

SILK PARK FOR ARANI WEAVERS'
(A Comprehensive Approach Towards Creating an Inclusive Society)

A THESIS

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

By

KIRUBA SHANKARI M
(39210041)



DEPARTMENT OF ARCHITECTURE
SCHOOL OF BUILDING AND ENVIRONMENT

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY) Accredited

With Grade "A" by NAAC

JEPPIAAR NAGAR, RAJIV GANDHI SALAI,
CHENNAI - 600 119

MAY 2024



SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited "A++" Grade by NAAC | 12B Status by UGC | Approved by AICTE

www.sathyabama.ac.in

DEPARTMENT OF ARCHITECTURE

BONAFIDE CERTIFICATE

This is to certify that Thesis Report is the bonafide work of **Kiruba Shankari M (39210041)** who carried out the Thesis entitled "**Silk Park for Arani Weavers**" under our supervision from December 2023 to May 2024.

Internal Guide
Ar. Esther Kiruba
Jebakumar Clifford

Internal Review Member

Ar. Surya Rajkumar

Dean and Head of the Department

Dr. DEVYANI GANGOPADHYAY

External Guide

Ar. Kishore Panikkar

Submitted for Viva voce Examination held on **24-05-2024**

Internal Examiner

External Examiner

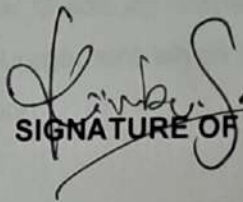
DECLARATION

I, **KIRUBA SHANKARI M** hereby declare that the Thesis Report entitled "Silk Park for Arani Weavers" done by me under the guidance of **Ar. Esther Kiruba Jebakumar Clifford** (Guide), **Ar.Sanghavi.V.V** (Internal Review Member) and **Ar.Hariesh K. Sankaran** (External Guide) Sathyabama Institute of Science and Technology is submitted in partial fulfillment of the requirements for the award of Bachelor of Architecture Degree.

DATE:

24/05/24

PLACE: Chennai



SIGNATURE OF THE CANDIDATE

ACKNOWLEDGEMENT

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 Thesis and for completing it successfully. I am grateful to them.

I convey my thanks to **Dr.Devyani Gangopadhyay**, Dean and Head of the Department, School of Building and Environment, Our Design Chair **Ar.Sarath C.Kanth**, Thesis Coordinator **Ar.Mohana Gopiraj** for 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 Thesis Internal guide **Ar.Esther Kiruba Jebakumar Clifford**, Internal Review member **Ar.Surya Rajkumar** and External Guide **Ar.Kishore Panikkar** their guidance, suggestions and constant encouragement which paved the way for the successful completion of my Thesis work.

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

KIRUBA SHANKARI M

THESIS SYNOPSIS

The vibrant history of handloom weaving is on the brink of oblivion amid a growing textile industry. This study descends into the issues confronted by handloom weavers in Arni, India, as a result of market dynamics and the introduction of power loom technology. The objective of the research is to promote inclusivity among weavers and develop a strategic architectural design for a silk park in a suburban area with minimal intervention by conducting on-site inspections and interviews, addressing working conditions and health issues wisely. Thus the project aims to revitalize traditional weaving traditions, increase economic growth, and improve the well-being of Arni weavers by potentially shifting the dyeing units to the outskirts, thus fostering a more resilient environment.

TABLE OF CONTENTS

CHAPTER No.	TITLE	PAGE No.
	THESIS SYNOPSIS	v
	LIST OF FIGURES	viii
	LIST OF PLATES	x
1	INTRODUCTION	1
1.1	INTRODUCTION	1
1.2	NEED OF THE PROJECT	1
1.3	AIM AND OBJECTIVE	2
1.4	METHODOLOGY	2
2	LITERATURE CASE STUDIES	4
2.1	SYNERGY LIFESTYLES KARUR	4
2.2	KARUR TEXTILE PARK	6
2.3	KANCHIPURAM SILK PARK	7
2.4	DAKSHINACHITRA ECR	8
3	DATA COLLECTION AND STANDARDS	24
4	SITE STUDY AND ANALYSIS	11
4.1	SITE SELECTION	24
4.2	SITE JUSTIFICATION	24
4.3	SITE ANALYSIS	25
5	ARCHITECTURAL DESIGN	29
5.1	SPATIAL REQUIREMENTS	29

5.2	CONCEPT	33
5.3	DETAILED DRAWINGS	33
6	REFERENCES	45

LIST OF FIGURES

FIGURE No.	TITLE	PAGE No.
1.1	Map showing Arni's location	1
1.2	Methodology Chart	3
3.1	No. of Looms operating in Arni Clusters	4
	Source: Detailed Project Report on Proposed Silk Park	
3.2	Study Chart 1	14
3.3	Study Chart 2	15
3.4	Study Chart 3	15
3.5	Various chart showing Survey Responses	15
3.6	Planning norms as per TNCDBR for Setbacks	17
3.7	Planning norms as per TNCDBR for Cottage Industries	17
3.8	Planning norms as per TNCDBR – Sanitary Fittings	18
3.9	Corridor Width	18
3.10	Lighting	18
3.11	Roof Type	19
3.12	Loading and Unloading	19
3.13	Employee flow	19
3.14	Spatial Layout	20
3.15	Turning Radius	20
3.16	Building Plan	21
3.17	Basement Plan	21
3.18	Pit Loom Standard	22
3.19	Machineries Standards	23
4.1	Site views	25
4.2	Contour Mapping	28
5.1	Area requirements	29
5.2	Green roofing system	30
5.3	Master Plan	37
5.4	Admin Plan	38

5.5	Views and Sections	39
5.6	Museum and Food Court Plan	39
5.7	Site Section	40
5.8	Connecting Bridge Isometric Section	40
5.9	Section	40
5.10	Isometric Section showing Green Roofs	41
5.11	Section showing Roofing and Thermal Quality	41
5.12	Manufacturing and Production Unit GF Plan	42
5.13	Manufacturing and Production Unit FF Plan	43
5.14	Manufacturing and Production Unit SF Plan	44

LIST OF PLATES

PLATE No.	TITLE	PAGE No.
2.1	Synergy Lifestyles Case Study	5
2.2	Karur Textile Park Case Study	6
2.3	Kanchipuram Silk Park Case Study	7
2.4	DakshinaChitra Case Study	8
2.5	Comparison Table of Case Studies	9
2.6	Comparison Study - Inferences	10
3.1	Study conducted in and around the town of Arni Silk Weaving Clusters	13
3.2	Process of Weaving	14
3.3	Standards	22
4.1	Site Feasibility	24
4.2	Site Analysis	26
5.1	SDGs	34
5.2	SDGs 6,11	34
5.3	SDGs 8, 12	35
5.4	SDG 9	35
5.5	SDG 15	36
5.6	Site Zoning and Vegetation	36

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Arni is a town in Thiruvannamalai District known for its silk sarees and rice varieties. Though the primary economic activity in and around Arni and its adjoining villages is weaving, it aims for recognition akin to Kanchipuram. The rise of power looms raises concerns about the authenticity of traditional handloom silk sarees nationwide.

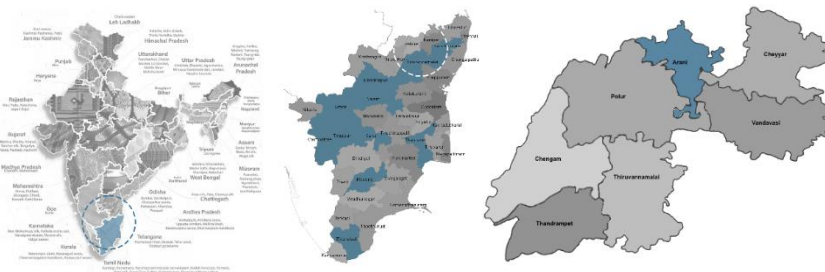


Figure 1.1. Map showing Arni's location

In addition to the problems that handloom weavers confront in maintaining their market presence, the environmental effect of dyeing textiles is another factor that must be noted. Therefore, it is imperative to address these issues and strive to create a resilient environment with an efficient spatial layout, lighting, and ventilation conducive to long working hours, in addition to address other health issues such as eye strain and body pains caused by these extended periods of work, in order to foster an inclusive weavers' society. Furthermore, the necessity to relocate dyeing units to the outskirts of cities marks a proactive move toward developing a more resilient environment within the textile industry.

1.2 NEED OF THE PROJECT

The Dr. Kalaignar Karunanidhi Centenary Handloom Park at Arani holds a promising scope, encompassing employment generation for local weavers and artisans, skill development, market

expansion, cultural preservation, women's empowerment, research and innovation, cultural exchange, and a tribute to Dr. M. Karunanidhi's legacy and dedication to cultural heritage.

1.3 AIM AND OBJECTIVE

This project aims to create a multifaceted facility that weaves together the threads of history, craftsmanship, and skill development, nurturing the revival of handloom traditions.

Spaces are designed to work harmoniously, culminating in a holistic environment that educates, inspires, and empowers.

- Employment Generation: Creating jobs for local weavers and artisans.
- Skill Development: Enhancing weavers' capabilities and promoting sustainable practices.
- Market Expansion: Accessing wider markets and increasing competitiveness.
- Cultural Preservation: Nurturing traditional handloom weaving techniques and designs.
- Women's Empowerment: Providing economic opportunities and financial independence.
- Research and Innovation: Supporting product development and entrepreneurship.
- Cultural Exchange: Attracting tourists and promoting Indian handloom textiles.

1.4 METHODOLOGY

To support the design philosophy, a multidimensional research technique will be used to get a comprehensive knowledge of the Weaver's Community. This will include a literature analysis that delves into the community's history, traditions, and socioeconomic reality, as well as on-site field research to examine workplace layouts and conduct interviews with weavers to learn about their requirements and concerns, aimed at fulfilling the imperative requirement for a silk park equipped with necessary facilities. Finally, the study will be expanded by examining effective architectural interventions aimed to assist or rejuvenate weaver communities across the world.

