeveloped. Redeveloped area mainly consist of Commercial and Office spaces. Source : Author



Survey Based On Image Parameter - Edge :Description

- The edge is only in the forms of arterial roads and few local roads and railway tracks.
- Definite edges doesn't exist in every zones.

Analysis

- Railway lines acts the most distinct edge compared to the roads.
- Previously the edges were visually and physically impermeable but in the proposed revitalization plans its becoming visually permeable .

Conclusion

- Since the activity type is changing in few areas like from industrial to recreational hence the egde type is also changing from impermeable to visually permeable.

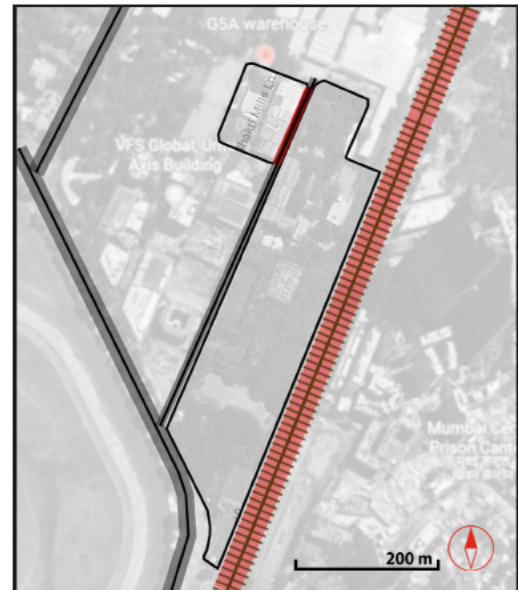


Fig.40: Zone 1 - Laxmi mill area ,Mostly abandoned. Railway track as edge .

Source : Author



Fig.37: Zone 1 - Building facade acting as semi permeable edge - Visually permeable. Source : Author



Fig.38: Zone 2 - Boundary wall acting as semi permeable edge. Visually permeable .Source : Author

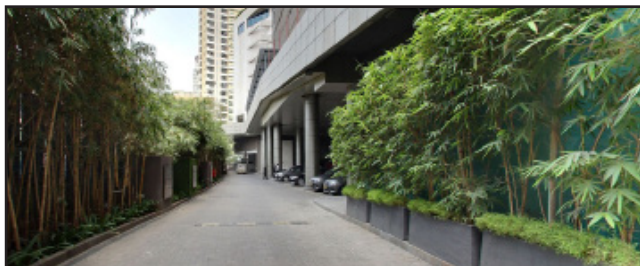


Fig.39: Zone 3 - Boundary wall acting as impermeable edge. Visually permeable. Source : Author

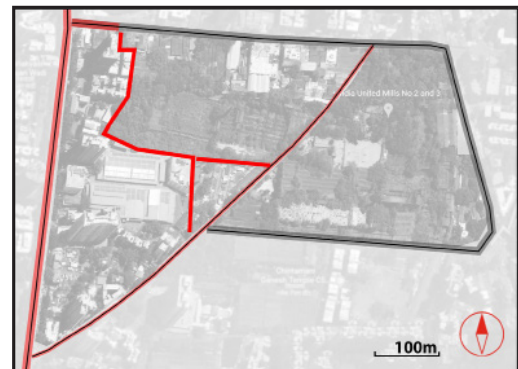


Fig. 41: Zone 2 - India United Mill 2 & 3. Partially redeveloped. Street as edge

Source : Author.

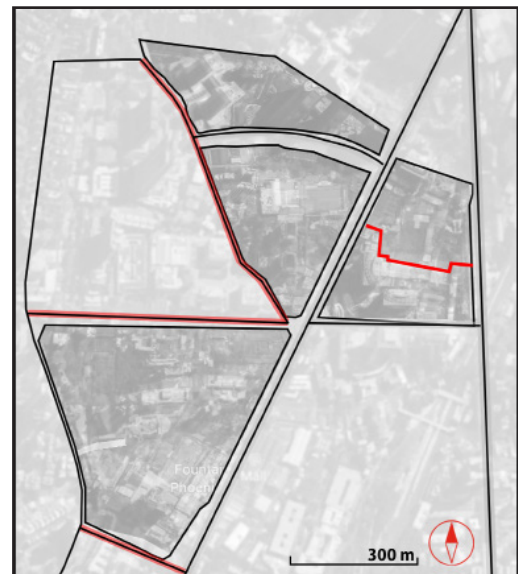


Fig . 42: Zone 3 - Pheonix mall , Todi mill area and Empire mill area , fully redeveloped. Street as edge Source : Author

**LEGEND**

- |                       |                |                  |
|-----------------------|----------------|------------------|
| Railway track as edge | Street as edge | No definite edge |
|-----------------------|----------------|------------------|



### Survey Based On Image Parameter - Pathway & Movement :

#### Description

- Pedestrian movement is smooth where normal roads prevails because of presence of 1.8m wide footpaths.
- No seperate pedestrian and vehicular roads at local level.

#### Analysis

- In many area infrastructural work is going on resulting in slow traffic and hurdles in vehicular movement.
- No definite footpath present in Zone 2.

#### Conclusion

- Vehicular movement is few places like in an around Pheonix mill and Todi mill is very slow due to high vehicular density.

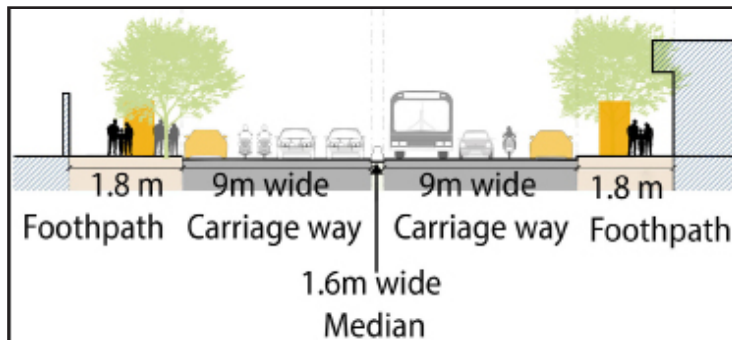


Fig. 43: Road Section of Zone 1. Source : Author

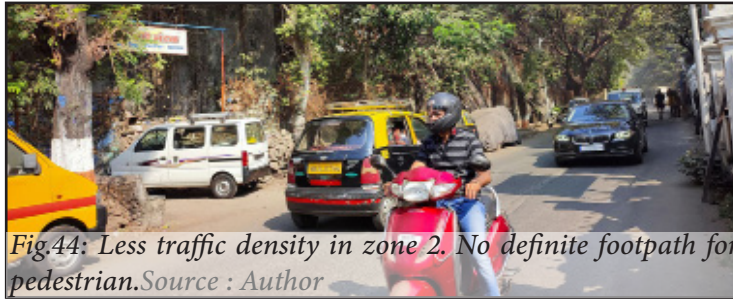


Fig. 44: Less traffic density in zone 2. No definite footpath for pedestrian. Source : Author



Fig. 45: Congested roads in Zone 3 due to ongoing infrastructural work. Source : Author

LEGEND	
Arterial road	Local Road
Flyover	Pedestrian Road
Sub-Arterial road	Under construction Road



Fig. 46 : Movement in Zone 1 - Laxmi mill area ,Mostly abandoned. Source : Author

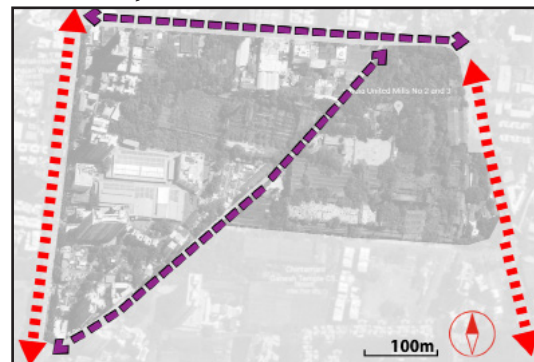


Fig. 47: Movement in Zone 2 - India United Mill 2 & 3. Partially redeveloped. Source : Author.

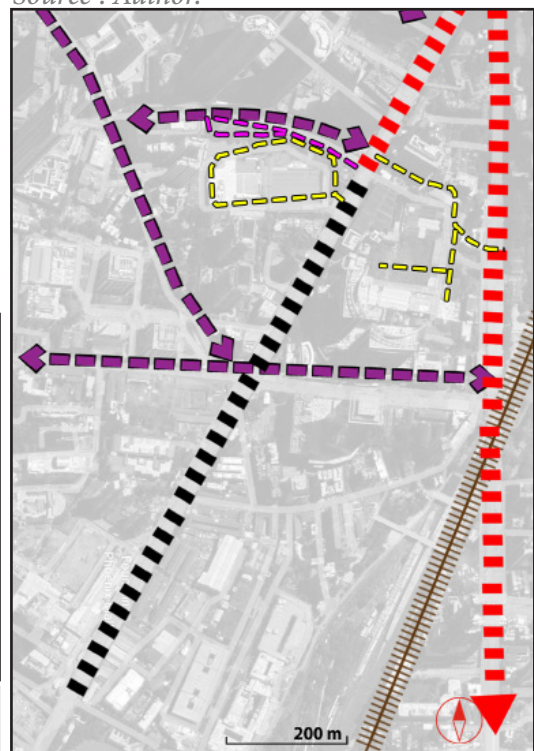


Fig. 48 : Movement in Zone 3 - Pheonix mall , Todi mill area and Empire mill area , fully redeveloped. Source : Author

Survey Based On Physical Parameter - Spaces & Activity :Description

- Part of laxmi mill compound has been converted from industrial space to recreational, commercial & leisure space like auditorium, black box theatre , study & restaurant.
- Indian United mills are converted to institutional space (museum) phrasewise.
- Todi mill complex has been partially restored to industrial and partially converted to commercial whereas Pheoenix mill has been converted to commercial mall.

Analysis

- In most of the areas an effort was made for not changing the type of activities.
- Places where there is a change in activity , its majorly from industrial to institutional or commercial like musuem , cafe etc .

Conclusion

- Parcels of land where the activity type haven't been changed , there the buildings are mostly reconstructed from scratch whereas buildings which are revitalized the activity types have been changed.

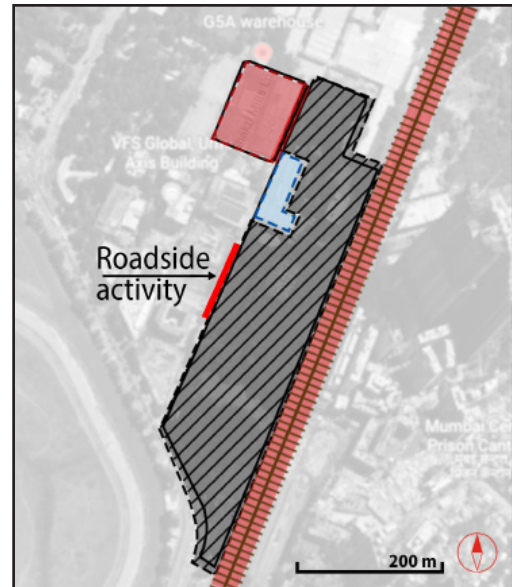


Fig.51: Zone 1 - Laxmi mill area ,Mostly abandoned. Source : Author

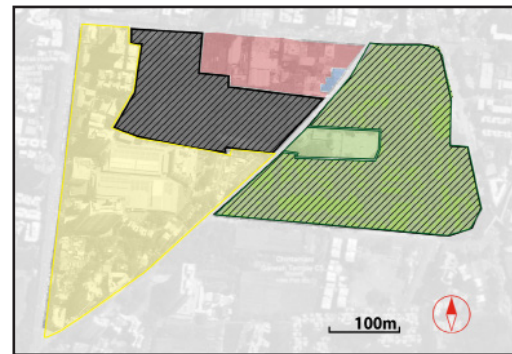


Fig.52: Zone 2 - India United Mill 2 & 3. Partially redeveloped. Source : Author.

### ACTIVITY RESTORED VS. NEW (ORIGINALLY GROWN)



Fig.49:Old residential activity has been retained.  
Source : Author

Fig. 50 : Few road side activities like car repairing , parking etc has grown organically.  
Source : Author

**LEGEND**

	Abandoned Urban Space		Commercial Space
	Existing Recreational Space		Residential Space
	Proposed Recreational Space		Institutional Space

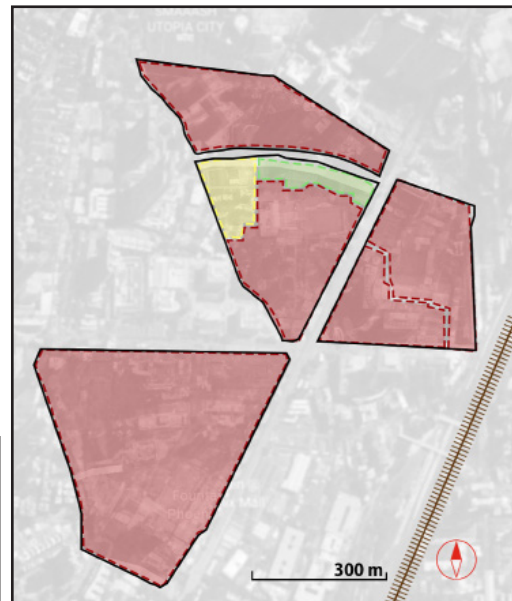


Fig.53: Zone 3 - Pheoenix mall , Todi mill area and Empire mill area ,fully redeveloped. No informal or roadside activity has developed in this zone. Source : Author



### Survey Based On Physical Parameter - Vista & Skyline :

#### Description

- In zone 1 there is no change in skyline due to little further development whereas an effort has been made to keep the skyline same in zone 2.
- There's a drastic change in skyline in zone 3 in most of the buildings are reconstructed from scratch.

#### Analysis

- Tall chimney from the textile mills were an important part of the old city's skyline which is mostly retained in modern days but the verticality of the modern day building contributes more to the city's skyline.

#### Conclusion

- There is an inclination to attain verticality in most of the fully redeveloped area which results in complete change in city's skyline.



Fig.57:View from point A. Source : Author.



Fig.58:Zone 1 - Mostly abandoned site. Tall tower far behind constitute to the skyline of this place. View from point B. Source : Author.



Fig.59 :View from point C. Source : Author.



Fig.60:Zone 2 - Partially developed. The old city skyline is kept in mind while proposing the new structures and redevelopment in the place. Source : Author.



Fig.61:View from point E. Source : Author.



Fig.62:Zone 3 - Fully developed. Drastic change in city skyline in an existing mill complex caused due to adaptive reuse and rebuilding from scratch. View from point D. Source : Author.

### KEY MAPS

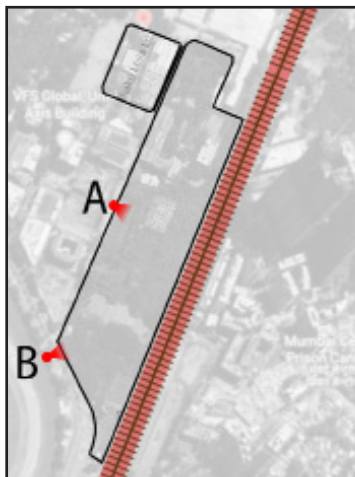


Fig.54:Keyplan for Zone 1. Source : Author.



Fig.55:Keyplan for Zone 3. Source : Author.



Fig.56:Keyplan for Zone 2. Source : Author.



### 3.2.2 Redevelopment of Kanpur Tannery Area ( Secondary Case Study)

- Location- Kanpur, India
- Total Area - 185 ha.
- Early use - Occupied by tanneries are making the surrounding area uninhabitable for Kanpur residents due to groundwater pollution and garbage discharge into the river.
- Design Team -  
Planning part - Studio Symbiosis lead by Amit Gupta and Britta Knobel Gupta.  
Landscape part - Design Accord.
- Present Proposal -Relocating the tanneries away from Ganga and providing accommodation for the local slum population so that people can enjoy the river.

#### PRESENT CONDITION OF THE SITE

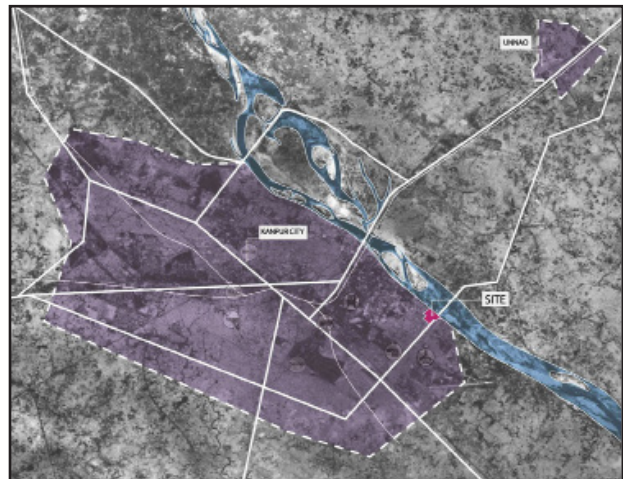
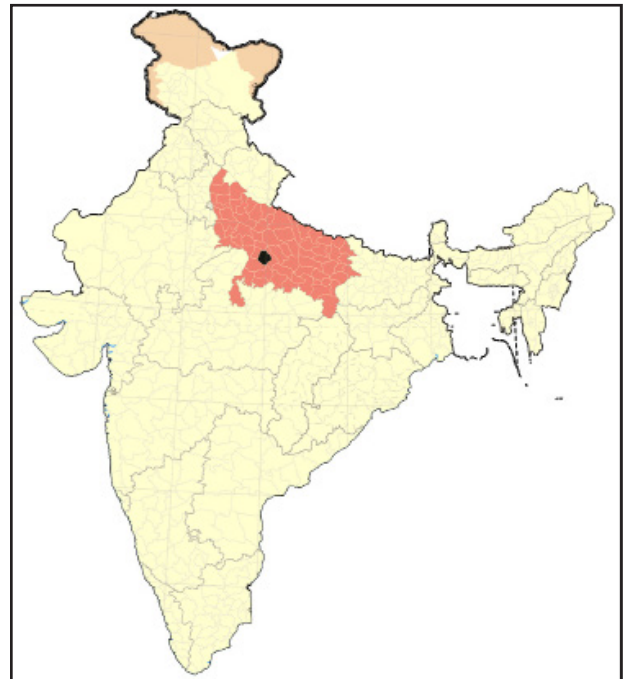


Fig.63: Area level map of Kanpur tannery area,India.  
Source : Journal of Coastal Research, Special Issue No. 85, 2018.



Fig.64 : Proposed Views of Kanpur Tannery Area.  
Source : Studio Symbiosis.

### Survey Based On Image Parameter - District(Landuse) :

#### Description

- The proposed landuse type is completely different from the present landuse type. There is a strict change in dominant landuse type from industrial to residential.
- Green recreational spaces along with other amenities has also been incorporated.

#### Analysis

- Very little percentage of landuse is allotted to roads. Hence it may lead to congestion in future as the population will rise due to highest percentage of land being allotted to the housing sector.
- The change in landuse or the relocation of industrial zone from the riverfront could be done as river no longer is the mode of transportation.

#### Conclusion

- There is clean shift in landuse type from industrial to residential.

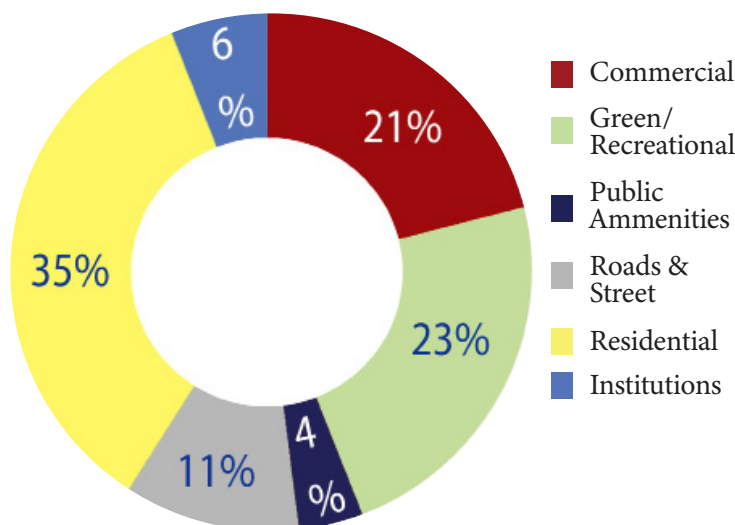


Fig.65: Proposed landuse breakdown. Source : Studio Symbiosis

#### PROPOSED VIEW



Fig . 66: Proposed recreational facilities like dedicated hawkingvending zone , food court & gaming area etc. Source : KANPUR MUNICIPAL CORPORATION JUNE, 2016



Fig.67 : Old landuse of Jajmau riverfront.

Source : Studio Symbiosis



Fig. 68 : Proposed landuse of Jajmau riverfront. Source : Studio Symbiosis

#### LEGEND

- Commercial
- LIG Housing
- MIG Housing
- HIG Housing
- HIG+ Housing
- Group Housing
- High-End Group Housing
- Institutional
- Recreational
- Amenities
- Green Space



**Survey Based On Image Parameter - Edge :****Description**

- Most of the recreational activities are concentrated around the edge.
- It has separate promenade for vehicular and pedestrian movement.
- The activities at the edge are designed in such a way that it makes the people to interact more with the river in a positive manner.

**Analysis**

- This edge makes use of city streets to build green corridors and provide crucial linkages to the riverfront and also public open spaces.
- This kind of edge design lacks river dependent livelihood like - fishing or jetty system of transportation.

**Conclusion**

- Though there was an effort get the inspiration from the Gardens by the Bay, Singapore but that seems an forceful incorporation in Indian context.



Fig.74: Proposed Edge .Source : Studio Symbiosis.

**PROPOSED VIEW**Fig.69: Proposed Edge .  
Source : Design Accord.Fig.70: Detailed view of parking and vehicular pathway connecting to the bridge.  
Source : Design Accord.Fig. 71: Proposed Edge with skyline .  
Source : Studio Symbiosis.

Fig. 72: Detailed view of pedestrian pathway. Source : Design Accord.



Fig.73 : Nightview of proposed Edge .Source : Design Accord.

**LEGEND**

- Jajmau existing
- Arterial road
- Promenade
- Neighbourhood roads
- Pedestrian Trails

### Survey Based On Image Parameter - Pathway & Movement :

#### Description

- Hierarchy of roads are properly maintained.
- A separate pedestrian and vehicular road is proposed along the promenade where the width of vehicular road varies from 12m to 18m.
- Approx 13.6 km of cycle track has been provided in all neighbourhood roads.

#### Analysis

- Principles of complete street design has been adopted which supports pedestrians, cyclists, public transport and private vehicles in that order.

#### Conclusion

- As the roads are laid in a rigid manner it is hard to merge the city with its organically grown surrounding.

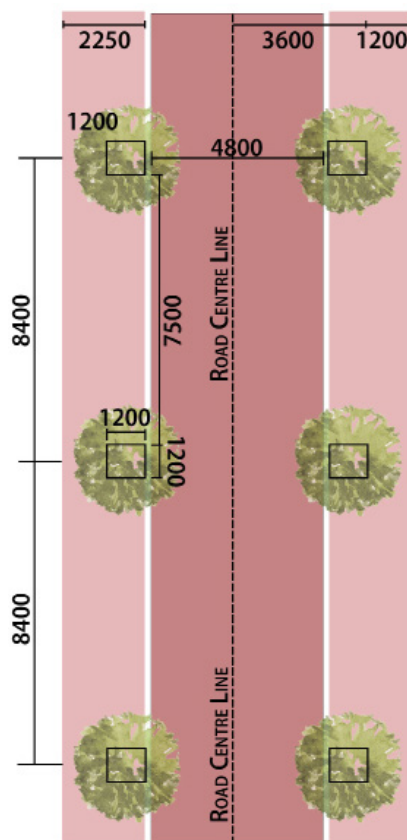


Fig. 75 : Road detail of pedestrian trail. Source : Studio Symbiosis.

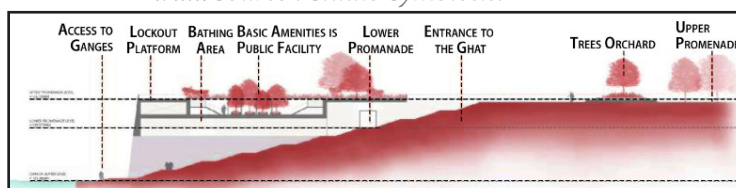


Fig. 76: Detailed Section of pedestrian trail along with ghat. Source : Studio Symbiosis.



Fig. 77 : Non-motorised transport track & short connection via green linear parks. Source : Studio Symbiosis.

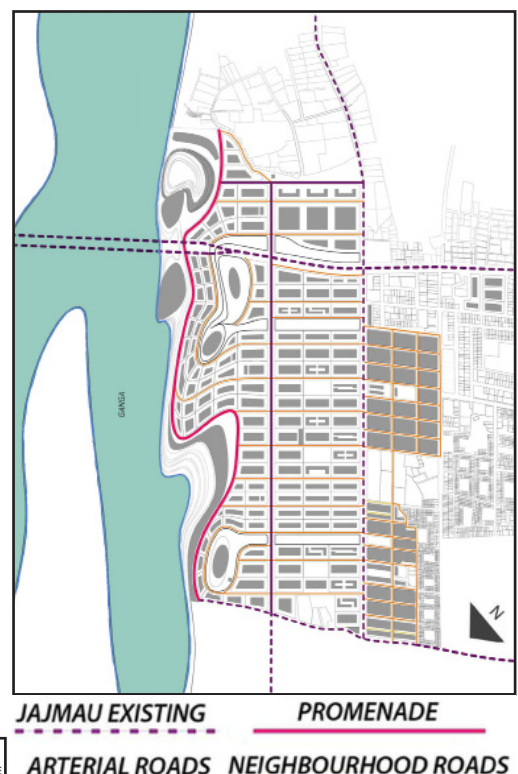


Fig. 78: Site Zoning - Street Hierarchy. Source : Studio Symbiosis.



Survey Based On Image Parameter - Nodes & Landmark :Description

- The existing landmarks are overlapping with the current landuse and hence there is a slight change in proposed landmarks.

Analysis

- For communication, direction, and wayfinding, landmarks serve as reference points, markers, or cognitive anchors.
- With change in conventional landmarks it will be hard for the people to navigate themselves through the city, as they are already used to certain set of landmarks over years.

Conclusion

- Change in conventional landmarks changes now looking imagine the image of the city and hence it became difficult for them to navigate through the city.
- Few unconventional landmarks like Mosques and Crematorium grounds are also hard to relocate as sentiments of the people are attached to those places.



Fig.81: All the nodes are formed by the intersection of local roads with arterial roads.  
Photograph : Google.

**LEGEND**

Arterial road Local Road



Fig.82 : Jajmau Tila ; existing conventional landmark. Photograph : Tanmoy Khan.



Fig.79: Ganga ghat aarti sthal ; existing conventional landmark. Ghats are completely shifted to other location in the proposed masterplan.  
Photograph : Dainik Bhasak.



Fig.80: Proposed deck as landmark for recreational facility. There is a conflict between existing and proposed landmark.

Source : Design Accord.

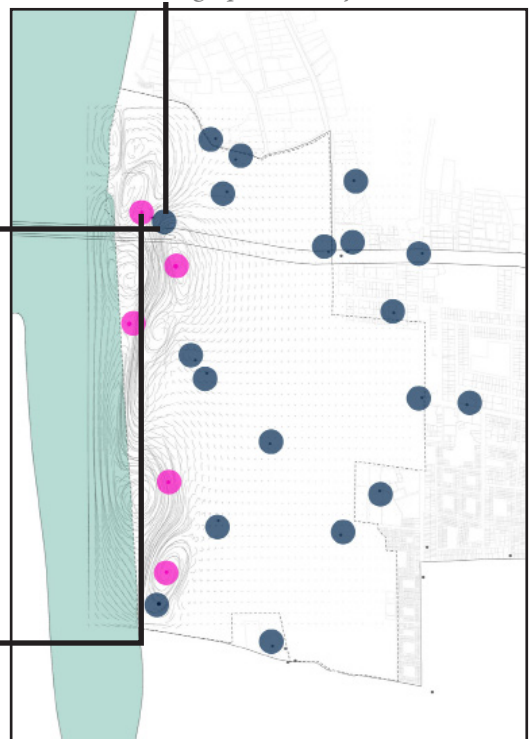


Fig. 83 : Existing and Proposed landmarks .  
Source : Studio Symbiosis.

**LEGEND**

Proposed Landmarks Existing Landmarks

### Survey Based On Physical Parameter - Spaces & Activity :

#### Description

- The old spaces like the ghats , archeological sites has been preserved and enhanced through design.
- The riverfront promenade has been enhanced with new activities such as entertainment, culture, and administration to make the riverfront more lively.

#### Analysis

- Though activities like administration has also been incorporated along the river edge but this kind of activity doesn't need any direct functional benefit of the river.
- Unlike the activities like entertainment and commercial facilities which increase the financial value and have direct functional relation with the riverfront.

#### Conclusion

- High end housing or commercial spaces near ghat areas can reduce or destroy river livelihood, damaging urban waterways and dependent inhabitants' means of subsistence.



Fig .84: Proposed 3d view of Zone 1 Recreational space .Private recreational activity zone for the High End Group Housing. Source : Design Accord.



Fig .85: Proposed 3d view of Private recreational activity zone for the High End Group Housing. (Zone 1). Source : Design Accord.



Fig . 86 : Space mapping . Source : Studio Symbiosis.

#### **LEGEND**

- Commercial
- LIG Housing
- MIG Housing
- HIG Housing
- HIG+ Housing
- Group Housing
- High-End Group Housing
- Institutional
- Recreational
- Amenities
- Green Space

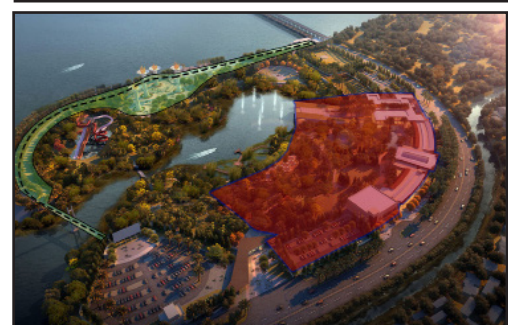


Fig .87: Proposed aerial 3d view of Zone 2 Recreational space .2 different promade for pedestrian and vehicular movement are proposed around the proposed commercial block. Source : Design Accord.

#### **LEGEND**

- Recreational
- Commercial



### 3.3 Outside India :

#### 3.3.1 Adamjee Jute Mill, Narayanganj ; Bangladesh (Secondary Case Study)

- Location- Narayanganj district , Bangladesh ; about 21.5 km away from Dhaka.
- Total Area - 99 ha - excluding 10.86 ha for non-bengali residence.
- Early use - The site was one of the largest Jute mill in Bangladesh from shut down on 2002.
- Design Team - Pleiades Bangladesh led by Mr. Naoko Tsuge
- Present Proposal - Adamjee EPZ with 229 industrial establishments

#### SITE IMAGES - PAST VS. PRESENT



Fig .88 : Early and present condition .



Fig .89: Early entry gate from river side, 1954.  
Photo: James Burke/Life.



Fig. 90: Present entry gate. Source: Wikipedia.

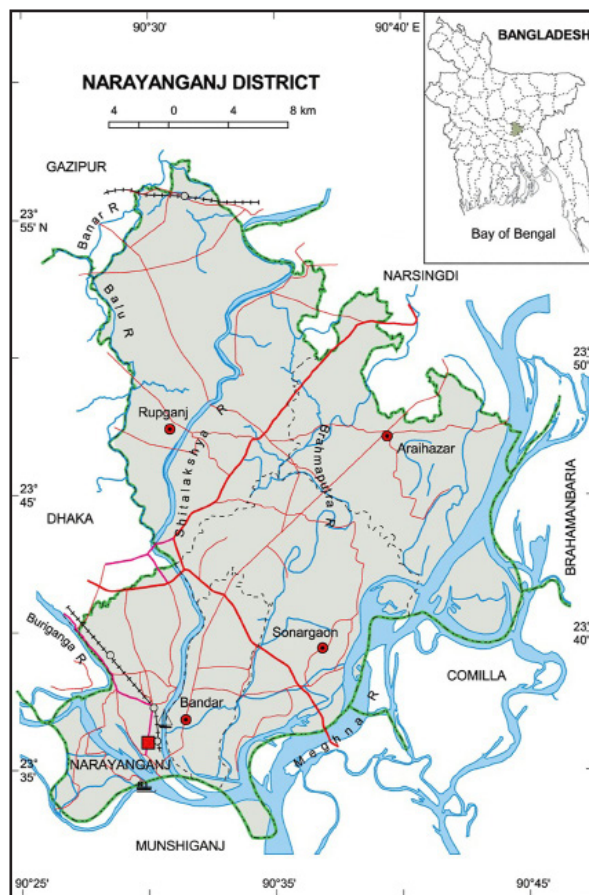


Fig .91: Narayanganj locational map.  
Source : NCC (2015c).

