

GRAPHIC ARTS INSTITUTE, Dhaka.

By

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A thesis submitted to the Department of Architecture
in partial fulfillment of the requirements for the degree of
Bachelor of Architecture

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Department of Architecture
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Declaration

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2. The thesis does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.
3. The thesis does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
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Approval

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Abstract

Graphic Art is a mode of communication through color, texture, lines, proportion, geometry, etc. Learning from their curricula gives a vast understanding of these practical knowledge of this vocational education Institute. But to grasp the practical learning, understanding in depth of different ideas and perspectives, Interaction of students of their inter departments, as well as interacting with the environment is very necessary. Therefore, public interaction is considered to be a major driving force for creating a learning environment for the students of all the 4 Departments here.. The scale, control and threshold of the major public, semi-public, semi-private and private spaces were provided through landscape and built forms itself, so that the spaces created a dialogue with the public interactivities, and student activities within the boundaries of the campus. As a portion of the active students are encouraged to avail accommodation facilities within the campus, therefore an overall learning as well as a comfortable environment was intended to craft here throughout the site, which would help nourish the thinking and working process of a developing mind of any active student studying here.

Keywords: Graphic Art; Printmaking; Visual Art; 3D Modeling; Animation; Vocational Training; practical learning.

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List of Acronyms

M.O.E- Ministry Of Education

G.A.I- Graphic Art Institute

ISOTYPE- International System of Typographic Picture Education

D.T.E- Directorate of technical Education

DU- Dhaka University

FFA- Facility of Fine Arts

Chapter 1: Introduction

1.1 Introduction to the Project

Graphic Art nowadays plays such an important role in our day to day life, and this specific field is expanding much more in the modern era. The use of print-making, graphic contents, graphic designs, and research on this field has made an impact on the economy, education, and employment since the past few decades.

Graphic Art is very much promising and fascinating as a discipline and work field for practice and flourishing. (Frascara,1997) In Our context, Graphic art is taught where the concern of interdisciplinary learning method, or learning through the environment is not practiced or encouraged. This project of Graphic Art is the only vocational education on Graphic design, printmaking, Computer Graphics, 3D and animation in Bangladesh, situated in Dhaka, the capital city. (Graphic Art Institute, 2020) The Four year structure of the diploma course of 8 semesters, has been adopted since 2012. This specialised field requires different experts for the teaching purpose. As technical education focuses more on Practical learning, it is of a prime necessity that the indoor outdoor space quality of this project should be very playful as well as upto the functional requirement. This Institute has currently 4 Departments, along with accommodation facilities provided for students, staff, teachers and its Principal. Each year a seat capacity of 300 students are enrolled, and thus to ensure the total seat capacity, two shifts of classes are held for each department respectively. The four departments are, Graphic Art Department, Printing and Printmaking Department, Computer Graphics Department, 3D and Animation Department. As a whole, this field of education needs to be more prioritized because nowadays every professional field needs the help of

Graphic content in many ways. The Demand in the job market is also rising, but we need to enhance the quality of this education, in order to compete with the global standards.

1.2 Aim and Objectives of the Project

The core aim of any sort of development project is to ensure the gradual progress of the quality of life. This project will open the door to the fresh graduates to the field of Graphic Art department in the job sectors, and also for the self employment of many others, through vitalizing the technical education in the core of the city. It will help enhance the quality of the learning environment through the attachment and bonding of the various departments and other functions, with students, teachers and others playing the vital role through different co-curricular activities in various open spaces.

The aim of the project is to ensure quality vocational education for the enthusiast students of this respective field of Graphic Communication. Nowadays the global perspective of the field of graphic communication is expanding exponentially at a high rate, but the required education of this sector is not getting enough space for development through research, communication, exploration and experimentation. A place was intended to be crafted here so that students and facilitators can explore through interdisciplinary knowledge and information.

1.3 Project Summary

Name of the Project: Graphic Art Institute

Implementer of the Project: Ministry of Education (M.O.E)

Client of the Project: Directorate of Technical Education (D.T.E)

Location: Satmasjid Road, Mohammadpur.

Site area available for the Project Development: 5.4 Acre

Proposed built-up area of the Project: 2,15,000 approx

Proposed Program of the Project:

1. Administration
2. Printing workshops
3. Lecture classrooms
4. Lab facilities
5. Library and Archive
6. Stationary and Souvenir shop
7. Auditorium
8. Indoor Games
9. Cafeteria
10. Dormitory
11. Staff Quarters
12. Gallery

Chapter 2: Literature Review

2.1 Graphic Arts In its Journey

By transcending linguistic representation approaches, Graphic Arts has reached a place where it is now considered as a modern and most Universal Communication Language throughout every corner of the world. It is nowadays an important mode of communication with the society in the speediest manner possible, which moves on with the progress of the development of the society. As Graphic Arts helps change society, the society shapes up this field likewise. (Heller.S, Steven.S.C. ,2000)

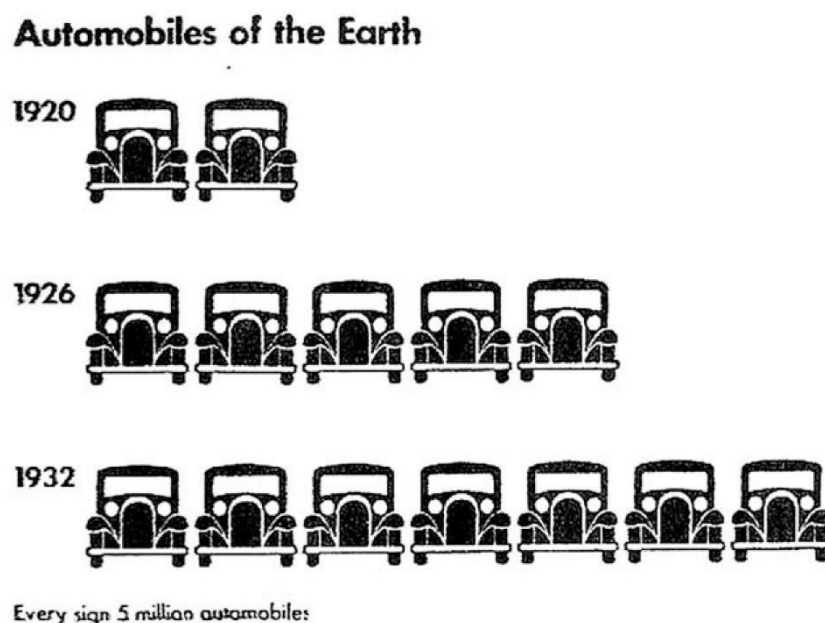


Figure 15.5 'Every sign 5 million automobiles' (Neurath 1936, 47)

Figure:2.1 ISOTYPE example

The ISOTYPE Project envisioned by Otto Neurath is more of a Movement rather than just limited to a Project, which started evolving from “Gesellschafts-und-Wirtschaftsmuseum

(Museum for Society and Economy) in Vienna 1924. ISOTYPE was designed primarily for the under-educated for serving the purpose of “Education by the Eye” helping them to learn through this universal communication language. This helped profoundly to understand very complex and critical data and issues, with a socialist approach to educate the working class adults of the society. With the objective to create a “Helping Language” consisting of a set of internationally recognized and standardized graphical symbols, later on helped develop the idea of Pictograms, which helped many people of different backgrounds to access knowledge and information. (Hartman,2007). As quoted by Neurath himself, “Words Make Division, Pictures Make Connection” (Neurath, 1936). Furthermore, Ware Myers elaborated the perception of Symbols with the help of his 7 Principles, namely “Proximity, Similarity, Common fate, Objective set, Direction set, Closure, and Differences” (Myers, 1981)

2.2 Evolution, Impacts and Applications of Graphic Arts.

Graphics as a whole, varies from a wide range of Hand Drawing, Line Art, Illustrations, Printing and Printmaking, Graphs, Diagrams, Symbols, Maps, Photography and Videography, Engineering Drawings to Computer Graphics and Web graphics as well. It all Started its



Figure: 2.2 Ancient European Manuscripts as example of early Graphic Arts.

Source: Meggs-History of Graphic Design.

journey through the invention of Alphabets to the Cave Paintings and invention of Writing methods, approximately dated back to 15,000 BCE. Later, after the invention of the printmaking process, its route towards enrichment was more fastened, but only due to the delay of the papermaking process in Europe, it took 1200AD to set its prosperous Journey of Enriched Graphic Art. (Meggs, 2012) From that phase to the involvement of Computers nowadays have created newer and inseparable dimensions in Graphic Design for today's World. To elaborate briefly about the conventional way of dealing Graphic design and modernist approach of dealing Graphic Design, the below diagram might be helpful. (Simon.D,2012)

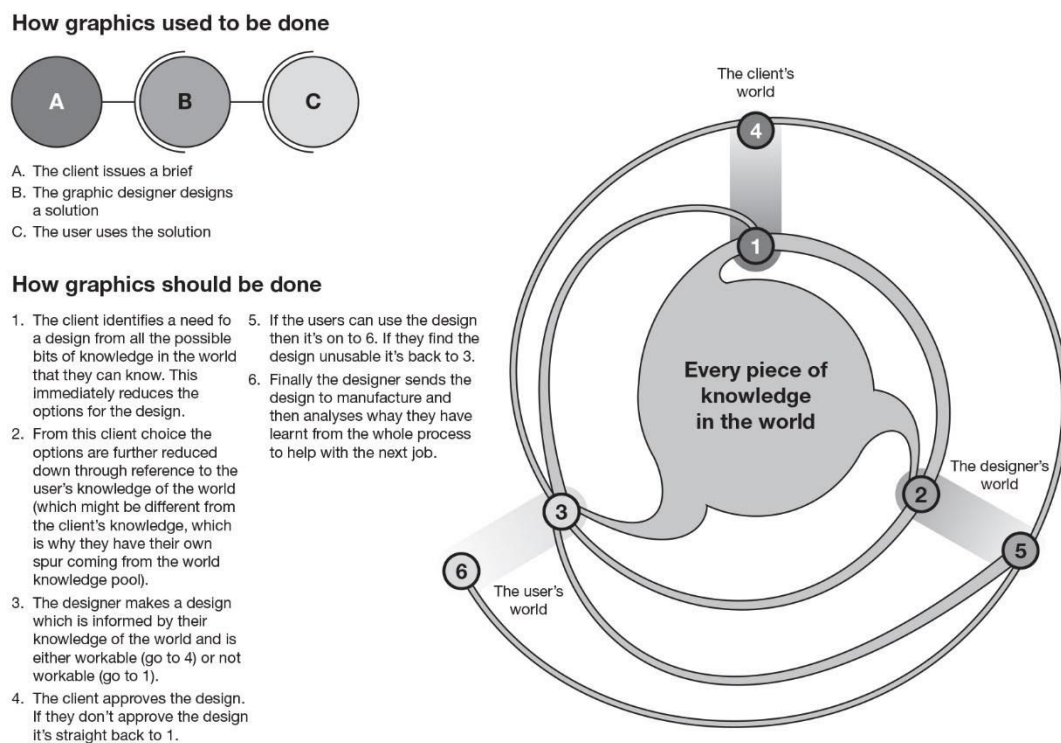


FIGURE 0.1

The traditional model of graphic design was a simple, linear affair; for reasons that are discussed later, the current model gets less linear all the time

Fig: 2.3 Model of Graphic Design

Source: (Simon Downs,2012)

Whereas, Myers says, “Graphic Design is the art of conveying visual concepts from a source through a medium to a human recipient. The source object is a human brain. The Medium is any form of representation the human eye can apprehend.” ((Myers, 1981)

As Illustration being one of the most important elements in Graphic Design Content, designers mostly use Font Typesetting, Visual art, Layout, Computer Software, and other technologies to make their desired content. The use of Graphic Contents and appropriate illustration, designing the Package of Commodity or digital marketing contents as Advertising or marketing, makes the buyers of commodities or the product more interested about the product. Through use of emotional contents, vivid colors, controlling the audience of the society of the specific graphical contents, social and cultural awareness can be done. Thus graphic Art and Illustrations plays such an important role in the social, political and economic aspect. (Zhang.S.,Wang.H.2017) Again on the other hand, the Cartoon form of the Illustrations also plays major roles in our day to day lives for different information depiction. Zhang categorizes these into four further categories, as – Exaggerated Illustrations, Satirical Illustrations, Humorous Illustrations, and Scherzando Illustrations.

Graphic Design and Printing technology are coined together according to Newark, since the Early development of Lithography, which flourished due to the Industrial revolution at the middle of the twentieth century, marking the birth of a new form of Graphic Design. Printing and printmaking technologies are one of the major role-playing contributors during the industrial revolution. (Newark,2007) Whereas, Worthington asserts that the Lithography printing Process was formerly invented by the Germans in 1797. Then due to further developments in the process, at the end of the nineteenth century artists found ways to add more colors and bigger size of canvas, and their own typography for their preferable work. (Hird & Finley,2010) (Mack,2007).

2.3 Graphic Art as Practice and Learning.

Starting from the publication of Books, Articles, or magazines to the attractive advertisement contents, everywhere this process of message conveying through the use of graphical elements have attracted many students, professionals and researchers to choose this occupation. But it requires much creative and technical skills like Accuracy, Creativity and Originality according to Poggenpoh (1993), Akinboye(2002), and Bagget (1989). Though, according to Nkuma(1997) the ones who tend to pursue vocational careers in this specified field, get the learning experience which is biased towards the necessity and demand of the job market, which includes self-employment as well. Therefore, this solves the unemployment problem for the graduates in this subject matter.

As Graphic Art is such a Universal subject, each year, the concurrent technology or the other factors are in an ongoing evolutionary process. The curriculum also should be changed according to the demands of the ever-evolving society and the market demands, upon which this professional field relies on. Therefore, adaptation of Hardware, Software and technical skills has to be ensured in the academic curriculum as it is greatly interlinked to the advancement of computer technology. (Rubin,1994), (Kinik,2019). He also questions the sufficiency of the education provided in this particular field, as it may need to be more versatile in order to give more space for researching, broaden knowledge, reading & travelling and much more non educational activities through adaptation process might play a vital role throughout the whole learning process. (Kinik,2015)

2.4 Rebirth of the Graphic Art

Printmaking has a long history of its journey which primarily served the purpose of reproducing religious texts and manuscripts, but due to the societal demands in various sectors, the duplication of images helped in communicating to the mass people in this Digital age. (Higgins, 2015) Instruments like Macintosh became one of the prior design tools after the mid 70's to help broaden the vision of the designers out of the Victorian style of designing, which had limitations in assessing the quality of the mass production.(Thornton,1996) It is proven through record that with the assistance of computers, many graphic design business enhanced their graphic related work with the help of Adobe software (Chawst,2000). At this digital era, many local professionals or small business groups would set up their graphics equipment very easily and buy design software for creating their own graphic contents.(Thornton,1996) On the contrary, Tracey Schwarts(2003) fears that “in taking Art out of the Graphic Design, we are creating a generation of computer software experts instead of producing creative artisans.” Winkzek adds on the similar note that with the help of the provided technologies of printmaking and Graphic design tools, the work became more confined to Technology oriented rather than an Artists complete imagination. (Winkzek,2018) Computer and the digital media helps these creative artists to create unique imaging, using various techniques, through making iterations of many types within their comfort of exploring creativity. (Joan.,1996)

2.3 Graphic Arts in Bangladeshi Context

Bangladesh faced severe necessity of Graphic Designer before and during the liberation war. The most important Designer who played a vital role as a designer, being an artist by profession and a patriot by heart, Qamrul Hassan fought with his designing skills for the Independence of Bangladesh, being on exile from his Government Job. He has gifted us the National Flag of our Country, as well as the State Monogram and the Bangladesh Bank



Fig: 2.4 Examples of graphic works from Quamrul Hassan, Source: (Mallick 2009)

Monogram during the war crisis. Then again, to bring unity among the Bengalis, he featured Yahya Khan as a caricatured Demon in his world famous poster entitled, “Annihilate These Demons” which later on made a considerable impact.(Jahangir, 1997) Later on he also designed monograms for Bangladesh Parjatan Corporation, Freedom Fighter Welfare Trust, and more. (Mallick, 2009)

In recent times, Bangladesh even though having a great demand for multimedia manpower, we are not being able to put the pieces of puzzles in place because we are being ignorant about some of the facts. We are too busy giving emphasis on the growth of Dhaka City, while the whole of Bangladesh lags behind due to illiteracy among most of the rural areas of our country. (Brian,2013) van Schelden says, according to Data, Bangladesh is a country with serious problems in terms of access to the media, which affects the democratic rights. (Van Schelden,2009).

Table 2.2: Bangladeshi media at a glance	
No. of daily newspapers (2010)	292
No. of weeklies (2010)	125
No. of private satellite television channels (2010)	23
No. of government owned television channels (2010)	2
No. of private FM radio stations (2010)	4
No. of community radio stations (2010)	14
No. of government owned radio stations (2010)	1
Mobile phone subscribers (2011)	76.43 million
PSTN (land phone) subscribers (2011)	1.28 million
Internet density (2013)	20.3% (BTRC)
Sources: Ministry of Information, GoB; Bangladesh Telecommunications Regulatory Commission	

Fig: 2.5 Media Distribution of Bangladesh Source: Ministry of Information.

According to Muntassir Mamoon, Bangladesh is very much vibrant with many festivals. Even in the religious festivals like Eid, Muharram, Janmashtami, Durga puja, all sorts of artists and other intellectuals, as well as religious devotees struggle to bring out their best, where a mixture of low and high cultural value is intertwined in our multicultural society we live in. Those images, colors, textures, emotions are portrayed in various ways in our day to day life. (Mamoon, 1996) According to Rokeya sultana, graduate and 1st batch of Print-Making Dept of D.U Print-making technology has its speciality as it can be made into

multiple editions, and this it easily reaches out to the masses, which now functions beyond making of posters, propagandas, pamphlets, manifestos, etc. (Sarah N.S. 2017)

Chapter 3: Site Appraisal

The site of this project is at one of the most important locations of the Capital city Dhaka. In this zone, the land value is at the peak, and is surrounded by a lot of important landmarks, nodes, and infrastructure. It falls under the DNCC, Dhaka North City Corporation, within Mohammadpur Thana.



