

REVAMPING THE SLUM AROUND CHENNAI CENTAL

THESIS

Submitted in partial fulfilment of the requirements for the award of Bachelor
of Architecture degree

By

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DEPARTMENT OF ARCHITECTURE
SCHOOL OF BUILDING AND ENVIRONMENT

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited with Grade "A" by NAAC

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JUNE 2021



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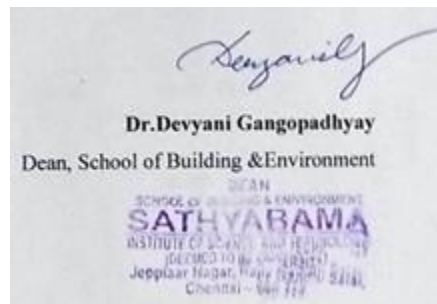
This is to certify that this Project Report is the bonafide work of **S.Bhargav Sai (3621016)** who carried out the project entitled “Revamping the slum around Chennai Central” under our supervision from January 2021 to June 2021.

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Submitted for Viva voce Examination held on _____

Internal Examiner

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DECLARATION

I, **S.Bhargav Sai** hereby declare that the Project Report entitled “**Revamping the slum around Chennai central**” done by me under the guidance of **Ar.P.R.Divya** (Internal Guide), **Ar.Deepa** (Internal Review Member) and **Ar.Pradeep Varma** (External Guide). Sathyabama Institute of Science and Technology is submitted in partial fulfilment of the requirements for the award of Bachelor of Architecture Degree.

DATE:

PLACE: Chennai
ACKNOWLEDGEMENT

SIGNATURE OF THE CANDIDATE

I am pleased to acknowledge my sincere thanks to Board of Management of **Sathyabama Institute of Science and Technology** for their kind encouragement in doing this project and for completing it successfully. I am grateful to them.

I convey my thanks to **Dr. Devyani Gangopadhyay**, Dean and Head of the Department, **Dr. Suresh Kuppuswamy**, Design Chair of School of Building and Environment, Department of Architecture and providing me necessary support and details at the right time during the progressive reviews.

I would like to express my sincere and deep sense of gratitude to my Project Internal Guide **Ar.P.R.Divya**, Internal Review member **Ar.Deepa** and External Guide

Ar.Pradeep Varma their guidance, suggestions and constant encouragement which paved the way for the successful completion of my project work.

I wish to express my thanks to all Teaching and Non-teaching staff members of the **Department of Architecture** who were helpful in many ways for the completion of the project.

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Chapter 1 – INTRODUCTION

ISSR (In-Situ Slum Redevelopment) using land as a resource. The “Pradhan Mantri Awas Yojana (Urban) – Housing for All” mission includes “in-situ” slum rehabilitation using land as a resource with private participation to provide houses to eligible slum dwellers. The traditional solution is to demolish slums and then build new houses with planned infrastructure such as water, sewage, and electricity (along new roads) – and then rehouse the slum dwellers.

Urban planning and modification to accommodate the existing population. Rather than evicting slum dwellers, slums should be reinforced. Increasing job opportunities. Slum upgrading addresses serious issues that slum residents face, such as illegality, exclusion, precariousness, and barriers to services, credit, land, social protection for vulnerable populations such as women and children and economic development promotion.

Passive design uses structure, fabric, and form to minimize or eliminate the need for mechanical cooling, heating, ventilation, and lighting. Passive design involves optimizing spatial planning and orientation to monitor solar gains and optimize daylighting, controlling the shape and fabric of the building to promote natural ventilation strategies, and make efficient use of thermal mass to help reduce internal peaks.

Examples of passive design include optimizing spatial planning and orientation to control solar gains and maximize daylighting, manipulating the building form and fabric to facilitate natural ventilation strategies, and making effective use of thermal mass to help reduce peak internal temperatures.

1.1 AIM

- To improve the living conditions of the slum around Chennai central.

1.2 OBJECTIVE

- To be brought out as a self-sustaining society.
- To provide proper housing for the existing population.
- To provide a good outcome with literacy.

1.3 NEED FOR STUDY

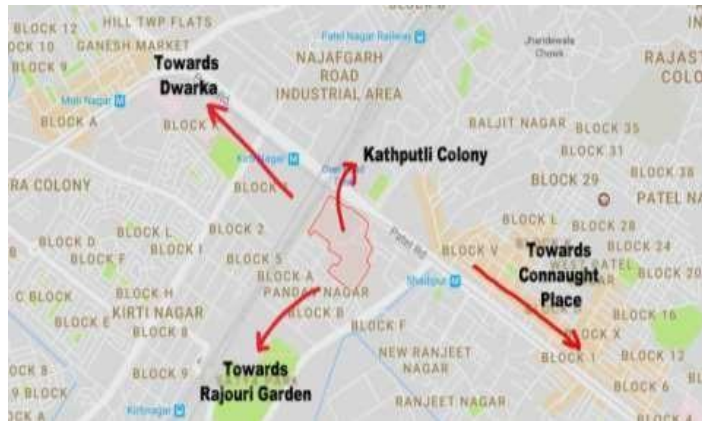
Tamil Nadu, especially Chennai has been a developing state and city for the past 1 decade but specific places are still under development and some are not even noticed at a point . One of the major undeveloped areas is the area around the Chennai central, which is due to the Cooum river, existing side-ways of the existing living conditions. Cooum river had been a major negative for the development because of all the wastage are disposed in the river till date. Due to which the living conditions have been worse in the development areas of the residence part. Which is why the study have been taken so that the best possible design for the development can be proposed. Passive design techniques have become a core aspect of a sustainable architecture. Including passive strategies further will increase the design quality and can alter the perspective of a typical active building.

CHAPTER 2: LITERATURE CASE STUDIES

- Kathpulti colony re-development, Delhi.
- Srinivasapuram slum, Chennai.
- Dharavi slum, Mumbai.
- Panthrapalaya slum, Bangalore.

2.1 KATHPULTI COLONY RE-DEVELOPMENT, DELHI.

- LOCATION :- Shadipur depot area, Delhi, India.
- TOTAL AREA :- 5.2 hectare [52000 sqm]
- 60% of area (31200 sqm) – For redevelopment of colony.
- 40% of area (20800 sqm) – Rehaja developer to built their own commercial and residential buildings.
- Almost 40 year of slum.
- Largest slum of delhi.
- NO. OF FAMILIES :- 2800

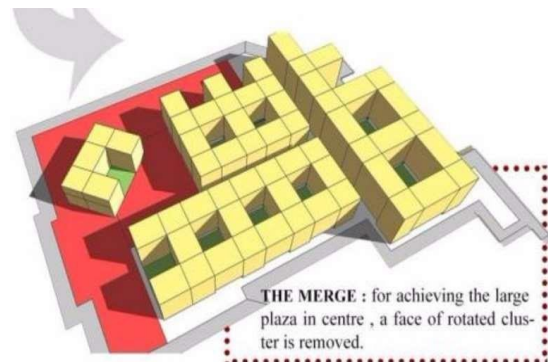
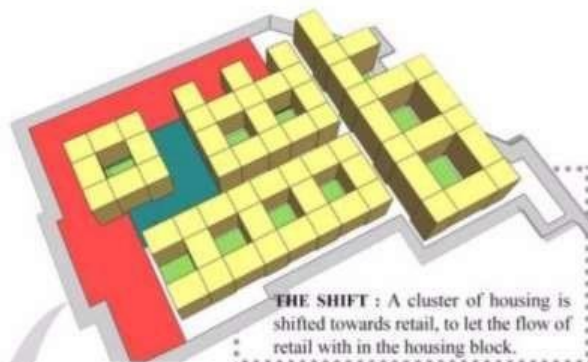