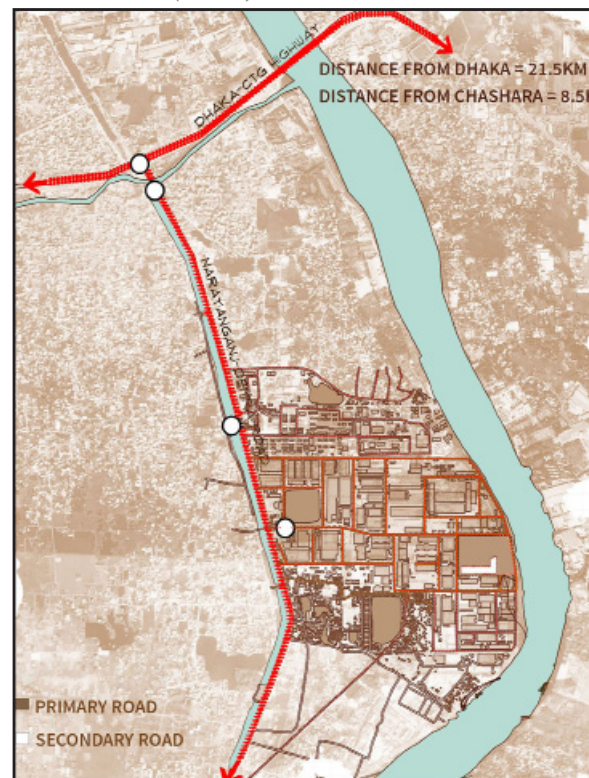


Fig .92: Adamjee EPZ. Source: NCC (2015c).

## Survey Based On Image Parameter - District(Landuse) :

### Description

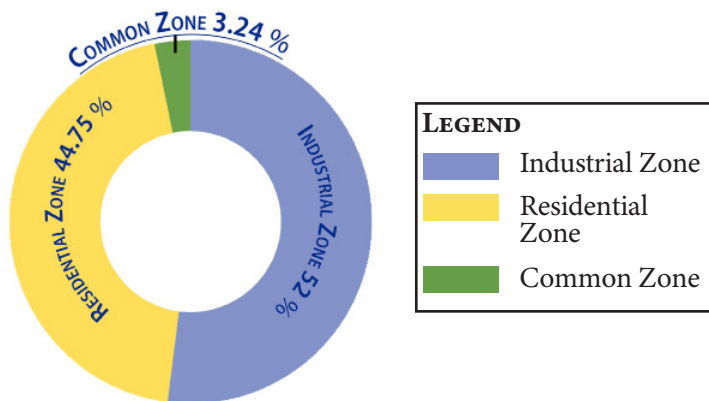


Fig.92: Existing landuse pattern.  
Source : GIS data base.

### Analysis

- Despite Naranganganj being a Industrial area the land use pattern drastically changes within 4km of the site, which is dominated by agricultural and residential zone.
- Only few residential are there which include Power plant housing and Bihari colony.
- In recent time many waterbodies are filled up due to increasing pollution from industries.

### Conclusion

- The lands are monitized in a good way without changing the landuse type.



Fig.93: Adaptive reuse of the mill structures for the production purpose. Source : mapio.net

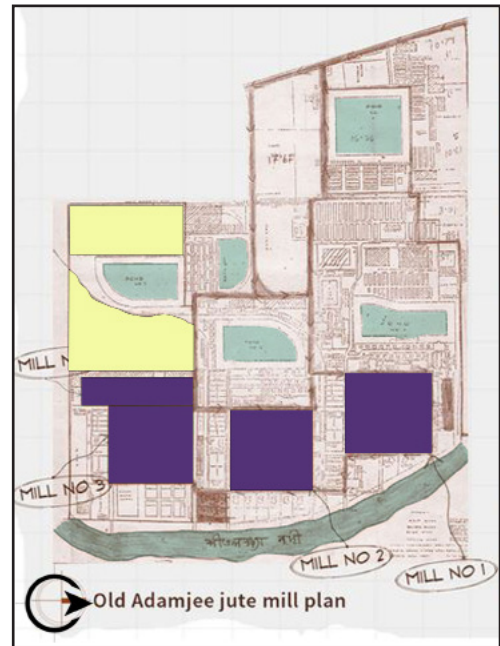


Fig.94: Old Adamjee Jute mill landuse map. Source : Uni.xyz projects.

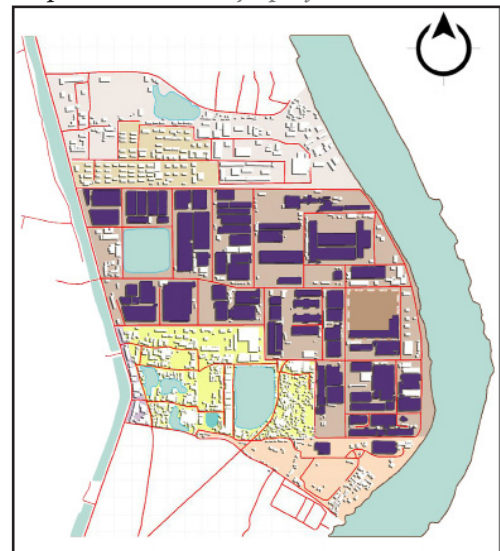
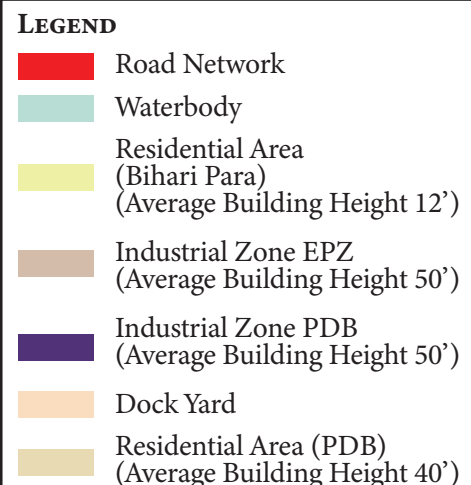


Fig. 95: Present Narayanganj EPZ landuse map. Source : Uni.xyz projects.





**Survey Based On Image Parameter - Edge :****Description**

- Adamjee EPZ is vbounded by Highway on the west and River on the east which acts as sigificant edges.
- The skyline merges with the existing city skyline. The elevation of the buildings merges with the existing ones making it a part of the city.

**Analysis**

- Natural boundary exist both in east & west direction.
- Presence of river and canal on either side and the ponds make it a socially sensitive place for human interaction.

**Conclusion**

- Industrial land on riverfront lessen the chances of interaction with the river for daily needs in present day scenario where water is not a mode of transport any more.

**Survey Based On Visual Parameter - Pathway & Movement****Description**

- Width of Primary roads - 12m
- Width of Secondary road - 9m
- Secondary roads are well connected but road layout is not much rigid making it look like a organically grown area hence merges with its surrounding unplanned area.
- Earlier Sitalakshya river was used as main transportation route. Presently it is replaced by Narayangunj - Demra highway (R110) because of urban development.

**Analysis**

- The primary roads are relatively narrower compared to the traffic movement which may lead to congestion.
- The secondary roads remain relatively uncongested.

**Conclusion**

- The Narayangunj-Demra highway is much more narrower compared to highway.



Fig.96: Sitalakshya River acting as edge.  
Photo : Shaziv & Shoilee.



Fig.97: Narayangunj EPZ map highlighting routes and pathways. Source : Uni.xyz.

**LEGEND**

- Sub - arterial road / Primary road
- Local road / Secondary road
- Waterbody



Fig.98: Road width insuficient for two way heavy vehicle. Adamjee Epz is highlighted.

Photo : The Promiscuous



Fig.99: Road inside EPZ . Source : mapio.net.

### Survey Based On Physical Parameter - Spaces & Activity :

#### Description

- Primary school within the premises is shifted resulting in decline in institutional spaces.
- A pond has been refilled to increase the industrial land within the EPZ.

#### Analysis

- The major activity types are kept intact.
- Institutional activity like primary school are removed and primary amenities like police station are added.

#### Conclusion

- Revitalization has been successful without changing the major landuse type.



Fig.100 : Vacant mill no 2. Source : mapio.net.



Fig. 101: Wetland area inside the EPZ. Source : mapio.net.



Fig.102: Industrial activities inside the EPZ. Old mills are revitalized without changing the landuse. Source : mapio.net.

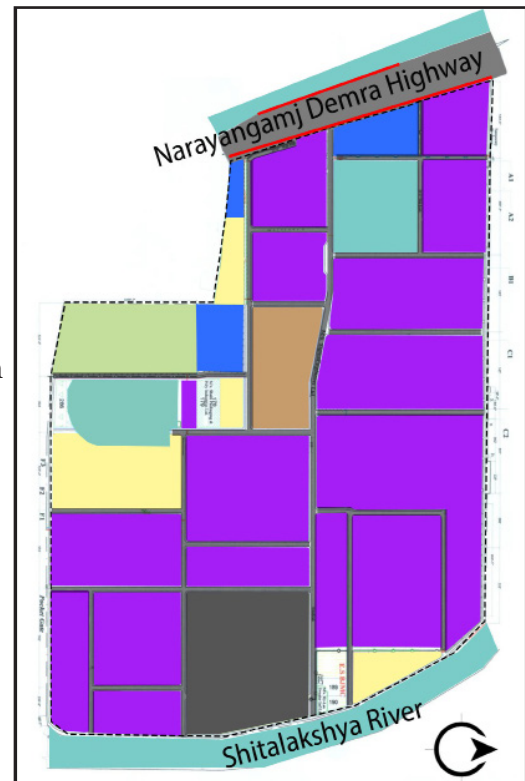


Fig.103: Activity mapping inside the EPZ. Source : Uni.xyz.

#### **LEGEND**

- Road Network
- Waterbody
- Residential
- Green Open Space
- Industrial
- Vacant Land
- Wet Land
- Unorganised Market



Fig.104: Residential area within EPZ area. Source : mapio.net.



Fig.105 : Residential area within EPZ area. Source : mapio.net.



Survey Based On Physical Parameter - Vista & Skyline :Description

- Skyline is kept continuous by maintaining the indigenous elevation.

Analysis

- Even though many new structures are introduced with time but the original skyline is maintained.

Conclusion

- Skyline is continuous, respecting the traditional elevational style of Bangladesh.

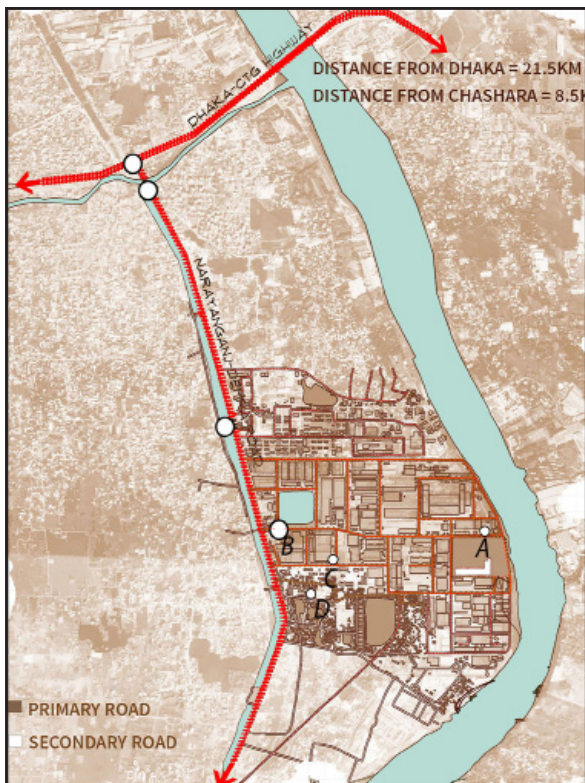


Fig.106: Key map. Source : Uni.xyz.



Fig. 107: Vacant mill no 2. View from point A. Source : mapio.net.



Fig.108: Residential area. View of point D. Source : mapio.net.



Fig.109: Skyline view from notun bazar. View from point C. Source : mapio.net.

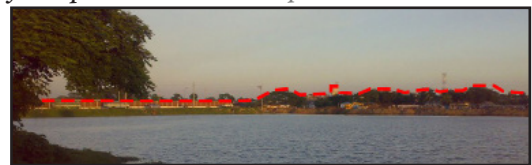


Fig.110 : Skyline view from notun bazar. View from point B. Source : mapio.net.



Fig. 111 : Aerial view of Narayanganj EPZ with the adjacent pond. Source : mapio.net.

### 3.3.2 Lisbon Expo 98 Urban Project ; Portugal (Secondary Case Study)

- Location- Lisbon , Portugal on the bank of Tejo & Tagus River.
- Total Area - 340ha.
- Total Stretch of Land - 5 km Waterfront
- Early use - Revitalization of a former industrial / brownfield area in the Northeast of Lisbon
- Design Team - Álvaro Siza Viera and team.
- Present Proposal - The two main aim of the project was intended to revitalise an urban region comprising about 340 hectares of eastern Lisbon and prepare for the Lisbon World Exposition.

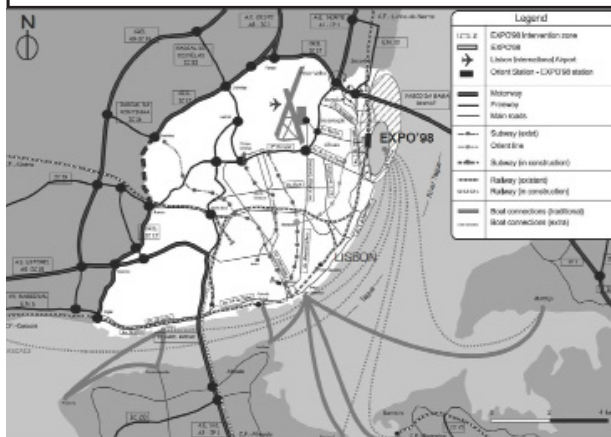


Fig.112: The location of Park of Nation (Parque das Nações). Source : European Conference of Ministers of Transport, 2003, p. 216.



Fig. 113: Detailed location.

Source : Adopted from 'Lisbon EXPO 98', Trigueiros e Sat (ed.), Vassalo Rosa, 1996



Fig.114 : An aerial view of the industrial area on the riverfront of Tagus before intervention  
Source : Radu, 2018, p. 30.



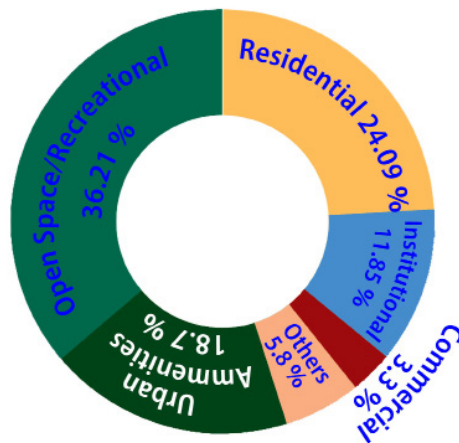
Survey Based On Image Parameter - District :Description

Fig. 115: Present landuse distribution. Source : Author

Analysis

- Most of the land parcels are allotted to green open space / recreational space and residential.
- Overall landuse type changed from Industrial to Residential.

Conclusion

- The type of industry whether hazardous or not determine the proposed landuse type for the future revitalization project.

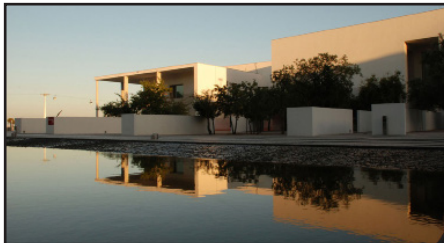


Fig.116: Portugal pavelion for Expo 98. Source : Arch Daily



Fig.117: Open green space - Tagus urban park. Source : Van Miltenburg, 2010

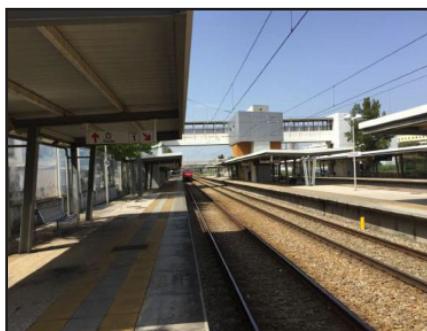


Fig.118: Transport Hub. Source : Van Miltenburg, 2010

**LEGEND**

Circulation	Commercial	Recreational
Institutional	Industrial	Green open space
Services	Mixed Use	Waterbody
Residential		

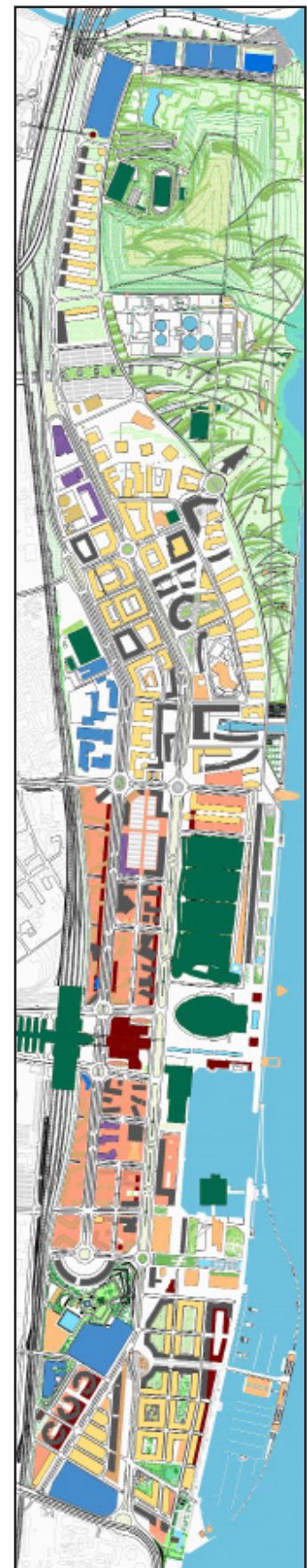


Fig.119 : PP 6 - District (Landuse) map. Source : Adopted from 'Lisbon EXPO 98', Trigueiros e Sat (ed.), Vassalo Rosa, 1996.



### Survey Based On Image Parameter - Edge :

#### Description

- 4 main axis are identified as design tool which also act as a distinct edge in the whole design.

#### Analysis

- Leisure axis or the edge of Tejo river act as natural edge.
- Public axis forms a vista and form a edge.
- Other two axis namely main axis and secondary axis constitute the arterial roads.

#### Conclusion

- Riverfront and the Arterial road / main axis acts as the major edge on the either side, and river Trancao in the north is another major edge of this linear site which is similar site context to the selected one.

### VIEWES OF THE EDGES

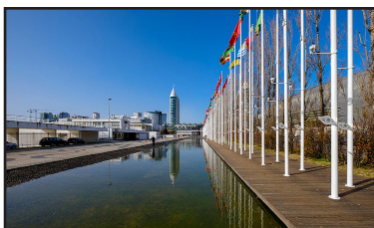


Fig.120: Public axis or the main square 'Rossio dos Olivais'.  
Photograph : João Gomes da Silva



Fig.121 : Main axis or 'Avenida D. João II'.  
Photograph : Sérgio Dias

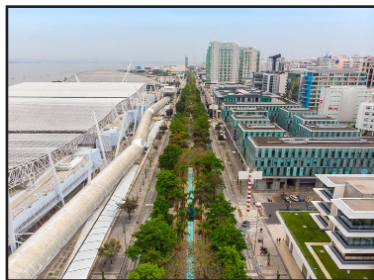


Fig. 122: Secondary axis or 'Alameda dos Oceanos'.  
Photograph : João Gomes da Silva



Fig. 123 : Leisure axis or 'Passeio Ribeirinho'.  
Photograph : João Gomes da Silva



Fig.124: River Trancao acting as the edge in the north.  
Photograph : Juntas

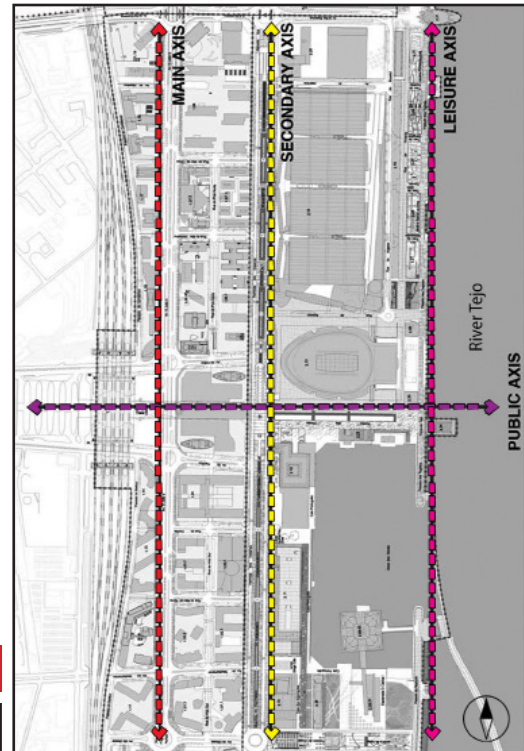


Fig. 125: The four organizing axis of the Expo '98 plan acting as edges.

Source : A World Fair for the Future: A Study of the Legacy of the Expo '98 Urban Model by Patricia Simões Aelbrecht.

#### LEGEND

- |                |              |
|----------------|--------------|
| Public Axis    | Main Axis    |
| Secondary Axis | Leisure Axis |



Fig.126: Detail plan of leisure axis.  
Photograph : João Gomes da Silva.

#### LEGEND

- |                     |                   |
|---------------------|-------------------|
| 1. Sports Center    | 6. Stables        |
| 2. Civic Center     | 7. Farm           |
| 3. Soccer Field     | 8. Seminar        |
| 4. Ridding School   | 9. Elevador       |
| 5. Open Air Theatre | 10. Barrio Social |

**Survey Based On Image Parameter - Movement & Pathways :****Description**

- Among 4 major design axis 3 major axis are arterial and sub-arterial roads and pedestrian promenade.
- The Lisbon's Nations' Park is situated at the junction of Inner Ring Road (CRIL), the National Highway N10, the Vasco da Gama Bridge, the North/South Axis, Oriente Station, and a ferry terminal.

**Analysis**

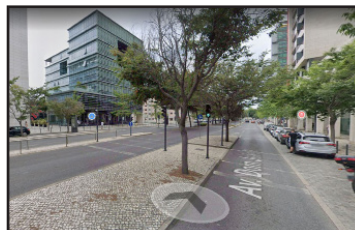
- The whole city is revitalized in such a way that public transport paves a important role.
- The transport route even have impacted zoning and major edges of the city.

**Conclusion**

- Principles of complete street design has been adopted which supports pedestrians, cyclists, public transport and private vehicles in that order.

**VIEWES OF MAJOR ROUTES AND PATHWAYS**

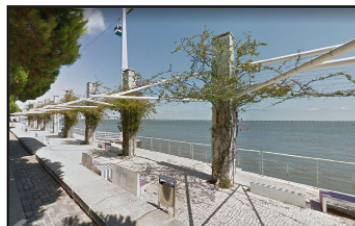
*Fig.127: Pedestrian road acting as an edge. Photograph : Google*



*Fig.128: Arterial road acting as an edge. Photograph : Google*



*Fig.129 : Pedestrian promanade acting as an edge. Photograph : Google*



LEGEND	
	Expressways
	Arterial Roads
	Sub-arterial Roads
	Local roads
	Pedestrian roads



*Fig.130 : Nation's Park (Parque das Nações) Road Network.*

*Source : Adopted from 'Lisbon EXPO 98', Trigueiros e Sat (ed.), Vassalo Rosa, 1996.*



### Survey Based On Image Parameter - Nodes & Landmarks :

#### Description

- Nodes are designed to channelize the traffic flow in more efficient manner.

#### Analysis

- All the nodes are lined along the main arterial road running parallel to the riverfront.
- Large installations has been installed to create a vista and converting the nodes to conventional landmarks too.
- Nodes are also placed where the traffic need to be channelized out of the city through overpass to avoid accidents.

#### Conclusion

- The nodes are efficiently designed to channelize the traffic and reduce overspeeding and accident .

### VIEW OF MAJOR ROUTES AND PATHWAYS



*Fig.131 : Major node .Photograph : Tripadvisor*



*Fig. 132 : Nodes also acting as landmark. Photograph : Tripadvisor*



*Fig. 133: Nodes. Source : Adopted from 'Lisbon EXPO 98', Trigueiros e Sat (ed.), Vassalo Rosa, 1996.*



**Survey Based On Physical Parameter - Spaces & Activity :****Description**

- The whole area is divided into 6 zones based on its activity type.
- Each activity zones are developed at different stages of development.

**Analysis**

- The major activity has been changed to residential.
- Institutional activities have grown organically and was not there in primary proposal.

**Conclusion**

- Very less of public ammenities like hospital, police station or train station compared to the whole developmental area.



Fig.134: PP 6 - Tagus urban park - green urban open space.  
Source : Van Miltenburg, 2010



Fig.135: PP 1 - Transport Hub. Source : Van Miltenburg, 2010

**LEGEND**







	PP 1 - Central Zone ; Transport Hub		PP 4 - Larger residential area, large commercial facility & a Train station.
	PP 2 - Leisure activities & Restaurant		PP 5 - Larger residential with commercial at ground floor.
	PP 3 - Residential with a single Hospital		PP 6 - Largest green space with recreational facility.



Fig.136: Proposed zones Park  
of the Nation - Proposed Plan.  
Source : Van Miltenburg, 2010

Table. 1: Conclusions from Case Example.

	DATA	MUMBAI, BANGLADESH	
DISTRICT (LANDUSE)	Landuse type has <b>majorly changed from industrial to commercial</b> with very little urban green open space.	The lands are <b>monitized</b> in a good way without changing the landuse type.	The type of <b>industry</b> whether <b>hazardous</b> or not <b>determine the proposed landuse type</b> for the future revitalization project.
Ecot	With the change in activity type in few areas from industrial to recreational hence the egde type is also <b>changing from impermeable to visually permeable</b> .	Industrial land on riverfront <b>lessen the chances of interaction with the river</b> for daily needs in present day scenario where water is not a mode of transport any more.	<b>Riverfront and the Arterial road / main roads</b> as the <b>major edge on the either side</b> , and <b>river</b> <b>Transect</b> in the north is another major edge of this <b>linear site</b> which is similar site context to the selected one.
Routes And Pathway	<b>Vehicular movement</b> in few places like in and around <b>Phoenix mill and Todi mill</b> is very slow due to <b>high vehicular density</b> .	The <b>Narayanganj-Demra highway</b> is much more <b>narrower</b> compared to highway.	<b>Principles of complete street design</b> has been adopted which supports pedestrians, cyclists, public transport and private vehicles in that order.
Nodes And Landmarks	_____	_____	The nodes are <b>efficiently design to channelize the traffic and reduce overspeeding and accident</b> .
Spaces And Activity	Parcels of land where the activity type <b>hasn't been changed</b> , there the buildings are mostly <b>reconstructed from scratch</b> whereas buildings which are <b>revitalized the activity types have changed</b> .	<b>Revitalization</b> has been <b>successful</b> without changing the major landuse type.	<b>Very less of public ammenities</b> like hospital, police station or train station compared to the whole developmental area.
Vista And Skyline	There's is a <b>inclination to attain verticality</b> in most of the fully <b>redeveloped area</b> which results in <b>complete change in city's skyline</b> .	Skyline is <b>continuous, respecting the traditional elevational style</b> of Bangladesh.	_____
Form	_____	_____	_____
	The designer <b>fails to replicate the wave or the current of the river through out the plan</b> . The inner lands gradually started following a rigid grid iron pattern.		



## 4.0 Case Application

### 4.1 Area Level Study:

#### 4.1.1 Selection of the Area ; Delineation & Description

- Location- Titagarh, West Bengal
- Total Area - 213 ha approx.
- Total stretch of land - 2.67 km .
- Depth varies from 0.8 km to 1.2 km.
- Early use - The project area is occupied by jute mills by the bank of river Hoogly.
- ◇ The linear stretch of area is selected, which is bounded by River Ganga on West and BT Road (SH 2) on the East.
- ◇ Administrative boundary of Titagarh municipality in North-South direction.
- ◇ Major link is BT Road. (SH 2).

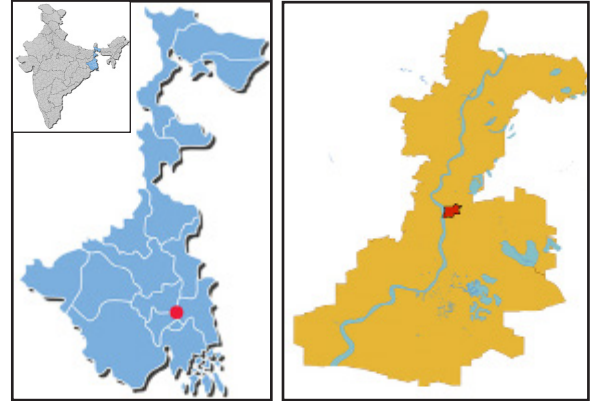


Fig.139: Site location. Source : Author

#### PRESENT VIEW OF SITE



Fig. 137: Kennison Jute Mill ghat . Source : Author



Fig. 138: Jute Mill ghat . Source : Author

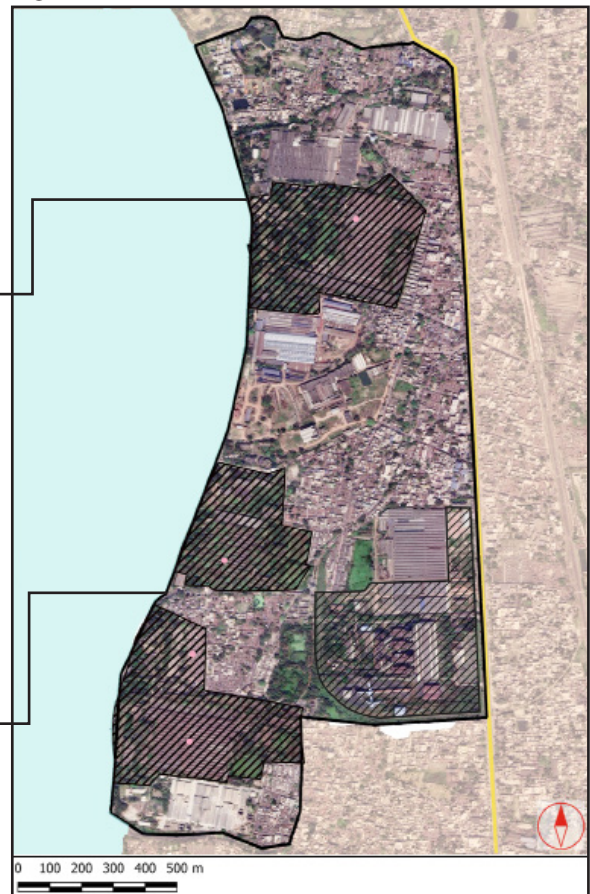


Fig. 140: Selected stretch of Land . Source : Author



Fig.141 : Mathkal Jute Mill + National Jute Mill Corp Ltd . Source : Author

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*The division of zones and selection of intervention sites were decided based on the following research questions. :*

1. Which were the running mills?
2. Which are the nearest hospital to the site?
3. What is the common mode of transportation from the house to the hospital?
4. How many local clinics and medical shops are present in each zones?
5. What is the common mode of transportation in general?
6. What are the ownership of the present mills (both running and closed)?
7. What are the working hours for the Jute mills workers?
8. What are the present job for the people who lost their jobs in mills?
9. How the mill owners are making their mills commercially viable despite of low production and cut down in working hours?
10. How many people are living in mazdoor colony vs how many are living in their own home?

