SUDAN UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF ARCHITECTURE AND PLANNING
ARCHITECTURAL DESIGN DEPARTMENT
FIFTH YEAR BACHELOR

كليـــة العمـــــارة والتخطيـــــط
College of Architecture and Planning

GRADUATION PROJECT REPORT

REPORT NAME:
MUSIC LIBRARY IN KHARTOUM

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SUPERVISED BY:
PROF SAUD.

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"لا يُكلفُ الله نَفسًا إلَّا وسعَها لَها مَا كسَبت وعَليهَا مَا اكتَسَبت ربنا لا تُؤاخِذنا إن نَسينا أو أخطَأنا ربَّنا ولا تَحمل علينا إصرًا كما حَملته على الذين من قبلنا، ربنا ولا تُحملنا ما لا طاقة لنا به واعفُ عنَّا، واغفِر لنا وأرحمنا، أنت مولانا فانصُرنا على القوم الكافرين"

DEDICATION:

To mum and dad I dedicate this humble project of mine to you for many reasons. One as a thank you for all the things you have done for me as I've grown up.

Mom thank you for every time you were there for me and for everything else you've done for me.

Dad thank you for being a great dad, For everything you taught me, for every day you where patient with me, for every homework you helped me in it.

ACKNOWLEDGMENT:

I would like to express my gratitude to ALLAH SWT for with his guidance I am here for.

All thanks and respect goes to my supervisor and all the faculty staff members for all the help they provided .

To my parents ,for all that I am or ever hope to be I owe to them.

Special thanks for Abdullah Hassan for always believing in me.

And finally to myself.

ABSTRACT:

Music library project contain music-related materials for patron use. Collections may also include non-print materials.Music library print collections include dictionaries and encyclopedias, indexes and directories, printed music, music serials and other music literature. It's used by student and citizens in all classes and levels.

The project aim is to providing education in musical fields that develop nourish and ensure their competence in all disciplinary disciplines.

This research deals with the study of music library project, in four chapters; the first chapter is a general introduction to the project which breaks into the definition, the objectives, and the aspects, the causes of choice, causes of the site selection. The second chapter which consist of the data and information collected and a brief history and the study of the architectural examples. The third chapter contains the project components and charts, the analysis of the site down to the indicators and guide lines to find the best zoning based on previous studies. Chapter four includes the whole architecture designing process which contains the design philosophy (concept) and how the beginning of the architectural form and then to modify the design and problems which existed and the ideas for solving it down till reaching the develop design and finally the technical solution for the project in terms of the method of selecting appropriate structure for the project and which achieves requirements and treatments for the project plus the services and the method of prevision and distribution. The main result of this project is to be able to study and design a building which has all of the needed spaces for the project, functional ,simple in circulation, structurally stable, appealing to the eye and finally able to profit the users, the owners and finally the county as a whole.

نبذة مختصرة:

يحتوي مشروع مكتبة الموسيقى على مواد ذات صلة بالموسيقى لاستخدام المستفيدين. قد تتضمن المجموعات أيضًا مواد غير مطبوعة. تشتمل مجموعات الطباعة في المكتبة الموسيقية على القواميس والموسوعات والفهارس والدلائل والموسيقى المطبوعة والمسلسلات الموسيقية والمطبوعات الموسيقية الأخرى. يتم استخدامه من قبل الطلاب والمواطنين في جميع الفصول والمستويات.

يهدف المشروع إلى توفير التعليم في المجالات الموسيقية التي تطور التغذية وتضمن كفاءتها في جميع التخصصات التأديبية.

يتناول هذا البحث دراسة مشروع مكتبة الموسيقى في اربعه فصول. الفصل الأول به مقدمة عامة عن تعريف المشروع وأهدافه وأبعاده وأسباب الاختيار ثم مرورا بالفصل الثاني الذي يتكون من البيانات والمعلومات التي تم جمعها وتاريخ موجز ودراسة الأمثلة المعمارية. يحتوي الفصل الثالث على مكونات ومخططات المشروع ، وتحليل الموقع وصولاً إلى المؤشرات وخطوط التوجيه للعثور على أفضل تقسيم للمناطق استناداً إلى دراسات سابقة. يتضمن الفصل الرابع عملية تصميم المبنى بأكملها والتي تحتوي على فلسفة التصميم (المفهوم) وكيفية بداية الشكل المعماري ومن ثم تعديل التصميم والمشكلات التي كانت موجودة والأفكار لحلها حتى الوصول إلى تطوير التصميم وأخيرا الحلول التقنيه من حيث طريقة اختيار النظام المناسب للمشروع والذي يحقق المتطلبات مرورا بالمعالجات الخاصة بالمشروع نهاية بالخدمات وطريقة توفيرها وتوزيعها.تتمثل النتيجة الرئيسية لهذا المشروع في القدرة على دراسة وتصميم المبنى الذي يحتوي على جميع المساحات اللازمة للمشروع ، وظيفية ، بسيطة في التداول ، مستقرة هيكليا ، جاذبه للعين وأخيراً قادرة على جني الأرباح ، لأصحابها وأخيرا المقاطعة ككل .

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CHAPTER ONE: (INTRODUCTION)

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ABSTRACT:

The first chapter is a general introduction to the project which breaks into the definition, the objectives, and the aspects the and the causes of choice, causes of the site selection.

1-PROJECT INTRODUCTION:

1-1PROJECT NAME:

MUSIC LIBRARY.

1-2MUSIC LIBRARY DEFINITION:

A **music library** contains music-related materials for patron use. Collections may also include non-print materials, such as digitized music scores or audio recordings. Use of such materials may be limited to specific patron groups, especially in private academic institutions. Music library print collections include dictionaries and encyclopedias, indexes and directories, printed music, music serials and other music literature. It's used by student and citizens in all classes and levels.


Music library, Leipzig, 1985

FIGURE 1-1 MUSIC LIBRARY LEIPZIG 1985

1-3LIBRARY:

A **library** is a collection of sources of information and similar resources, made accessible to a defined community for reference or borrowing. It provides physical or digital access to material, and may be a physical building or room, or a virtual space, or both. A library's collection can include books, periodicals, newspapers, manuscripts, films, maps, prints, documents, microform, CDs, cassettes, videotapes, DVDs, Blu-ray Discs, e-books, audiobooks, databases, and other formats. Libraries range in size from a few shelves of books to several million items. In Latin and Greek, the idea of a bookcase is represented by *Bibliotheca* and *Bibliothēkē* (Greek: βιβλιοθήκη): derivatives of these mean *library* in many modern languages, e.g. French *bibliothèque*.

The first libraries consisted of archives of the earliest form of writing—the clay tablets in cuneiform script discovered in Sumer, some dating back to 2600 BC. Private or personal libraries made up of written books appeared in classical Greece in the 5th century BC. In the 6th century, at the very close of the Classical period, the great libraries of

the Mediterranean world remained those of Constantinople and Alexandria.

- Library at Melk Abbey in Austria

FIGURE 1-2 LIBRARY AT MELK ABBEY INAUSTRIA

- The Halifax Central Library, a modern city library

FIGURE 1-3 THE HALIFAX CENTRAL LIBRARY

1-4HISTORY:

1-4-1EARLY LIBRARIES:

The first libraries consisted of archives of the earliest form of writing the clay tablets in cuneiform script discovered in temple rooms in Sumer, some dating back to 2600 BC. These archives, which mainly consisted of the records of commercial transactions or inventories, mark the end of prehistory and the start of history.

According to legend, mythical philosopher Laozi was keeper of books in the earliest library in China, which belonged to the Imperial Zhou dynasty. Also, evidence of catalogues found in some destroyed ancient libraries illustrates the presence of librarians.

FIGURE 1-4 TABLET FROM FROM THE LIBRARY OF ASHURBANIPAL

1-4-2CLASSICAL PERIOD:

The Library of Alexandria, in Egypt, was the largest and most significant great library of the ancient world. It flourished under the patronage of the Ptolemaic dynasty and functioned as a major center of scholarship from its construction in the 3rd century BC until the Roman conquest of Egypt in 30 BC. The library was conceived and opened either during the reign of Ptolemy I Soter (323–283 BC) or during the reign of his son Ptolemy II (283–246 BC). An early organization system was in effect at Alexandria.

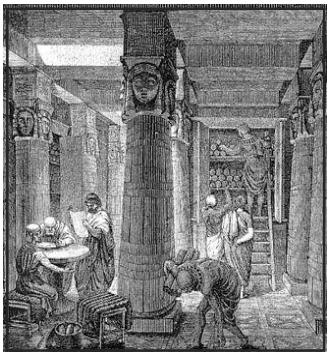


FIGURE 1-5 ARTISTIC RENDRING OF THE LIBRARY OF ALEXANDRIA

1-4-3LATE ANTIQUITY:

During the Late Antiquity and Middle Ages periods, there was no Rome of the kind that ruled the Mediterranean for centuries and spawned the culture that produced twenty-eight public libraries in the *urbs Roma*. The empire had been divided then later re-united again under Constantine the Great who moved the capital of the Roman Empire in 330 AD to the city of Byzantium which was renamed Constantinople. The Roman intellectual culture that flourished in ancient times was undergoing a transformation as the academic world moved from laymen to Christian clergy.

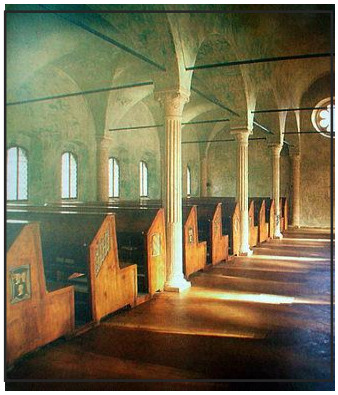


FIGURE 1-6 MALATESTIANA LIBRARY OF CESENA

1-4-4ISLAMIC LANDS:

By the 8th century, first Iranians and then Arabs had imported the craft of papermaking from China, with a paper mill already at work in Baghdad in 794. Early paper was called bagdatikos, meaning "from Baghdad", because it was introduced to the west mainly by this city. By the 9th century, public libraries started to appear in many Islamic cities. They were called "house of knowledge" or *dar al-'ilm*.

FIGURE 1-7 INSIDE QUR'ANIC LIBRARY IN CHINGUETTI

1-4-5ISLAM:

The centrality of the Qurʾān as the prototype of the written word in Islam bears significantly on the role of books within its intellectual tradition and educational system. An early impulse in Islam was to manage reports of events, key figures and their sayings and actions.

FIGURE 1-8 QUR'AN MANUSCRIPT ON DISPLAY AT THE BIBLIOTHECA ALEXANDRIA

1-4-6EUROPEAN MIDDLE AGES:

In the Early Middle Ages, monastery libraries developed, such as the important one at the Abbey of Montecassino in Italy. Books were usually chained to the shelves, reflecting the fact that manuscripts, which were created via the labour-intensive process of hand copying, were valuable possessions.