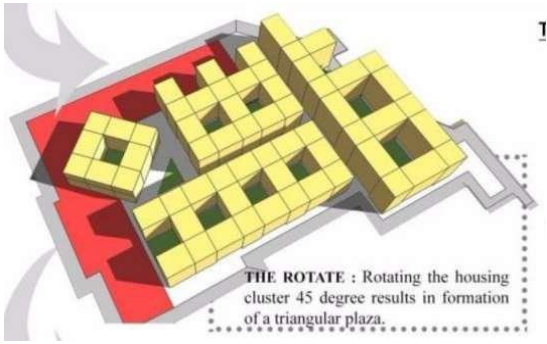
NEEDS FOR THE RE-DEVELOPMENT

- In order to create slum free Delhi.
- To uplift the living conditions of slums.
- Homelessness , degraded living conditions.
- None public space for recreational purpose.
- Streets are narrow.
- Illegal construction.
- The area lack basic utilities such as sewage treatments and proper ventilation.
- The 2800 families of kathputli shall be given on lease of life by providing them the latest modern apartments with full facilities.
- Each apartment shall be over 30 Sqm in size.
- Till the time these structures are built on kathputli colony residents shall be rehabilitated in a Transit camp facility at Anand Parbat barely, 1.8kms away from the site.
- This shall be only for 2-3 yr by which the time building is ready.
- From 2009 after 7 yrs ,DDA started vacating the area.

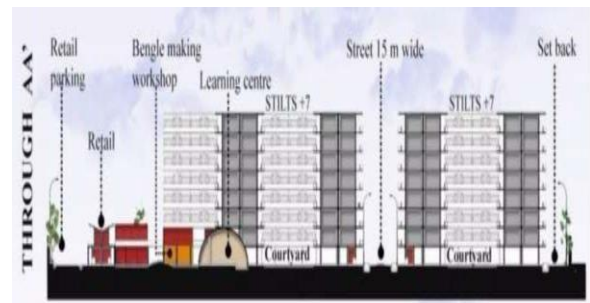


Site allotment:





THE ROTATE : Rotating the housing cluster 45 degree results in formation of a triangular plaza.



2.2 Srinivasapuram slum, Chennai.

Integrated Redevelopment of Foreshore Estate and Srinivasapuram – a research paper on the development of the area.

Shortly mentioning about the abstract that: Tamilnadu Slum Clearance Board (TNSCB) and Tamilnadu Housing Board (TNHB) together hold 51.01 acres of land (23.5 and 27.51 acres respectively) in Srinivasapuram and Foreshore Estate area, facing the Marina Beach. Projected as the “Integrated Development in Foreshore Estate” the scheme envisions malls, luxury hotels and high-end residential complexes for private parties and senior Government officials and resettling the 3576 slums and 2000 housing board tenements. So the area of study would be: Socioeconomic study, Market Analysis, Urban level study, Analysis of existing infrastructure, Neighbourhood plan and land values as the land is in a prime area and is thoroughly underutilized.

Settlement map from 2011 and 2016:

This map clearly depicts that the clustered and populated growth of the particular development. Some increased number of encroachment taking place all along the edges of the srinivasapuram area. The city has an average elevation of 6m and its highest point being 60m with the coastline along Foreshore estate and Srinivasapuram is full of sandy soil.

The temperature over the course of a year varies from 21°C to 38°C and rarely below 20°C. The precipitation is most likely around 1200mm/year with humidity from 39% to 95% over the course of the year and wind speed varies from 0m/s-7m/s.



Transportation	Hospitals	Institutions
Airport : Chennai International Airport: 16km.	Private Hospital: 800m	St.Lazarus Middle School : 850m
Bus Stop: Srinivasapuram Bus Depot: 500m	BSS Hospital: 1.4km	Santhome Higher Secondary School: 1.9km
Railway Station: Light House MRTS Station: 2.9km	Apollo Spectra : 1.6km Billroth Hospital: 1.8km	St.Bed's Anglo Indian Higher Secondary: 1.3km

The above mentioned are the amenities provided and some existing provisions of social infra structures within the area limits. Marina Beach is a natural urban beach in the city of Chennai, India, along the Bay of Bengal. Mylapore is a cultural hub and neighborhood in



the southern part of the city of Chennai. Mylapore is known for its tree-lined avenues. Nochi and Dummig Kuppam are largely populated fishermen residential areas in Chennai, famous for fish markets.

Environmental challenges

- Height restrictions of the buildings on the shore line.
- Reduce the hard pavement.
- No compound wall facing the sea

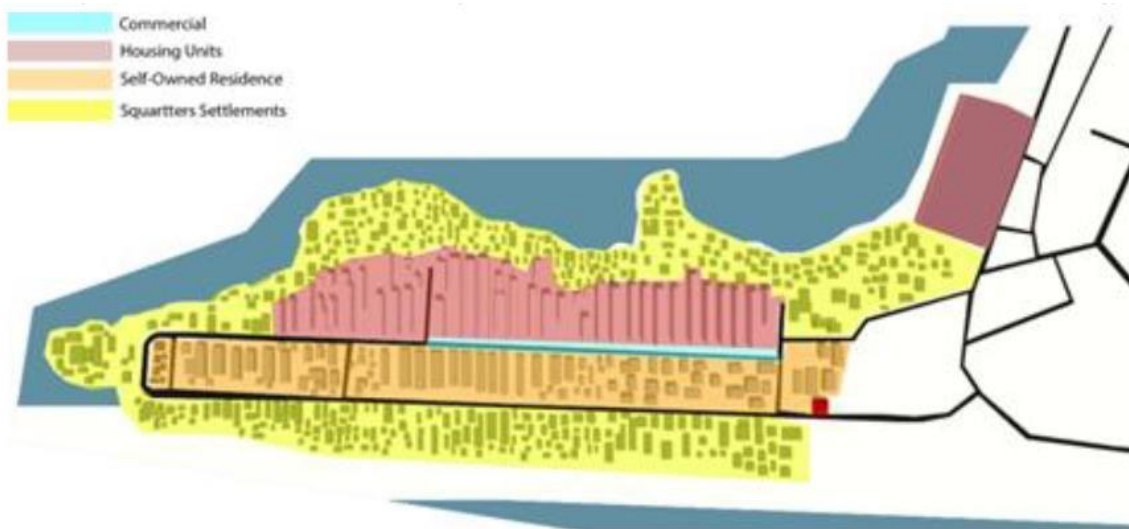
Institutional Challenges

- The non-existence of institutional memory.

- Poor transfer of information.
- Poor documentation of process and implementation.
- Lack of awareness and community participation.
- Lacks timeline in projects.

Design Challenges

- Minimize footprint.
- Incorporate community and educational needs.
- Multidimensional and flexibility.
- Provide the necessary social amenities and infrastructure.
- Prevent further encroachments



Financial Challenges

- Delay of payment due to change in political parties.
- Failure of public-private partnership.
- Less returns after completing the project.