Fig: 3.1 Site location

3.1 Site surroundings

The site of this project lies along the North Western side of the Satmasjid Road of Dhanmondi.

Though, the Satmasjid, from where the road was named is located at Mohammadpur, satmasjid is mostly known for its important establishments being a continuation of the developments along Dhanmondi Major roads.

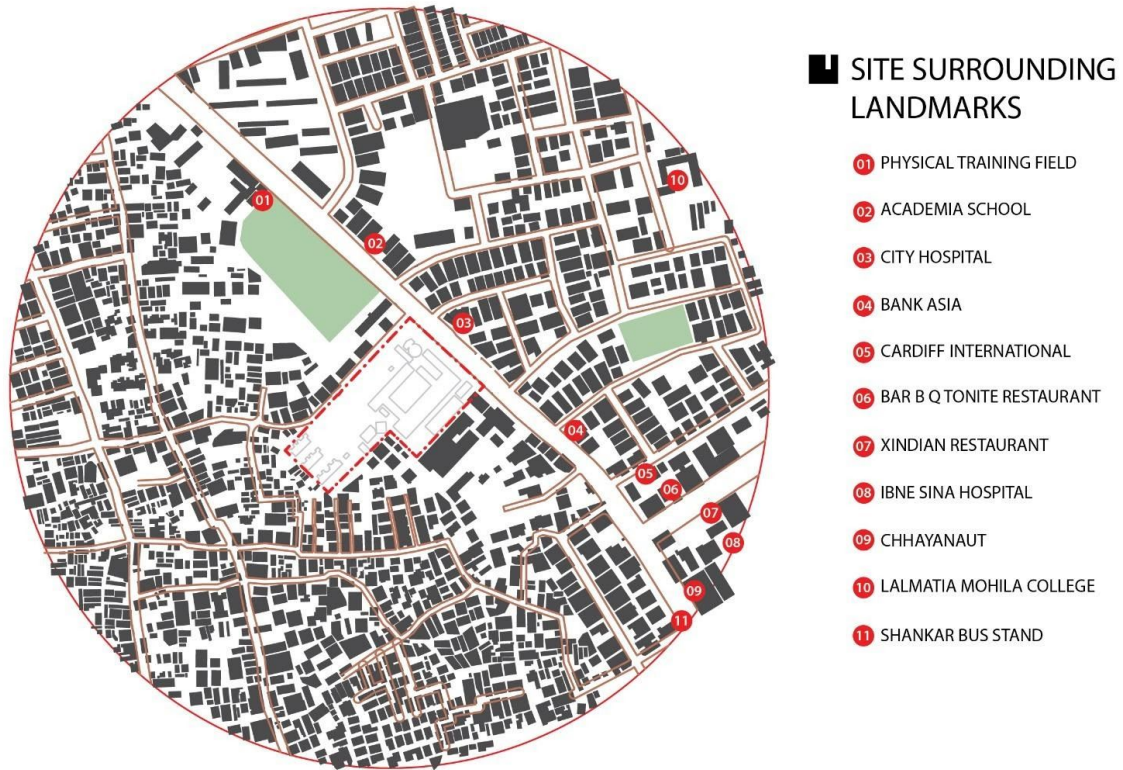


Fig 3.2: Site Surroundings

From this above map we can have an insight that most of the important landmarks and nodes around the site is mostly along the Satmasjid Road which connects directly with the site. Therefore there will be impacts of these nodes and landmarks on the site due to having a connectivity.

3.2 Historical Development of the Site

Dhanmondi & Mohammadpur were mostly crop fields before or during the Mughal period.

At around 1950, the area was being planned from the initiative of the then Government, which makes the Major roads of these areas noticeably wider. The Site surrounds with many of the historic structures as this place was somewhat important to all of the rulers starting from the

Mughals, which is proven by two of the

Mughal mosques standing one at

Dhanmondi side of Satmasjid Road, and

another one being on the other end of the same road, at Mohammadpur. Most of the

Commercial & Institutional developments

along this road were established after the

90's, whereas the graphic Art Diploma

was first established in 1967, 19 years

after the Fine Arts Institute at Shahbag.

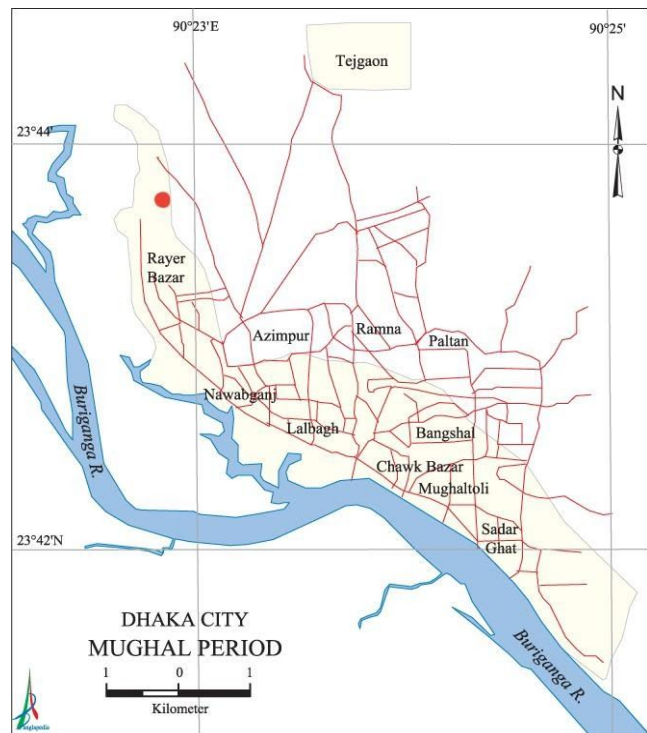


Fig3.3 : Site location compared to historical development around site

3.3 Geographical Characteristics of the Site

This region was once a floodplain, but recently, after residential developments were planned, a lot of commercially important zones also made it an important location in Dhaka City. But even today, during heavy shower rain, this zone goes under water being flooded with most of the zones including Satmasjid Road, even after the construction of the City Barrier Dam,

Beribadh. But the intensity of flooding has gradually decreased after the construction of the dam.

3.4 Land-use Pattern of the Surroundings

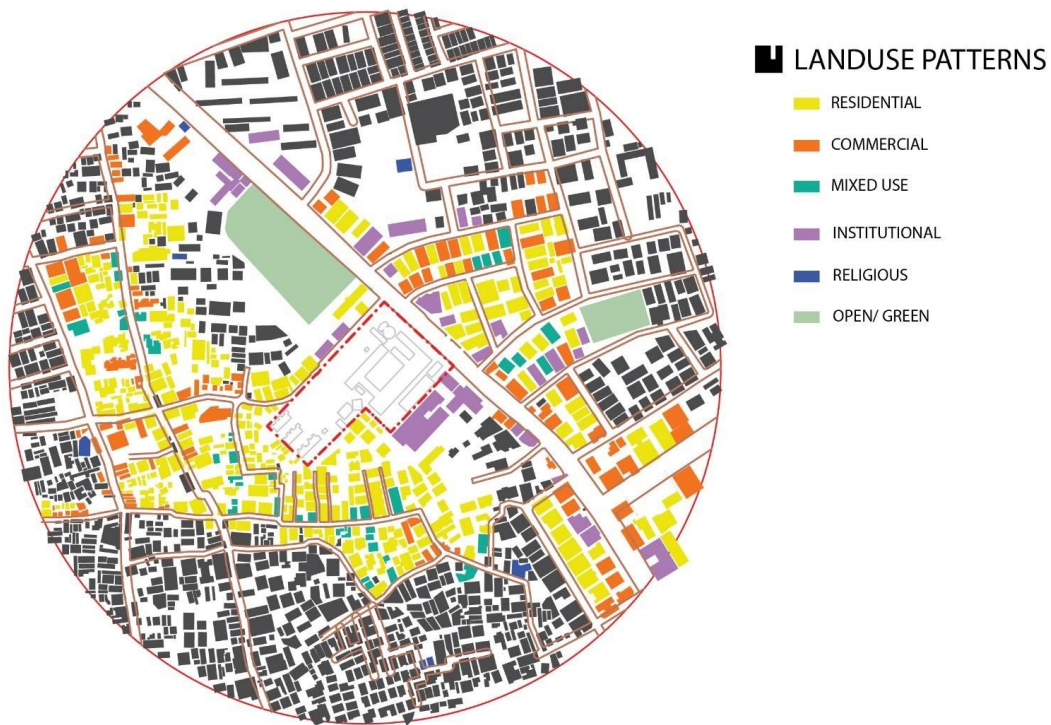


Fig 3.4 land use Pattern

The site lies at the edge of the separation line between the two residential zones, and it is also having few of the mixed-use built forms around. It also has a lot of institutions surrounding the site.

3.5 Accessibility and Connectivity

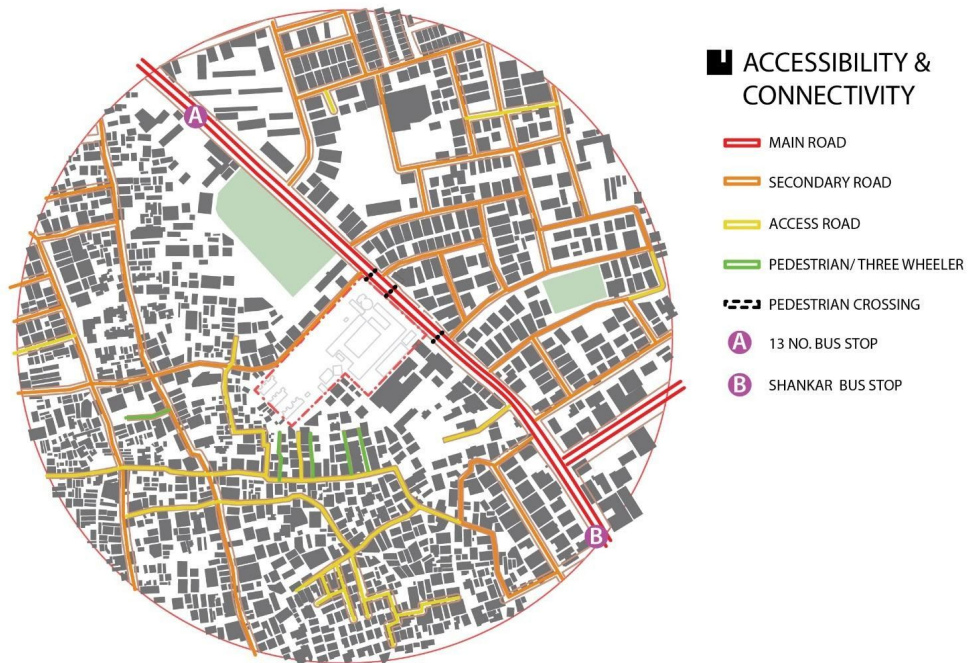


Fig: 3.5 Accessibility map

3.6 Climatic Conditions

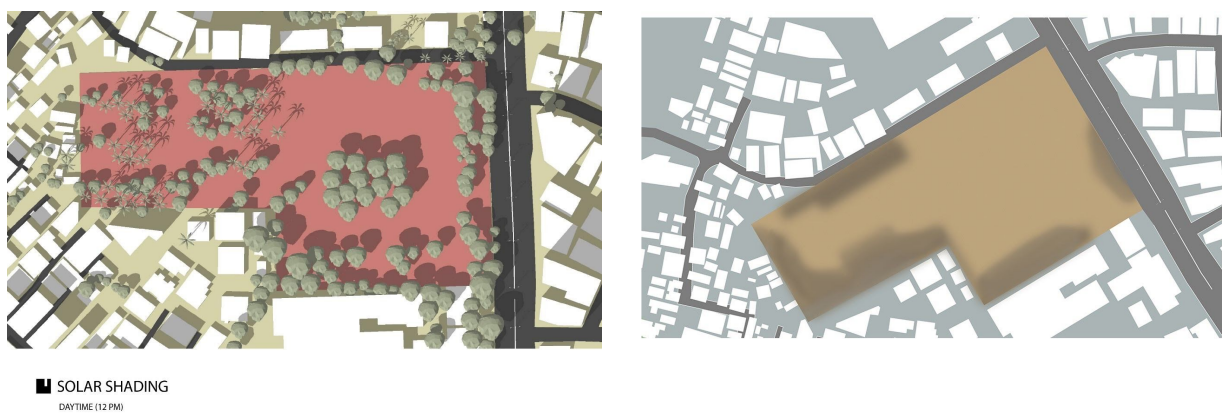


Fig: 3.6 Solar shading on site



WIND FLOW MAP

MORNING (6AM-10AM)

AFTERNOON (11AM-2PM)

EVENING (3PM-8PM)



NOISE MAP

MORNING (35-50 Db)
AFTERNOON (40-65 Db)

MORNING (60-70 Db)
AFTERNOON (65-90 Db)

Fig: 3.7 Environmental survey on Sound and wind

3.7 Socio-Cultural and Economic Contexts



Fig: 3.8 Activity Mapping around the site

The site is surrounded with many prominent activities which were traced down and are represented here through an infographic mapping.

POTENTIAL OF THE SITE

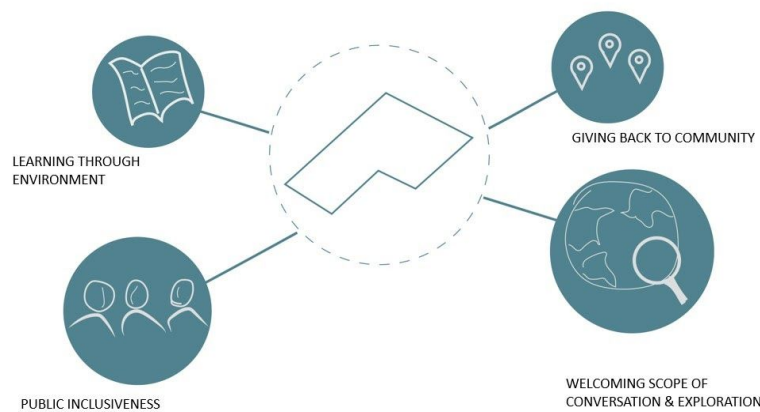


Fig: 3.9 Potential of the site

3.8 Images of Existing Site Condition

The Site has a few built forms functional to some extent, but at high risk, which were mostly built during 1967.





Chapter 4: Case Study Appraisal

The Case studies for Graphic Art Institute were chosen according to some of the similar context of the program, or the complexity of functions, or similarity with site contexts. A brief analysis has been given below.

4.1 NID National Institute of Design, Ahmedabad.

4.1.1 *Project Brief*

Project Architect: Sarabhai and Gira Architects

Site Area: 63848 sqm

Year of Completion: 1961

Location: Paladi, Ahmedabad, Gujrat, India

User Group: Design Studios (200) Guests and Staff accommodation

Currently the institute enrolls 100 students each semester, and each department has a 2 year long academic program. There are Departments of Graphic Communication, Industrial Design, and Textile Design. To accommodate both the girls and boys and the staff of the institute, and provisions for guests, there are hostels/dorms provided within the campus.

4.1.2 *Environment and micro climate*

Ahmedabad being 51 m above the sea level is a hot-semi-arid climatic zone, with very less amount of rainfall. Addressing the climatic factor, for any building design in this region would be very important. The site is beside Sabarmati River, and it is slightly sloped toward the river shore line. It is very hot and dry during the daytime of the Summer. Vegetation and

usage of building material has played a major role in designing the environment of this institute.

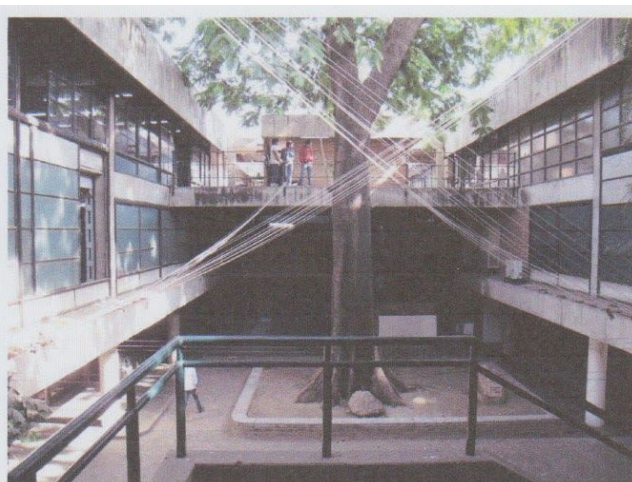


4.2.3 *Form and Function*

4.1 *Semi outdoor spaces* *Source: NID*

The main academic building is a 3 storied institute building with several other built forms surrounding it with other ancillary functions. It has its vaulted roof for hot air to ventilate through it in the daytime. It has a few courtyards which spatially connects the classrooms, labs, and workshops.

Fig: 4.2 Courtyard Spaces *Source: NID*



4.2.4 *Site Planning and Landscape detailing*

The whole site has been organized in such a way that the academic block gets its own zone for the students for a comfortable environment for studying, and the accommodation facilities were placed further away but within a range so that it keeps a harmony with the other built forms.