*Deduction from questionnaire survey :*

1. Kelvin & Empire Jute Mill – running
2. Nearest hospital – BN Bose hospital
3. CESC power station – Earlier land was under Mathkal Jute Mill.
4. Mathkal jute mill is operational for full time only for last 2-3 weeks. Before that it used to be operational for 4hrs a day and 5 days a week . so many labors have shifted from mill workers to fishery
5. National jute mill and Kinnison jute mill permanently closed down; these are government lands; closing order has also been issued.
6. Loomtex jute mill is presently renting out its land and factory spaces as lease to different bodies like CESC power plant, Bajaj etc.
7. CESC power plant is running successfully ; Bajaj has developed a market which is yet to be opened for political reasons ; A part of Titagarh wagon land is also used for navy ships building factory (Ownership not known).
8. Loomtex factory buildings are used for plywood manufacturing etc.
9. Only one govt hospital (in Barrackpore – approx 1 km from site) – BN Bose
10. 1-2 local clinics
11. No medical shops near by
12. Road width – insufficient for two way road or ambulance, local vehicle used – toto.
13. A newly proposed and completed jetty but yet to be functional, at Rashmani ghat connecting Sreerampore.
14. Most shut down mills are located at Titagarh.
15. Ferry service at Bijaylaxmi ghat is not so regular (people also use this to go to workplace).
16. Mill school up to class 4 present, girls secondary school present. Higher secondary schools also present.
17. Sufficient nos. of playgrounds are absent. Only playground present at ward no 12. Playground for football or other sports is absent.
18. Housing provided by the mills are not used by workers. Most of them own their own house.
19. For college people have to travel to Barrackpore – Shivnath Shastri college, an ITI college is present but none of the resident mentioned about it which make it evident that they are unaware of it.



### 4.1.2 Identification of Intervention Zone

Migrants, newcomers, and individuals changed the socio-economic makeup of Barrackpore and Titagarh. The demographic composition revealed an imbalanced sex ratio, with males being predominant (2:1). In a study conducted in 1911 it is observed that the influx is predominantly male industrial laborers from Bihar and Orissa (around 20%) , with a similar percentage coming from the United Provinces.

Most jute industrial labour came from different districts

of India due to the exhaustion of the local labour market in Bengal. Many factory workers formed foreign colonies, surrounded by a language and culture mainly alien to them. They became ‘pardeshi’ villagers at the first point and ‘immigrant’ workers at the second point. Their social identity tended to become loose and their area of influence shrank to the joint family and relatives. In the society of destination, the immigrant remained aloof from the mainstream of society.

The rural immigrants were unfamiliar with the factory

environment and work carried out, as they had grown up in a village. They had to work under strict supervision and a load of responsibility and fear.

Migration had a significant impact on the city’s population composition, leading to unprecedented changes.



*Fig.142 : Effect of migration in present day scenario. (Madrasi & Bihari population respectively)*  
Source : Author

<u>Zone 1</u>	<u>Zone 2</u>
<ul style="list-style-type: none"> <li>Bounded by river Hoogly on the West and BT Road on the East.</li> </ul>	<ul style="list-style-type: none"> <li>Bounded by river Hoogly on the West and BT Road on the East and a canal as its southern boundary.</li> </ul>
<ul style="list-style-type: none"> <li>Less public space.</li> </ul>	<ul style="list-style-type: none"> <li>Presence of more public space.</li> </ul>
<ul style="list-style-type: none"> <li>Annapurna mandir located at the northern boundary of the site act as the main magnet of the zone.</li> </ul>	<ul style="list-style-type: none"> <li>Presence of more number of easily accessible ghats with ferry services increase the footfall in this zone.</li> </ul>
<ul style="list-style-type: none"> <li>Settlement is mostly of people who migrated from Bihar and Jharkhand as jute mill workers when the mills were operational.</li> </ul>	<ul style="list-style-type: none"> <li>In this zone majority of the population is native of Bengal and few of the Madrassi family who migrated in 1930s.</li> </ul>

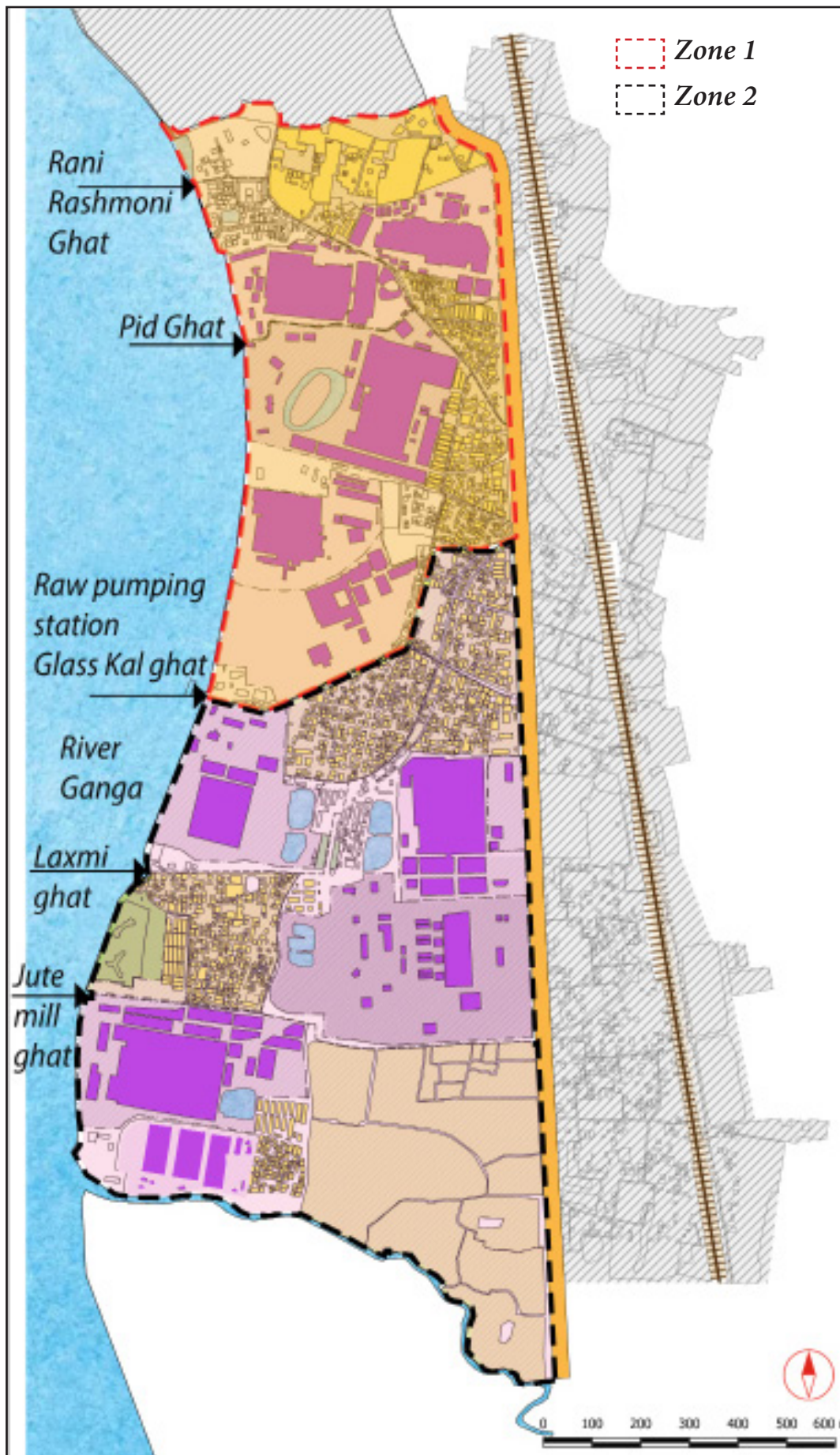


Fig.143 : Area level map denoting the Zones. Source : Author



## 4.2 Zonal Level Study:

### 4.2.1 Zone 1

#### Survey Based On Image Parameter - District (Landuse) :

##### Description

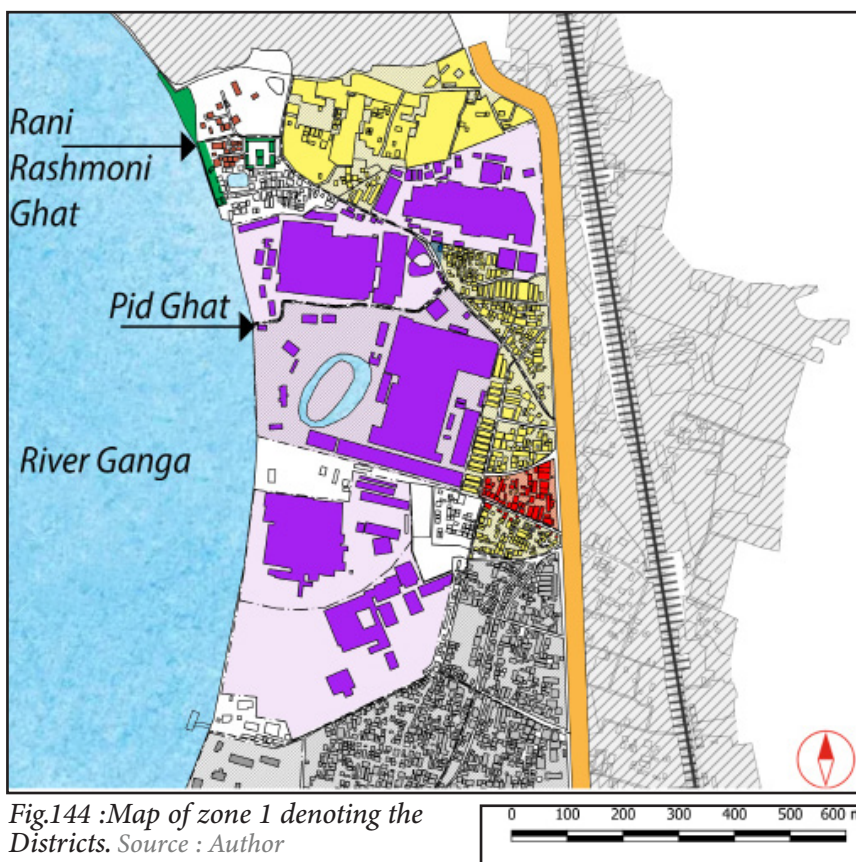
- Industrial and residential are the dominant landuse types in this zone.
- Almost no green open space.
- Lack of leisure activities.

##### Analysis

- Mostly residential are in the form of chowks and low cost housing.
- No hospital is present in this zone.
- Adequate number of primary school is present.
- Lacks secondary school and college facility.
- No playground for kids and adults in this zone.

##### Conclusion

- Abandoned Industrial sites takes up a large chunk of riverfront area which need to revitalized and monetized.



##### **LEGEND**

Industrial	Residential	Recreational
Abandoned Industrial Site	Commercial	Institutional
	Arterial Road	Waterbody

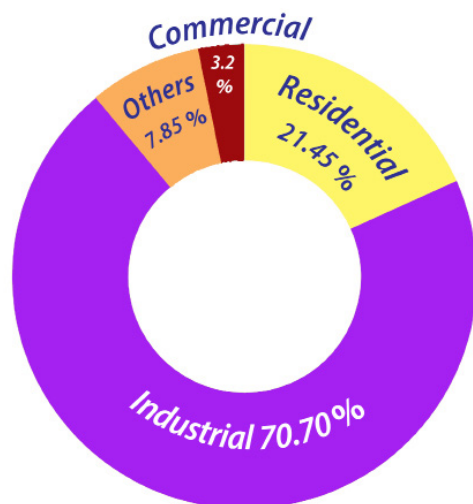


Fig.145 : Landuse of zone 1.

\*Others include recreational, institutional etc. Source : Author

#### PRESENT CONDITION



Fig.146 : Residential chowk. Source : Author



Fig.147 : Identified riverfront brownfield site. Source : Author



### Survey Based On Image Parameter - Edge :

#### Description

- Bounded by River Ganga and BT road on either side which act as the natural edge to the site.

#### Analysis

- The local road act as the edge in most of the places but not in all.
- There are no definite edge in few of the cases.
- Untreated water canal which release water directly to river acting as edge have huge negative environmental impact and against CRZ norms.

#### Conclusion

- CRZ norms should be followed.

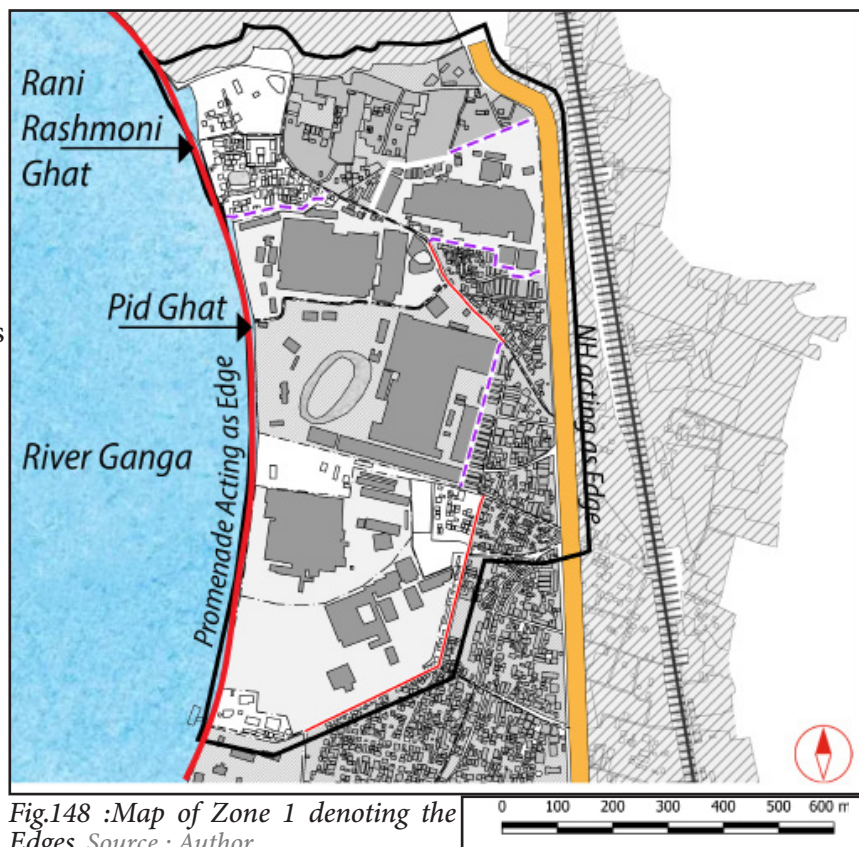


Fig.148 :Map of Zone 1 denoting the Edges. Source : Author

— Definite Edges      - - - No Definite Edges



Fig. 149 :Untreated water canal act as unprominent edge. Source : Author



Boundary wall of Kinnison Chawls (Residential) jute mill .(Industrial)

Fig.150 :Local road acting as edge. Source : Author

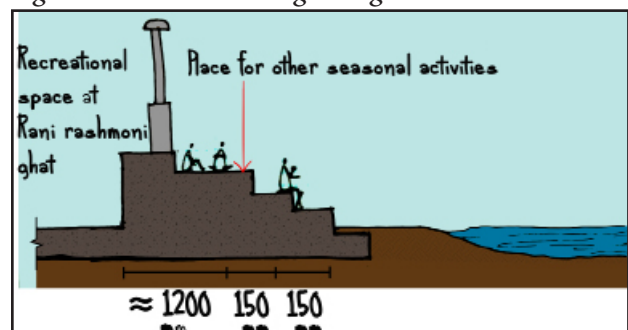


Fig. 151 :Skematic sectional detail of the riverfront edge. Source : Author



Survey Based On Image Parameter - Pathway & Routes :Description

- Toto is the major mode of transportation in between the city.
- No separate pedestrian roads, cycle track or footpath are present.
- Roads usually remain congested due to absence of elevated footpaths.

Analysis

- Sub arterial roads and local roads are too thin for two way movement.
- Though an arterial road runs through the linear stretch of the site but it is not used for daily movement inbetween the site.
- As the residential zone are located immediate to the pathway so there is a spill over of activities resulting on slower traffic.

Conclusion

- Roads need to be widen as per need according to proposal.

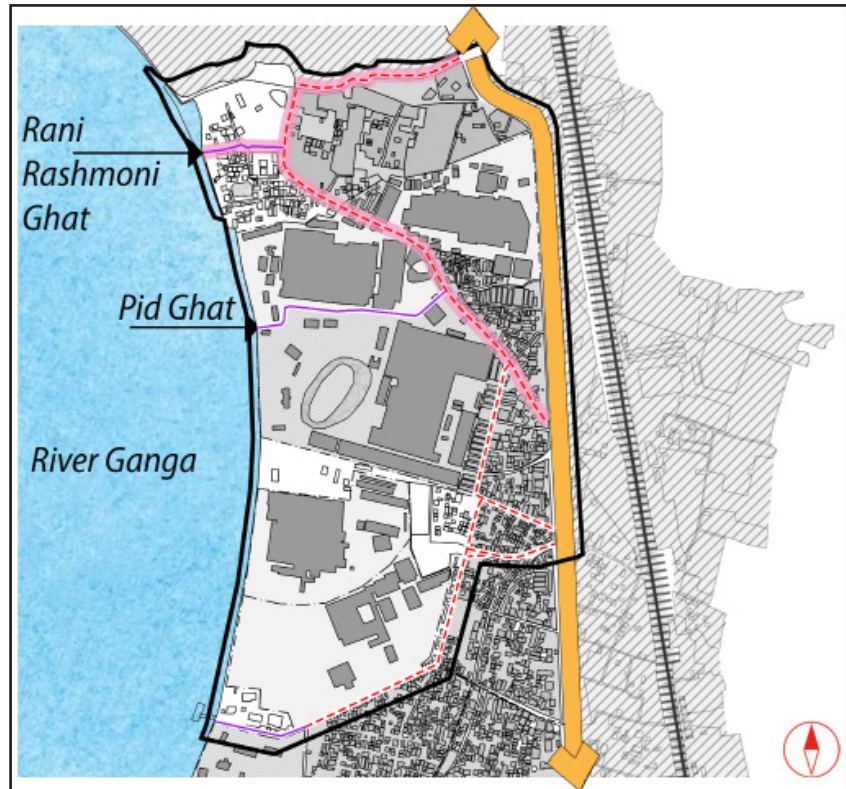






Fig.152 :Map of zone 1 denoting the pathway & routes. Source : Author

**LEGEND**

- |  |   |
|--|---|
|  Arterial Roads     |  Local roads       |
|  Sub-arterial Roads |  Seasonal Movement |

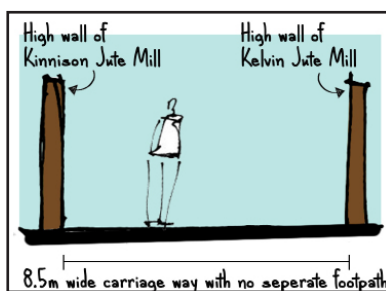
**SKETCH DEPICTING PRESENT CONDITION OF THE MOVEMENT PATTERN**

Fig.153:Road section of the local road.(8.5m wide). Source : Author

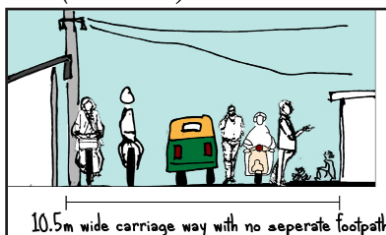


Fig.154 :Road section of the sub arterial road. (10m wide).

Source : Author

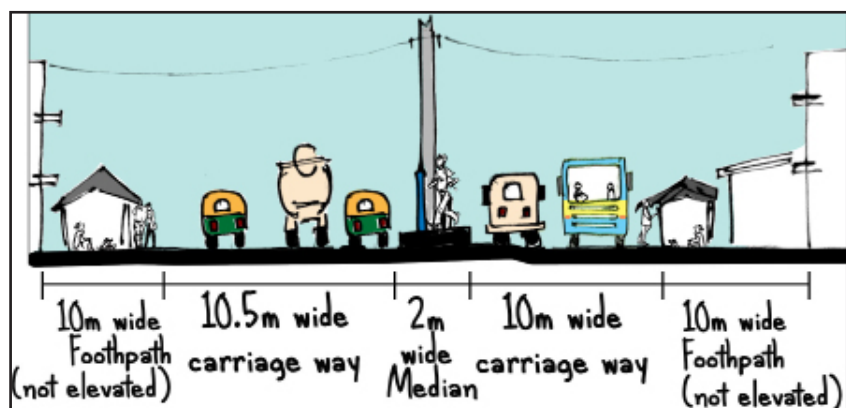


Fig.155 :Road section of arterial road - BT road (40m wide).

Source : Author

Scale : NTS.

### Survey Based On Image Parameter - Nodes & Landmark :

#### Description

- Only one major node is present within the zone.
- Area surrounding Annapurna mandir along with its ghat and burning ghat is the major landmark within the zone.

#### Analysis

- From the node the traffic majorly divert towards the north towards Barrackpore and very less divert to the selected zonal area.
- Annapurna mandir act as an major magnet of the zone which governs other parameter like activity & movement.

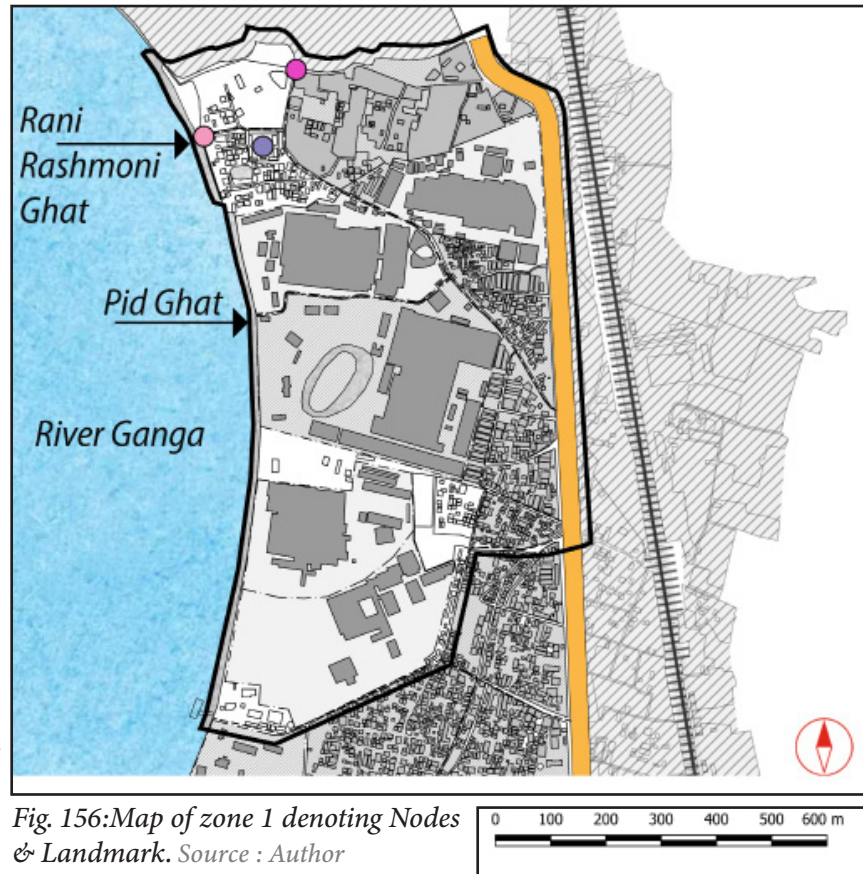


Fig. 156: Map of zone 1 denoting Nodes & Landmark. Source : Author

#### Conclusion

- This act as the magnet for crowd flow along the entire site.

### SKETCH DEPICTING PRESENT CONDITION OF THE MOVEMENT PATTERN



Fig. 157 : Only landmark present in the zone. Source : Author



Fig. 158 : Only major node within in the zone. Source : Author

←--- Towards the selected site

←--- Towards Barrackpore



**Survey Based On Physical Parameter - Activity & Space :****Description**

- Industrial and residential and the dominant activities.
- Bazar activities are clustered in a small area.
- Institutional activities are very limited in this zone.

**Analysis**

- Though there are primary schools but lack basic activities like playground or recreational activities for kids.
- Very limited recreational activity is seen at Rani Rashmoni ghat. It remain crowded during special occasions like chhat puja etc.
- Sufficient amount of community toilets are present as it lacks attached toilet.

**Conclusion**

- There is a strong need for recreational activities in this zone.
- Rani Rashmoni ghat area is slowly developing for this purpose in recent past.

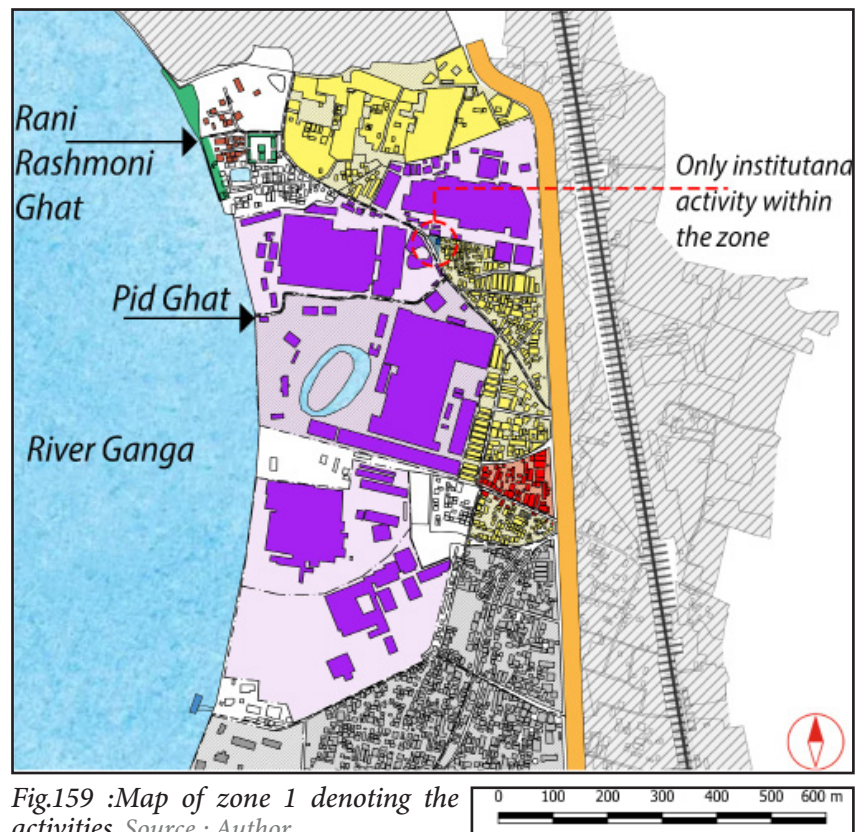


Fig.159 : Map of zone 1 denoting the activities. Source : Author



Fig.160: Recreational activity at Rani Rashmoni ghat . Source : Author



Fig.161 : Newly opened jetty service at Rani Rashmoni ghat. (only few months old).

Source : Author



Fig.162 : Different kind of seasonal activity at Rani Rashmoni ghat. Source : Author





### Survey Based On Physical Parameter - Vista & Skyline :

#### Description

- Homogenous and Continuous green skyline.
- Majorly the Chimneys constitutes the vertical element to the skyline.

#### Analysis

- No proper open green space or recreational space constitutes to the skyline. The green in the skyline is majorly due to wild vegetation which have grown due to lack of maintainace of the riverfront side in present day scenario.

#### Conclusion

- The skyline is homogenous and continuous.



Fig.163: Chimney of Kinnison Jute mill constitute to the vista & skyline of the zone. View from point B. Source : Author

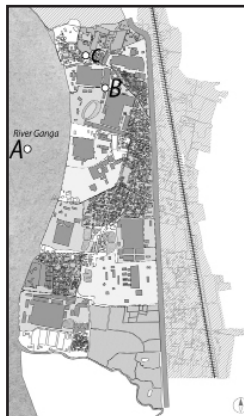


Fig.164: Key plan.



Fig. 165: The skyline is homogeneous & continuous. View from point C. Source : Author



Fig.166: Skyline of the selected site. View point A. Source : Author

Zone 1

Selected site



### 4.2.1.2 Design Guidelines

#### Description

- Homogenous and Continuous green skyline.
- Majorly the Chimneys constitutes the vertical element to the skyline.

#### Analysis

- No proper open green space or recreational space constitutes to the skyline. The green in the skyline is majorly due to wild vegetation which have grown due to lack of maintainace of the riverfront side in present day scenario.

#### Conclusion

- The skyline is homogenous and continuous.