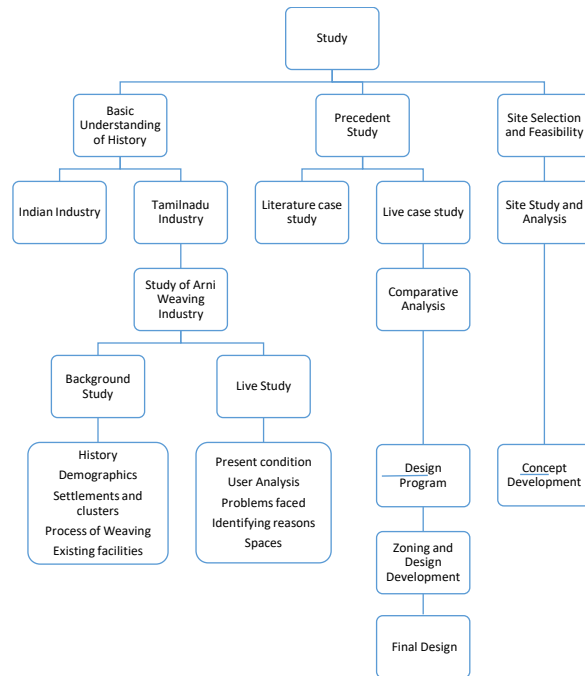


Figure 2.2. Methodology Chart

CHAPTER 2

LITERATURE CASE STUDIES

2.1 SYNERGY LIFESTYLES, KARUR

Location - Karur, Tamil Nadu, India

Architect- SJK Architects

Building type- Home Textile Industry

Completion – July 2016

CASE STUDY

SYNERGY LIFESTYLES – KIRURU

Synergy Lifestyles is a home building industry chain operating in various home ownership models, from a semi-detached house to a round barn of a public market. The design of the project is a response to the growing demand for a new type of housing in the area.



The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

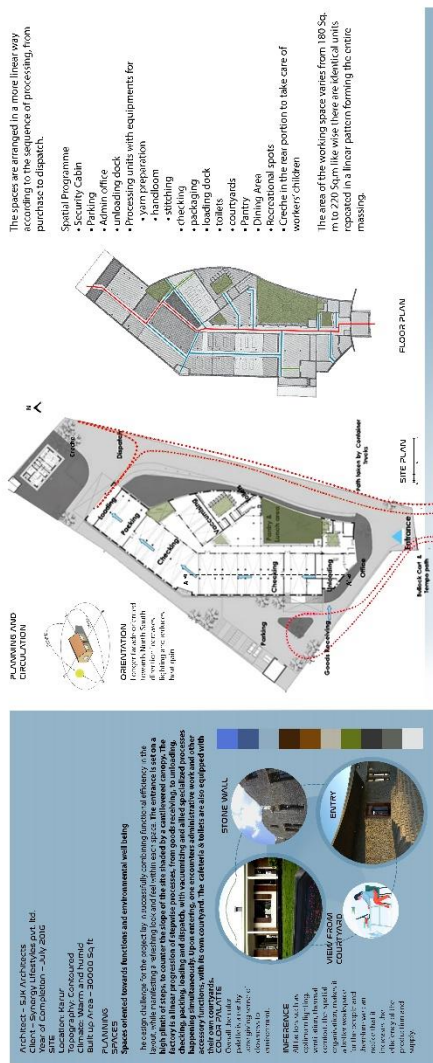
The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

The project is a response to the growing demand for a new type of housing in the area. The design of the project is a response to the growing demand for a new type of housing in the area.

Plate 2.1: Synergy Lifestyles Case Study



HANDBLOOM PARK – ALONE TOGETHER

392/10041, KIRUBA SHANKARI M
SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY

2.2 KARUR TEXTILE PARK – ATLAS EXPORTS

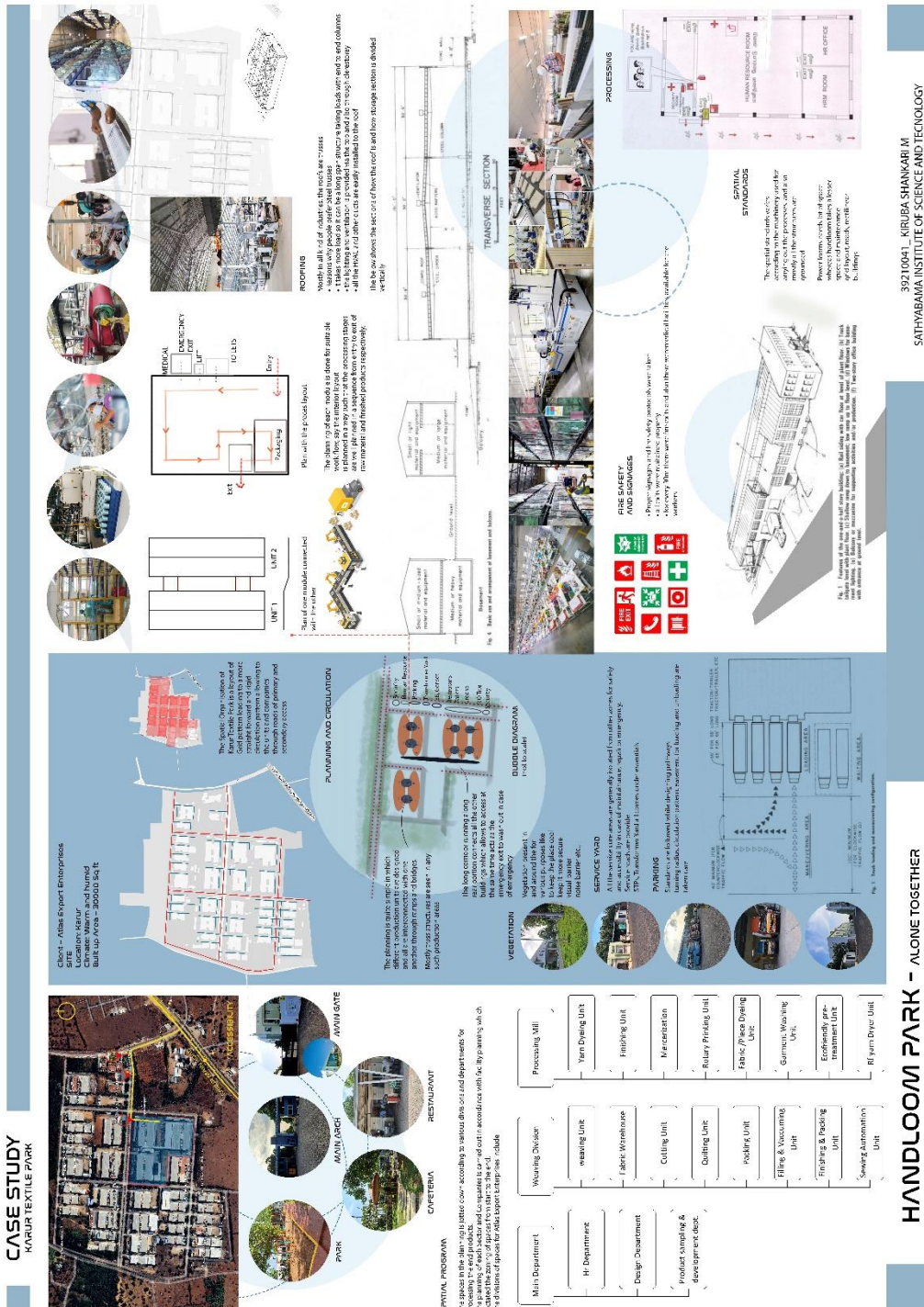


Plate 2.2: Karur Textile Park Case Study

2.3 KANCHIPURAM SILK PARK

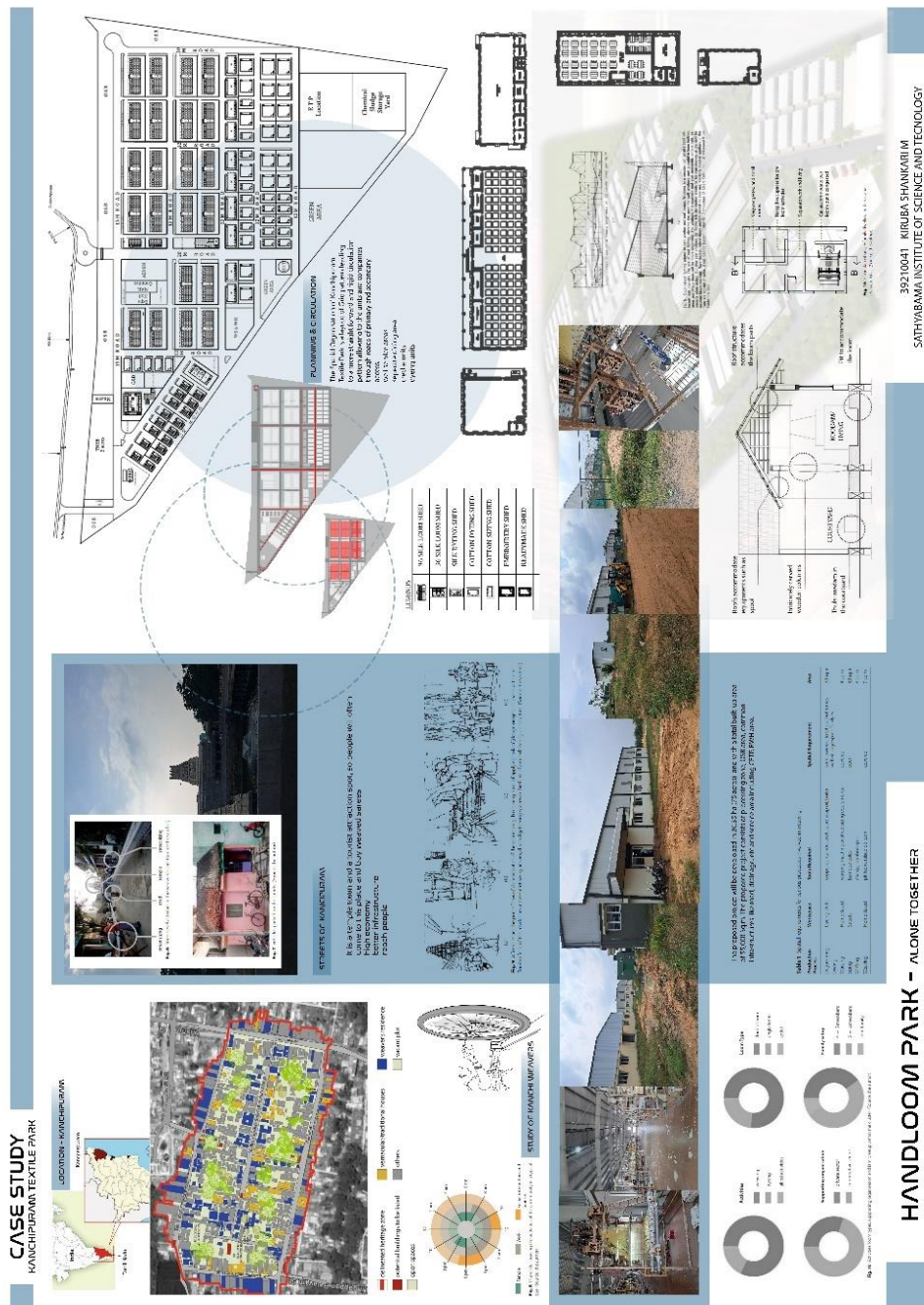


Plate 2.3: Kanchipuram Silk Park Case Study

2.4 DAKSHINACHITRA



Plate 2.4: DakshinaChitra Case Study

2.5 COMPARITIVE STUDY AND INFERENCES

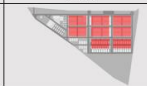
	Name	Dakshina Chitra Weaver's House	Cooptex	Kanchipuram Silk Park	Pockampally Handloom Park	Kurur Textile Park	Synergy Lifestyle	Tex Valley (Mall)
	Typology	Croco-cuboid mansion	Rural Shop	Manufacturing Unit	Manufacturing Unit	Manufacturing Unit	Home Textile Industry	Integrated textile wholesale and retail market
	Location	Muthukadu, ECR, Chennai	Pantheon Road, Egmore, Chennai, Tamil Nadu	RM2+47V, RT3B, Vikasadi Kall Street, Kanchipuram	Pockampally, Nalgonda District, Telangana	Talugatti, Kurur	Kurur, Tamil Nadu	NH - 47, Coimbatore - Bangalore Highway, Erode
Project Details	Architect	Lavin Baker, Bony Karickhoff			IL & FS Cluster Development Initiatives Ltd		Shamal Javuri Kodali, S.R. Architects Vaishali Mangalwedekar, Rahul Dhanu, Sonali Bhargava	CS Architects Pvt. Ltd, Salem, TN
	Client	Madras Craft Foundation	Tamil Nadu Handloom 'Weavers' Cooperative Society		Ministry of Textiles		Synergy Lifestyle Pvt. Ltd.	Ministry of Textiles
	Site Area	10 acres (40,468 sq.m)	100 Sq. m		24 acres		2 acres	18 acres
	Built Area	3 acres	634				20000 Sq. ft.	148444 Sq. m
	Completion	1936	1935		2006		2004	2014
	Age Group							
Architecture	Style							
	Form	Rusticform	Rusticform	Rusticform	Cluster Dotted			
Spatial Organisation								
		According to the book titled Architects: Form Space and Order, Francis D.K. Ching the spatial organization of this space is a Clustered Organisation with ease of flow towards way section of the village.	According to the book titled Architects: Form Space and Order, Francis D.K. Ching the spatial organization of this space is a Cluster Organisation with a straight flow of access.	According to the book titled Architects: Form Space and Order, Francis D.K. Ching the spatial organization of this space is a Grid Organisation with a straight flow of access.	spatial organization of this space is a Grid Organisation with a straight flow of access.			
Architecture								

Plate 2.5: Comparison Table of Case Studies

As per the inferences from the case studies the one thing that is clear is the importance of process and pathway design. Since this is a design which is more towards an industrial setup the process paves way for an effective planning but it shouldn't compromise the design.

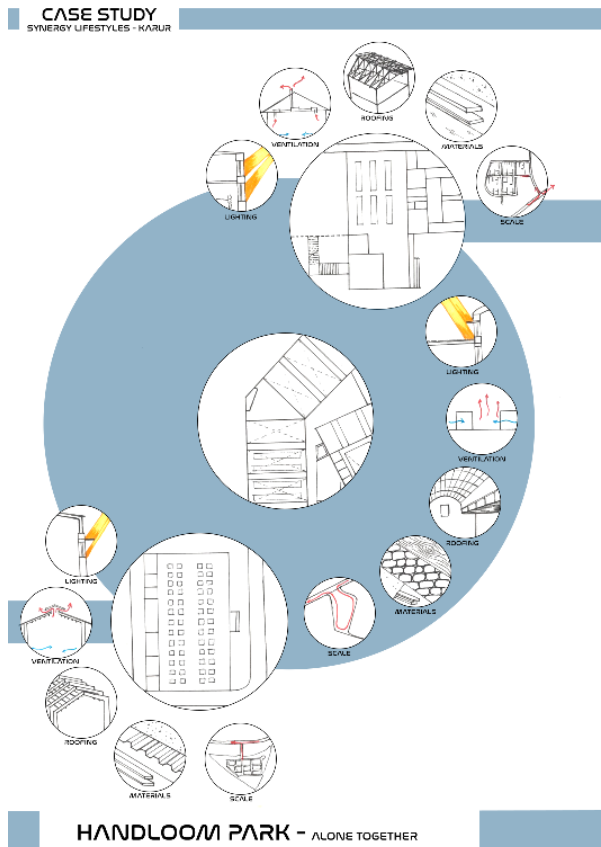


Plate 2.5: Comparison Study - Inferences

CHAPTER 3

DATA COLLECTION AND STANDARDS

3.1 HISTORY OF HANDLOOM:

India's textile weaving traditions reflect its rich cultural heritage and regional diversity, each area known for unique styles and techniques. Varanasi in Uttar Pradesh is famous for luxurious Banarasi silk sarees with intricate zari work, while Kanchipuram in Tamil Nadu produces vibrant Kanjivaram sarees using traditional pit looms. Maharashtra's Paithani sarees feature peacock motifs, and Gujarat's Patola sarees are known for double ikat weaving. Chanderi sarees from Madhya Pradesh are lightweight with fine zari work, and Assam's Muga and Eri silks are renowned for their sheen and warmth. Telangana's Pochampally sarees boast ikat patterns, and West Bengal's Jamdani muslin is known for delicate handwoven designs. Punjab excels in Phulkari embroidery, and Gujarat's Kutch region is famous for its vibrant fabrics with mirror work. These traditions, spanning various states like Rajasthan, Jammu and Kashmir, Karnataka, and more, not only preserve India's artistic heritage but also contribute significantly to its textile industry.

3.2 STUDY AREA AND LOOMS OF WEAVING

The weavers of Arni create the vast majority of India's silk clothing. Arni has a population of over 50,000 people, with approximately 35,000 of them working as weavers. Villages in and surrounding Arni include Kosapalayam, Saidapet, Paiyur, Mullipattu, Sevoor, Mel Seeshamangalam, Valappandal, Munugapattu, Thirumani, and Agaram, which are active in the weaving of silk sarees and other related activities. Not only are these villages active in saree weaving, but many more are as well. Each village has more than 500 looms working.

Arni has over 10,000 looms that use the Jacquard process to manufacture Brocade and Jangala silk sarees with traditional motifs enhanced by current color combinations. The collection also contains exquisite Wedding Silk sarees made from pure silk and golden jari, with traditional colors and unique motifs. 3,000 of the 20,000 handlooms are operated by cooperative groups, with the other 17,000 divided into micro and small units. Within the 17,000, 100 micro-entrepreneurs' control 10,000 looms, while the other 7,000 looms are divided among 50 small entrepreneurs.

Villages	No. of Looms
Arni, Mullipattu	1000
Sevoor	1000
Kunnathur	500
Athimalaipattu	5000
Onnupuram, Durgam	
Nadukuppam	1000
Iluppakunam, Kalambur	
Keelpattu	1000
Maampattu	500
Marusoor, Arayalam	500
Devikapuram, Aagaaram, Thirumani	1500
Anmaruthai, Aavaniapuram, Vazhaipandal, Munugapattu	1000
Seesamangalam	1500
Cheyyar	500
Irumbedu, Thimiri, Pudupet, SV Nagaram, Meyyoor	5000
Total	20000

Fig 3.1: No. of Looms operating in Arni Clusters
Source: Detailed Project Report on Proposed Silk Park



Plate 3.1: Study conducted in and around the town of Arni Silk Weaving Clusters

From the preparation of the raw silk to the final packaging of the finished product, the process of weaving a silk saree is a drawn-out one that includes steps like Purchase of raw material, Yarn Storage & Sorting, Degumming, Washing, Dyeing, Drying, Warp Winding, Weft Winding, Twisting, Street Sizing, Warping, Beaming, Weaving, Testing & Packing.

The primary concern about the entire weaving process is the potential impact on the environment caused by the dyeing processes, which are carried out completely inside the town of Arni, which could adversely affect the air and water due to smoke and effluent released into the atmosphere. To dye 3,000 kg of silk each day, weavers in Arni need three lakh gallons of water. So there is an increased risk of groundwater pollution because of the effluent being released into the drainage system of the town.

WEAVER'S HANDLOOM PARK

39210041_KIRUBA SHANKARI M
SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY

Plate 3.2: Process of Weaving

3.3 Results from the Questionnaire and Survey

Clear insights were obtained from the survey carried out during the site visit about several topics, including the necessity of a Silk Park and working conditions, remuneration, and socioeconomic concerns and health conditions. It was clear that the majority of the weavers in the region had inherited the craft, with very few being motivated by personal interests. Nevertheless, a lot of weavers are quitting their jobs since their pay is so low that they cannot support themselves.

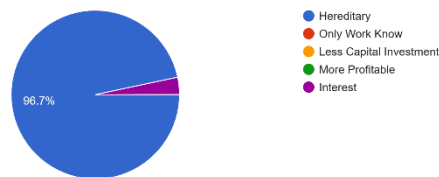


Fig 3.2: Study Chart 1

How many hours do you work daily?

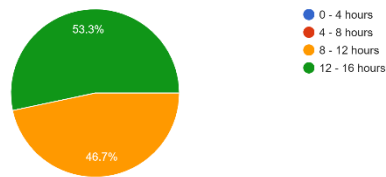


Fig 3.3: Study Chart 2

Major Health Problems

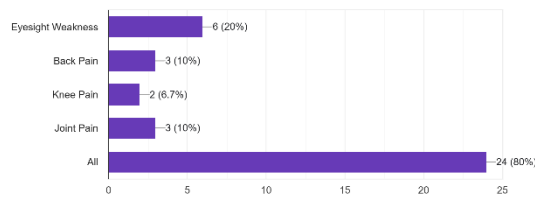


Fig 3.4: Study Chart 3

Do you think will it be useful for the weavers in and around Arani?

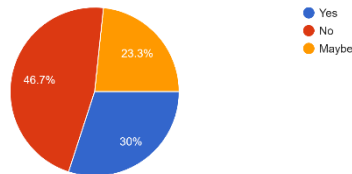


Fig 3.5: Various chart showing Survey Responses

More than 60% of the participants conveyed their opinion that the Silk Park proposal would function as a comprehensive solution, enabling weaving, marketing, and product development, consequently boosting recognition for their art. In addition, they believe that relocating the dyeing units outside of the town would help create a better environment.