2.3 Impact of Slum Rehabilitation Project in Bangalore City: A Case Study of Pantharapalya:

This study revolves around this research paper on panthrapalya slum region.

The abstract depicts - the planning and implementation of slum rehabilitation project of Pantharapalya slum including its constraints and physical and socio-economic impact.

Seventy six per cent of the slum population live below poverty line and hardly 22 per cent of the slum population has monthly income less than Rs.3000. The housing is the most vulnerable condition and about 14 per cent are still living in kutcha houses and 42 per cent living in semi-pucca houses and rest the 45% of the housing stock are pucca houses. Forty two per households depends on public taps and 18 per cent household do not have access to water supply and only 40 per cent households have individual tap connections. Pantharapalya slum is situated in Ward Number 31 of Bruhath Bangalore Mahanagar Palike. The slum existed for more than 30 years. It occupied in an extent of 20000 sq.mts. It is bounded by Bangalore-Mysore State Highway on eastern side, storm water drain on western and southern sides and 5.5mt wide road on northern side.

The condition of housing was most vulnerable and the majority of the people lived in kutcha and semi-pucca houses. The situation in terms of socio-economic condition and physical infrastructure namely water supply and sanitation were in vulnerable conditions. People were erected houses according to their wishes and there was no security of land tenure. Pantharpalya slum was selected for in-situ rehabilitation with a funding from Jawaharlal Nehru National Urban Renewal Mission project under centrally sponsored scheme. In the beginning, it was planned for construction of 896 dwelling units in 24 blocks of 32 dwelling units each; later, the project was re-designed for construction of 1088 dwelling units to cover 34 blocks.





The residential land use was increased from 34.5% to 43.5%. Open spaces was reduced from 8% to 3%, civic amenities was reduced from 19% to 9%. The dwelling unit density was increased from 410 dwelling units/ hectare to 516 dwelling units/ hectare.

The provision of openings has been to ensure adequate lighting and ventilation, which are some of the factors encouraging a high degree of human activity outdoors, including cooking, washing and sleeping.



Carpet Area	Dimension in meters	Area in Sq.mt	As per Building Bye-laws in Sq.mts	IS888 Code for LIG Housing (Sq.mts)
Living	3.8x2.7	9.83	8.05	9.0
Room	2.85x2.30	6.55	8.05	6.50
Kitchen	1.50x3.05	4.57	5.05	3.30
Water closet	1.2x0.90	1.085	1.15	0.90
Bath	1.2x1.0	1.20	1.25	1.20
Total		25.05		

These are the satisfaction levels of the dwelling units with the quality of improvement in their life.

BASIC INFRASTRUCTURE

1.WATER SUPPLY

There are two tube wells, 68 sumps in 34 blocks of 6000 litre capacity each, 02,7.5 HP pumps. Also, water is drawn from public taps as well; there is no accountability for the quantity of water consumed by the each of the dwelling units.

2.ENVIRONMENT SCHEDULE

Garbage cleared by BBMP twice in a week. Wastes are being dumped in open drains, setback area and storm water drains as well. There is no provision of community dustbins in the locality.

Functional Space	Satisfaction levels (Per cent)
Satisfaction of carpet area (25.03 sq.mt)	90% of the residents were satisfied with the carpet area. 10% expressed desertification
Satisfaction of quality of dwelling	19% satisfied with quality of dwelling units 81% not satisfied with quality of dwelling unit
Satisfaction in floor level	56% of the households expressed satisfaction in residing at different floor levels. 44% expressed dissatisfaction on top floors
Ownership/ rentals	63% of the dwelling units occupied by allottees 37% of the houses are rented or leased
Mobility	66% of allottees very much desirous stay in the same area. 34% expressed to move out from this place
Difficulty of upper floors	59% found no difficulty 41% had expressed difficulty in upper floors.

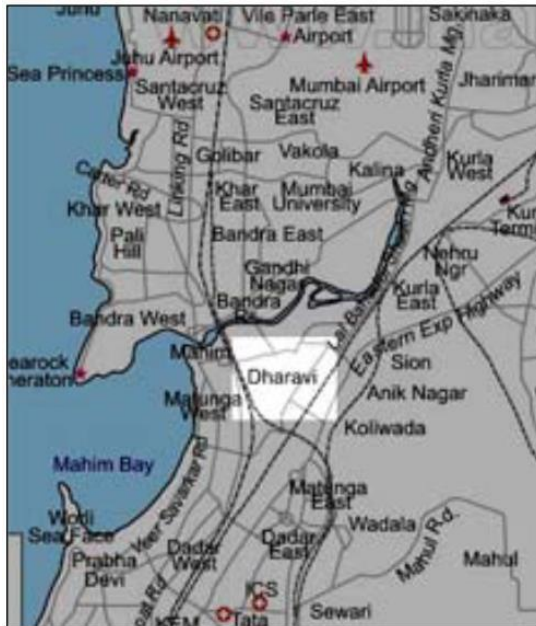
2.4 Dharavi, Mumbai:

The Dharavi slum in Mumbai is a sprawling 525-acre mosaic of matchbox houses with rickety roofs and questionable sanitation housing over one million residents in the Centre of India's glitzy financial capital of Mumbai. Dharavi's residents, like most slum dwellers around the world, live in illegal housing units lacking basic amenities and suffer from social exclusion.

Despite the poor living conditions in the Dharavi slum, it is an urban space unlike any other, with truly unique characteristics. While the slum is essentially a collection of cramped shanties, the land on which it sits has an estimated value of over \$1.3 billion due to its prime location at the intersection of two major railway lines and proximity to Mumbai's central business district.

This fact has not gone unnoticed by real estate sharks, who have been lobbying to take over a piece of Dharavi land for private real estate development. But what truly makes Dharavi iconic is that the slum is a thriving microcosm of small industries like pottery, leather products, recycled products, baked items and knock-off apparel, which generate an annual turnover of over \$650 million. Amidst the poor living conditions, constant political tugs-of-war and neglect, Dharavi has emerged as a shining example of human enterprise. The slum also contains 28 temples, 11 mosques, 6 churches, 50 banks and 60 government schools. It even hosts its own mobile design museum, where residents showcase items produced in the slum, emphasizing the fact that Dharavi's residents have been able to create a good community life for themselves despite neglect from the local government. The government's attempts at redevelopment have been ongoing since 1971. However, even after years of drafting and redrafting plans, only one small sector of five of the slum has been redeveloped, with no sign of further developments in the area.

Current Dharavi residents migrated to Mumbai from different parts of the country around 1958, when several factories were set up in the area. Traders and craftsmen set up small residential colonies by trade—potters, leather workers, tanners and embroidery workers. These settlement patterns persist to this day in the slum.



Some health factors: Poor sanitation is also a major problem in slums. Many of Dharavi's residents live in the highly industrial parts of the slums where waste water from leather tanning and cloth dyes flows in the streets, exposing the residents to health hazards like diarrhoea, cholera, malaria and parasitic infections.

Residents are often excluded from a clean water supply, which both increases their risk of contracting diarrheal diseases and also poses a serious threat of cross contamination due to illegal tapping of the city's water pipes. Some efforts have been made by the

government in the last five years to provide tap water, electricity and pipe gas connections to households.

A lack of clean toilets still remains an issue: because many houses do not have attached bathrooms, roughly ten houses share one ill-maintained communal bathroom. The practice of open defecation is common and presents health and safety issues like diarrhoea, enteropathy and even death.



