PUBLIC REALM IN EDUCATIONAL HUB, SITAPURA, JAIPUR

An Urban Design Thesis Report

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CERTIFICATE:

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Amarnath Sharma

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BACKGROUND:

With changing times, concept of Education Hubs is becoming a prominent aspect of Educational groups worldwide; in this the groups are coming together to develop several Colleges/ Universities/ Institutes in a close knit peripheral area.

These Educational Hubs can be of different scales such as Country, Regional, and City & Local. At Local Scale, Educational Hubs can be classified as areas with cluster of institutions within the city boundary serving the metropolitan and also inviting students from other parts of the country.

Most of the Institutes /Colleges/Universities around the urban land have small campuses with limited area and are able to only provide basic infrastructure like Academic, Administrative, Limited Hostel Facilities, Canteen etc.

These basic infrastructure facilities in the campuses are not accessible after class hours, for students leading to very limited interact able & casual activity space for students, teachers & other stake holders of education fraternity .Therefore these stakeholders try to identify and employ spaces for social interactions and extracurricular development which sometimes tend to be unsafe and raise concerns regarding safety and security of an individual.

Such Problems are not faced by Leading & Reputed Universities with large individual campuses as social spaces are already designed.

Academic precinct have been always an arena for social interaction & causal activities. So, it is required to identify & employ spaces for social interaction & casual activities, in an around of education hub. This will provide the opportunity to interact, enjoy & be involved in various activities in a safe & healthy built environment.

Thus for such small campuses in an Educational Hub :Public realms provide the opportunity to the development authorities for infrastructural development in consideration of need of Colleges/ Universities/ institutes & their stake holders like students, teachers & other with the initiative of facilitating them with best conditions of growth.

High quality public realm is necessary for creating harmonious & socially inclusive educational hubs. Also, Successful public realm can help reduce crime, improve health and well-being and make significant contributions to a better quality of life. In the overall process, it strengthen the concept of educational hub

The thesis will focus to identify the missing elements in educational hub in a city & to improvise the hub through public realm to make a vibrant built environment.

1. INTRODUCTION:

1.1.EDUCATIONAL HUB:

1.1.1. Definition:

Educational hub is a cluster of educational institutions with leading economy generator & responsible of knowledge of the area.

Key factors of educational hub are;

- Co-location,
- Inter-connection between students,
- Institutes & research facilities.

Rationales of Educational hubs are;

- Economic Development
- Brain Gain
- Education Industry
- Higher Knowledge-intensiveness
- City as 'Soft Power'
- Build Local Capacity (Wilmoth,2013)

1.1.2. Existing concept:

The first ideas on education hubs have been developed in 1990 in Singapore and Malaysia. One reason was that Malaysia had to fight against a large exodus of local students, whereas Singapore had problems with the currency crisis and wanted to promote its own industry by exploring a new sector (Knight, 2014)

It forms part of an evolution process in the higher education and can be used to improve the global competitiveness of cities or states. (Kinser & Lane, 2010).

Concept of Education hub (urban form)			
Countries (e.g. Singapore)	Cities (e.g. Bangalore)	**Unplanned urban hubs**(e.g. Kota)	**Planned urban hubs** (e.g. Education city Doha , Dubai)
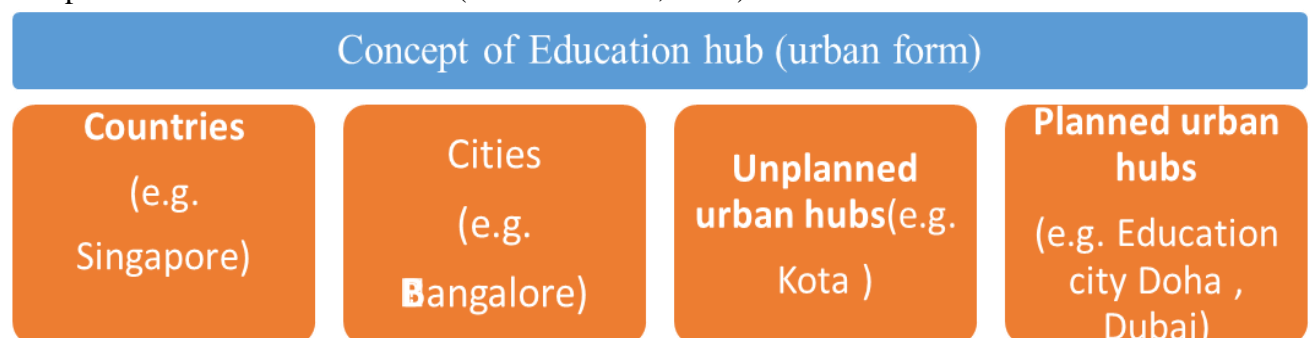
Figure 1Urban forms of educational hub

(Wilmoth, 2013)

1.1.3. Education sector in India:

Presently, India has more than 1.4 million schools, more than 850 universities & 40,000 higher educational institutes (CARE rating report, 2018) and it has additional requirement of 20,000 schools, 700 universities & 35,000 educational institutes. The education industry in India is estimated to reach US$ 144 billion by 2020 from US$ 97.8 billion in 2016(IBEF, 2018).

So, it can be understood that development of educational area / hubs is happening & is going to happen in recent futures, & there is a need to accommodate specific needs of such hubs.

1.2. PUBLIC REALM:

1.2.1. Definition:

The value of a well-designed public realm has manifold economic, environmental, social and cultural benefits. It contributes to a sense of belonging, community cohesion, improved health and wellbeing, reduction of crime and anti-social behavior, and greater opportunities for play and learning. (Foster + partners, 2017)

The public realm is made up of publicly accessible space both between and within buildings. The public realm includes streets and squares, special places, linkages, interfaces and pedestrian zones which are fundamental to the creation of a functional, visually attractive and safe environment for people. (The city of Calgary, 2018)

A public space will only work if there is already pedestrian activity in the area. A public space cannot attract people where there is no one there to begin with and people do not feel safe stopping in public space if there is no one walking on the surrounding streets. Public spaces must therefore be located in areas with existing pedestrian activity. (Jane Jacobs, 1961)

Public realm is a space that is shared communally by the public. It should have; universal access, the common ground, and shared amenities. Public spaces influence the form and function of cities and the daily interactions that take place at the community level.

1.2.2. Existing concept:

Abu Dhabi Urban Planning Council classifies Public Realm into four categories:
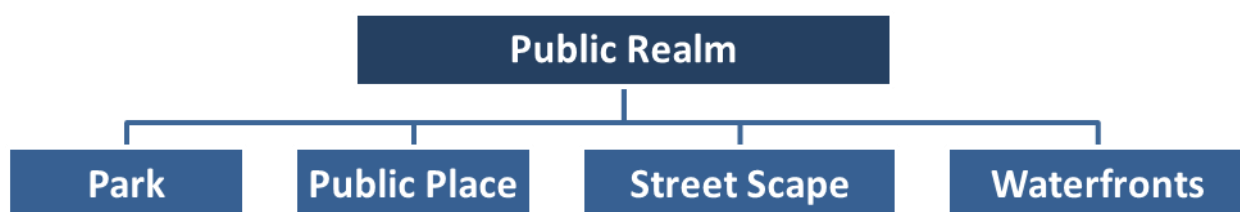
Figure 2Classification of public realm

- ✓ **Parks** - Public spaces within a community for recreational use. Parks may include natural areas such as mountain ridges and wadi systems.
- ✓ **Streetscapes** - The visual elements of a street including the road, sidewalk, street furniture, trees and open spaces that combine to form the street's character.
- ✓ **Waterfronts** - All land areas along the water's edge.
- ✓ **Public Places** - All open areas within a community visible to the public or for public gathering or assembly. (Abu Dhabi Urban Planning Council,2017)

The Public Realm Urban Design Guidelines by Local government association of South Australia offer a set of principles of Public Realm:

Place and Community	**Animation**	**Multi-Functional and Adaptable**
Social Interaction	**Health and Wellbeing**	**Connectivity**
Environmental Sustainability	**Financial Sustainability**	**Movement**
Image	**Streetscape**	

Figure 3 Principles of public realm

- ✓ **Place and Community**

Successful public realm and spaces are those that remain relevant to people's day-to-day lives. Such success is not only a function of the available spaces and facilities but more importantly for people, the connections that those places make with their community, their environment and their history.

Figure 4 Place for everyone

Source: Local Government Association of South Australia,2014)

- ✓ **Animation**

A vibrant public realm is not just a result of quality design, but the way in which a place encourages, enhances and creates opportunities for activity. The edges of spaces, the buildings and routes that surround the place, must work together to encourage interaction and mutually beneficial associations.

✓ **Multi-Functional and Adaptable**

Communities and their needs and choices change over time. Multi-functional and flexible public realm must be able to adapt to these changes by allowing for a range of users and uses to access spaces, facilities and infrastructure at different times and over time. Adaptable infrastructure that can be augmented to meet changing demands are critical to the community that is served.

Figure 5 Adaptable co-loacated use

Source: Local Government Association of South Australia,2014)

✓ **Social Interaction**

Whether it be individuals meeting while walking their dogs in the park, people walking to a public transport terminal, or adults meeting at nodes for entertainment and shopping, well planned public realm promotes opportunities to interact socially. Healthy public realm creates healthy communities (socially and economically).

Figure 6 Incidental spaces for people

Source: Local Government Association of South Australia,2014)

✓ **Health and Wellbeing**

A strong relationship between quality of life and access to public open space and the natural environment is playing an increasingly critical role in the community's health and wellbeing. The way cities, towns and neighborhoods are planned and designed impacts on people's opportunity to walk, cycle and use public transport; to access healthy food; to recreate; and to participate in community life.

✓ **Connectivity**

Direct correlations exist between access to public open spaces and interaction with the natural environment for young people and their mental health and socialization. A well utilized and designed public realm is invariably one that is easily accessible to and functional for all members of the community.

Figure 7 Interconnected Movement Network
Source: Local Government Association of South Australia,2014)

✓ **Environmental Sustainability**

As well as contributing to the overall sustainability of a site, bio diverse landscapes improve physical and psychological wellbeing, and offer opportunities to ameliorate climatic conditions and may provide cost effective solutions for the provision of open space and branding.

✓ **Financial Sustainability**

An understanding of the long term financial sustainability of the public realm is essential if community aspirations are to be realistic and the quality of these spaces is to endure. Careful design and planning is critical to ensuring sustainable ongoing maintenance costs and achieve anticipated life cycles.

✓ **Movement**

Public realm is made up of squares, parks, and spaces, and the streets, footpaths and alleyways that link them. Designing for movement, providing connected, legible and 'people friendly' streets that encourage walking and cycling and meet the access needs of the whole

Figure 8 Safe and legible access
Source: Local Government Association of South Australia,2014)

community, is key to creating successful public realm.

✓ Image

The public realm plays a vital role in defining the 'image' of our towns, neighborhoods and local streets.The public realm affects the perception of an area and influences desires to live, work and visit these places. Urban design should influence the image of places and shape perceptions and interactions.

Figure 9 Unique, recognizable and branded spaces
Source: Local Government Association of South Australia,2014)

✓ Streetscape

Streetscape improvements which utilize sustainable design strategies and practices are a key component to enhancing an area's economic viability, attractiveness, environmental health and social well-being. Tangible benefits to the community might include increasing the property value of homes and businesses, reducing

Figure 10 Streetscape idea
Source: Local Government Association of South Australia,2014)

traffic congestion by providing access to alternative modes of transportation, and providing recreational spaces that encourage healthier, active lifestyle. (Local Government Association of South Australia, 2014)

1.3.JUSTIFICATION:

1.3.1. Educational hubs globally:

Several planned educational has been developed across the global with dedicated education related facilities & infrastructures. Some of them are:

- **EduCity Iskandar, Malesiya-**

International hub in a larger planned cluster with14 higher educational institutes, 10 international schools, student village & sports complex, etc .
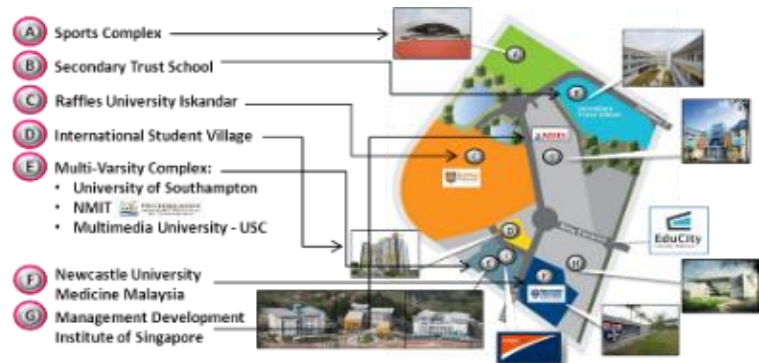
Figure 11 Zonal map of Educity, Iskandar, Malesiya
<u>Source: www.iskandarinvestment.com</u>

- **Education city, Bhutan-** It is spread in 4oo Acres, planned for 50,000 Students with Approx. 30 Universities, R&D facilities, laboratories, hotels, healthcare services, sports centres , libraries, cultural and entertainment centres, and cafes.(Wilmoth,2013)

- **Dubai International academic city (DIAC), Dubai-** it is spread in 18 million sq. ft , currently 25,000 Students are studying in more the 17 International Universities, DIAC also have R&D Centre, Sports Facilities, Students Accommodation & Entertainment centers etc. (University Programme guide, DIAC, 2018/19)

Figure 12 DIAC, Dubai
<u>Source: https://whichschooladvisor.com</u>

• Other educational hubs are Knowledge Village Dubai, International Academic City Dubai, Education City Doha, & City of Knowledge Panama, etc.

1.3.2. Educational hubs in India:

Educational hubs are development in various cities of India, also. Some of them are:

• Educational hub, Gajwel, Telangana- Educational hub in Gajwel is having Two separate hubs one for boys and another for girls. It has polytechnic institutes, schools, college, auditorium, hostels.

Figure 14 Educational hub in Gagwal

Source: The Hindu

• Others such hubs in India are; knowledge city Delhi, Educational hubs Tirupati, Rajarahat, Kolkata, etc.

Figure 14 Education city, sonipat

Source: 99acres.com

1.3.3. Educational hubs in Rajasthan:

In 1998, Govt. of Rajasthan realized the need of software & IT Experts in industry. Because of it, RAJASTHAN STATE INDUSTRIAL POLICY' 98 (chapter 18 part 5) has a provision that up to 5 acres of land at a concessional rate of 25% of the prevailing land rates will be allotted, by RIICO (Rajasthan State Industrial Development and Investment Corporation) in selected industrial areas, for promotion of advanced software training. This triggered Allotment of RIICO Industrial plot to educational institutions & development of educational Hubs. (E.g. Sitapura Institutional Area).

Figure 15 Educational institutions in Sitapura & Ramchandrapura Industrial Area

Source: Google map
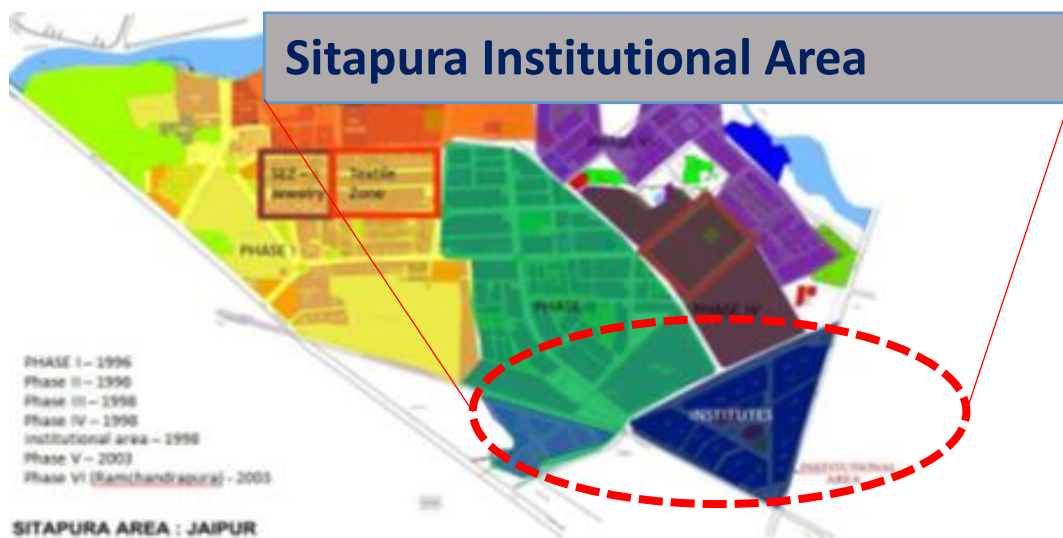
Figure 16 Zonal Map of Sitapura Industrial Area   Source: RIICO office, Jaipur

However, it contradicts with URDPFI guidelines, in which use of Industrial land for establishment of educational Institutions is prohibited.

Due to which, such educational hubs are least support by surrounded built environment & need of Public realm arises.

1.3.4. Life of students:

Survey on students in Curacao-

The Survey explains criteria related to social life for students attraction to Educational Hubs. Some of them related to are: (Lohmann, 2015)

- Exciting place to live
- Social Infrastructure
- Health care
- Gender roles
- Low discrimination
- Safety
- Social environment
- Cultural diversity
- Interaction between institutions
- Customer oriented culture.

As per Sodexo's first International University Lifestyle Survey :

- 38% of UK students & 32% global students identified, an 'active social life/ good social facilities', as a criteria for their choice of university.

- Overall, students globally wanted to see an attractive campus (37%) and the most popular services that students were looking for included good IT/library (38%) and study facilities and good social facilities (32%).(Sodexo,2017)

1.3.5. Need of public realm in educational hubs:

Overall scenario of educational hubs & various surveys on students Explains:

- Educational hubs are developing worldwide.
- Educational hubs, in & around industrial areas, lack behind in providing Students oriented infrastructure & facilities.
- Need to enhance social life of students.
- Vibrant, social, & interactive environment makes educational hubs more attractive & user friendly.

This establishes the need of dedicated, well designed & active public realm in educational hubs.

1.4.BRIEF INTRODUCTION FOR SITE:

Jaipur is the capital of Indian state of Rajasthan in Northern India. It was founded on 18 November 1727 by Jai Singh II, the ruler of Amer, and after whom the city is named. As of 2011, the city had a population of 3.1 million, making it the tenth most populous city in the country.

Jaipur is second top in the District wise list of number of colleges with 558 colleges & 14 Universities with 206339 enrolled student. (All India Survey on Higher Education: 2017-18 by MHRD)

Map of India
Source: https://www.bankersadda.com
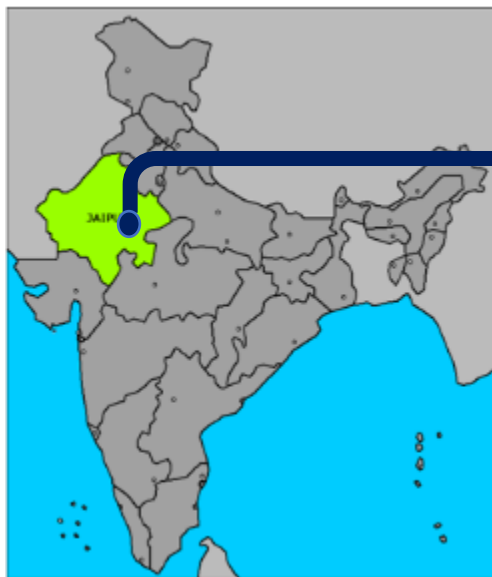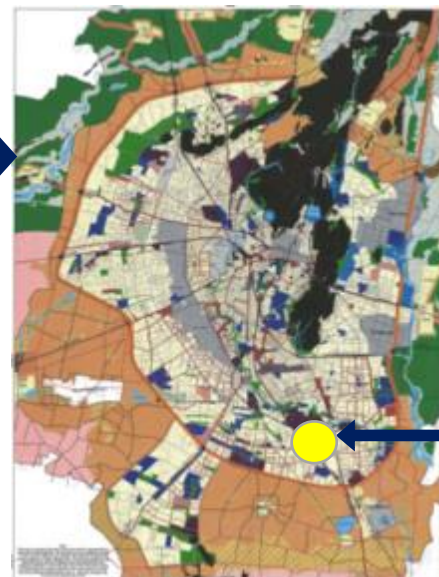
Map of Jaipur
Source: JDA, Jaipur

Educational hub,Sitapura

Figure 17 Location of study area

Growth of city

1727-1850   1850-1930   1930-1970   1970-2000   2000-2014
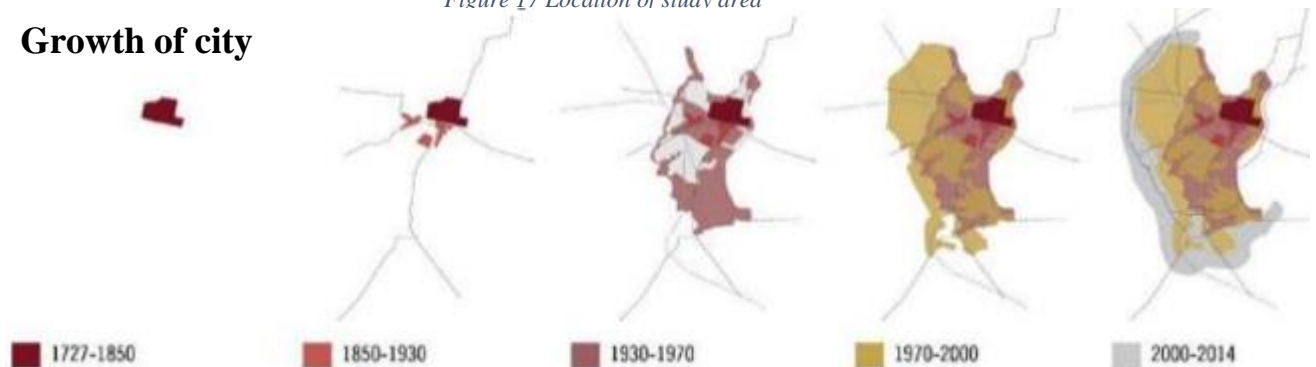
Area   6.7 sq. km   303.9 sq. km

Figure 18 Growth of Jaipur city   Source: Atlas of Urban Expansion

Jaipur is growing rapidly, mostly in south direction due to its geographical Condition.

Sitapura institutional area developed in late **90's** & lies in **Southern most part of City.**

Jaipur **is second top** in the district wise list of number of colleges with **558 colleges** & **14 Universities** with **206339 enrolled student**. (All India Survey on Higher Education: 2017-18 by MHRD)

1.5.PARAMETERS OF STUDY:

Depending upon the image & characteristic studies in urban design, following parameters have been selected for my topic, based on which my further study will proceed:

- ✓ **Land use & building use**
- ✓ **Land ownership**
- ✓ **Urban forms (Pattern, Grain, Texture)**
- ✓ **Route & pathways (Road network & Nodes)**
- ✓ **Orientation & climatic**
- ✓ **Open & green spaces**
- ✓ **Magnets & generators**
- ✓ **Architectural features**
- ✓ **Vista, skyline & landmarks**
- ✓ **Street furniture.**

1.6.AIM:

The aim of study is to design a public realm emphasizing on the needs of Students & other stakeholder of an educational hub in Jaipur.

1.7.OBJECTIVES:

The objectives of the study are as follows:

1. To study the educational hub in a city.
2. To understand and establish the relationship between public realm and urban development.
3. To understand the needs & activities of a public realm in such hub.
4. To give an urban design solution for fulfilling the need of outdoor activities for such hubs of a city.

1.8.SCOPE

- Study of various concepts, theories & tool of urban design for designing a public realm.
- Understand educational hub of a city Study of similar urban design problems & issues.
- Analysis of the site area.
- Development of final design, stressing on the important urban issues solved/addressed.
- Preparation of policies & guidelines with implementation schedule, to support the final design.

1.9.LIMITATIONS

- The study will be limited to the delineated site area, which is a part of city.
- The work will not include budget requirements & capacity building requirements for the project.
- Scope of work shall be limited to public space only.