FIGURE 1-9 SCIENCE LIBRARY OF UPPER LUSATIA IN GERMANY

1-4-7RENAISSANCE:

From the 15th century in central and northern Italy, libraries of humanists and their enlightened patrons provided a nucleus around which an "academy" of scholars congregated in each Italian city of consequence. Malatesta Novello, lord of Cesena, founded the Malatestiana Library

FIGURE 1-10 READING ROOM OF THE LAURENTIAN

1-4-8ENLIGHTENMENT ERA LIBRARIES:

The 17th and 18th centuries include what is known as a golden age of libraries; during this some of the more important libraries were founded in Europe.

- **Subscription libraries**

FIGURE 1-11 SUBSCRIPTION LIBRARIES

- **Private libraries**

FIGURE 1-12 PRIVATE LIBRARIES

- **National libraries**

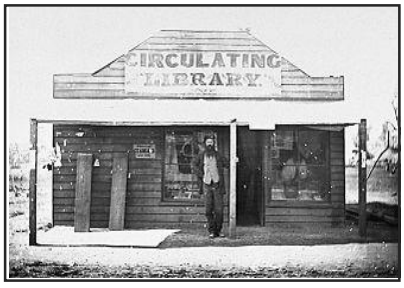


FIGURE 1-13 NATIONAL LIBRARIES

1-4-9MODERN PUBLIC LIBRARY:

Although by the mid-19th century, England could claim 274 subscription libraries and Scotland, 266, the foundation of the modern public library system in Britain is the Public Libraries Act 1850. The Act first gave local boroughs the power to establish free public libraries and was the first legislative step toward the creation of an enduring national institution that provides universal free access to information and literature.

FIGURE 1-14 PETER WHITE PUBLIC LIBRARY BUILT IN 1905

1-5TYPES:

Many institutions make a distinction between a circulating or lending library, where materials are expected and intended to be loaned to patrons, institutions, or other libraries, and a reference library where material is not lent out. Travelling libraries, such as the early horseback libraries of eastern Kentucky and bookmobiles, are generally of the lending type. Modern libraries are often a mixture of both, containing a general collection for circulation, and a reference collection which is restricted to the library premises. Also, increasingly, digital collections enable broader access to material that may not circulate in print, and enables libraries to expand their collections even without building a larger facility.

1-5-1ACADEMIC LIBRARIES:

Academic libraries are generally located on college and university campuses and primarily serve the students and faculty of that and other academic institutions. Some academic libraries, especially those at public institutions, are accessible to members of the general public in whole or in part.

FIGURE 1-15 THE ROUND READING ROOM OF MAUGHAN LIBRARY

FIGURE 1-16 THE UNIVERSITY LIBRARY IN BUDAPEST

1-5-2CHILDREN'S LIBRARIES:

Children's libraries are special collections of books intended for juvenile readers and usually kept in separate rooms of general public libraries.

FIGURE 1-17 A CHILDREN'S LIBRARY IN

1-5-3NATIONAL LIBRARIES:

A national or state library serves as a national repository of information, and has the right of legal deposit, which is a legal requirement that publishers in the country need to deposit a copy of each publication with the library.

FIGURE 1-18 NATIONAL LIBRARY OF WALES

1-5-4PUBLIC LENDING LIBRARIES:

A public library provides services to the general public. If the library is part of a countywide library system, citizens with an active library card from around that county can use the library branches associated with the library system. A library can serve only their city, however, if they are not a member of the county public library system.

FIGURE 1-19 THE PUBLIC LIBRARY OF POLAND

1-5-5REFERENCE LIBRARIES:

A reference library does not lend books and other items; instead, they must be read at the library itself. Typically, such libraries are used for research purposes, for example at a university.

FIGURE 1-20 DEFINITION OF A LIBRARY AT ENTRANCE TO THE MAINE STATE LIBRARY IN AUGUSTA

1-5-6RESEARCH LIBRARIES:

A research library is a collection of materials on one or more subjects. A research library supports scholarly or scientific research and will generally include primary as well as secondary sources; it will maintain permanent collections and attempt to provide access to all necessary materials.

FIGURE 1-21 QUAID-E-AZAM LIBRARY IN PAKISTAN

1-5-7DIGITAL LIBRARIES:

Digital libraries are libraries that house digital resources. They are defined as an organization and not a service that provide access to digital works, have a preservation responsibility to provide future access to materials, and provides these items easily and affordably.

1-5-8SPECIAL LIBRARIES:

All other libraries fall into the "special library" category. Many private businesses and public organizations, including hospitals, churches, museums, research laboratories, law firms, and many government departments and agencies, maintain their own libraries for the use of their employees in doing specialized research related to their work.

1-6MUSIC LIBRARY TYPE:

The type of this music library it is one of those developed as independent libraries or archives supporting music organizations.

1-7PROJECT'S AIMING:

*providing education in musical fields that develop nourish and ensure their competence in all disciplinary disciplines.

*understanding the integration of music in social and cultural processes and music as a performance of culture.

*encouraging the development of creative ,intuitive and intellectual abilities.

*develop an informed group of defenders and confirm that music is an integral part of education.

*providing and enriching cultural and educational life in the city and the state through excellence education ,research ,performance and training.

*support cooperation between music and related disciplines.

1-8REASONS OF CHOOSING THIS PROJECT:

*the need of such project in Sudan .

*upgrading music in general.

*the development of music in Sudan and the emergence of interest in music learning and the development of talent among individuals in the last period led to the emergence of this kind of interest.

*a forum and a youth outlet for unloading their concerns in music and singing.

*looking forward to future generations needs.

1-9PROJECT'S DIMENSIONS :

Functional dimension :

*doing the cultural and entertaining activities .

*add activities that attractive people to the library.

Economic dimensions:

*the development of talent resulting in the acquisition of musical and musical skills and a good knowledge of music thus increase the income of the individual of this talent.

*provide income to the owner of the project through concerts and events.

Social dimensions:

*strengthen social connections among the population through their pool I musical performances.

*symbol to the richness of the cultural state.

*contributing to the advancement of intellectual society .

CHAPTER TWO: (DATA COLLECTION)

CONTENTS:

ABSTRACT:

The second chapter which consist of the data and information collected and a brief history and the study of the architectural examples.

2-DATA COLLECTION:

2-1LIBRARY DESIGN GUIDELINES:

- Choosing the right location for building a library, where the place shouId be away from noise , disturbance and traffic congestion , the building must be in a location that allows natural lighting and ventilation.
- A suitable space souid be left between them and the adjacent building .
- Consider the space of the corridors between the shelves ,where it must be up to 85 cm in the large libraries ,while in the small libraries shouId be the distance between the shelf and another 77cm.
- The proper distribution of the drawers ,where it must be in every 25 meters drawer, in addition to the existence of fireboxes used in emergency situations such as fires.
- Set up an alarm that works quickly in emergency situations.
- Design shelves for books with appropriate sizes , the length of the shelf must be one meter ,and width of about 72cm.
- Furniture shouId be chosen to provide the right atmosphere and comfort for library visitors, leading to long stays.
- Provide a good comfortable lighting system that enables the reader to see the letters, symbols , and graphics in the book he reads.
- The use of light colors in the painting of walls, ceiling and in the floor tiles as well as in the color of furniture .
- Take into consideration the temperature in the library store , where it shouId not exceed 15 c,with suitable ventilation for the place.

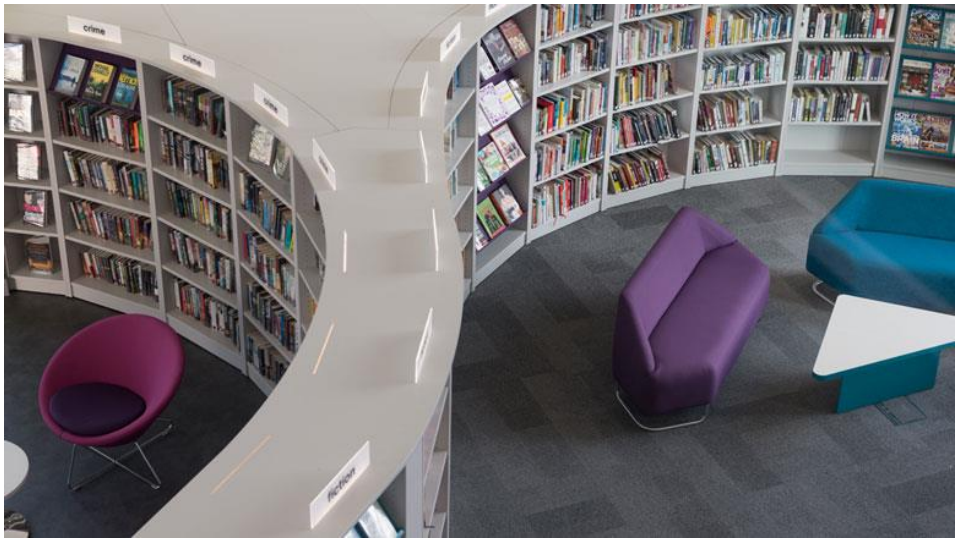
2-2PLANNING AND DESIGN GUIDELINES:

We come out of the analysis with data and requirements for the correct design and from those data and requirements we come out with guides leading to design that ensures the success of the work of the project.

The building was designed into three areas according to the analysis :

- Nuisance area.
- Quiet area.
- Quieter area.

- ❖ The services of high capacity for the public such as exhibitions halls,resturants and reception in the lower floors.
- ❖ Put all the activities that need quiet in the middle floors such as educational areas and entertaining areas.
- ❖ Put all the activities that need a quieter place in the upper floors such as library's hall.