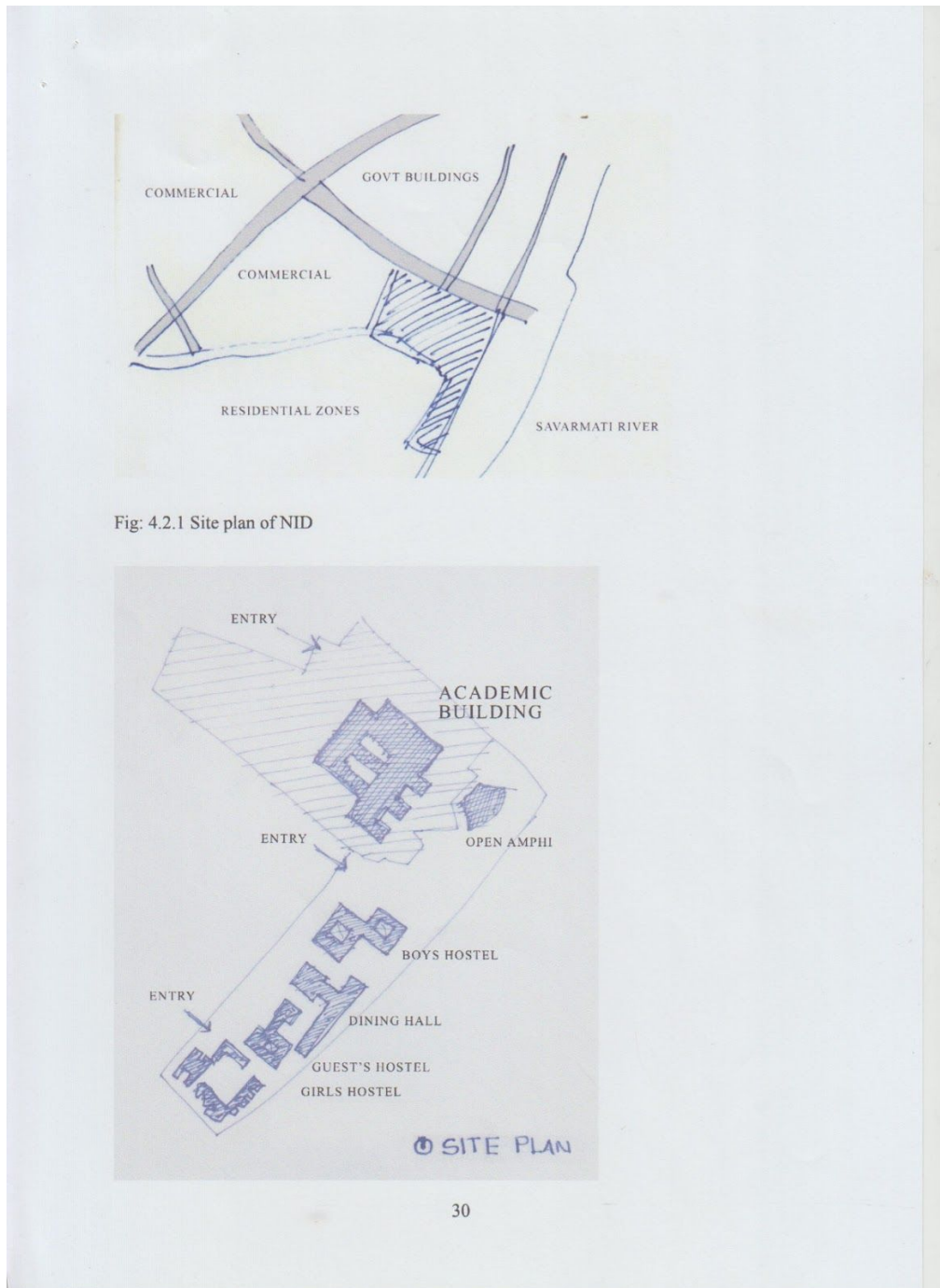


Fig: 4.3 Site Planning Source: Author

Refer to the Article on the blog “A Guide to Site Planning“, which deals with different aspects considered in site planning in greater detail.

4.1.6 Academic Circulations

There are circular stairs and some regular stairs which connect immediate floors at different places mostly, to make a heterogenous circulation in order to break the boredom of the spaces. there are some defined circulations connecting the labs, design studios, and workshops, and offices, while some other open free circulation are designed carefully for clustering the spaces.



Fig: 4.4 Ground Floor plan, NID



Fig: 4.5 1st floor plan, NID

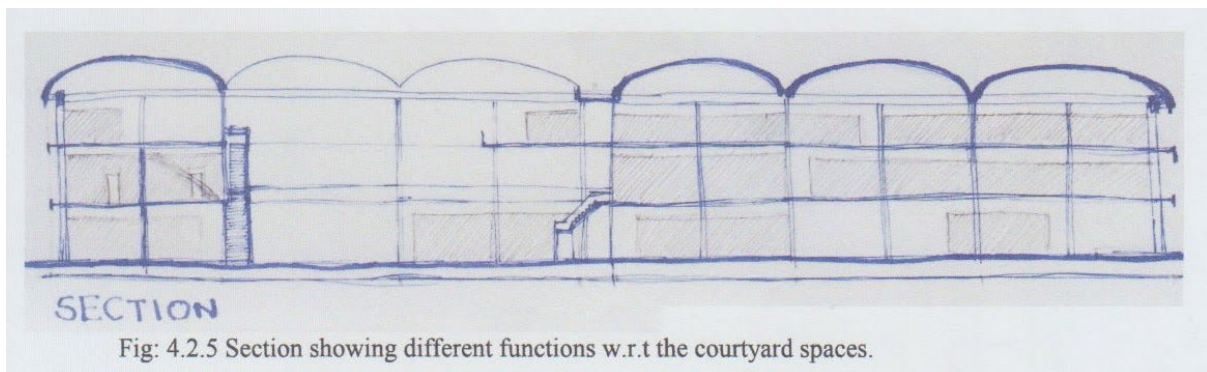


Fig 4.6 Section, NID

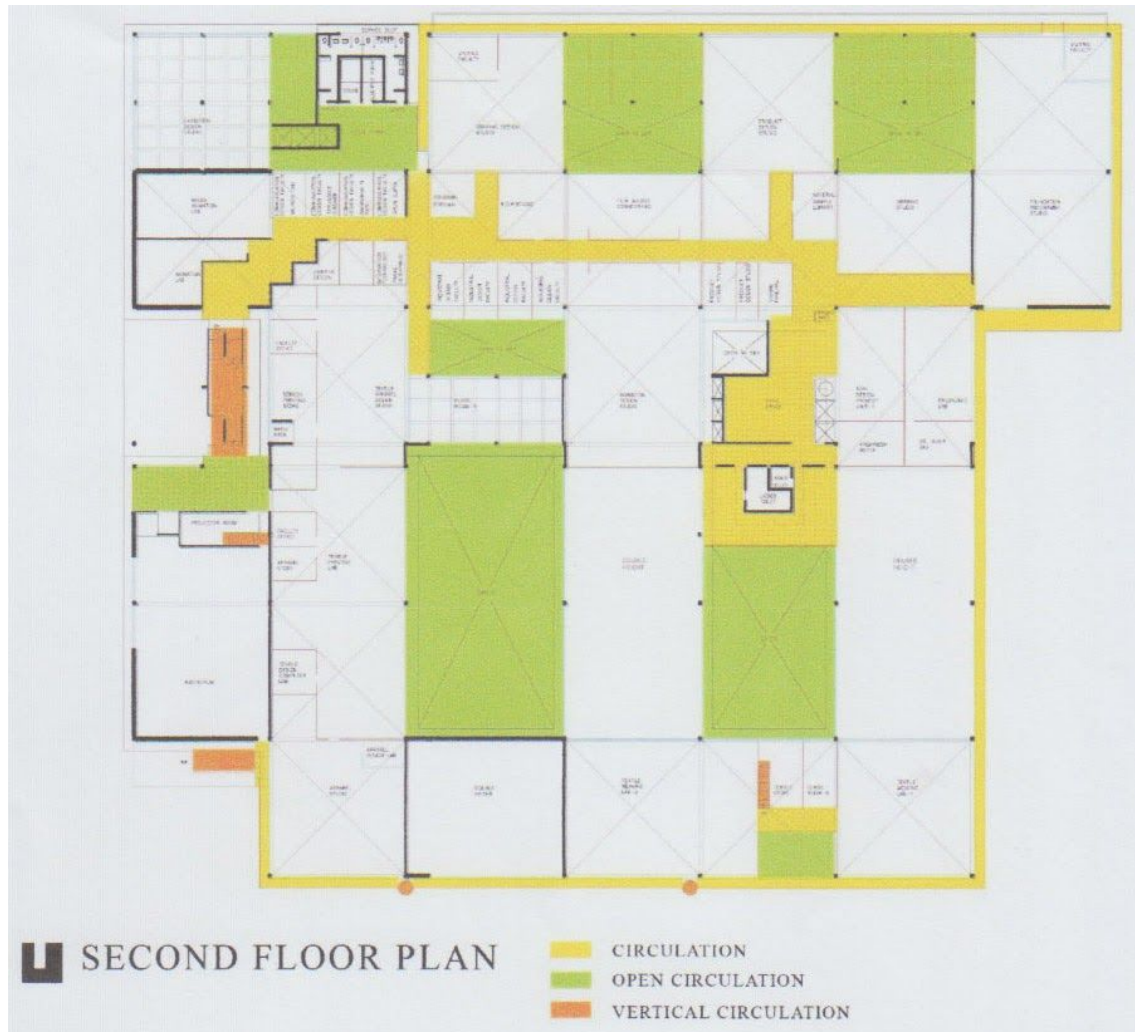


Fig: 4.7 2nd Floor plan, NID

Here if we observe the circulation layout, we will find locations of vertical circulations at the strategic locations which are used by mostly students and staff alike. There are a lot of courtyard spaces connecting different functions.

4.1.8 Structural details

The whole building is framed structure, where some of the column free spaces are designed with waffle roofs and the vaulted super roof is a shell-like structure made of concrete here.

4.1.9 Design detailing

The building is very sensitively designed with a lot of design detailing. The glazing used for the classroom provides sufficient light wherever needed, but for being located in a hot dry climate, the glazing had to be treated with large foliage of trees. The inward courtyards are shaded mostly. There are a hierarchy of spaces in each floor and connective floors through the courtyards.

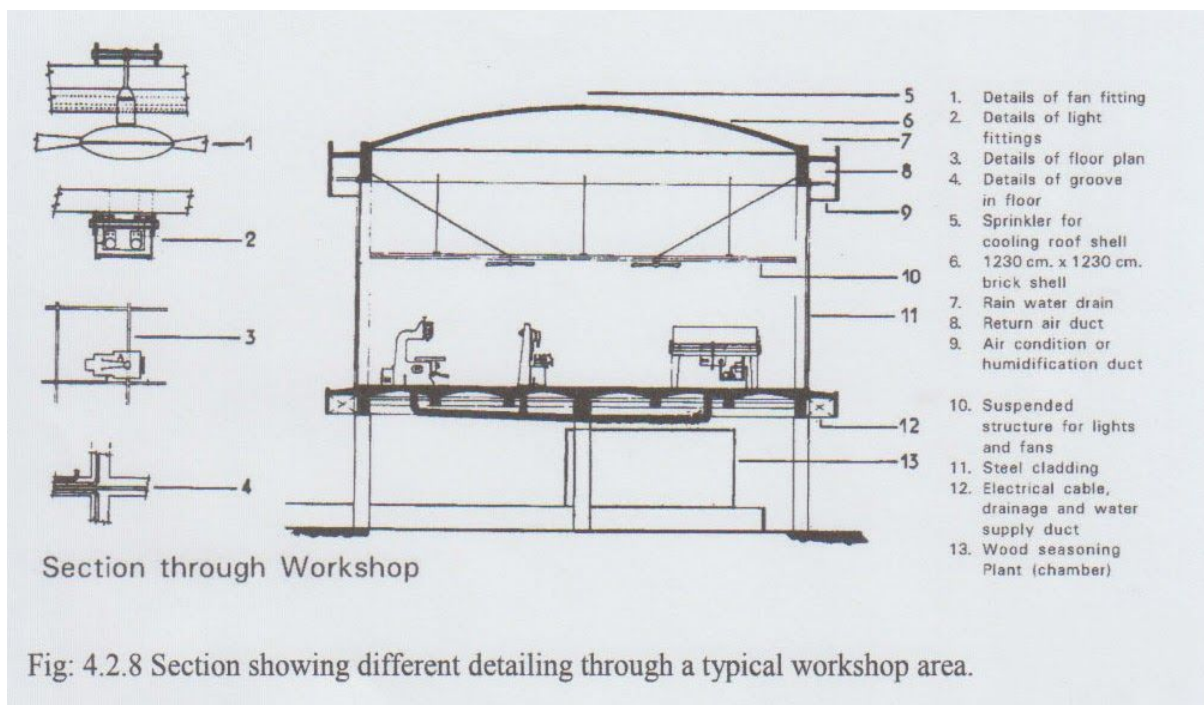


Fig: 4.8 Section through workshop.

4.2 HKDI Hong Kong Design Institute.

4.2.1 Project Brief

Project Architect: Thomas Coldefy & Isabel Van Haute CAAU

Site Area: 42000sqm

Year of completion: 2010

Location: Tiu Keng Leng, HK,

User Group: Students (4000) and the public

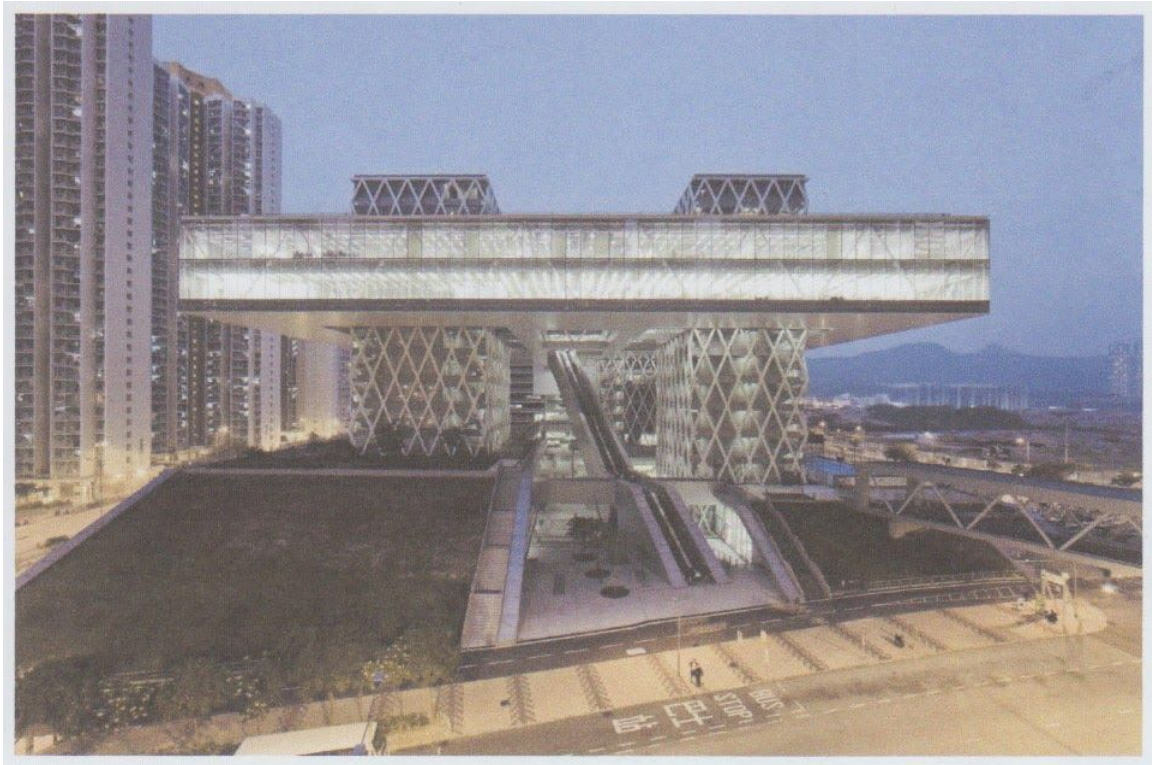


Fig: 4.9 HKDI front view *Source: Archdaily*

This project was internationally won by these two Architects through a two phase competition by competing 162 teams from many countries. The Principal Architect, Thomas is the first french Architect to work for this kind of context in HK, but sensitively addressed

the cultural issues of this place, through solving urban issues, by making a bold expression of this building by thinking out of the box of the trend of making an ordinary High Rise building.

4.2.2 Environment and micro climate

The Climatic zone of Tiu Keng Leng area is hot and humid, 640 m away from the sea shore, and surrounded by green hills of Hong Kong. Here the highest average temperature rises up to 30C and it rains for around 5 months a year. As we know Hong Kong is a densely populated area, but this area having residential and industrial zones around, has a lot of parks and natural a lot of greens reserved for the neighborhood.

4.2.3 User Behavior and requirements

The HKDI is a 42000sqm project dedicated to the users of Hong Kong community is a vocational study institute. The area is served by the HKmetro, and is 20 mins from HKcentral also has a bus stop near the site .The site surrounds mostly residential area and commercial area and green hills. The view towards the Junk Bay area is kept from mostly everywhere on the elevated site.

4.2.4 Form and functions

Breaking through the common notion of building up just another highrise on the skyline of HK, these architects utilized concrete glass and steel to fabricate this truly unconventional multifunctional built form. This design Institute building offers different levels of interaction places at various bases, the podium of the built form sloped towards the main fraud of Tui

Keng Leng. Above is the raised glass box suspended 7 stories above the ground level, held up through 4 vertically upright yours of seel lattice framework.