1.10.   METHODOLOGY:

A brief introduction to topic is discussed to outline the importance of the research. Similar case studies are to be carried out & Site is to be surveyed & analyzed. Based on analyzed results guidelines, proposal & conclusion are to be framed. The methodology for the thesis work has been provided in the form of a flow chart:

Based on preliminary study through research papers, books journals related to recent urban issues.	→	**SELECTION OF TOPIC**

BACKGROUND

INTRODUCTION

Educational Hub: Definition Existing Concepts Education Sector in India	**Public Realm:** Definition Existing Concepts	**Justification:** Educational Hubs globally Educational Hubs in India & Rajasthan Life of Students Need of Public Realm in educational hubs	**Brief of selected site Formulation of Parameters**

AIM & OBJECTIVE

SCOPE & LIMITATION

Case Study
Selection of Case Studies
Study based on parameters & Observations

Primary Case Study Ahmedabad Educational Hub, Ahmedabad	**Secondary Case Study** Ryerson University Campus, Toronto University of British Columbia, Vancouver

Site Study- Educational Hub, Sitapura, Jaipur
Study based on parameters & Questionnaire survey of user
Study of various norms & standards, Building bye-laws & Planning guidelines
Analysis of study
Comparative analysis of norms & standards with available infrastructure

FORMULATION OF DESIGN GUIDELINES

DESIGN PROPOSAL

CONCLUSION

2. CASE STUDY:

2.1. SELECTION OF CASE STUDIES

This section presents a review of various case studies on Public Realm & educational Hub; it helps primarily in understanding how the Public Realm & educational hub is designed at global and national level. The different consideration and Design methods incorporated in these case studies helps in identifying and assembling ideas including techniques and appropriate methodologies to develop public realm in educational vicinity.

Case studies are divided into two parts:

- Primary case study:

   1. **Ahmedabad Educational Hub, Ahmedabad**

- Secondary case studies:

   2. **Ryerson University Campus, Toronto**

   3. **University of British Columbia, Vancouver**

2.2.Primary Case Study:

2.2.1. Ahmedabad Educational Hub, Ahmedabad

Ahmedabad is the largest city & formal Capital of Gujarat. It is located on the banks of the Sabarmati River, 30 km (19 mi) from the state capital Gandhinagar. (Wikipedia.org)

Ahmedabad has Universities, colleges & schools all over the city, But, Navrangpura area has several educational institutes with in a close knit periphery. This makes it an educational hub.

Educational hub of Ahmedabad consist of,

- Ahmedabad Educational Society: 25+ Institutions(CEPT university, Ahmedabad university, IICT, etc.), 10,000+ College students & 3,000+ School
- Gujarat university,
- IIM, Ahmedabad,
- & many other institutes.
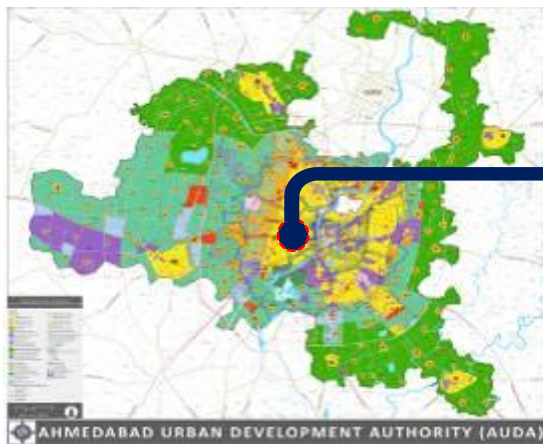
Base map of Ahmedabad   Source: AUDA
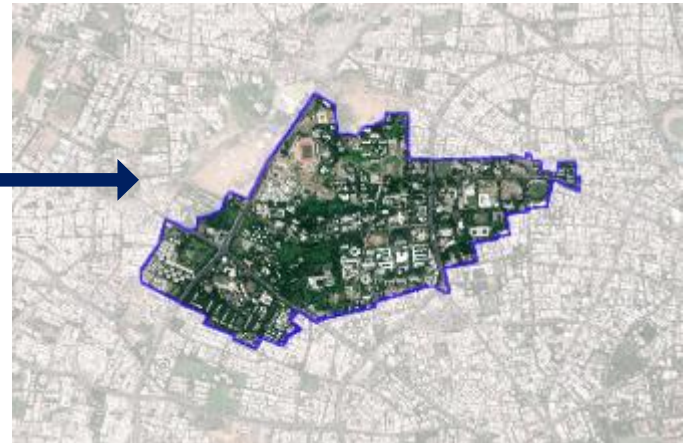
Map of educational hub   Source: Google Map

Figure 19 location map of Ahmedabad educational hub

URBAN FORM:

Roads are linear with irregular geometry. Buildings are rectangular in shape (mostly), low rise & have sufficient size of access roads.

Varying size of plots & building give uneven texture of the area. Major development is low rise.
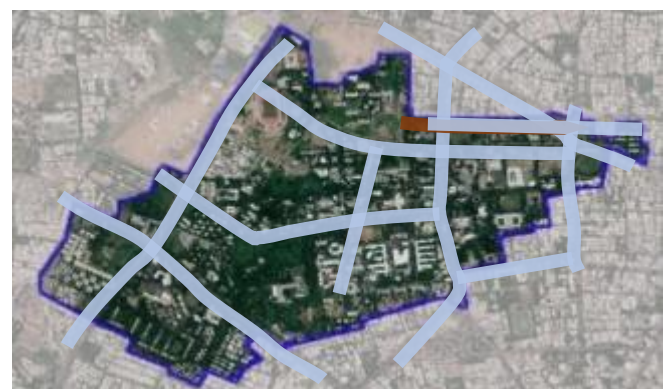
Figure 20 Geometry of raods

Source: Google Map

ROUTE & PATHWAYS:

Roadways:

Area is well connected with city. It has three kind of roads:

1. Sub-Arterial Roads (42, 36 & 30 Meters wide)
2. Collector Roads (24 & 12 Meters wide)
3. Local Roads (12 Meters wide)
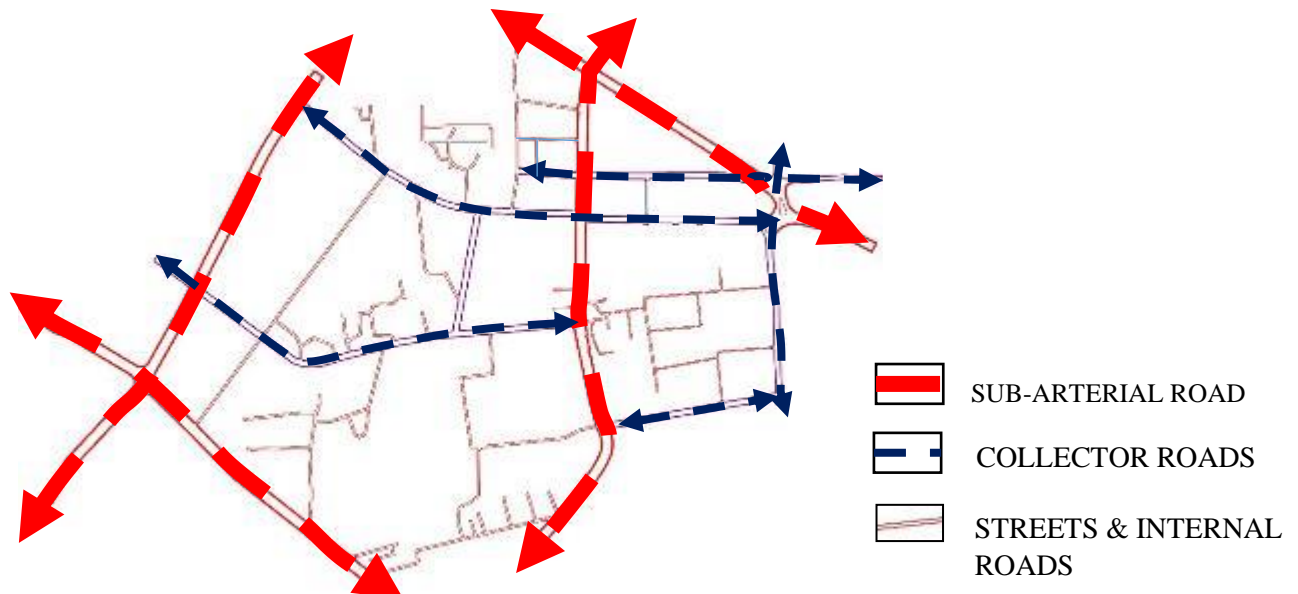
Figure 21 type of roads educational hub, Ahmedabad

1. Sub-Arterial Roads (42, 36 & 30 meters wide):
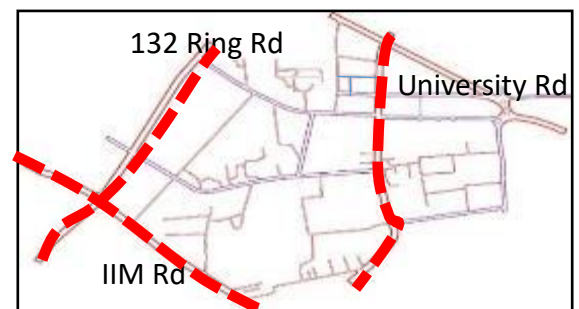
Figure 22 42,36 & 30 meter wide roads

i.   42 Meter Wide Ring Road

42 meter wide ring road meets the URDPFI Guidelines. It has BRT lane (7.0 meters wide) with BRT bus Stops, mixed traffic lane (9.0 meters wide), NMV/cycle lane (2.0 meters wide) & Pedestrian lane (3.5 meters) with median between varying lanes. Also, it has tree at median between BRT & mixed traffic lane, between mixed traffic lane & NMV/cycle lane and along the pedestrian lane.
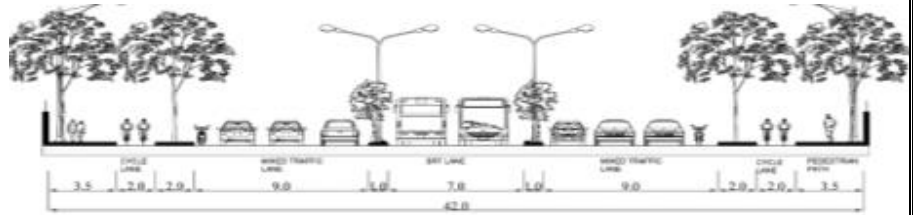
Figure 23 Ring road

ii.   36 Meter Wide University Road

36 meter wide university road lack in provision of adequate pedestrian lane & NMV/cycle track. It has BRT lane (7.0 Meters wide) with BRT bus stops (4 Meters wide), mixed traffic lane (10.5 Meters wide), pedestrian lane (2 Meters) with trees for shade.
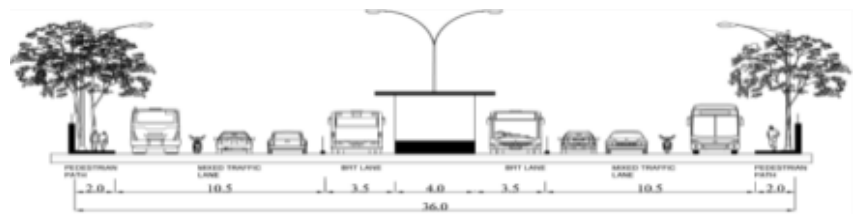
Figure 24 University road

iii.   30 Meter Wide IIM Road

30 meter wide IIM road lack in provision of NMV/cycle track & Median for tree plantation. It does not have BRT lane. It has mixed traffic lane (10.5 Meters wide), wider pedestrian lane (4 Meters) with trees for shade & separated street light for pedestrian lane.
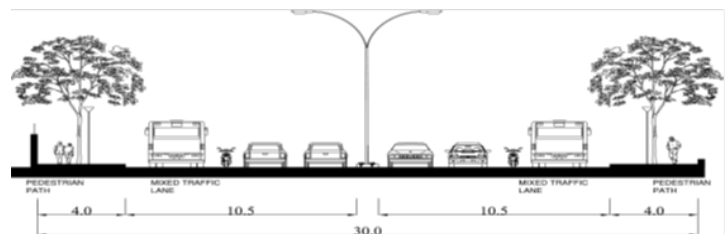
Figure 25 IIM road

2. Collector Roads (24 & 12 meters wide)
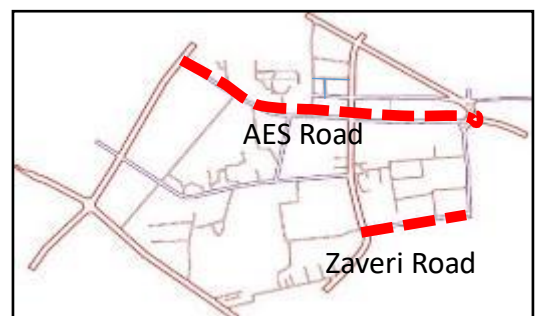
Figure 26 24 & 12 meter wide roads

i.   24 Meter Wide AES Road

24 meter wide AES road lack in provision of NMV/cycle track & Median for tree plantation. It does not have BRT lane. It has mixed traffic lane (9.5 Meters wide), less wide pedestrian lane (2 Meters) with trees for shade.
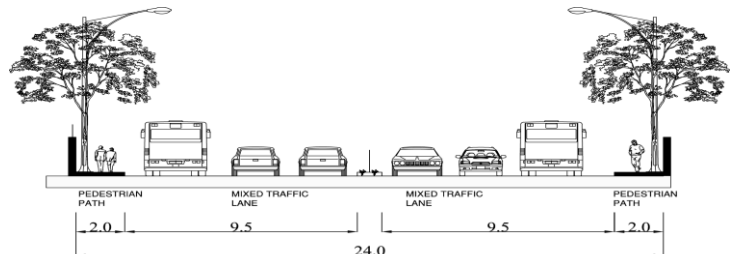
Figure 27 AES road

ii.   12 Meter Wide Zaveri Road

12 meter wide Zaveri road lack in provision of NMV/cycle track. It has two way mixed traffic lane (8 Meters wide), pedestrian lane (2 Meters) without trees for shade. High rise commercial buildings & trees with the plot along the boundary creates shade on the road.
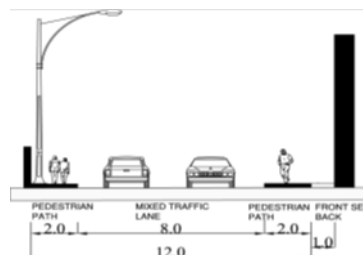
Figure 28 Zaveri road

4. Local Roads (12 Meters wide)

i.   12 Meter Wide M.G. College Road

12 meter wide M.G. Science college road lacks in provision of NMV/cycle track. Segregation of lanes is not done. Cars can be seen parked along one side of road. Road has trees along the both side, which creates good amount of shade for walking.
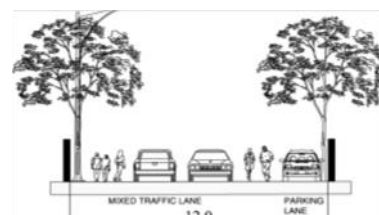
Figure 29 M.G Science road

Public transport network

Majorly, public transportation functions on Sub-Arterial roads. However, some collector roads are also part of public transportation networks. Educational hub has good connectivity to other part of city, through public transportation. All sub-Arterial roads has BRTS Lanes. One Metro Route is also passing through the edge of educational hub, which is under construction, presently.

Public Transport Road network

Metro Rail Network
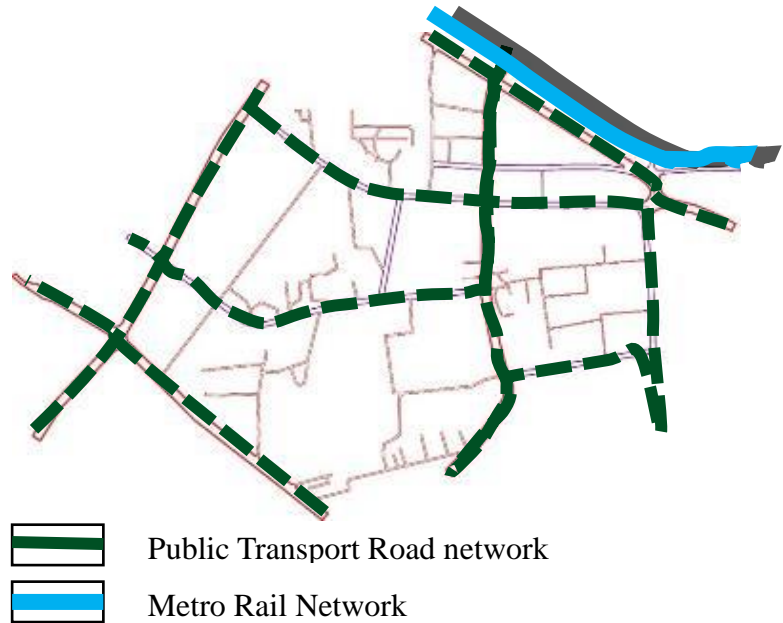
Figure 30 Public transportation network

Transit Oriented Zone (Proposal by HCP):

AUDA's (Ahmedabad development Authority) Comprehensive Development Plan 2021, with its focus on compact and sustainable development, has identified 400 m wide corridors along the public transit corridor (BRTS and Metro Line) as Transit Oriented Zone (TOZ). HCP has been appointed by AUDA to prepare the TOZ plans for additional six corridors covering about 51 kms length along the existing BRTS and proposed Metro Line.

Also, Educational hub's Sub-Arterial roads & roads with metro line will be developed, accordingly.

HCP is engaged by AUDA to prepare Local Area Plans (LAPs) for more than 70 kms of TOZ corridors. These LAPs are to transform the development within the TOZ corridors by incentivizing redevelopment and encouraging compact development by increasing the FSI from 1.8 to 4.0. At the same time they also identify additional land to be taken into public ROW to add new streets, to improve pedestrian connectivity and at the same time, increase the green cover. This will enhance accessibility through direct connectivity with BRTS and upcoming Metro.(HCP, 2015)

Figure 31 Metro line with BRT corridor

Figure 32 BRT Corridor

Source: www.hcp.co.in
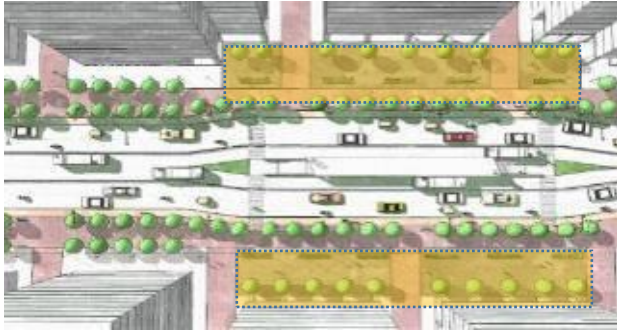
Figure 33 Plaza with BRT corridor
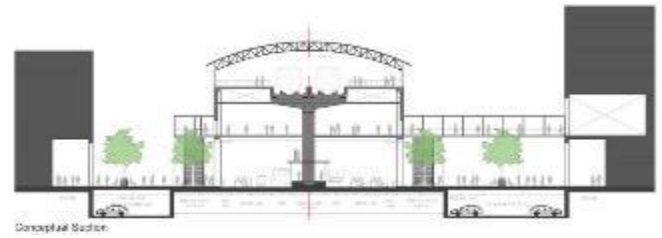
Figure 34 Multilevel use of road

Source: www.hcp.co.in

Nodes:

Nodes, which are around hostels, Residential area & institutions, are more active, then others. Building blocks around this node have shops like Restaurant, Cafe, Daily need, stationary, Barber shops. Snack & tea, Tobacco stalls Second hand book stalls can also be seen around these nodes.

● Major nodes   ● Other nodes
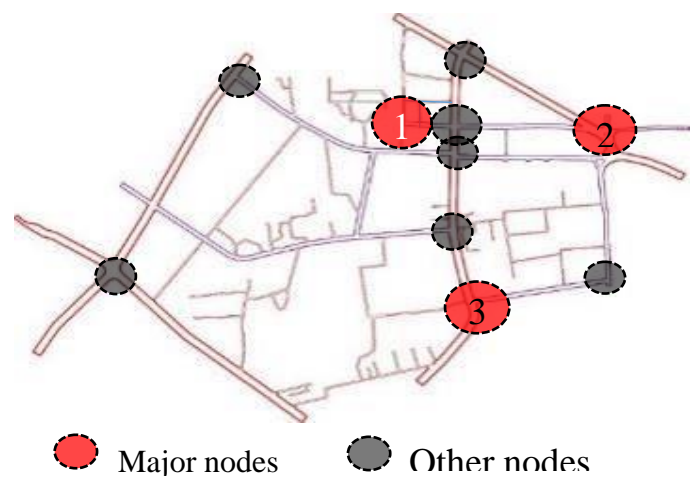
Figure 35 Location of nodes

Major Nodes:

Following node are the active nodes:

1. Hostel Tiraha (T-shape intersection of local roads)
2. Commerce Circle (Multi leg intersection of Sub-Arterial roads & local roads)
3. Gulab Tekra Teen Rasta (Y shape intersection of Sub-Arterial & collector roads)

1. Hostel Tiraha

Hostel Tiraha is having student oriented activities, as surrounded area has AES sports ground, Gujarat University & hostel buildings. It has tea stalls, restaurants & snacks stalls. Costumers parks their vehicle along the road. Roads are wide enough to avoid conjunction.

Figure 36 Images of Hostel Tiraha node

2. Commerce Circle

Commerce circle is having activities for students as well as local residents, as surrounded area has college buildings, school & residential area. It has tea stalls, book shops, tobacco stalls; daily need shops Restaurants & cafés and ATMs etc. Costumers park their vehicle along the road. Roads are wide enough to avoid conjunction. It has a traditional style pol as landmark.
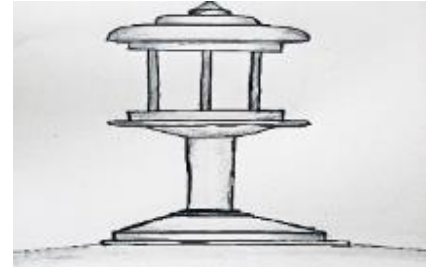
Figure 37 Images of commerce circle node

3. Gulab Tekra Teen Rasta

Gulab Tekra Teen Rasta is have actives for students as well as local residents, as surrounded area has college buildings & residential area & Private Hostels. It has tea stalls, tobacco stalls; daily need shops Restaurants & cafés, coaching centers, offices banks and ATMs etc. Parking space is available at this node. Still, vehicle can be seen parked along the road. Roads are wide enough to avoid conjunction.

Figure 38 Images of Gulab tekra Teen Rasta node

ORIENTATION & CLIMATE:

Ahmedabad has a hot, semi-arid climate. To avoid adverse effect of heat to local & collector roads are heavily shades with trees, where pedestrian movement is high.

Most of the buildings have North-South side orientation to avoid direct sun light. Building blocks are parallel and perpendicular to street. Orientation of streets is irregular. Ahmedabad has a hot, semi-arid climate. To avoid adverse effect of heat to local & collector roads are heavily shades with trees, where pedestrian movement is high.