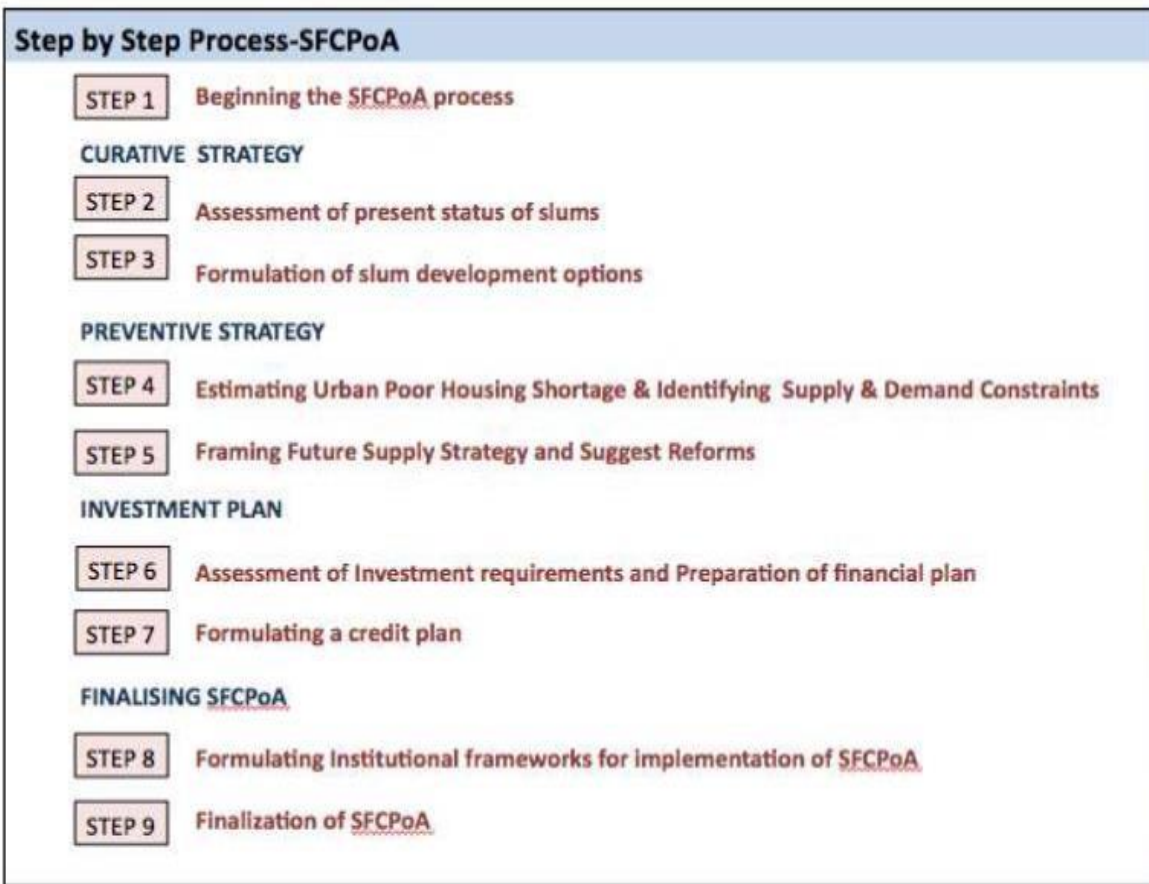
COMPARATIVE ANALYSIS AND INFERENCE:

S.NO	KATPULTI COLONY	SRINIVASAPURAM SLUM	PANTHRAPALAYA SLUM	DHARAVI SLUM
LOCATION	Delhi	Chennai	Bangalore	Mumbai
SLUM EXTENT	52000 Sq.m	94000 Sq.m	20000 Sq.m	500 acre
DESIGN INTENT	To promote slum free space and uplifting living conditions	Here it is already a slum space with more number encroachment already taken place, to revitalize the existing conditions to a better living standards	To provide basic infrastructure for people residing in low living standards by providing dwelling units and infrastructures.	To provide more features within the slum to overcome the existing deteriorating conditions of Dharavi
PROJECT STATUS AND REASONS	The project is partially successful were some parts are still under development but on a over-all stage it is still at a pending stage.	The proposal is still under process of continuous changes due to the site conditions varying from risk factors and other aspects redevelopment factors.	This proposal is a successful project were the dwelling units are under maximum occupancy and used to its maximum	Still under negotiation because Dharavi's residents have always opposed the proposal for high-rise tower construction, believing that such construction would jeopardize their communal business structures.



CHAPTER 3 : Standards and regulations for slum re-settlement:

- The State Government has formally increased the floor space index (FSI) for slum rehabilitation projects from 2.5 to a maximum of 4.
- As per the notification, approvals for redevelopment projects with higher tenement density will be cleared by the state government.
- For more information on the guidelines for the further proceedings the “Guidelines for Preparation of Slum Free City Plan of Action” from period 2013 – 2022 by Rajiv Awas Yojana Ministry of Housing & Urban Poverty Alleviation Government of India.
- The entire process can be summed up in the following simple nine steps illustrated in the chart and explained in detail in the following sections:



3.1 The do's and don'ts of citywide slum upgrading :

□ Do's:

1. Include slums in the city's overall development plans.
2. Develop strategies to manage new slum formation.
3. Invest in existing physical, social and organizational resources in slum settlements.
4. Combine slum upgrading with employment generation and local economic development.
5. Include a sustainability plan as part of the overall programme and institutionalize it.
6. Design improvements according to the specific needs and priorities of settlements and also should be affordable.
7. Design and negotiate relocation plans only when absolutely necessary and with the agreement of those concerned.
8. Plan with, the slum communities at all stages of the upgrading process.

□ Don'ts:

1. Treat slum upgrading as a special issue outside normal city development planning.
2. Assume upgrading the slums of today will be the end of slum formation.
3. Consider slum upgrading solely as a physical issue
4. Impose unrealistic standards and regulations
5. Underestimate the importance of poor communities in the design, implementation and maintenance of their neighbor-hoods.
6. Assume that upgraded settlements will automatically sustain themselves.
7. Provide unaffordable infrastructure and services.
8. Assume relocation is the best alternative for poor people living in bad housing conditions.

3.2 Basic amenities and programme for the slum resettlement:

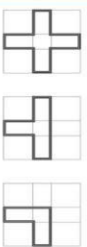
- Under the scheme to provide in the selected slum five basic amenities. Restrooms, tap/tube wells, street lights, pathways and drainages.
- These were the basic amenities for an initial development in the slum dwelling quality.
- Firstly the residents need a proper:
 1. A dwelling unit with all the basic amenities within their boundary.
 2. Employment factors within the allotted area.
 3. Educational factors for the students present in the resettlement area.
 4. Recreational spaces for the old aged and public gathering spaces for the general public access.
 5. An association acting as a multi purpose space for the weekends to turn into a market and general gathering or meeting space other than the weekends.
 6. In total a self sustaining society with all the basic needs for a normal human being to increase their life standards.