4.2.5 Academic Circulation

An exlosure runs straight through toward the building in two steps ending at the suspended glass box which constitutes mainly the studio. Then there are pairs of lift and stairs. Ground Floor major circulation is through the main axis parallel to the escalator, and then going parallel to the eastern portion of the tower. The rest of the circulation of 7th and 8th are at the periphery of the studios and the hollow space.

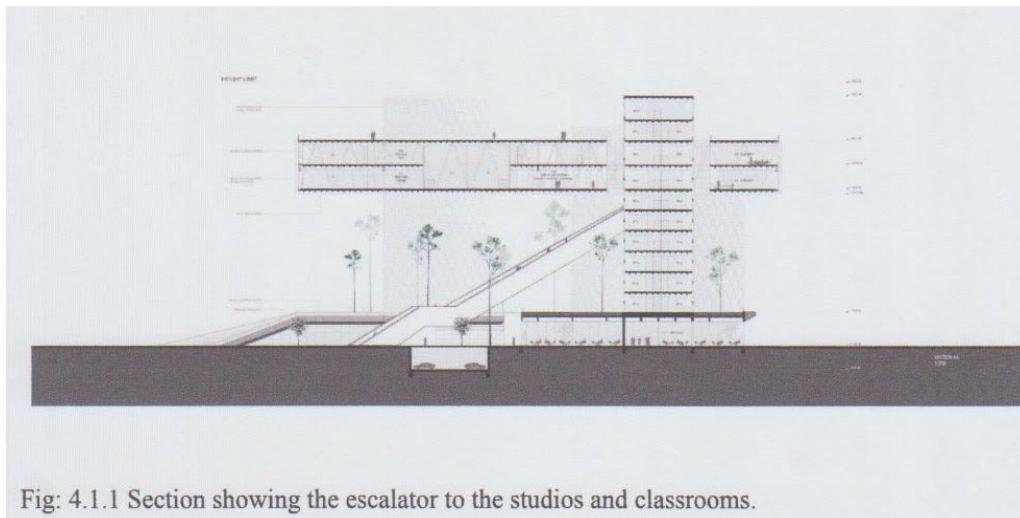


Fig: 4.1.1 Section showing the escalator to the studios and classrooms.

Fig: 4.10 Section through the escalator and studios, HKDI Source: Archdaily

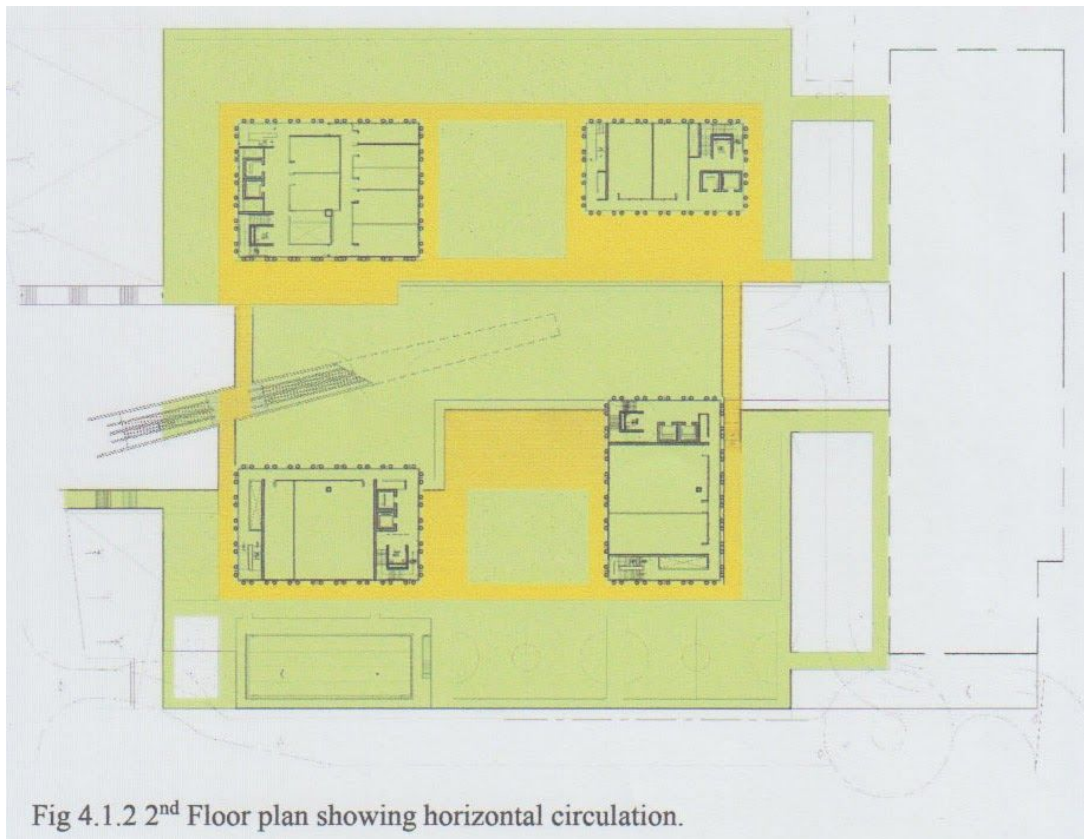


Fig: 4.11 2nd Floor plan, HKDI

4.2.6 Site Planning and Landscape detailing

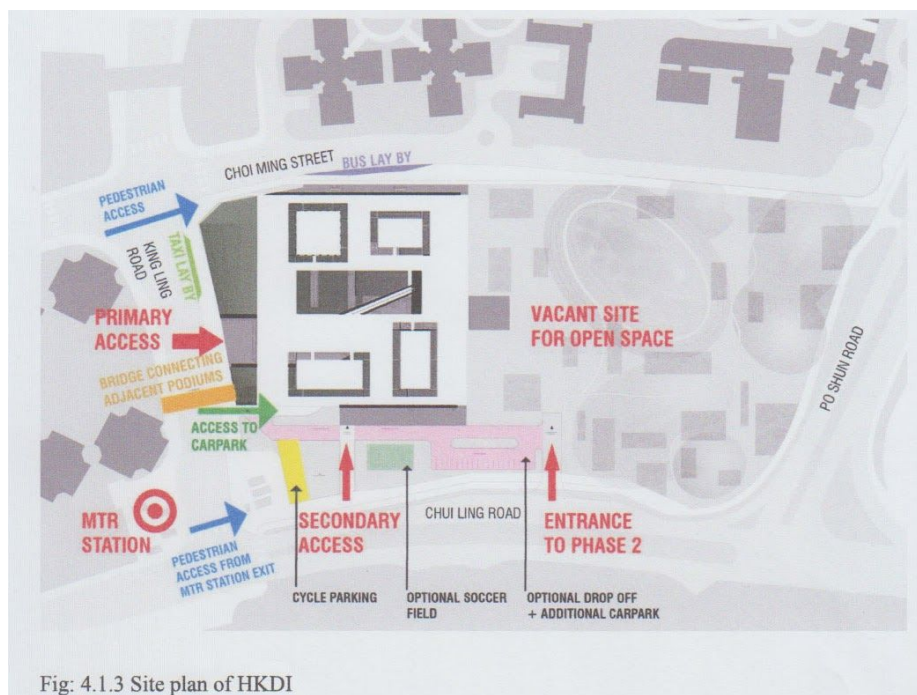


Fig: 4.12 Site plan of HKDI Source: Archdaily

4.2.7 Structural details

It is mostly vertical steel trellis structure known as diagrid structure, mixed with the conventional beam slab reinforced concrete system and fabricated with glass. The 100m x 100m suspended box is overhung through the trelliswork of the four towers.

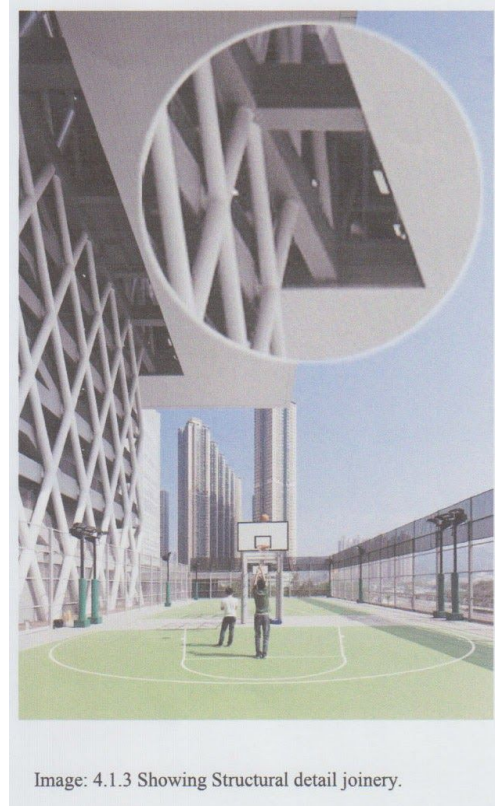


Fig: 4.13 structural detail, HKDI Source: Archdaily

4.2.8 Design details

The different programs like studios and classrooms are well lit with natural light, and the large hollow space provides more natural ambient light in the interior spaces of the institute. The structural expressions are in such a way that is bold and pure which intrigues the student to make and think innovative. This is a perfect blend for a creative thinking process for the city context of HK.

4.3 Fine Art Institute, Dhaka

4.3.1 Project Brief

Project Architect: Architect Muzharul Islam

Site Area: 4 Acres

Year of completion: 1953

Location: Shahbag, Dhaka, Bangladesh.

User group: Students of Fine arts, and Public



Image: 4.3.1

Fig: 4.14 View of the classrooms from courtyard. Source: Author

4.3.2 Environment and Micro Climate

The zone is tropical wet and dry and shows a distinct monsoon climate characteristic. The main road junction is near the site, but due to the site planning, the city congestion is not prominently noticeable from inside the campus.

4.3.3 User Behavior and requirements

Despite being a fine arts institution, this premises is used for various other purposes. It is one of the most demanding spots for recreational purposes for the general public and mostly to the university students. In the crowded environment, and ambience of the city Dhaka, this piece of green brings them close to life and living beings. The existence of the beautifully

crafted open spaces, yards, and vegetation, allows people to bring the peace of mind so that it opens up their mind for creative thinking, which would further help them in exploring and crafting new ideas and forms of art.

4.3.4 Form and Function

The Architect Muzharul Islam planned the building addressing the site and climatic contexts. Considering the number of users, he tried to keep the built form as minimal as possible and placed the studios with respect to the site and climatic considerations, and the key concept of the fine art institute and the exhibition spaces. The function has been arranged in a properly solved manner without compromising with the uniqueness of the form. The clearly noticeable geometric forms coherents every quality of being presented as one of the best solved architecture and detailing.

4.3.5 Site Planning and Landscape detailing

It is located at the heart of Dhaka city, and is a department of the University of Dhaka Campus area, which is at a congruent blend with the city fabric.

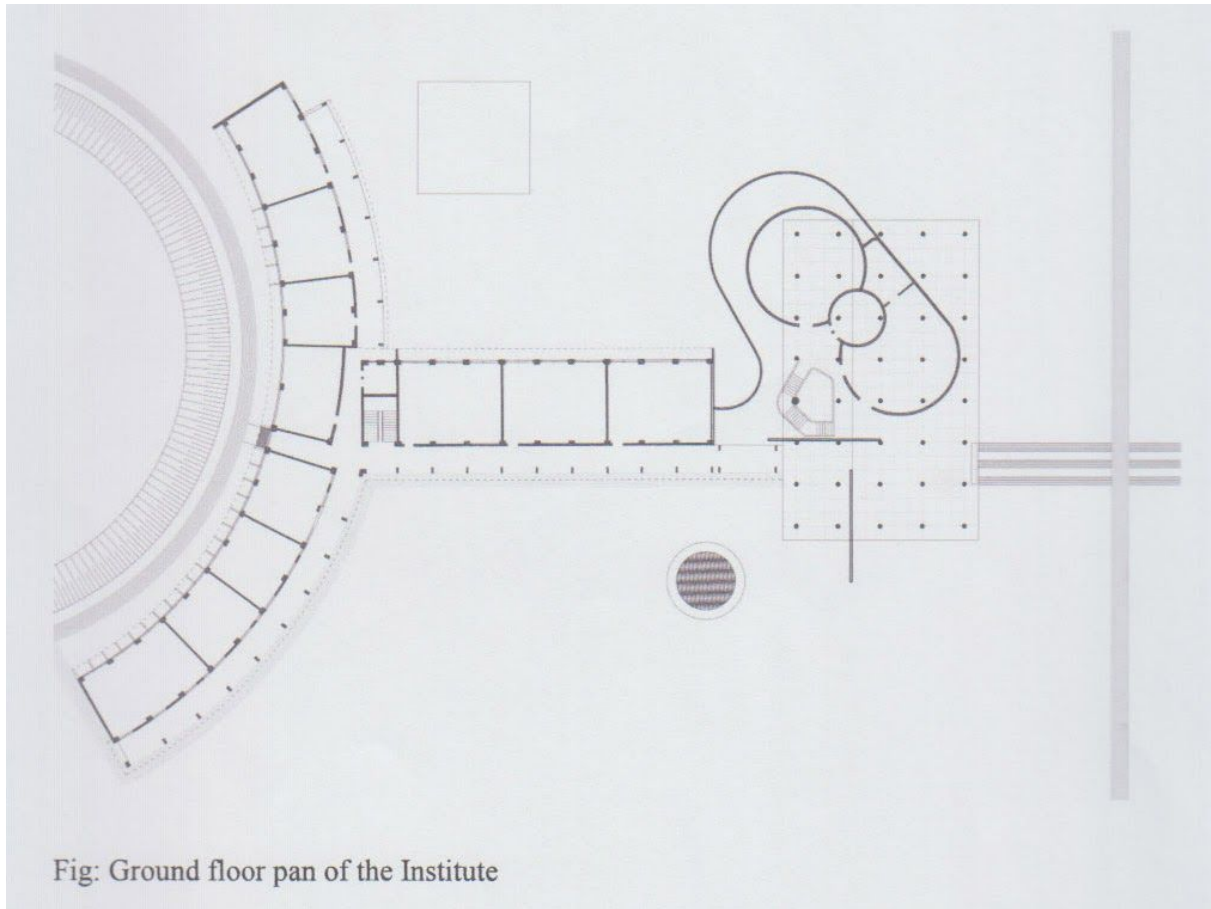


Fig: 4.15 Ground Floor Plan, Fine art inst. Source: Author

4.3.6 Structural Details

The Structural elements are mostly brick columns incorporated with concrete slabs and the beams have been casted with cast concrete keeping both the structural and aesthetic value in mind. The columns have been placed not only as a structural element, but also to enhance the visual quality of the clinging corridor. The structural skeleton has been tried to keep transparent to the viewers. In several spaces, vertical members have been used in the purpose to create the ambience of a crowd even in the presence of the least number of people.

4.3.7 Utility planning

The Design is a masterpiece itself. The Architect has not only designed it as an institute rather he has detailed every single corner of this building, together with immense effort and designed its every piece with care and with heart's desire. Each and every column, windows, beams, railings, have been designed with sincerity, keeping in mind about the intimate scale for the students. The perforated brick walls have been used in some places of the main structure as well as an element to create recess space for the users.

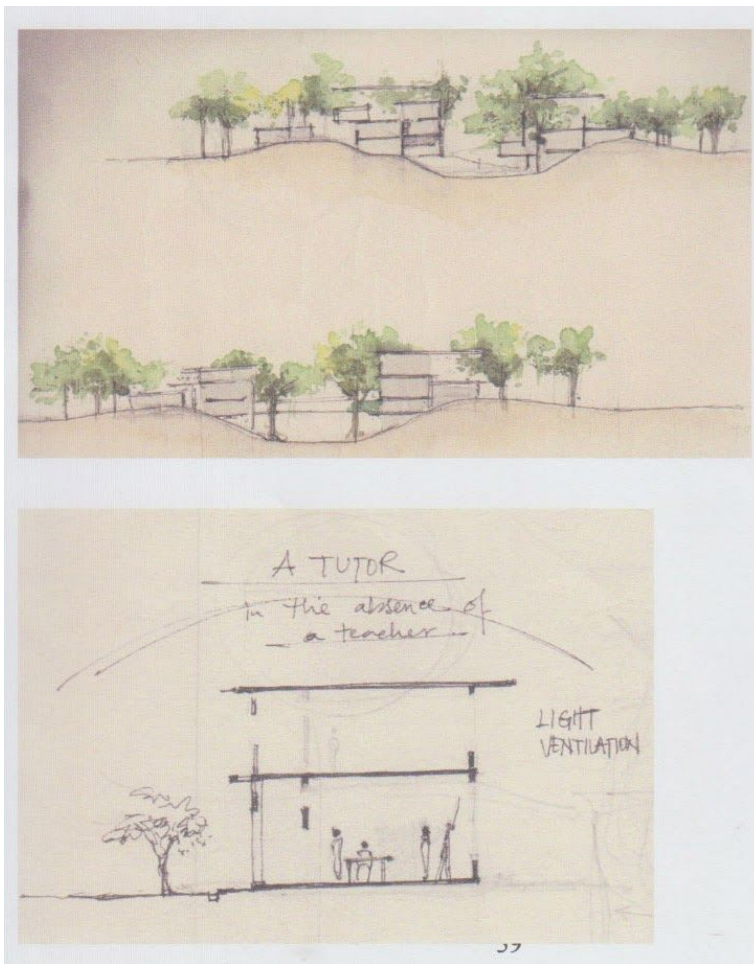


Fig: 4.16 space quality, Fine Art Inst. Source: Author

Chapter 5: Program Appraisal

According to the Cambridge Dictionary, an Institute is referred as an organization having a particular purpose, especially which are involved with Science and Technology, Education or a Specific Profession. This project is dedicated to the students who are willing to acquire a diploma on a specific Graphic Field, and implement this education into his professional field. But in order to serve the country and worldwide to bring international remuneration, the student has to endure with the competitive market, and thus utilize the most of their 4-year academic timeline. Sensitivity of design of this institute is thus very important.