Figure 41 Orientation of roads
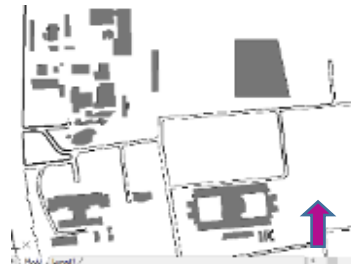
Figure 39 Orientation of buildings

Figure 40 Shades local roads

OPEN & GREEN SPACES:

Open areas are evenly distributed in the study area. Public open Space as designed mostly as playground. However some open space has casual sitting space, cafe, and stage area for functions. These playground are also used for various activities like Celebrity dance show, Garba events, Annual, culture functions of colleges & other social & cultural Activities.
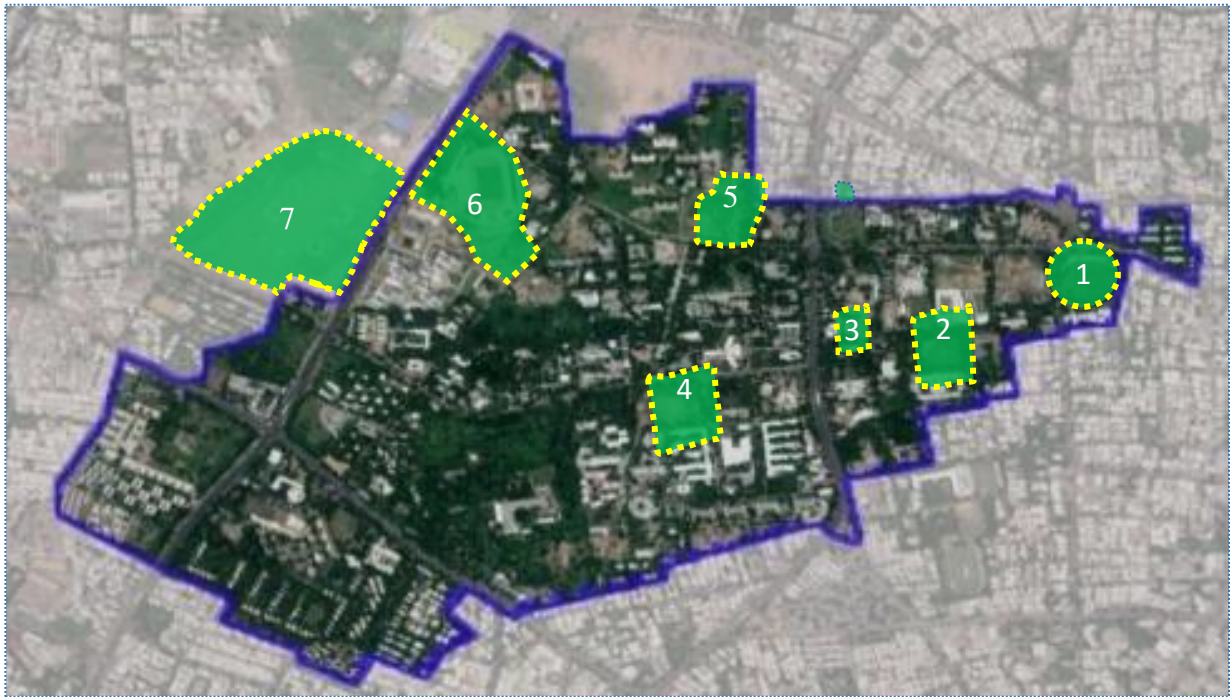
Figure 42 Green space in educational hub, Ahmedabad

<u>Source: Google Map</u>

1. **H.L Ground**:

It has cricket ground, jogging track Informal Sitting spaces, Stage area for functions & parking space.
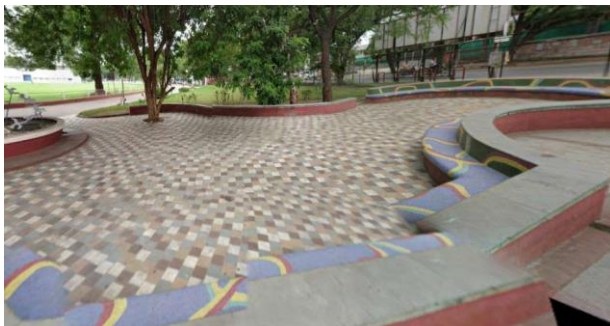
Figure 43 Cricket ground with informal sitting space & jogging track

Figure 44 Stage area & sitting spaces

2. **Gymkhana & Sport Ground:** It has two football ground & Gymnasium.

Figure 45 Football ground

3. **Husain-Doshi Gufa:** Famous Husain –Doshi gufa is the favorite interacting space for students. Sitting space around it with a café attract a lot of students during evening time. Road, approaching to it, has developed as sitting spaces.

Figure 46 Ahddavad Ni Gufa (Husain-Doshi Gufa)

Figure 47 causal sitting along road

4. **L.D. College Ground:** It has two Cricket ground & sitting space along the boundary with parking space. This ground is also used by surrounding college for their various sports activities & events.

Figure 48 L.D college cricket ground

5. **AES Ground:** Ahmedabad education society has developed a sports complex, which has cricket & football ground, running track, parking space & sitting spaces.

Figure 49AES Ground

6. **Gujarat University's Ground:** It has Football ground with Running track.

Figure 50GU ground

7. **GMDC Ground:** It is one the biggest open ground of the city with a capacity of 3.5 lakh people. Grand events & functions of the city are being organized in this ground.

Figure 51GMDC ground

Source: Google.com

MAGNETS & GENERATOR:

The Area has several **play grounds** which attracts students & local residents of surrounding areas.

Gujarat University Convention and Exhibition Centre Is one of the biggest state-of-the-art convention facility in gujarat, with **open ground space, parking for more than 500 four wheelers** & auditoriums with 2,300 seating capacity etc.
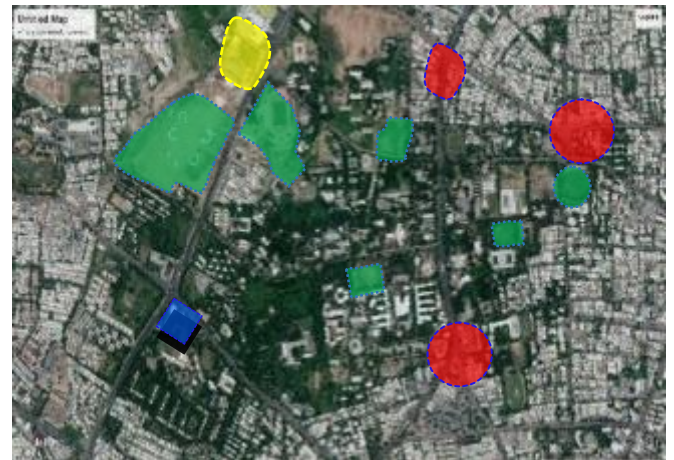
Figure 52 Magnets in and around the area

Source: Google Map

YASH AQUA complex is one of the **Landmark** of the area. It has Restaurants, Offices & shopping area.

The Area has several Universities & institutes Like Gujarat University, Ahmedabad university & CPET etc, & their hostel, which are the generators of the area.
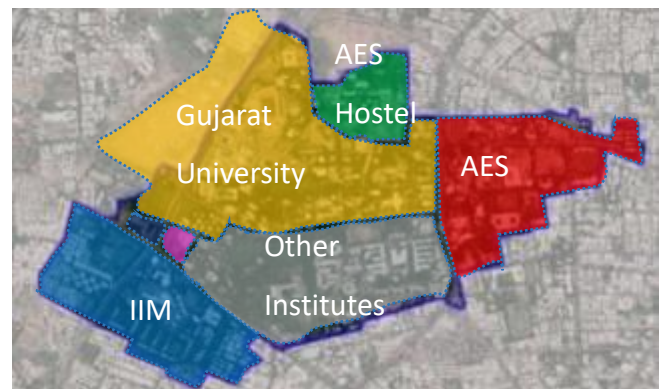
Figure 53 Generators in the area

Source: Google Map

Surrounding Area

Majorly residential with small commercial pockets. Students, coming from other cities then Ahmedabad, reside here.
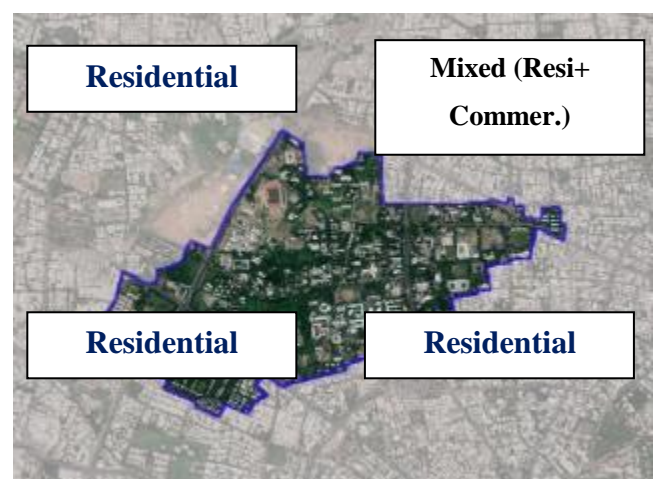
Figure 54 Surroundings of the area

Source: Google Map

ARCHITECTURAL FEATURES

Buildings do not have dominating style of architecture.

Area has some old traditional buildings, new age buildings with exposed brick & concrete work, glass façade with climatic treatment facades.

Figure 57 Gujarat University

Figure 55 CEPT University

Figure 56 School of Engineering and Applied Science

VISTA, SKYLINE

Straight line road with trees & boundary walls of brick creates uniforms vista.

Sufficient setback of buildings from plot line create effective skyline. At major nodes, High building height gives sense of landmark.
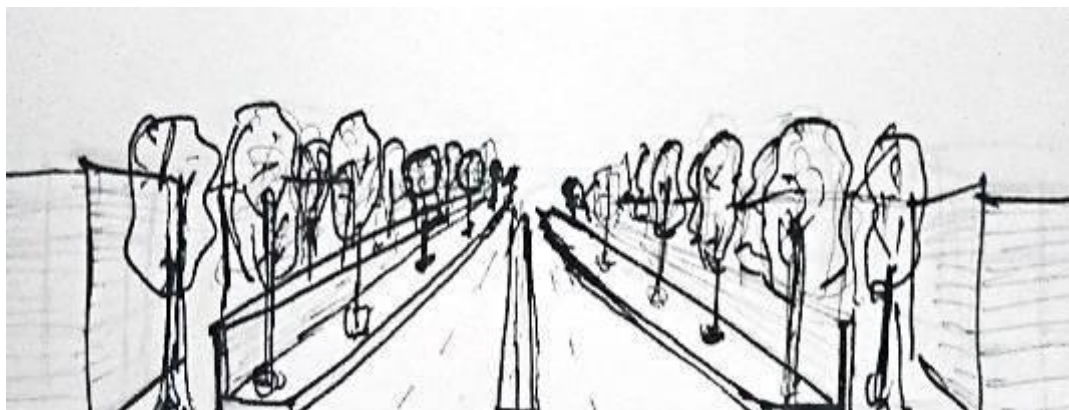
Figure 58 Vista of a street

ACTIVITY PATTERN: Street Hawkers & Venders

Educational areas always attracts street hawkers & venders, as street food is cheaper & fit into the survival need of students.

Street hawkers can also be seen in educational hub, Ahmedabad, but in controlled manner & on specific roads. AUDA has restricted hawking on Heavy traffic road. Majorly, Hawkers can be seen on roads with less traffic or small roads, which are:

1. Hostel road(Street)
2. AES Road (collector Rd)
3. IIM Road (Sub- Arterial Rd)
4. ATIRA Road(Collector Rd)

Vending zones   No-vending zones

Figure 59 Location of street vendors & hawkers

<u>Source: Google Map</u>

1. Hostel road(Street)

Figure 60 Images of tea & snack stalls at hostel road

2. AES Road (collector Rd)

Figure 61 Images of food, automobile repair, bag repair & cloth stalls

Figure 62 Images of old books, Tobacco products & fashion accessories at AES road

3. IIM Road (Sub- Arterial Rd)

Figure 63 Images of Tea & snacks shops at IIM road

4. ATIRA Road(Collector Rd)

Figure 64 Food & snack stalls at Atira road

STREET FURNITURE:

Several Elements of Streetscape can be seen to cater the need of the people on the street, like:

- Sitting spaces along the road
- Street Lights
- Bus stops
- Dustbins
- Signage
- Public Arts

Sitting along local Roads

Sitting around tree (IIM Road)

Sitting at a node

Dustbin

BRT bus Stop

Bus stop

Street lights for walkways

Signage art

Signage

Figure 65 Images of street furniture

OTHERS:

Space below Flyover is developed as sitting space & also, used for social projects.

Figure 67 Sitting spaces below flyover

Figure 66 Learning center for kids from slum

CONCLUSION

Routes & pathways

- Hierarchy of roads is maintained.

- Good movement pattern with BTR system.

- Need of landscape at junctions & nodes

- More focus on NMV lane & pedestrian movement is required.

Orientation & climate

- Shaded pathways & dense vegetation for east-west orientated roads.

- Shaded spaces for outdoor activities.

Open spaces

- Most of open spaces are playgrounds.

- Play grounds are developed as parks areas by providing jogging tracks & casual sittings spaces.

Magnets & generators

- Well connected to area through roads & pathways.

- Active nodes are the magnets.

Architectural features

- Need to implement design guidelines to control haphazard development of private buildings (especially at nodes).

Vista & skyline

- Straight road gives good experience.

- Requirement of guidelines for buildings & boundary walls to enhance the experience.

Activities pattern: Street hawkers & vendors

- Restriction of hawkers on major roads helps in free moving traffic & avoids conjunctions.

- Dedicated zones for vendors, but unorganized.

Street furniture

- Provision of sitting/rest space along the roads & at nodes.
- A poor condition of signage's in inner parts.
- Barrier free BRT bus stops.

Others

- Provision of public toilets
- Good utilization of space below flyover
- Safe & secure environment.

2.3.SECONDARY CASE STUDY:

2.3.1.   RYERSON UNIVERSITY CAMPUS, TORONTO, CANADA

Toronto is the provincial capital of Ontario and the most populous city in Canada. Ryerson University (commonly referred to as Ryerson) is a public research university in Toronto, Ontario, Canada. It is located at one of the busiest intersections in downtown Toronto.

The university is composed of 39,000+ undergraduate students, 2,600 graduate students, and 12,000 continuing education students. (*Source: wikipedia.org)*

The public realm is built upon a framework of streets, lanes, and open spaces shaped by the surrounding built form.

Source: https://www.narcity.com

Figure 68 Location map of Ryerson University   Source: Google Map

ROUTES & PATHWAYS:

A clear pattern of streets and pathways has been provided:

	Promenade
	Perimeter Street
	Pedestrian Only
	Pedestrian Priority
	Inner Streets
	Connecting Streets (Btw Perimeter Streets)
	Lanes
	Pedestrian only Path
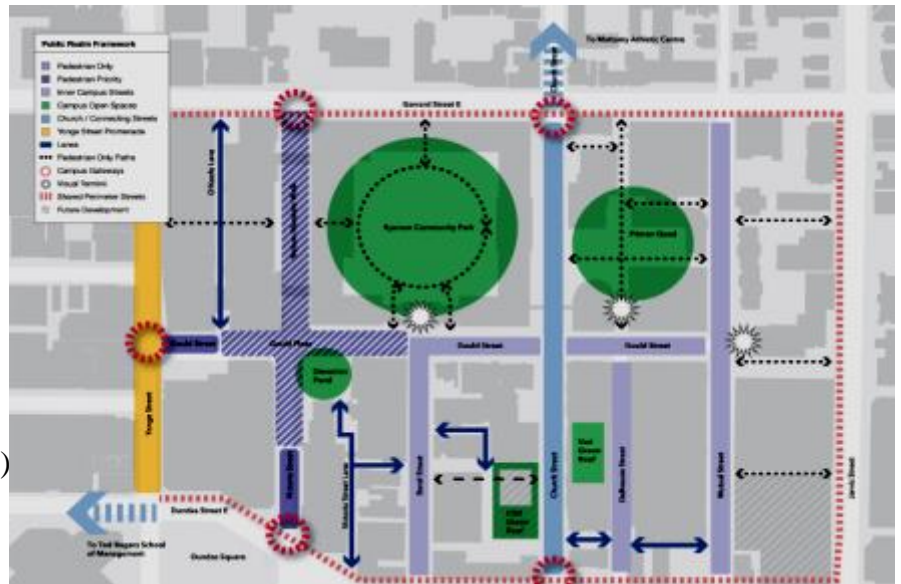
Figure 69 Route strategy

Source: Ryerson University Campus Public Realm

Majorly, the area has following type of road sections:

1. Promenade (20 meters wide)- Younge Street
2. Perimeter road (24 meters wide)- Gerrard Street
3. Pedestrian only roads (24 meters wide) – Gould street
4. Street lanes (12 meters wide)- Dalhousie street

Figure 70 Types of Roads

Source: Google Map

1. Promenade (20 meters wide)- Younge Street

It has 10 meter wide mixed traffic lane, 4 meter wide walkways & 2 meter wide one side cycle track with dedicated street line for walkways.

Source: google.com

Figure 71 Younge Street

2. Perimeter road (24 meters wide)- Gerrard Street

It has 7.5 meter wide mixed traffic lane, 3 meter wide walkways, 2 meter wide cycle track, 2.5 wide one side parking lane & 4 meter wide one side planter bed with dedicated street lights for walkways. Planter bed has sitting space at the edge.

Source: google.com   *Figure 72 Gerrand Street*

3. Pedestrian only roads (24 meters wide) – Gould street

It has 7.5 meter wide Cycle track, 5 meter wide walkways on one side & 7.5 meter wide on another side and 4 meter wide one side planter bed with dedicated street lights for walkways. Planter bed has sitting space at the edge.
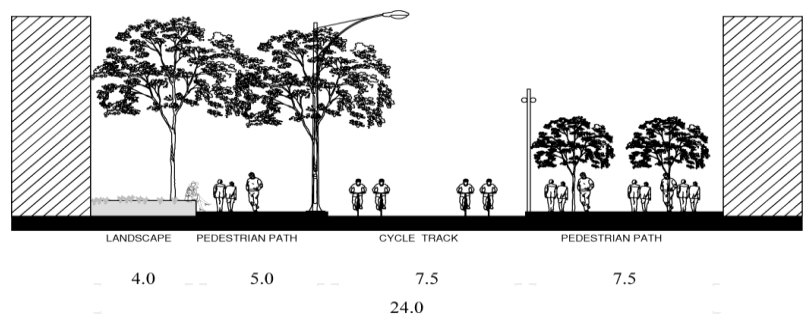
Source: google.com   *Figure 73 Gould Street*

4. Street lanes (12 meters wide)- Dalhousie street

It has 7 meter wide mixed traffic lane, 2 meter wide one side walkways & 3 meter wide parking lane with street lights.
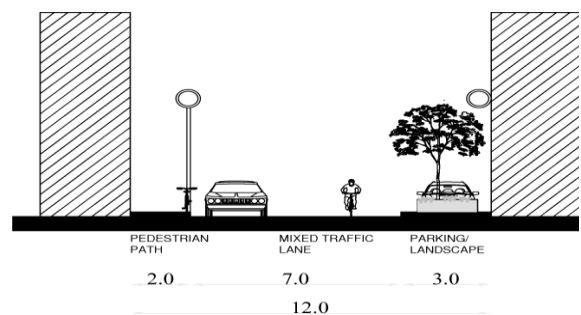
Source: google.com   *Figure 74 Dalhousie Street*

Street Lighting:

Street & Pedestrian level lights in public spaces contribute to the character and identity of Ryerson. Pedestrian scale lighting is provided along the key routes: Gould, Victoria, Bond, and Church Street. Decorative lighting supports a wider range of uses such as gatherings and retail. Special lighting is provided at main entrances and key visual termini.
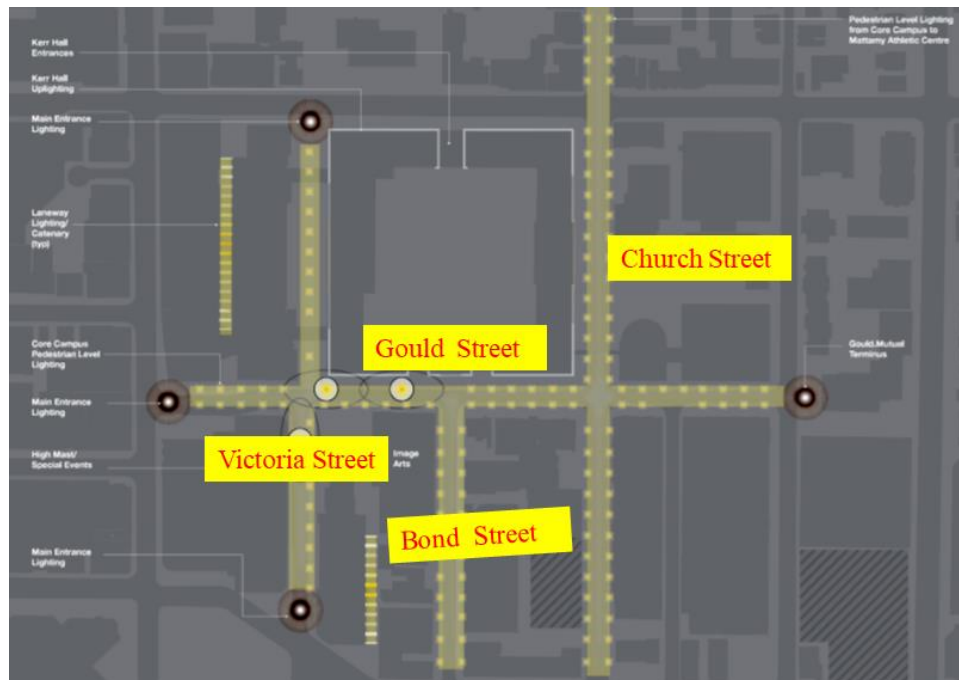
Figure 75 Street lighting plan of Ryerson University
Source: Ryerson University Campus Public Realm

Figure 76 Image & section of street lighting on the key routes
Source: Ryerson University Campus Public Realm

Paving:

Paving is a critical public realm component for Ryerson University. Given that streets compose the majority of public space on campus, paving is the dominant material that people see and experience first and most.

Following paving strategies to ensure a beautiful, consistent and more accessible public realm:

- Use high quality and durable materials and details throughout the campus public spaces. Pedestrian priority spaces will receive the highest level of finish and best quality materials.
- Use of paving pattern to create interesting pathways
- Introduce special paving in roadway, with or without angled curbs.
- Enhanced paving in lanes.
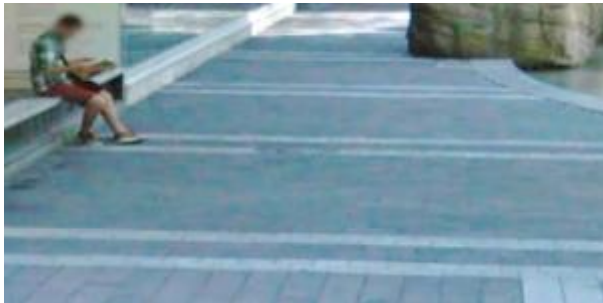
Figure 77Use of patterns to add further interest.

Figure 78 High quality and durable Materials and details

Figure 82 curb stone to define diverse lanes

Figure 80 Prevention of curb stone to enhance accessibility

Figure 81 Color variation between carriage way & walkway

Figure 79 Use of color to define access

Source: google.com

Paving:

Paving Strategy

- Unit Paver / No Vehicle Access
- Unit Paver / Vehicle Access No Curbs
- Unit Paver / Vehicle Access w/ Curbs
- Unit Paver / Sidewalks Only - Church St.
- Unit Paver / Sidewalks Only
- Unit Paver / Lanes (TBD)
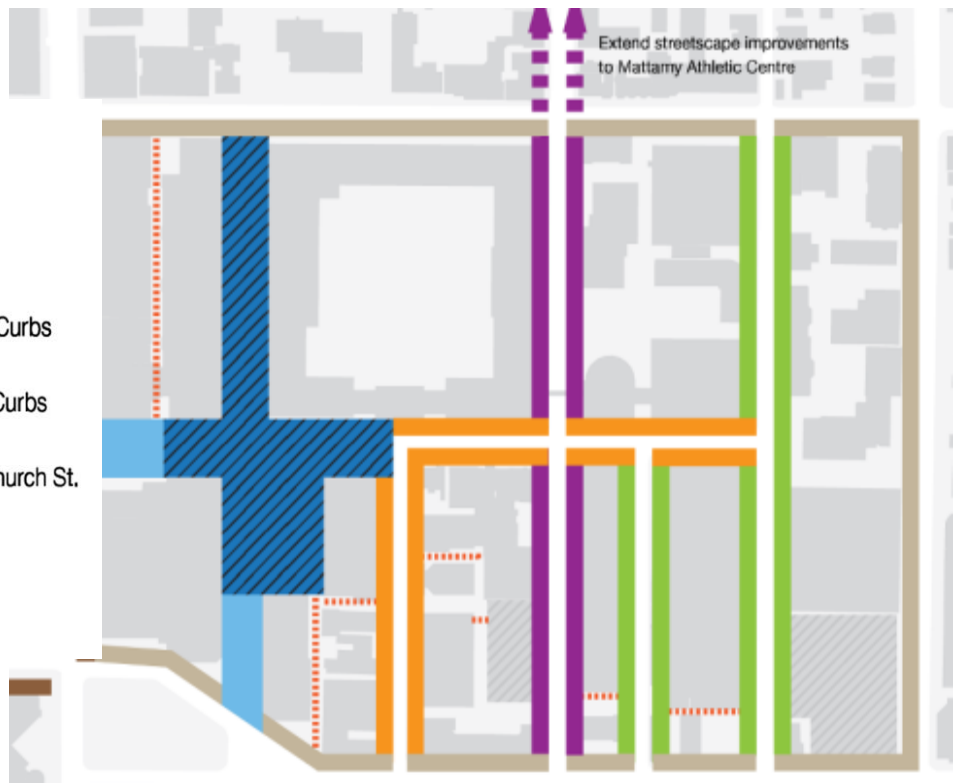
Figure 83Paving strategy for the roads

Source: Ryerson University Campus Public Realm

Cycling:

To promote a safe and comfortable cycling environment in campus, Streets & Public Spaces are categorized in various categories for:

- Dismount zone
- Bike parking room
- Bike parking/existing
- Bike parking/racks
- Bike parking/post & rings
- Bi cycle lanes
- Bike friendly streets
- Slow bike zone/high Pedestrian area

Cycle stand
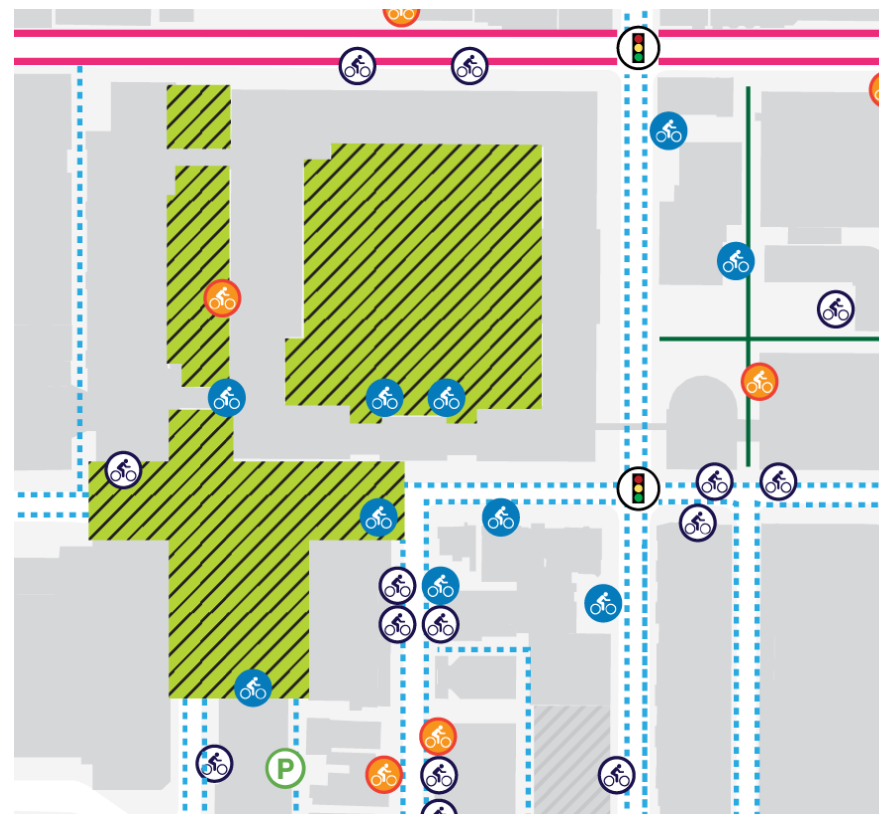
Figure 84 Cycling strategies

Source: Ryerson University Campus Public Realm

ORIENTATION & CLIMATE:

Toronto has humid continental climate with warm summer & cold winters with frequent snowfall.