Here are the links to the survey that was conducted on-site.

https://docs.google.com/forms/d/1k_lAa8ee5vCS33ouVYYOG6wwtaZkwY74AGlHZ2UxvYk/edit

https://docs.google.com/document/d/17EdDt_0OOzKWx4F-616G7ztAy3gg7u2eoVBBBoNpg0c/edit?usp=sharing

Also, more than 90% of them work long hours in stationary positions, which results in several problems like eye strain and knee, joint, and back pain, underscoring the need for intervention.

3.4 DISCUSSION & CONCLUSION

In conclusion, choosing a suitable location for the silk park is critical, especially when shifting dyeing facilities away from the town center. This strategic placement guarantees that effluents are properly disposed of at a Common Effluent Treatment Plant where it efficiently filters and reuses 2.75 lakh liters of water for dyeing, with the excess set aside for campus landscaping, reducing adverse effects thus creating a resilient environment.

Thus the goal is to modernize the age-old practice of weaving to provide sustainable lives. The proposed design will contain separate units for each stage of saree production, from warp size to pirn winding. The intent is to establish around 2,000 looms for the weavers. These looms will be fitted with electronic jacquard boxes for ease of work. This innovative technology will allow weavers to experiment with new designs and elaborate patterns for their sarees, with memory card-holding designs. The park will also have a design studio, where professionals will interact and discuss novel ideas for new designs. Also, a training center or a skill development sector along with R&D can be established for the people to experiment and learn new designs and weaving techniques. Design for retail to be carried to meet the market needs which never fade. Combined with a museum for displaying unique pieces and achievements thus fostering an inclusive design of all for enriching the Arani Weavers.

3.5 STANDARDS:

In a cottage industry, addressing standards and norms, including anthropometry and spatial layout, ensures ergonomic efficiency, safety, productivity, and worker satisfaction. Proper ergonomic design minimizes injuries and enhances workflow efficiency and product quality. Safe, comfortable conditions boost morale and reduce turnover, while compliance with legal standards prevents legal issues, ensuring smooth operation within the legal framework.

36. Planning Parameters of Industries.— The road width, FSI, Setbacks etc. for cottage industries, Green industries, Orange industries and Red industries shall be regulated according to the table below. The Detailed lists of these industries are given in Annexures V, VI, VII and VIII respectively.

Sl.No.	Description	Category of industries			
		Cottage Industries	Green & Orange industries	Red industries (Special & Hazardous)	
A.	Minimum road width	7m.	7m.	7m.	
B.	Maximum Height	18.30m.	18.30m	18.30m.	
C.	Maximum FSI	1.50	1.50	1.50	
D.	Minimum Setback	Where Street Alignment/new road is prescribed, it shall be from that street alignment/new road line. In the case of others, it shall be from the property boundary.			
(i)	Front Setback	Abutting road width less than 9m	Front Setback 1.5m	6.0m	6.0m
		9m. to 18m.	3.0m.		
		18m. to 30.50m.	4.5m		
		More than 30.5m.	6.0m.		
(ii)	Side Setback	1.50m.	3.0m.	6.0m.	
(iii)	Rear Setback	Nil	2.0m.	6.0m.	
E.	Structures permissible in the minimum prescribed Front set back, Side setback and Rear set back are given in the rule 28 In addition, incidental structures such as Gate pillars, servant room, watch man booth, cycle stand and toilets with height not exceeding 4m are permissible in these minimum prescribed setback spaces.				
F.	Parking spaces shall be provided within the site conforming to standards prescribed in the Annexure - IV.				
G.	Rainwater harvesting provisions as prescribed in the Annexure - XXII.				

Fig 3.6: Planning norms as per TNCDDBR for Setbacks

(17) Industries
(a) Manufacturing industries, service industries, biotechnology industries
1 car space for every 100sq.m of office floor area or part thereof and 1 two wheeler space and 1 cycle space for every 50sq.m of workshop floor area or part thereof and 1 lorry space for every 500sqm or workshop floor area or part thereof
(b) Cottage Industries
1 car space for every 100sq.m of office floor area or part thereof and 1 two-wheeler space and 1 cycle space for every 50sq.m of workshop floor area or part thereof.
(c) Garments / Packaging Industries
1 car space for every 200sq.m of office floor area or part thereof and 1 two-wheeler space and 1 cycle space for every 50sq.m of workshop floor area or part thereof.
(d) Electrical and Electronic Industries including Computer hardware industries
1 car space for every 100sq.m of office floor area or part thereof and 1 two-wheeler space and 1 cycle space for every 50sq.m of workshop floor area or part thereof.
(e) IT Industries, Software, Bio Informatics Industries
1 car space for every 50sq.m of floor area or part thereof and 1 two-wheeler space for every 25sq.m of floor area or part thereof.

Fig 3.7: Planning norms as per TNCDDBR for Cottage Industries

Table:11 Sanitation Requirements for Factories

Sl. No.	Sanitary Unit	For Male Personnel	For female Personnel
1.	Water Closet	1 for 15 persons 2 for 16-35 persons 3 for 36-65 persons. 4 for 66-100 persons. For 101 to 200 persons add at rate of 3%. From over 200 persons, add at the rate of 2.5%.	1 for 1-12 persons 1 for 13-25 persons. 2 for 26-40 persons. 3 for 41-57 persons. 4 for 58-77 persons. 5 for 78-100 persons. For 101 to 200 persons, add at the rate of 5%. From over 200 persons add at the rate of 4%.
2.	Ablution Taps	One in each W.C.	One in each W.C.
3.	Urinals	Nil upto 6 persons 1 for 7-20 persons 2 for 21-45 persons 3 for 46-70 persons 4 for 71-100 persons From 101 to 200 persons add at the rate of 3%; for over 200 persons add at the rate of 2.5%.	--
4.	Washing Taps with draining arrangement	One for every 25 persons or part thereof	
5.	Drinking Water Fountains	One for every 100 persons with a minimum of one on each floor	
6.	Baths Preferably Showers	As required for particular trade or occupation	
7.	Emergency shower and eye wash fountain	1 per every shop floor per 500 persons	

Note:

- For many trades of a dirty or dangerous character, more extensive provisions are required.
- One water tap with draining arrangement shall be provided for every 50 persons or part thereof in the vicinity of water closet and urinal
- Crèches where provided shall be fitted with water closets (One for 10 persons or part thereof), wash basins (1 for 15 persons or part thereof) and drinking water tap with drinking arrangement for every 50 persons or part thereof.

Fig 3.8: Planning norms as per TNCDBR – Sanitary Fittings

Minimum Width Provisions for Passageway/Corridors		
S. No.	Type of Building	Minimum width (m)
(A)	(B)	(C)
1	Individual Residential buildings	1.00
2	Other Residential buildings, e.g. Hostels, Group Housing etc.	1.25
3	All Other Buildings including Hotels	1.50
4	Assembly Buildings like Auditoria, Theatres and Cinemas	2.00
5	Hospital, Nursing Homes, etc.	2.40

Fig 3.9: Corridor Width

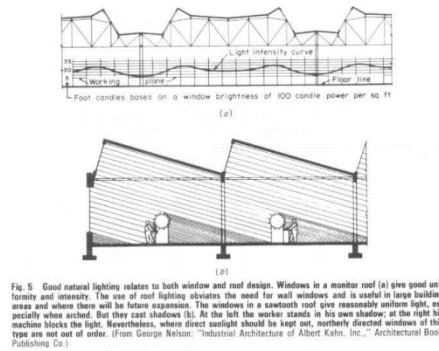


Fig 3.10: Lighting

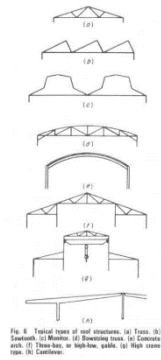


Fig 3.11: Roof Type

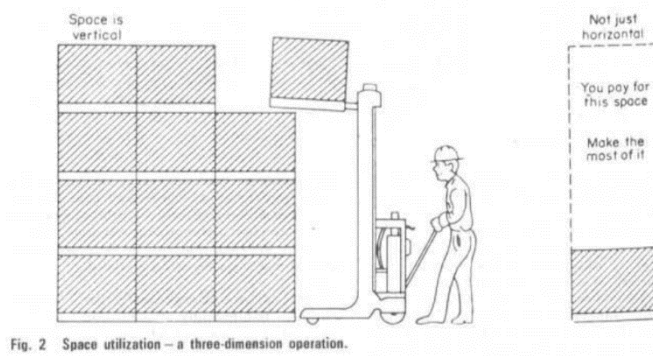


Fig 3.12: Loading and Unloading

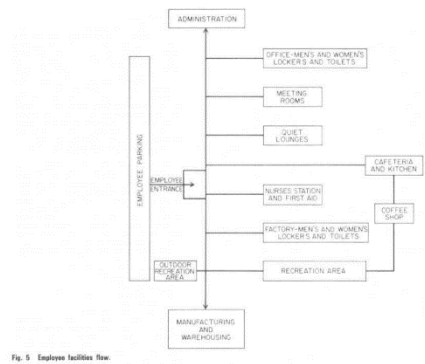


Fig 3.13: Employee flow

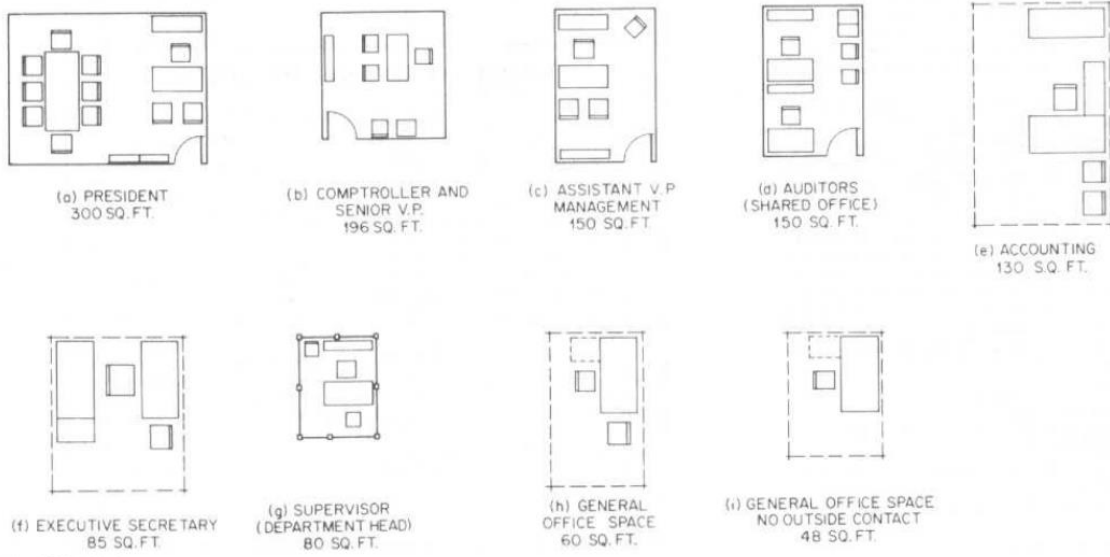


Fig. 4 Office areas.