2-3CASE STUDIES:

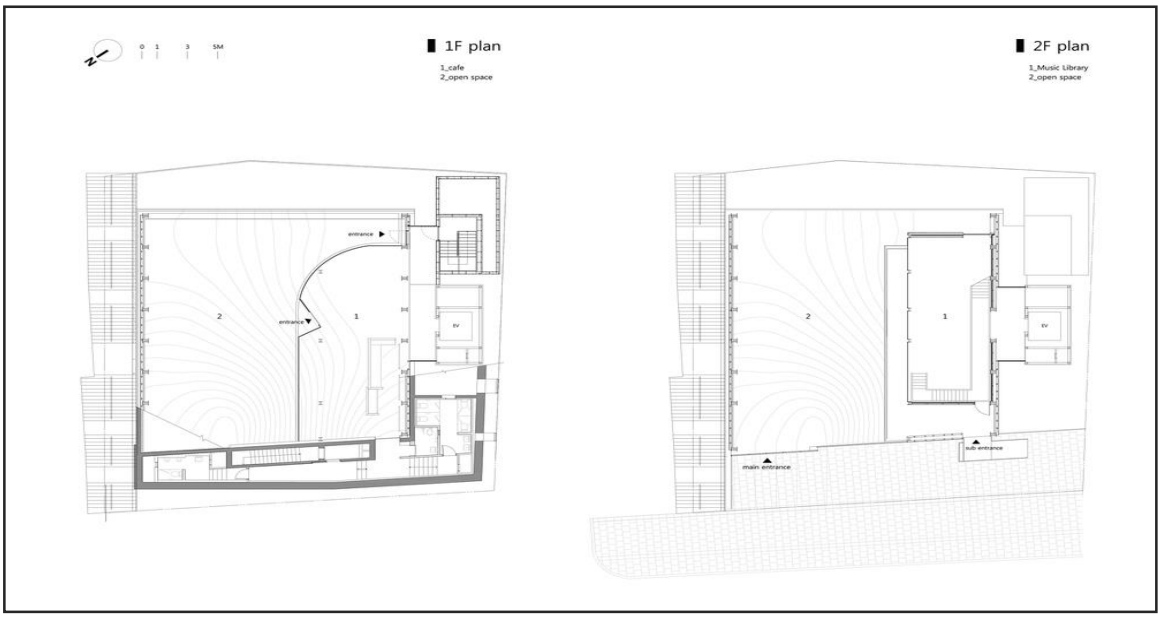
2-3-1INTERNATIONAL PROJECT:

Ma HYUNDAI CARD MUSIC LIBRARY BY CHOI MOONGYU AND GA.A ARCHITECTS

Architects: Moongyu Choi (Yonsei University) + Ga.A Architects
Client: Hyundai Card Co.,Ltd.
Location: Seoul, Republic of Korea
Structural design: MIDO Structural Consultants
Gross usable floor space: 2,963 sqm
Lot size: 738 sqm
Start of work: 2012 - 2014
Completion of work: 2011 - 2015
Indoor surfaces: corrugated galvanized steel sheet, T40 densiphalt, paint
Outdoor surfaces: galvanized steel sheet, AL sheet panel, corten steel panel, low iron glass
Floors: 5 stories below, 2 stories above the ground

A double –height space filled with rare vinyl records and magazines is the centerpiece of this music library.

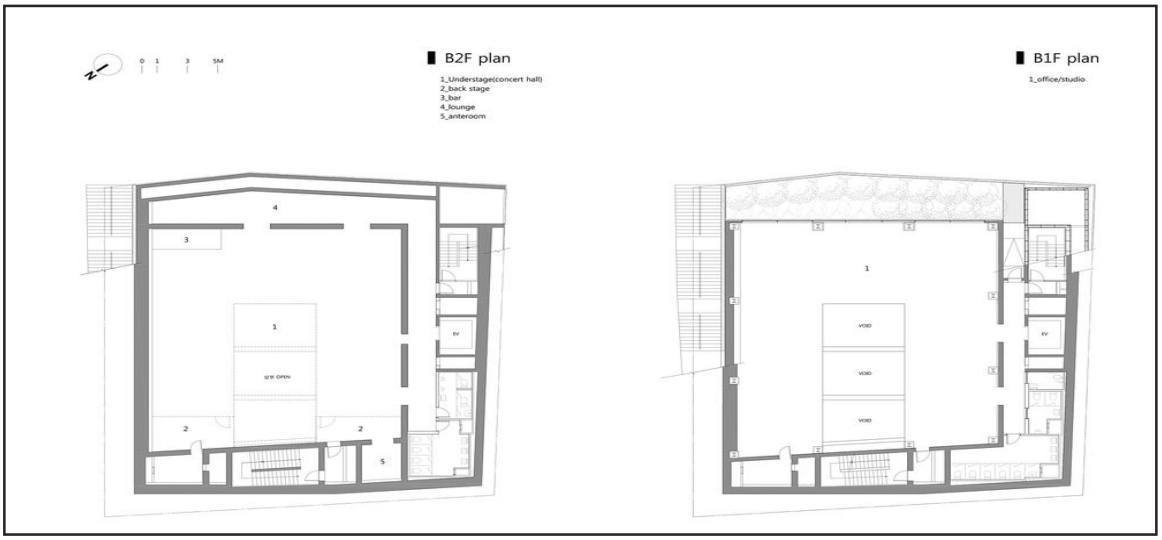
FIGURE 2-1 view



1floor plan
1-café.
2-open space.

2 floor plan
1-music library.
2-open space.

FIGURE 2-2 plans



B 2 floor plan
1-understage (concert hall).
2-back stage.
3-bar.
4-lounge.
5-anter room.

B 1 floor plan
1-office/studio.

FIGURE 2-3 plans

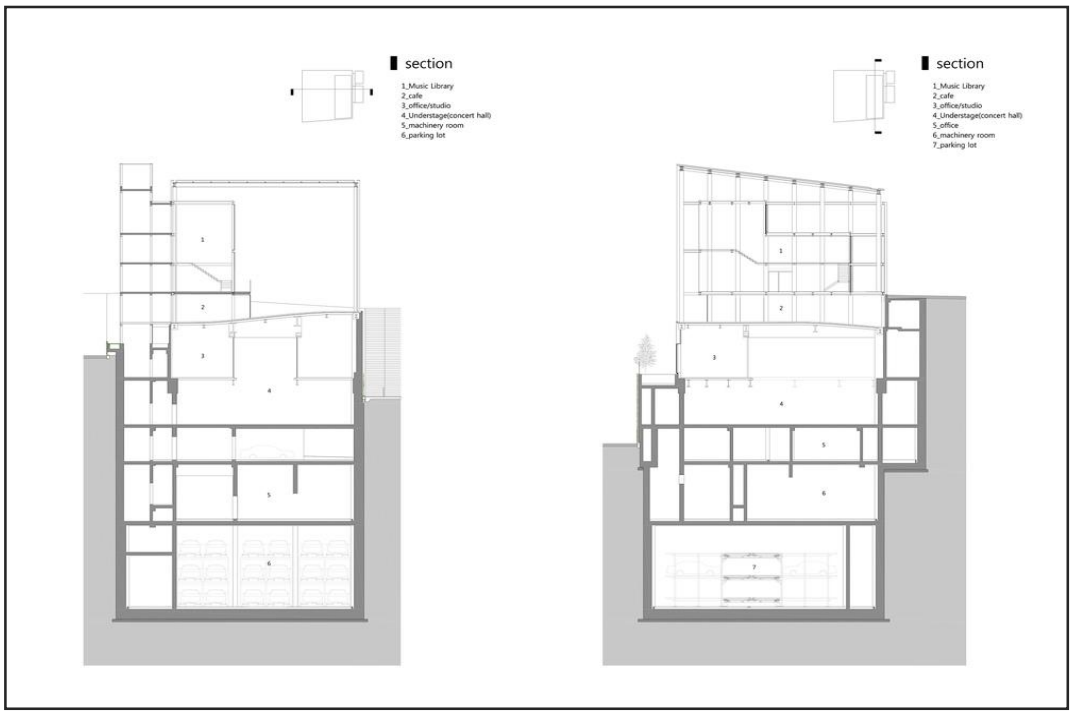


FIGURE 2-4 sections

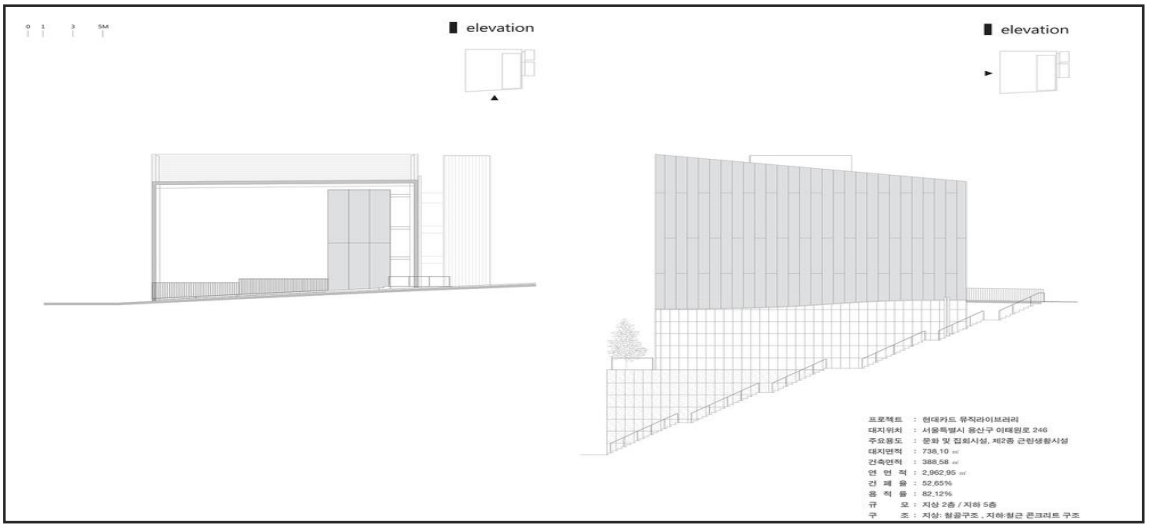


FIGURE 2-5 elevations

Section:
1-music library.
2-café.
3-Office/studio.
4-understage (concert hall).
5-machinery room.
6-parking lot.

The architects realized the potential of the view and decided to work by subtraction, opening up a break on the architectural scene presented by the road.