Source: https://https://en.wikipedia.org

Major Streets & buildings are are in East- West oriented to maximize the effect of Sun light. building block are parallel/ perpendicular to roads.

Figure 85 Orientation of buildings & roads   Source: Google Map

OPEN & GREEN SPACES:

Open areas are evenly distributed in the study area. Public open space are well designed.

Devonian pond has a pond & sitting space at it's periphery.ryerson community park is the biggest public park with jogging track, sitting & relaxing space. Several activities do happen in the park. Pitman quad square has interesting water fountain.green roofs are also provided. Csd square has good sitting space. Follwing are the major open & green spaces of ryerson university campus:

1. Ryerson Community Park
2. Pitman Quad
3. Vari Green Roof
4. CSD Square
5. Devonian Pond Square.
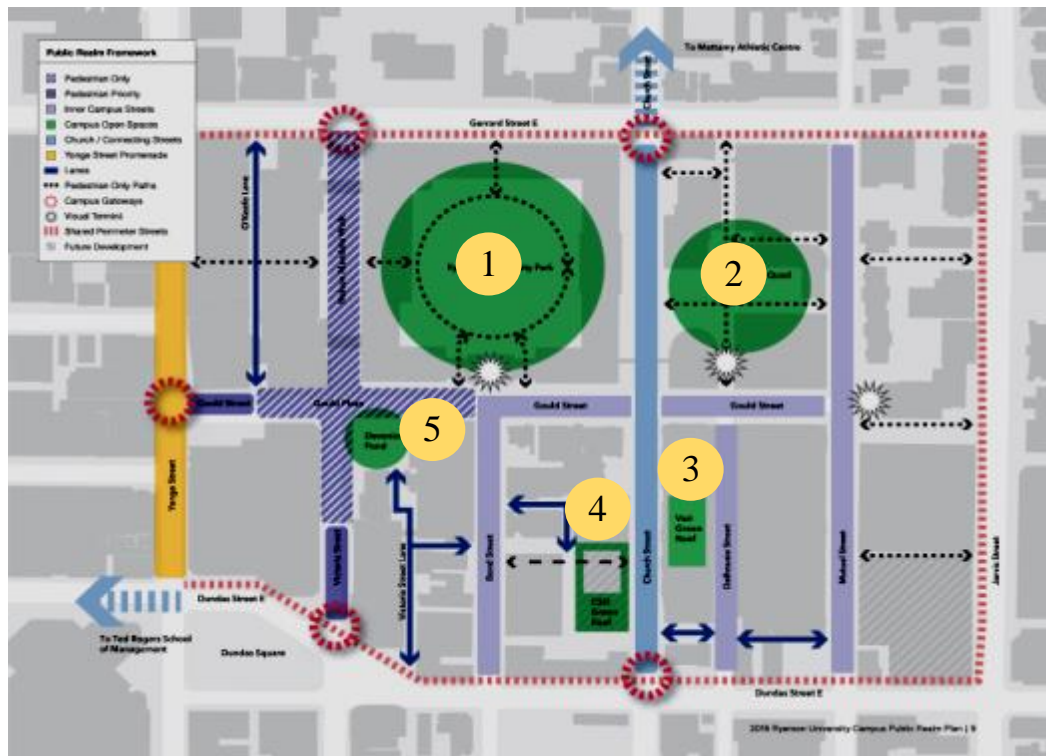
Figure 86 open & green spaces in Ryerson university campus

<u>Source: Ryerson University Campus Public Realm</u>

1. Ryerson Community Park:

It is the biggest green space of campus. It has lush green play ground with jogging track. It is also used for gatherings & organising events.

Figure 87 Ryerson community park

<u>Source: google.com</u>

2. Pitman Quad:

It is open space with hard landscape & fountain.

Figure 88Pitman Quad

<u>Source: google.com</u>

3. Vari Green Roof:

It is the roof of an acadmic building which is used for agriculture purpose & gives vertical dimesion to green spaces.

Figure 89 Vari green roof

4. CSD Square:

It is the Green Social interactive space with rowsof benches to attract big number of students.

Figure 90CSD square
Source: google.com

5. Devonian Pond Square:

It has a Casual sitting space with pond in centre.During the winter time, this forzen time becomes a place for sketing & other ice relatetd sports.

Figure 91 Devonian pond square

Source: Ryerson University Campus Public Realm

STREET FURNITURE:

Interactive furniture is placed considering movement between classes to enhance socializing during off time.

The public spaces on campus have comfortable furnishings that support the social and cultural activities that happen on a daily basis, for both individuals and groups.

Figure 92 Images of street furniture
Source: www.archdaily.com/tag/ryerson-university

CONCLUSION:

Routes & Pathways

- Major parts of Streets are dedicated to Pedestrian & NMV movement
- Development of Interesting sitting Spaces & landscape.
- Marking of space with paving patterns & colors.
- Good quality & Material enhance the functionality of Streets & public spaces.
- Cycling- Zoning of Cycling routes enhance safety of People.
- Street Lighting- Contributes to enhance the character & identity of campus. Also, Creates safe environment for outdoor activities.

Orientation & Climate

- Climate oriented design gives better opportunity for outdoor activities
- OPEN SPACES
- High Quality of open & green Spaces with Variety
- Provision of green roofs creates multiple levels of public spaces.
- Water pond invites several activities during winters

Street Furniture

1. Informal sittings spaces along the street bring interaction activities among users.

2.3.2. UNIVERSITY OF BRITISH COLUMBIA, VANCOUVER   , CANADA

Vancouver is a coastal seaport city in western Canada, located in the Lower Mainland region of British Columbia. As the most populous city in the province. University of British Columbia is a public research university. The Vancouver campus is situated about 10 km (6 mi) west of Downtown Vancouver.

Source: https://https://en.wikipedia.org

The university is composed of 44,000+ students, 960+ graduate students.

The Campus Public Realm plan has five priority elements: Organizing spines, Large commons, Outdoor informal social and learning spaces, Pedestrian pathways, Entryways

Figure 93Map of Vancouver

Source: Google Map

Figure 94Map of UBC Campus

Source: www.ubc.ca

ROUTES & PATHWAYS:

Campus has a pattern of streets and pathways. Following three types of road are developed to enhance public realm of campus:

1. Main Mall Road & University Boulevard
2. Pedestrian Pathways
3. Entryways

Figure 95 Categorization of roads

Source: UBC Public Realm Plan,2009

1. **44 Meter wide Main Mall Road(Main Spine):**

It has 12 meter zig-zag shape pedestrian lane in centre with landscape, 6 meter mixed traffic lane, 2 meter median between cycle lane & mixed traffiic lane, 3 meter wide cycle lane & 5 meter landscape strip at the edge. Dedicated street light is provided for cycle lane.
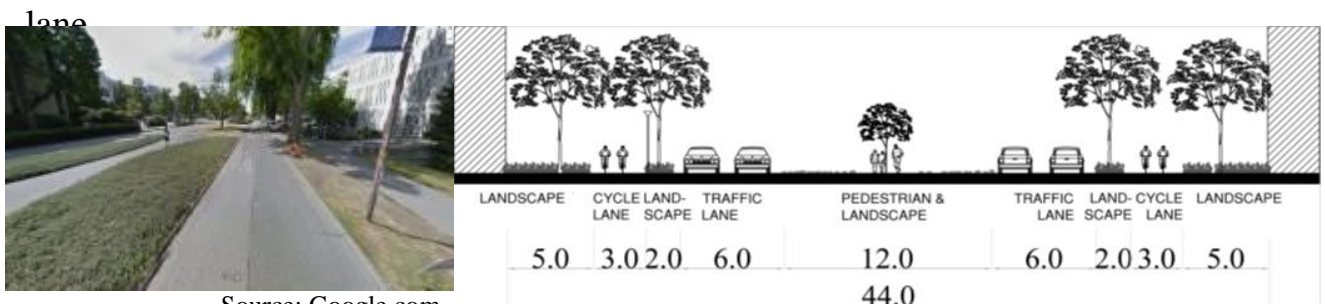
Source: Google.com

Figure 96Main Mall Road

2. **20 Meter wide West Mall Road(Padestrian pathways):**

It has 6 meter two-way mixed traffic lane, 3 meter one side Car Parking lane, 3 meter wide Padestrain lane & 2.5 meter landscape strip at the edge with cycle parking points at specific locations. Dedicated street light is provided for Padestrain lane.
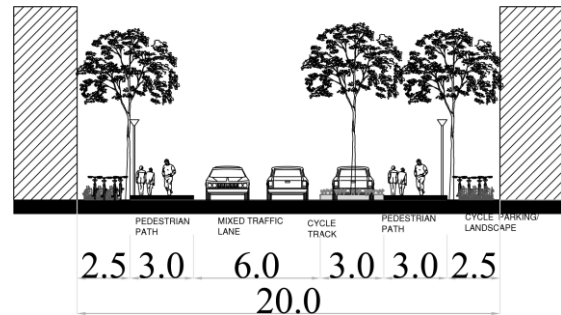
Source: Google.com   *Figure 97 West mall road*

3. **40 Meter wide University Boulevard (Entryway):**

It has 8 meter wide median with landscape, 7.5 meter mixed traffic lane, 7 meter wide Padestrain lane. Dedicated street lights is provided for Padestrain lane & traffice lanes.
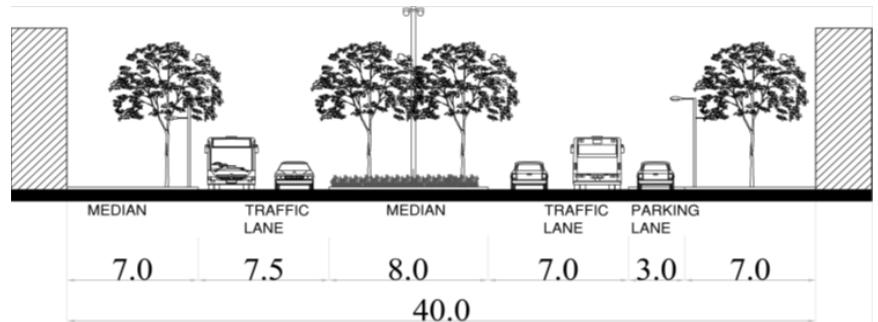
Source: Google.com   *Figure 98 University Boulevard*

ORIENTATION & CLIMATE:

Vancouver has warm summer Mediterranean Climate (Dry summer, Rainy & Cold Wintor.)

Summers are drying & warm (Avg. Max. 22°C, July) winters are typically cold with frequent snowfall (Avg. Max. 6°C, Dec.)

Streets & buildings are at an angle to North. Building Block Are Parallel/ Perpendicular to Roads

Figure 99 Orientation of roads & buildings

Source: Google Map

OPEN & GREEN SPACES:

Open areas are evenly distributed in the study area.   Public spaces are designed as Green public spaces & informal social learning spaces & playgrounds with indoor with indoor recreational spaces. Green spaces are designed mostly as playground & dense landscape. Informal & social learning spaces have casual sitting space, in and around academic buildings with hard landscape.

Green Public Spaces & Informal Social Learning Spaces:
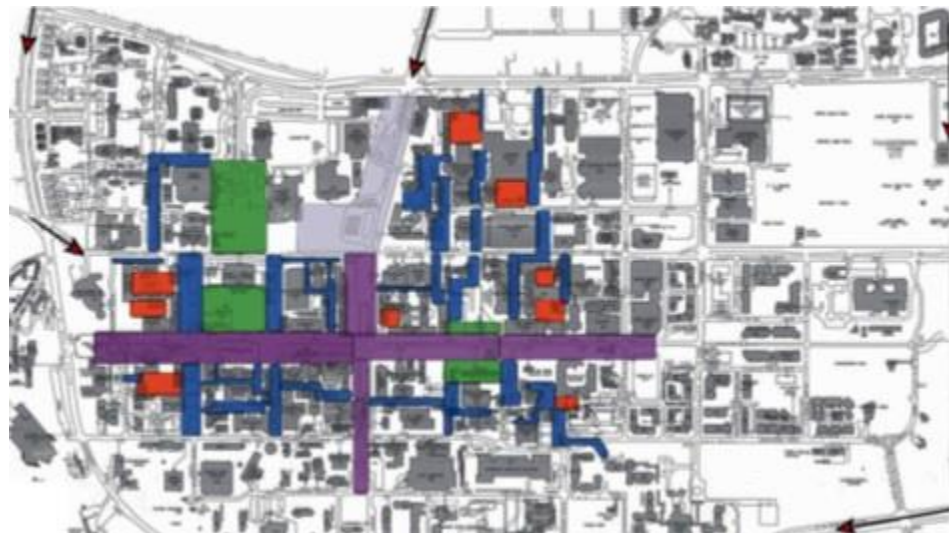
■ Green Public Spaces   ■ Informal & Social Learning Space

Figure 100Green & Informal Public spaces

Source: UBC Public Realm Plan , 2009

Figure 101Informal & Social learning spaces

Figure 102 Green public spaces

Source: google.com

Playgrounds & Indoor Recreational spaces:

UBC campus has following playgrounds & recreational centers:

1. **War Memorial Gym**

It has 4 volleyball courts & one basketball court with 2,862 seating capacity.

Figure 103 War Memorial Gym

Source: www..ubc.ca

Indoor recreational

Playgrounds

Source: www..ubc.ca

2. **UBC Tennis Centre**

It has 12 indoor courts, 1 outdoor court in 7,175 Sq.m area.

Figure 104UBC Tennis Centre

Source: www..ubc.ca

3. **UBC Boathouse**

It has spaces for Small meetings, corporate events, social gatherings and large formal events.

Figure 105UBC Boathouse

Source: www..ubc.ca

4. **Student Recreation Centre**

It has 6 Volleyball Courts, 3 Basketball Courts, 12 Badminton (Main ground for tournaments) with 12,000 seating capacity Courts, Dance Studio, Martial Arts & Fitness Centre in 17,00 Sq m area.

\

Figure 106Student Recreation Centre

Source: www..ubc.ca

5. **Aquatic Centre**

it has 50 meter & 25 meter Swimming pool, recreational pool, 34-person hot tub Steam room and sauna), with 460 seating capacity.

Figure 107Aquatic Centre

Source: www.ubc.ca

6. **Thunderbird Sports Centre**

It has concerts & sporting events Hall with 7000 Seating capacity,2 separate ice surface for ice hockey & skating, with 900 seating capacity.

Figure 108Thunderbird Sports Centre

Source: www.ubc.ca

7. **Thunderbird Park**

It has Soccer, Baseball Hockey, Rugby, running track with long jump pit, steeple chase & shot-put play grounds.

Figure 109 Thunderbird Park

Source: www.ubc.ca

8. **Thunderbird Stadium**

It is the main ground of campus. Several annual events are being organized here. It has 12,000 Seating capacity.

Figure 110Thunderbird Stadium

Source: www.ubc.ca

STREET FURNITURE:

UBC campus has, cycle stands at various locations, weather protected sitting area, barrier to divide pedestrian & cycle tracks, public area & dustbins & public art, as street furniture.

Cycle Stands
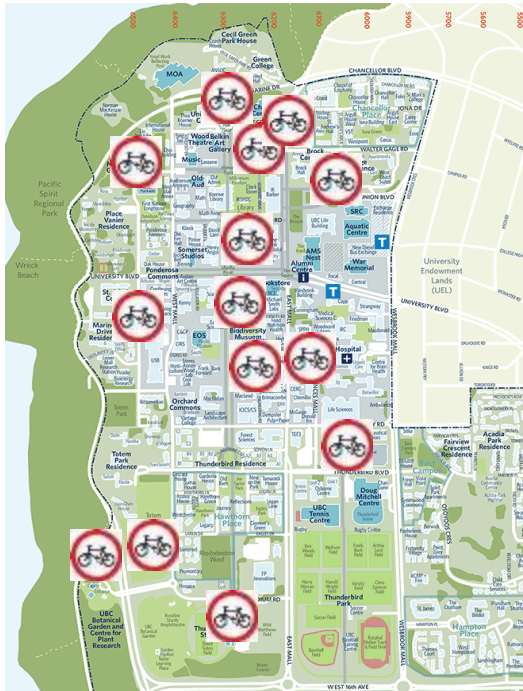
Cycle Stands

Cycle & bike parking points

Weather Protected Sittings along Road &

barriers to divide pedestrian & cycle tracks
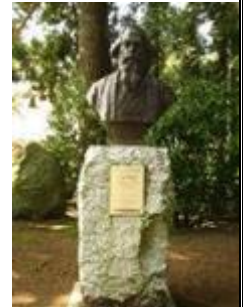
Public Art

Source: UBC Public Realm Plan , 2009

Figure 111 Street Furniture

CONCLUSION:

Routes & Pathways

Classification of roads as per need of traffic movement & pedestrian movement.

More focus is given to pedestrian movement & cycle movement.

Zig-zag pattern of pathways for effective connection between buildings & spaces.

Orientation & Climate

Moderate climate gives better opportunity for outdoor activities.

Open & Green Spaces

Large and local commons include flexible places, seating for individuals and groups and relevant features in close proximity of academic buildings that allow for lectures, group projects and exhibitions.

Playgrounds & Indoor Recreational spaces:

Indoor & outdoor sports facilities & recreation facilities are provided.

Street Furniture

Provision of cycle stands encourages use of cycles. Weather protection provisions are considered.

3. SITE STUDY: Educational Hub, Sitapura, Jaipur

SELECTION OF AREA:

Jaipur is the capital of Indian state of Rajasthan in Northern India. It was founded on 18 November 1727 by Jai Singh II, the ruler of Amer, and after whom the city is named. As of 2011, the city had a population of 3.1 million, making it the tenth most populous city in the country.

Jaipur is second top in the District wise list of number of colleges with 558 colleges & 14 Universities with 206339 enrolled student. (All India Survey on Higher Education: 2017-18 by MHRD)

| Map of India Source: https://www.bankersadda.com | Map of Jaipur Source: JDA, Jaipur |
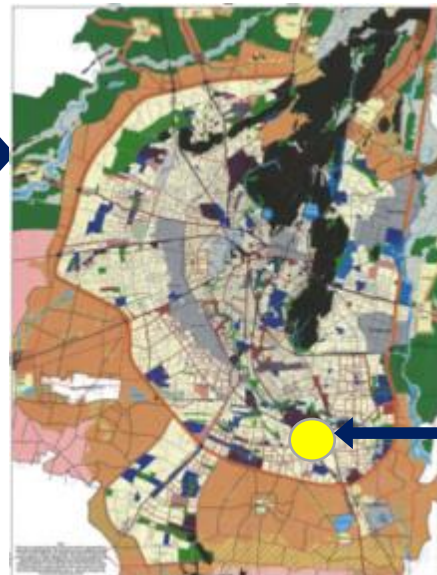
Figure 112 location of Site area

Growth of city

| 1727-1850 | 1850-1930 | 1930-1970 | 1970-2000 | 2000-2014 |
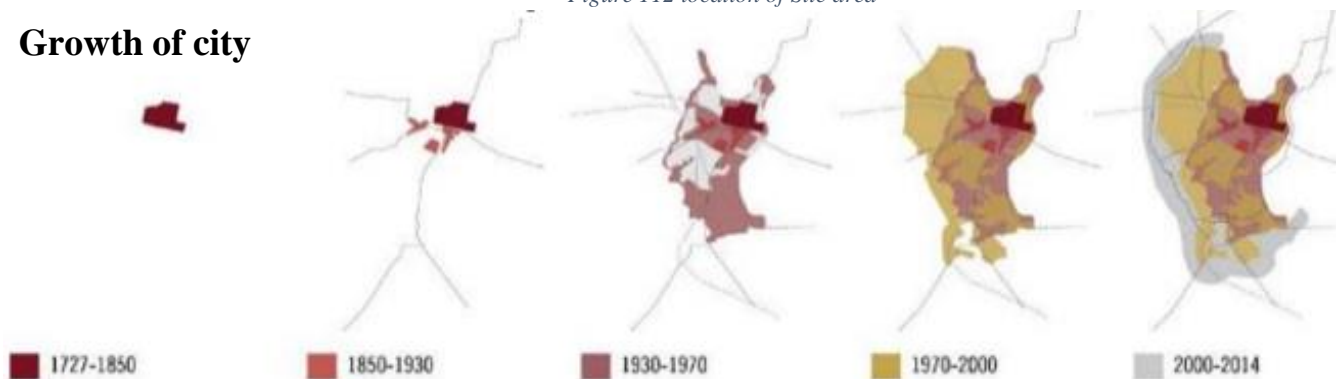
Area   6.7 sq. km ⟶ 303.9 sq. km

Figure 113 Growth of Jaipur city

Source: Atlas of Urban Expansion

Jaipur is growing rapidly, mostly in south direction due to its geographical Condition.

Sitapura institutional area developed in late **90's** & lies in **South most part of City**

Jaipur **is second top** in the district wise list of number of colleges with **558 colleges** & **14 Universities** with **206339 enrolled students**. (All India Survey on Higher Education: 2017-18 by MHRD)

Selected site: Sitapura Educational hub is part of RIICO Industrial area, Sitapura. It got developed in two phases (Phase IV & institutional Area) in 1998.