CHAPTER 4: AREA PROGRAMMING AND CONCEPT

PROGRAMME AND AREA STATEMENT

PROGRAMME	AREA IN SQM	QUANTITY	TOTAL AREA
Dwelling units (single bedroom) 1. Hall 2. Kitchen 3. Bedroom 4. Restroom	35	200	7000 SQM
*Double bedroom Association house 1. Lobby 2. Restrooms 3. Activity space 4. Auditorium 5. Exhibition space 6. Gym	45 948	320 1	14400 SQM 948 SQM
Market space 1. Storage 2. Shopping space 3. Restrooms 4. Counters	5000	1	5000 SQM
Learning space 1. Lobby 2. Reception 3. Classrooms 4. Leisure space 5. Office space 6. Printing space	2559	1	2559 SQM
Library 1. Staffrooms 2. Restrooms 3. Reading space 4. Electric room	1552	1	1552 SQM
		Total built up area	Total - 31459 sqm

Zoning and concept



Transformation leads to more organised infrastructure

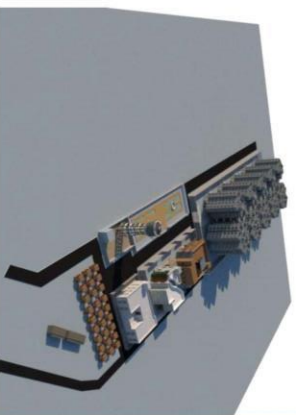
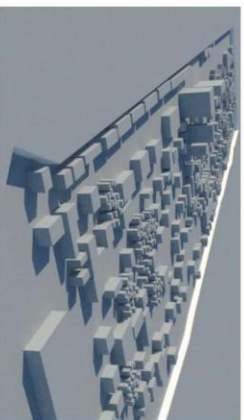
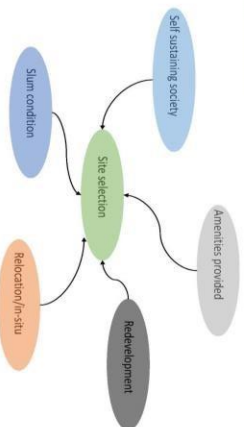
Transformation :

The principle that an **architectural concept**, structure, or organisation can be altered through a series of discrete manipulations and permutations in response to a specific context or set of conditions without a loss of identity or concept.

It is an opportunity of doing more and better with what is already existing.



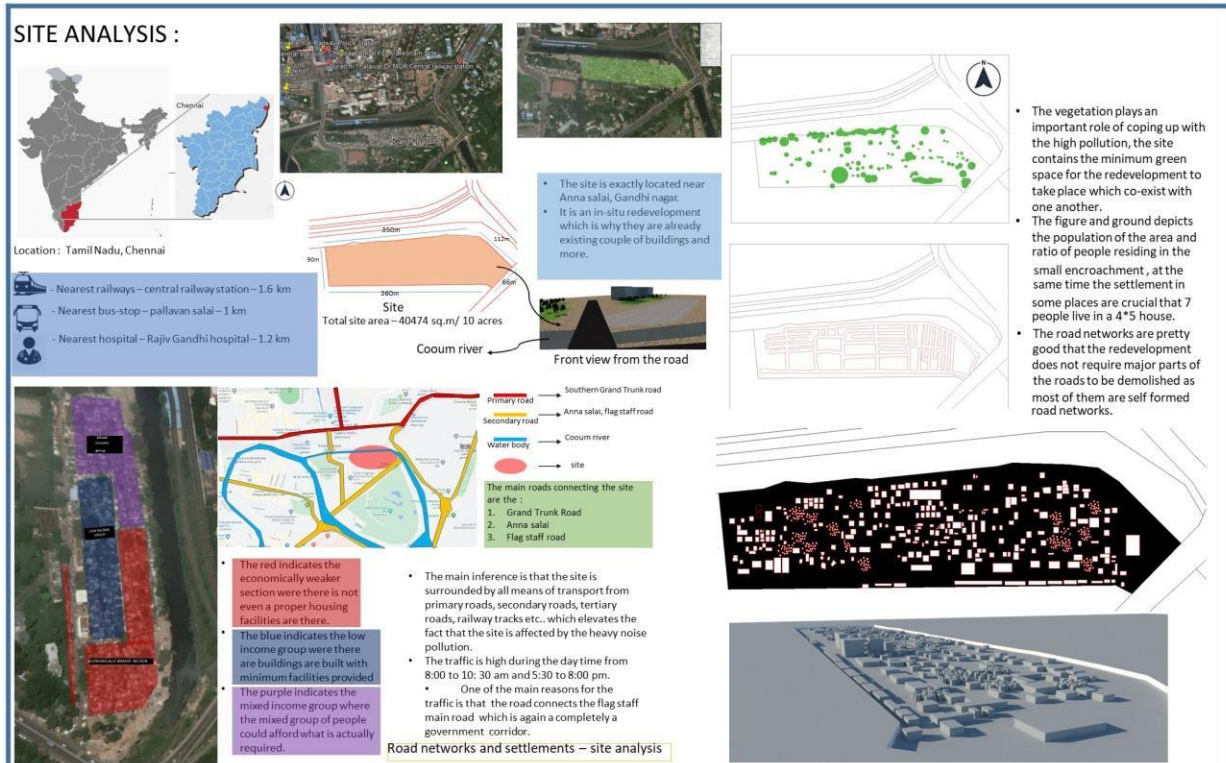
Rough present condition of the site which completely un-organised
Under certain conditions



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CHAPTER 5 : SITE ANALYSIS



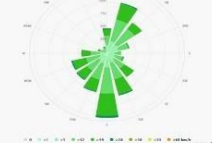
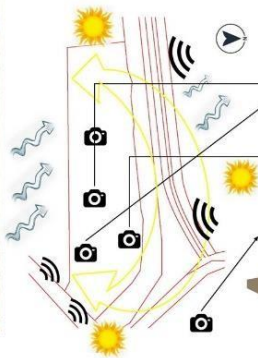
SITE ANALYSIS

EXISTING SITE CONDITIONS:

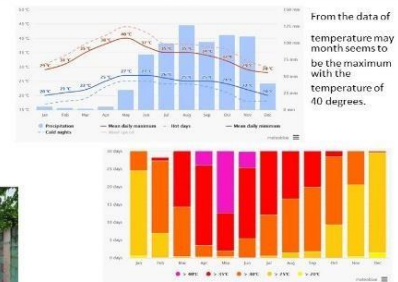
SITE AREA: 10 ACRES

EXISTING POPULATION: 2000 PEOPLE

The existing site conditions are much worse than the past and is degrading at a fastening pace. The site needs a proper passive technique to avoid the regular congestion and discomfort.



The predominant wind direction is clearly known : From south east to north west in summer and vice versa in winter.



The data reveals that may month till the mid temperature is maintained to a level and after the mid of may the temperature raises from 40 degrees.

Shadow analysis:



Climatic and shadow – site analysis



Strengths

- The site is located in a core area with all the necessary amenities required.
- Natural vegetation is good, i.e., the existing trees are more in number.
- Road networks are already planned.

Weaknesses

- The site is heavily polluted to the maximum.
- Roads at some points are narrow along the drain lines making the accessibility tough.
- Majority of the buildings have no access to open spaces.

Opportunities

- Housing can be clearly allotted due to the existing job opportunities around the site (as requested by the people).
- Market space can be formed as a new weekly market sessions.

Threats

- Young people are more exposed to the scenarios like robbery, drugs and more.
- Structurally weak built structures are more often seen during the site visit.
- Heavily polluted regions have risks of spreading diseases.