FIGURE 2-6 elevations

FIGURE 2-7 views

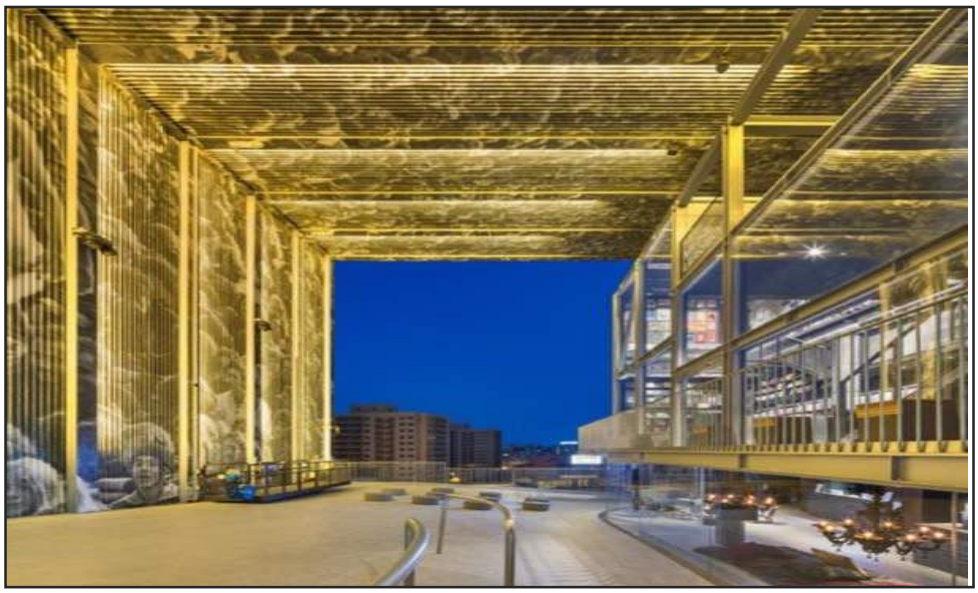


FIGURE 2-8 view

FIGURE 2-9 outdoor seating view

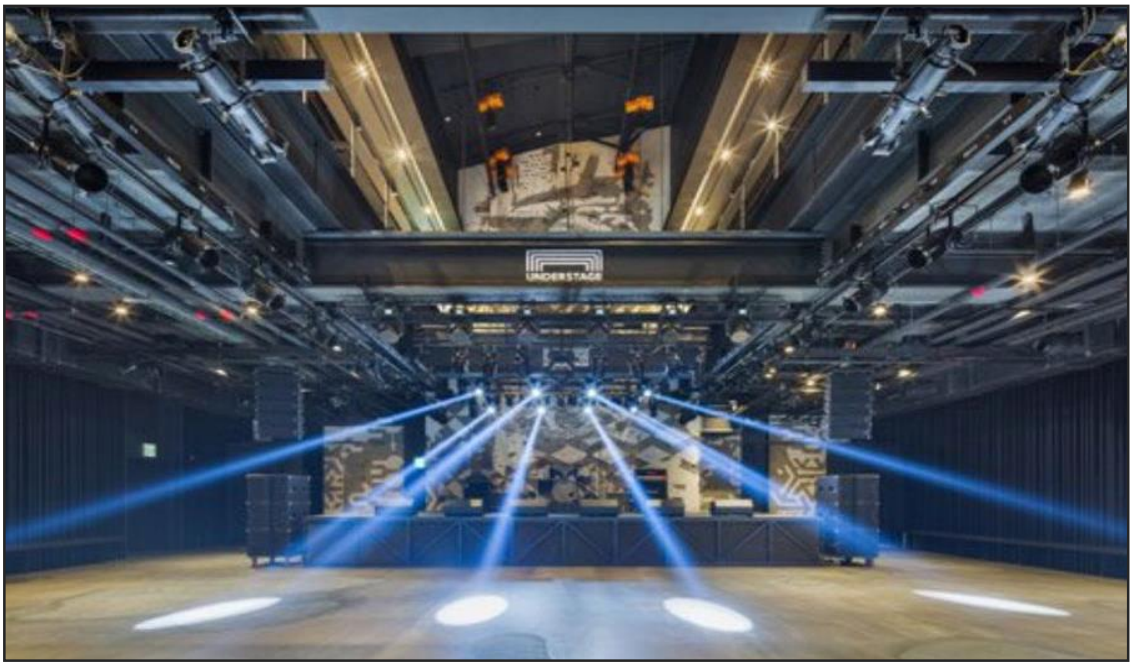


FIGURE 2-10 stage's view

FIGURE 2-11 sound's library view

FIGURE 2-12 view

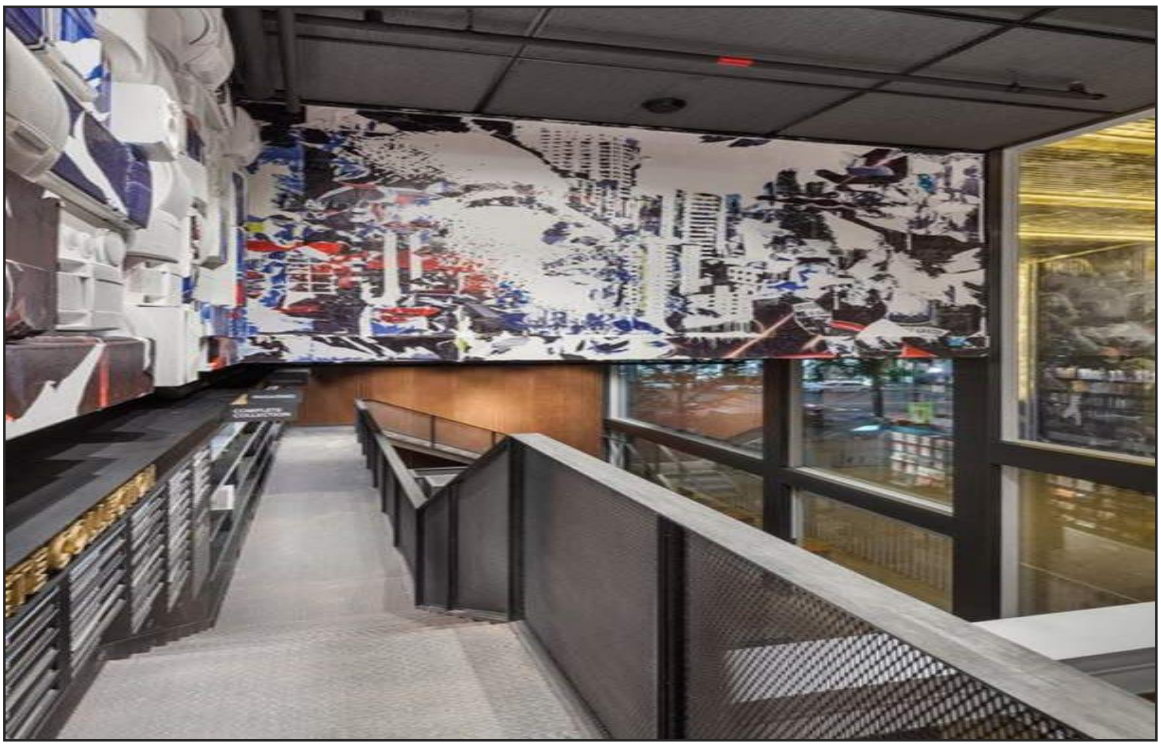


FIGURE 2-13 view

Advantages :

- strong bond between the spaces(functionally).
- A good determinations of spaces .

Disadvantages :

- The difficult of the vertical motions between the spaces.
- Small spaces.

2-3-2INTERNATIONAL PROJECT:

THE JEAN GRAY HARGROVE MUSIC LIBRARY AT THE UNIVERSITY OF CALIFORNIA, BERKELEY / MACK SCOGIN MERRILL ELAM ARCHITECTS 23 APRIL, 2011