E.P.I.P. - 1996
I PHASE - 1996
II PHASE - 1998
III PHASE - 1998
IV PHASE -1998
INSTITUITIONAL AREA- 1998
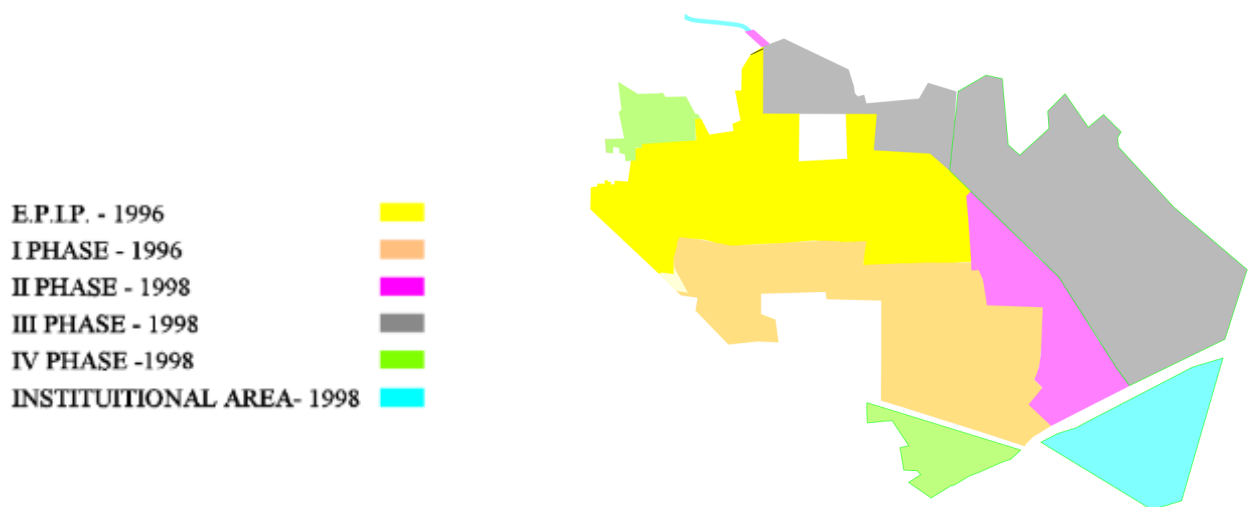
Figure 114Phase development of RIICO Industrial Area, Sitapura   Source: RIICO, Jaipur

RESIDENTIAL
COMMERCIAL
INDUSTRIAL
PUBLIC/SEMI-PUBLIC
VILLAGES
RECREATIONAL
OTHERS

Figure 115Land use plan of Sitapura Industrial Area

Source: RIICO, Jaipur

Historical development:

Major Development in the area happened 2000 onwards, with time, surrounding are developed as residential in unplanned & organic way.

2003   **2013**   **2019**

Figure 116Historical development of the area

Source: Google Map

DESCRIPTION OF AREA

The delineated area is Sitapura institutional area & its surroundings. The delineated area is part of sitapura industrial area from Tonk road to Mahal road. Major buildings in the area are Aayogen School   of   Architecture,   MG   Medical   University   & Hospital, JNIT, Poornima & REC Engineering Institute. Sitapura Institutional Area is surrounded by industries likes IOC, Bosch etc.

Goner road is major road of area & it Connect Tonk road & Mahal road. Railway line (Jaipur to Kota lane) passing through the area. A Railway flyover is under construction, which is 1.2 km long, on Goner Road. Goner Road has most of the commercial Activities in the area. One nala is positioned at the periphery of study area, which segregate educational hub to agricultural land.

Educational hub is surrounded by industrial area at North side, residential area in South side, & agricultural area in the East side.

Institutional Area

Mahal Road

Industrial Area

Agricultural Land

Railway Line

Residential Area

Village

Nala leading Chandail Lake
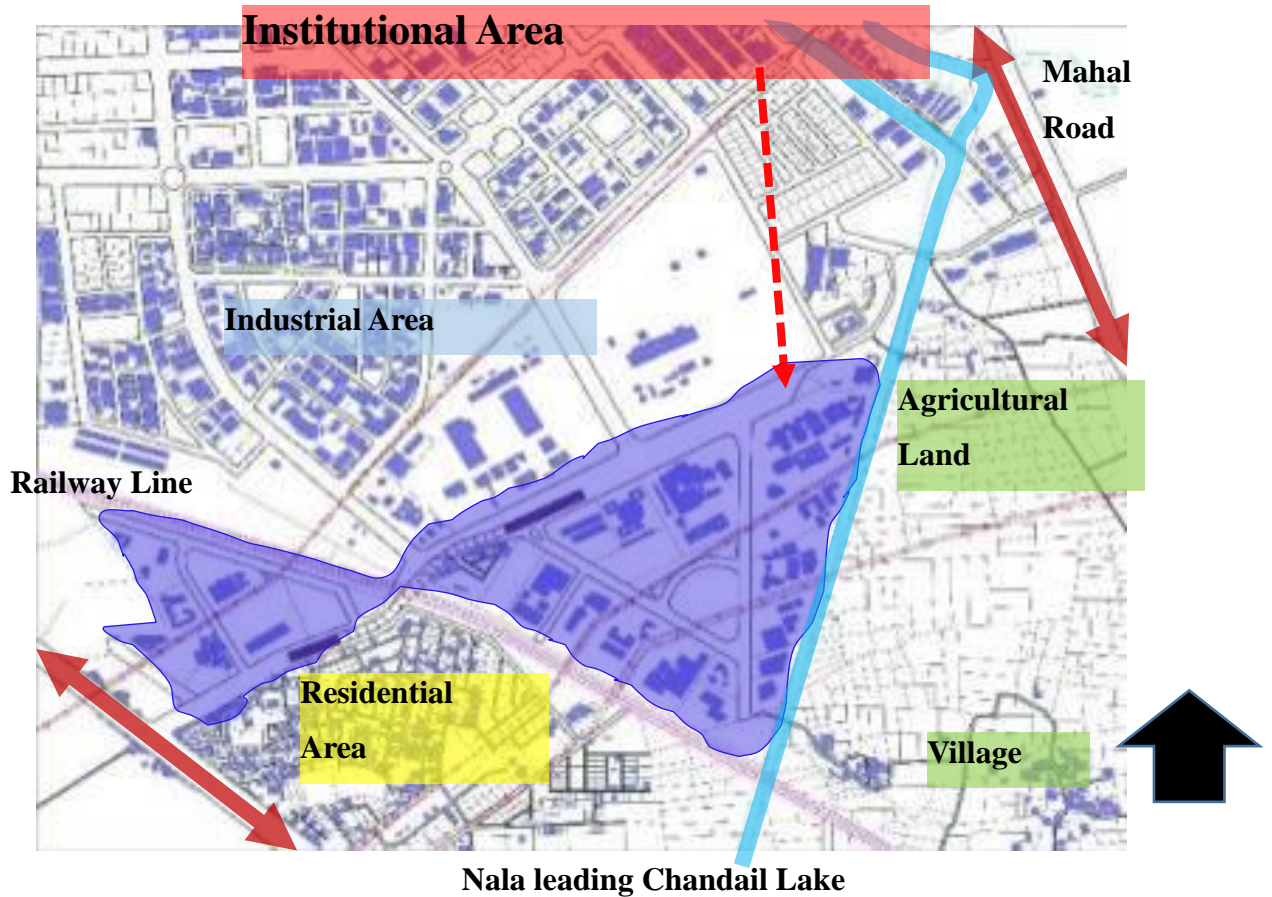
Figure 117 Description map of site

Aayogen School of Architecture

MG Medical University

Indian Oil Corporation

Figure 118 Major buildings at the site

LAND USE & BUILDING USE:

land use map show institutional plots & buildings are forming an educational hub, surrounded by industrial & agricultural land, majorly.
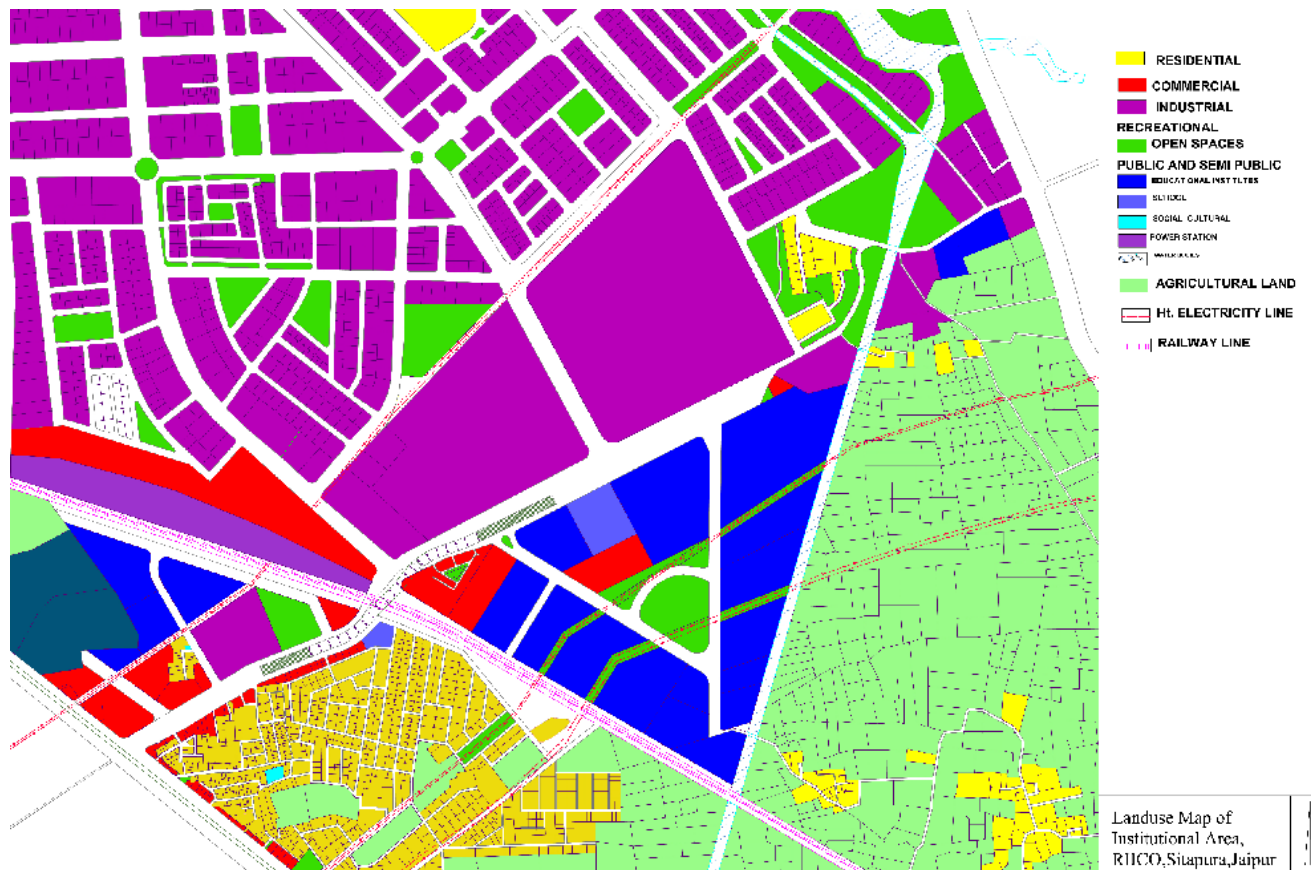
Figure 119 Land use map

LAND OWNERSHIP MAP:

Major undeveloped land belongs to government. Some plots owned by Govt. Agencies, but remains unbuilt land.

Government	**Private**	**Trust**

Figure 120 land ownership map

URBAN FORM:

Most of the roads are linear with irregular geometry. Buildings are not relevant to each other in term of shape. Area has low rise & grain texture development. Institutional area has comparatively high rise buildings.
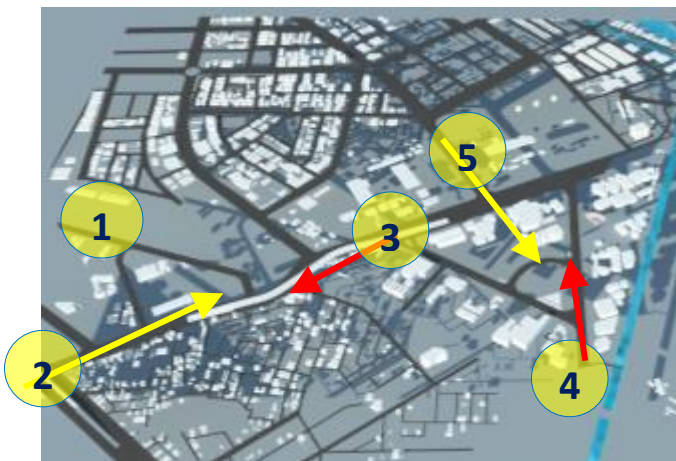
Figure 121Grain & texture of development

Figure 122 Shape of buildings & geometry of roads
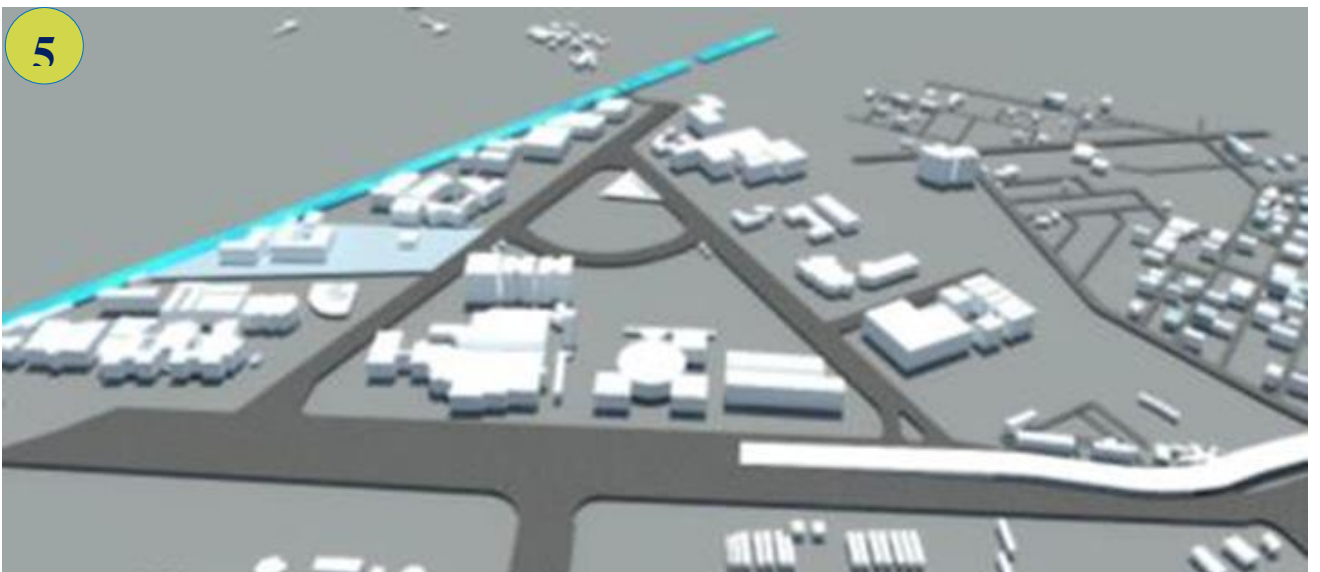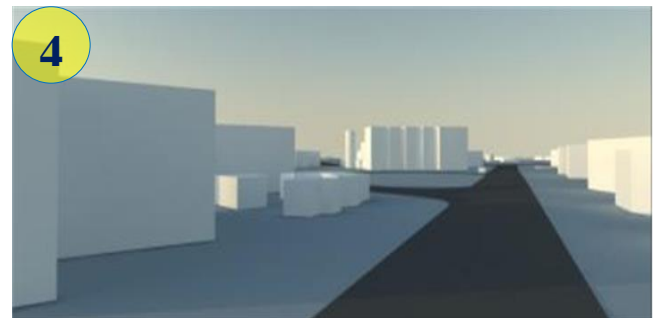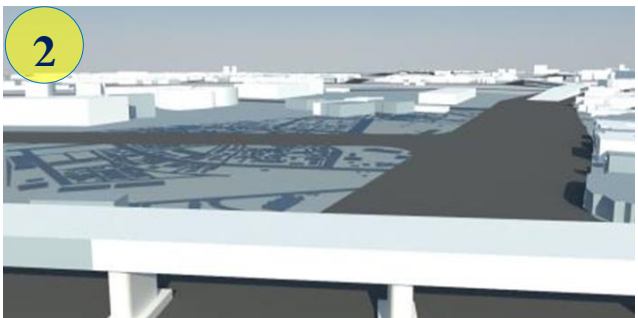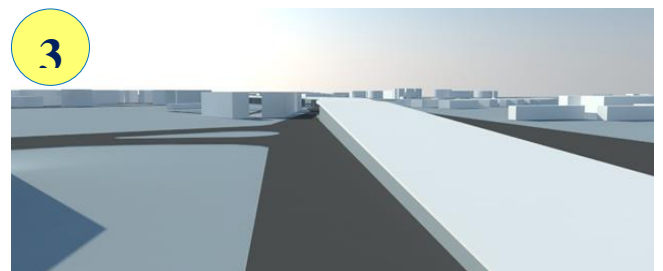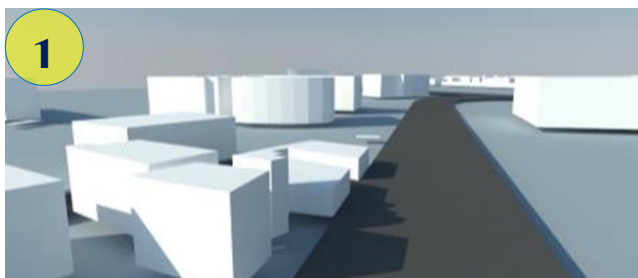
Figure 123 views of the different parts of the area

ROUTES & PATHWAYS:

Roadways:

Area has four Types of roads:

1. Expressway (60 Meters wide)
2. Sub-Arterial Road (30 Meter wide)
3. Collector Roads (24 Meters wide)
4. Local Roads (9 Meters wide)
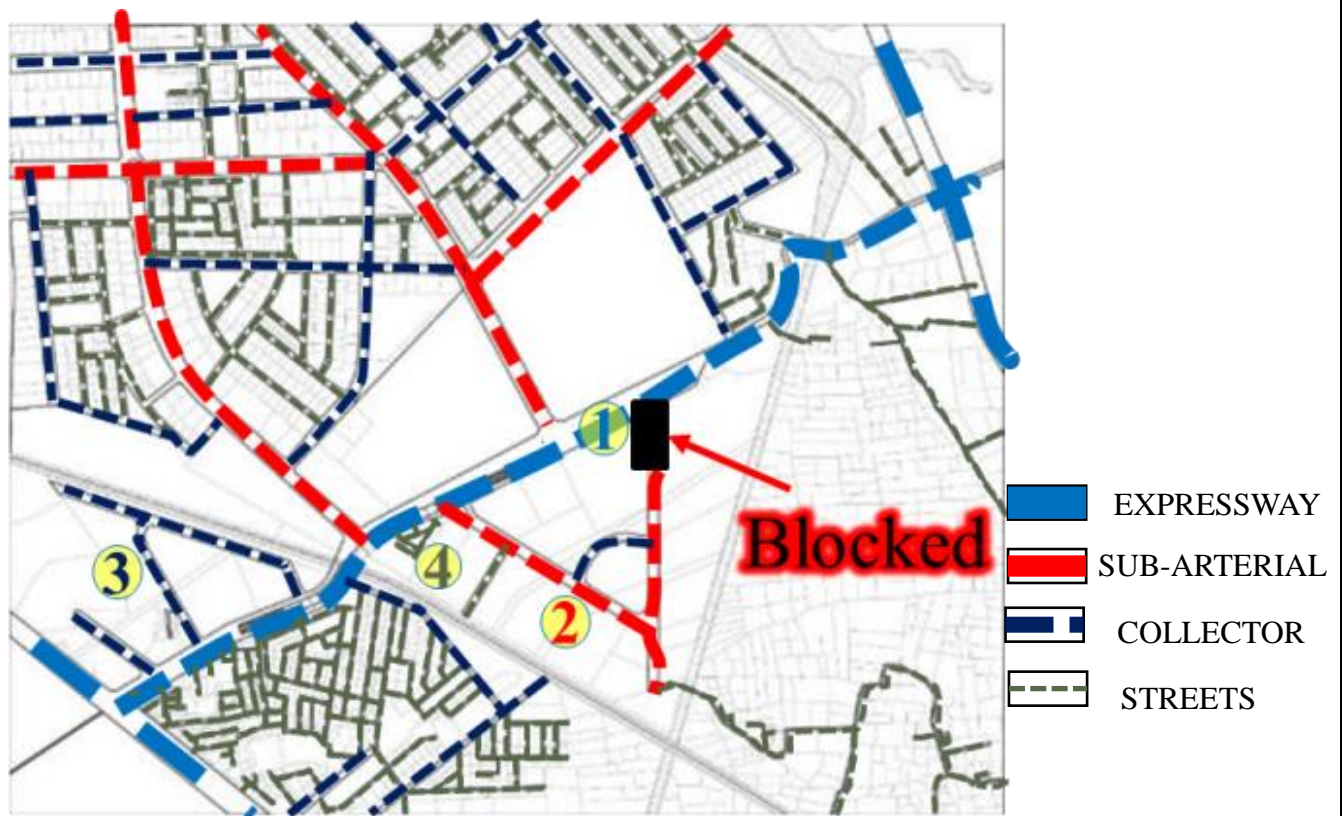
Figure 124 Types of roads & railway line

1. Expressway (60 Meters wide)- Goner Road

It has 7 meter wide mixed traffic lane, 7 meter wide service lane, 2 meter wide pedestrian lane, 7 meter wide median between Mixed traffic lanes, 8.6 meter wide median at one side between Mixed traffic lane & service lane & 2.0 meter wide median at another side between Mixed traffic lane & service lane, 2 meter wide one side open drain and 4 meter wide leftover at both side of the road.
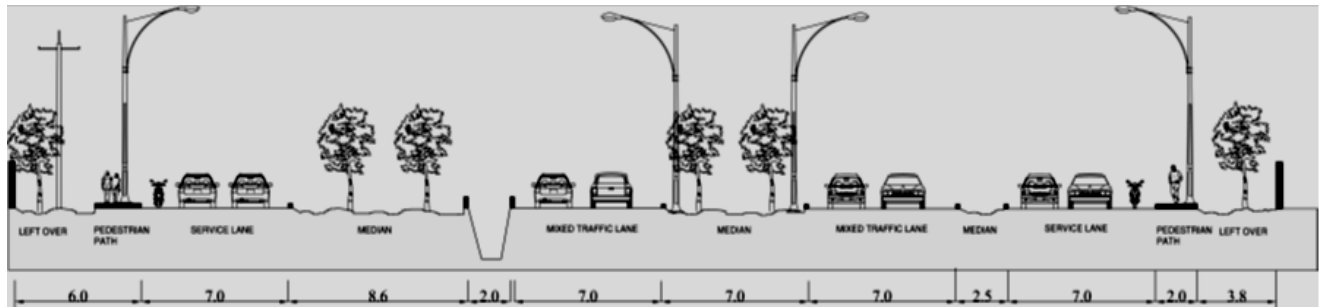
Figure 125Goner Road

2. Sub-Arterial Road (30 Meter wide)- Aayogan Road

It has 9 meter wide both way mixed traffic lane, 3 meter wide pedestrian lane, 7 meter wide median between mixed traffic lanes, 2 meter wide one side open drain and 5 meter wide leftover with a drain.
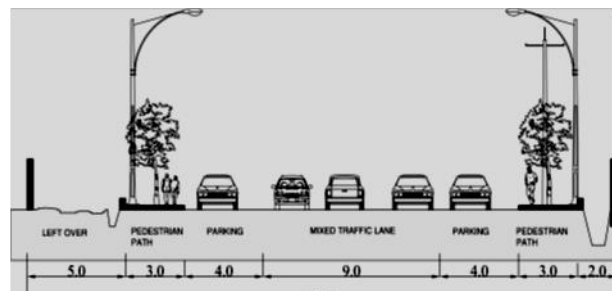
Figure 126 Aayogan Road

3. Collector Roads (24 Meters wide)- JNIT Road

It has 7 meter wide both way mixed traffic lane, 5.5 meter wide pedestrian lane with drain at one side.
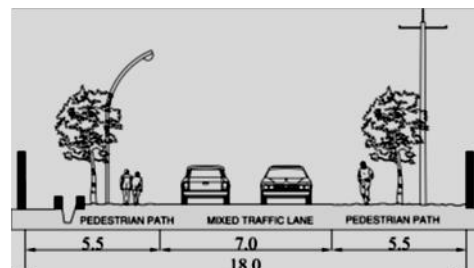
Figure 127 JNIT Road

4. Local Roads (9 Meters wide)- Market Road

It has 3.5 meter wide both way mixed traffic lane, 2.8 meter wide pedestrian lane with drain.
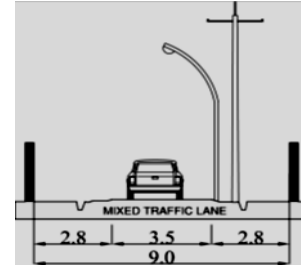
Figure 128 Market road

Following issue have been found about the roads:

- No Road has On-Road Parking lane Provision.

- Taxi stands and bus stops are not located properly.

Figure 129 Buses & taxis occupying part of road

- Approach of one collector road is blocked by hospital authorities, for personal interest.

- Median & part of carriageway is occupied for parked vehicle & informal shops.