Fig 3.14: Spatial Layout

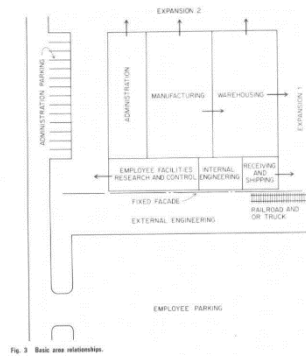


Fig. 3 Basic area relationships.

Fig 3.15: Planning

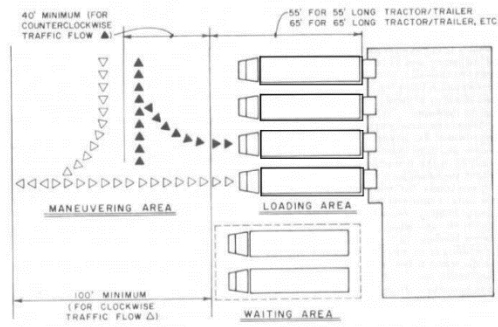


Fig. 1 Truck loading and maneuvering configuration.

Fig 3.16: Turning Radius

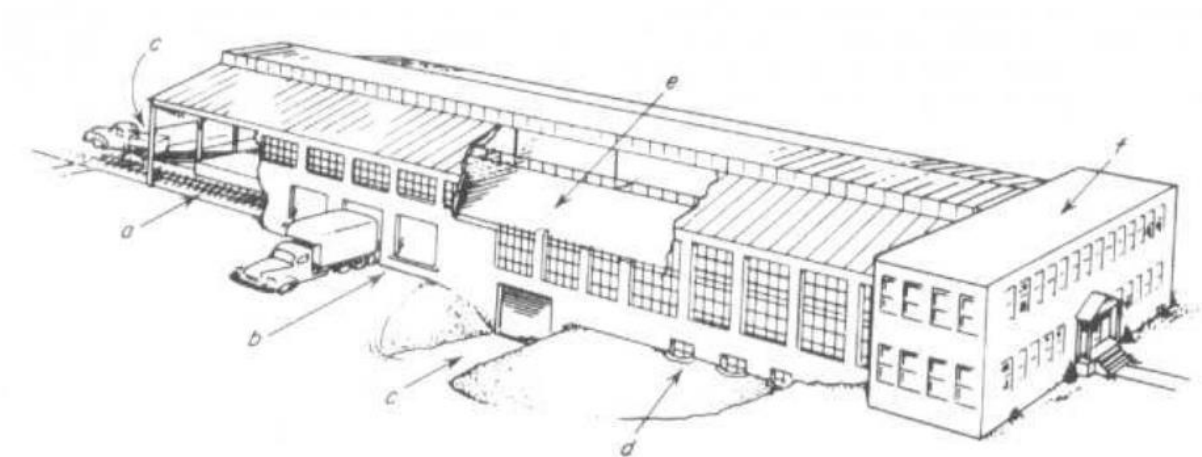


Fig. 1 Features of the one-and-a-half story building: (a) Rail siding with car floor at level of plant floor. (b) Truck tailgate level with plant floor. (c) Shallow ramp down to basement; low ramp up to floor level. (d) Windows for basement lighting. (e) Balcony or mezzanine for supporting activities and/or production. (f) Two-story office building with entrance at ground level.

Fig 3.17: Building Plan

[illegible]

22

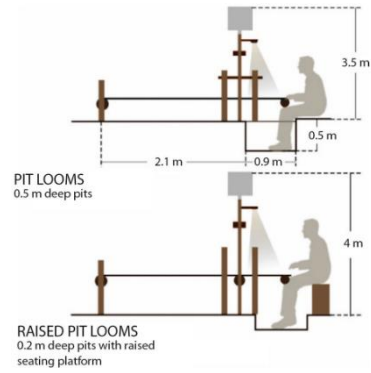


Fig 3.18: Pit Loom Standard

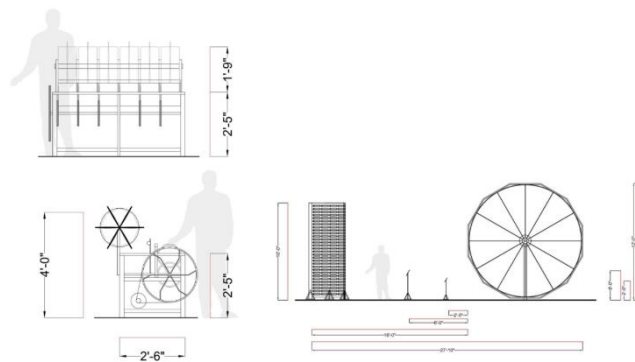


Fig 3.19: Machinerie Standards

CHAPTER 4

SITE STUDY AND ANALYSIS

4.1 SITE STUDY:

Site is located in the village called Periyana Nallur neae Arani in the Arani Vandavasi Road. The total site area covers upto 20 acres of land which is 80937.13 sq.m

4.2 SITE JUSTIFICATION AND FEASIBILITY:

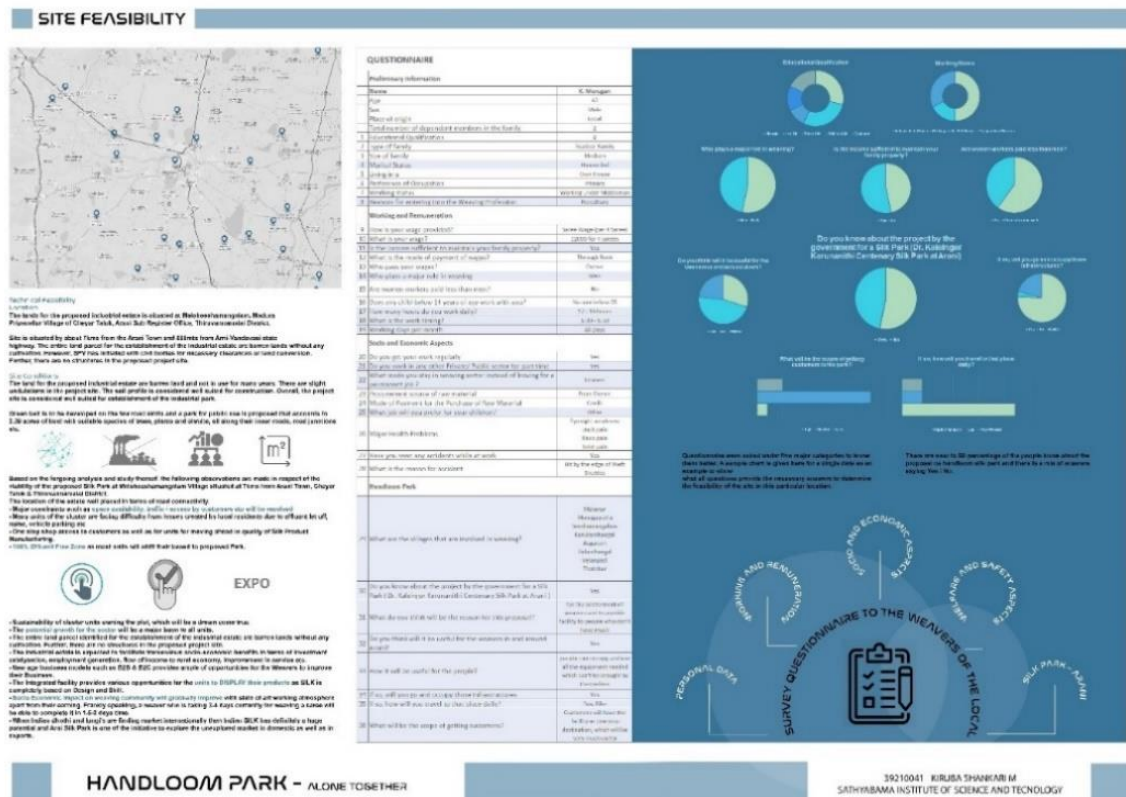


Plate 4.1: Site Feasibility

Site is located in the center of the village on the main road so it will be easy for other village students to come to school. The surroundings of the site is residential area. There is a bus stop opposite to the site.



Fig 4.1(a),(b),(c): Site views

4.3 SITE ANALYSIS:

4.3.1 Neighborhood Context:

Site has only one major access and a proposal for a service road prevails. There is not much of buildings around, only few settlements very near the site. But there are other village situated in a radius of 3km and more. Mostly there are agricultural fields in the area.

4.3.2 Site and Zoning:

Setbacks – South (Front) - 3m
East - 6m
West - 6m
North - 6m

Height restriction - 15m

Parking - 20% of the site
- 1,654.05sq.m

4.3.3 Circulation:

Considering circulation as the major aspect and a preliminary need for designing an industrial setup. Therefore thorough understanding of the spatial needs and process layout are important. Which contributes to the special study of the design.

4.3.4 Man Made Features:

There are no man made features in the site. Power poles are throughout the road in the east side. There are residential buildings in the east and north and there is a health care in the west side

4.3.5 Natural Physical Features:

Site has a natural slope of 0.5m difference in which 126.5m is the lowest point and 138m is the highest point on the ground. Drainage pattern follows the slope towards the rear of the site and partially to the front. Soil type is Black cotton soil.