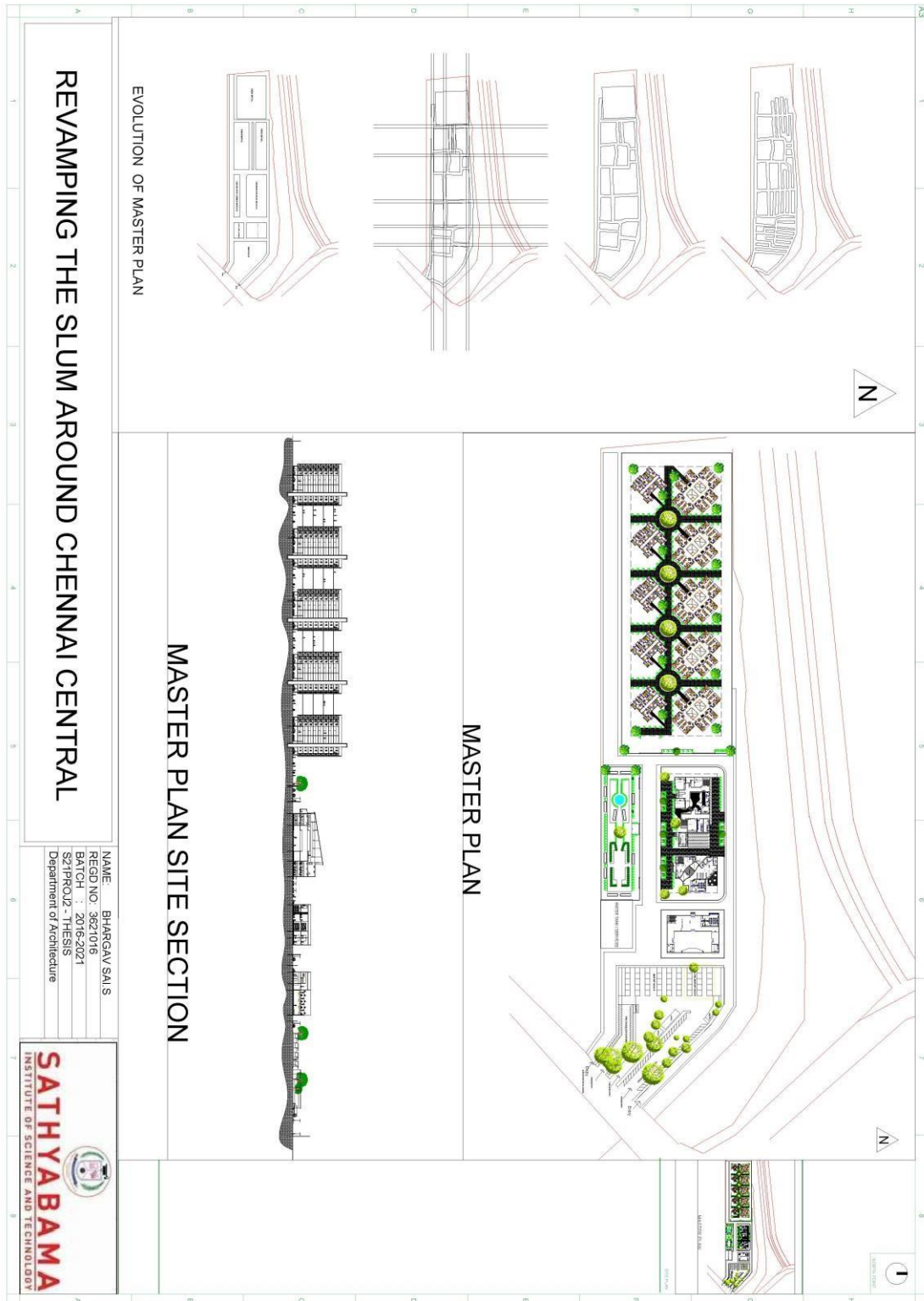
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CHAPTER 6 : DRAWINGS