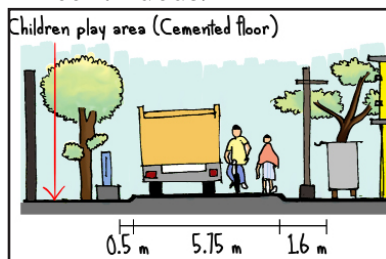


Fig.167 :Present situation - Narrow road. Source : Author



Fig.168 :Present situation - Open drain and open sewage disposal should be avoided. Source : Author



Fig.169:Present situation - mazdoor colony. Inspired by Aranya river edge , promenade and users. provided to avoid palying on street. Source : Pinterest

Source : Author

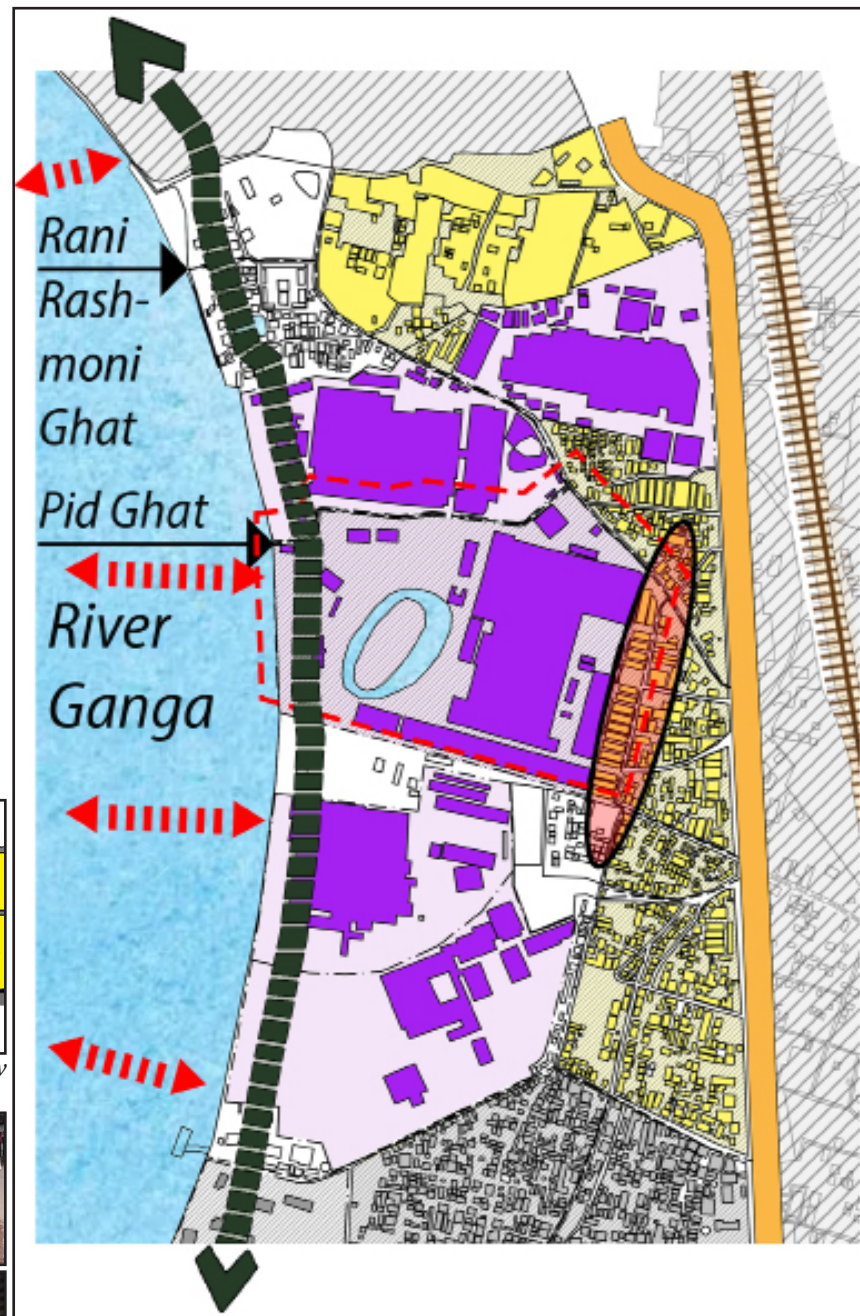


Fig.170:Map of Zone 1 denoting proposals. Source : Author

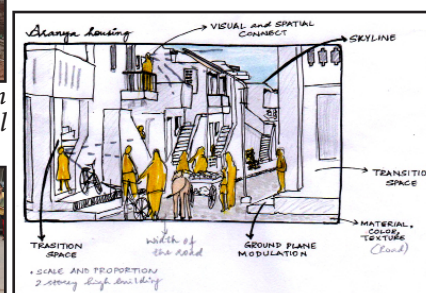


Fig.171:In-situ rehabilitation of Fig.172 :Interaction between the Aranya river edge , promenade and users. Source : Diyun Hou





### 4.2.1.3 Identification of Potential Site

#### Site 1 - Kinnison Jute Mill Area

- Kinnison Jute Mill along with the mazdoor colony is selected as the potential site for intervention since :
  - ◇ The site is abandoned and closing order has been released by the Government of India.
  - ◇ Ownership - Central government
  - ◇ Total site area - 18.32 ha

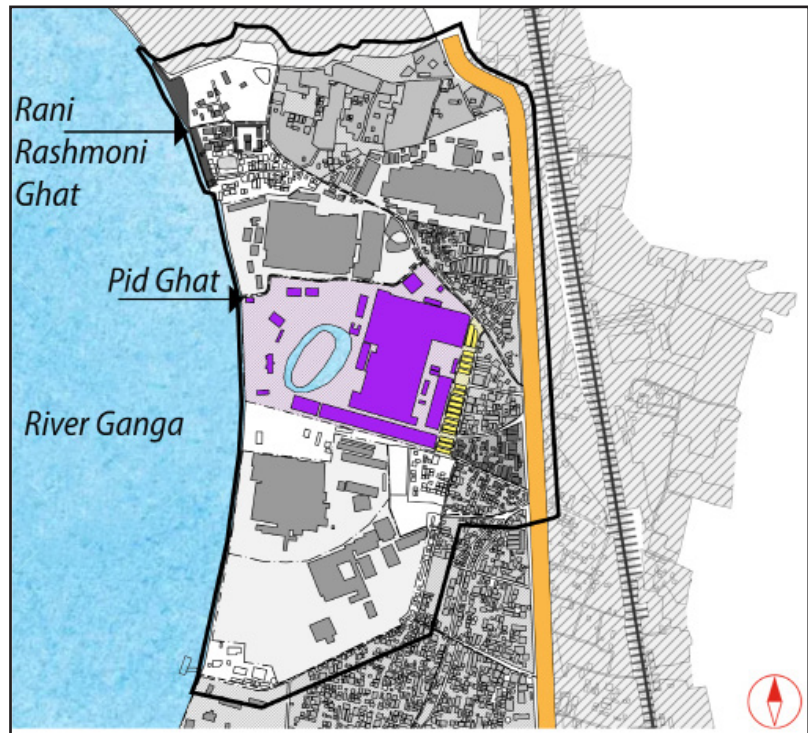


Fig.173:Map of Zone 1 denoting selection of potential site.

Source : Author

#### KINNISON JUTE MILL AREA - PAST VS. PRESENT



Fig. 174 :Present photographs of Kinnison Jute Mill.Source : Kinnison cenetary celebration video.

### 4.2.2 Zone 2

#### Survey Based On Image Parameter - District (Landuse) :

##### Description

- Industrial and residential are the dominant landuse types in this zone.
- Very little green open space.
- Resedential space is more compared to Zone 1.

##### Analysis

- Mostly residential are in the form of private home.
- No hospital is present in this zone.
- Lacks commercial and institutional space.

##### Conclusion

- More potential abandoned Industrial sites are located in this zone as compared to Zone 1 despite having a low Industrial to Residential ratio as compared to Zone 1.

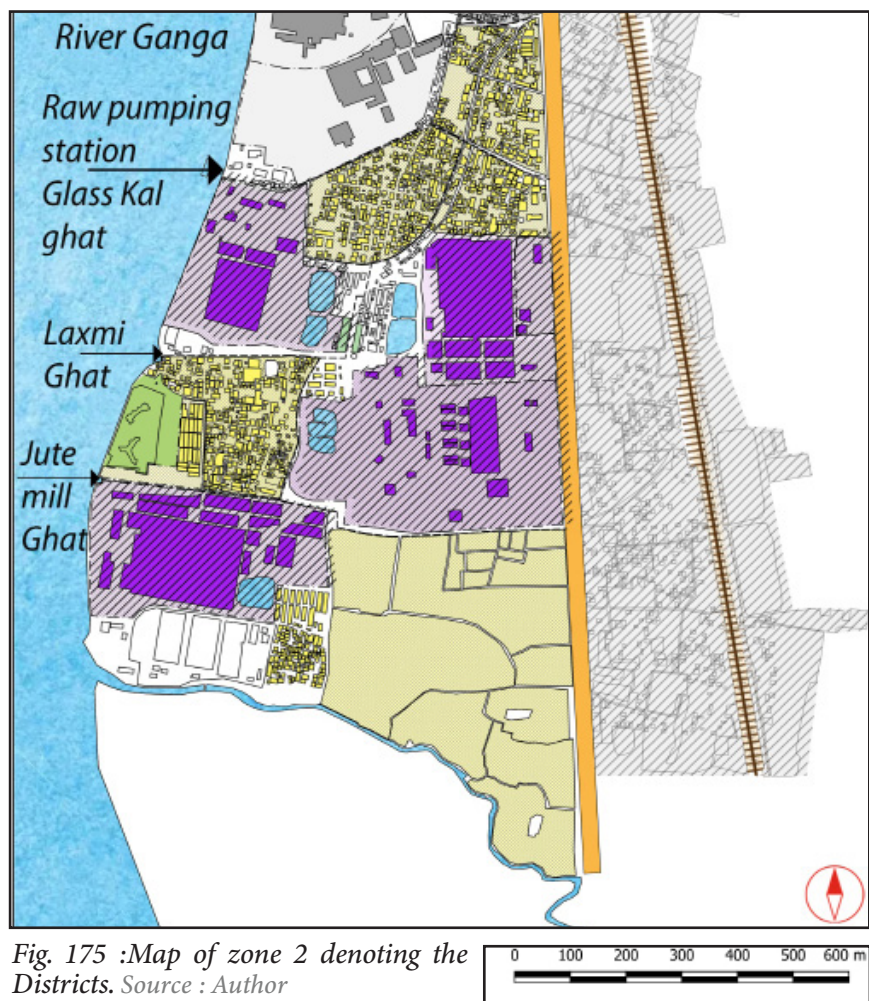


Fig. 175 : Map of zone 2 denoting the Districts. Source : Author

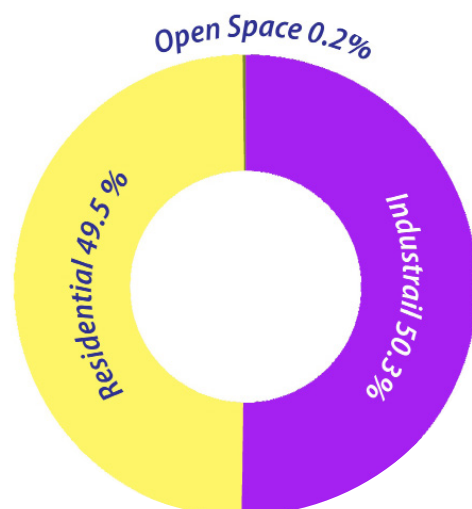
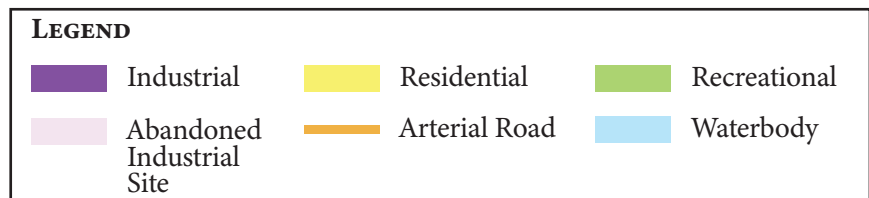


Fig. 176 : Landuse of zone 2.  
Source : Author

#### PRESENT CONDITION



Fig. 177 : Abandoned Industrial area. Source : Author



### Survey Based On Image Parameter - Edge :

#### Description

- Bounded by River Ganga and BT road on either side and a canal running in the south of the site natural edge to the site.
- The local roads and waste water canal act as edge in the site area in this zone.

#### Analysis

- The local road act as the edge in most of the places but not in all.
- There are no definite edge in few of the cases.
- A waste water canal which act as an edge between glass kal mill and adjacent residential area.

#### Conclusion

- Waste water canal release untreated water directly to river which is against CRZ norms Hoogly causing water pollution which creates a negative impact on the environment.

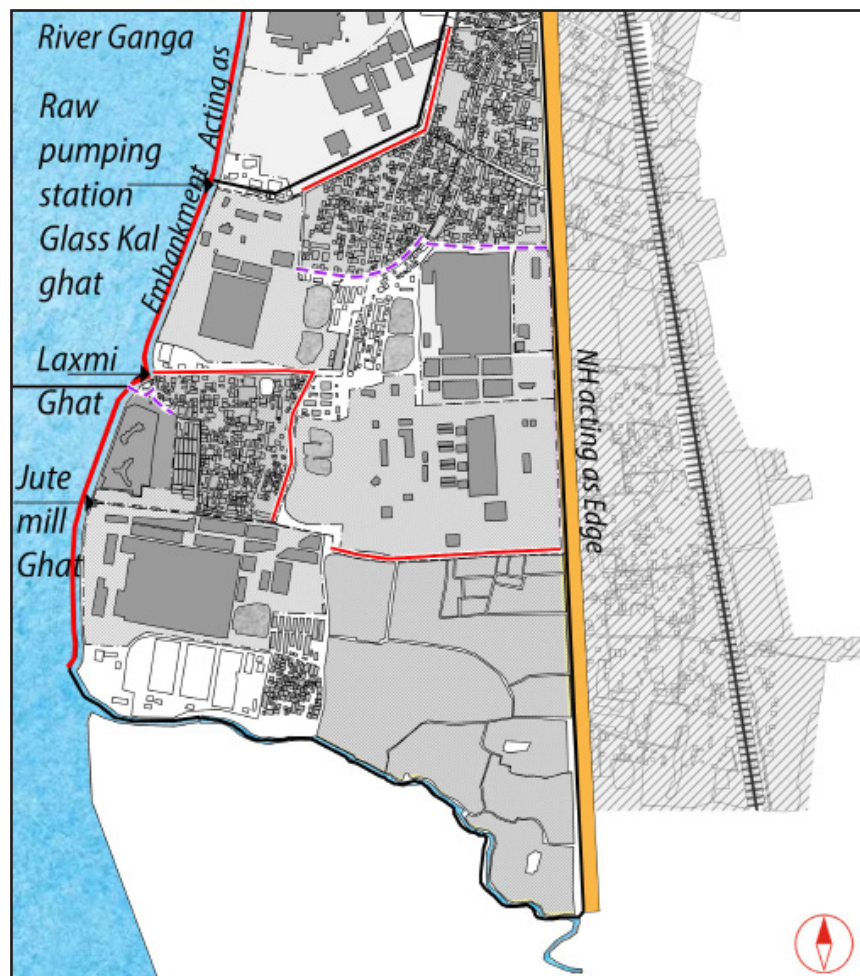


Fig.178 :Map of Zone 2 denoting the Edges. Source : Author

— Definite Edges      - - - - - No Definite Edges



Fig.179:Waste water canal acting as a non - prominent edge between industrial and residential area.

Source : Author



Fig.180 :Local roads acting as a prominent edge between industrial and residential area. Source : Author



Survey Based On Image Parameter - Pathway & Routes :Description

- Almost similar condition with respect to Zone 1 exist.
- Roads are not shaded in most of the occasion.

Analysis

- Sub arterial roads and local roads are too thin are little wider than Zone 1 resulting in comfortable two way movement.
- Footpaths are absent in this zone also.

Conclusion

- Roads need to be shaded for comfortable pedestrian and non motorised vehicular movement as the climate is hot and humid .

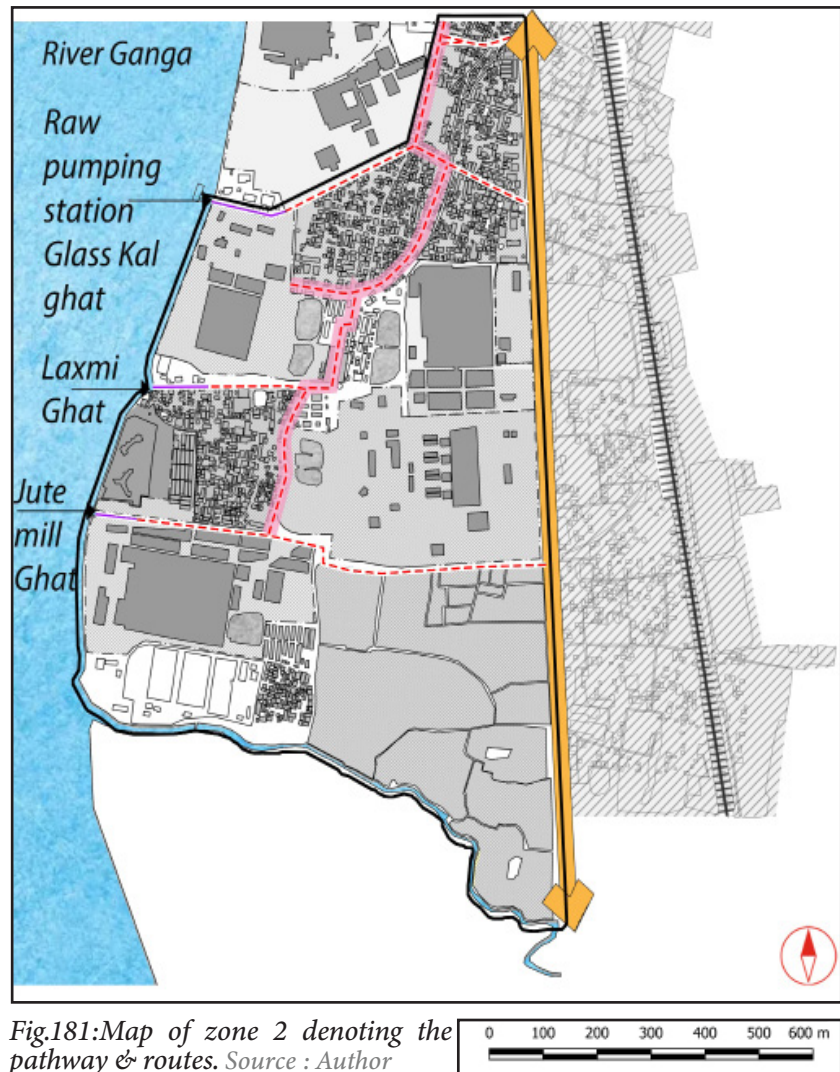
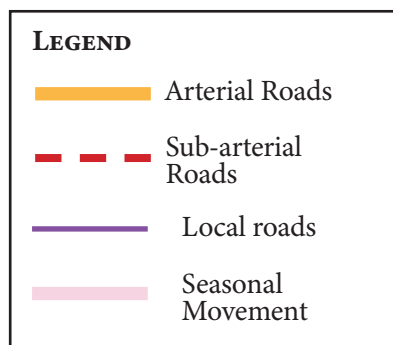


Fig.181:Map of zone 2 denoting the pathway & routes. Source : Author

## PRESENT CONDITION OF THE MOVEMENT PATTERN

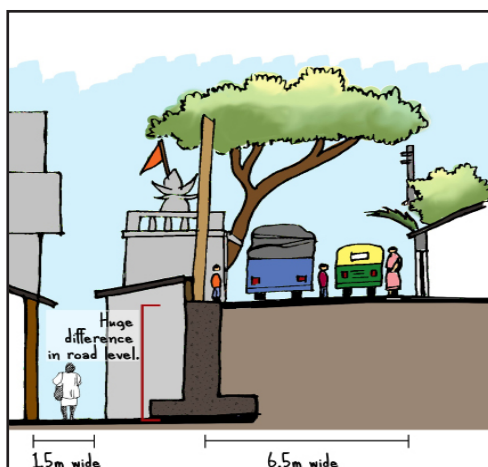


Fig.182 :Sketch depicting the section of the road leading to Laxmi ghat. (10m wide). Source : Author. Scale : NTS



Fig.183 :Roads are not shaded. Source : Author

Scale : NTS.

### Survey Based On Image Parameter - Nodes & Landmark :

#### Description

- Node 1 at Titagarh bus stop act both as an major node and landmark to the site.
- Glass kal mill act as the seasonal landmark only during chhat puja.

#### Analysis

- From node 2 the traffic majorly divert towards the north towards site and very less to the south towards Khardah.
- Titagarh Coal Power Station India, CESC act as an landmark in this zone.

#### Conclusion

- The major economic activities like present day CESC or the closed down NJMC is located near this nodes which help in easy navigation and traffic flow.
- Hence the brownfield at NJMC site is at prime

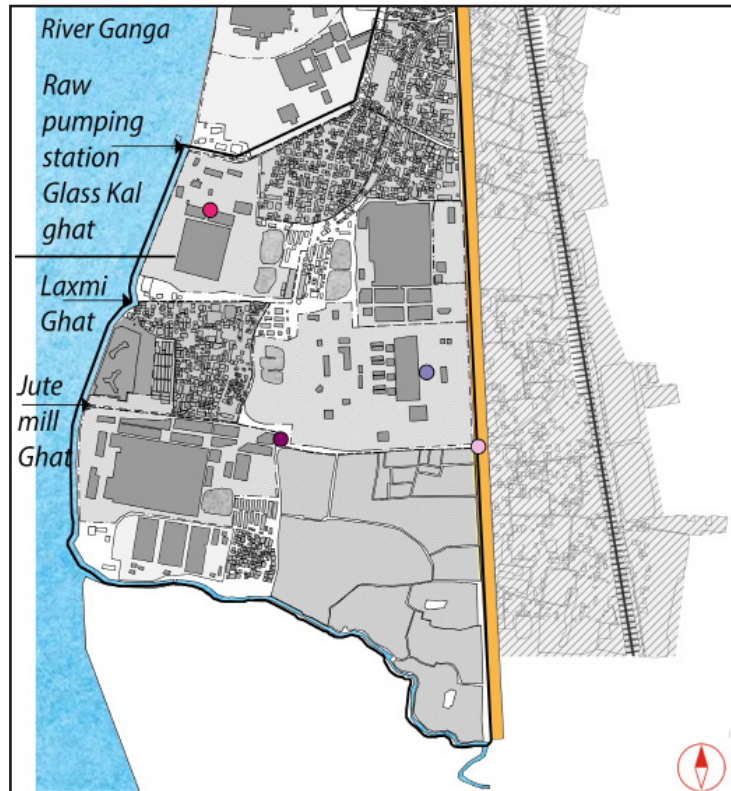


Fig.184 :Map of zone 2 denoting Nodes & Landmark. Source : Author

#### LEGEND

- |   |        |   |                   |
|---|--------|---|-------------------|
| ○ | Node 1 | ● | Landmark          |
| ● | Node 2 | ● | Seasonal Landmark |

### IMAGES DEPICTING THE PRESENT CONDITION OF THE NODES



Fig.185 :Glass kal mill act as the seasonal landmark during chhat puja, the above building commonly known as 'Bhootiya bungalow' among the locals the zone.

Source : Author

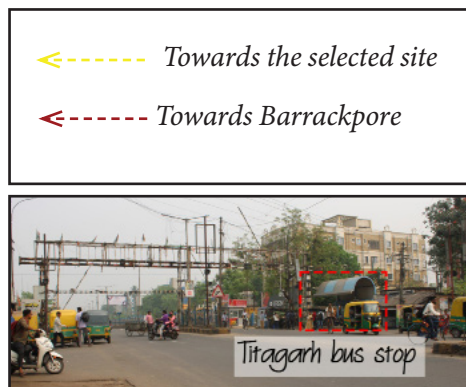


Fig.186:Node 1



Fig.187 :Node 2

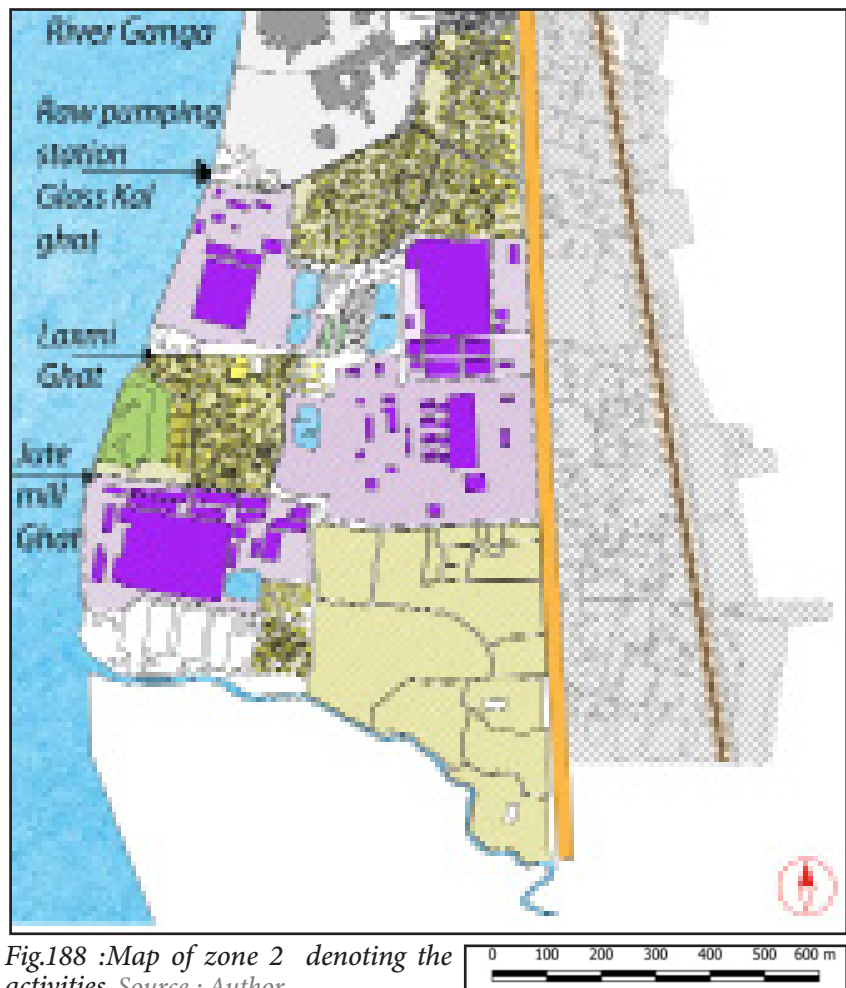


**Survey Based On Physical Parameter - Activity & Space :****Description**

- Residential is the dominant activity as all the industries in this zone is closed down.
- Pocket parks for kids are present only at this zone but very limited which make the kids play on vehicular roads.
- A lot of people have shifted their profession from mill worker to fishing in recent times.

**Analysis**

- More green open spaces and recreational spaces compared to zone 1.
- Only one playground is present which remain open for only 2 hours a day in the morning.
- Fishing is one of the major activity during the hours of low tide.

**Conclusion**

- Ghats should be accompanied with more recreational spaces and industrial spaces should be revitalized.

**PRESENT CONDITION**

Fig.189 : Children playing on vehicular road. Source : Author



Fig. 190 : No recreational spaces present adjacent to the ghats. (In pic : Jute mill ghat). Source : Author



Fig. 191 : Only playground for kids present in the entire site. Source : Author



### Survey Based On Physical Parameter - Vista & Skyline :

#### Description

- Homogenous and Continuous green skyline.
- Majorly the Chimneys constitutes the vertical element to the skyline.

#### Analysis

- No proper open green space or recreational space constitutes to the skyline. The green in the skyline is majorly due to wild vegetation which have grown due to lack of maintainace of the riverfront side in present day scenario.

#### Conclusion

- The skyline is homogenous and continuous.

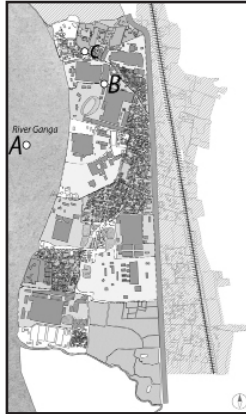


Fig.193 : Key plan.



Fig.192 : Chimney of Loomtex Jute mill constitute to the skyline of the zone. View from point B. Source : Author

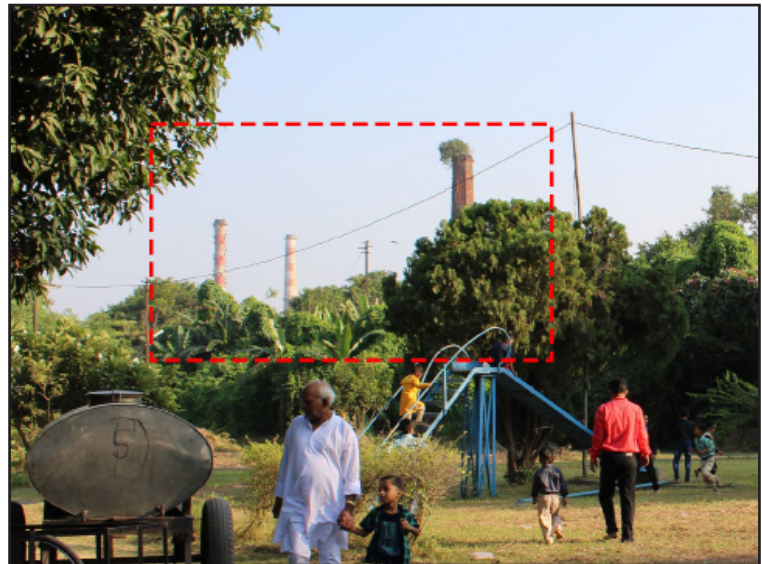


Fig.194 : The skyline is homogeneous & continuous. View from point C. Source : Author



Fig. 195 : Skyline of the selected site. View point A.

Zone 2

Selected site

#### 4.2.5 Design Guidelines

- **Roads need to be widened for :**
  - ◇ Comfortable 2 way vehicular movement.
  - ◇ Movement of emergency vehicles like ambulance and fire engines.
- Guidelines for complete street design to be adopted for safety of the users.
- Space for recreational activities like playground for teenagers should be provided.
- Also the playground should be open to the users for sufficient amount of time.
- (Presently the park remain open from 7am to 9:15 am though it is supposedly to remain open till 11:30 am.)
- Ferry system and jetty at Vijaylaxmi ghat should be improved.
- Introducing ferry services is essential for workforce who rely on it for their transportation needs.
- Sewage treatment plant should be built for the entire area.
- CRZ norms to be followed.
- Adaptive reuse to be encouraged.
- In-situ rehabilitation of the mazdoor colony.
- A continuous promenade to connect the entire riverfront to be proposed.
- Homogeneity in skyline to be maintained.
- Uniform vista along the promenade to be maintained.

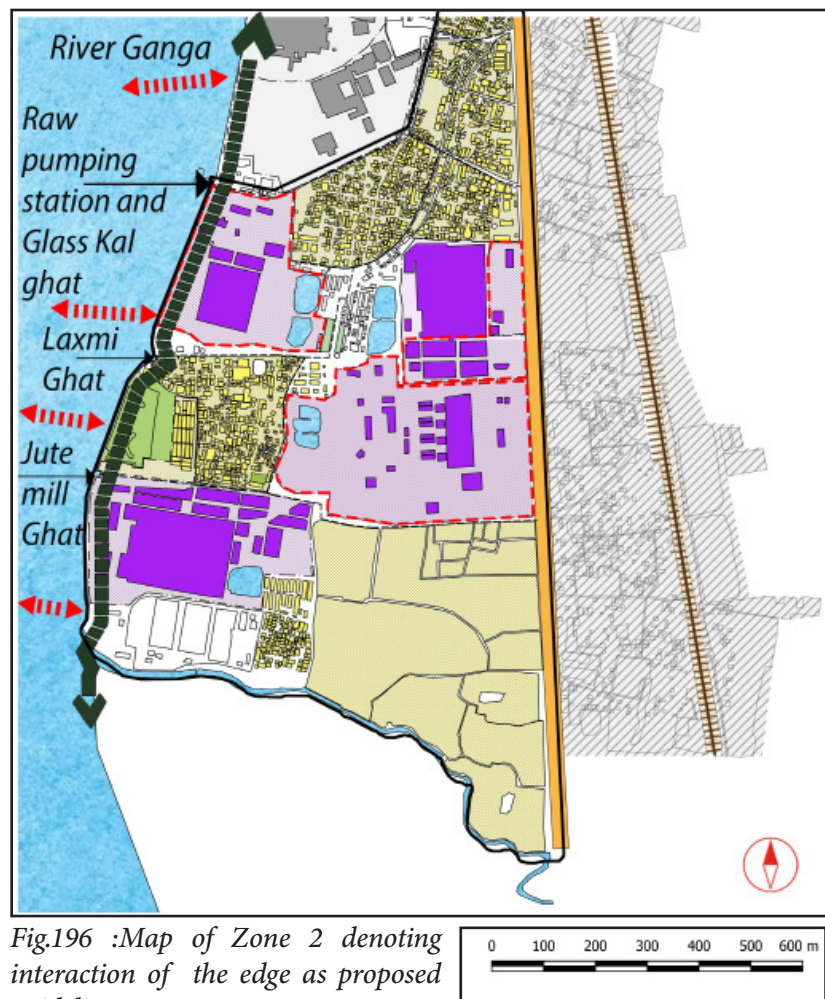


Fig.196 :Map of Zone 2 denoting interaction of the edge as proposed guidelines. Source : Author



Fig. 197 :Pedestrian trial by the edge of river Ganga present only at Glass kal mill. Uniform vista along the promenade to be maintained. Source : Author



#### 4.2.6 Identification of Potential Site

##### Site 2 - NJMC

NJMC along with the Staff bungalow is selected as the potential site for intervention since :

- The site is abandoned and closing ordered has been released by the Government of India.
  - Ownership - Central government
  - Total site area - 18.32 ha
- A part of the factory has been leased out to Jayshree chemical and fertilizers.

##### Site 3 - CESC

- CESC thermal power plant is located along the BT road. This is one of the oldest power plant in Bengal established in 1982.
- Ownership - Private (Loomtex Engineering Pvt. Ltd)
- Total site area - 23.58 ha
- Earlier it was under Titagarh Jute mill no. 1.