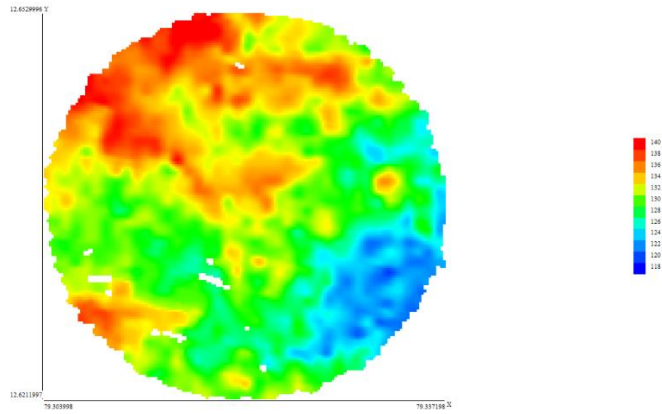


Fig 4.2: Contour Mapping

CHAPTER 5

ARCHITECTURAL DESIGN

5.1 SPATIAL REQUIREMENTS

	Sl. No.	SPATIAL PROGRAMME	OCCUPANCY (PERSON & MACHINERY)	NO. OF UNITS	AREA PER PERSON & SPACE	TOTAL AREA
	1	Security Cabin	3	2	20	40
	2	Entrance	50	2	50	100
	3	Reception Area	25	1	30	30
	4	Visitor Waiting Area	25	1	50	50
Admin Block	1	Park Director Room/ MD	1	1	30	30
	2	General Manager Room	1	1	25	25
	3	Managers Rooms	1	5	20	100
	4	Assistant Managers Rooms	1	5	15	75
	5	Supervisors	1	5	12	60
	6	Other Employees work space	20	1	75	75
	7	Meeting Rooms	10	2	25	50
	8	Conference room	30	1	75	75
	9	Record Room		1	9	9
	10	Storage		1	12	12
	11	Material distribution/ Unloading area		1	75	75
	12	Building Management Room/ Control Room		1	60	60
	13	Staff Lounge/ Cloak area		1	12	12
	14	Dining Room	15	1	22.5	22.5
	15	Pantry		1	12	12
	16	Toilets		30	3	90
		TOTAL				1002.5
		TOTAL AREA WITH CIRCULATION				1203
The Processing and Manufacturing Units	1	Storage for Raw Silk		1	200	200
	2	Dyeing Yard including Degumming & Washing				
	2a	Mechanized Dyeing Unit 1	20		150	3000
	2b	Mechanized Dyeing Unit 2	10		200	2000
	2c	Manual Dyeing Unit 3	5		75	375
	3	Drying area		1	75	75
	4	Storage of dyed silk		1	150	150
	5	Warp Winding		10	40	400
	6	Pirn/ Weft Winding		10	14	140
	7	Yarn twisting		10	15	150
	8	Sizing		10	30	300
	9	Warping Mechanised		10	60	600
	10	Designing Space		10	50	500

	11	Card punching room	15 Machines /unit	12	12	144	
	12	Punch card Storage		5	12	60	
	13	Jacquard Storage		10	9	90	
	14	Production Looms/ Weaving - 50 looms/unit					
	14a	Pit Looms	250		12	3000	
	14b	Jacquard Looms	700		9	6300	
	14c	Power Looms	100		36	3600	
	15	Finishing		21	21	441	
	16	Checking Room		21	15	315	
	17	Folding & Organizing & Packaging		21	50	1050	
	18	Finished Material Storage		1	450	450	
		TOTAL					23340
		TOTAL AREA WITH CIRCULATION					28,008
SKILL DEVELOPMENT SECTOR	1	Classroom	20	2	45	90	
	2	Director cabin	1	1	12	12	
	3	HOD cabin	1	1	10.5	10.5	
	4	Staffroom	10	2	15	30	
	5	Meeting Rooms	10	1	18	18	
	6	Library	1	1	50	50	
	7	Workshops					
	8	Design lab	10	1	20	20	
	9	Pit Looms - sample	25		12	300	
	10	Jacquard Looms - sample	50		9	450	
	11	Dyeing lab		1	25	25	
	12	Other workshop		1	25	25	
	13	Cafeteria		1		0	
	14	Staff toilets		15	3	45	
	15	Toilets		30	3	90	
		TOTAL					1165.5
		TOTAL AREA WITH CIRCULATION					1398.6
	ACCOMODATION		Creche		1	100	100
		Rest rooms		10	12	120	
		Dormitories		10	15	150	
		TOTAL					370
		TOTAL AREA WITH CIRCULATION					444
Emporium		Entrance		1	50	50	
		Reception		1	15	15	
		Storage		25	4	100	
		Retail units		25	15	375	
		Cafeteria		1	75	75	
		TOTAL					615
		TOTAL AREA WITH CIRCULATION					738
Research and Development Facilities		Entrance		1	15	15	
		Reception		1	9	9	
		Office space		1	25	25	

		Director Cabin		1	12	12
		Manager Cabin		1	9	9
		Meeting Area		1	15	15
		Staff toilets		10	3	30
		Toilets		20	3	60
		Silk Testing Laboratory		1	50	50
		Dyeing and Printing labs		1	50	50
		Silk Preservation and Conservation Labs		1	25	25
		Library and Documentation Center		1	100	100
		TOTAL				400
		TOTAL AREA WITH CIRCULATION				357.6
EXPERIENCE CENTRE AND MUSEUM WING	1	Exhibit/ Display area		2	60	120
	2	Multi-purpose hall/ Auditorium	200	1	300	300
		TOTAL				420
		TOTAL AREA WITH CIRCULATION				504
OVERALL TOTAL						32,653

Fig 5.1: Area requirements

5.2 CONCEPT

5.2.1 Strategies can be followed at site level:

(a) Orientation -

The built forms longer facades can be oriented facing the east and west directions. The east and north side orientations can have the larger window open it helps in avoiding the direct exposure to sunlight and also allows the interior to receive ample amounts of indirect natural light and help preventing solar heat gain

(b) Built form -

The longer facades of the building are oriented to face the North and South directions in order to maximize natural lighting in the workspace and industry. The larger window openings help to avoid direct exposure to sunlight and also allow the interior to receive ample amounts of indirect natural light, helping to prevent solar heat gain.

(c) Mutual shading -

Mutual shading by placing and planning the building such that they share each other from the sun can help in reducing the heat gain

(d) Vegetation -

Vegetation and landscaping can play a major role in changing the microclimate of a site and can lower the temperature. Vegetation can also be used to prevent and protect from the undesirable winds and solar radiation

(e) Wind channeling and buffer spaces -

Buffer spaces, open gardens and courtyards can be provided to channel and bring in good breeze and wind into the building

5.2.2 Passive design strategies:

(a) Courtyard effect –

Courtyard can be microclimate modifier and controller. It helps in evaporative cooling and increase of heat loss through ventilation. Usually open to the sky. The heat transfer that takes place within a courtyard is affected greatly by - the Airflow, thermal mass, solar radiation. Due to the incident solar radiation in the courtyard the air in it becomes warmer and rises up to replace the cool air from the ground level floors through the louvered openings of the room thus producing the air flow

(b) Passive air conditioning system –

Allowing natural ventilation and day lighting through proper implementation can help in achieving passive air conditioning. Techniques like stack ventilation can also be implemented to avoid the use and consumption of mechanical air conditioning system

(c) Green roofing systems –

These are roofs covered with vegetation and soil and also function by providing shading, insulation, evapotranspiration, and act as thermal mass

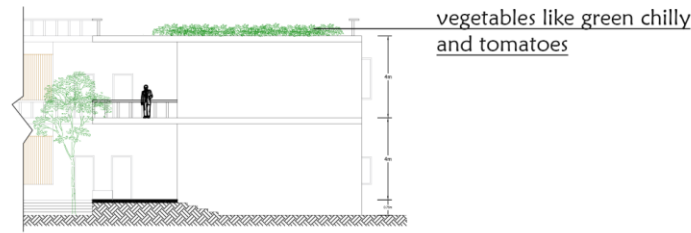


Fig 5.2: Green roofing system

5.2.3 Concept

1. Sustainable Development Goals

This thesis tackles the challenges confronting these weavers in sustaining their market presence, aiming to devise an efficient spatial layout, lighting, and ventilation conducive to prolonged working hours. It also addresses health issues such as eye strain, and back, joint, and knee pains resulting from extended periods of work. This architectural design strategically aligns with majorly six key Sustainable Development Goals (SDGs) outlined by the United Nations for the revival of traditional weaving in Arani. It encompasses establishing a silk saree industry with processing and manufacturing infrastructure, an R&D center for innovation, a skill development center to train interested individuals, retail spaces, worker accommodation, and recreational areas, supporting **SDG 9 (Industry, Innovation, and infrastructure)**. The choice of a outskirts location near Arani town supports **SDG 6 (Clean Water and Sanitation)**, with effluent wastewater treated and reused using a CETP, addressing targets under **SDG 12 Responsible Consumption and Production)**. These initiatives promote **SDG 11 (Sustainable Cities and Communities)** and **SDG 15 (Life on Land)**. By fostering consistent work and business, the design contributes to **SDG 8 (Decent Work and Economic Growth)**, creating a balanced B2B and B2C setup. Thus fostering comfort, safety, and well-being while boosting productivity for weavers.