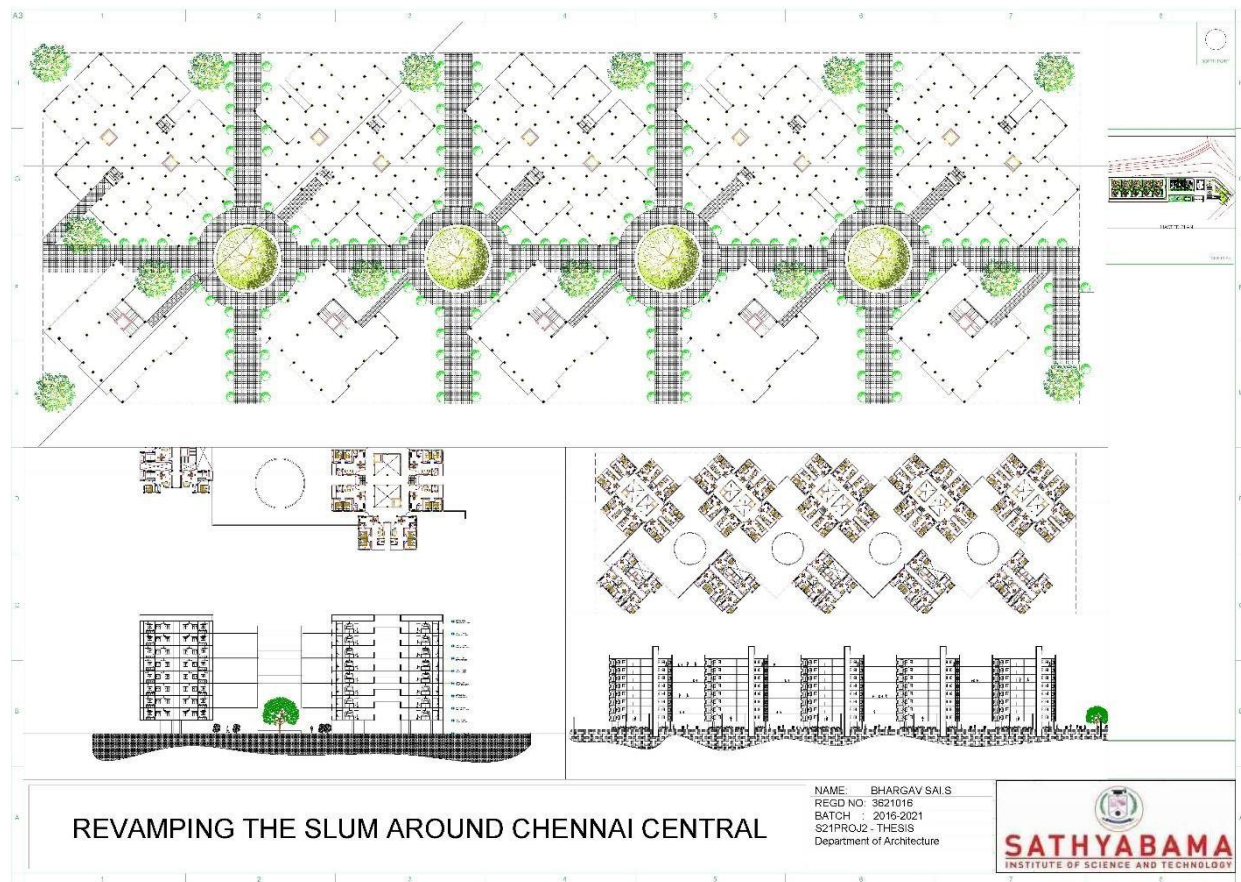
6.1: Master plan and evolution



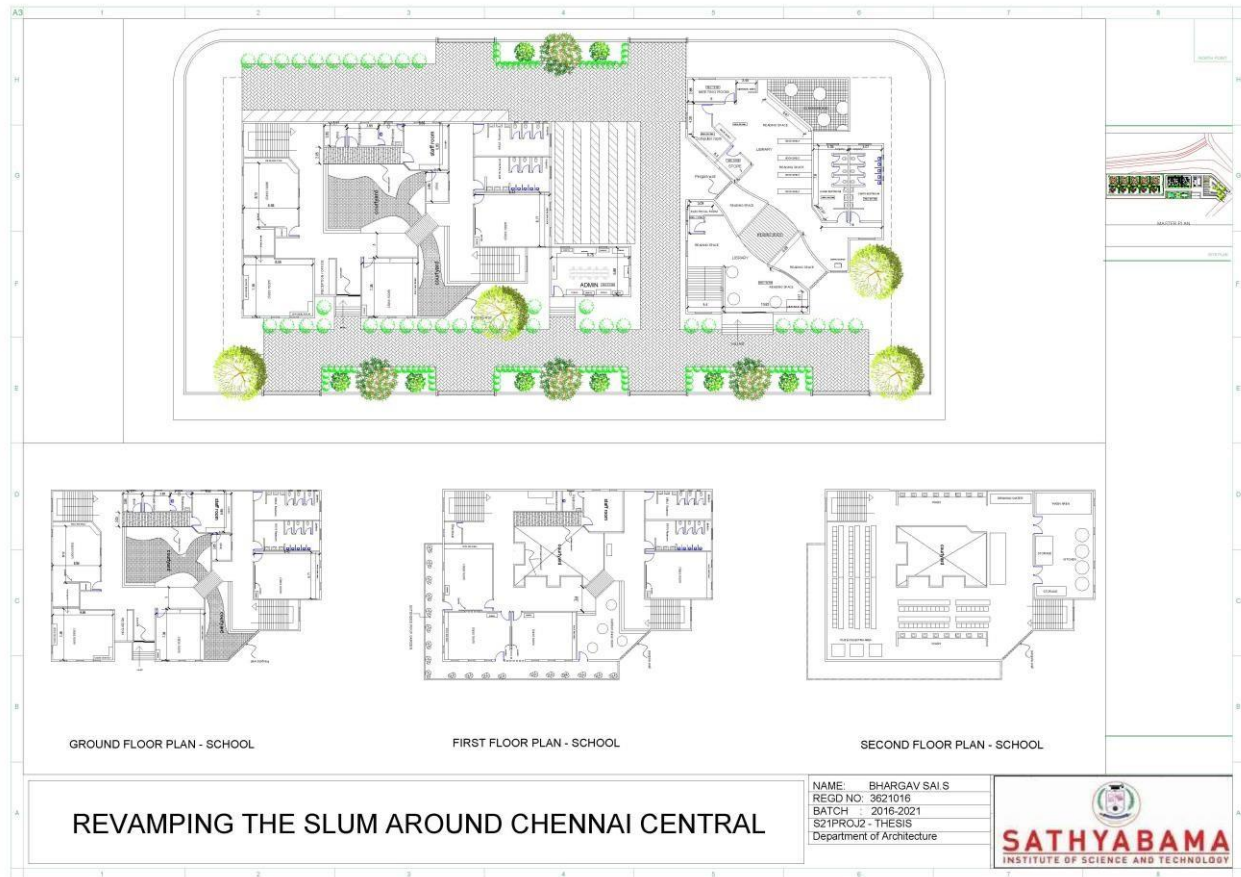
6.2: Residential plan and cluster arrangement