First to understand about the structure of this institution, we have to know about the Organogram, which has been described below.

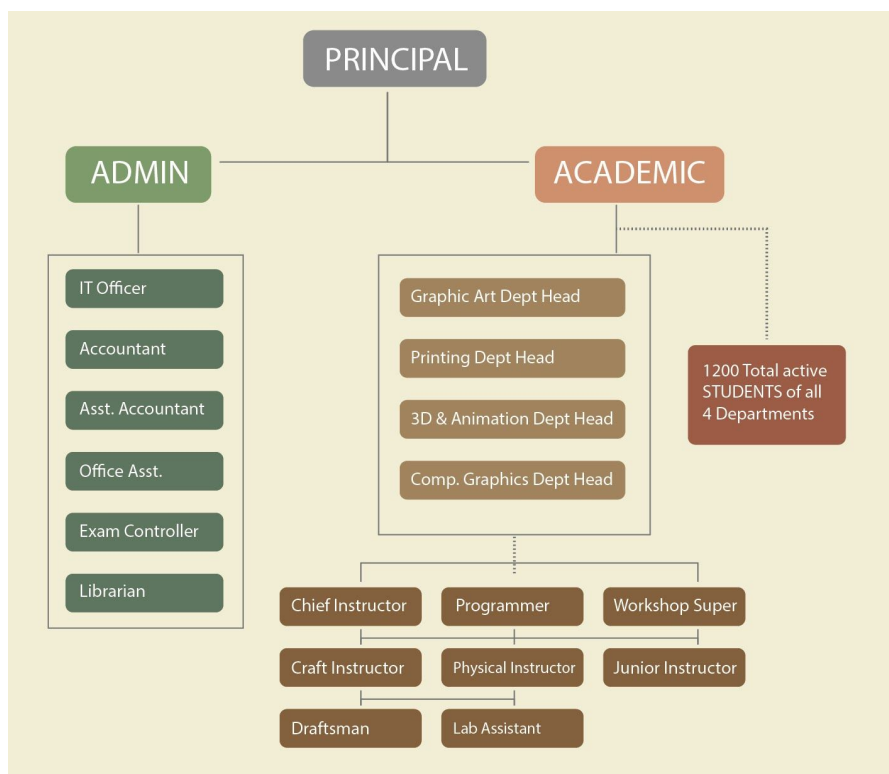


Fig5.1: Organogram of the inst. Source: Author

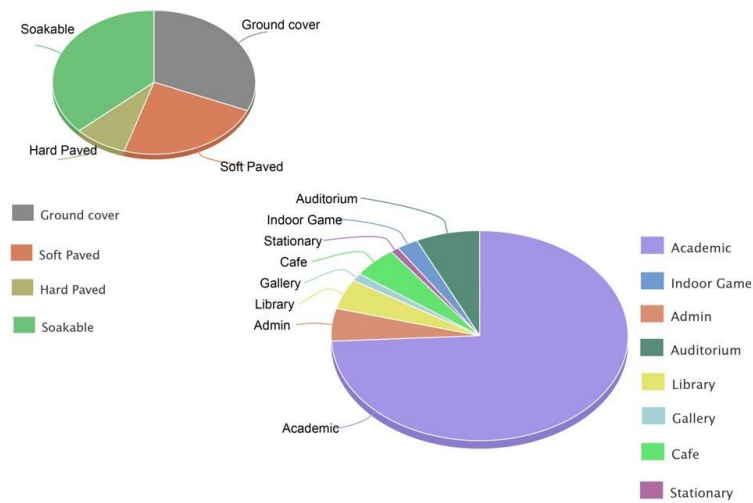


Fig: 5.2 Programmatic Distribution and ground cover distribution

5.1 Administration

The administrative facilities include the Principals room, accountants, exam controller, IT officers and a few other services. Most of the teachers Functions are within the Academic section.

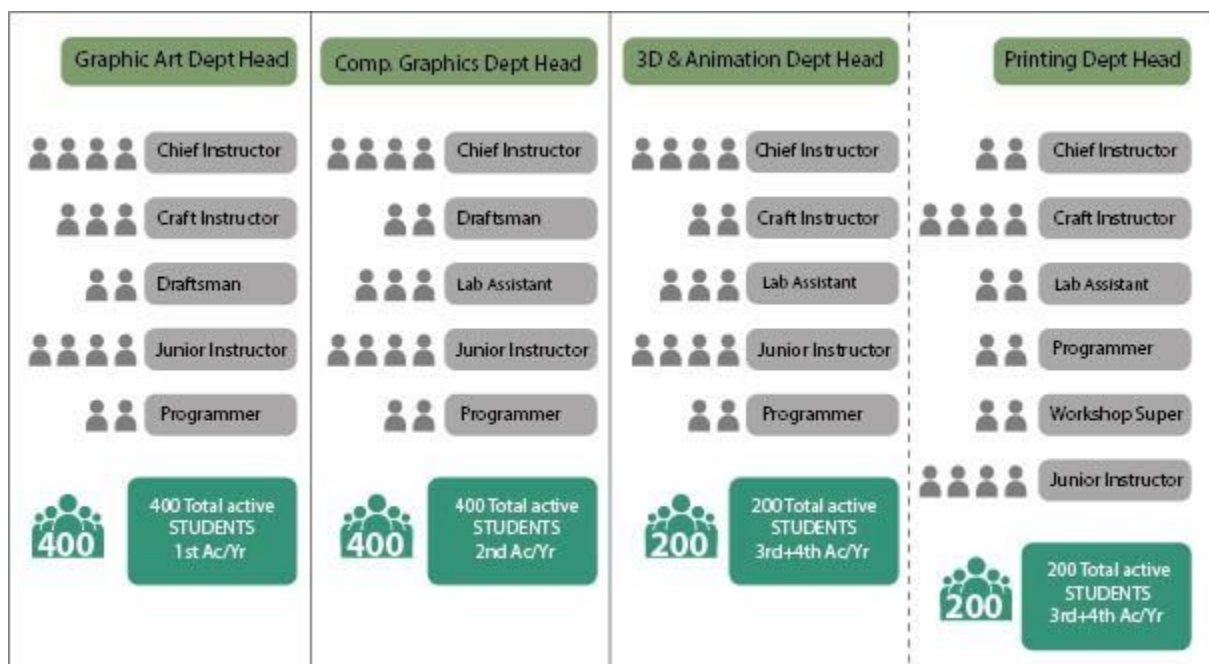
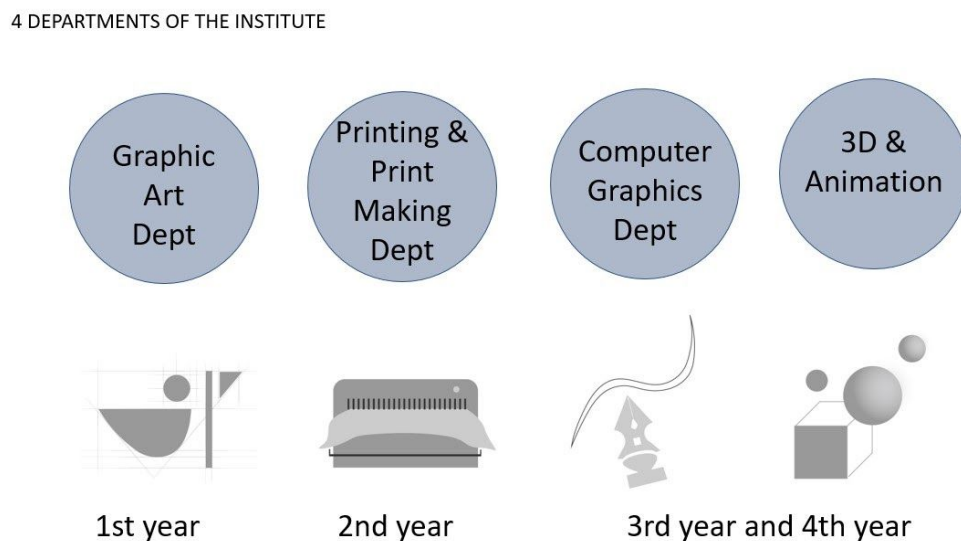


Fig: 5.3 Facilitators : student ratio diagram Source: Author

5.2 Academic Section

The Academic section comprises four departments. The Graphic Art Department, Printing and Print-Making Department, The Computer Graphic Department, and 3D and Animation Department. Most of the department requires the aid of different instruments and equipment. There are several dedicated Labs and Workshops and Studios of each separate department.

Fig: 5.4 the 4 departments



5.2.1 Lecture Rooms

The Lecture rooms have a requirement of 50 students in each class, which is the maximum a standard specialized classroom with projector and whiteboard can hold. In order to increase the number of students from the optimum condition, it is a better idea to add the number of students in each row rather than adding up more than 5 in a classroom. The projection screen and the whiteboard backdrop vary with the size of the receiving student crowd. Whatever be the Layout or Organization, the angle of vision has to be proper for each of the students. According to the Standard, the maximum distance of the seat from the screen should be

within 22', which is also related with the angle of vision being at a maximum of 80°. There has to be a minimum of 1 Wheelchair provision.

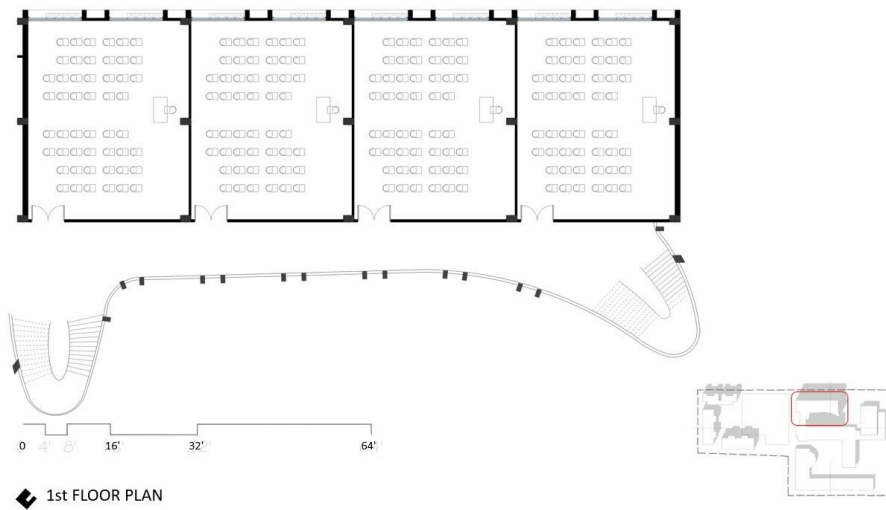


Fig: 5.5 Suggested Lecture Classroom Layout and Dimensions. Source: Author

Following the Standards, the Above layout can be suggested for the Lecture Classrooms, but there has to be a provision for Natural ventilation and light, considering the direction preferable for each class, regarding the orientation.

5.2.2 Printing Workshops

As mentioned before, the Workshops houses different equipment and machineries, which requires special kind of circulation and space requirements. A chart has been given below

mentioning the Name, Dimension, and how many students are engaged with each of these machines while operating the workshops.

Name of Equipment	No of Units	No of Students Involved	Dimensions	Total Area Required
Offset Printing Machine	6	12	3'x3' or 8'x5'	1650
Digital Printing Machine	2	4	12'x8'	1008
Screen Printing Machine	2	6 + 12	7'x3'-6" or 12'x12'	1568
CTP Lab Machine	2	4	6'x4'	409
DIE Cutting Machine	4	6	12'x4'-6"	420
LED UV Print Machine	2	2	4'x3'-2"	186
Flexographic Printing Machine	1	3	8'x16'	504

Table: 5.1 Equipment used in each Printing workshop, and number of students engaged in each of the machine activities.

According to the use typology and pattern of each individual machine, the space organization for each machine can be suggested by cross-checking with the international standards as well.

There has to be specific office rooms with the supplies and storage of the materials used for the printing and cutting purpose.

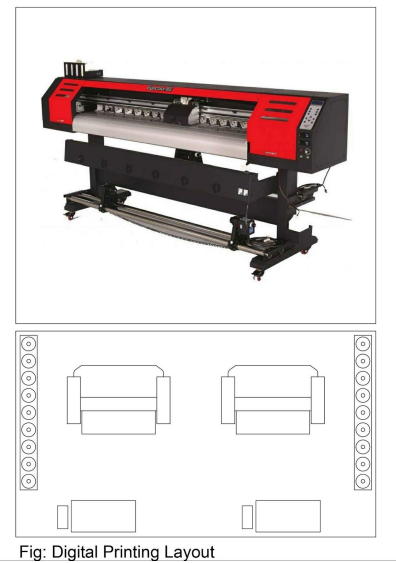
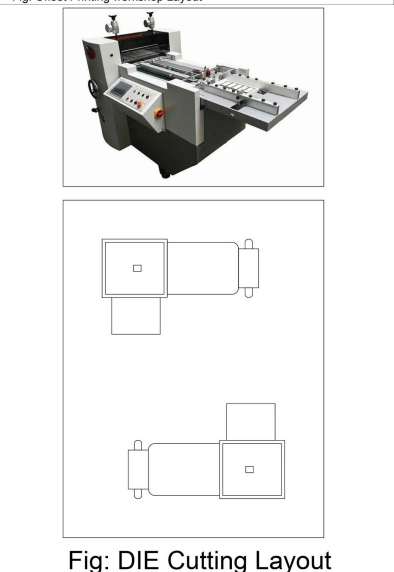
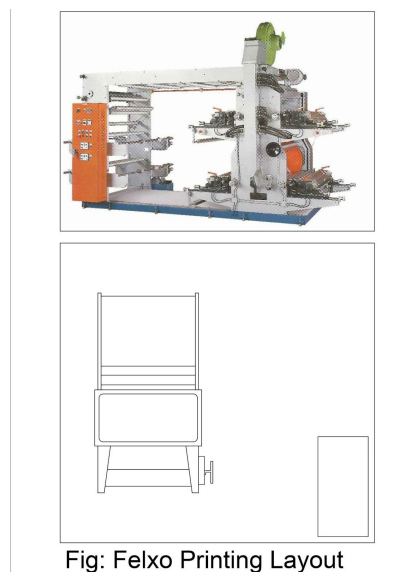
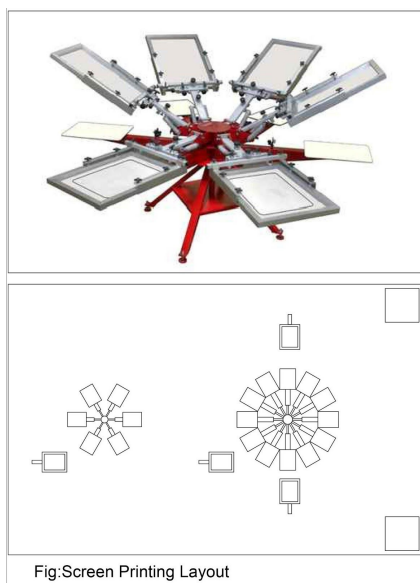


Fig5.6: Printing equipments with dimension and layouts Source: Author

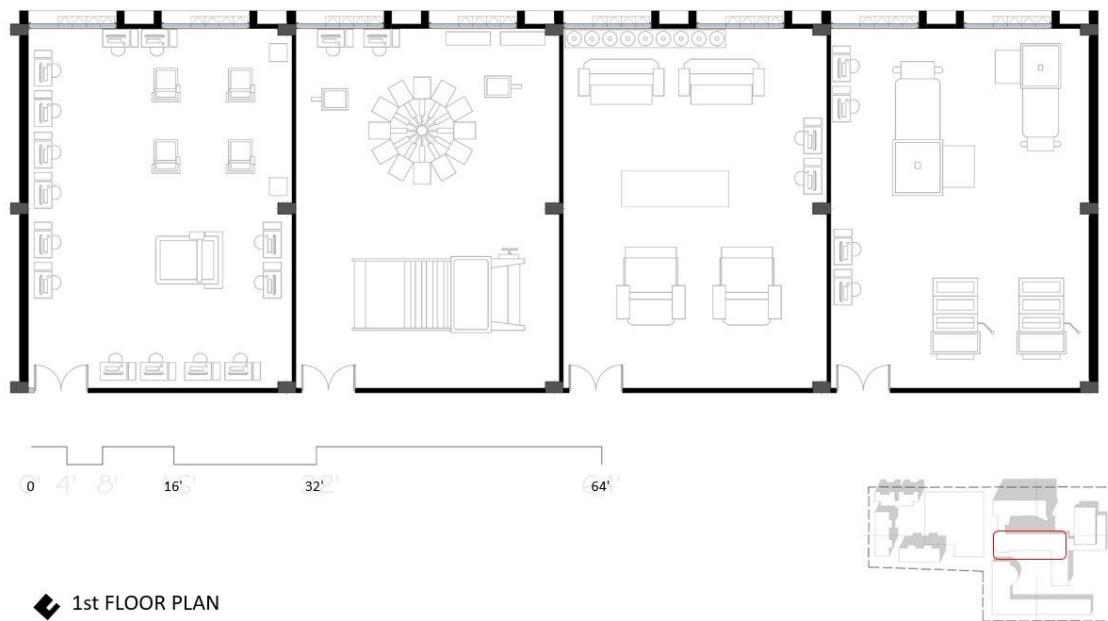


Fig: 5.7 Printing workshop layouts

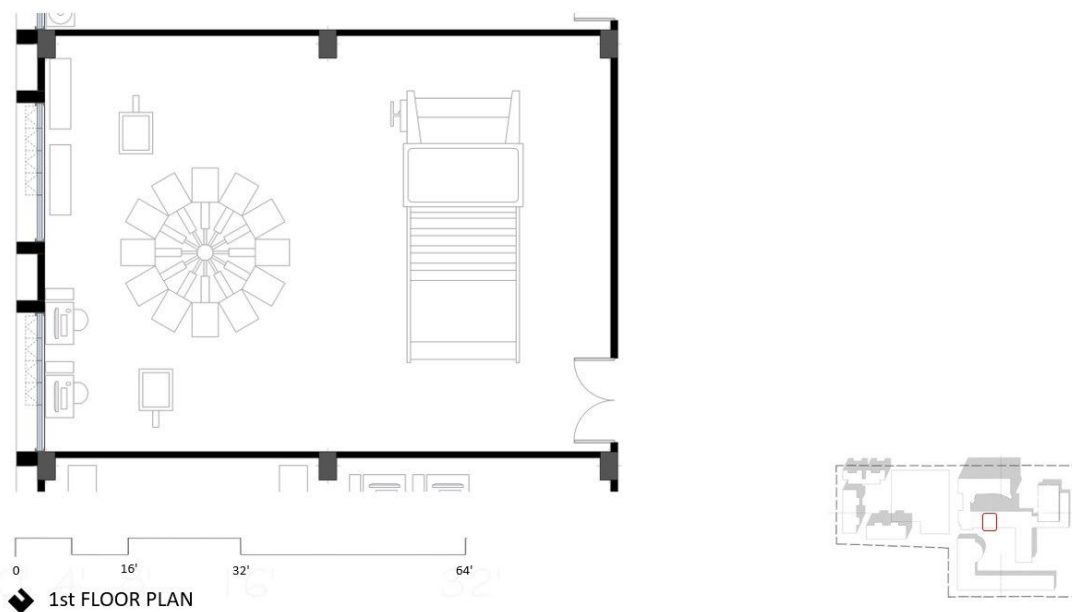


Fig: 5.8 1 unit of printing blow up layout

5.2.3 Graphics Studios

The Graphic Design studio basically has one to three instructors which depends according to the necessity. Each studio holds 50 students approximately, needs a storage space, separate