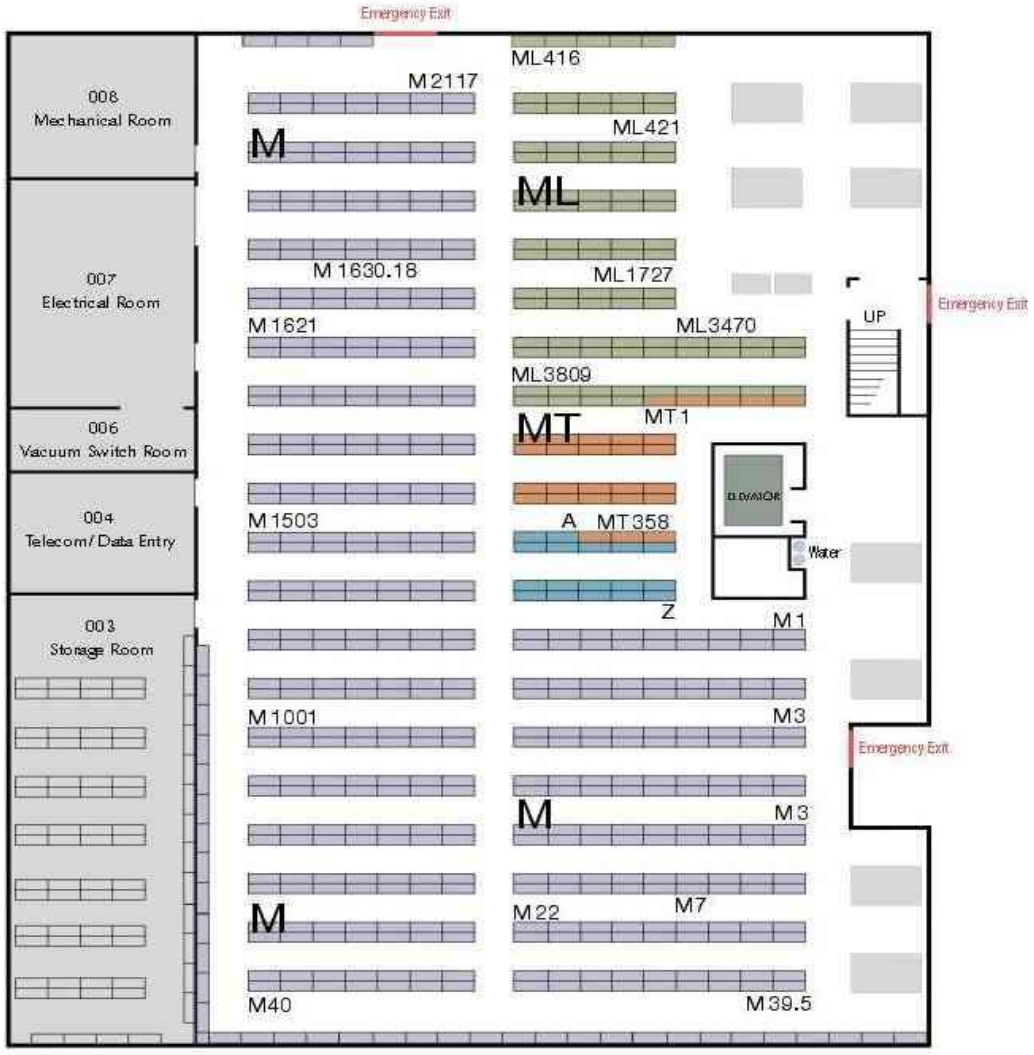


FIGURE 2-14 bedroom plan

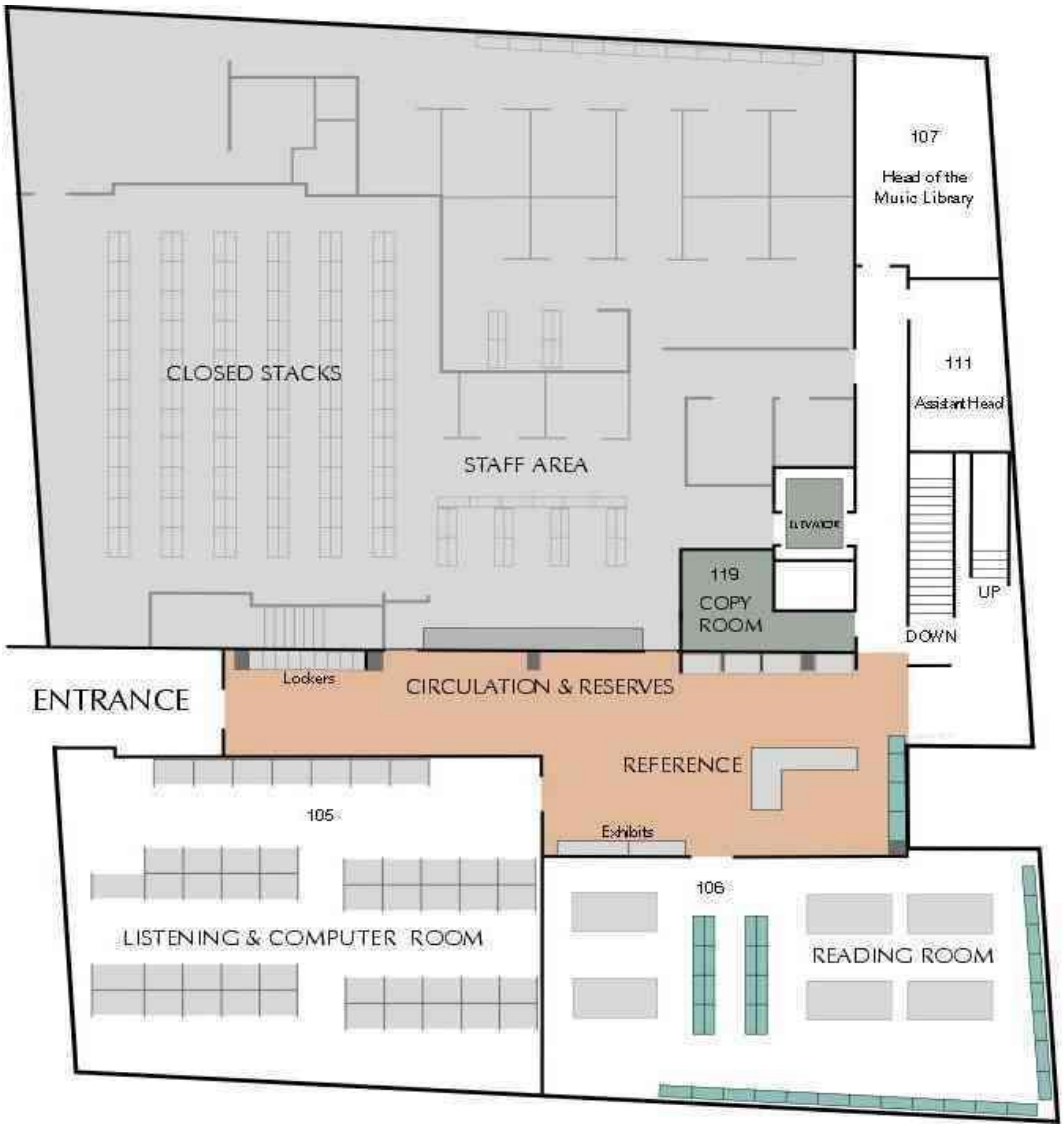


FIGURE 2-15 ground floor plan

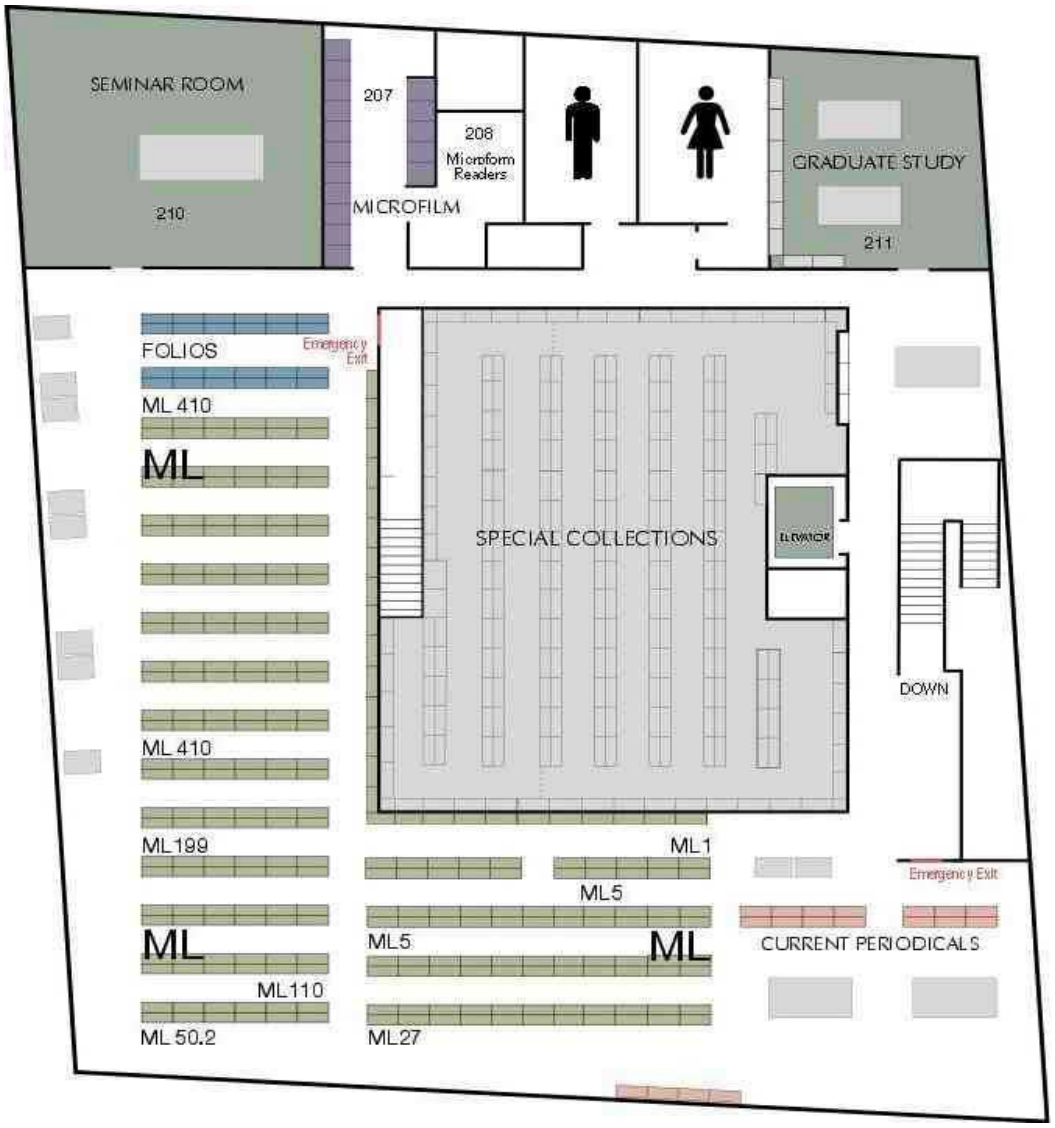


FIGURE 2-16 first floor plan

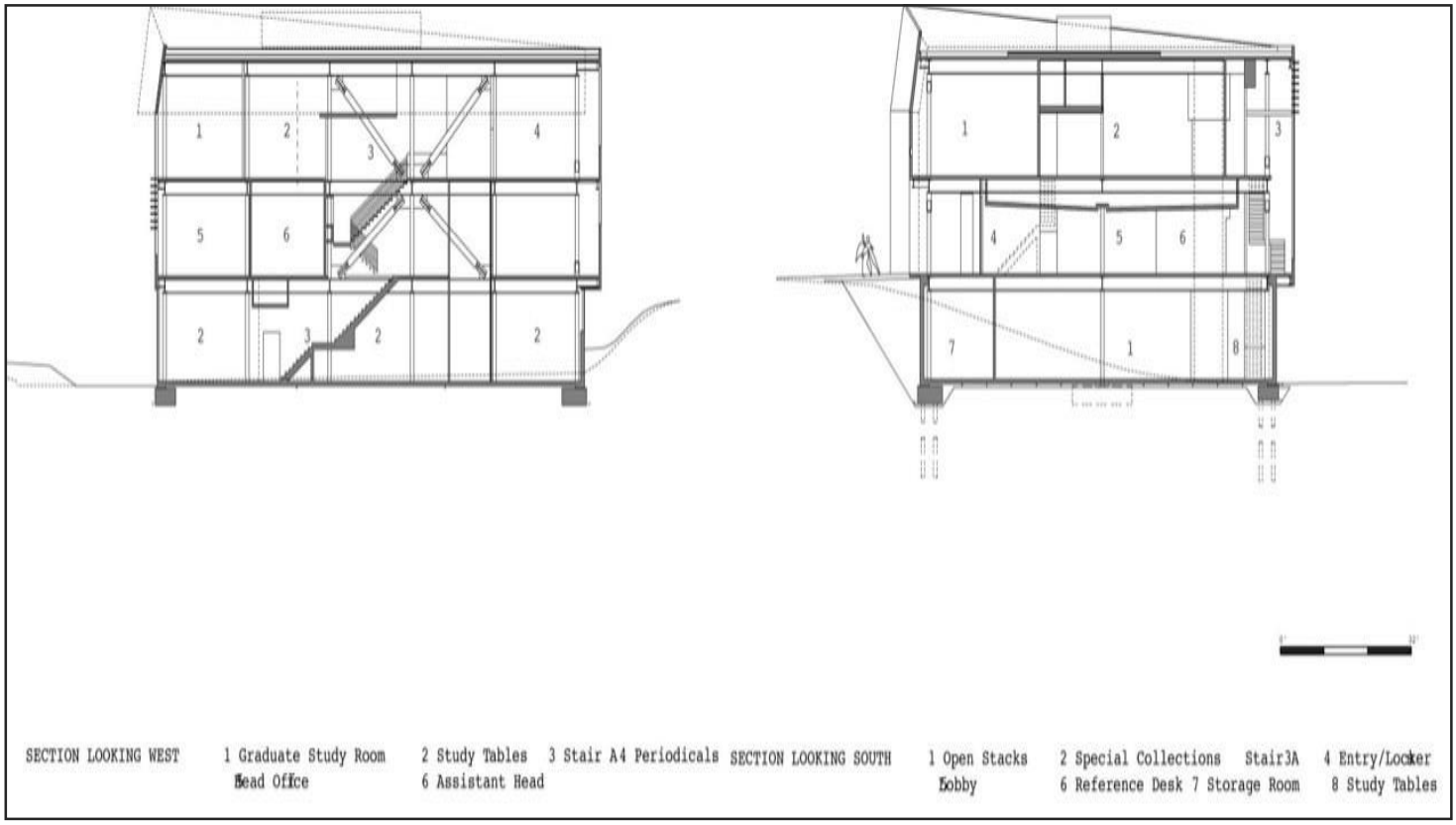


FIGURE 2-17 sections

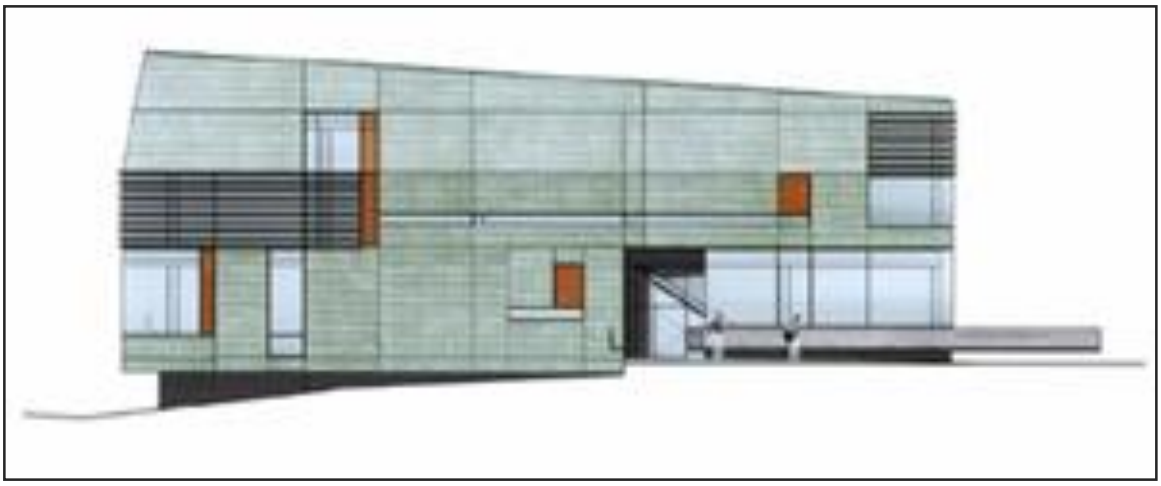


FIGURE 2-18 elevation

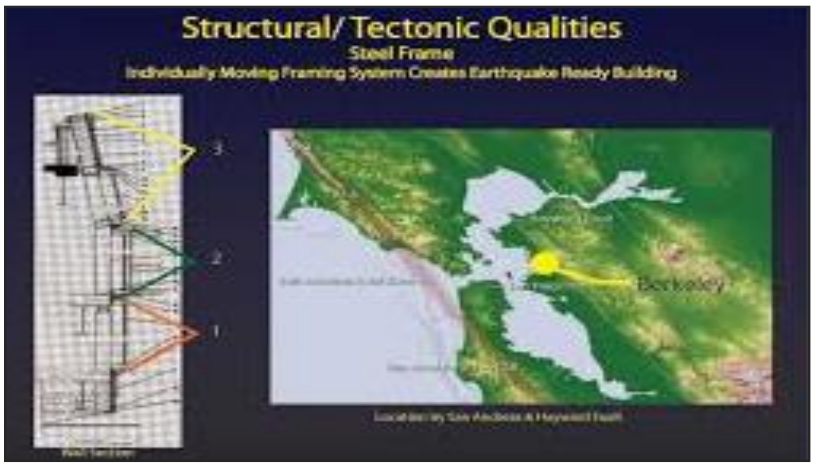


FIGURE 2-19 structural

FIGURE 2-20 structural

FIGURE 2-21 view

FIGURE 2-22 function of

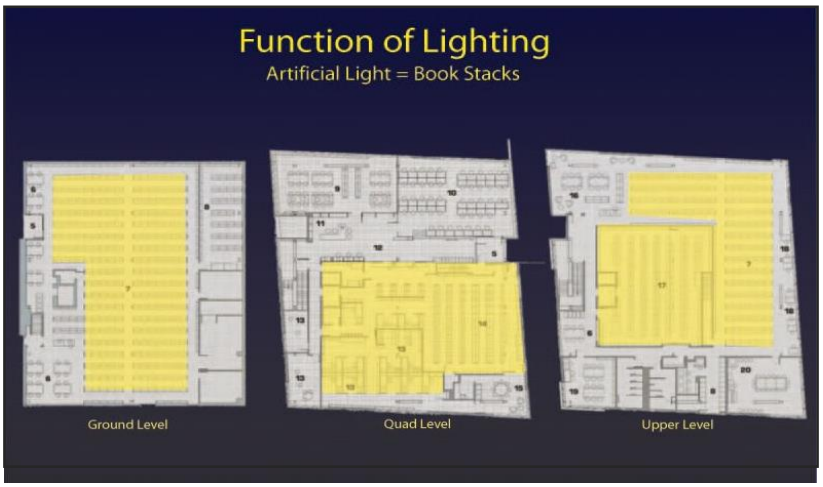


FIGURE 2-23 function of lighting

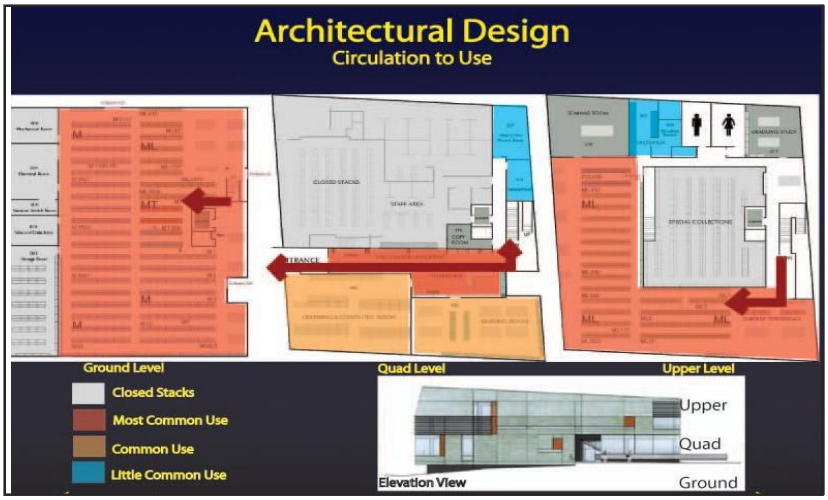


FIGURE 2-24 circulation to use

Advantages :

- strong bond between the spaces(functionally).
- A good determinations of spaces .
- The ease of the vertical motions between the spaces.

Disadvantages :

- Limited services.

2-4SUGGESTED SITES:

FIGURE 2-25 suggested site

A

Site :Khartoum
Owner : Sudanese government
Total area :15000sqm(1.5hectares)
Neighbors:
North:msjd alsnhorii.
East :residential area.
West:residential area.
South :pizza corner.

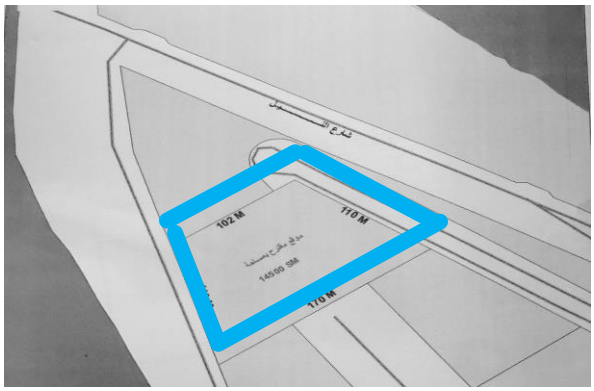


FIGURE 2-26 suggested site

B

Site :Khartoum
Owner : Sudanese government
Total area :14500sqm(1.4hectares)
Neighbors:
North : green area.
East : nile street.
West : the nile.
South : investment neighborhoods related to acacia.

FIGURE 2-27 suggested site