Figure 130 Blockage of road
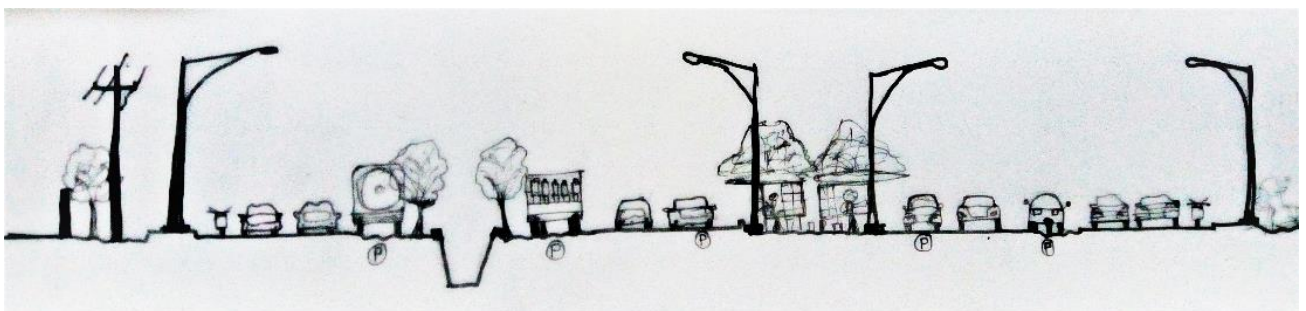
Figure 131 Encroachment at goner road

- Oil & gas carrying trucks are parked below overhung electricity line.

- Open Sewerage lines used as garbage bins.

Figure 132open drainage

Pedestrian Movement:

Pedestrian movement is majorly form colleges to bus stops, much walking distance of premises from bus stop & to commercial, result more use of private vehicles.

Barrier free considerations are not taken for footpaths, roads have lack of street furniture, and footpath is occupied for parking at some roads.

Condition of pedestrian lane is not satisfactory.

Blockage of road increases walking distance.
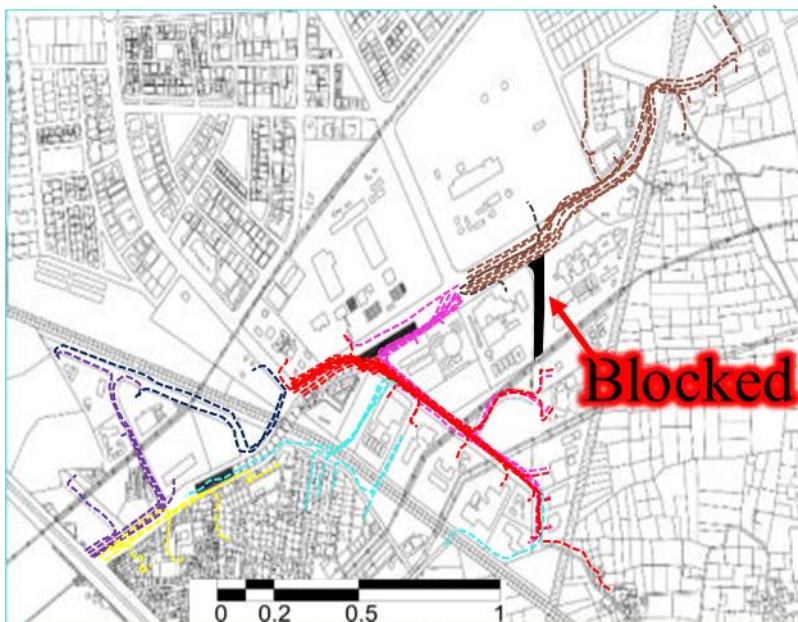
Figure 134 Pedestrian movement in the area

Figure 133Encroached pathway for parking

Figure 135 Poor condition of footpath

Public Transport Network:

The area has 3 major public transportation routes, which connects the area to the other part of city. Public transportation system does not access the internal areas.

Route A:

Route A has following public transportation routes:

1. Mahatma Gandhi Hospital to Joshi marg, Heerapura via Mansarovar Bypass, Ajmeri Gate, Sodala via Mansarovar (**Bus no. AC2, 9B, 3C, 55)**

2. Mahatma Gandhi Hospital to Sanganer (**Local Tempo）**

Figure 136 Public transportation routes

Route B:

Route B has following public transportation routes:

1. State buses Jaipur to Kota.

2. Goner mod (12 Mill) to Siroli via Ajmeri Gate-Transport N agar, Ajmeri Gate & Chaksu, (Bus no. 27A, 16)

Route C:

Route C has following public transportation routes:

1. Goner mod (12 Mill) to Goner Via Mahatma Gandhi Hospital & Siwad via Jaipur Railway Station (Bus no. 11)

2. Goner Mod to Goner Via Mahatma Gandhi Hospital (Local Tempo)

MG hospital road is the terminal point for route no. A. Due to unavailability of terminal & bus stops, buses & tempo parks on the road and create conjunction.

Future Proposals:

As per Comprehensive mobility plan for Jaipur by JDA, development of BRT route & Cycle track is proposed on major routes.

—— BRT(Bus Rapid Transit) Route

—— Metro Rail Route   —— Cycle Track
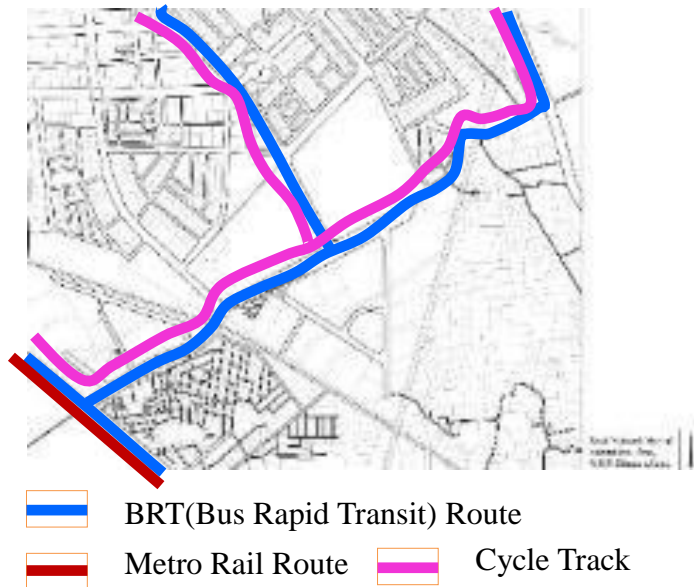
Figure 137 Future proposals in the area

Nodes:

Following are the major nodes are:

1. Goner Mod
2. Dathali Phatak
3. MG Hospital Mod.
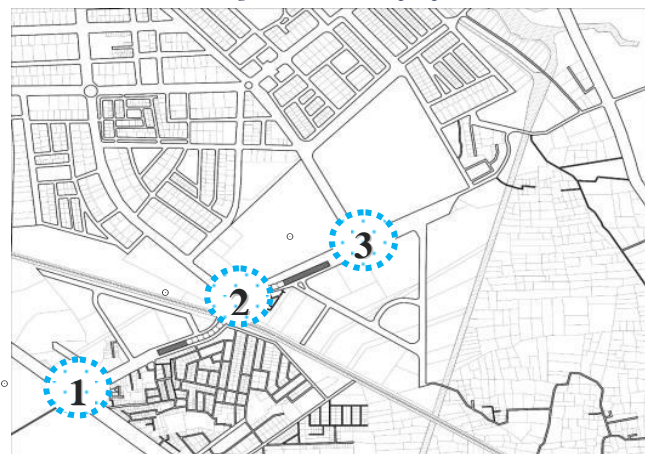
Figure 138 location of nodes

Figure 141Goner mod

Figure 140 Dathali phatak

Figure 139 MG hospital mod

Shop at node 2 & 3 are informal & unorganized. Other intersections of area are very less active. Datheli Pathak intersections face huge conjunction, while trains are passing through. Nodes are unorganized commercial hubs of the area.

ORIENTATION & CLIMATE:

Major road of area is stretched along East-West direction oriented. Orientation of buildings is as per road layout (perpendicular or parallel to approach road)

Jaipur has a hot semi-arid climate. Temperature remain high from April to early July (avg. Max. 38°c). Winters (November to February), are pleasant, but temperatures occasionally falling below freezing in winters, especially in outer & rural Areas.

Rainy Season is July & August. Rainfall is low (63 CM annually)

During Summer, Winds are hot with high speed.

Climate data for Jaipur (Jaipur Airport)												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Record high °C (°F)	31.7 (89.1)	36.7 (98.1)	42.8 (109.0)	44.9 (112.8)	48.5 (119.3)	47.2 (117.0)	46.7 (116.1)	41.7 (107.1)	41.7 (107.1)	40.0 (104.0)	36.1 (97.0)	31.3 (88.3)
Average high °C (°F)	22.4 (72.3)	25.0 (77.0)	31.0 (87.8)	37.1 (98.8)	40.3 (104.5)	39.3 (102.7)	34.1 (93.4)	32.4 (90.3)	33.8 (92.8)	33.6 (92.5)	29.2 (84.6)	24.4 (75.9)
Average low °C (°F)	8.4 (47.1)	10.8 (51.4)	16.0 (60.8)	21.8 (71.2)	25.9 (78.6)	27.4 (81.3)	25.8 (78.4)	24.7 (76.5)	23.2 (73.8)	19.4 (66.9)	13.8 (56.8)	9.2 (48.6)
Record low °C (°F)	−2.2 (28.0)	−2.2 (28.0)	3.3 (37.9)	9.4 (48.9)	15.6 (60.1)	19.1 (66.4)	20.6 (69.1)	18.9 (66.0)	15.0 (59.0)	11.1 (52.0)	3.3 (37.9)	0.0 (32.0)
Average precipitation mm (inches)	7.0 (0.28)	10.6 (0.42)	3.1 (0.12)	4.9 (0.19)	17.9 (0.70)	63.4 (2.50)	223.3 (8.79)	205.9 (8.11)	66.3 (2.61)	25.0 (0.98)	3.9 (0.15)	4.2 (0.17)
Average rainy days	0.6	1.0	0.4	0.7	1.4	3.9	11.2	10.0	3.8	1.3	0.4	0.4

Source: India Meteorological Department (record high and low up to 2010)[19][20]

Figure 142 Climatic data of Jaipur
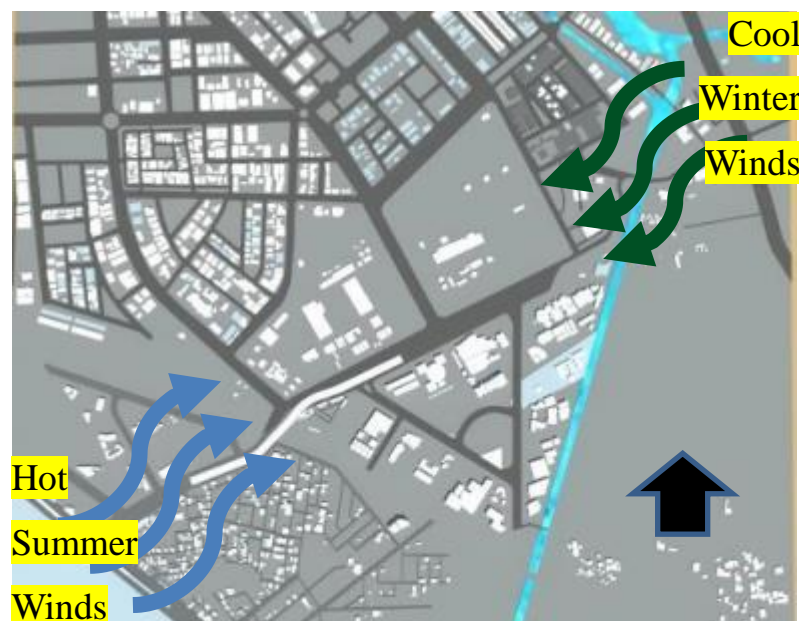
Figure 143 Wind direction

Shading provisions plays an important role in such harsh climatic conditions. Cooling techniques should focus to increase vapor in environment.

Area has very less vegetation on the street

No Shade   Partially Shaded   Shade Spaces

Figure 144 Situation of shading for outdoor spaces

OPEN & GREEN SPACE:

Unavailability of designed green spaces. Govt. owned vacant lands are well distributed in area.

Govt. owned vacant spaces can be possible interventions areas.

| | Govt. Owned | | Private Owned | | NALA | | Agricultural land |
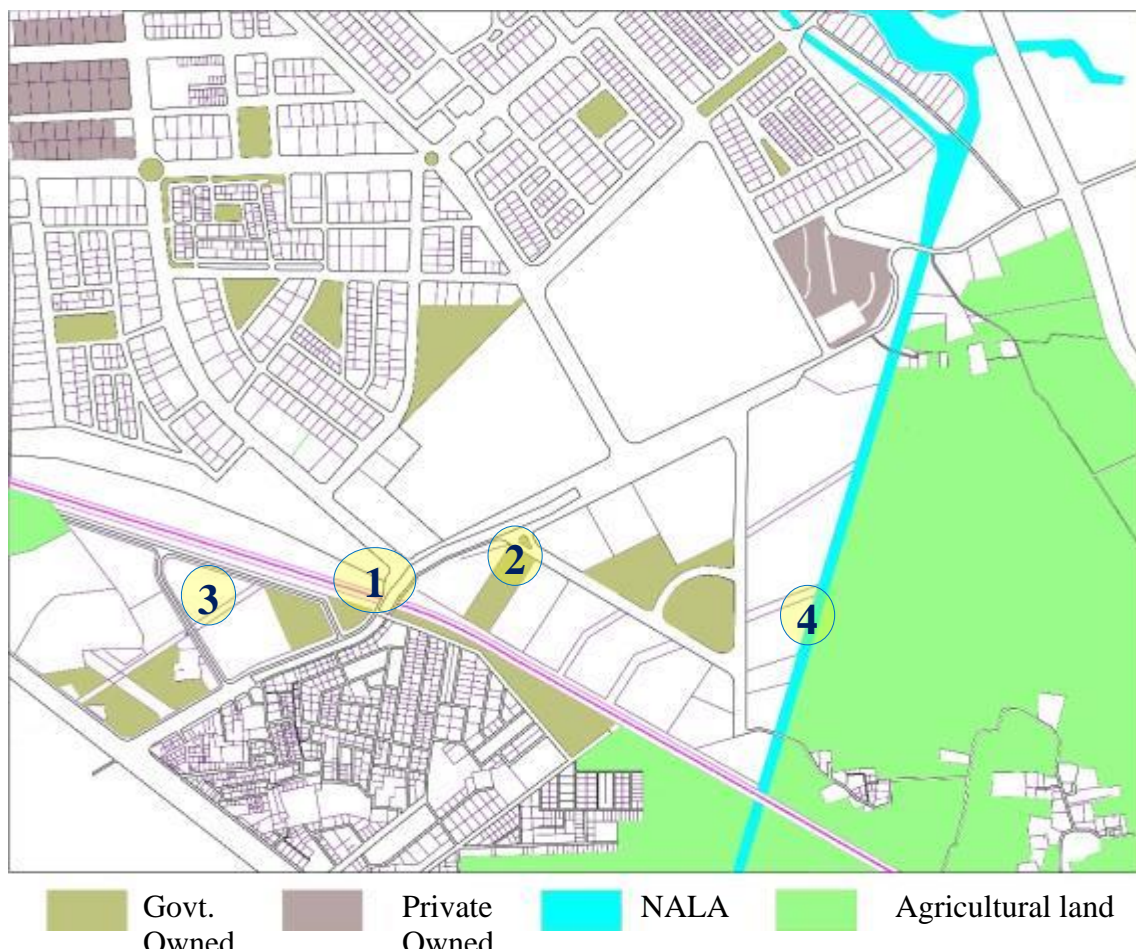
Figure 145 Location of open & green spaces

Figure 146 Open & green spaces in the area

MAGNETS & GENERATOR:

Mahatma Gandhi hospital is a super specialty hospital & only magnet of the area.

Figure 147Location & image of MG hospital

VISTA, SKYLINE & LANDMARK:

Ununiformed distribution of built-up, at two sides of road, gives irregular vista. Unpleased signage, overhead electrical lines creates disturbance in views. Low-rise with Similar height heights creates a good skyline. The area has no specific landmark in the area. Educational institution colleges behave like landmarks.

Figure 148 Vista, Skyline situation in the area

ACTIVITY'S PATTERN:

There is a lack of recreational activities, due to unavailability of parks & playground. Informal tea shops (Thadi) are the main outdoor social interactive spaces. Inner parts with institution area do not have many activities. Goner road has major commercial activities.

Figure 149 land use map showing major activity spaces.

Figure 150 Hawkers & Informal shop along the Roads

Figure 151 Commercial activities & informal shops along the road

Figure 152 Commercial activities at node & along the road

Activities on the Roads:

🟦 Informal Shop	🟢 Institute bus	🔴 Private car & bikes	⬛ Encroached
🔺 Taxi & Auto	🔵 Trucks	🔵 Public bus	
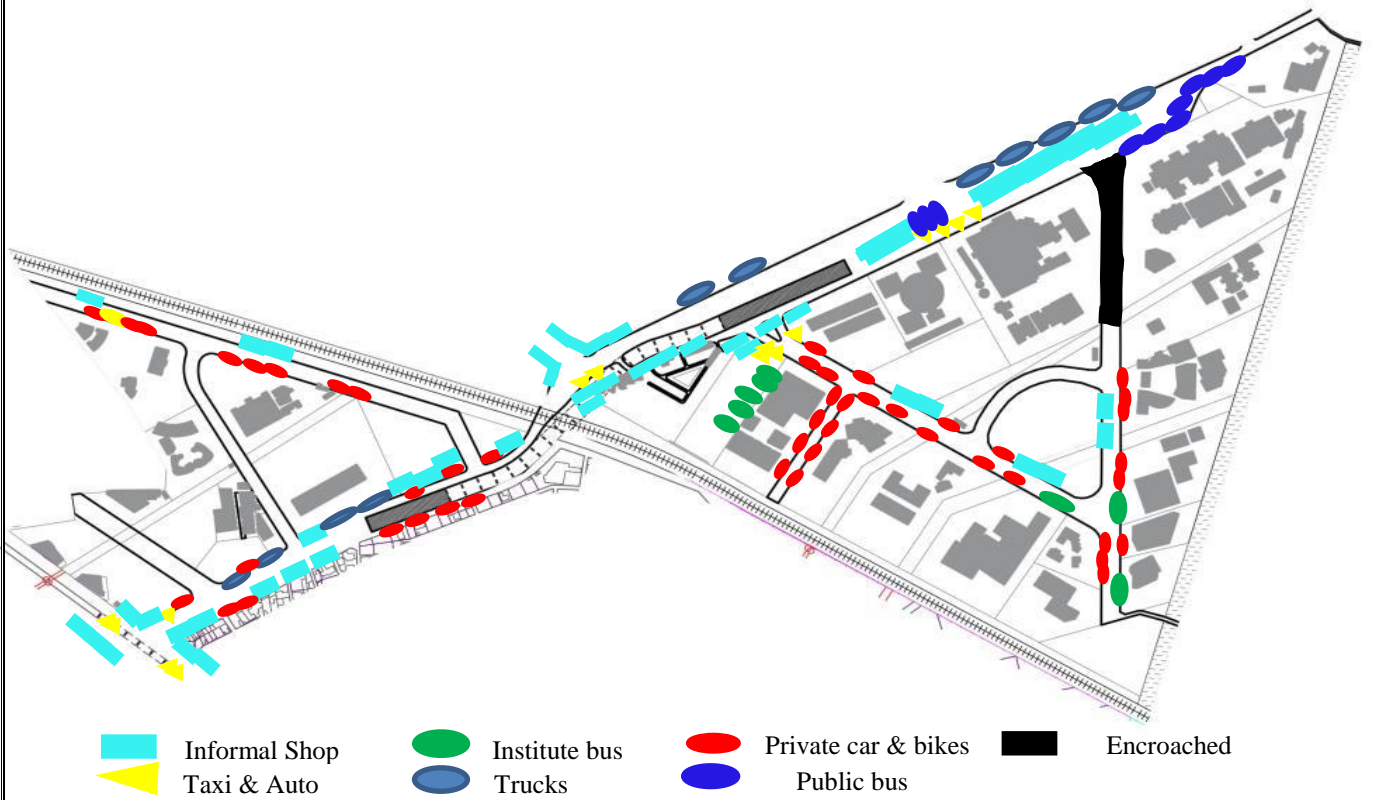
Figure 153 Various activities on the roads

Auto-rickshaw stand & informal shops

Institute buses parked at vacant land

Car & bikes parking

Trucks parking

Figure 154 Activities on the roads

STREET FURNITURE:

Streets & road has lack of street furniture like shading, dustbins etc. Bus stops are identified, but bus stop shelter is not available. Some parts do not have street light. No Street Art & sculptures are installed. No proper signage's are provided showing the road networks no signage's demarking activity zones in this area. Some of them which are provided are unmaintained and in desecrated condition.

QUESTIONNAIRE SURVEY OF USERS:

Questionnaire survey is conducted in the area to understand the area from user's perspective. Two set of surveys are conducted according the different types of users, which are:

1.   Questionnaire survey of students & academic staff (Annexure-I & II)
2.   Questionnaire survey of shopkeepers & vendors (Annexure-III)

1.   Results of Questionnaire Survey of Students & Staff:

72 Students & 12 Staff responded to survey & following are the results of survey.

Permanent Residence
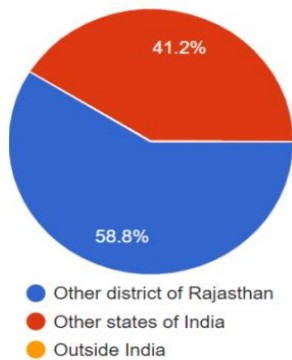
Current stay from college
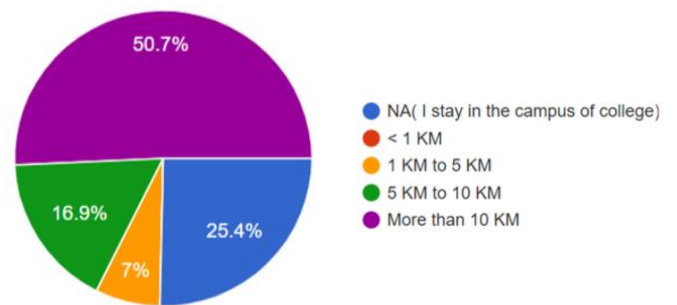
Mode of transportation
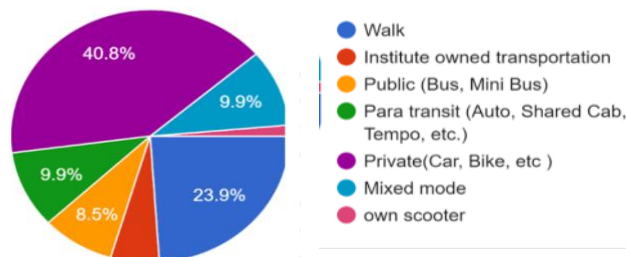
Does area connects well public transport?
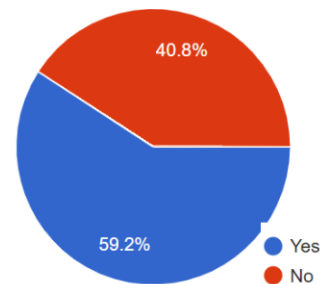
Distance of college from bus stop
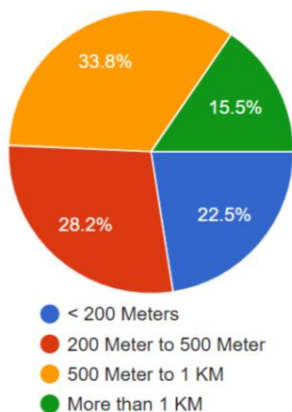
Sufficient facilities at bus stop
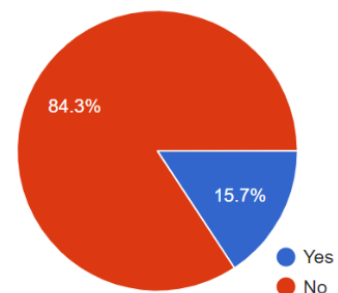
Barrier-free bus stop

Is it safe during odd hours at the bus stops?
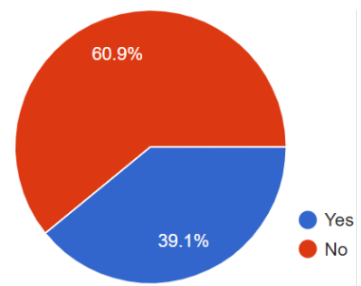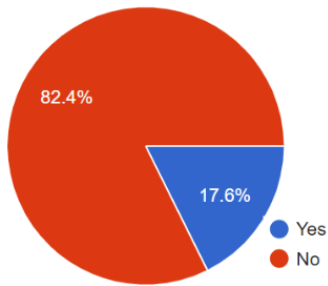
Need of facilities at bus stop:

- Shed, Sittings, Mobile charging slots
- Toilet and cool drinking water facilities
- Food serving shops , Stationery shops, ATMs
- Safe & secure environment
- Bus information system
- Free WI-FI
- Facilities for physically challenged.