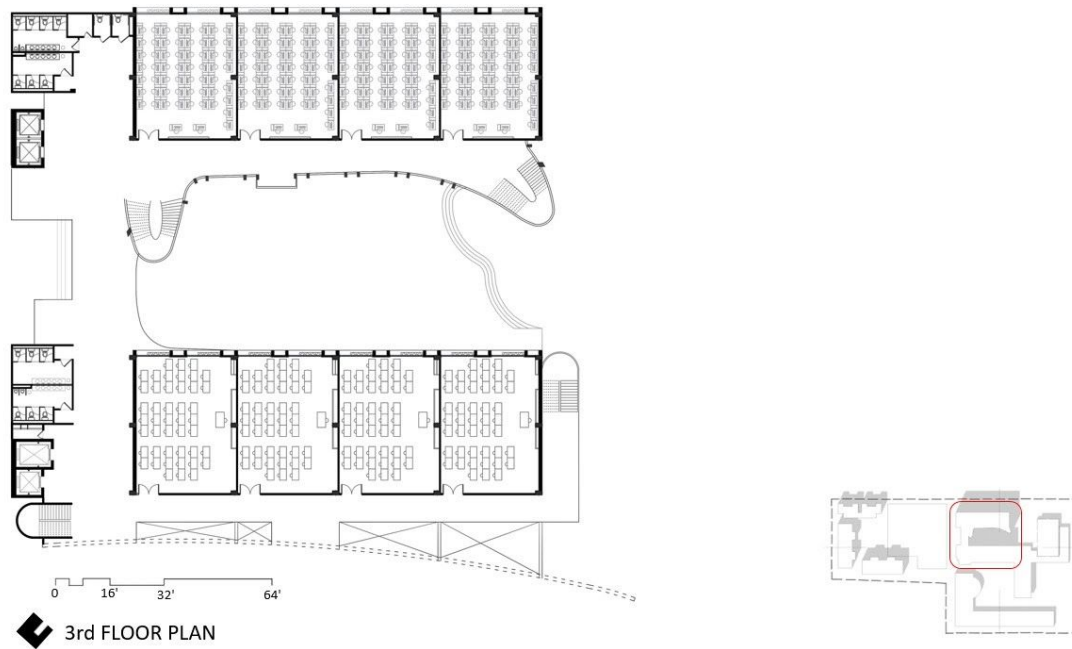
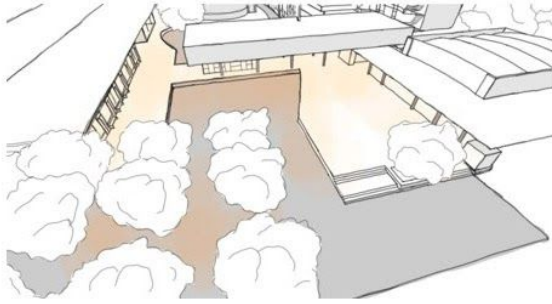
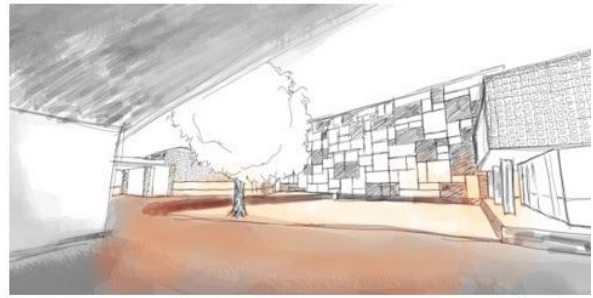


Fig: 5.9 Graphics and Lab layouts

locker rooms outside the studio, and if possible Natural Lighting. It is not necessary to bring in Natural ventilation into the Studio, as well as the workshops, as there is an issue of sensitivity of the workshop and studio equipment. But making a good use of natural ventilation will bring in a good scope of design for the students.



Public Place



Semi Public Niche spaces



Semi Private Academic Zone



Dorm and Quarter

Fig: 5.10 the four types of spaces segmented to understand the scale and proportion of the spaces

Program for GRAPHIC ART INSTITUTE

Functional space	Number of units	Number of users	Area per unit (in sft)	Total area (in sft)
A. Administrative facilities				
1 Principals Room	1	6	300	300
2 Toilet (Principals)	1	1	30	30
3 Accountant	1	1	100	100
4 Assistant Accountant	1	2	120	120
5 Office Assistant	1	2	48	48
6 IT Officer	1	1	100	100
7 Exam Controller	1	1	48	48
8 Toilets	3	1	24	72
9 Tea Corner, Cabinet & Storage	1	5	80	80
10 Common Meeting Room	1	20	400	400
Subtotal				1298

B. Academic facilities

Graphic Art Dept

1 Dept Head's Room	1	4	100	100
2 Teachers Room	1	15	645	645
3 Graphic Art Studios	8	50	1200	9600
4 Lecture Rooms	4	50	845	3380
5 Computer Labs	2	50	1055	2110
6 Toilets	15	15	24	360
7 Lockers & Storage	1	8	200	200
Subtotal				16395

Printing Dept

1 Dept Head's Room	1	4	100	100
2 Teachers Room	1	16	645	645
3 Printing Workshops	2	50	5800	11600
4 Lecture Rooms	2	50	845	1690
5 Computer Labs	2	50	1055	2110
6 Toilets	8	1	24	192
7 Lockers	1	6	200	200
8 Dept Storage.	1	4	800	800
Subtotal				17337

3D & Animation Dept

1 Dept Head's Room	1	4	100	100
2 Teachers Room	1	15	645	645
3 Lecture Rooms	1	50	845	845
4 Computer Labs	1	50	1055	1055
5 Toilets	15	1	24	360
6 Lockers & Storage	1	8	200	200
7 Innovation & Fabrication Lab	1	10	500	500
Subtotal				3705

Table: 5.1 Program distribution with area

Computer Graphics Dept

1	Dept Head's Room	1	4	100	100
2	Teachers Room	1	15	645	645
4	Computer Labs	1	50	1055	1055
5	Toilets	15	1	24	360
6	Lockers & Storage	1	6	200	200
Subtotal				2360	

C. Recreational & Other facilities

1	Indoor Sports facilities	1	50	3000	3000
2	Common Lounge	1	15	450	450
3	Cafeteria	1	420	5030	5030
4	Stationary & Shop	1	6	400	400
Subtotal				8880	

D. Common facilities**Auditorium**

1	Lobby	1	100	1000	1000
2	Hall	1	400	4800	4800
3	Storage	1	1	1296	1296
4	Green Room and Service	1	8	1296	1296
5	Toilets	10	1	24	240
Subtotal				8632	

Library & Archive

1	Reading Space	1	240	5376	5376
2	Stack Area	2000	1	0.52	1040
3	Librarian	1	2	200	200
4	Storage & Photocopy	1	1	500	500
5	Archive	1	50	750	750
Subtotal				7866	

Lobby & Reception

4	Waiting lobby	1	80	800	800
5	Information Desk	1	10	150	150
Subtotal				950	

E. Accommodation facilities

1	Teachers Quarter	32	32	350	11200
2	Principals House	1	4	800	800
3	Vice Principals House	1	4	800	800
4	Staff Quarter	12	12	300	3600
5	Students Quarter	350	350	250	87500
6	Prayer Rooms	2	50	300	600
Subtotal				104500	

Accommodation Facilities-85,000 sft

All total with circulation- 2,15,000 sft

Chapter 6: Design Considerations

For a good design, there must be some key major ideas. And there must be the innovative ways of materializing those ideas into a concept, which is the brief of the creativity and innovation of that design. The site of this project is at a busy urban thoroughfare, which has buildings and landmarks of cultural and social importance. According to the study of the land use pattern of the site surroundings, the neighborhood consists mostly with commercial institutional and residential buildings, and there is very less amount of open and green space among this community. In most of the good designed institutes of similar urban context, and other issues, they have invited the public space toward the site, making a thoughtful fine line of the control of this public spill. And there is enough space provided along the circulation and other functions, and there are hierarchy of space and functions. There are intentions of breaking the regularity, but it has been considered to keep things in order.

6.1 Climate responsiveness

In any building design, there should be ideas about how it adapts with the climatic issues, as in how it responds to the factors of the climate. According to the morphology of this site, there has been a considerable number of trees within the site, and there is an ecosystem of this area.

The green demand of the green and open space in this dense mixed used area is very high. Therefore, this ample amount of designed green space can be provided for the users of this site as well as a portion can be considered for the use of the public of the neighborhood to some extent. Thus, the green has to be conserved properly, which even helps mitigate the recent problem of our city, the air pollution, and cutting of the noise of this busy street along

the site. In this way giving back to the community might ensure the sustainability of the project.

The daylight has to be utilized for the classrooms and studios and printing workshops, as well as in other spaces, as there are certain intensity and color factors of natural daylight which these electronically equipped fixtures can hardly provide.

Another important issue to be addressed is the appropriate use of the materials used for the design, considering the climatic factors of this area. There has to be scopes for proper ventilation of air throughout the building and other spaces.

6.2 Activity driven space design

Worldwide, the definition of institute is evolving from the series classroom and studio to the informal areas for exploration, for thoughtful ideas, for creating opportunities for conversations, etc.

There has to be hierarchy of spaces and programs, proper clustering among the functions which comes according to the need of the spaces required. This proper clustering helps contrast the activities of the students and makes them explore themselves through their activity with others in the common ground.

To flourish as an institute, the regularity of the studio and classrooms has to be critically fragmented which even helps with the international competency for the graduates from this institute.

The Design detailing of the studios, workshops, offices and classrooms has to be in such a way that evolves from the necessity of the activities to provide for the utilization by the students. The landscape and façade treatment as well as the master planning has to be done in such a way where the planning and design are evolved according to the necessity of the activities.

Therefore, in short it can be concluded into three sub points that, Activity driven design and planning can be done through addressing these sub points as-

- Space Clustering
- Design Detailing
- Rethinking Studio & classrooms.

6.3 Public Inclusiveness

According to the case studies that have been done for this project, there is room for public place within the projects. To some extent, there are designed public functions in some places whereas, there is room for public use around and within the site.

Again, according to a program given from the client, there is a function named as Placement cell, where the practice is to address the fresh graduates to the market employers of their need, chosen mostly according to their need. This notion understates the goal of an institute,

which somehow makes a cycle like, the institute produces workforces of different calibers of different fields, and people from the market field come to buy their skill sets in order to run their business.

It rather should work in this way that people of different disciplines come to share their ideas and the market demands by proposing their own demands to different individuals or authorities. In this way the juniors get a scope of learning from the graduates in those common grounds and vice versa. As well as there are grounds open for the public to get involved with the discipline and enrich the field, as Graphic Art nowadays are the contents of use for every individual and has an international market value. In this way, the competencies of the practicing graduates will also be enhanced.

Chapter 7: Design Suggestions

Throughout the design phase, the functional requirements had to be cross checked while planning the spaces, distributing the functions, zoning of the programs along the site, formation of the outlook along with structure of the built form had to make a dialogue with each other. The main priority of the user group are considered to be both residential and regular students, then the staff and facilitators, then the all sorts of public. The scale of the intimate spaces were of a prior concern to sculpt out the environment for the students activity.

UNIDIRECTIONAL METHOD OF THEIR TRAINING

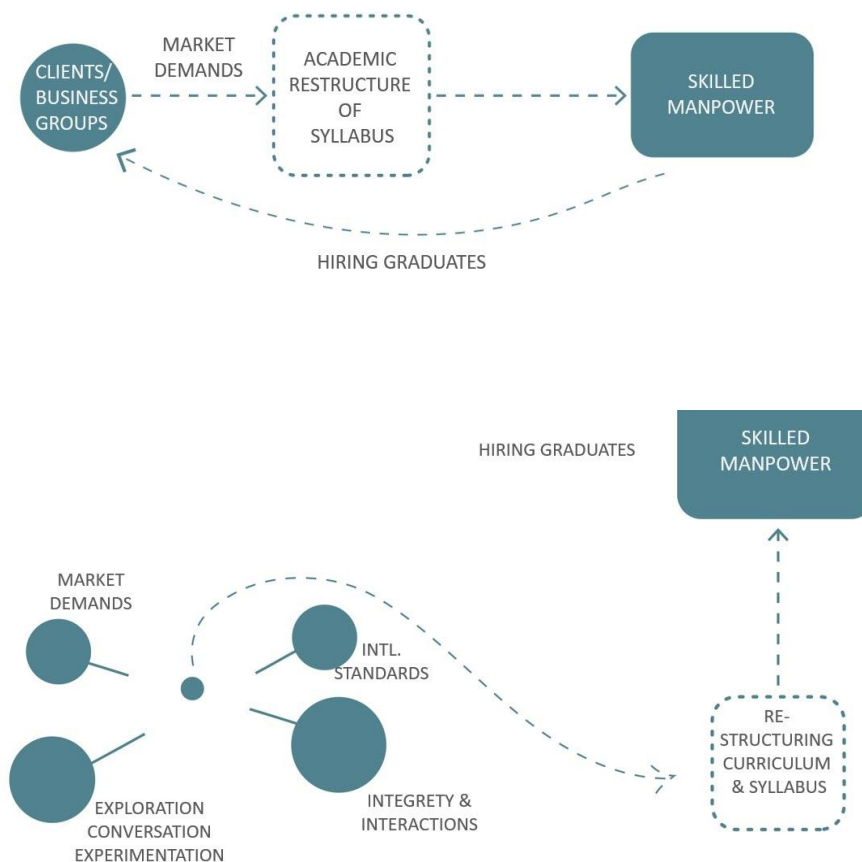


Fig: 7.1 the academic re structure chain

7.1 Design Process

The whole design process can be fragmented into different phases as a key to development of the whole project through the understanding of the scale, proportion, urban context, landscaping elements, environment, future prediction, detailing of design, space quality, place making etc. Initially a few sketches and programmatic relations were questioned, and study of the form was done with the help of both physical and 3D models, and conceptual sections as well. Firstly the key ideas affecting the design were reconsidered and those are described as following,



Fig7.2: Study Model

As the site suggests, and through the help of the site surveys and the programmatic distributions, the overall zoning of the site was segmented into public, academic and private accommodation facilities. Some figures might help explain the zoning and functional distribution of the programs. As two of the other institutes were connected through the site, and considering the primary and the access road as the major site forces, initially the decision of the public realm and the semi public activity zones were made.