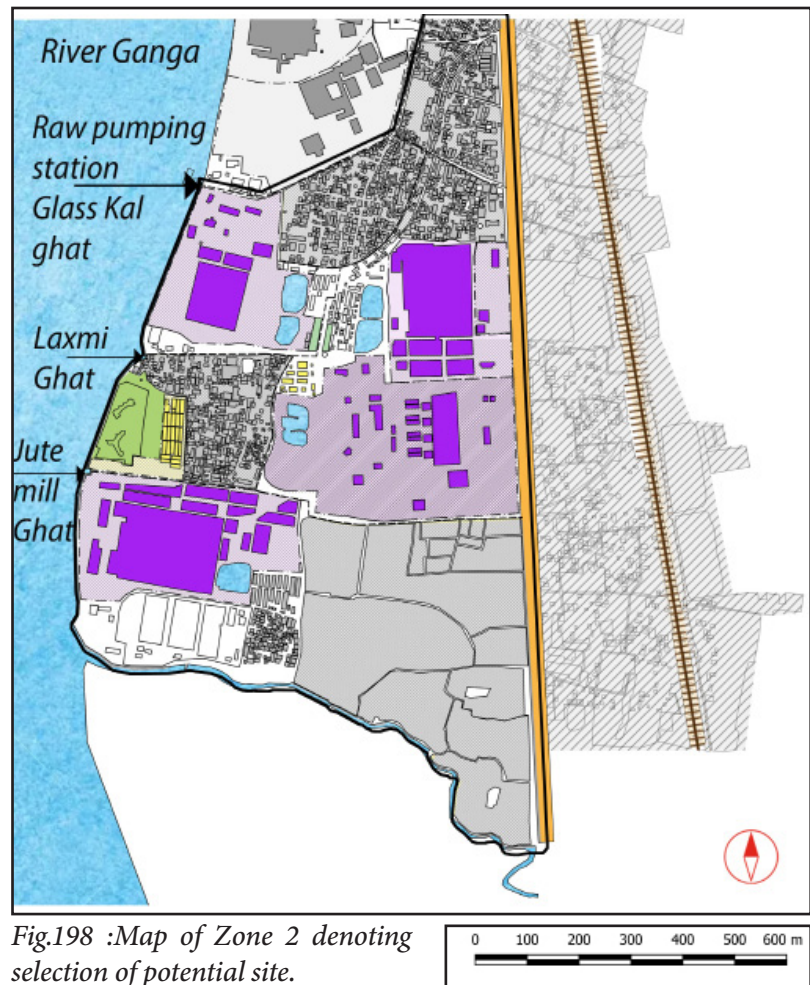


Fig.198 :Map of Zone 2 denoting selection of potential site.

Source : Author

##### Site 4 - GLASS KAL MILL

- The whole area is divided into 2 parcels one allocated to warehouse and another for factory purpose.
- Ownership - Private (Loomtex Engineering Pvt. Ltd)
- Total site area - 25.26 ha
- Earlier it was under Titagarh Jute mill no. 2.



Fig.199 :Site 2 - NJMC.

Source : Author



Fig.200 :Site 4 - Glass Kal Mill (Factory land) .

Source : Author



Fig.201 :Site 3 - CESC.

Source : Author



Fig. 202 :Site 4 - Glass Kal Mill (Warehouse land) .

Source : Author



### 4.2.3 Conclusions from Zonal level study

Table. 2: Conclusions from Zonal study.

PARAMETERS	ZONE 1	ZONE 2
DISTRICT (LANDUSE)	Abandoned Industrial sites takes up a large chunk of riverfront area which need to revitalized and monetized.	More potential abandoned industrial sites are located in this zone as compared to Zone 1 despite being have low Industrial to Residential ratio as compared to Zone 1.
EDGE	CRZ norms should be followed.	Waste water canal release untreated water directly to river which is against CRZ norms Hooghly causing water pollution which creates a negative impact on the environment.
ROUTES AND PATHWAY	Roads need to be widen as per need according to proposal.	Roads need to be shaded for comfortable pedestrian and and non motorised vehicular movement as the climate is hot and humid .
NODES AND LANDMARKS	This act as the magnet for crowd flow along the entire site.	The major economic activities like present day CISE or the closed down NUMC is located near this nodes which help in easy navigation and traffic flow. Hence the brownfield at NUMC site is at prime location.
SPACES AND ACTIVITY	There is a strong need for recreational activities in this zone. Rani Rashmoni ghat area is slowly developing for this purpose in recent past.	Ghats should be accompanied with more recreational spaces and industrial spaces should be revitalized.
VISTA AND SKYLINE	The skyline is homogenous and continuous.	The skyline is homogenous and continuous.

#### 4.2.4 Vision Plan

##### Vision

Incorporating Charles Correa mill land report in the context of Barrackpore brown field.

##### Context

- The Industrial City
- The Colonial Buildings
- A city for all : Informal Sector

##### Proposed Strategies

- Meeting the requirements of mill owners involves assessing the economic viability of their mills.  
Proposed Industrial park/EPZ at Kinnison Jute mill area.  
Proposed film studios at Glass kal mill area.
- Meeting the requirement of the city authority.  
Insitu development of affordable housing  
Unification of the promenade.
- Meeting the requirements of the local residents of the area.  
Seperate fishing ghat to meet the present change in job prospect scenario.

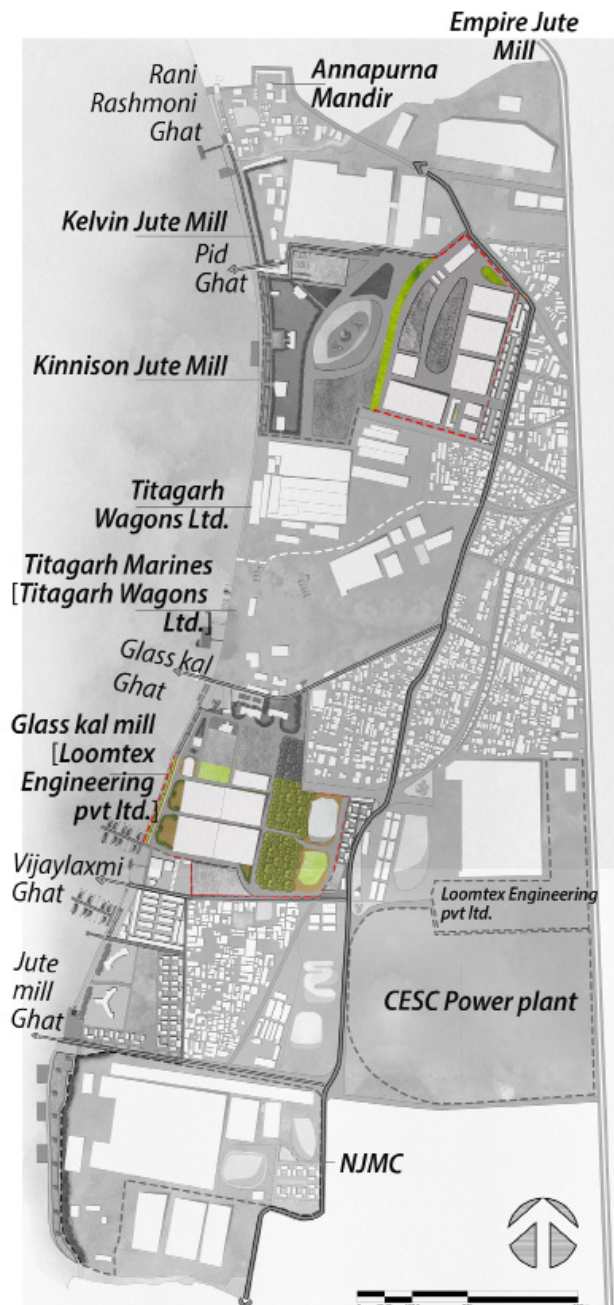


Fig. 203: Requirement of mill owners. Source : Author

#### CONTEXT



Fig. 204: Industrial city.  
Source : Author



Fig. 205: Colonial buildings.  
Source : Author



Fig. 206: A city for all : Informal Sectors. Source : Author

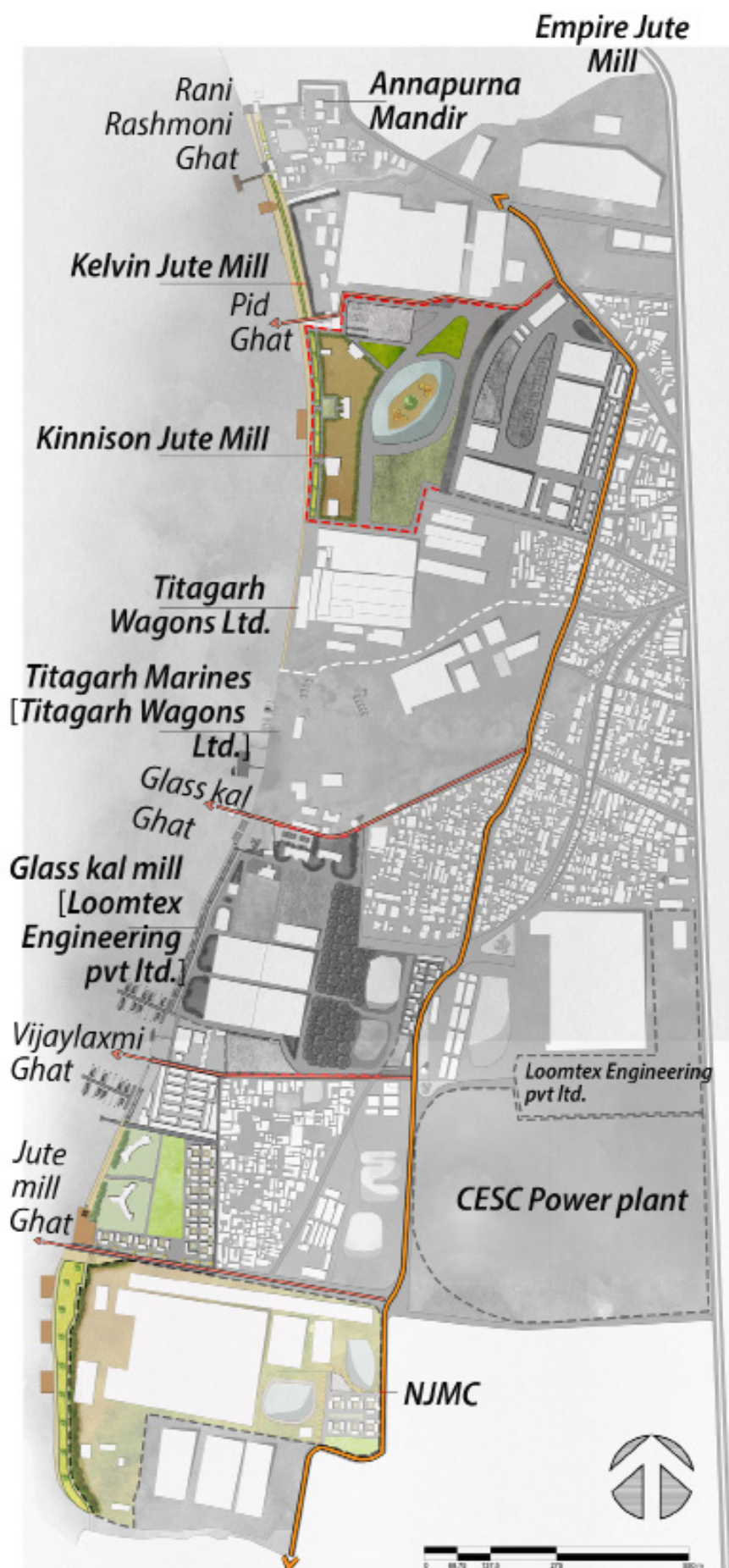


Fig. 207 : Requirement of city authority. Source : Author



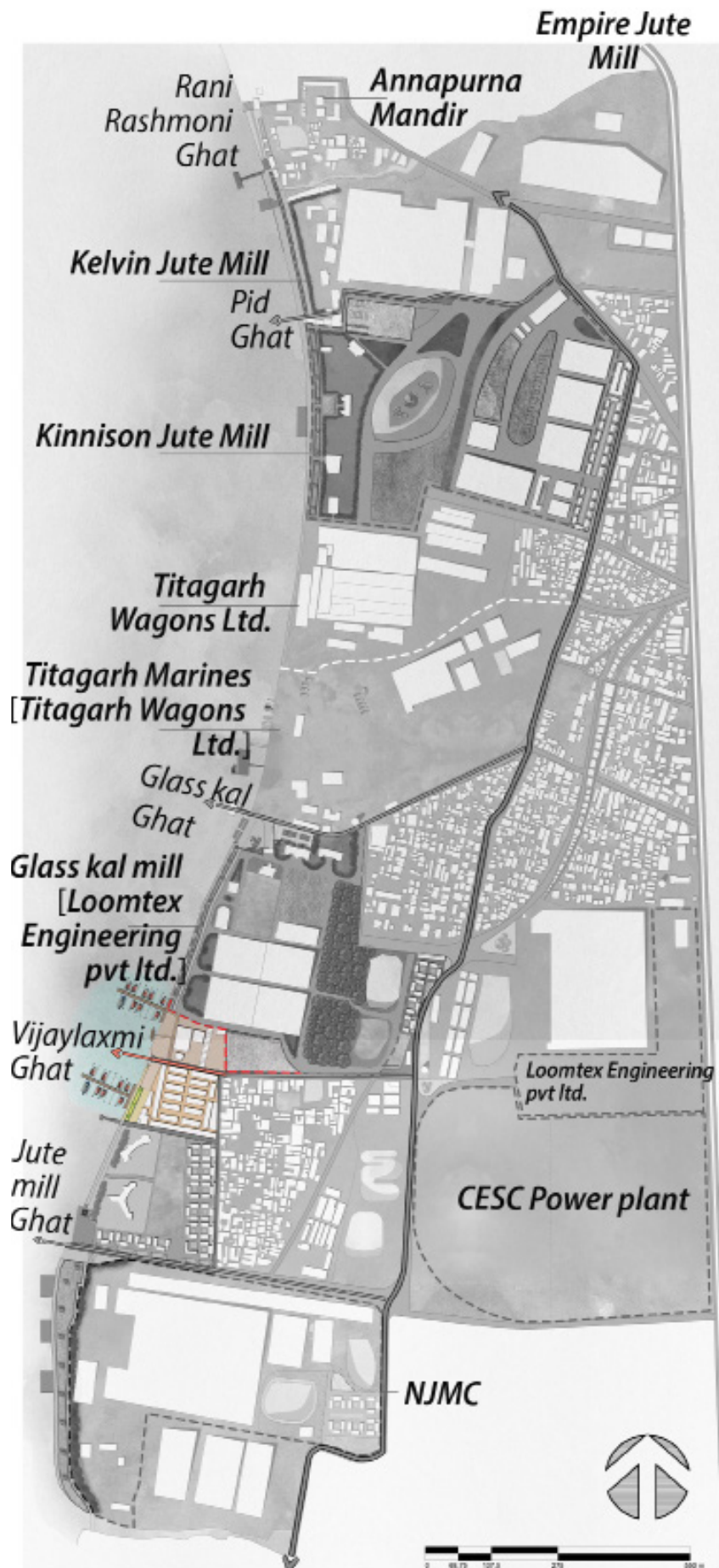


Fig. 208: Requirement of local residents. Source : Author

#### 4.2.5 Structure Plan



One third to the owners / developers for commercial development.

One third to the Titagarh Municipality for open spaces.

One third to the WB Housing for public housing.

*Fig. 209: Applying the recommendations given by Charles Correa study group in the context of Barrackpore Jute mills - Ideal situation. Source : Author*

A. Recreational (Titagarh municipality)- Picnic , Open event space, along with a Jute museum at Site 1.

B. Commercial Development - EPZ / Industrial parks at Site 1.

C. Widening of the most commonly used road by the users to 12m wide road running parallel to BT road .

D. Recreational (Titagarh municipality)- Picnic , Open event space, Chhat puja ground etc at Site 4 .

E. Institutional (Titagarh municipality)- Film park and Studio at Site 4.

F. Commercial Development - Logistic hub can be setup in the second parcel of land of Site 4.

G. Housing along with a commercial mall is proposed at Site 3. (Scope of developer)

H. Proposed market at the fishing ghat to sell fresh fish directly to consumer along with other items like vegetables and machinery parts.

I. Proposed in-situ rehabilitation of mazdoor colonies to Affordable housing (Titagarh municipality) along with street side shop and recreational facility both at Site 4 and Site 1.

J. Scope for future expansion

K. Recreational (Titagarh municipality) - Unification of riverfront through a uniform promenade

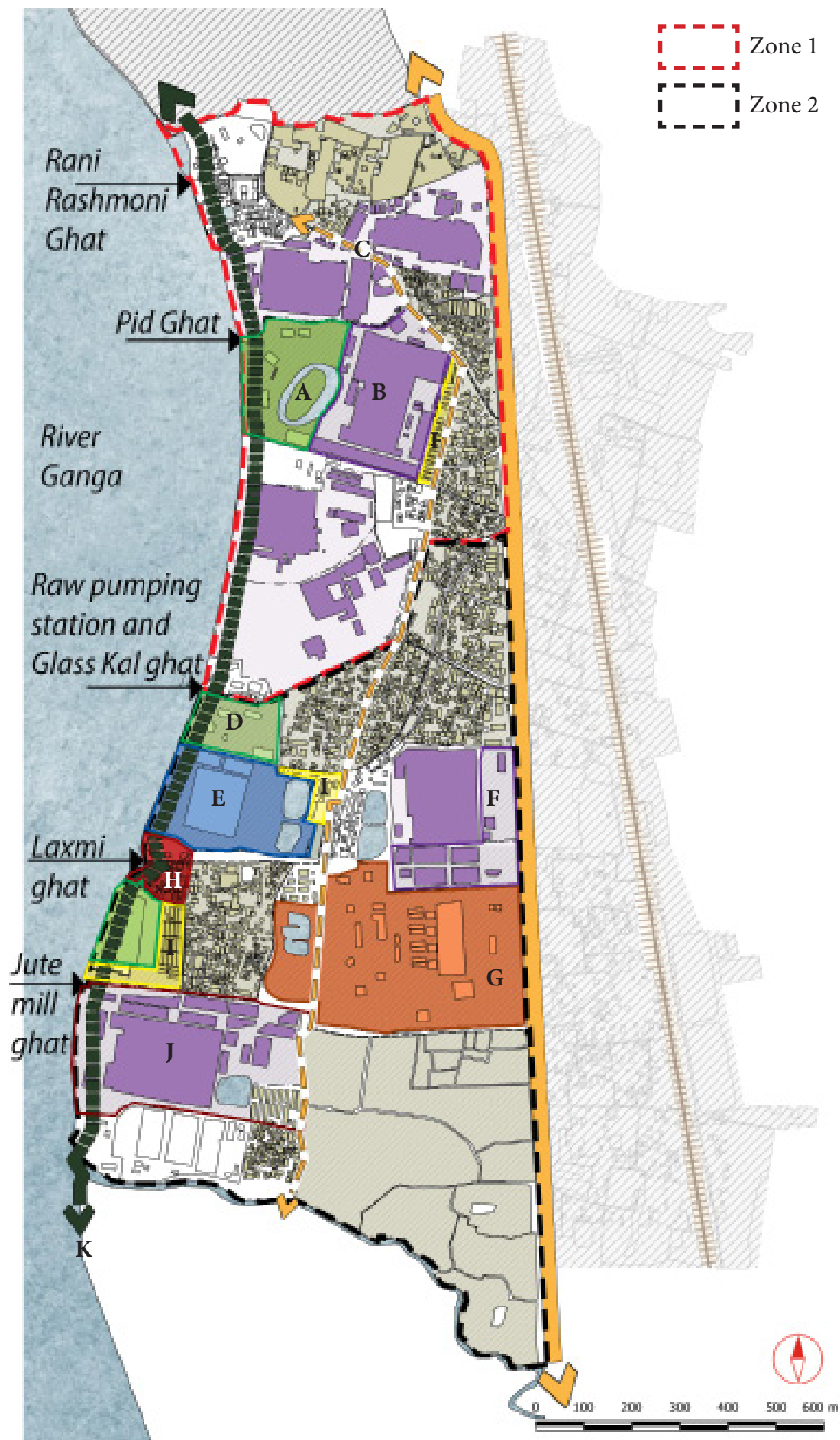
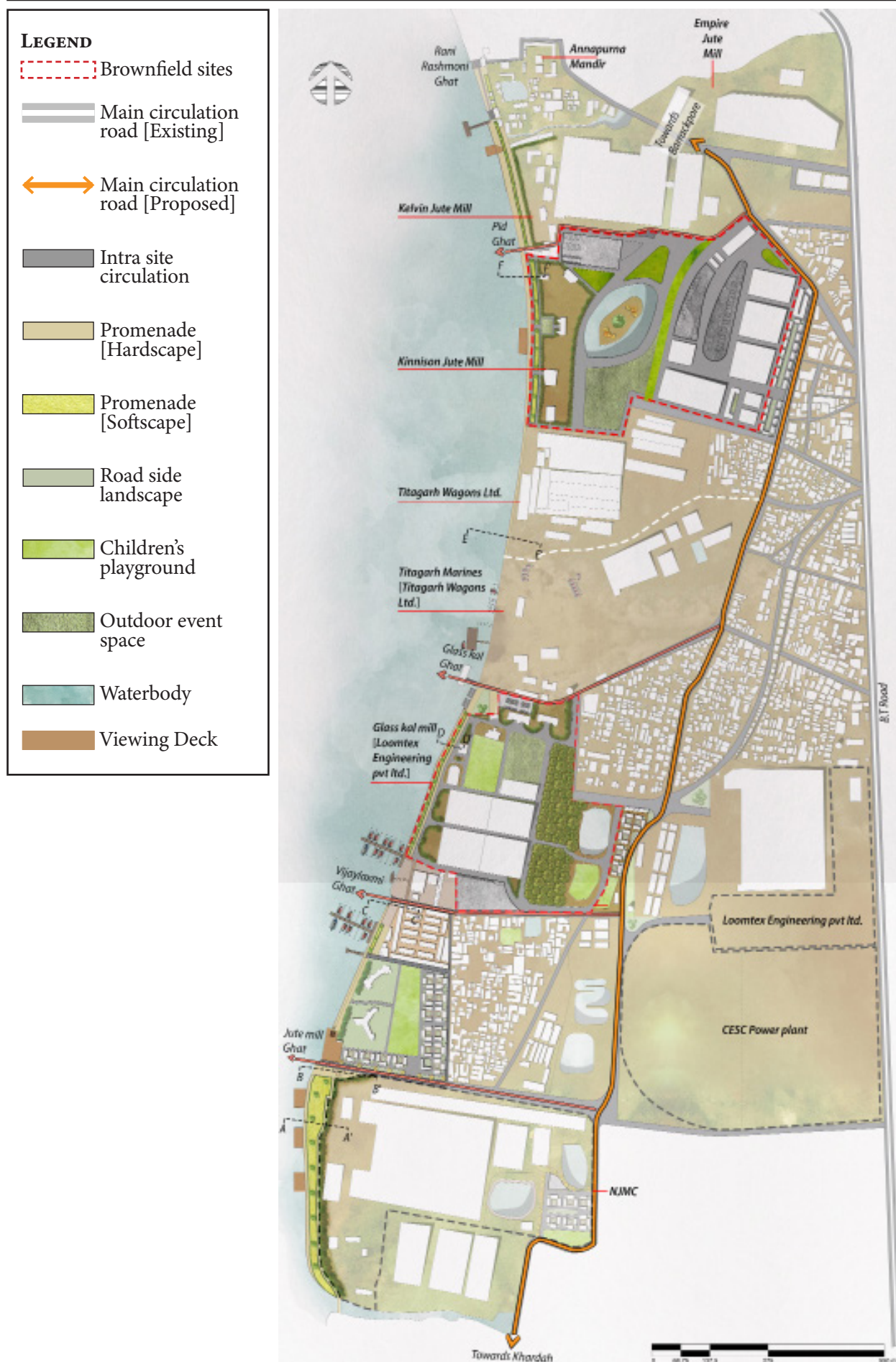


Fig. 210:Area level map denoting the the proposals. Source : Author





Existing Sections Vs. Proposed Sections:

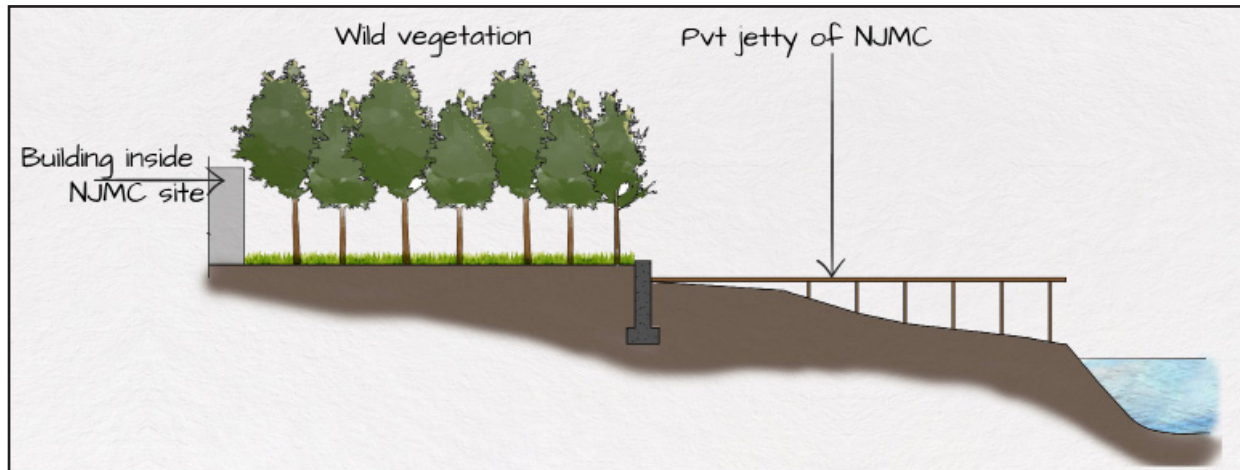


Fig. 212: Existing Sec A-A' through NJMC. Source : Author

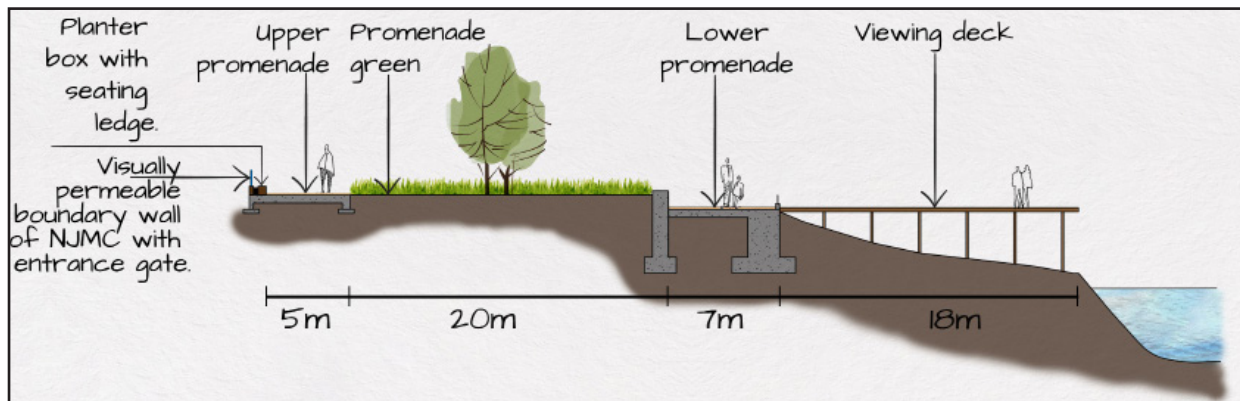


Fig. 213: Proposed Sec A-A' through NJMC. Source : Author

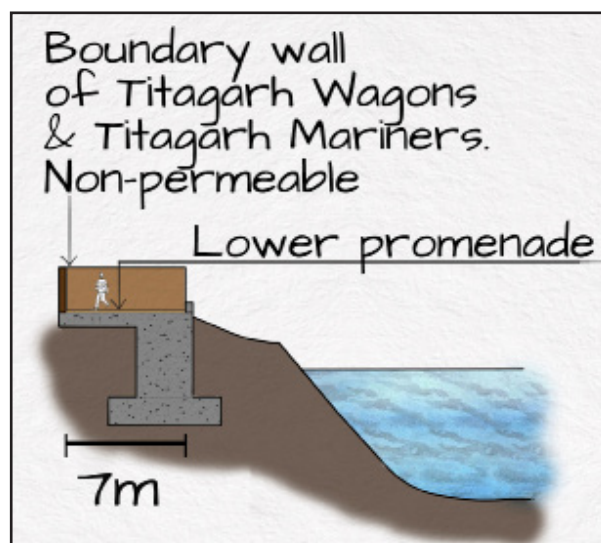


Fig. 214: Proposed Sec E-E' through Titagarh Wagons.  
Source : Author



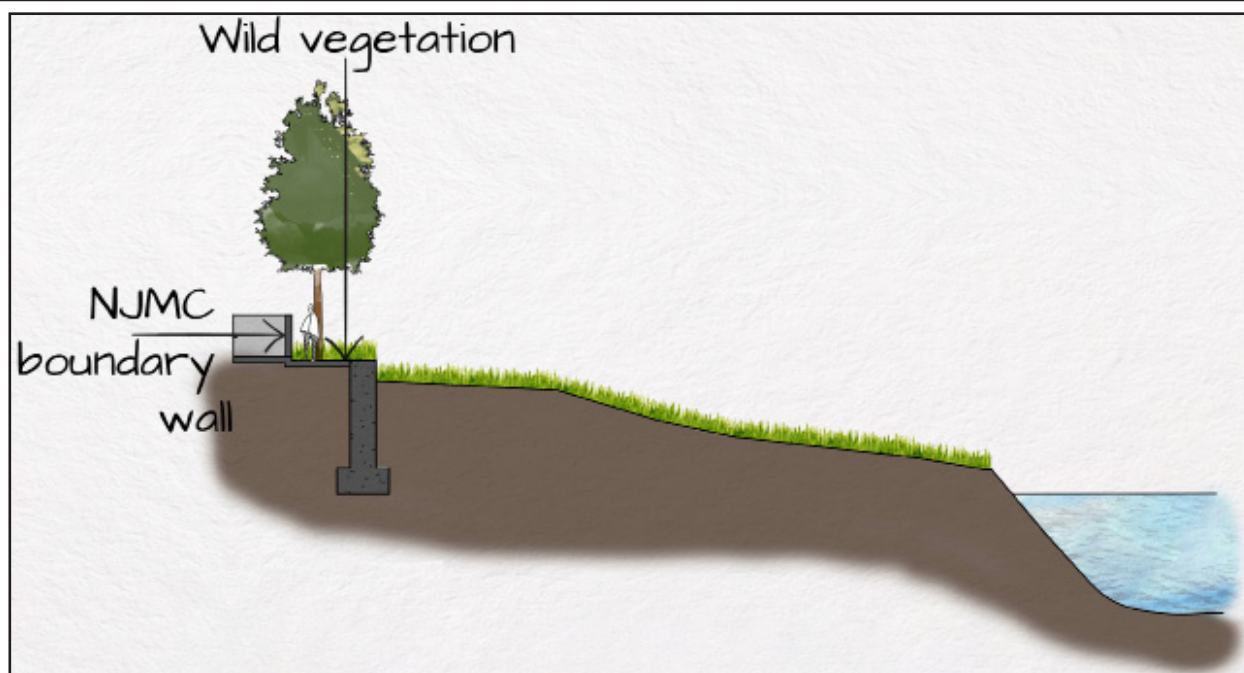


Fig. 215 :Existing Sec B-B' through Jute Mill Ghat. Source : Author

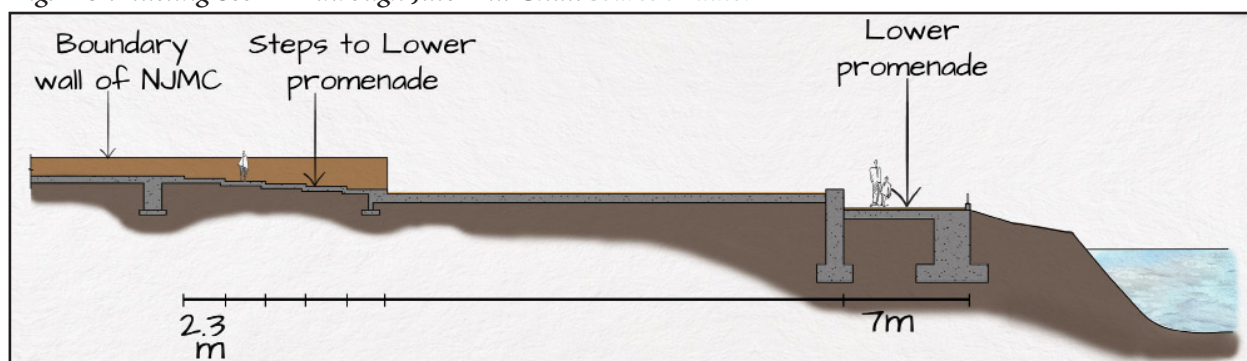


Fig. 216 :Proposed Sec B-B' through Jute Mill Ghat. Source : Author

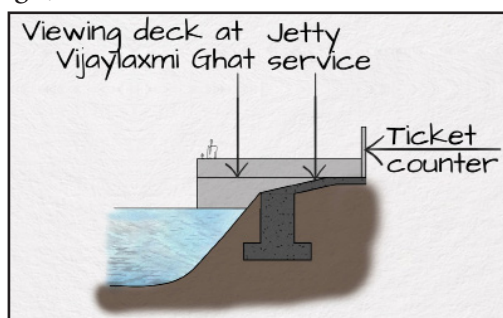


Fig. 217 :Existing Sec C-C' through Vijaylaxmi Ghat. Source : Author

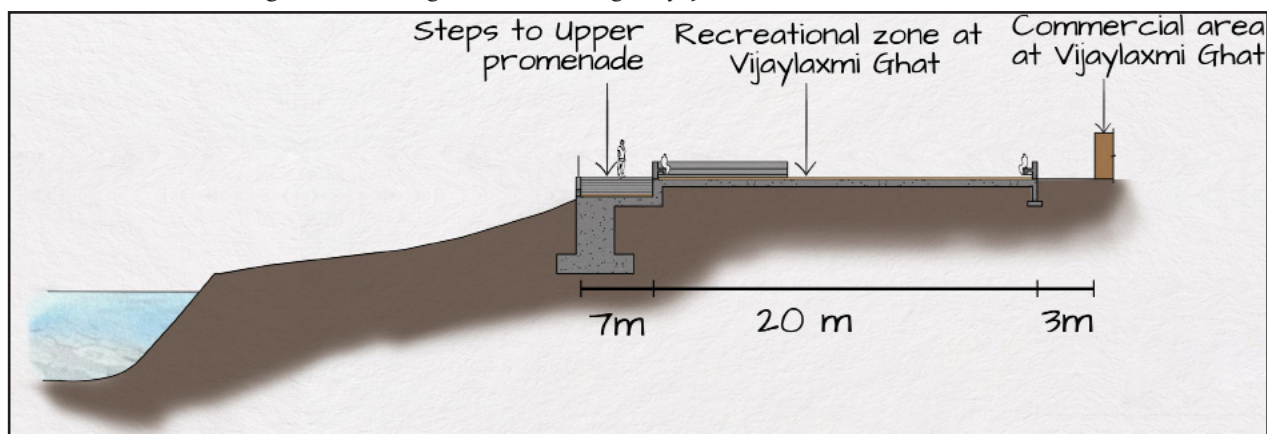


Fig. 218 :Proposed Sec C-C' through Vijaylaxmi Ghat. Source : Author



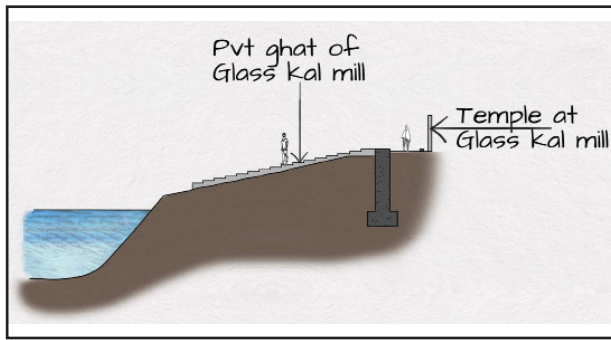


Fig. 219 :Existing Sec D-D' through Glass kal Ghat.  
Source : Author

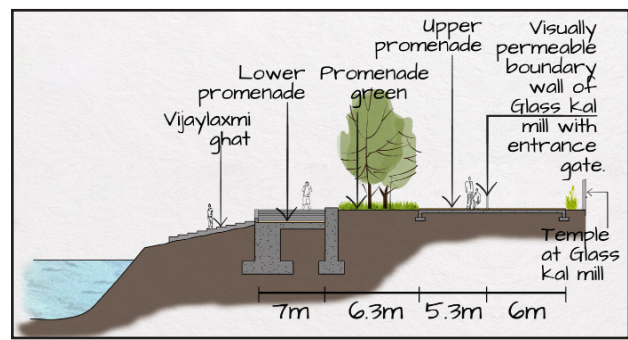


Fig. 220 :Proposed Sec D-D' through Glass kal Ghat.  
Source : Author

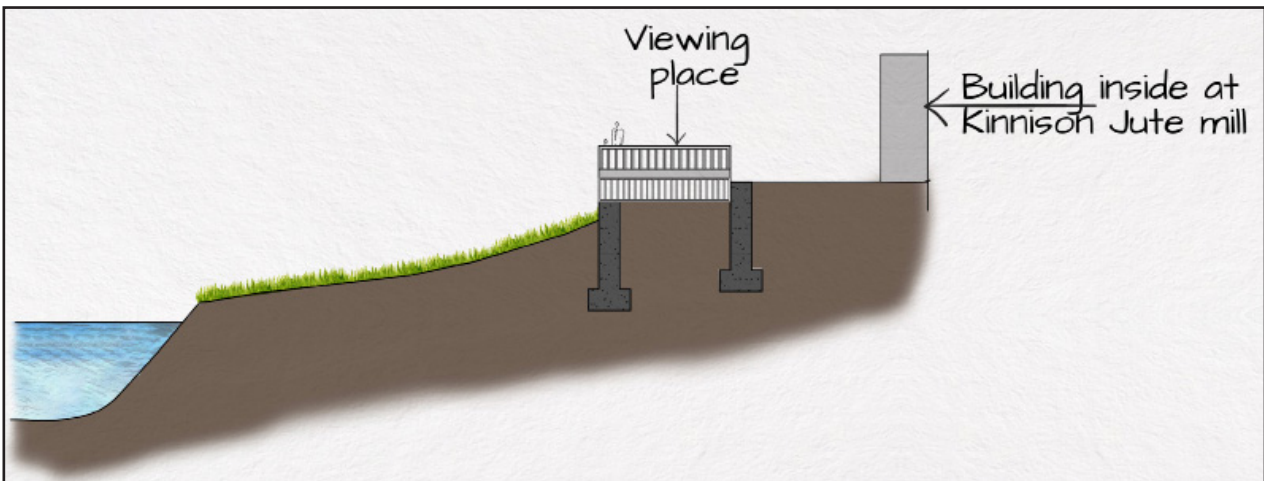


Fig. 221 :Existing Sec F-F' through Kinnison Jute Mill. Source : Author

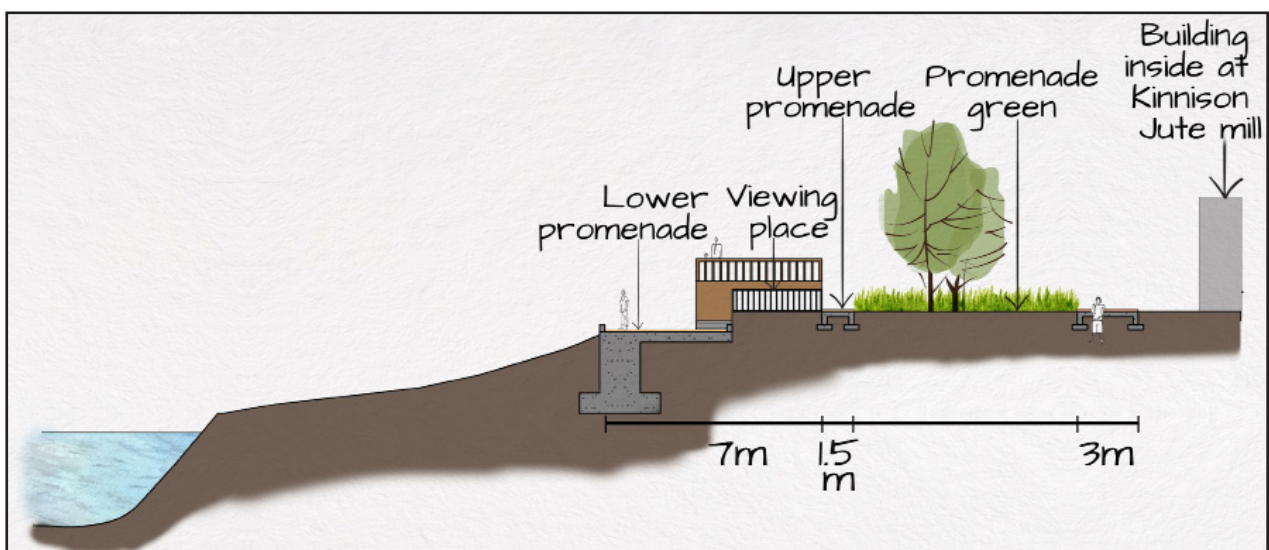


Fig. 222 :Proposed Sec F-F' through Kinnison Jute Mill. Source : Author



Fig. 223 :Proposed Figure ground map. Source : Author



Fig. 224 :Proposed Foreground map. Source : Author

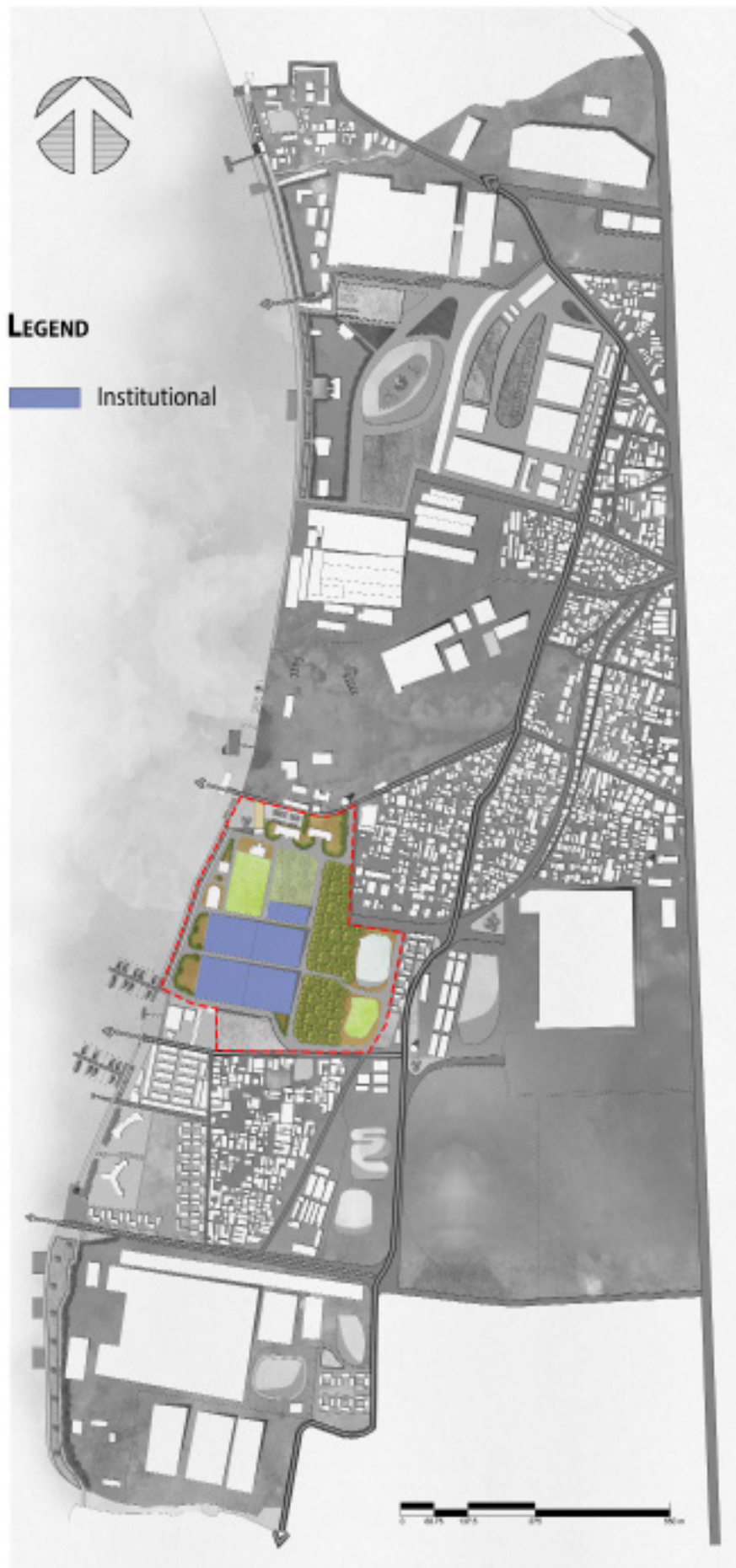




Fig. 225 :Proposed map for typology of residential landuse. Source : Author



Fig. 226 :Proposed map for typology of commercial landuse. Source : Author



*Fig. 227 :Proposed map for typology of institutional landuse. Source : Author*



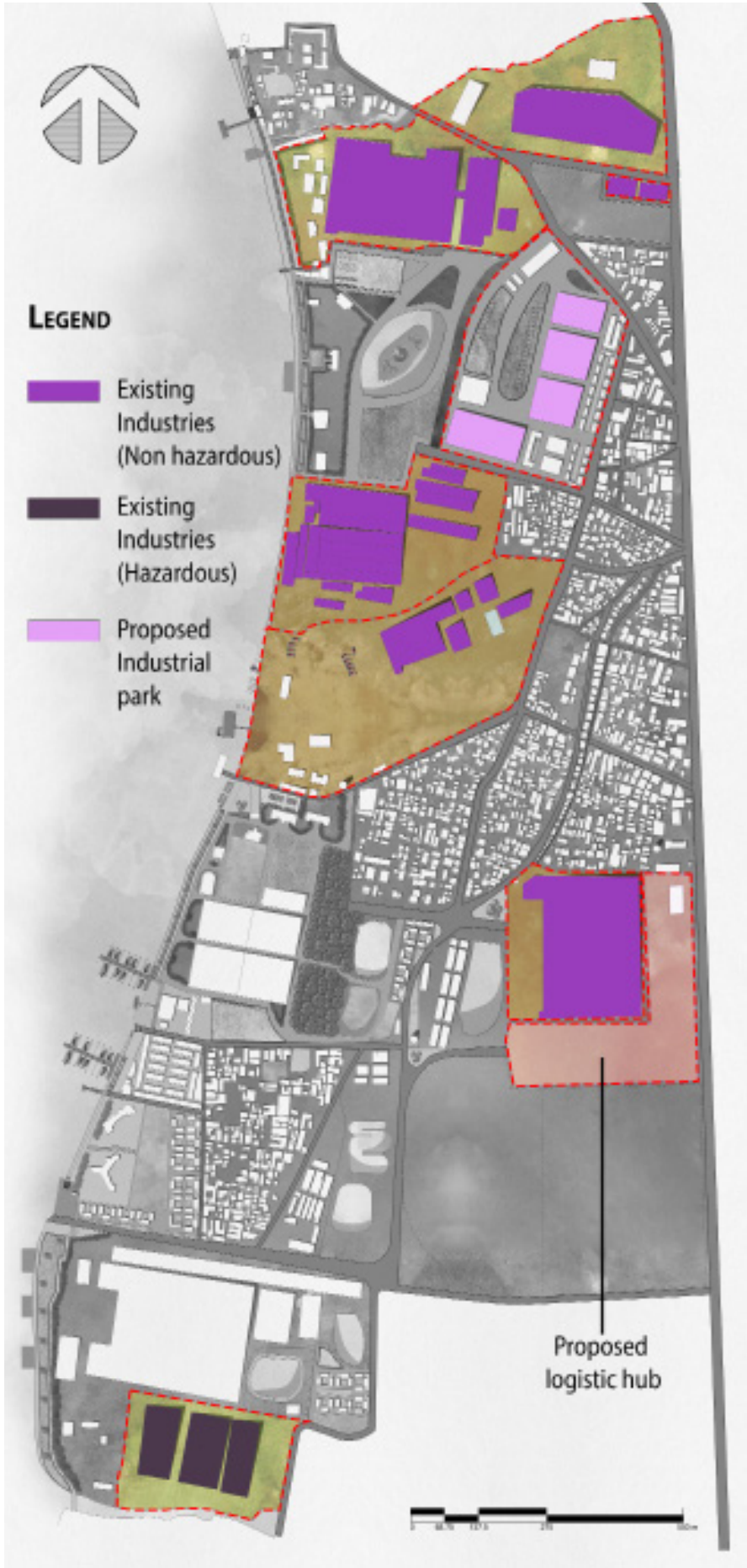


Fig. 228 :Proposed map for typology of industrial landuse. Source : Author

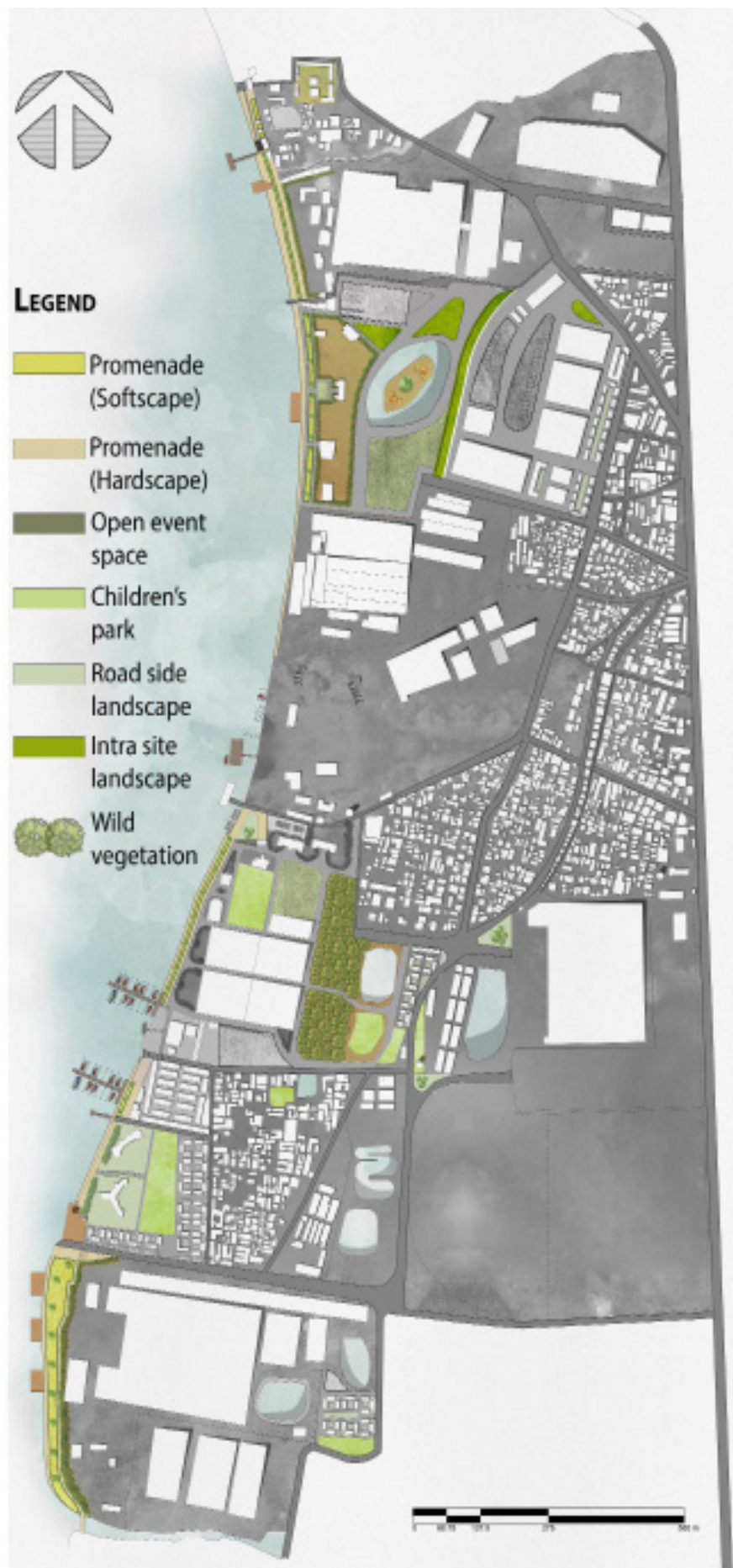


Fig. 229 :Proposed map for typology of recreational space, open space and waterbodies. Source : Author

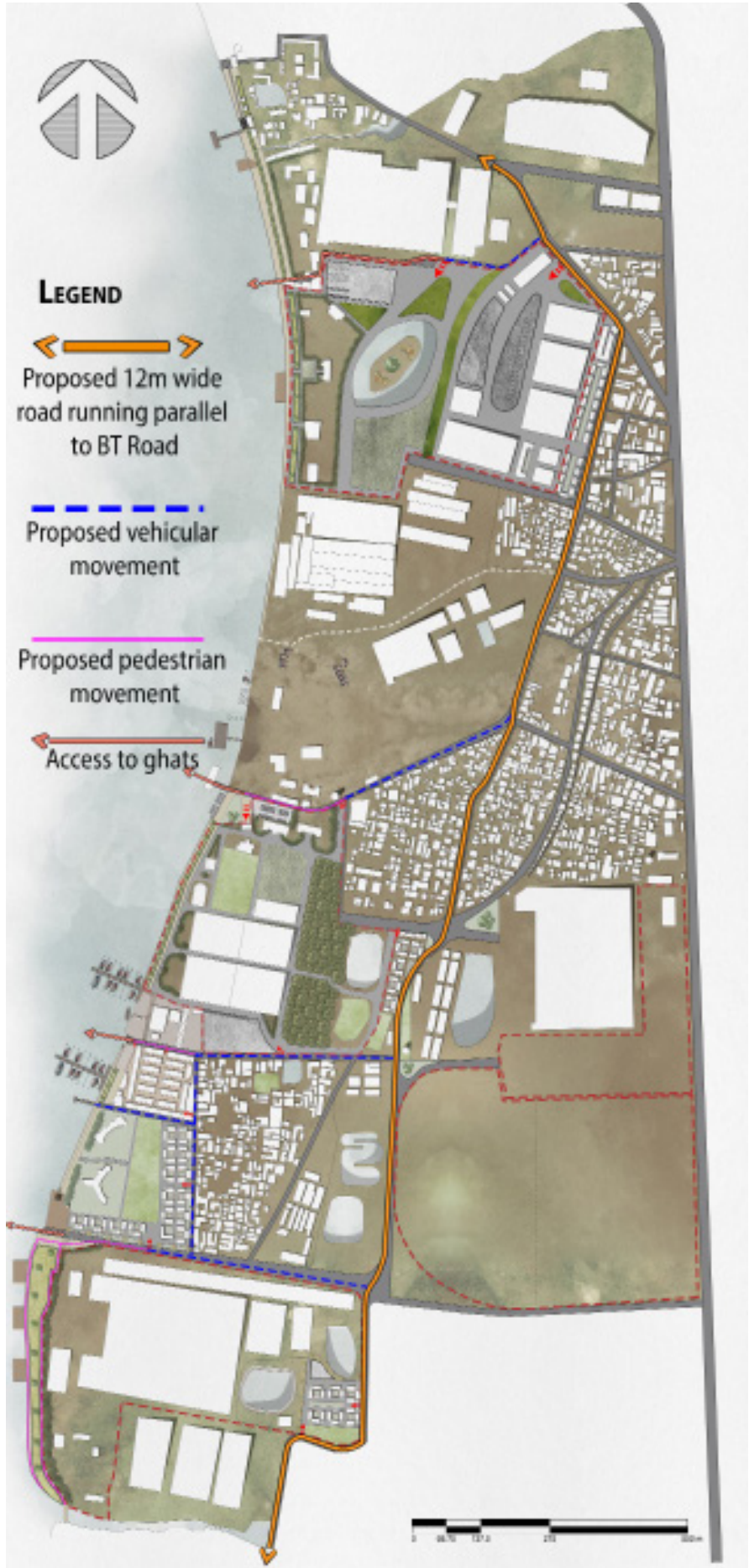
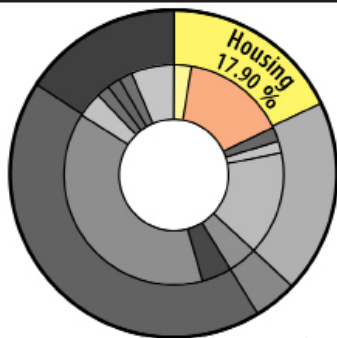


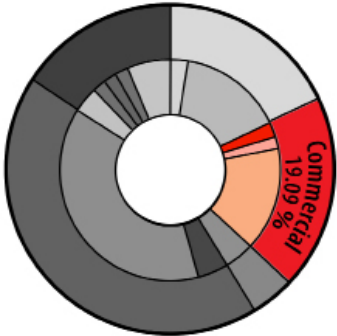
Fig. 230 :Proposed map for movement pattern. Source : Author



Proposed Landuse Distribution

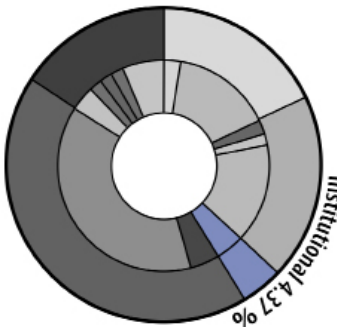
- Affordable housing [2.6 %]
- High rise (Scope of developer) [15.3 %]

Fig. 231 :Proposed housing landuse distribution. Source : Author



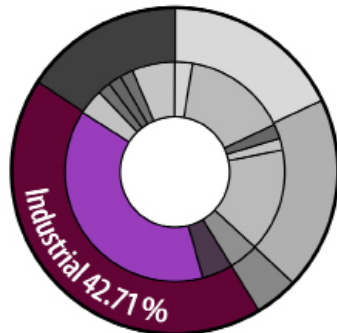
- Bazaar area[2.04 %]
- Street side shops [1.74 %]
- Commercial mall (Scope of developer) [15.3 %]

Fig. 232 :Proposed commercial landuse distribution. Source : Author



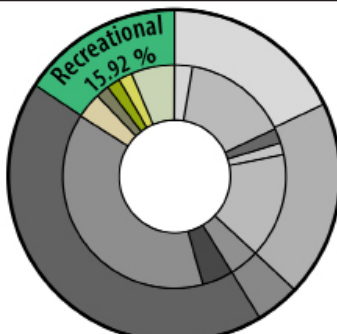
- Institutional [4.37 %]

Fig. 233 :Proposed institutional landuse distribution. Source : Author



- Hazardous [4.41 %]
- Non - Hazardous [38.30 %]

Fig. 234 :Proposed industrial landuse distribution. Source : Author



- Promenade [3.78 %]
- Open event space [1.86 %]
- Children's park [2.00 %]
- Wild vegetation [1.95 %]
- Closed recreational area [6.32 %]

Fig. 235 :Proposed recreational landuse distribution. Source : Author

## 4.3 Site Level Study:

### 4.3.1 Background - Introduction of sites

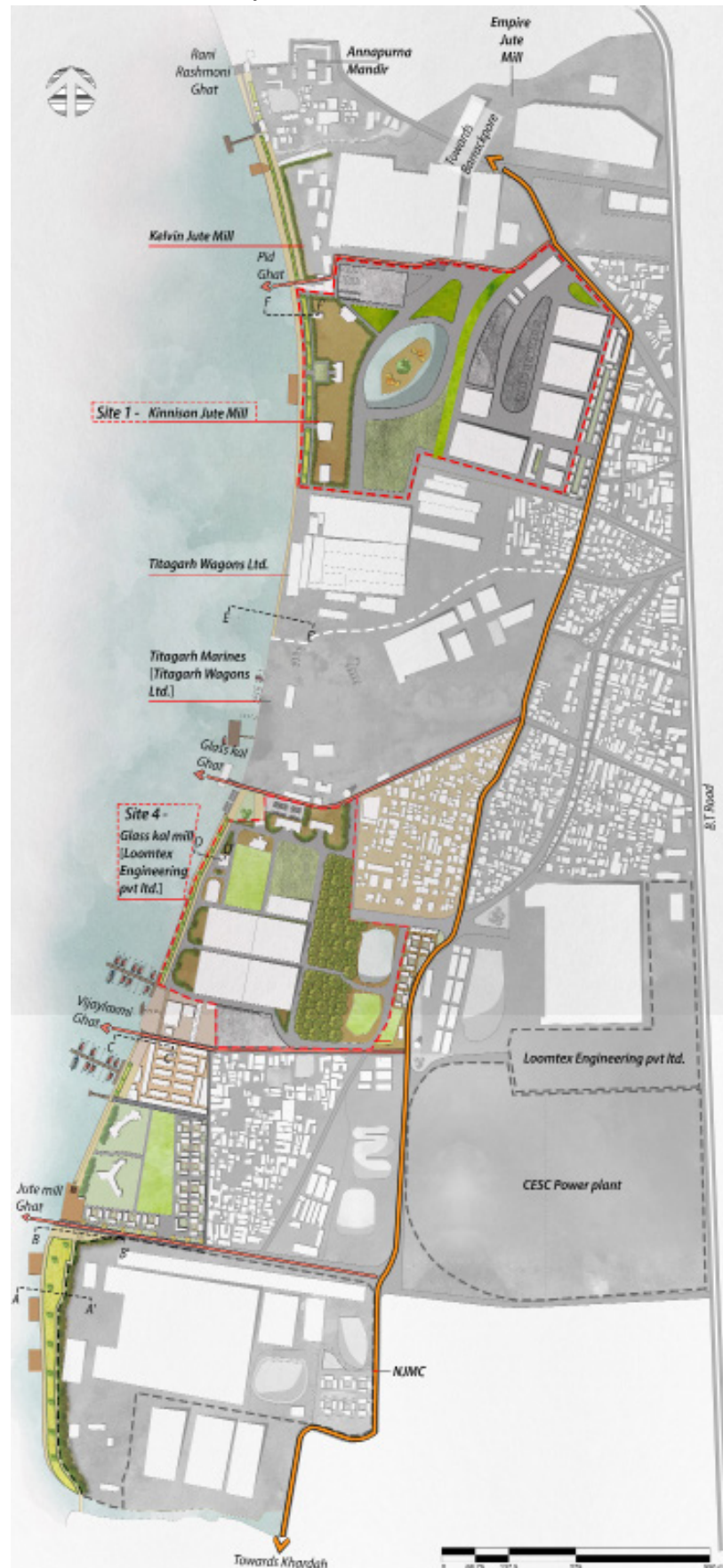


Fig. 236 :Map denoting the intervention sites. Source : Author

### 4.3.2 Intervention Site 1

#### 4.3.2.1 Intervention Site 1 - Description & Delineation

##### Site 1 - KINNISON JUTE MILL AREA

Kinnison Jute mill area is bounded by :

- River Hoogly in the East.
- A local road in the North which prominently divides two industrial sites of Kinnison and Kelvin.
- A sub-arterial road in the South through Titagarh the bazar area which prominently divide the industrial site of Kinnison Jute mill with the adjacent Titagarh paper mill and Titagarh Wagons.
- A sub-arterial road in the West through the Titagarh bazar region which accommodate most of the traffic flow of the zone.