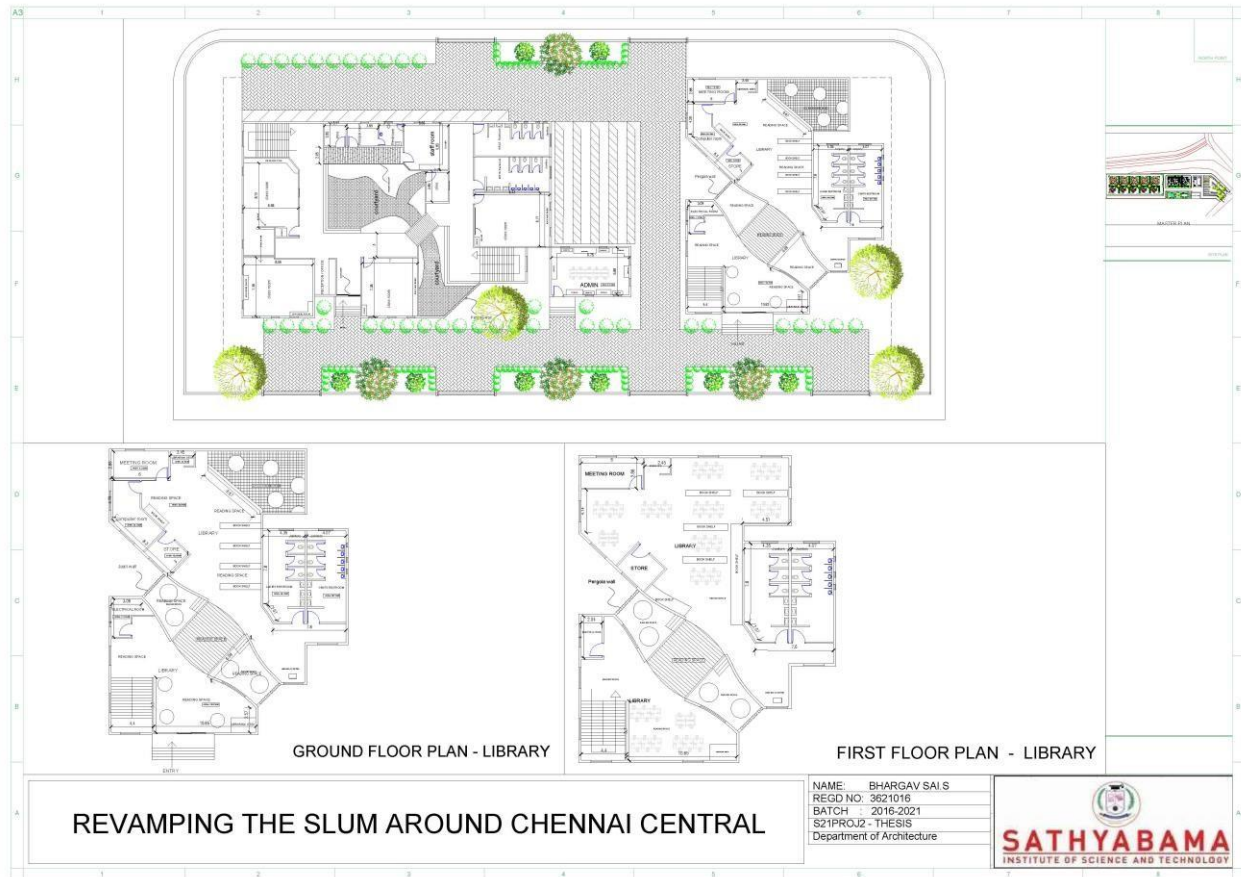
6.3: Column Layout and Sections



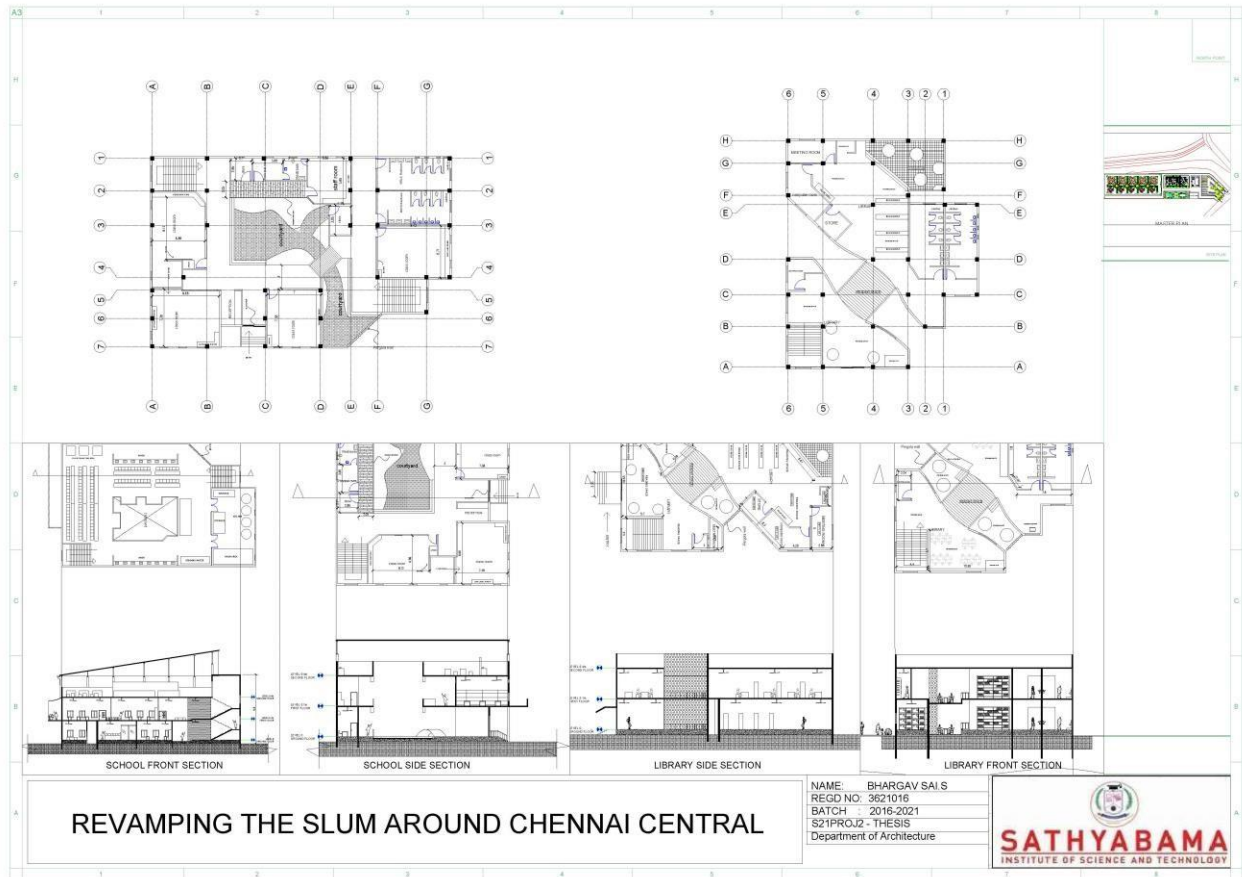
6.4: School Floor plans



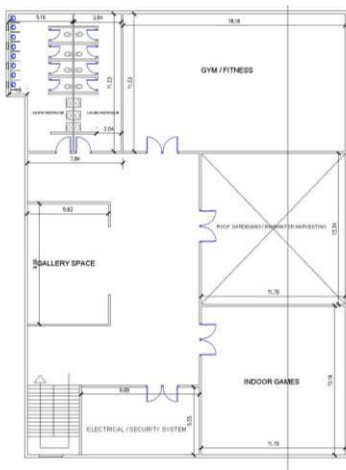
6.5: Library floor plans



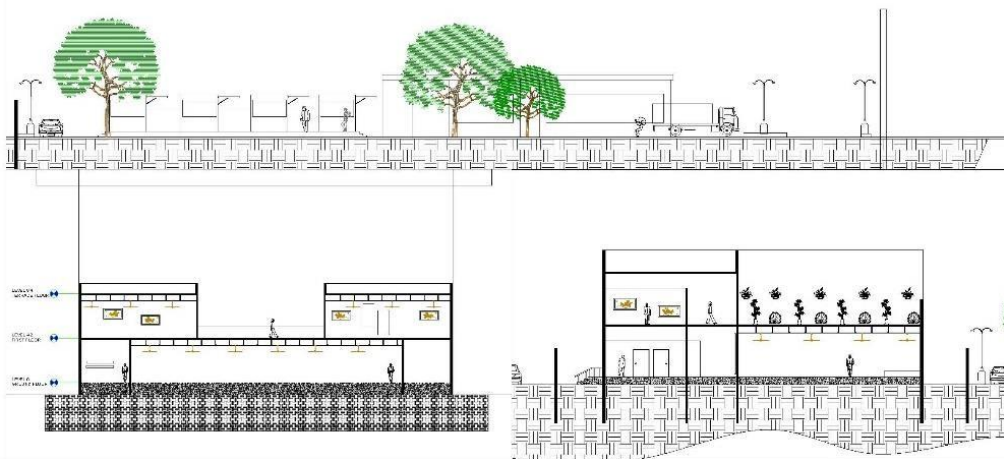
6.6: Column Layout & Sections of school and library:



6.7: Floor plan of association house and market area



6.8: sections of association and market area:



7. ELEVATIONS



Residential side elevation



Residential front elevation



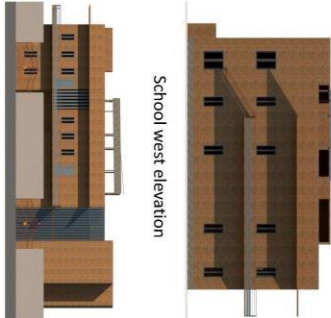
Library east elevation



Library front elevation



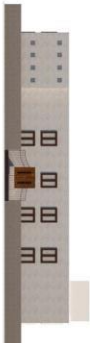
Library rear elevation



School west elevation



School front elevation



Association front elevation



Association rear elevation



School east elevation

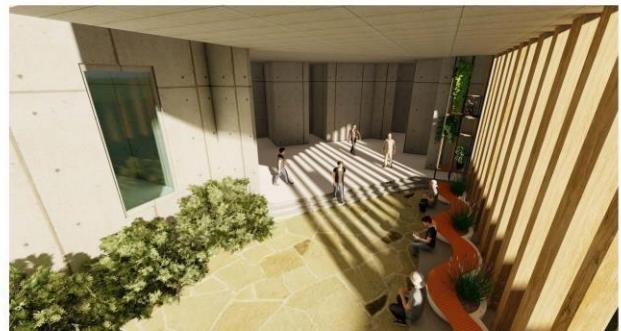
REVAMPING THE COOUM SLUM AROUND CHENNAI CENTRAL

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7. MODEL VIEWS:

RENDERS



RENDERS



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