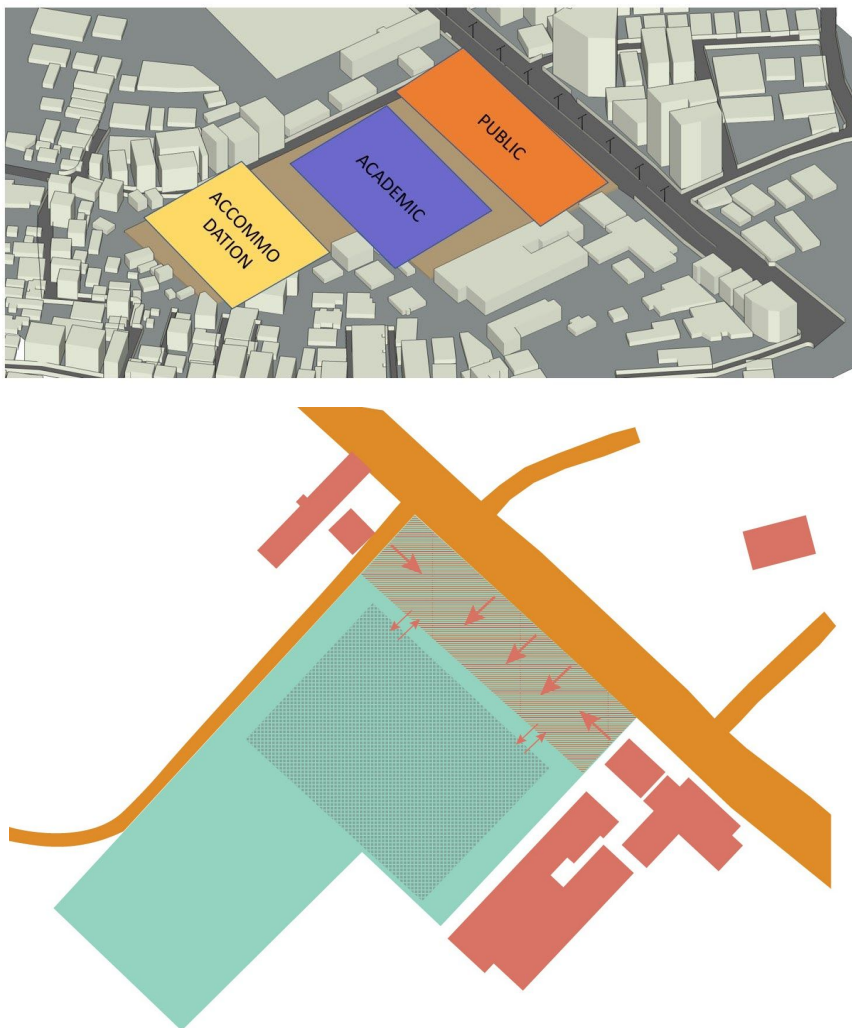


Fig7.3 : Site forces impacting public zone

7.2 Space Organization

The space organizing exercise was done on the basis of scales of the student spaces, type and pattern and size of the crowd, variations of student activities around the programs.



7.4 Form and Functional Formulation



Fig: 7.4 Study model and top view massing study

7.5 Planning and Landscaping

The Ground is mostly covered by the semi public programs of the institutes and there are academic lecture classrooms and printing workshops.

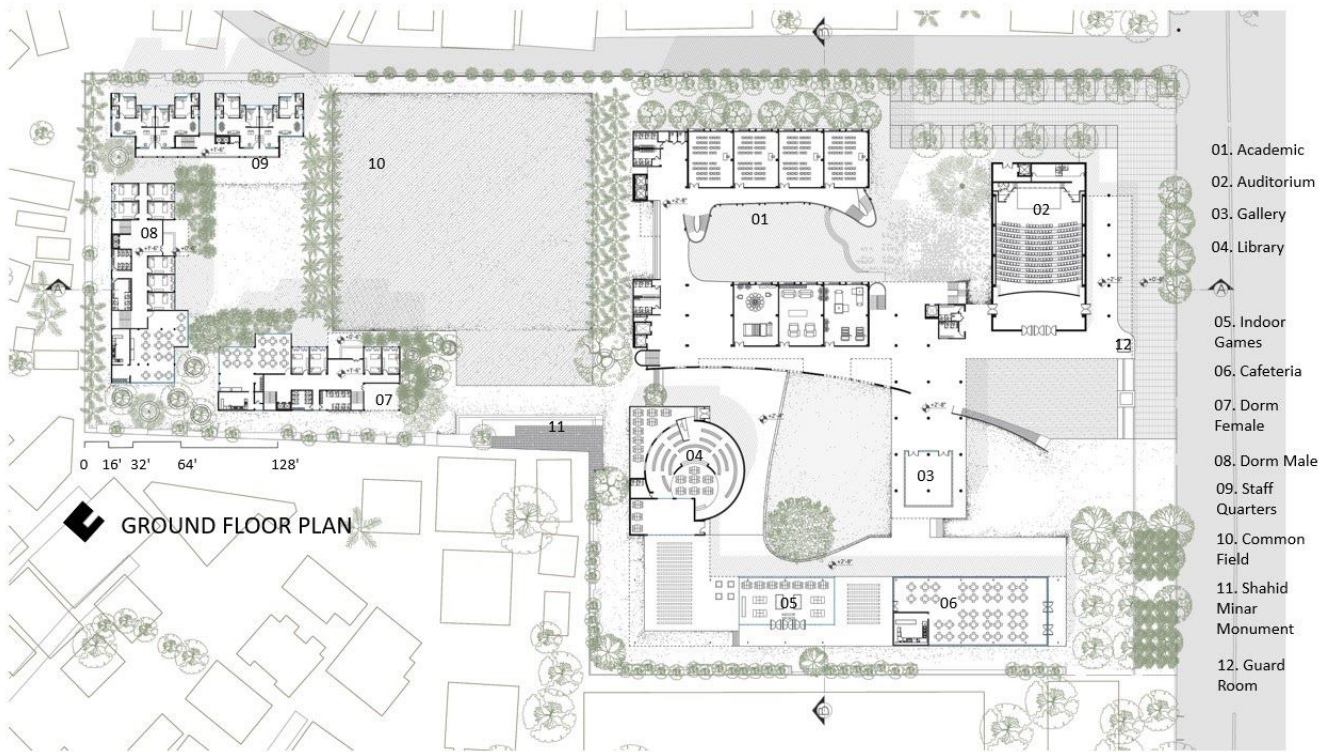


Fig7.5 : Ground Floor Plan.

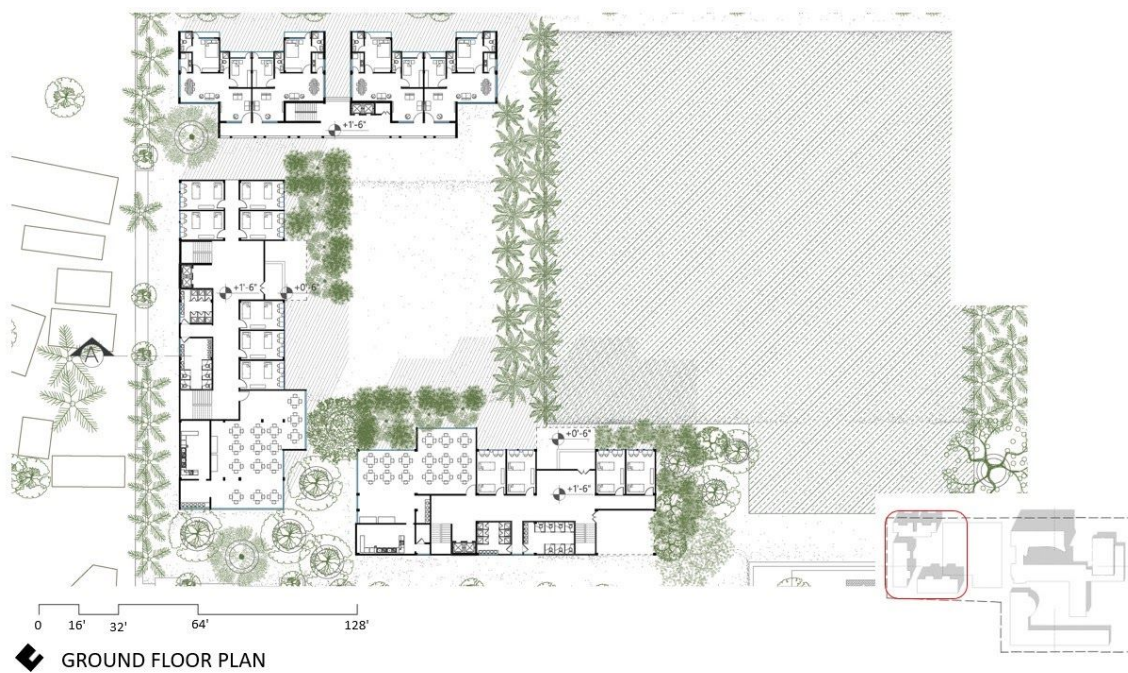
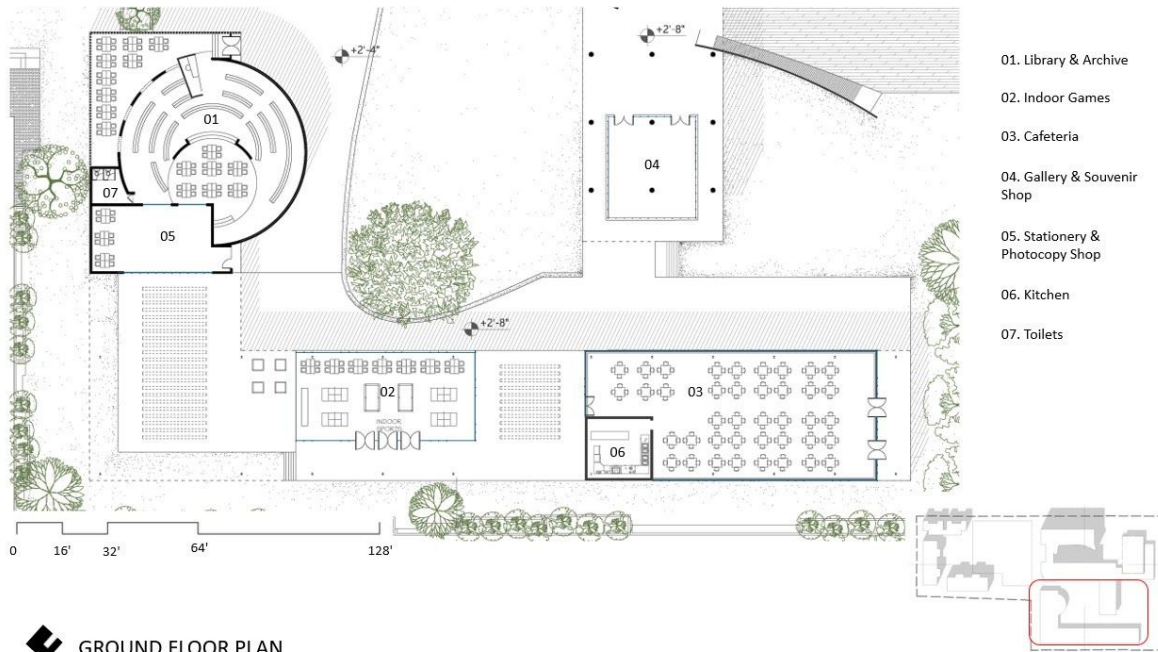


Fig 7.6 blowup of Ground Floor Plan



- 01. Teachers room
- 02. Dept Offices
- 03. Meeting Rooms
- 04. Offices
- 05. Principal
- 06. Toilets
- 07. Lounge

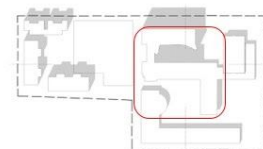


Fig 7.7 1st floor plan

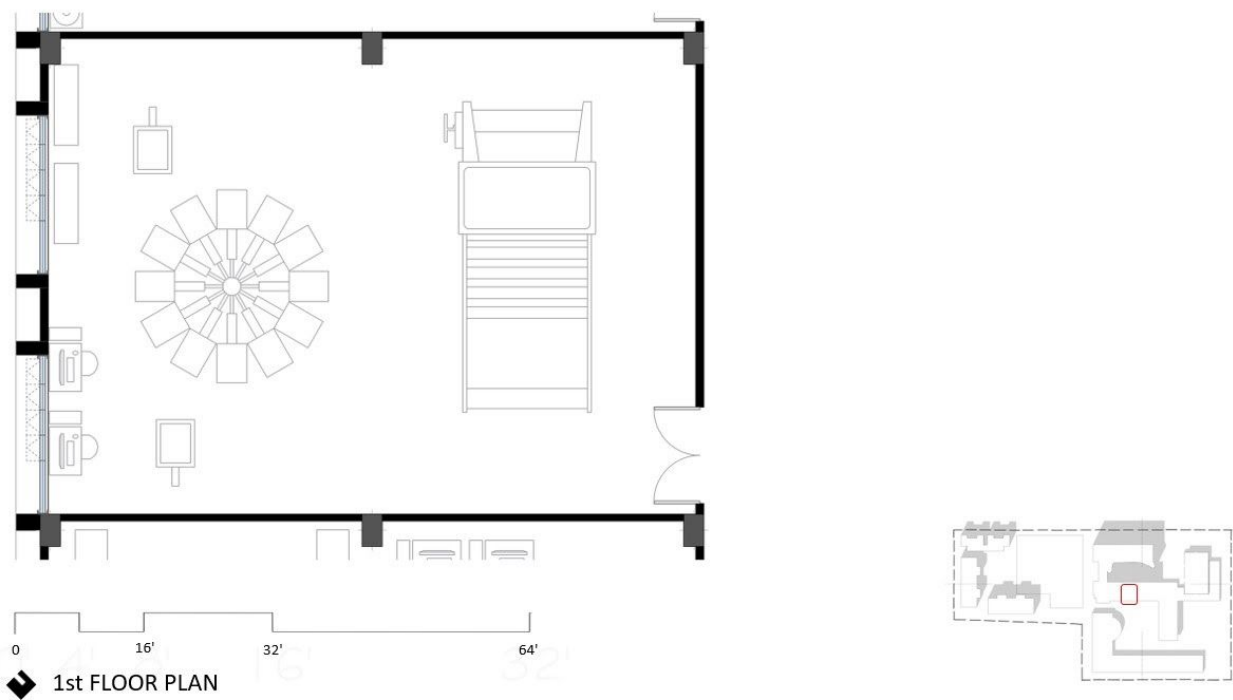
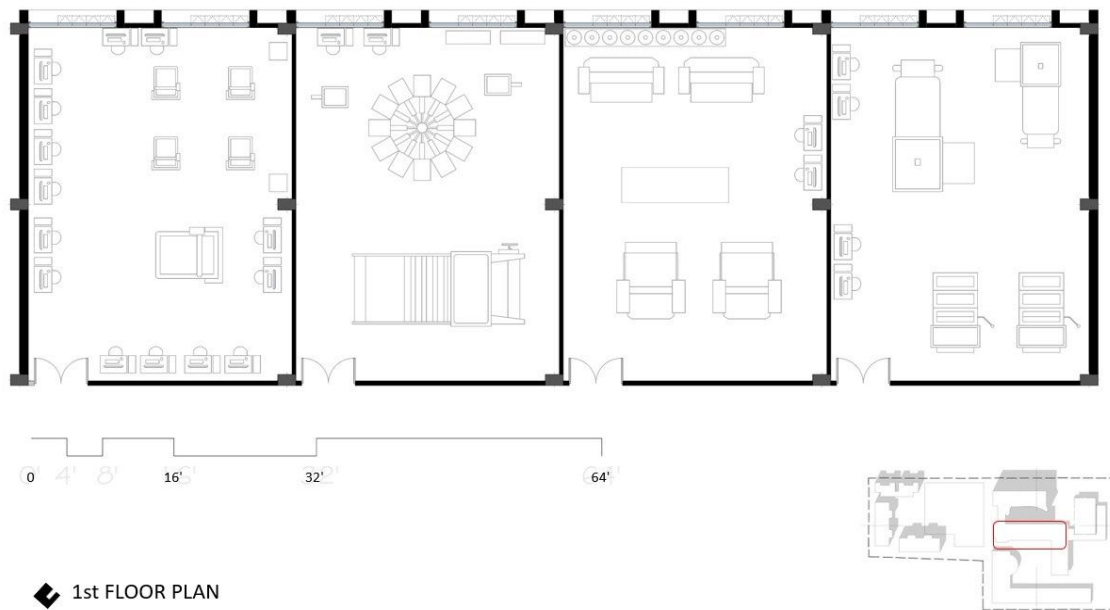