##### LEGEND

- • • • East boundary
- • • • West boundary
- • • • North boundary
- • • • South boundary

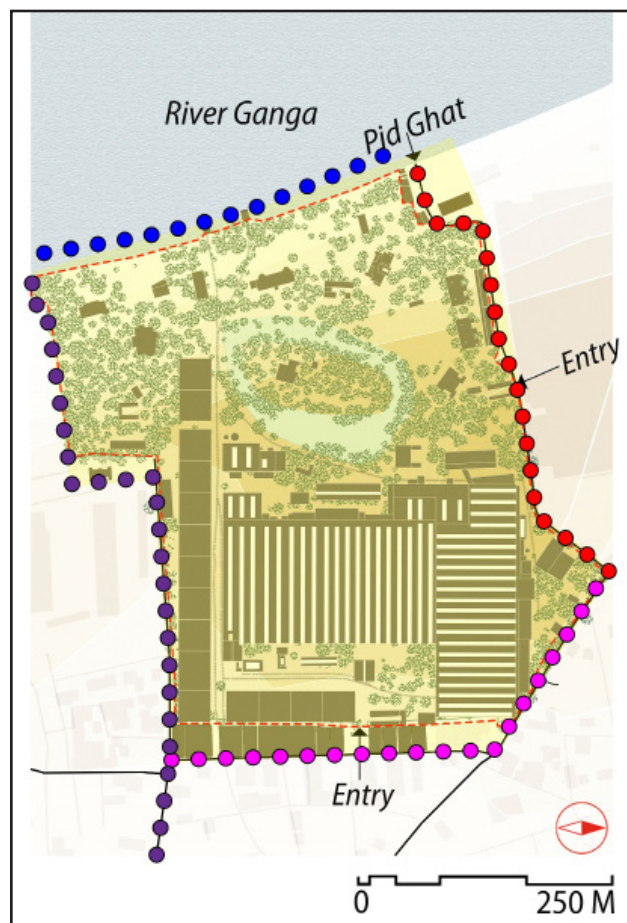


Fig. 237 :Map of intervention site 1 - delineation.  
Source : Author

### PRESENT CONDITION



Fig.238 :River Hoogly act as East boundary.  
Source : Author



Fig.239 :Sub arterial road through the Titagarh bazar region act as the South boundary of the site. Source : Author

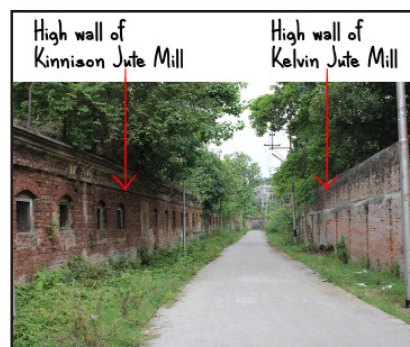


Fig.240:Local road between Kinnison and Kelvin Jute mill.  
Source : Author



#### 4.3.2.2 Survey

##### Survey Based On Image Parameter - District (Landuse) :

###### Description

- Most of the area is under the abandoned Kinnison mill.

###### Analysis

- No attached toilets present. A community toilet is present in every block of the mazdoor colony.
- Open sewage disposal area is present.

###### Conclusion

- Open sewage disposal makes the place unhygienic and should be avoided.

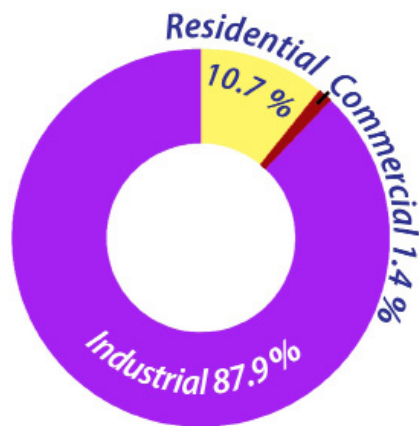


Fig.241 :Landuse of site 1. Source : Author

###### **LEGEND**

<span style="display:inline-block; width:15px; height:15px; background-color:blue; border:1px solid black;"></span> Commercial	<span style="display:inline-block; width:15px; height:15px; background-color:yellow; border:1px solid black;"></span> Open space
<span style="display:inline-block; width:15px; height:15px; background-color:green; border:1px solid black;"></span> Recreational	<span style="display:inline-block; width:15px; height:15px; background-color:lightblue; border:1px solid black;"></span> Waterbodies
<span style="display:inline-block; width:15px; height:15px; background-color:darkgrey; border:1px solid black;"></span> Abandoned Industrial Site	<span style="display:inline-block; width:15px; height:15px; background-color:orange; border:1px solid black;"></span> Residential
	<span style="display:inline-block; width:15px; height:15px; background-color:purple; border:1px solid black;"></span> Institutional

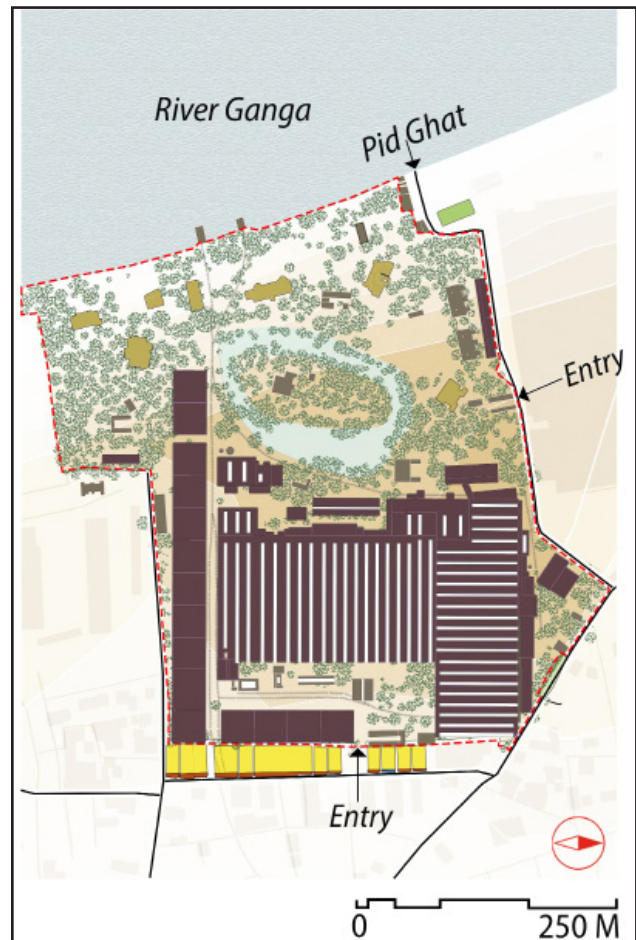


Fig.242 :Map of zone 2 denoting the Districts. Source : Author

## PRESENT CONDITION



Fig.243 : Institutional use - Telugu library. Source : Author



Fig.244:Mazdoor colony block. Source : Author

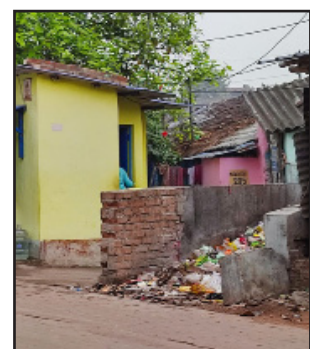


Fig.245:Presence of open sewage disposal system. Source : Author

**Survey Based On Image Parameter - Edge :****Description**

- River Hoogly act as an prominent edge on the East and local road acting as the edge between the site and Kelvin Jute mill in the northern direction of the site.

**Analysis**

- The high boundary wall of the mill act as an edge between the mill and its adjacent mazdoor colny.
- No edge exist between the bazar space and mazdoor colony.

**Conclusion**

- There is no clear distinct edge between the existing abandoned mill and its impact area which consist of the mazdoor colony and the immediate bazaar area.

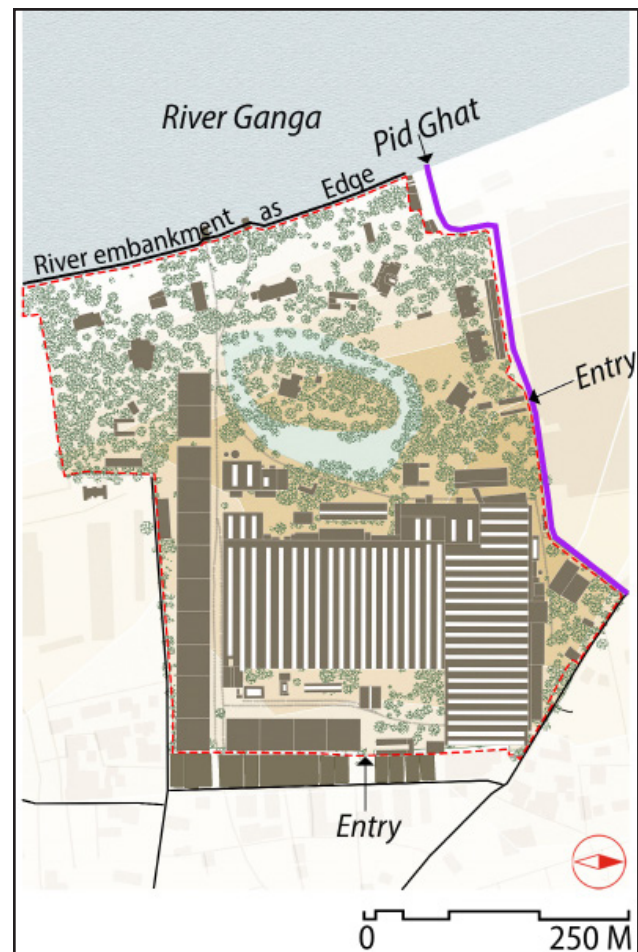
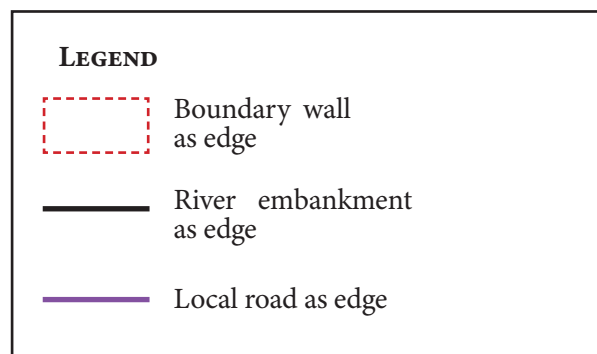


Fig.246 :Map of Zone 2 denoting the Edges.  
Source : Author

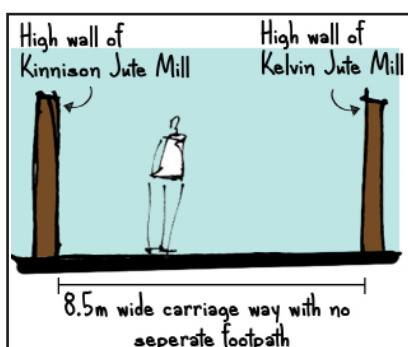
**PRESENT CONDITION OF THE EDGES**

Fig.247: Road section of the local road.(8.5m wide). Source : Author.  
Scale : NTS

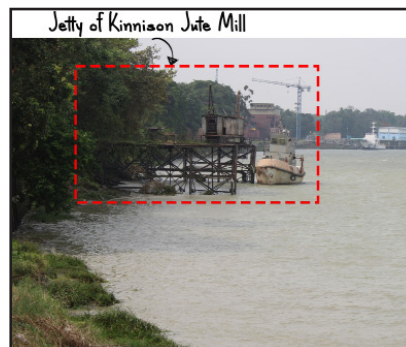


Fig.248: River Hoogly acting as edge in the east. Source : Author



Fig.249 : High boundary wall acting as edge. Source : Author



### Survey Based On Image Parameter - Pathway & Routes :

#### Description

- The whole site is connected through tramway for carrying supply cart and wagons from the mill buildings to the wharf.
- The mill compound has entry gate from all side easing the accessibility of the mill.

#### Analysis

- Open drain present at the side of sub arterial road should be avoided.
- Footpath in arterial roads should be introduced.
- Most of the intra mill pedestrian pathway is covered by wild vegetation and remain unmaintained.

#### Conclusion

- No separate walkway for intra mill pedestrian is present.
- The path has resulted from the wear and tear caused by the frequent use of the most commonly used road.

#### **LEGEND**

- Boundary wall
- Intra mill tramways
- Local roads
- Intra mill pedestrain movement



Fig.250 :Map of site 1 denoting the pathway & routes.  
Source : Author

### SKETCH DEPICTING PRESENT CONDITION OF THE MOVEMENT PATTERN

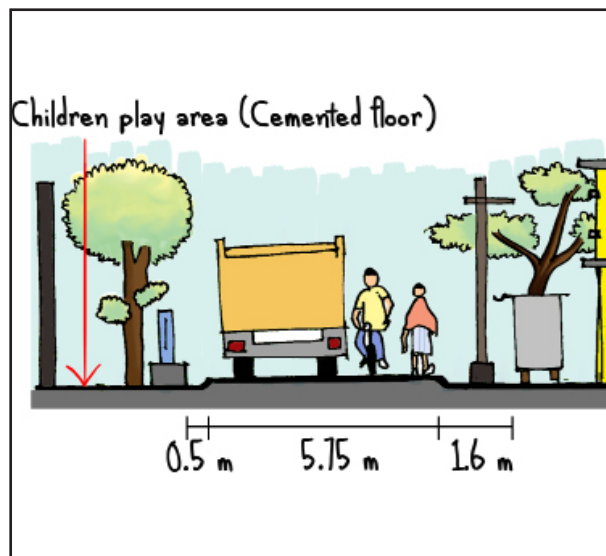


Fig.251:Narrow roads. Source : Author

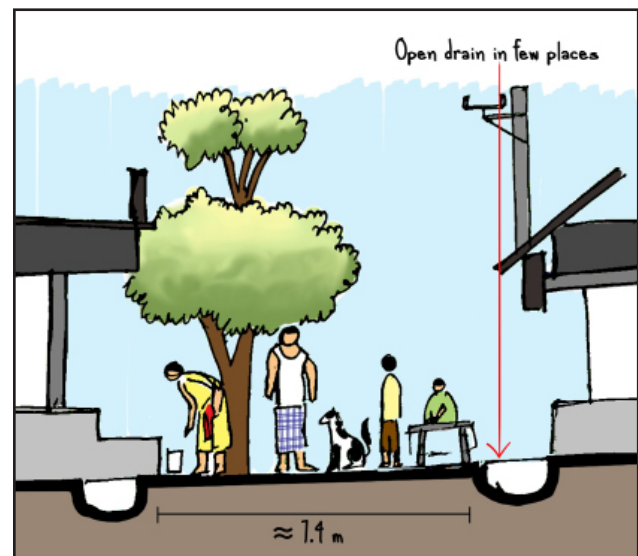


Fig.252:Road through the bazar area.  
Source : Author

Scale : NTS.



**Survey Based On Image Parameter - Nodes & Landmark :****Description**

- Pid ghat act as the major landmark to the site.  
While Sri Mukteshwari devi temple and Karbala and Narkuli Shah Baba Majar residing side by side acting as another landmark to the site.
- Two major nodes are located in the site.

**Analysis**

- Both the nodes remain congested during the morning and the evening time as a part of bazaar crowd.

**Conclusion**

- The roads joining these two nodes is very narrow to accommodate the daily as well as the seasonal crowd.
- Spill over activities should be avoided which results in congestion in vehicular movement.

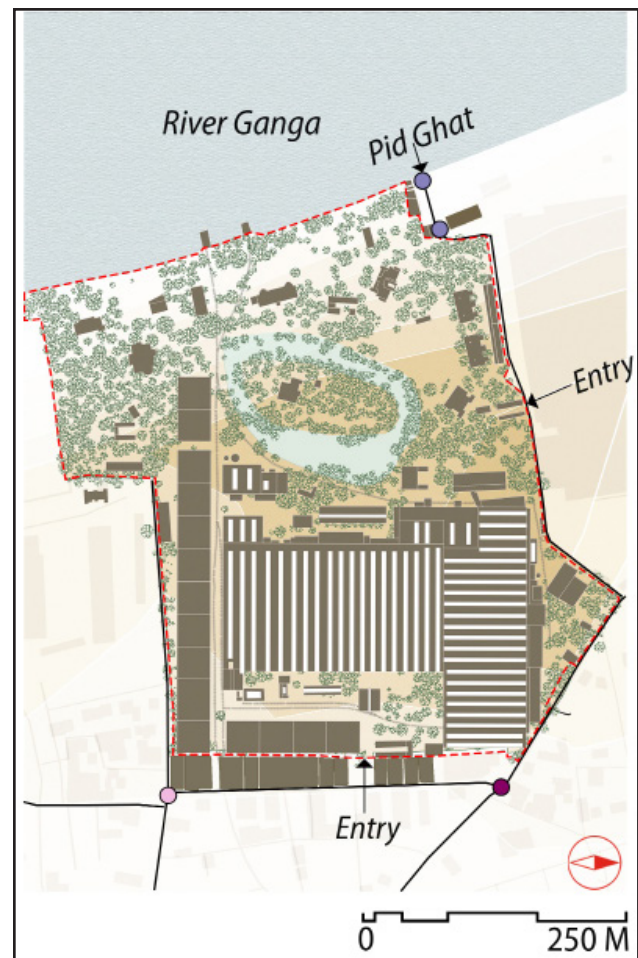


Fig.253:Map of site 1 denoting Nodes & Landmark.  
Source : Author

**LEGEND**

- Node 1      ● Node 2      ● Landmark

**PRESENT CONDITION OF THE NODES AND LANDARK**

Fig.254:Pid ghat act as landmark to the site. Source : Author



Fig.255:Sri Mukteshwari Devi temple and Karbala and Narkuli Shah Baba Majar act as landmark to the site. Source : Author



Fig.256 :Node 2. Source : Author

←----- Towards Pid Ghat.

←----- Towards Node 1.

### Survey Based On Physical Parameter - Activity & Space :

#### Description

- Residential for the mill workers are located adjacent to the mill boundary wall.
- A small pocket park is also located adjacent to the boundary wall.

#### Analysis

- The mill was used as occasional picnic spot even after the mill was closed down.
- A lot of community toilets are present and common toilets in each block is present in the mazdoor residential colony.

#### Conclusion

- Though the mill is fully shut down but the workers still live in the allocated residential.

#### LEGEND

	Commercial		Abandoned Residential
	Recreational		Waterbodies
	Abandoned Industrial		Residential
	Institutional		

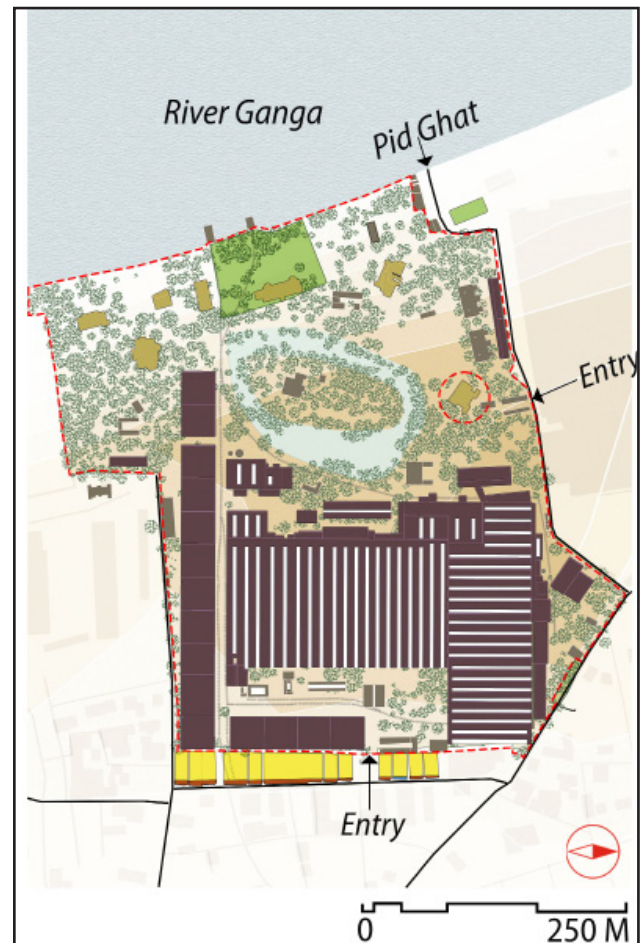


Fig.257:Map of site 1 denoting the activities.  
Source : Author

### PRESENT CONDITION



Fig.258:Mazdoor colony block.  
Source : Author



Fig. 259 : Abandoned industrial space. Source : Surbhi Agarwal

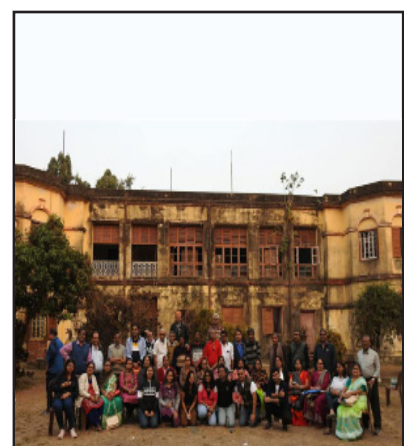


Fig. 260 : Used as occasional picnic spot. Source : Author



Survey Based On Physical Parameter - Vista & Skyline :Description

- Homogenous and Continuous green skyline.
- Majorly the Chimneys constitutes the vertical element to the skyline.

Analysis

- No proper open green space or recreational space constitutes of the skyline. The green in the skyline is majorly due to wild vegetation which have grown due to lack of maintainace of the riverfront side in present day scenario.

Conclusion

- The skyline is homogenous and continuous.



Fig.261 : The skyline is homogenous & continuous.  
View from point C. Source : Author

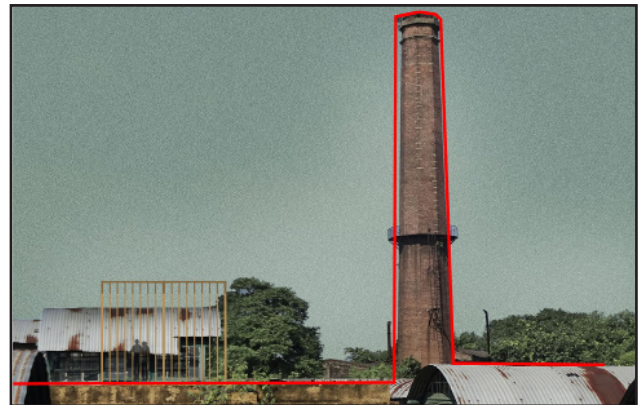


Fig. 263 : Chimney of Loomtex Jute mill constitute to the skyline of the zone. View from point B.  
Source : Author

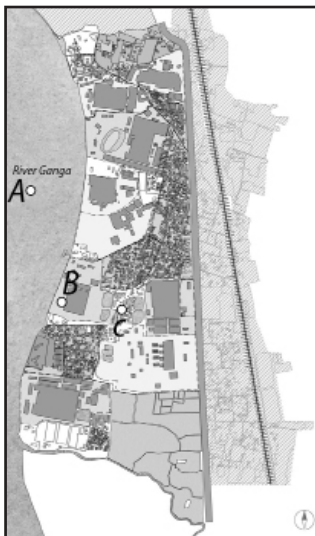


Fig. 262 : Key plan.



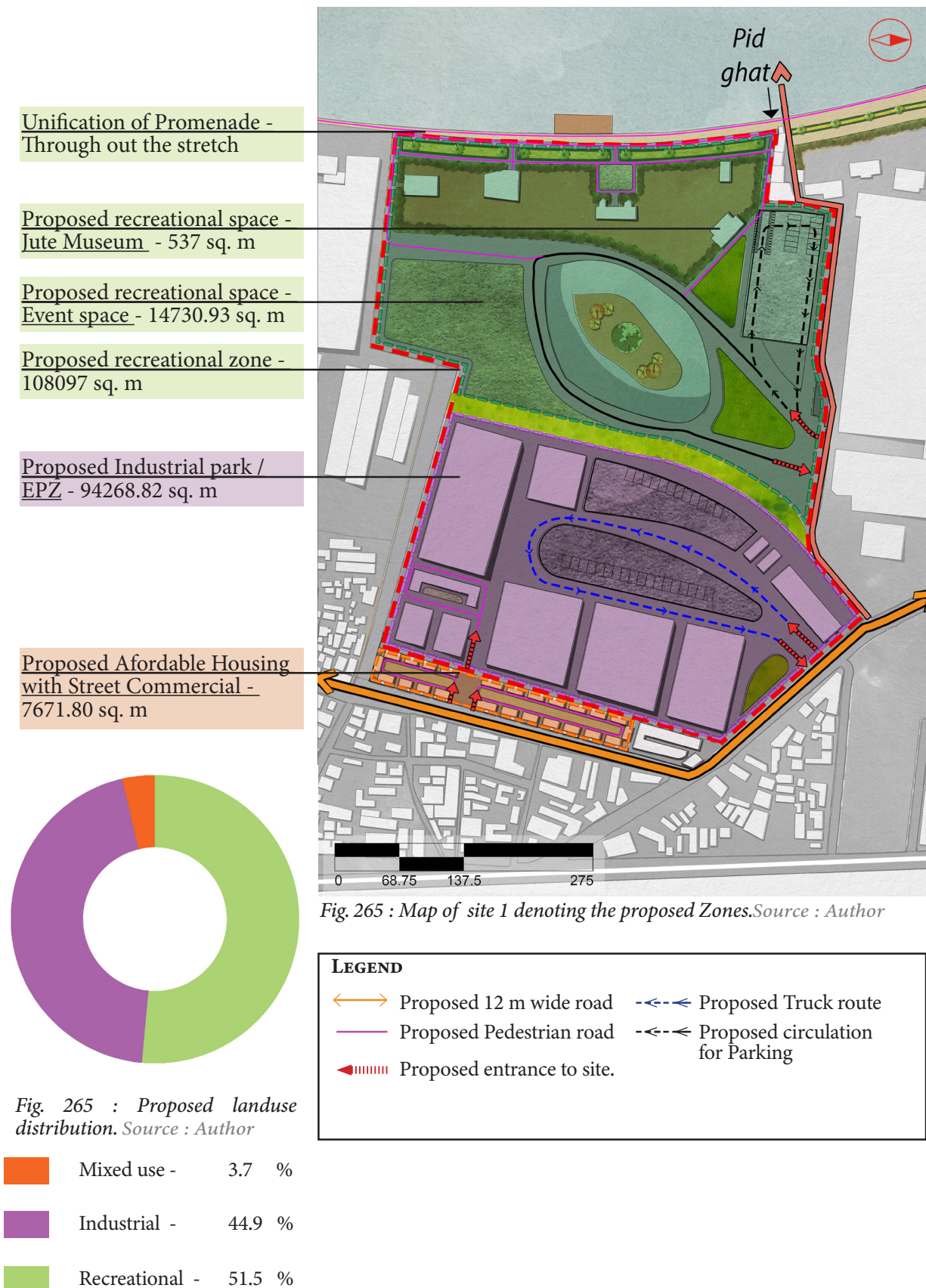
Fig. 264 : Skyline of the selected site. View point A

  Site 1

  Selected area



### 4.3.2.3 Proposals



### 4.3.3 Intervention Site 4

#### 4.3.2.1 Description & Delineation

##### Site 4 - Glass Kal Mill (Mill Land)

Glass Kal Mill area is bounded by :

- River Hoogly in the East.
- A sub arterial road in the North which leads to Raw pumping station and Glass kal ghat.
- A sub-arterial road in the South which leads to the Vijaylaxmi ghat.
- A sub-arterial road in the West which accommodate most of the traffic flow of the zone.

#### LEGEND

- • • • East boundary
- • • • West boundary
- • • • North boundary
- • • • South boundary

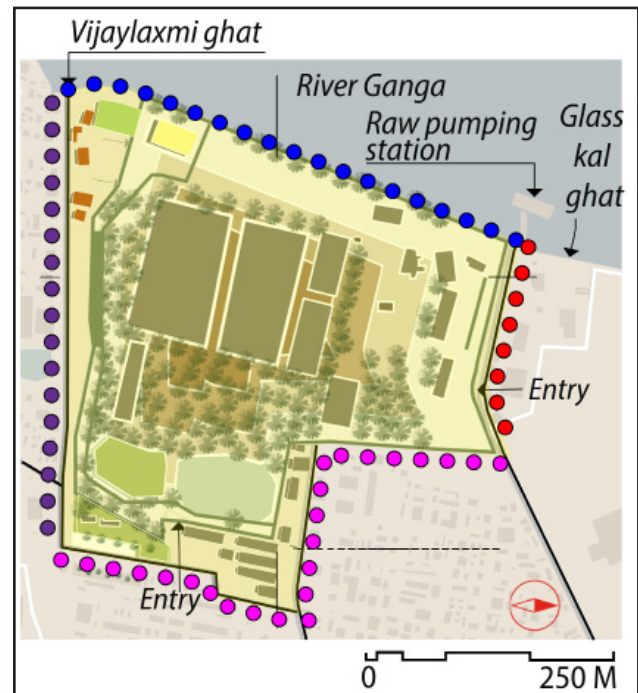


Fig. 268 :Map of intervention site 4 - delineation.  
Source : Author

### IMAGES OF SITE BOUNDARY OF INTERVENTION SITE 4



Fig.269 :River Hoogly act as East boundary.  
Source : Author



Fig.270 :Sub-arterial road leading to Raw pumping station act as the Northern boundary. Source : Author



Fig.2671:Sub-arterial road leading to Vijaylaxmi ghat act as the Southern boundary.  
Source : Author



#### 4.3.2.2 Survey

##### Survey Based On Image Parameter - District (Landuse) :

##### Description

- Most of the area is under the abandoned Glass kal mill.
- The residential of the mill is located inside the mill compound.

##### Analysis

- Though the mill is closed down but still in use as a popular shooting spot for crime thriller and ghost sets.
- Many popular bengali movies and web series has been shot here in recent past and is gaining more popularity day by day.

##### Conclusion

- The shooting spot should be properly equipped with other supporting spaces required for successful running of a shoot.

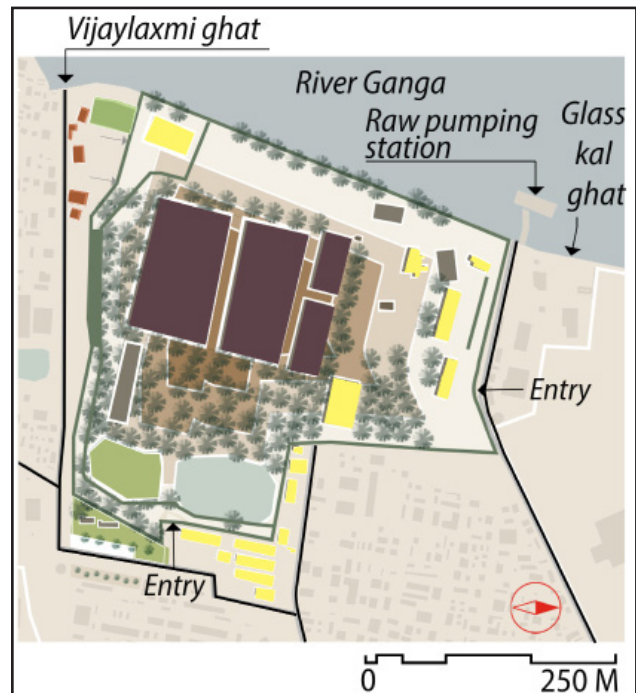


Fig.272 :Map of site 4 denoting the Districts.  
Source : Author

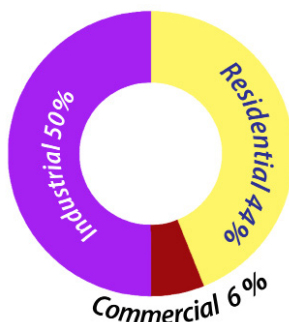


Fig. 273 :Landuse of site 2. Source : Author

##### LEGEND

<span style="display:inline-block; width:15px; height:15px; background-color:purple; border:1px solid black;"></span> Industrial	<span style="display:inline-block; width:15px; height:15px; background-color:yellow; border:1px solid black;"></span> Residential
<span style="display:inline-block; width:15px; height:15px; background-color:brown; border:1px solid black;"></span> Abandoned Industrial Site	<span style="display:inline-block; width:15px; height:15px; background-color:lightblue; border:1px solid black;"></span> Waterbody
<span style="display:inline-block; width:15px; height:15px; background-color:lightblue; border:1px solid black;"></span> Commercial	

## PRESENT CONDITION



Fig.274 :Abandoned mill shed which is being used as shooting spot. Source : Author



Fig.275 :Unused swimming pool complex. Source : Author



Fig. 276 :Commercial activities in the selected site. Source : Author



**Survey Based On Image Parameter - Edge :****Description**

- Local roads acts as the edge in most part of the site.
- Whereas river Hoogly acts as the natural edge through out the selected area.

**Analysis**

- Due to low maintainance there is a damage in the embankment in a part of the site which the local people use as the ghat during chhat puja . This can lead to severe accidents.

**Conclusion**

- The edge along the embankment should be made more safe respecting the present backdrop for the movie shoots to avoid accidents.