Availability of Pedestrian walkways

Barrier-free walkways
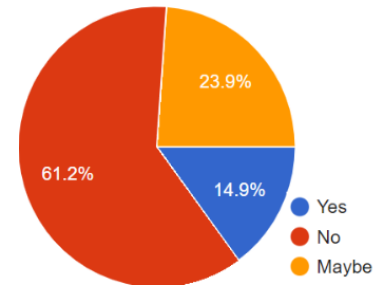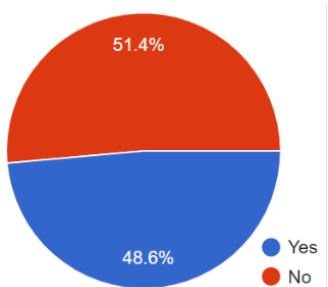
Need of facilities along walkways:

- Shading
- Drinking water
- Street furniture
- Trees
- Dustbins
- Lighting

Do you go for meal outside the college?

Distance of food joint from college
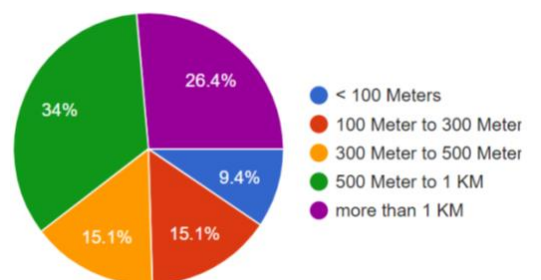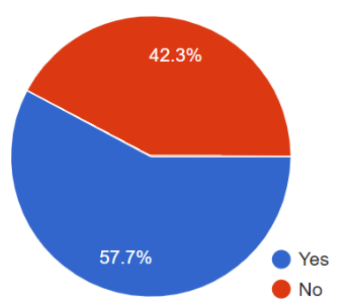
Visit to refreshment stall outside college

Yes 91.5%
No 8.5%
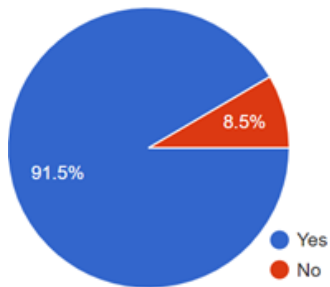
Condition of refreshment stall

Good 15.7%
Average 71.4%
Bad 12.9%

Inter-institute interaction

66.2%
33.8%
Yes
No
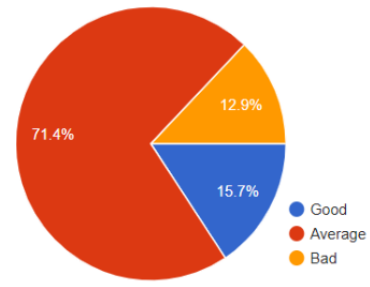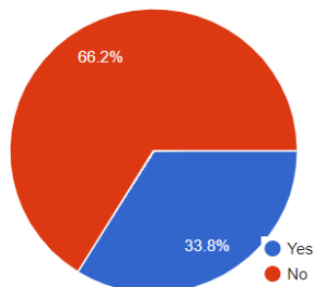
Places of inter-institute interaction

- Tea shops(Thadi)
- Along the roads
- Restaurants & cafes
- Jawahar kala Kendra

Distance of recreational center

- <1 KM
- 1 KM to 5 KM
- 5 KM to 10 KM
- more then 10 KM

51.5%
7.4%
22.1%
19.1%
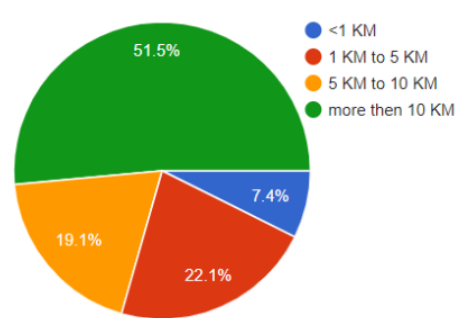
Affordable hostels in & around

58.7%
41.3%
Yes
No
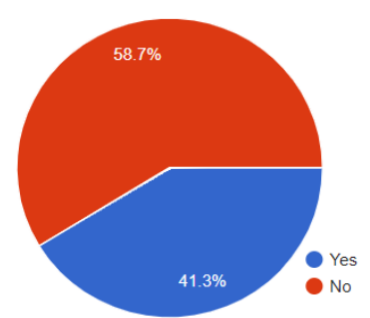
Shopping from street vendor

32.4%
11.8%
50%

- Once a week
- Once a day
- More than once a day
- Never
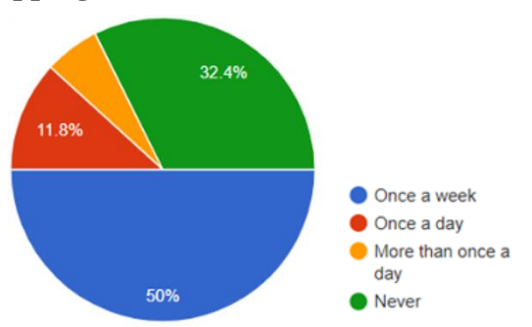
Likes about street trade

- Accessibility
- cheaper in price
- Price worth
- Availability of local products

Dislike about street trade

- Unhygienic
- Quality
- Less availability of options
- Unorganized structure
- lack of parking
- Unsafe environment

Stopover after class hours

60.6%
39.4%
Yes
No
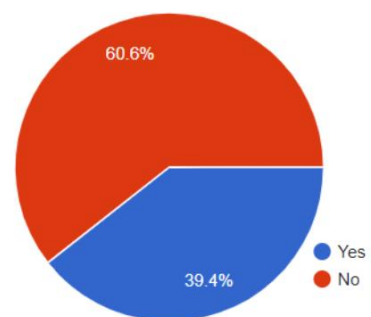
Activities during stopover
- Chatting
- Printing & purchase of stationary
- Sports
- Recreational
- Class works
- Group Activities

Reason to avoid stopover
- Not safe during late night
- No good places to stopover
- Better options than college area
- Abundant & dark at night
- No interesting hangout & recreational centers
- Lack of development

Safe Environment during college hour
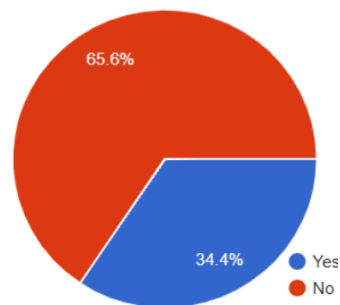
Safe Environment during odd hours
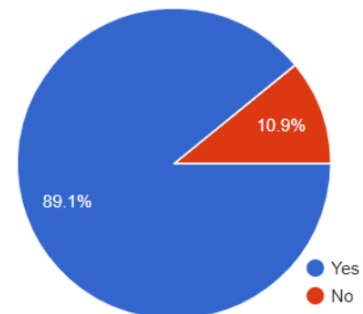
Factors, which makes this area unsafe
- Low Lighting
- Less development
- Unavailability of security persons
- Anti-social behavior
- Dormant after college hours
- Illegal activities like : Violence, Drugs smuggling, Chain snatching, misbehave with other girls, fights between groups

Situation of Infrastructure
- No public toilet
- No Crèche facility nearby
- Hardly any parks & play grounds & spaces for casual activities

2. Results of Questionnaire Survey of Shopkeepers & Vendors:

Distance of current stays

- < 1 KM
- 1 KM to 5 KM
- 5 KM to 10 KM
- More than 10 KM

Categories of shops

- Refreshments
- Food
- Pharmacy
- Daily need
- Vegetables
- Stationary/ Photostat
- computer
- salon
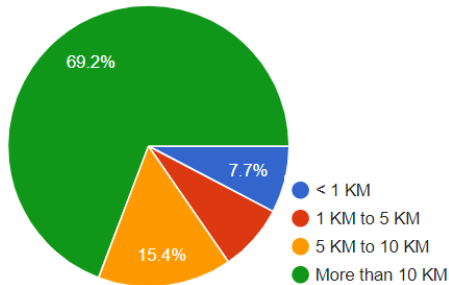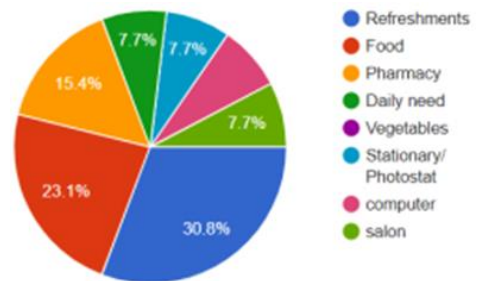
Categories of customers

- Students
- Institutional Staff
- People from surrounding industries
- Patient & their relative
- local residents

Timing of business

- 6 am -6 pm
- 9am – 9 pm
- 8:00 am to 00:00 Mid Night
- 10 am to 8 pm
- 9 am to 7 pm

Business during holidays

- Yes
- No

Mode of transportation

- Walk
- Public (Bus, Mini bus)
- Para transit (Auto, shared cabs, Magic Tempo, etc.)
- Private(Car, Bike, etc)
- Mixed mode
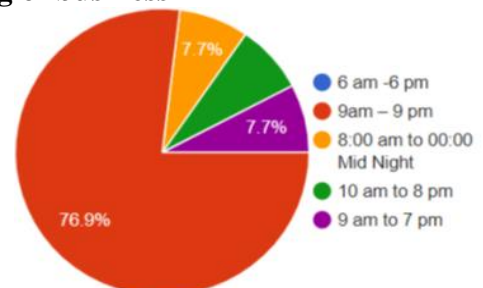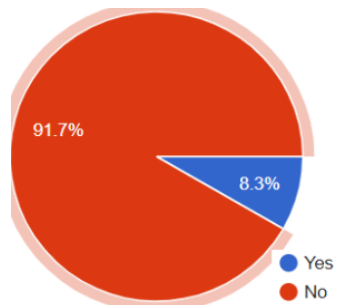
Safe environment for business

- Yes
- No
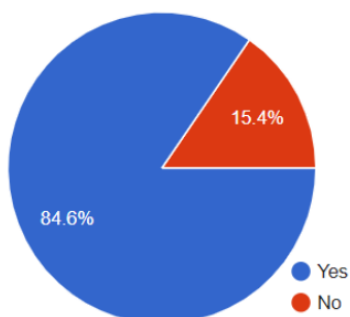
Children play area

- Yes
- No
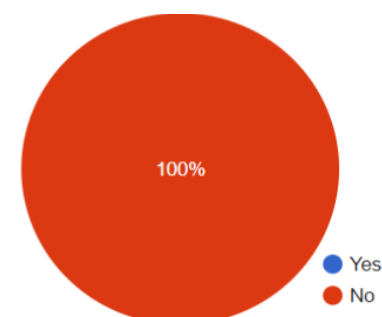
Kind of waste Generated
- Liquid Waste
- Solid Rubbish
- Organic Waste
- Recyclable Rubbish

Electricity:
- Provided to formal Shops by local Authorities
- Informal Shops arranges by their own
- Waste disposal system
- Municipality workers collects it
- Throw it to municipality garbage bin
- Water:
- Most of Institutes, Shopkeepers arrange by their own

Additional facilities required:
- Safe Storage Facilities

Inferences from Questionnaire Survey:

Accommodation:

- ✓ 8% (14,500 students) requires hostels, 20% (5,100 students) stays in campus hostels & very less hostels are available in and around the area. So, there is a need of hostel buildings within the area for 9,400 students.

Routes & Pathways:

- ✓ 5% of total students use institute owned transportation & 42% uses private transportation, results high need of public transportation infrastructure, cycle tracks, walkways, solar lighting, barrier-free design Considerations.
- ✓ More no. of bus stops & new bus routes to reduce walking distance to & from colleges
- ✓ Need to provide bus stop shelter with facilities.

Amenities:

- ✓ Need of public toilets & should be provide near to bus stops.
- ✓ Need to provide dedicated zones for informal market with basic amenities like electricity, water, parking, secure storage facilities & dustbins.

Land Use:

- ✓ Need to provide food joints, restaurant & café with casual sitting spaces, at a walking distance to institutes.
- ✓ Need of recreational facilities, parks & playgrounds for students & other stake holders of the area. Also, need of space for healthy interaction between colleges through inter-college event, seminar & other activities.
- ✓ Need of good shopping area, mall.
- ✓ Need of crèche facilities for kids of female employees.
- ✓ Provision of guest house for visitors.

Safety & Security:

- ✓ Need to make safe environment by stopping illegal activities, making area more active & providing lighting in inner part of area & installing security hut with security persons.

LOCATION OF INSTITUTES IN EDUCATIONAL HUBS:
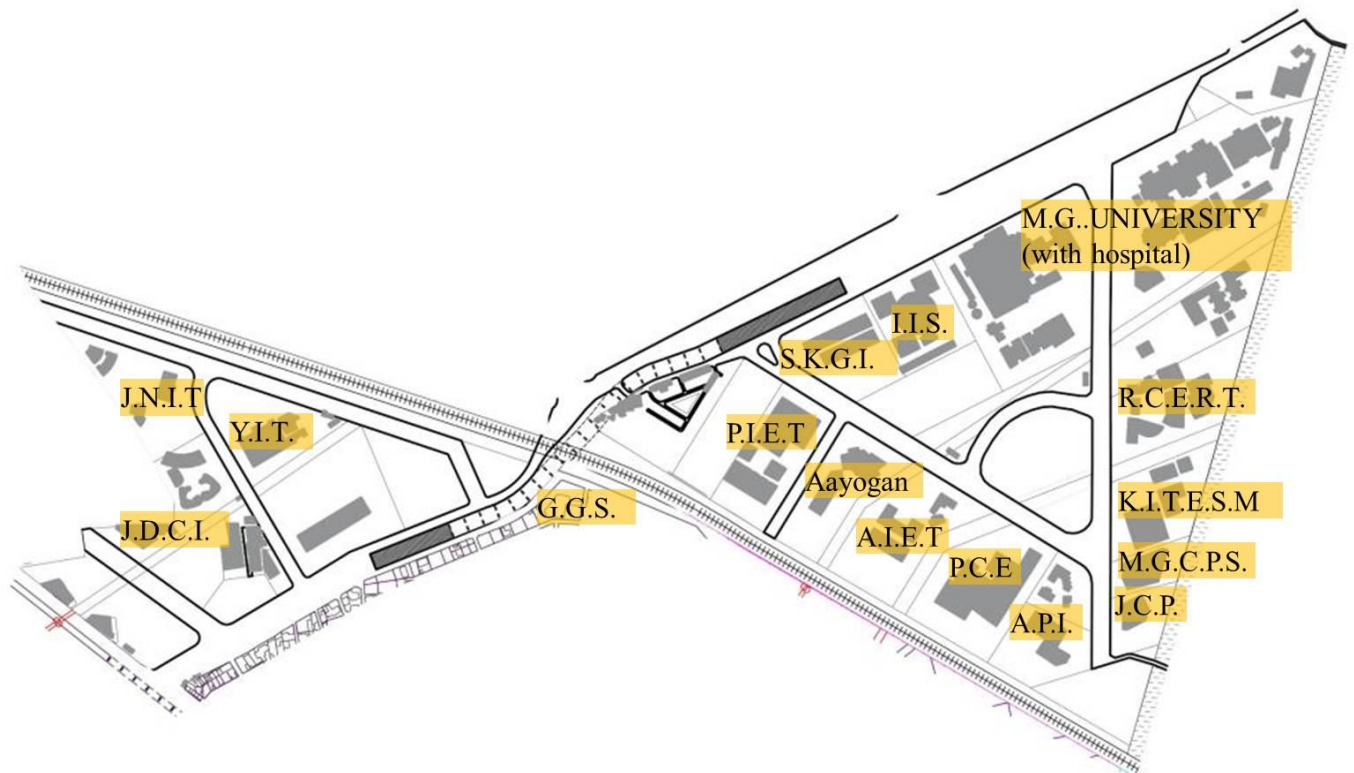
Figure 155 Location of institutes in educational hub

J.N.I.T	Jagannath Gupta Institute of Engineering & Technology
Y.I.T.	Yagyavalkya Institute of Technology
J.D.C.I.	Jashoda Devi College And Institution
G.G.S.	Geeta Global School
P.I.E.T	Poornima Institute of Engineering and Technology
Aayogan	Aayojan School of Architecture
A.I.E.T	Apex Polytechnic Institute, Jaipur
P.C.E	Poornima College of Engineering
A.P.I.	Apex Polytechnic Institute, Jaipur
J.C.P	Jaipur College of Pharmacy
M.G.C.P.S	Mahatma Gandhi College of Pharmaceutical Sciences
K.I.T.E.S.M	Kautilya Institute of Technology and Engineering and School of Management
R.C.E.R.T.	Regional College For Education Research and Technology
S.K.G.I	Swasthya Kalyan Group of Institutions
I.I.S.	India International School

DEMOGRAPHICS (Based on Primary Survey):

Educational Hub has:

- ✓ 16 Institutes, (25155 Students; 2038 Teaching Staff & 4407 Non-Teaching Staff)
- ✓ one Hostel (200 Students & 10 Staff)
- ✓ one Hospital(200 doctors + 1000 Patient + 1000 Visitors + 900 Nursing staff + 200 Guards + 400 Housekeeping Staff + 300 Ward)
- ✓ Floating Pollution: approx. 5000

S. No.	Type	Name	Students (in nos.)	Teaching Staff (in nos.)	Non-Teaching Staff (in nos.)	Total
Population figure of institutions in the area						
1	ISI-2	Poornima Institute of Engineering and Technology	1150	120	200	1470
2	ISI-4	Aayojan School Of Architecture	740	88	200	1028
3	ISI-5	APEX Institute of Engineering and Technology	1440	130	140	1710
4	ISI-6	Poornima College of Engineering	3060	240	250	3550
5	ISI-7	Apex Polytechnic Institute, Jaipur	900	80	600	1580
6	ISI-15	Jaipur College of Pharmacy	520	40	35	595
7	ISI-15(A)	Mahatma Gandhi College of Pharmaceutical Sciences	468	20	22	510
8	ISI-16	Kautilya Institute of Technology and Engineering and School of Management	2388	200	140	2728
9	ISI-17	Regional College For Education Research and Technology	3840	300	200	4340
10	IP-1	Yagyavalkya Institute of Technology	2340	140	160	2640
11	IP-2	Jagannath Gupta Institute of Engineering & Technology	2440	150	160	2750
12	IP-4	Jashoda Devi College And Institution	410			410
13	ISI-10	Swasthya Kalyan Group of Institutions	2992			2992
14	SPL-6	Geeta Global School	120	15	15	150
15	ISI-11	India International School, Sitapura	147	15	15	177
16	ISI-18A / ISI-19	Mahatma Gandhi University of Medical Science & Technology	2200	500	2260	4960

			25155	2038	4397	31590
	ISI-20					
	ISI-21					
	Total		**25155**	**2038**	**4397**	**31590**
	Population figure of hospital in the area					
17	ISI-18	ARSHA VIDYA TEERTHA Chhatralaya	200	0	10	210
18	ISI-12 ISI-13 ISI-14	Mahatma Gandhi Hospital	200 doctors + 1000 Patient + 1000 Visitors + 900 Nursing staff + 200 Guards + 400 Housekeeping Staff + 300 Ward			4000
	Grand Total= 31693+4000+ floating population of 50% of (1931+4407+4000)5169					**40800**

Table 1 Population figures of institutions in the area

CALCULATION OF SHORTFALL OF INFRASTRUCTURE IN THE AREA:

Available infrastructure of institutions is compared with requirements mentions in norms & standards formed by approving authorities of educational institutes in India:

Shortfall of infrastructure in the area					
Requirement	**Available**	**Requirements as per AICTE/ COA/ MCI**	**Requirement as per URDPFI for 40.000 population**	**Time saver standards for 25,000 students**	**Shortfall**
Built Infrastructure					
Auditorium/ Multi-purpose hall	3000 Sq.m (Limited Access)	4000 Sq.m	**Community centre- 2 ha.** **Convenience shopping centre- 1.2 ha** Including: Informal eating space with Storage facilities- 1000 Sq.m **Total= 3.2 Ha**	7000 Sq.m	**Community centre- 2 ha.** **Convenience shopping centre- 0.4 ha** Including: informal eating space with Storage facilities- 1000 Sq.m **Total= 2.4 Ha.**
Amphitheatre	1200 (Limited access)	4000 Sq.m			
Guest house	Not Available	600 Sq.m		–	
Library with reading room	Available (not accessible during off hours)	8000 Sq.m		(Central Library) 1400 Sq.m	
Canteen / mess	Available (not accessible during	3000 Sq.m		–	

	off hours)				
child day care centre	Not available	As per availability of land		_	
Shopping/ restaurants/ daily needs	8000 Sq.m	_		4000 Sq.m	
Organized informal eating spaces	Not available	_		_	
Milk distribution	Not available	_	1200 Sq.m	_	
Petrol/ diesel filling station	Not available	_	510 Sq.m.	_	
Weekly markets	Not available	_	0.2 ha	_	
Post office	Not available	As per availability of land	226 Sq.m	139 Sq.m	
ATM/ bank	Available (4 ATM, 1 bank) 400 Sq.m	As per availability of land	Bank with atm (216 Sq.m)	_	
Public toilet	Not available	_	@ Every 1 km	_	@ Every 1 km
Bus terminal	Not available	_	0.3 ha	_	0.3 Ha
Bus Stop	Not available	_	At a walking distance of 400 Meter	_	At a walking distance of 400 Meter
Police post (at major road intersections)	Not available	_	10-12 Sq.m.	_	10-12 Sq.m.
Music, dance and drama centre	Not available	_	400 Sq.m	_	400 Sq.m
Staff accommodation	150 person	As per availability of land	Working women – men hostel - 500 Sq.m	_	Working women – men hostel -500 Sq.m
Students accommodation	5,100 Students	Adequate(14,500 students)	-	7.5 Sq.m per Students	70,500 Sq.m Built up (9,400 Students)
Training & Placement cell	Not available	850 Sq.m		_	
Institution-industry cell, placement cell, property right cell, startup cell / incubation center	Not available	As per availability of land	Community welfare centre - 0.35 Ha.	_	0.35 Ha
Consultancy cell	Not available	As per availability of land		_	
Recreational Club	Not Available	-	_	4000 Sq.m	4000 Sq.m
Green Infrastructure					

Sports Play Ground	8.5 Ha.	4000 Sq.m	Sports ground- 42 Ha.(For colleges)+ 0.8 Ha. (For schools)	25 Ha. for Colleges	16.5 Ha (for Colleges Students) + 0.8 Ha.
Indoor sports / Gymnasium	Not available	–	Max. 20% built-up for indoor sports & facilities	2.5 Ha	2.5 Ha. (Part of Sports play Ground)
Parks	Not available	–	Community park- 2.5 Ha. Multipurpose ground- 0.8 Ha	–	Community park- 2.5 Ha. Multipurpose ground- 0.8 Ha

*Requirements includes suggestions provides by users through questionnaire survey

Table 2 Calculation of shortfall of infrastructure in the area

4. DESIGN GUIDELINES:

ROUTES & PATHWAYS:

- ✓ To introduce new public transportation routes for effective public transportation.
- ✓ To provide track & widen the walkways.
- ✓ To incorporate future proposal of BRT system.
- ✓ To provide bus stops at walking distance of 400 meter.
- ✓ To make pathways & bus stops accessible for physically disabled
- ✓ To make provisions of on-road parking with people's activity spaces & intersections.
- ✓ To create of hierarchy of road in terms of vehicle roads, pedestrian road & pedestrian priority roads.
- ✓ To provide adequate facilities at nodes to make it more active, safe & user friendly.
- ✓ To provide elevated passageways & fencing for railway line to make effective pedestrian movement & avoid accidents.
- ✓ To provide underground electricity & drainage lines.
- ✓ To provide underground parking.
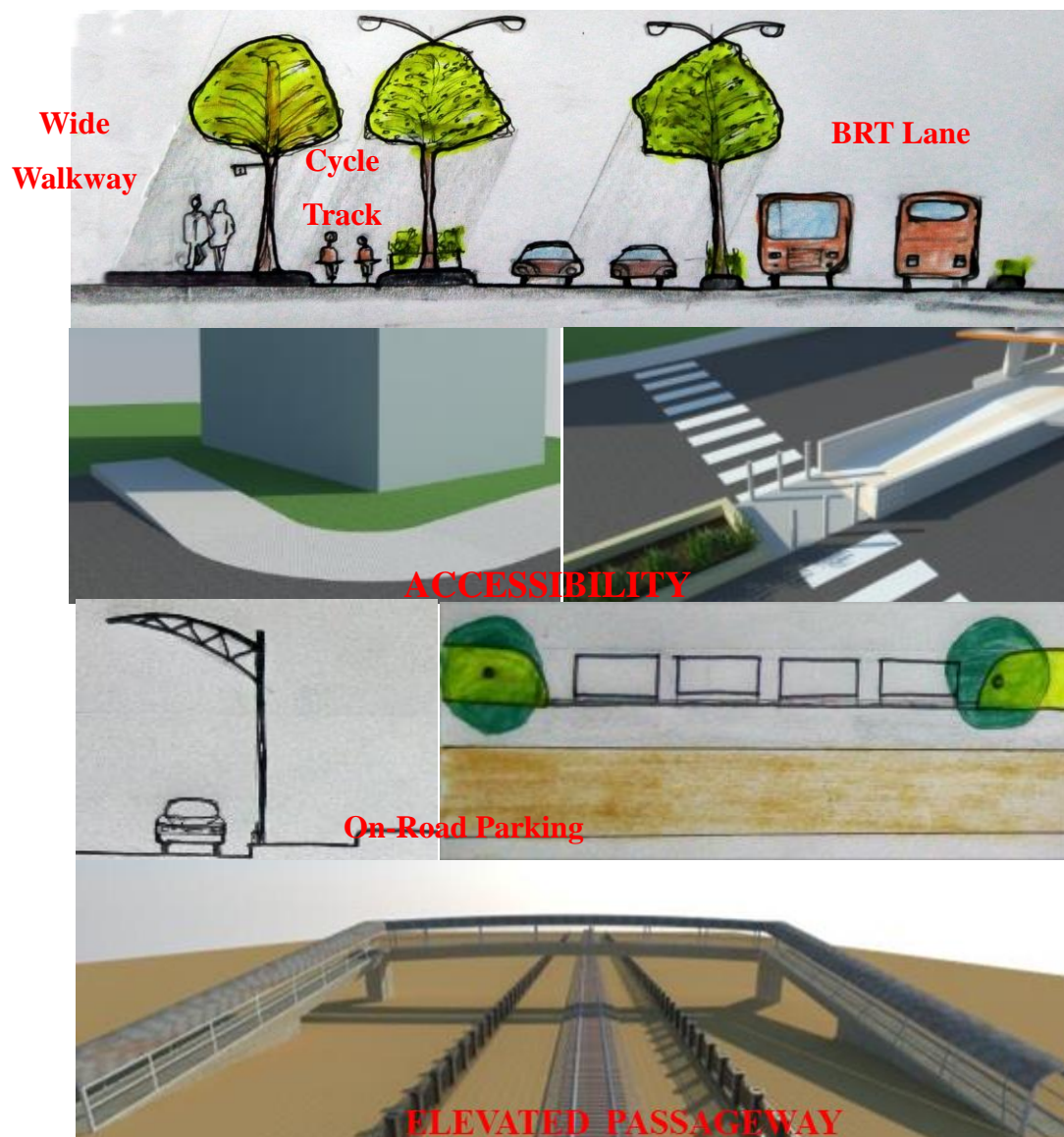
Figure 156 Sketches for design guidelines of routes & pathways

STREET FURNITURE:

- ✓ To provide Weather protected sitting space, dustbins at every 100 meter, street lights, good quality of paving pattern & signage,   NMV stands & barriers, Drinking water facilities on major intersections & activity areas.

- ✓ To provide coordinated placement of street lighting with other street elements.
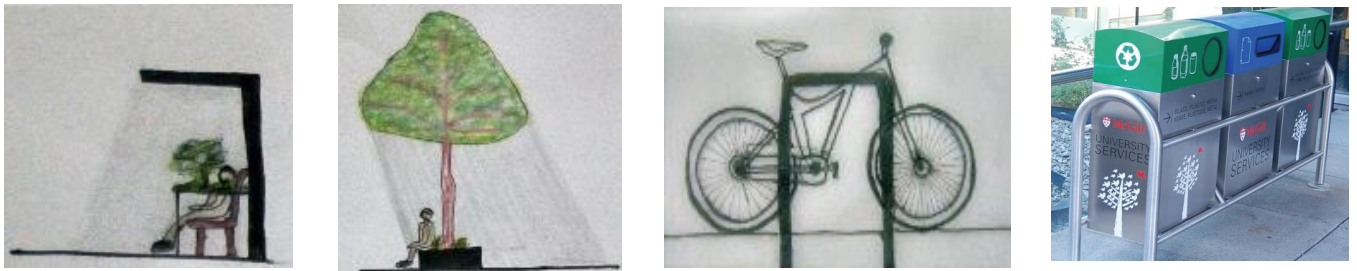
Figure 157Sketches for design guidelines of street furniture

MAGNETS   & GENERATORS:

- ✓ To create more magnets for Students & other stakeholders of area, to increase attractiveness & activeness.

- ✓ To distribute magnets all around the area, to attract people.

Existing   New magnets

Figure 158 Sketches for design guidelines of magnets & generators

LANDUSE & BUILDING USE:

- ✓ To incorporate more activities in undeveloped land as per the need of Students & other stakeholders, to enhance social interaction & liveliness.

- ✓ To create activity zones in close proximity of users.

- ✓ To organizing Restriction free vending zones, Restricted Vending Zones' and No-vending zones.

New activities

Figure 159 Sketches for design guidelines of land use & building use

OPEN & GREEN SPACES:

- ✓ To develop public realm in unutilized & abandoned open spaces.
- ✓ To development of public space as parks, casual sitting space & playground & creating inter-linkages.
- ✓ To providing green space in close proximity of users to increase group activities & inter-connect with Built Spaces.
- ✓ To making front development along water channel to create in into public space.

Play ground
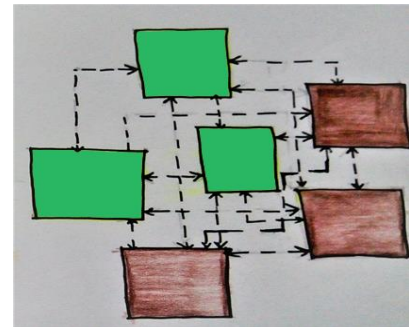
Connecting spaces

Development along Nala

Park for school students

Figure 160 Sketches for design guidelines of open & green spaces

VISTA, SKYLINE & LANDMARKS:

- ✓ To make a uniform development, to create good vista.
- ✓ T control Built up & Height of buildings to respective surrounding.
- ✓ To create good views from buildings & from open spaces.
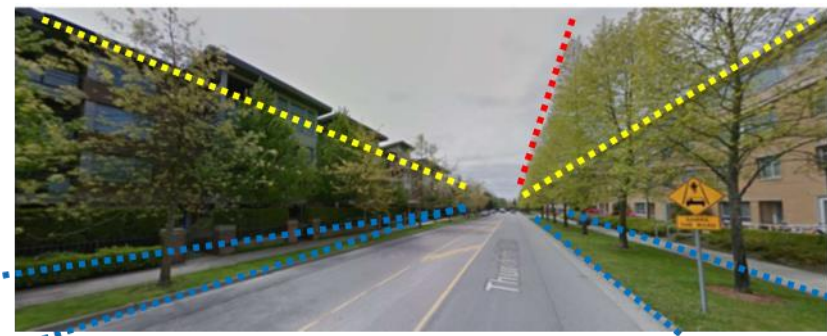
Figure 161Sketch for design guidelines of vista, skyline & landmarks

## 5. DESIGN PROPOSAL:

6. CONCLUSION:

6.1.ISSUES:

Social interaction & public Spaces: Social interaction is very important phenomena of   students & other stakeholders of educational hub. So, it is necessary to create informal interactive public space like playgrounds, parks, informal sitting space around the nodes & road, with in the educational hub.

Connectivity: Educational hub generates a lot of pedestrian & traffic movement. So, it is required to provide facilities to enhance the experience of pedestrian movement & reduce the dependency on vehicles. Also the segregation of traffic is required.

Vibrant & Safe Environment: Mostly, the area turns inactive after class hours, which makes it a dormant & unsafe environment. It is required to bring new activities to make it a vibrant & safe Environment.

6.2.CONTRIBUTION:

> ➤ Finding out the possible open spaces in educational hub, Sitapura, Jaipur.
> ➤ Understanding and establishing the relationship between Public Realm & Urban Design.
> ➤ Identifying the problems & counter the issues of life of an educational hub
> ➤ Designing and providing an alternative balanced solution to have a better & safe environment as an urban designer
> ➤ Creating walkable & interactive public spaces, catering to places or activities as well as leisure, making the environment convenient and attractive.
> ➤ Integrating community centers, convenient shopping centre, playgrounds & parks, community facilities such as public toilets, bus stops & police post, bus terminal, amphitheatre & auditorium, activity centers into the public realm
> ➤ More over creating a place for stakeholders of educational hub, where they can interact with each other in a good environment.

6.3.FUTURE APPLICATIONS:

This thesis was taken up with the idea to Studying & understanding the impact of Public Realm in an educational hub of a city. Since, development of educational hubs is becoming prominent in India, there is a great scope of application in such hub.

The model of development proposed in the thesis may be used and improved upon, in order to create an idea of the proper relation between stakeholder and their requirement of the places they wish to have in new & existing educational hub developments, their requirement of activities in designated spaces and their physical relation with their urban forms.

Also, there are several scopes to continue this research work in future. For example to work on proposing distinct urban design guideline for the development of upcoming educational hub. From environmental point of views there are immerse space to work further. The whole project demands to be self-sustainable & energy efficient. There is an huge scope to include energy simulations as a part of urban design process.

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ANNEXURE-I

-: Questionnaire Survey for students on educational hub/institutional area, Sitapura, Jaipur:-

1.　　**Name : …………………………**

2.　　**Gender:**
☐　　Male
☐　　Female

3.　　**Age (years):**
☐　　16 to 20
☐　　21 to 24
☐　　24 to 28
☐　　Above 28

4.　　**Level of course:**
☐　　Diploma/polytechnic
☐　　Undergraduate
☐　　Post graduate
☐　　PhD.
☐　　Other (Pls Specify) ………………………….

5.　　**From where, do you belong?**
☐　　Jaipur
☐　　Other district of Rajasthan
☐　　Other state of India
☐　　Outside India

6.　　**Distance of your current stay from your college:**
☐　　NA(I stay in the campus of college)
☐　　< 1 KM
☐　　1 KM to 5 KM
☐　　5 KM to 10 KM
☐　　More than 10 KM

7.　　**What mode of transportation do you use?**
☐　　Walk
☐　　College owned transportation
☐　　Public (Bus, Mini Bus)
☐　　Para transit (Auto, Shared Cab, Magic Tempo, etc.)
☐　　Private(Car, Bike,etc)
☐　　Mixed mode
☐　　Others (Pls specify) ………………

8.　　**Is this area is well connected with public transport?**
☐　　Yes
☐　　No

9.　　**What is the walking distance of your college from bus stop?**

☐   < 200 Meters
☐   200 Meter to 500 Meter
☐   500 Meter to 1 KM
☐   More than 1 KM

10.   Do bus stops have sufficient facilities for waiting time (like shaded sitting space, drinking water facilities, etc.)?

☐   Yes
☐   No

11.   If no, then kindly give suggestion that what facilities should be available at bus stop?
…………………………………………………………………..
12.   Do you feel secure during odd hours waiting at the bus stops?
☐   Yes
☐   No

13.   Are the bus stops accessible to physically handicapped persons?
☐   Yes
☐   No

14.   Is this area has pedestrian walkways?
☐   Yes
☐   No

15.   If yes, what facilities are not available along street?
☐   Shading devices
☐   Drinking water
☐   Street furniture
☐   Trees
☐   Lighting(during night time)
☐   Dustbins
☐   Other (pls specify)……

16.   Are the walkways accessible to physically handicapped persons?
☐   Yes
☐   No

17.   Do you need to go outside the college campus to have your regular meal?
☐   Yes
☐   No

18.   If yes, then how far do you go for meal?
☐   < 100 Meters
☐   100 Meters to 300 Meters
☐   300 Meters to 500 Meters
☐   More than 500 Meter

19.   Do you go out for places for refreshments (like tea/coffee/snakes) & casual/causal gathering with friend?
☐   Yes
☐   No

20.   What is the condition of the places for refreshments (like tea/coffee/snakes) & casual/causal gathering with friend?
☐   Good
☐   Average
☐   Bad

21.   Do you interact with people other than your college with in this area?
☐   Yes
☐   No

22.   What   are   the   places,   where   interaction   happens   with   in   and   around?
……………………………………………………………

23.   Where do you go for recreational activities?
☐   In and around this area
☐   Other Areas (like Pratap Nagar, Gaurav Tower etc.)………………………

24.   Kindly, mention the distance of recreational center from your current stay?
☐   < 1 KM
☐   1 KM to 5 KM
☐   5 KM to 10 KM
☐   More than 10 KM

25.   Do you ever purchase items from street vendors?
☐   Yes
☐   No

26.   How often do you purchase items from street vendors?
☐   Once a week
☐   Once a day
☐   More than once a day
☐   Never

27.   What do you like about street trade?
………………………………………
28.   What do you dislike about street trade?
……………………………………………….
29.   What would encourage you to make use of street vendors?
☐   Clean, Neat & nice looking stall
☐   Conveniently located
☐   Nothing?

30.   If you don't purchase items from street vendors, please state why?
☐   It is located far
☐   It is unhygienic
☐   It is unsafe
☐   Other(pls Specify)

31.   Do this area have stationary shops?
☐   Yes
☐   No

32. **If yes, do stationary shops provide tools & equipment's required for your Study?**
☐   Yes
☐   No

33. **Do you stopover in this area after class hours?**
☐   Yes
☐   No

34. **If yes then in what activities are you involved in this area after class hours?**
……………………………………….
35. **If No, then why?……………………………….**

36. **Does this area have parks, play grounds & spaces for casual activities?**
☐   Yes
☐   No

37. **Does this area have public toilets?**
☐   Yes
☐   No

38. **Does this area have affordable hostels with in the walkable distance?**
☐   Yes
☐   No

39. **Do you feel safe in this area during college hours?**
☐   Yes
☐   No

40. **Do you feel safe in this area after college hours?**
☐   Yes
☐   No

41. **What factors makes you feel unsafe in the area?**
☐   Low Lighting
☐   Social scenario
☐   Less development
☐   Unavailability of security person/ polices
☐   Dormant after college hours/class hours
☐   Anti-social behaviour
42.   Other (Pls Specify) …………

43. **Please rate the safety & security conditions of this area & its surroundings?**
☐   Very good
☐   Good
☐   Ok
☐   Bad
☐   Very bad

44. **Have you seen any illegal activities happening with this area or in surroundings?**

☐   Yes
☐   No

45.   If yes, kindly mention…………………………………………………….
46.   Which functions/ occasions are celebrated annually within this area?
………………………………………………………………………………………………….
47.   Please rate the educational hub/Institutional area in term of infrastructure, image, function & social Interaction & liveliness.
☐   1
☐   2
☐   3
☐   4
☐   5

48.   According to you, which is your preferred educational hub you have visited so far?
……………………………………………………………………………………………………
49.   What can make this area better than the present?(give your opinion)
……………………………………………………………………………………………………

ANNEXURE-II

-: Questionnaire Survey for staff on educational hub/institutional area, Sitapura, Jaipur:-

1.   Name: …………………………

2.   Gender:
☐   Male
☐   Female

3.   Age (years):
☐   22 to 30
☐   30 to 40
☐   40 to 60
☐   Above 60

4.   Classification of Job:
☐   Teaching Staff
☐   Non-teaching staff
☐   Service Staff

5.   From where, do you belong?
☐   Jaipur
☐   Other District of Rajasthan
☐   Other state of India
☐   Outside India

6.   Distance of your current stay from your college:
☐   NA(I stay in the campus of college)
☐   < 1 KM
☐   1 KM to 5 KM
☐   5 KM to 10 KM
☐   More than 10 KM

7.   What mode of transportation do you use?
☐   Walk
☐   Public (Bus, Mini bus)
☐   Para transit (Auto, Shared Cab, Magic Tempo, etc.)
☐   Private(Car, Bike, etc)
☐   Mixed mode
☐   Others (Pls specify)………………

8.   Is this area well connected with public transport?
☐   Yes
☐   No

9.   What is the walking distance of your college from bus stop?
☐   < 200 Meters
☐   200 Meter to 500 Meter

☐   500 Meter to 1 KM
☐   More than 1 KM

10.   Do bus stops have sufficient facilities for waiting time (like shaded sitting space, drinking water facilities, etc.)?
☐   Yes
☐   No

11.   If No, then kindly give suggestion that what facilities should be available at bus stop?…………………………………………………………………..
12.   Do you feel secure during odd hours waiting at the bus stops?
☐   Yes
☐   No

13.   Are the bus stops accessible to physically handicapped persons?
☐   Yes
☐   No

14.   Is this area has pedestrian walkways?
☐   Yes
☐   No

15.   If yes, what facilities are not available along walkways?
☐   Shading
☐   Drinking water
☐   Street Furniture
☐   Trees
☐   Lighting (during night time)
☐   Dustbins
☐   Other (pls specify)…………

16.   Are the walkways accessible to physically handicapped persons?
☐   Yes
☐   No

17.   Do you need to go outside the college campus to have your regular meal?
☐   Yes
☐   No

18.   If yes, how far do you go for meal?
☐   < 200 Meters
☐   200 Meter to 500 Meter
☐   500 Meter to 1KM
☐   More than 1KM

19.   Do you visit refreshments (like tea/coffee/snakes) space/stalls/ shops & casual gathering space with colleagues?
☐   Yes
☐   No

20.   What is the condition of the places for refreshments (like tea/coffee/snakes)   & casual/causal gathering with friend?

☐   Good
☐   Average
☐   Bad

21.   Do you interact with colleagues of other college or office with in this area?
☐   Yes
☐   No

22.   What are the places, where interaction happens with in and around?
……………………………………………………………
23.   Do you feel comfortable at such place with majority of Students?
☐   Yes
☐   No

24.   Where do you go for recreational activities?
☐   In and around This area
☐   Other Areas (like Pratap Nagar, Gaurav Tower etc.)………………………

25.   Kindly, mention the distance of recreational center from your current stay?
☐   < 1 KM
☐   1 KM to 5 KM
☐   5 KM to 10 KM
☐   More than 10 KM

26.   Do you ever purchase items from street vendors?
☐   Yes
☐   No

27.   How often do you purchase items from street vendors?
☐   Once a week
☐   Once a day
☐   More than once a day
☐   Never

28.   What do you like about street trade? ……………………………….

29.   What do you dislike about street trade? ……………………………….

30.   What would encourage you to make use of street vendors?
☐   Clean, Neat & nice looking stall
☐   conveniently located
☐   Nothing

31.   If you don't purchase items from street vendors, please state why.
☐   It is located far
☐   It is unhygienic
☐   It is unsafe
☐   Other (pls Specify)…………

32.   Does this area have public toilets?
☐   Yes

☐   No

33.   **Is the crèche facility available at your work place?**
☐   Yes
☐   No

34.   **Is the crèche facility available in this area or in its surrounding area?**
☐   Yes
☐   No

35.   **Does this area have parks & play grounds & spaces for casual activities?**
☐   Yes
☐   No

36.   **Do you feel safe in this area during odd hours?**
☐   Yes
☐   No

37.   **What factors do you feeling making you feel unsafe in the area?**
☐   Low Lighting
☐   Social scenario
☐   Less development
☐   Unavailability of security person/ polices
☐   Dormant after college hours/class hours
☐   Other (Pls Specify)……………………………………

38.   **Please rate the safety & security conditions of this area & its surroundings?**
☐   Very good
☐   Good
☐   Ok
☐   Bad
☐   Very bad

39.   **Have you seen any illegal activities happening with in this area or in surroundings?**
☐   Yes
☐   No

40.   **If yes, kindly mention …………………………………………………….**
41.   **Which functions/ occasions are celebrated annually within this area?**
…………………………………………………………………
42.   **Please rate the educational hub/Institutional area in term of infrastructure, image, function & social Interaction & liveliness.(1 to 5)**
………………………………………………….
43.   **According to you, which is your preferred educational hub/Institutional Area you have visited so far?**
…………………………………………………….
44.   **What can make this area better than the present? (Give your opinion)**
………………………………………….

ANNEXURE-III

-: Questionnaire for Shopkeepers & vendors in educational hub, Sitapura, Jaipur (Sitapura Institutional Area):-

1.   Name of shopkeeper & Title of shop: …………………………………………
……………………………………………………………………………………

2.   Age:
☐   20 to 30
☐   30 to 40
☐   40 to 60
☐   Above 60

3.   Gender:
☐   Male
☐   Female

4.   How long you are involved in this business?
☐   < 2 yrs
☐   2 to 5 yrs
☐   5 to 10 yrs
☐   More than 10 yrs

5.   From where, do you belong?
☐   Jaipur
☐   Other district of Rajasthan
☐   Other state then Rajasthan

6.   Distance of your current stay from the area:
☐   < 1 KM
☐   1 KM to 5 KM
☐   5 KM to 10 KM
☐   More than 10 KM

7.   Type of shop:
☐   Formal
☐   Informal

8.   Category of products, you sell:
☐   Refreshments
☐   Daily need
☐   Food
☐   Vegetables
☐   Pharmacy
☐   Others (pls specify)……………

9.   Do you own the shop?
☐   Yes
☐   No

10.   How do you get electricity?
☐   Through local authorities
☐   Through private supplier
☐   By your own

11.   How do you get water?
☐   Through local authorities.
☐   Through private supplier
☐   By your own

12.   Timing of business:
☐   6 am -6 pm
☐   9am – 9 pm
☐   Others (pls specify) ………
13.   Do you run your business during holidays?
☐   Yes
☐   No

14.   What mode of transportation do you use?
☐   Walk
☐   Public (Bus, Mini bus)
☐   Para transit (Auto, shared cabs, Magic Tempo, etc.)
☐   Private(Car, Bike, etc)
☐   Mixed mode
☐   Others (Pls specify)………………

15.   What kind of customers you get?
☐   Students
☐   Faculties & staff
☐   Industrial official
☐   Industrial workers
☐   Institute workers
☐   Patient & their relative
☐   Other (pls specify) ……………………………

16.   Do you pay any charges or fee/ tax to local authority?
☐   Yes
☐   No

17.   What kind of waste is generated?
☐   Liquid Waste
☐   Solid Rubbish
☐   Organic Waste
☐   Recyclable Rubbish
☐   Hazardous Waste

18.   How the waste does is disposed?
☐   Muncipalility workers collects it
☐   Throw it to municipality garbage bin
☐   Throw it to nearby open land by ur own
☐   Others (pls specify) …………

19.   Do bus stops has sufficient facilities for waiting time (like shaded sitting space, drinking water facilities, etc.)?
☐   Yes
☐   No

20.   If No, then kindly give suggestion that what facilities should be available at bus stop?
……………………………………………………………………..

21.   Do you feel secure during odd hours waiting at the bus stops?
☐   Yes
☐   No

22.   Is this area has pedestrian walkways?
☐   Yes
☐   No

23.   If Yes, What facilities are not available along street?
☐   Shading
☐   Drinking water
☐   Street Furniture
☐   Trees
☐   Lighting
☐   Dustbins
☐   Other (pls specify) ……………………

24.   Do you bring your children at your work place
☐   Yes
☐   No

25.   If yes, is there any safe place in surroundings for children to play?
☐   Yes
☐   No

26.   Where do you go for recreational activities?
☐   In and around This area
☐   Other Areas (pls Specify) …………………………..

27.   Does this area have parks & play grounds & spaces for casual activities?
☐   Yes
☐   No

28.   Does this area have public toilets?
☐   Yes
☐   No

29.   Is the environment safe enough for business?
☐   Yes
☐   No

30.   Have you seen any Illegal Activities Happening with in the educational area or in surroundings?

☐   Yes
☐   No

31.   If yes, please Explain………………………………………………….
32.   What are the safety & security Conditions in the educational hub & it's Surrounding?

☐   Very Good
☐   Good
☐   Ok
☐   Bad
☐   Very Bad

33.   What Additional facilities will be good for your business? (give your opinion)

………
………
…………………………………………………………………………