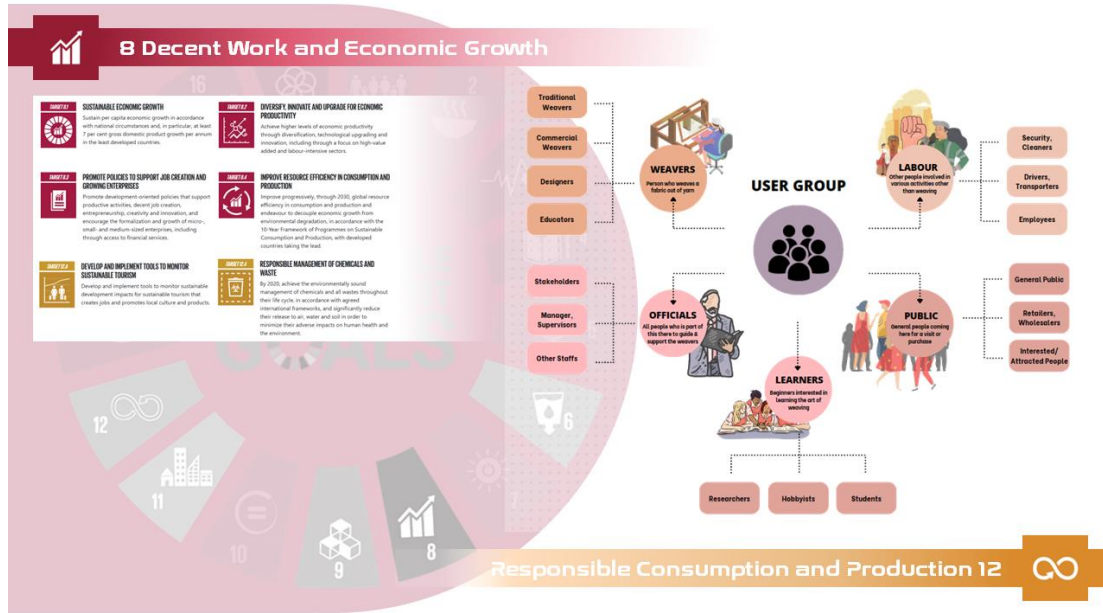


Plate 5.3: SDGs 8, 12

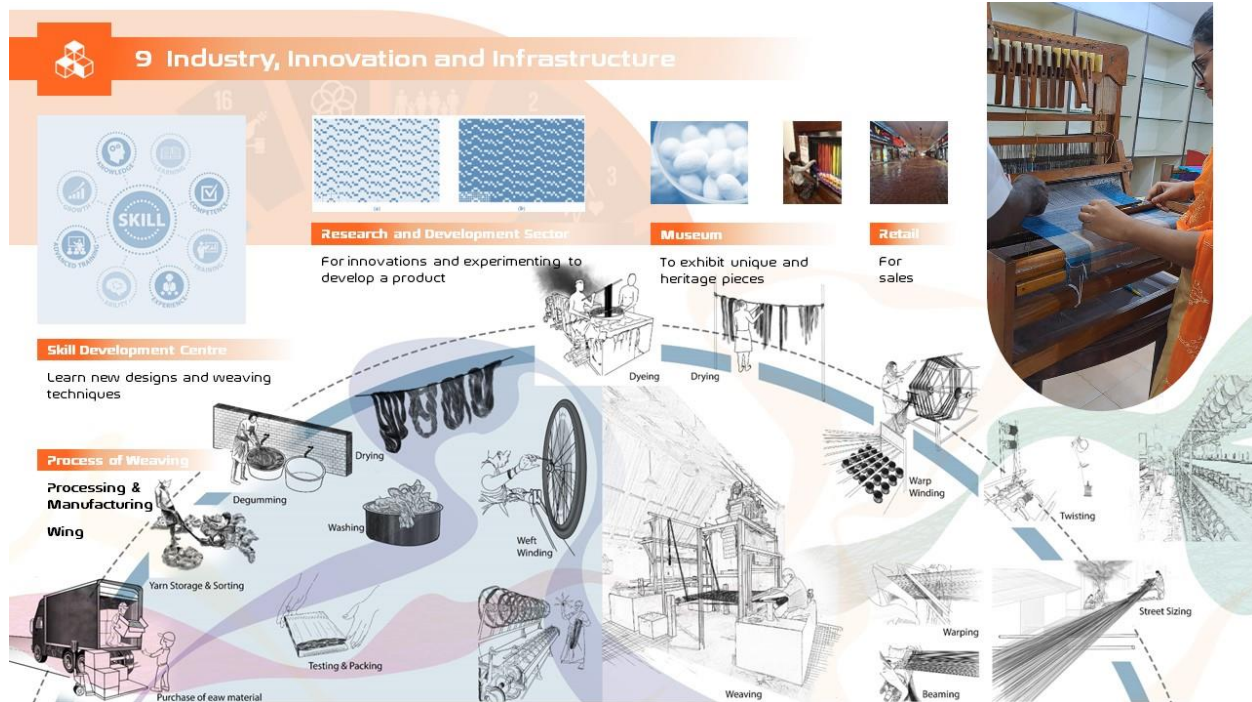


Plate 5.4: SDG 9



Plate 5.5: SDG 15



Plate 5.6: Site Zoning and Vegetation

5.3 DETAILED DRAWINGS

5.3.1 Site plan:



Fig 5.3: Master Plan



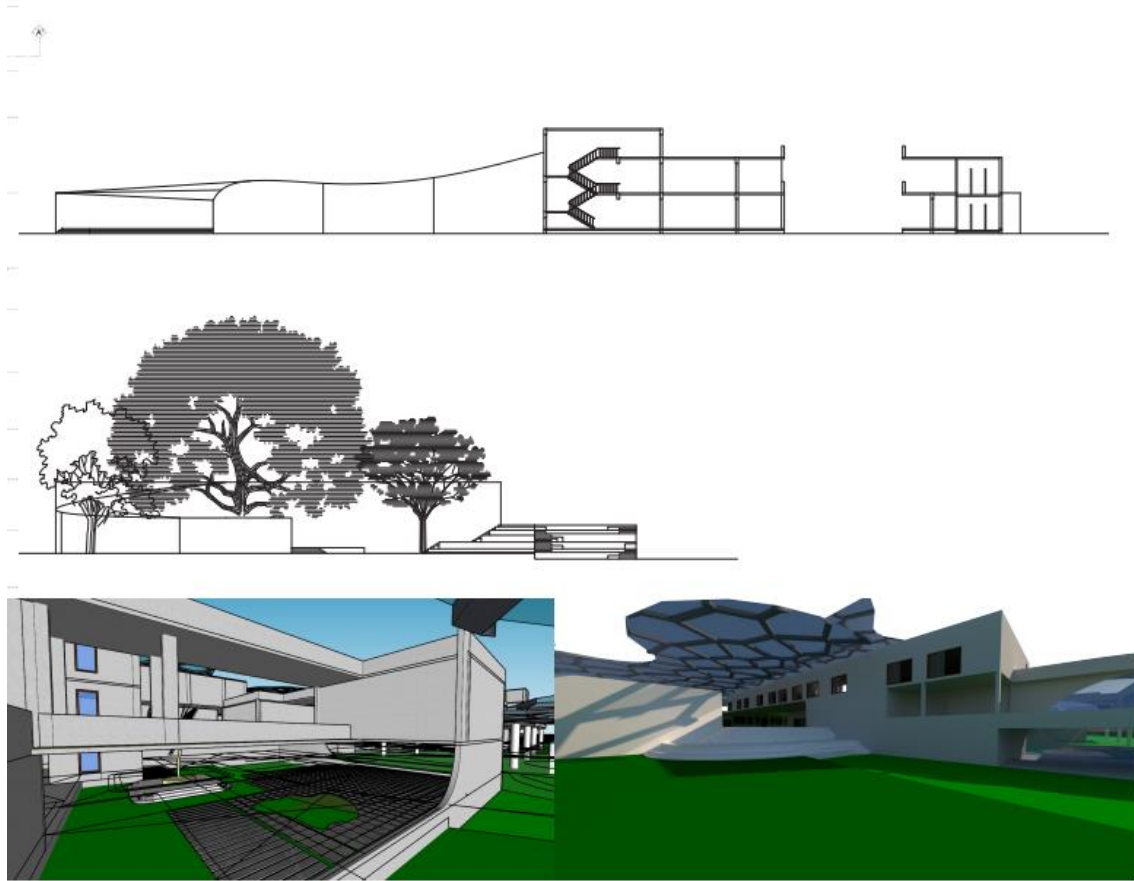


Fig 5.5: Views and Sections

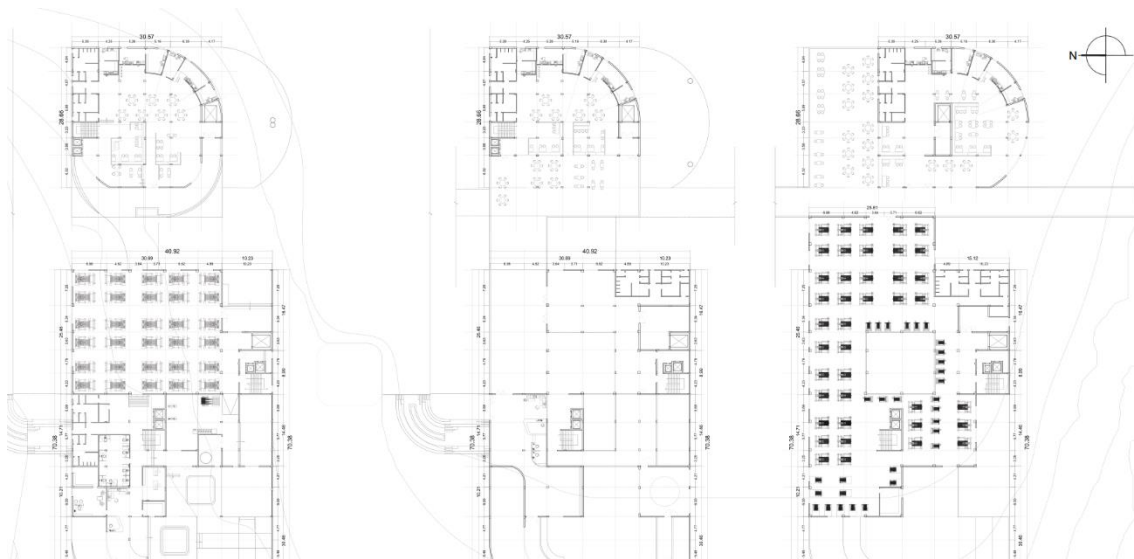


Fig 5.6: Museum and Food Court Plan



Fig 5.7: Site Section

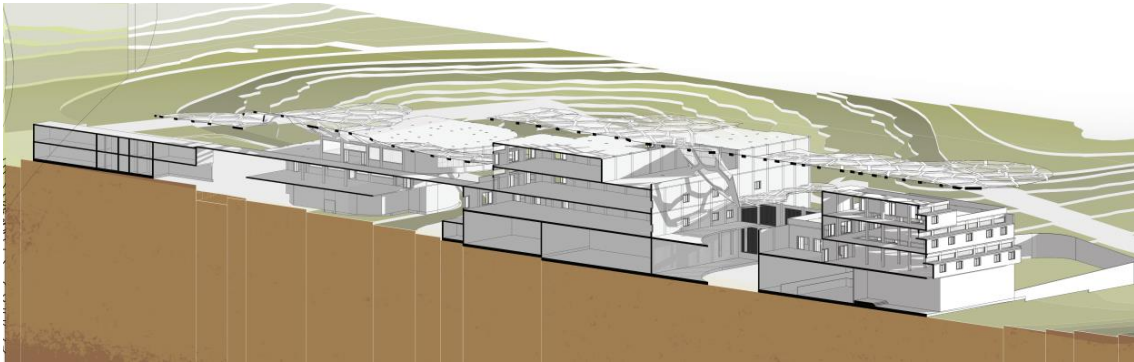


Fig 5.8: Connecting Bridge Isometric Section

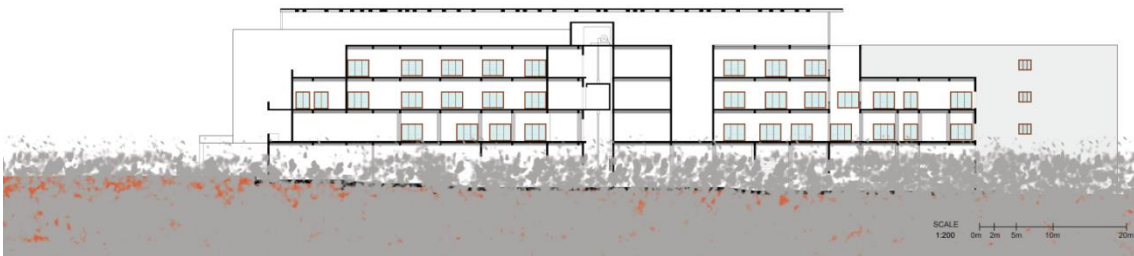


Fig 5.9: Section



Fig 5.10: Isometric Section showing Green Roofs

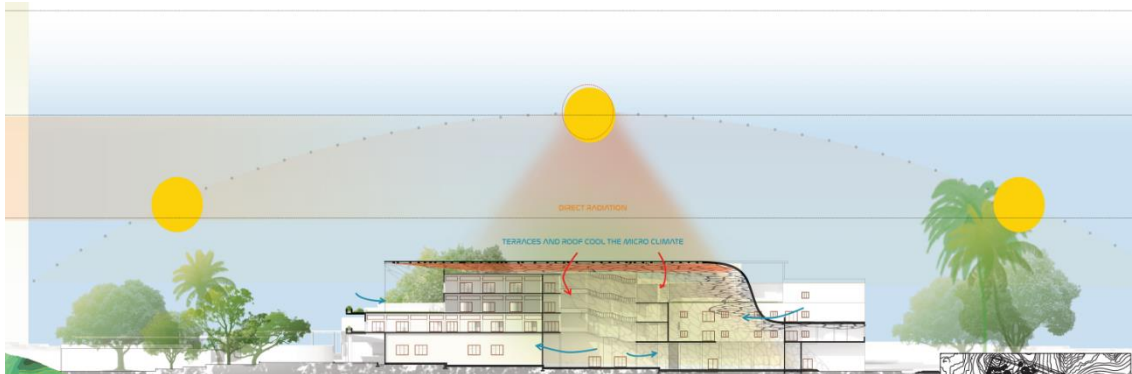


Fig 5.11: Section showing Roofing and Thermal Quality



Fig 5.12: Manufacturing and Production Unit GF Plan

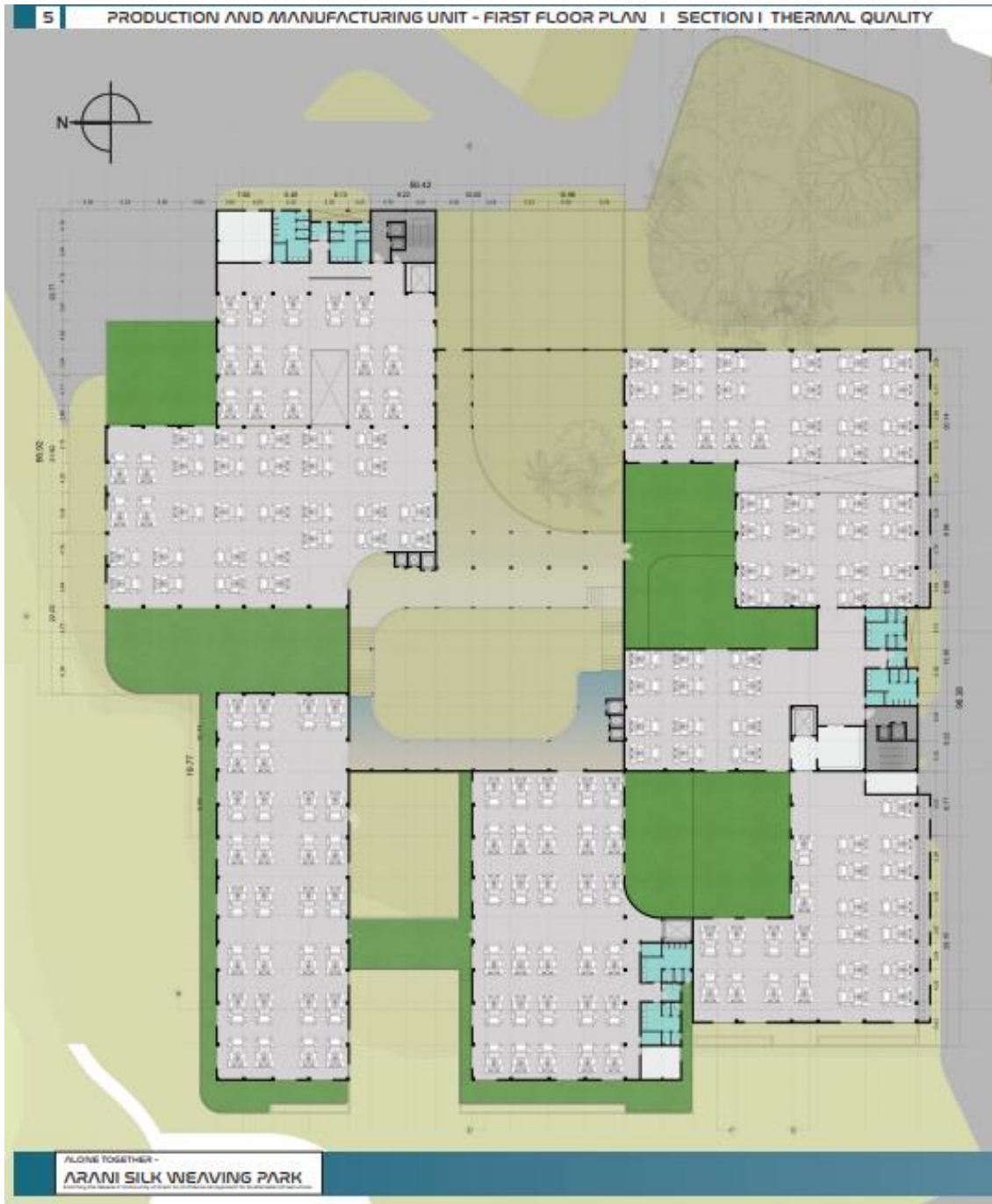


Fig 5.13: Manufacturing and Production Unit FF Plan

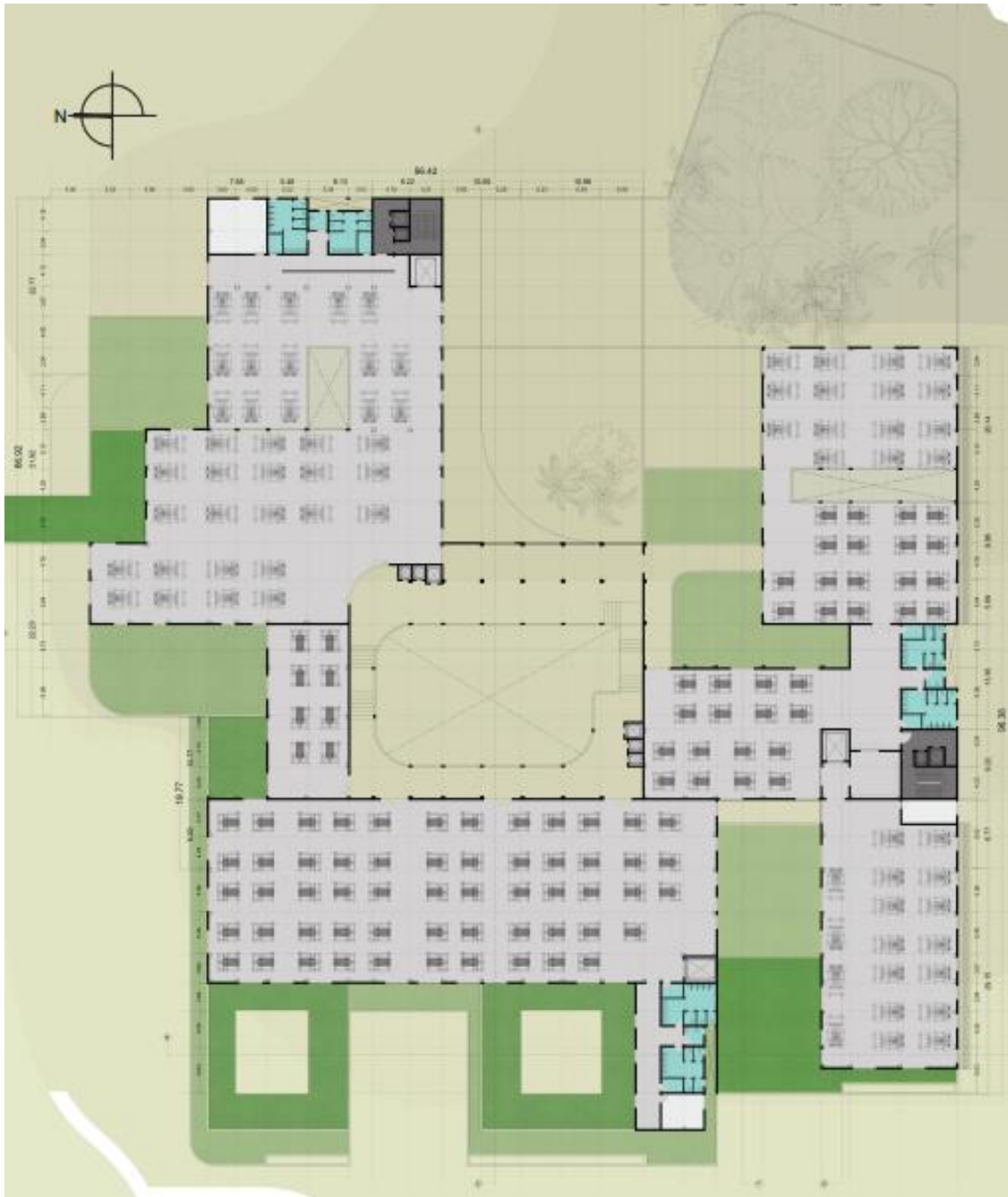


Fig 5.14: Manufacturing and Production Unit SF Plan

CHAPTER 6

REFERENCES