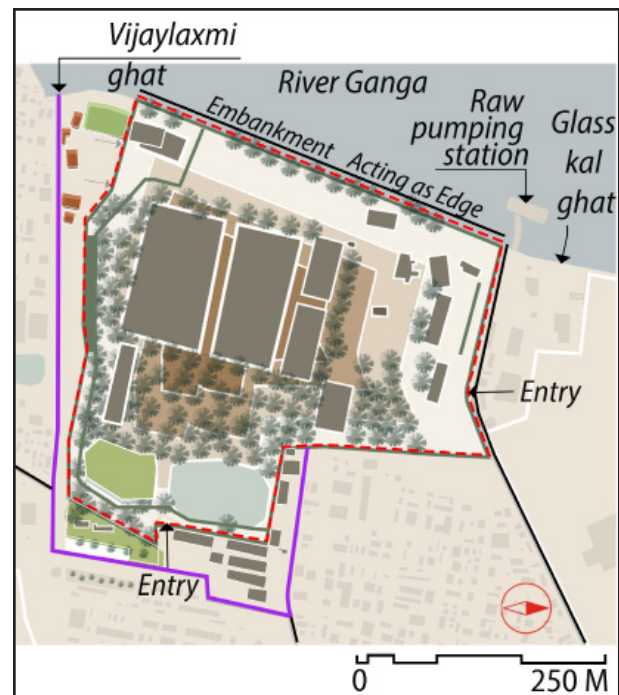


Fig.277 :Map of site 4 denoting the Edge.

Source : Author

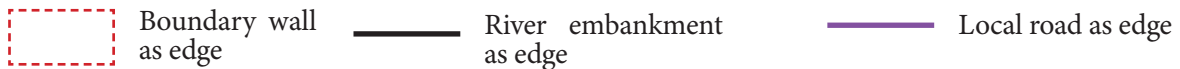
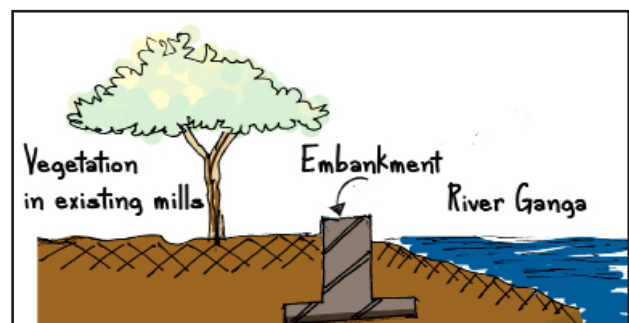
**LEGEND****PRESENT CONDITION OF THE EDGES**

Fig.278 :Local roads acting as edge. Source : Author

Fig.279 :Damaged embankment posing threat.  
Source : AuthorFig. 280 :High embankment of the mill acting as edge.  
Source : AuthorFig.281 :Schematic sectional detail of the riverfront edge.  
Source : Author. Scale : NTS.

### Survey Based On Image Parameter - Pathway & Routes :

#### Description

- The tramways connecting to wharf is disconnected at present.
- The site is divided into two parcel of land by a vehicular road running through the site.

#### Analysis

- Proper circulation for both pedestrian and vehicular movement exist in the site.

#### Conclusion

- Proper circulation only exist in the east part of the site which is commonly used.

#### LEGEND

- Boundary wall
- Intra mill tramways
- Local roads
- Intra mill pedestrain movement
- Intra mill Vehicular movement

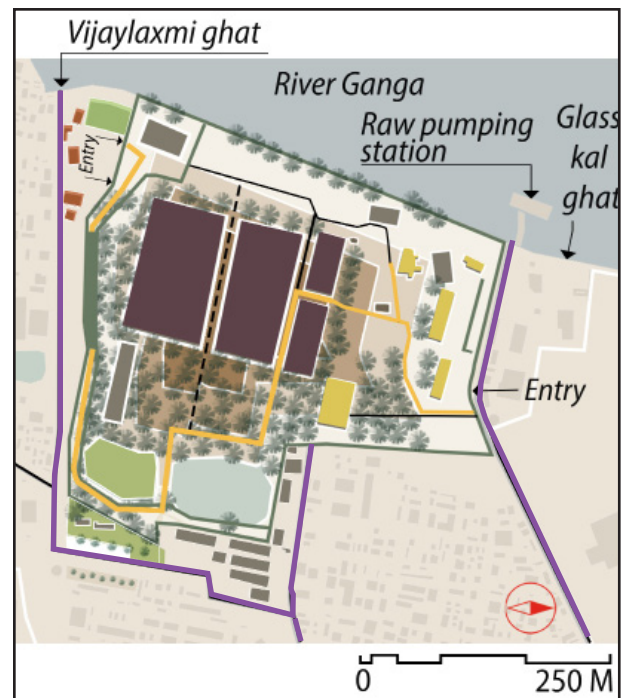


Fig.282 :Map of site 4 denoting the Pathway & Routes.  
Source : Author

### SKETCHES DEPICTING PRESENT CONDITION OF THE PATHWAYS

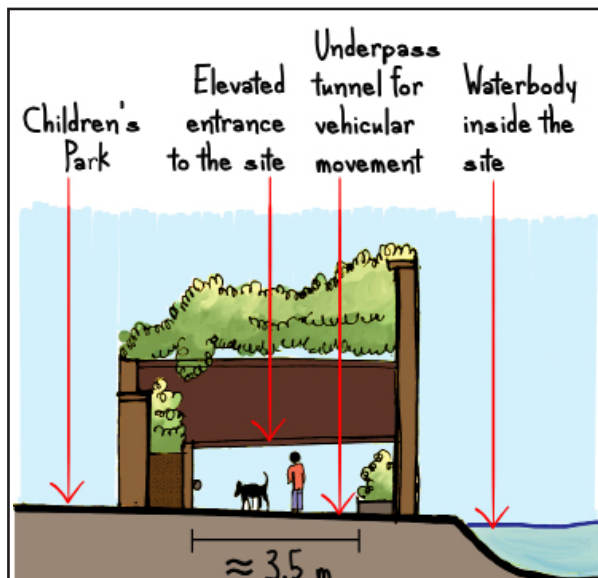


Fig.283:Road section of elevated path.  
Source : Author



Fig.284 :Intra mill tramways. Source : Author

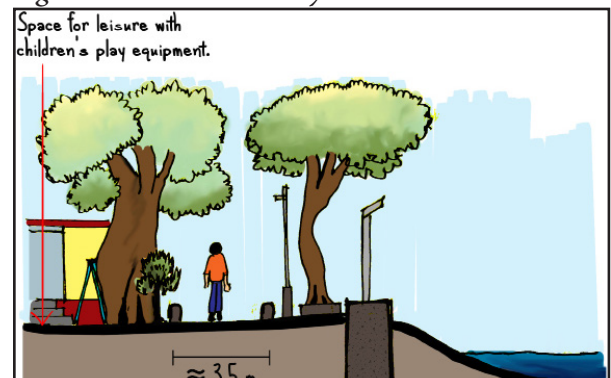


Fig.285 :Pedestrian trial by the edge of river Ganga.  
Source : Author



**Survey Based On Image Parameter - Nodes & Landmark :****Description**

- Flanked by Vijaylaxmi ghat & Glass kal mill on both side which act as landmark in this site.
- Only one node exist in this site.

**Analysis**

- Glass kal ghat has low crowd attraction as compared to Vijylaxmi ghat as it the only ghat with ferry service in the entire selected area.
- The entire Glass kal mill and glass kal ghat acts as an seasonal landmark during chhat puja.

**Conclusion**

- Ferry service at Vijaylaxmi ghat should be improved.

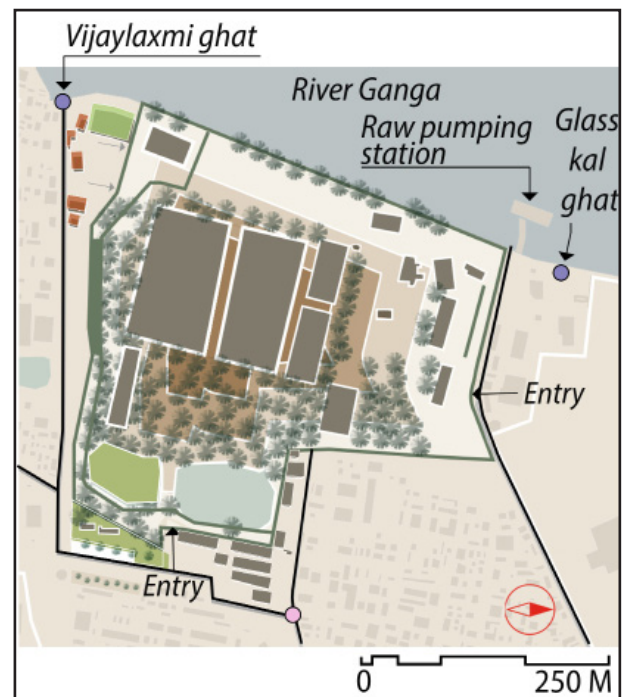


Fig.286 :Map of site 4 denoting the Nodes & Landmark. Source : Author

**PRESENT LANDMARKS**

Fig.287:Vijaylaxmi ghat ferry service. Source : Author



Fig.288 :Glass kal mill acts as an seasonal landmark. Source : Author



Fig.289 :Glass kal ghat acts as an landmark. Source : Author



### Survey Based On Physical Parameter - Activity & Space :

#### Description

- Currently, the majority of the area has been designated for recreational activities.
- The famous activity of Glass kal ghat is navy ship building.

#### Analysis

- Due to change in activity type there is a major change in profession of the locals around the site - from working in mills to fishing.
- Fishing is generally done at the time of low tide.

#### Conclusion

- Whole of abandoned industrial space has been converted into seasonal and part time recreational space.

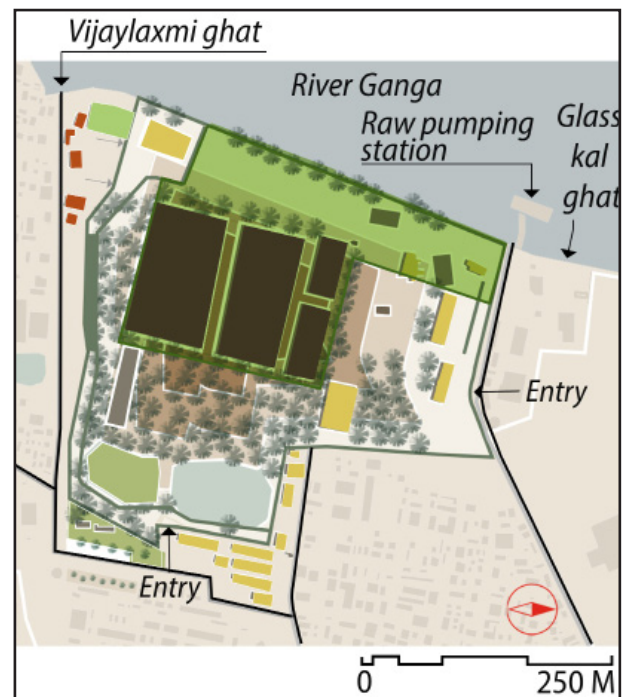


Fig. 290 :Map of site 4 denoting the Activity and Space. Source : Author

#### **LEGEND**

Recreational	Residential	Commercial	Waterbody
Abandoned Industrial Site	Abandoned Residential	Local Road	

### **PRESENT ACTIVITIES**



Fig.291:Seasonal recreational activity - Chhat puja. Source : Author



Fig.292:Clip of popular Bengali web series Bomkesh bakshi being shot at Glass Kal mill. Source : Hoichoi



Fig.293 :Fishing serves as the main activity during the time of low tide. Source : Author



Fig.294 :Navy ship building at Glass kal ghat. Source : Author.

**Survey Based On Physical Parameter - Vista & Skyline :****Description**

- Homogenous and Continuous green skyline.
- Majorly the Chimneys constitutes the vertical element to the skyline.

**Analysis**

- No proper open green space or recreational space constitutes to the skyline. The green in the skyline is majorly due to wild vegetation which have grown due to lack of maintainance of the riverfront side in present day scenario.

**Conclusion**

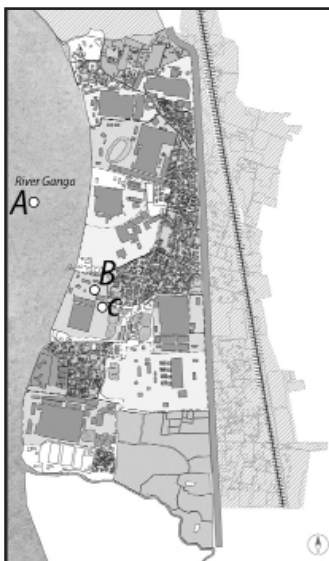
- The skyline is homogenous and continuous.



*Fig.295 : Wild vegetation contributes to the skyline. View point B. Source : Author*



*Fig.296 : Chimneys contribute to the verticle element of the skyline. View point B. Source : Author*



*Fig.297: Key plan.*



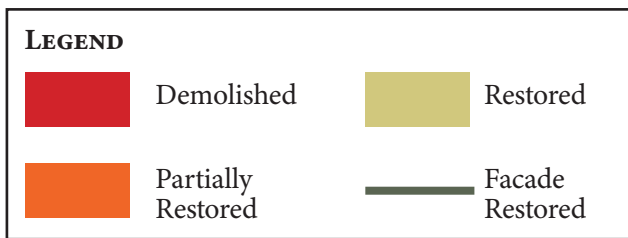
*Fig.298 : Skyline of the selected site. View point A*

Site 4

Selected area



### 4.3.2.3 Present condition of Site 4



Based on the present condition of the buildings and their build heritage the building is proposed for demolition/ restoration / partial restoration / facade restoration.

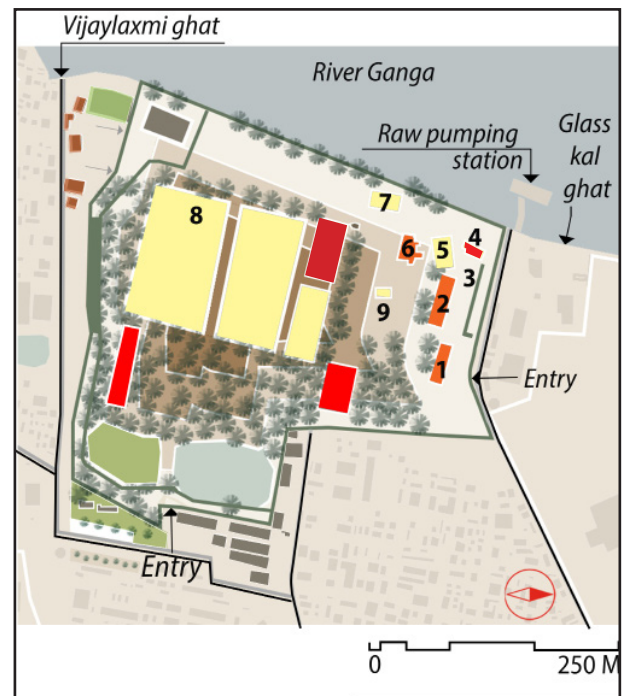


Fig.299 :Map of site 4 denoting the buildings to be Demolition /Restoration /Partial restoration /Facade restoration. Source : Author



Fig. 300 :Building 1. To be partially restored. Source : Author



Fig.301 :Building 2. To be partially restored. Source : Author



Fig.302 :Part of old boundary wall. To be demolished . Source : Author



Fig.303 :Gate leading to building 6. To be restored. Source : Author

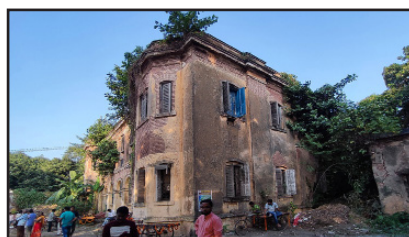


Fig.304 :Building 4. To be restored. Source : Author



Fig.305 :Building 8. To be restored. Source : Author



Fig.306 :Building 6. To be partially restored. Source : Author



Fig.307 :Building 7. To be restored. Source : Author



Fig. 308 :Building 9. To be restored. Source : Author



### 4.3.2.4 Proposals

Unification of Promenade - Through out the stretch
Proposed Affordable Housing - 12946.43 sq.m
Proposed Market - 14373.06 sq. m
Proposed Affordable Housing with Street Commercial - 6114.68 sq. m
Proposed Fishing Ghat with other fishing services - 10179.04 sq. m
Proposed Film studio - 55186.36 sq.m
Proposed Event Space - 50207.05 sq. m
Proposed Affordable Housing - 6247.24 sq. m



Residential - 6.7 %
Commercial - 9.6 %
Institutional - 31.7 %
Public facility - 0.4 %
Recreational - 2.5 %
Open space - 49.1 %*

\*49.1% includes children's park, hardscape as well as softscape of the promenade.

Fig.310:Proposed landuse distribution. Source : Author

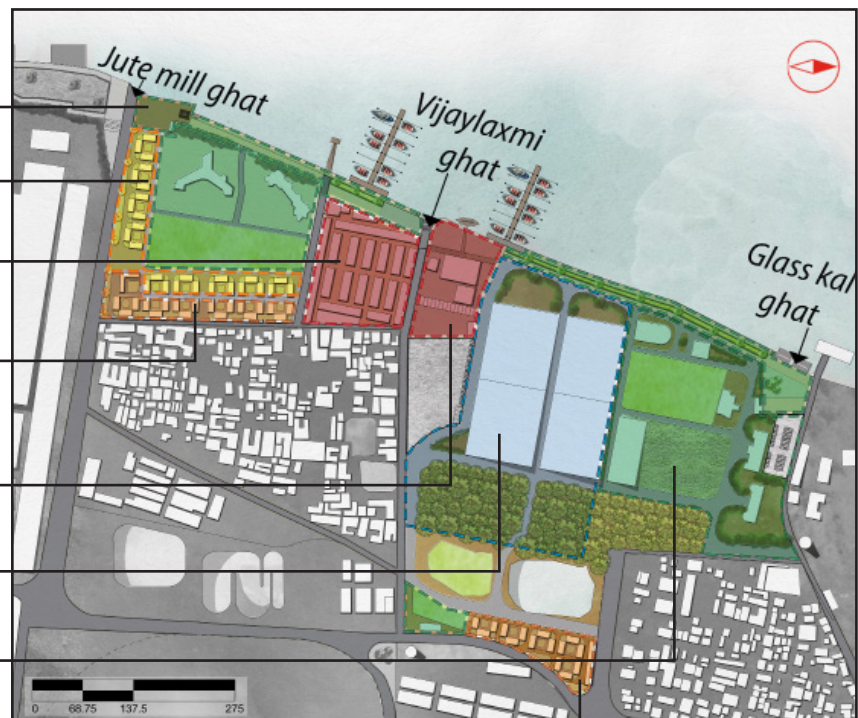


Fig. 309 :Map of site 4 denoting the proposed Zones.Source : Author

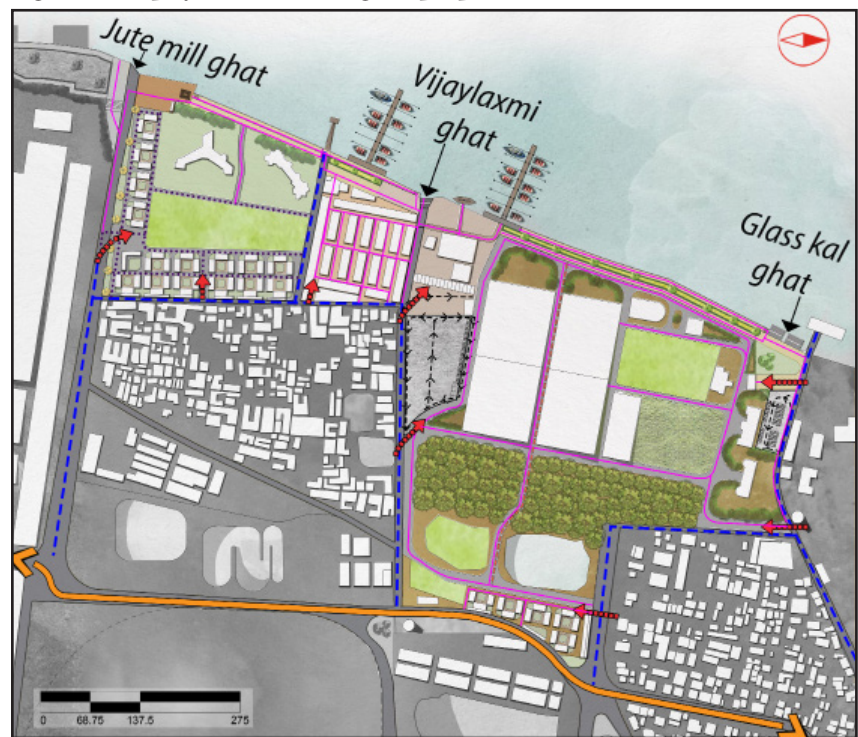


Fig.311:Map of site 4 denoting the proposed movement pattern. Source : Author

#### LEGEND

←→ Proposed 12 m wide road	••••• Proposed NMT, Pedestrian and 2 wheeler road
--- Proposed Vehicular road	----- Proposed circulation for Parking
— Proposed Pedestrian road	----- Proposed entrance to site.
- - - Seasonal vehicle movement	

### 4.3.3 Conclusions from Site Level Study

Table. 3: Conclusions from Zonal study.

PARAMETERS	SITE 1	SITE 2
DISTRICT (LANDUSE)	Open sewage disposal makes the place unhygienic and should be avoided.	The shooting spot should be properly equipped with other supporting spaces required for successful running of a shoot.
EDGE	There is no clear distinct edge between the existing abandoned mill and its impact area which consist of the mazdoor colony and the immediate bazaar area.	The edge along the embankment should be made more safe respecting the present backdrop for the movie shoots to avoid accidents.
ROUTES AND PATHWAY	No separate walkway for intra mill pedestrian is present. The path has resulted from the wear and tear caused by the frequent use of the most commonly used road.	Proper circulation only exist in the east part of the site which is commonly used.
NODES AND LANDMARKS	The roads joining this two nodes is too narrow to accomodate the daily as well as the seasonal crowd. Spill over activities should be avoided which results in congestion in vehicular movement.	Ferry service at Vijaylaxmi ghat should be improved.
SPACES AND ACTIVITY	Though the mill is fully shut down but the workers still live in the allocated residentials.	Whole of abandoned industrial space has been converted into seasonal and part time recreational space.
VISTA AND SKYLINE	The skyline is homogenous and continuous.	The skyline is homogenous and continuous.

## 5.0 Master Conclusion and Design Guidelines:

Table. 4: Master conclusion.

PARAMETERS	LITERATURE STUDIES	CASE STUDIES	ZONAL STUDIES	SITE STUDIES
<b>DISTRICT (LANDUSE)</b>	Landuse should be based on mill owner's requirement, City requirement and Requirement of local people.	Landuse type has shifted from industrial to either residential or commercial. In case of Bangladesh lands are monitored without changing the land use type which is a positive outcome. Change in landuse is also determined by the industry type that has been previously existed - Hazardous or non hazardous.	Abandoned industrial site at the riverfront make the riverfront inaccessible in most of the stretch.	Closed waste disposal system should be introduced which are absent at present. Present activity should be accompanied which their respective facility.
<b>EDGE</b>		River acts as the major edge in all the contexts but the river interact with the surrounding in different ways. In Karpur the edge design is more of a corridor one which doesn't merge with the surrounding. While in Bangladesh the river edge act as the major linkers aids. In case of Murangangari, Bangladesh the river was once the major transport route hence all the buildings face the river. Type of edge also changes with change in landuse type.	Crz norms are not followed. Waste untreated water is released directly into the river.	Riverfront which act as the edge should be made useable and safe for the users.
<b>ROUTES AND PATHWAY</b>	Road network form the main backbone for the entire deign proposal and activity mapping.	The width of the road should be proposed based on the future traffic density prediction and principle of complete street design to be followed.	Road which runs parallel to the BT road through the site needs to be widened as it is commonly used by the public.	Narrow roads in most areas. Separate pedestrian roads are absent. Guidelines for complete street design is absent.
<b>MOOES AND LANDMARKS</b>		Existing landmarks shouldn't be changed since those help the commuters to navigate through the city, as we have seen in the case of Karpur, India. New landmarks can be added accordingly to the need.		
<b>SPACES AND ACTIVITY</b>	There should be a change in activity and space due top the result of adaptive reuse.	In case of Mumbai, India places where adaptive reuse has been adapted successfully there the landuse type has been changed where in Bangladesh adaptive reuse has been successful without changing the acnity type. Activity like high end housing or commercial activity reduce the city's interaction with the river as we have seen in the case of Karpur, India.  In case of Mumbai, India where majority of the building are made from scratch there is a inclination to attain verticality and hence a major change in city's skyline. But in the case of Murangangari, Bangladesh old skyline has been respected.	Overall recreational spaces should be increased including playground for teenagers and also ghats should be accompanied with recreational spaces too.	There is a shift in activities from Industrial. Fishing as one of the main activity has been emerged in recent times due to job loss of the mill workers.
<b>VISTA AND SKYLINE</b>	Original city skyline should be respected.		Skyline is homogenous and continuous.	Skyline is homogenous and continuous.



## 7.0 Conclusion

### 7.1 Issues :

#### 1. Public Space or Place making -

- Un- utilized brownfields
- Less to no recreational spaces.

#### 2. Connectivity -

- Un-accessible riverfronts
- Narrow roads compared to daily traffic.

#### 3. Environmental Impact -

- Polluted sewage water released directly in the river causing pollution and not abiding CRZ norms.

### 7.2 Contributions :

1. Developing the framework for Brownfield revitalization in other Jute mills of bengal with respect to Charles Correa report.
2. Understanding the relation between Brownfield Revitalization and Urban Development.
3. Identifying the issues & counter of the urban life of an Industrial city.
4. Proposing varios programs to the brownnfield based on the studies
5. Proposed unification of riverfronts
6. Proposed sewage tretment plant within the selected area.
7. Proposed widening of the roads to accommodate daily traffic.
8. Proposed recreational spaces along the promenade.



Fig. :Issues - Less to No recreational spaces.  
Source : Author

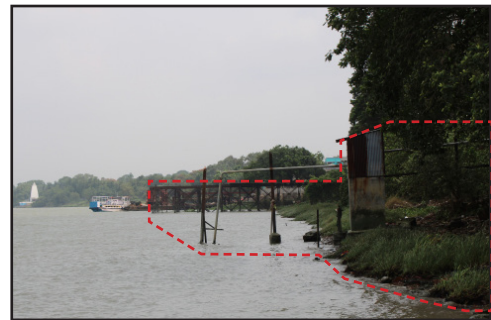


Fig. :Issues - Unaccessible riverfronts.  
Source : Author

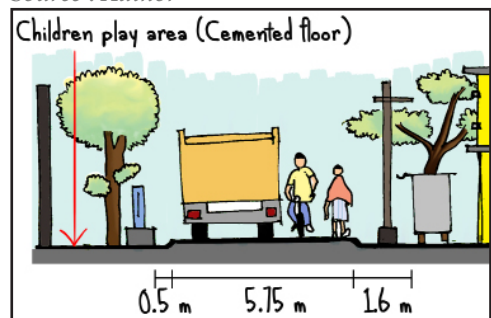


Fig. :Issues - Narrow roads compared to daily traffic. Source : Author



Fig. :Issues - Environmental issues.  
Source : Author

### 7.3 Future Scope :

The thesis was taken up with the idea of studying and understanding the impact of Brownfields on the socio-economic structure of an industrial city.

Firstly, the methodology or the process of study from an urban design perspective may be utilized in order to understand local impacts of Brownfield revitalization which is also one of the main points in Charles Correa report on mill land. It also help to identify the issues that need to be immediately address in order to develop the betterment of the city.

Secondly, the role of Urban design as a tool to analyze such impacts may be addressed, especially in a developing nation like India. Urban design needs to be established as a amalgamation between large scale architecture, landscape design, infrastructural and city planning. It must be used to analyze qualitative aspects of the physical environment with respect to the quantative ones, keeping in mind the beneficiaries of the project.

The model od development proposed in this thesis may be used and improved upon , in order to create an idea of the proper relationship between people and the requirement of the places they wish to have in a city, their requirement of activities in designated spaces and their physical relation with their urban forms.

In this study and project I tried my best to make some design strategies alligning with Charles Correa Report and incorporating that in the context of my case applicatipon area ie. Barrackpore Industrial zone. But as there is a certain constraint I had to restrict my domain. There are several scopes to continue this research work further in future. My dream is to see this brownfields sustain and get commercially viable in the future.

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## Appendix:

<i>Activity</i>	<i>In a city, different areas have different characteristic functions called activities.</i>
<i>Adaptive reuse</i>	<i>Process of reusing an existing building for a purpose other than which it was originally built or designed for.</i>
<i>Arterial Roads</i>	<i>An arterial road or arterial thoroughfare is a high-capacity urban road that sits below freeways/motorways on the road hierarchy in terms of traffic flow and speed.</i>
<i>Brownfield</i>	<i>Land that is abandoned or underutilized due to pollution from industrial use.</i>
<i>Charles Correa Rule of Third</i>	<i>Based on Charles Correa report on mill land , 1996.</i>
<i>CRZ</i>	<i>Coastal Regulation Zone - Under the section 3 of Environment Protection Act, 1986 of India, Coastal Regulation Zone notification was issued in February 1991 for the first time, for regulation of activities in the coastal area by the Ministry of Environment and Forests (MoEF).</i>
<i>District</i>	<i>A city is composed of component neighborhoods called districts.</i>
<i>Edge</i>	<i>The districts of a city terminate in edges.</i>
<i>Expressways</i>	<i>A high-speed divided highway for through traffic with access partially or fully controlled.</i>
<i>Greenfield</i>	<i>One that lacks constraints imposed by prior work on the site</i>
<i>Industrial Area</i>	<i>An area outside of a town or city that is designed especially for factories or offices.</i>
<i>Industrial Corridor</i>	<i>Offer effective integration between industry and infrastructure, leading to overall economic and social development.</i>
<i>Landmark</i>	<i>The prominent visual features of a city are its landmarks.</i>
<i>Local roads</i>	<i>Provide limited mobility and are the. primary access to residential areas, businesses, farms, and other local areas.</i>
<i>National Industrial Manufacturing Zones [NIMZs]</i>	<i>Large areas of developed land with the requisite ecosystem for promoting world class manufacturing activity.</i>

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<i>Nodes</i>	<i>The centers of activities of a city are its nodes.</i>
<i>Open Spaces</i>	<i>Land that is not intensively developed for residential, commercial, industrial or institutional use.</i>
<i>Pathway &amp; Movement</i>	<i>A city has a network of major pathways, while a district has a network of minor pathways.</i>
<i>Pedestrian Roads</i>	<i>Areas of a city or town reserved for pedestrian-only use and in which most or all automobile traffic is prohibited</i>
<i>Public Private Partnership</i>	<i>Long-term arrangement between a government and private sector institutions which typically involves private capital financing government projects and services up-front, and then drawing revenues from taxpayers and/or users over the course of the PPP contract.</i>
<i>Recreational Activities</i>	<i>Activity of leisure, leisure being discretionary time.</i>
<i>Residential Area</i>	<i>The use of land and buildings on a site by people for living accommodation either alone, in families or groups.</i>
<i>Revitalization</i>	<i>The action of imbuing something with new life and vitality.</i>
<i>Satellite Town</i>	<i>Smaller municipalities that are part of a larger metropolitan area and serve as regional population and employment centers.</i>
<i>Seasonal Movement</i>	<i>Movement of people from one place or another on a seasonal basis.</i>
<i>Space</i>	<i>A city can be considered as a vast space.</i>
<i>Spill Over Activities</i>	<i>Unintentional or secondary effects and interactions that occur as a result of the design and development of urban spaces.</i>
<i>State Manufacturing Zone</i>	<i>Zones or properties which are used for manufacturing activities and the permit is given through a zoning ordinance.</i>
<i>Sub-arterial Roads</i>	<i>The city roads which provided lower level of travel mobility than arterial streets,</i>
<i>Vista &amp; Skyline</i>	<i>Every city has a few striking vistas, of it and from it. They are of great importance in characterizing the city and enriching its visual experience. The skyline of a city is a representation of its physical form. It acts as its collective vista.</i>

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