Fig: 7.8 1st Floor Printing blowup

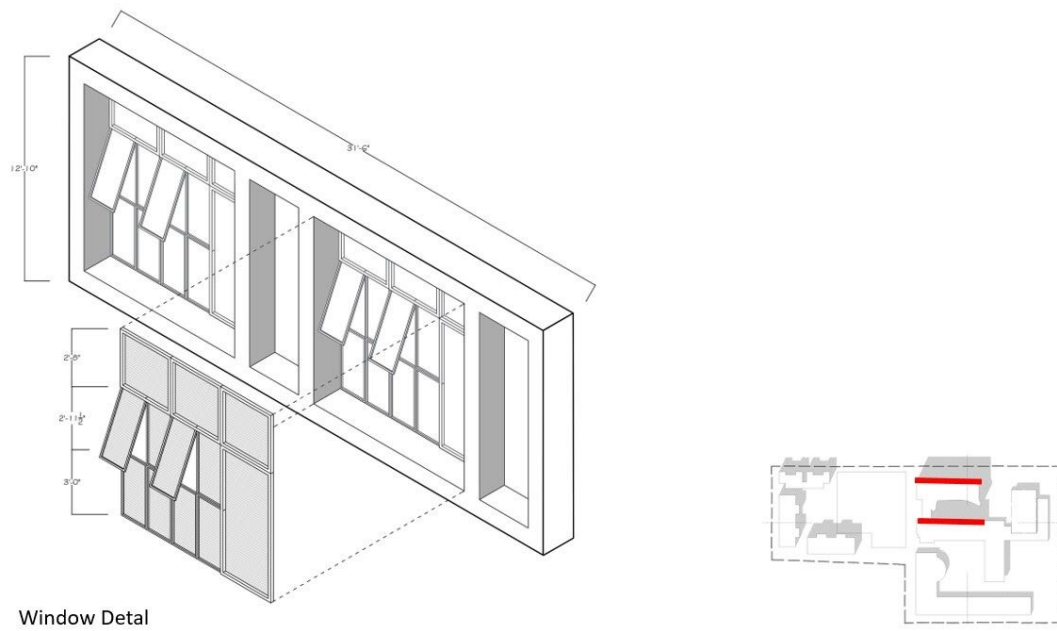


Fig: 7.9 Window detail, academic section



Fig: 7.10 Male dorm typical Layout



Fig: 7.11 Staff Quarter Typical Layout

STRUCTURAL DERIVATION
OF THE SCREEN

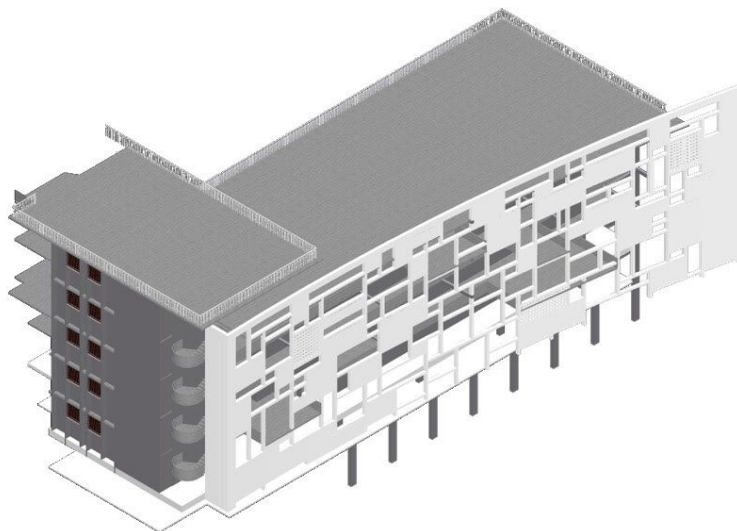


Fig7.12: Structural derivation of the screen

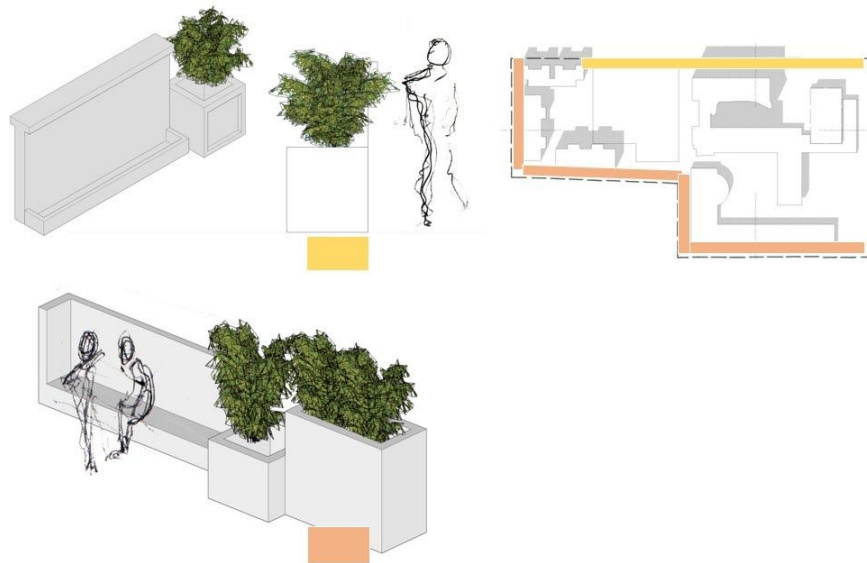


Fig7.13: Landscape and control detail

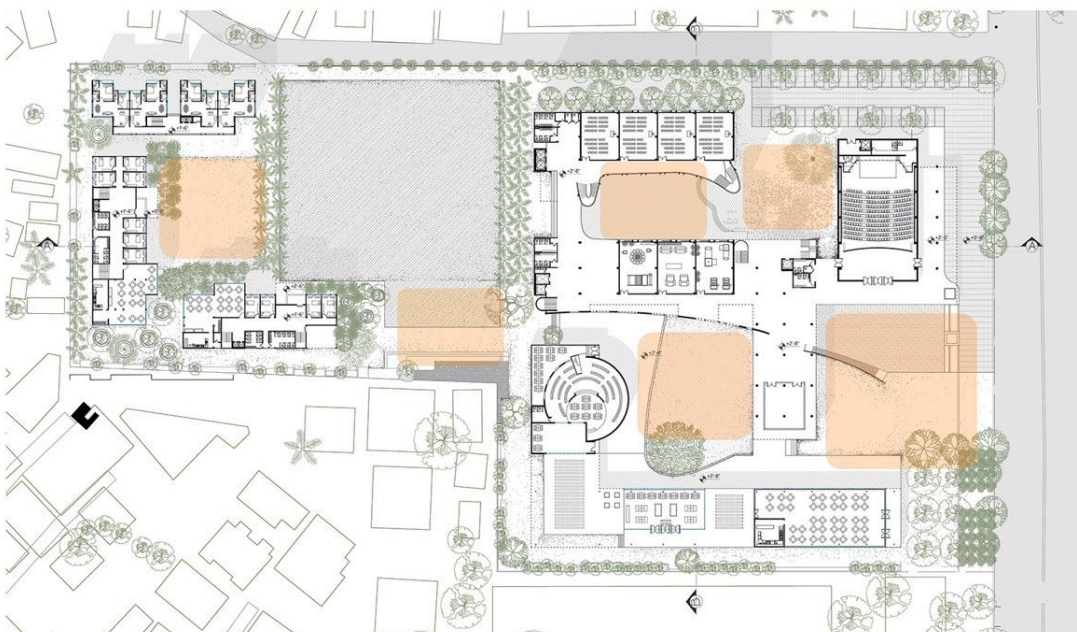


Fig: 7.14 Courtyard formation

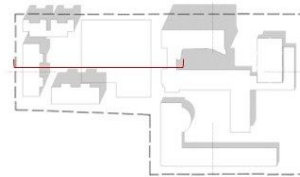


Fig: 7.15 A longitudinal Section showing Dorm spaces and Academic connective spaces through the blocks.

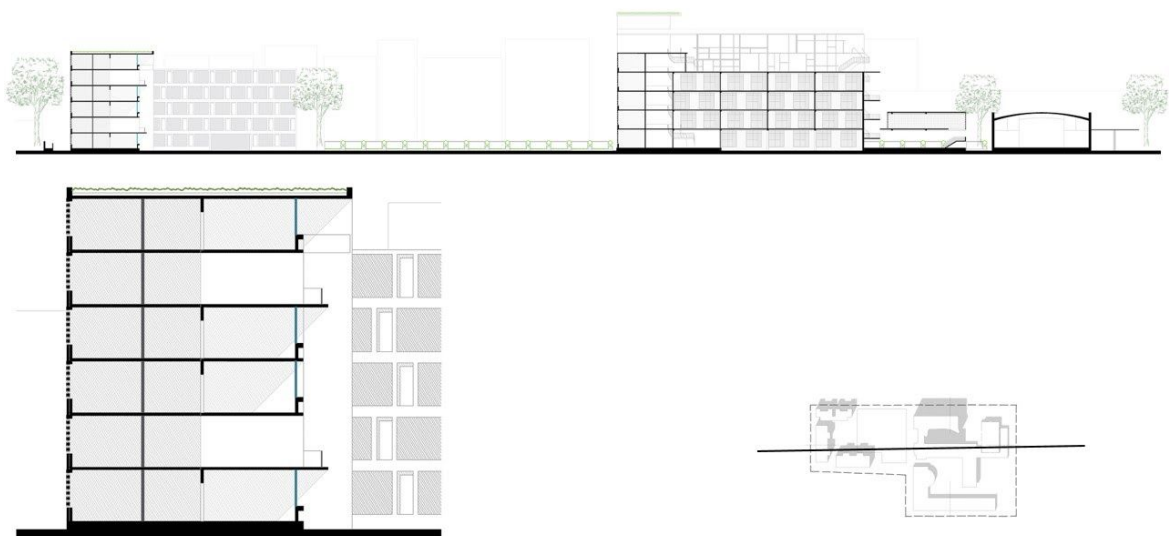


Fig: 7.16A Longitudinal section through the site



Fig: 7.17 A Transverse section through the site



Fig: 7.18 Section showing Male and Female dorms.

7.6 Detailing and Rendered Views

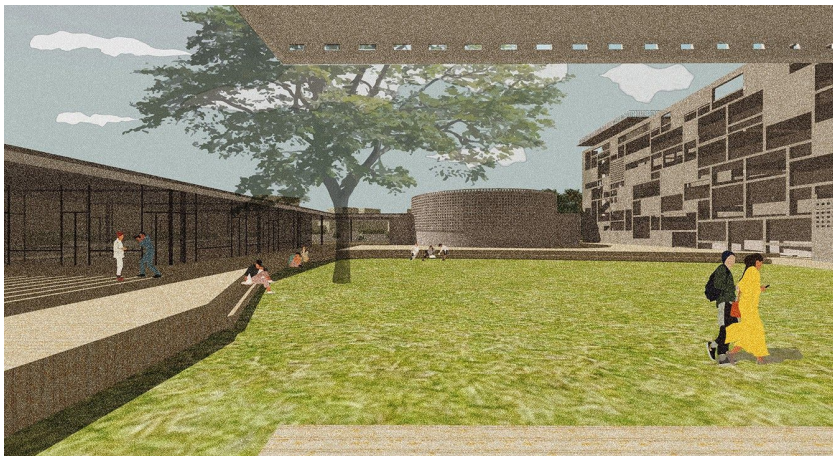
The final rendered outputs are the graphical expressions of the space qualities dedicated for their learning environment.

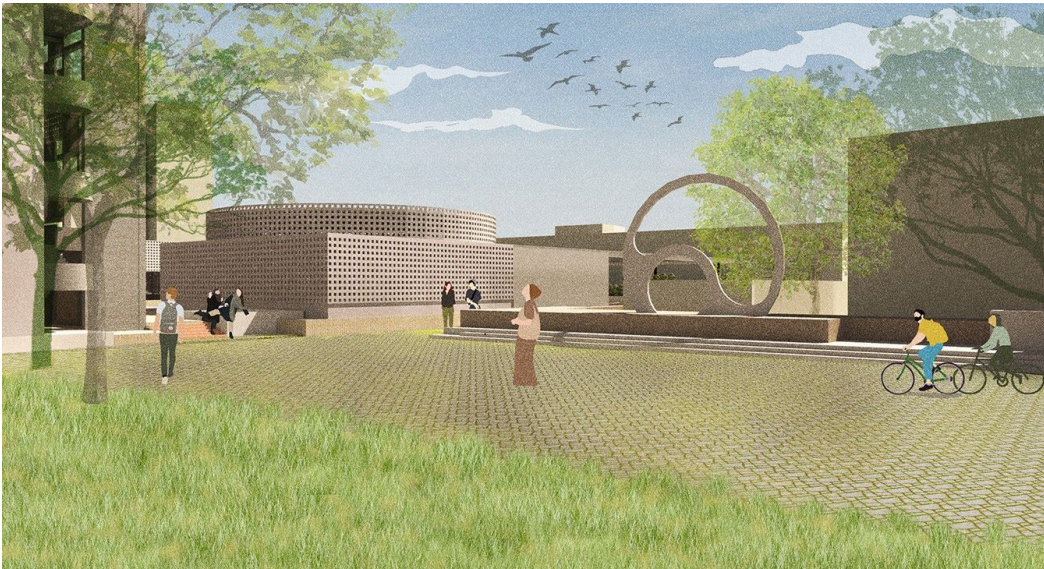


Fig7.19: View of the overhung Auditorium block from the Academic Courtyard.



Fig7.20: View of the Dorm Blocks and Staff Quarters.







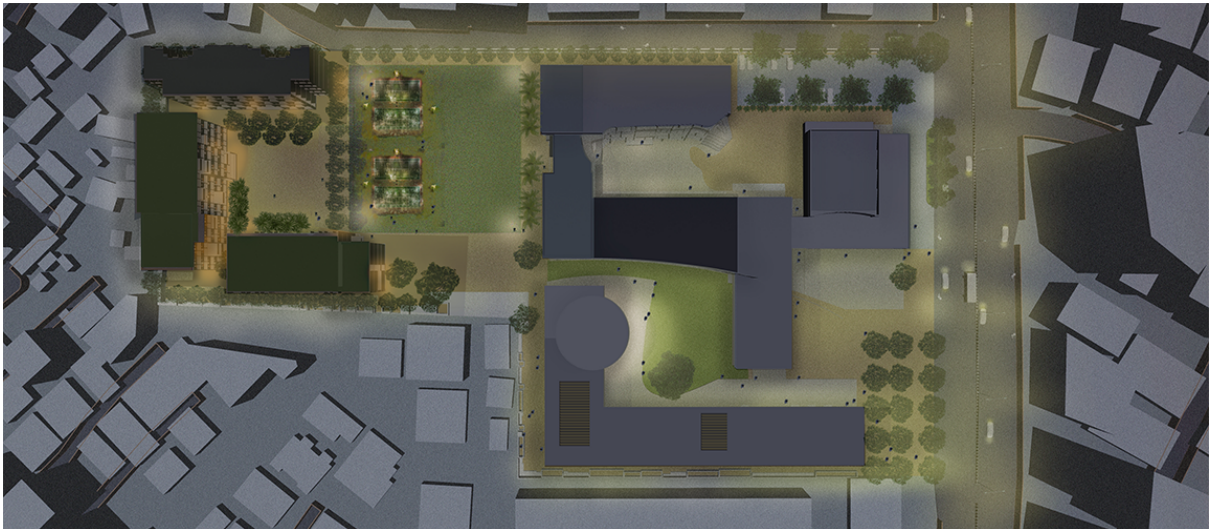


Fig: 7.21 Rendered views of the project

References

- [1] Frascara J. 1997. User Centred Graphic Design, Mass Communication and Social Change, London.
- [2] GAI, August 2020, retrieved from <http://www.gai.gov.bd>
- [3] Heller S. Steven S.C. 2000. Graphic Style, from Victorian to Digital, New York.
- [4] Hartman F. 2007, Visualizing Social facts, Otto Neuraths ISOTYPE Project.
- [5] Neurath O. 1936. International Picture Language, London, Kegan Paul.
- [6] Myers. W. 1980. Computer Graphics: The Human Interface, Vol-13.
- [7] Meggs. B.P, Alston W.P, 2012, Meggs' History of Graphic Design, New Jersey
- [8] Simon D. Graphic Communication Handbook, Routledge.
- [9] Myers W. 1981 Computer Graphics, The Human Interface, Vol-13
- [10] Zhang S. Wang H. 2017. Two stage plant species recognition by local mean clustering, cluster computing. nb.
- [11] Newark Q. 2007, What is Graphic Design? Rochport Publishers,

- [12] Hrid K. and Finley C. (2010) Offset lithographic Technology 4th Edition. Goodheart Willcox Co.
- [13] Neurath, O. 1936, International Picture Language, London, UK.
- [14] Freedman K. (1991), Possibilities of Interactive computer graphics for Art instruction, Art Education.
- [15] Poggenpoh, S.H. (1993) Graphics design, New York, Alga press.
- [16] Anyakoha E.U 1994 Strategies for enhancing the teaching of home economics skills at the junior secondary level, Nigeria.
- [17] Akinboye J.O 2002 Psychological
- [18] T. Tulabandhula and C. Rudin, "Tire Changes, Fresh Air, and Yellow Flags: Challenges in Predictive Analytics for Professional Racing.," *Big data*, 2014.
- [19] R. D. Choudhury and P. Bhargava, "Use of Artificial Neural Networks for Predicting the Outcome," *International Journal of Sports Science and Engineering*, vol. 1, no. 2, pp. 87-96, 2007.
- [20] F. Duckworth and T. Lewis, Your Comprehensive Guide to the Duckworth/Lewis Method for Resetting Targets in One-day Cricket, University of the West of England, 1999.
- [21] I. Bhandari, E. Colet, J. Parker, Z. Pines, R. Pratap and K. Ramanujam, "Advanced Scout: Data Mining and Knowledge Discovery in NBA Data," *Data Mining and Knowledge Discovery*, pp. 121-125, March 1997.

- [22] S. Brian, "The Problem of Shot Selection in Basketball," *PLoS One*, 25 January 2012.
- [23] T. Tulabandhula and C. Rudin, "Tire Changes, Fresh Air, and Yellow Flags: Challenges in Predictive Analytics for Professional Racing.," *Big data*, 2014.
- [24] R. D. Choudhury and P. Bhargava, "Use of Artificial Neural Networks for Predicting the Outcome," *International Journal of Sports Science and Engineering*, vol. 1, no. 2, pp. 87-96, 2007.
- [25] F. Duckworth and T. Lewis, Your Comprehensive Guide to the Duckworth/Lewis Method for Resetting Targets in One-day Cricket, University of the West of England, 1999.
- [26] I. Bhandari, E. Colet, J. Parker, Z. Pines, R. Pratap and K. Ramanujam, "Advanced Scout: Data Mining and Knowledge Discovery in NBA Data," *Data Mining and Knowledge Discovery*, pp. 121-125, March 1997.
- [27] I. Bhandari, E. Colet, J. Parker, Z. Pines, R. Pratap and K. Ramanujam, "Advanced Scout: Data Mining and Knowledge Discovery in NBA Data," *Data Mining and Knowledge Discovery*, pp. 121-125, March 1997.
- [28] I. Bhandari, E. Colet, J. Parker, Z. Pines, R. Pratap and K. Ramanujam, "Advanced Scout: Data Mining and Knowledge Discovery in NBA Data," *Data Mining and Knowledge Discovery*, pp. 121-125, March 1997.

[29] I. Bhandari, E. Colet, J. Parker, Z. Pines, R. Pratap and K. Ramanujam, "Advanced Scout: Data Mining and Knowledge Discovery in NBA Data," *Data Mining and Knowledge Discovery*, pp. 121-125, March 1997.

[30] I. Bhandari, E. Colet, J. Parker, Z. Pines, R. Pratap and K. Ramanujam, "Advanced Scout: Data Mining and Knowledge Discovery in NBA Data," *Data Mining and Knowledge Discovery*, pp. 121-125, March 1997.

Appendix A.