- Vijayalaxmi, J., & Arathy, K. C. K. (2022). Critical evaluation of socio-cultural and climatic aspects in a traditional community: a case study of Pillayarpalayam weavers' cluster, Kanchipuram. *Built Heritage*, 6(1). <https://doi.org/10.1186/s43238-022-00050-4>
- Tanusree, S. (2015). A Study of the Present Situation of the Traditional Handloom Weavers of Varanasi, Uttar Pradesh, India. *International Research Journal of Social Sciences*, 4(3), 48–53. <https://www.isca.me/IJSS/Archive/v4/i3/8.ISCA-IRJSS-2014-310.pdf>
- About District | Tiruvannamalai District, Govt. of Tamil Nadu | India. (n.d.). <https://tiruvannamalai.nic.in/about-district/#:~:text=Tiruvannamalai%20District%20was%20created%20from>
- Government of Tamil Nadu. (2022). DISTRICT STATISTICAL HAND BOOK 2022-23 (Department of Economics and Statistics Tiruvannamalai, Ed.) [Review of DISTRICT STATISTICAL HAND BOOK 2022-23]. Tiruvannamalai.nic.in. <https://cdn.s3waas.gov.in/s318997733ec258a9fc239cc55d53363/uploads/2023/12/2023122769.pdf>