C

Site :Khartoum

Owner : Sudanese government

Total area :24905sqm(2.4hectares)

Neighbors:

North : empty land.

East : residential building.

West : s.u.s.t.

2-4-1SITE COMPARISON:

Comparison objectives	Suggestion A	Suggestion B	Suggestion C
Area	1	1	0
Functional convenience	1	0	1
accessibility	1	1	1
services	1	1	1
Neighboring convenience	1	0	1
Environmental factors	1	1	1
Near to the center of the city	1	0	1
Easy to go to the other cultural buildings	0	1	0
Total points	7	5	6

TABLE 2-1 SITE COMPARISON

Note :assessment is by points.

Note :due to the comparison , suggestion A was selected.

2-5PROJECT COMPONENT:

- Library halls.
- Musical instruments gallery.
- Small party hall.
- Karaoke.
- Sound library.
- Classes.
- Discussion halls.
- Digital librarys.
- Administration.

2-6INFORMATION ABOUT SOME SPACES:

2-6-1ENTRANCE :

- It must be clear that it advertises itself directly to make it easy to find it without discomfort.
- The entrance must be directly connected to the basic services (stairs, security room..etc).

2-6-2READING HALL:

- Need a good lighting especially sunlight consdiring the reflections.
- Paint the walls and floors with light colors.
- Control the humidity.
- Long spans between columns..

CHAPTER THREE: (DATA ANALASYIS)

CONTENTS:

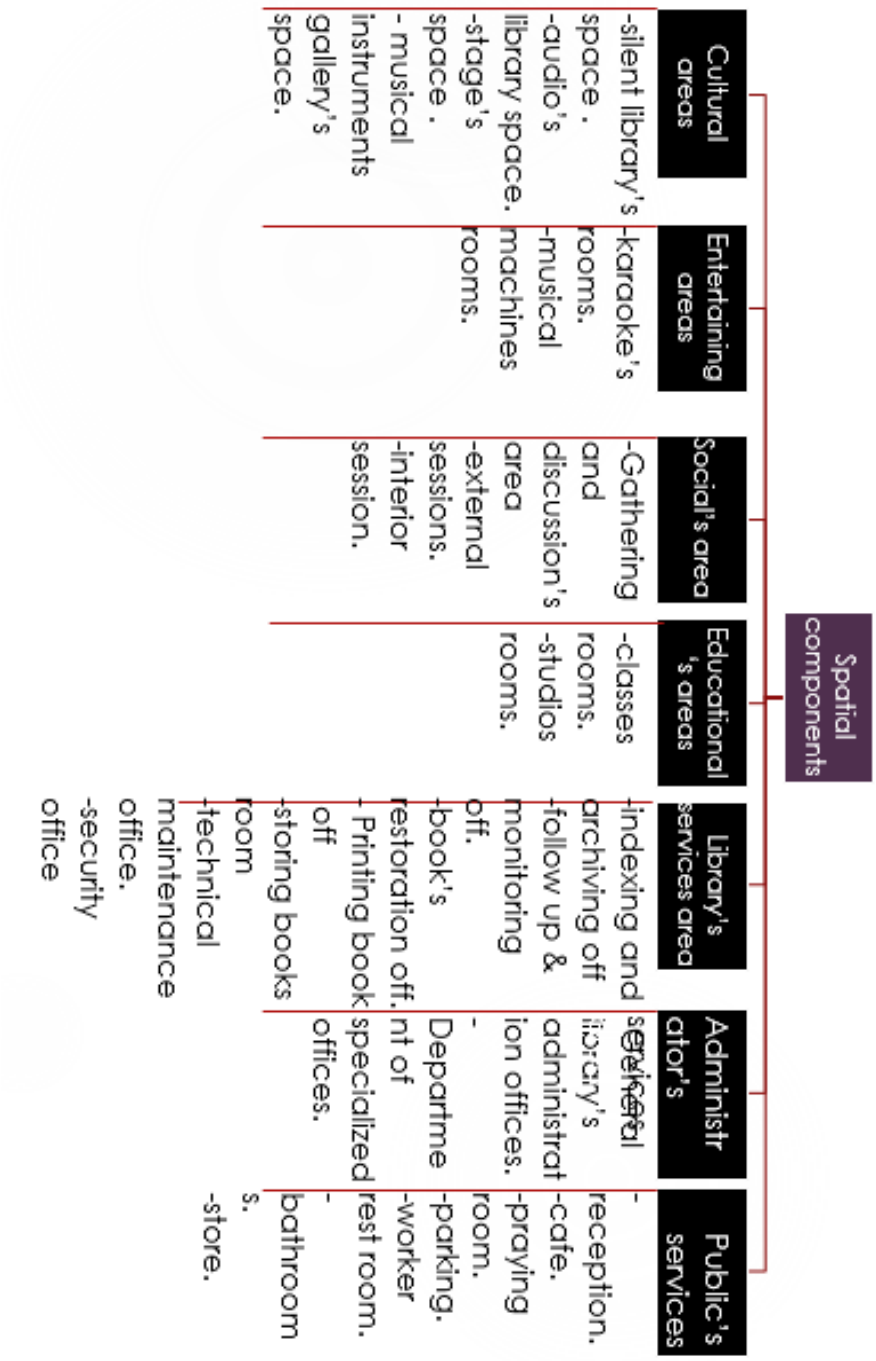
ABSTRACT:

The third chapter contains the project components and charts, the analysis of the site down to the indicators and guide lines to find the best zoning based on previous studies.

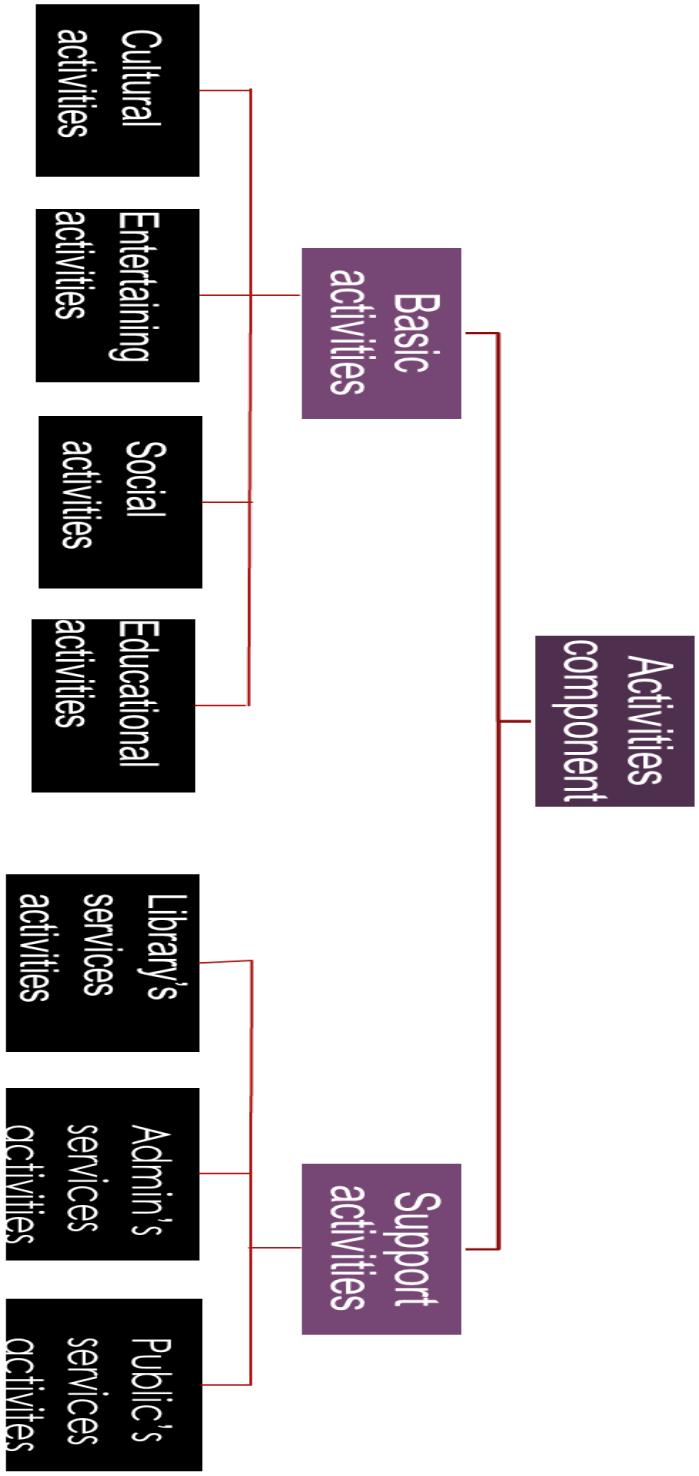
3-DATA ANALASYIS

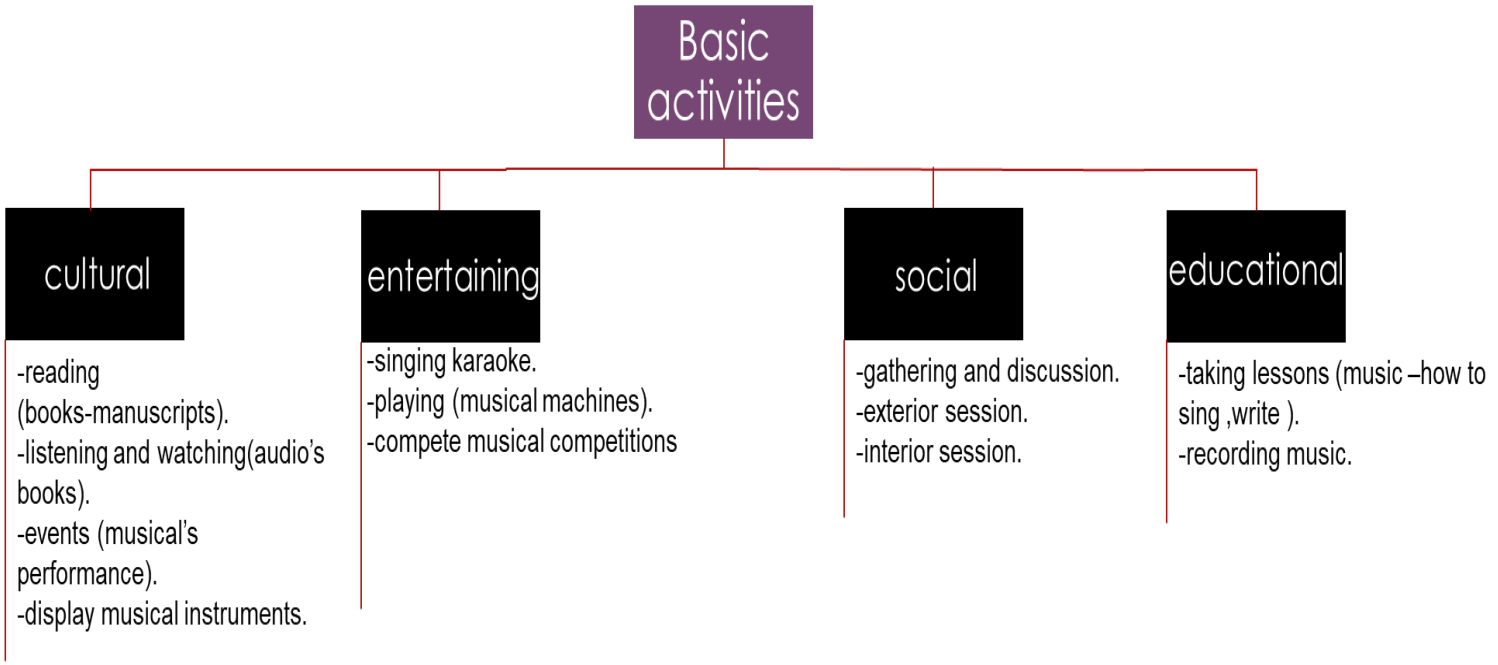
3-1COMPONENT

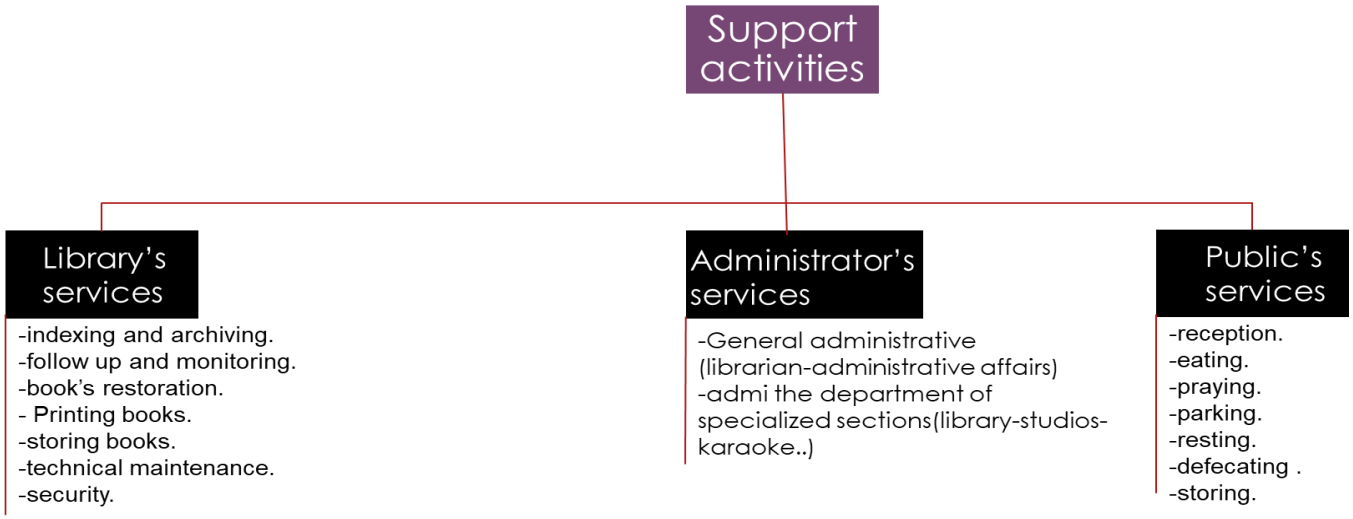
3-1-1SPATIAL COMPONENT:



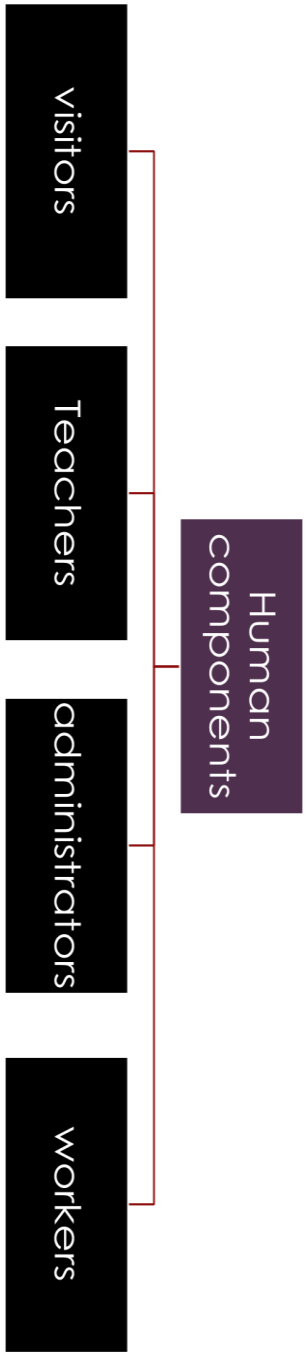
3-1-2ACTIVITIES COMPONENT:

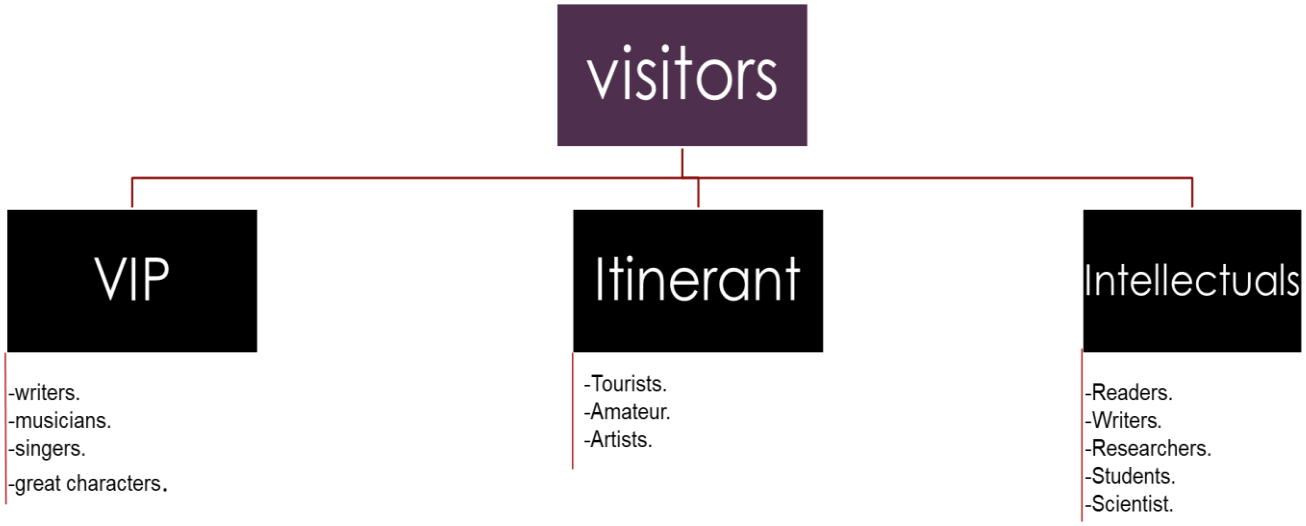



Basic activities
cultural
-reading (books-manuscripts).
-listening and watching(audio's books).
-events (musical's performance).
-display musical instruments.
entertaining
-singing karaoke.
-playing (musical machines).
-compete musical competitions
social
-gathering and discussion.
-exterior session.
-interior session.
educational
-taking lessons (music –how to sing ,write).
-recording music.

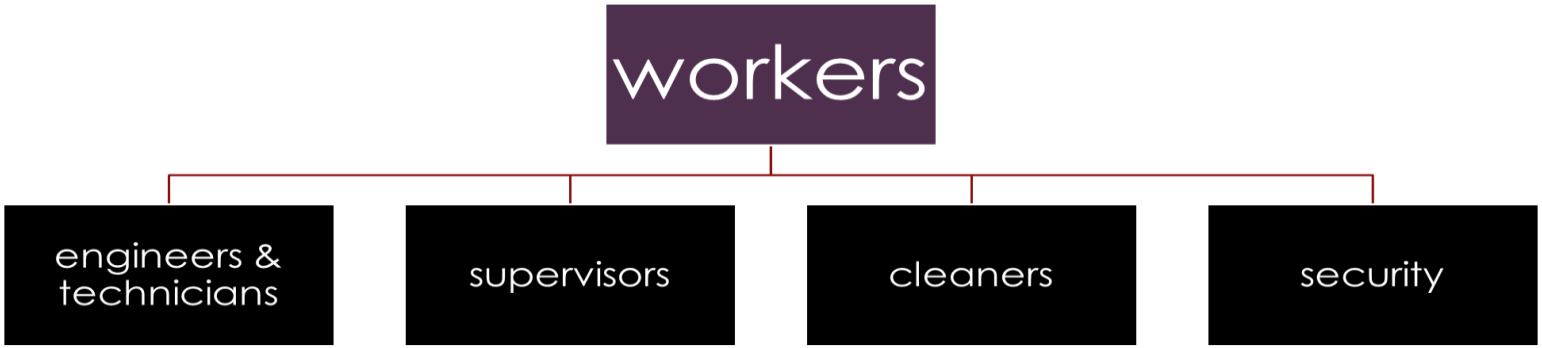

Support activities
Library's services
-indexing and archiving.
-follow up and monitoring.
-book's restoration.
- Printing books.
-storing books.
-technical maintenance.
-security.
Administrator's services
-General administrative (librarian-administrative affairs)
-admi the department of specialized sections(library-studios-karaoke..)
Public's services
-reception.
-eating.
-praying.
-parking.
-resting.
-defecating .
-storing.

3-1-3HUMAN COMPONENT:



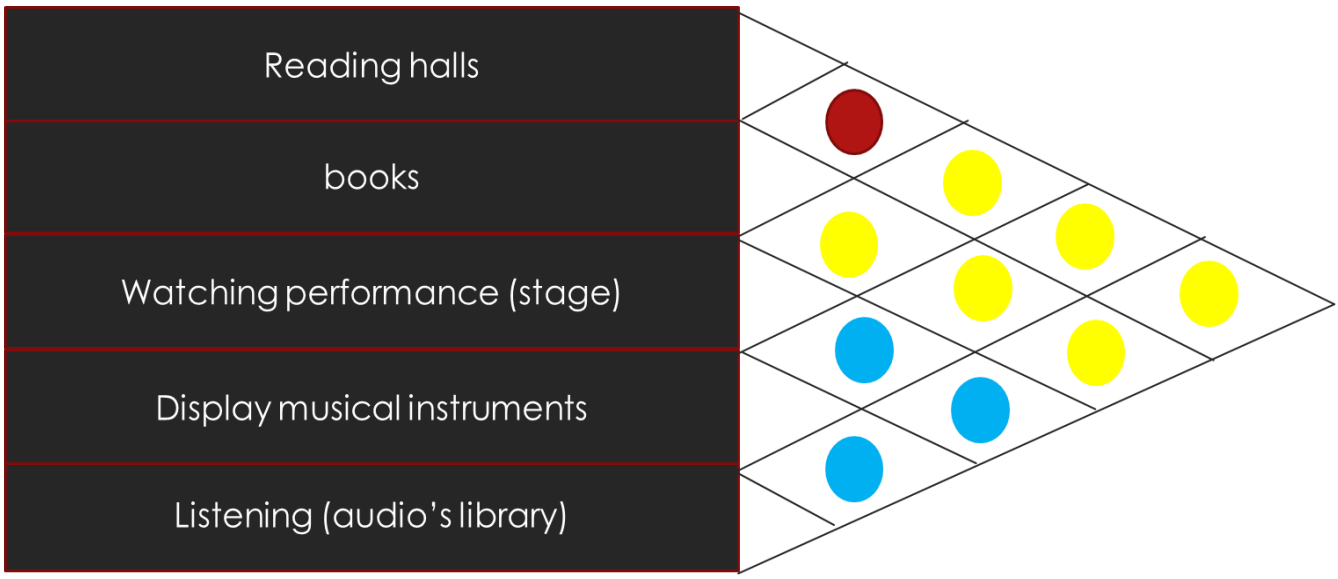

visitors
VIP
-writers.
-musicians.
-singers.
-great characters.
Itinerant
-Tourists.
-Amateur.
-Artists.
Intellectuals
-Readers.
-Writers.
-Researchers.
-Students.
-Scientist.

Administrators
General administration
Department of specialized sections
Management of technical units


workers
engineers & technicians
supervisors
cleaners
security

3-2PYRAMID MATRIX DIAGRAM:

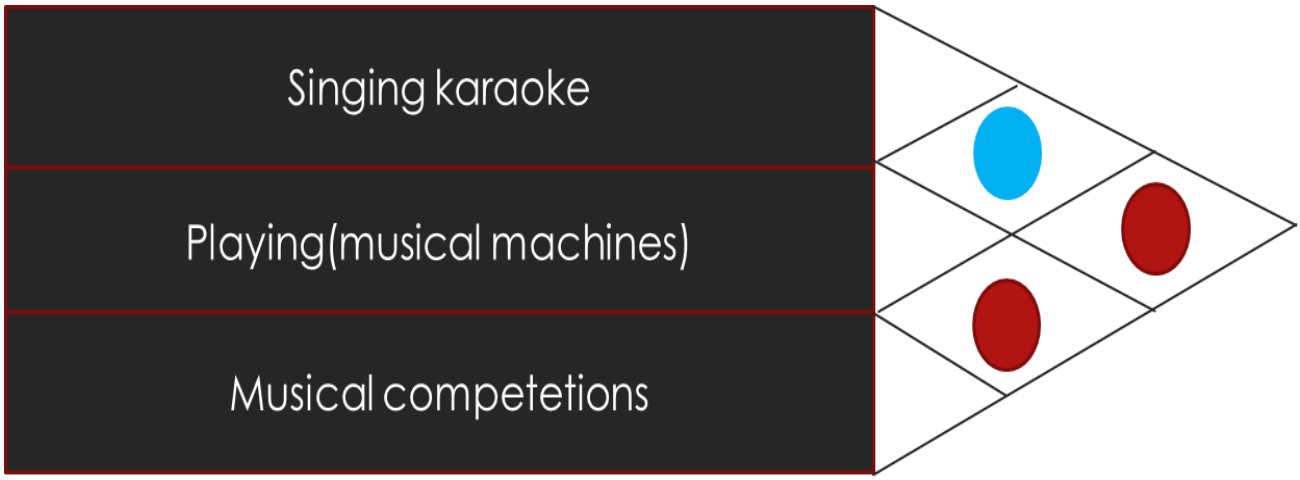
3-2-1LIBRARY'S ZONE MATRIX :



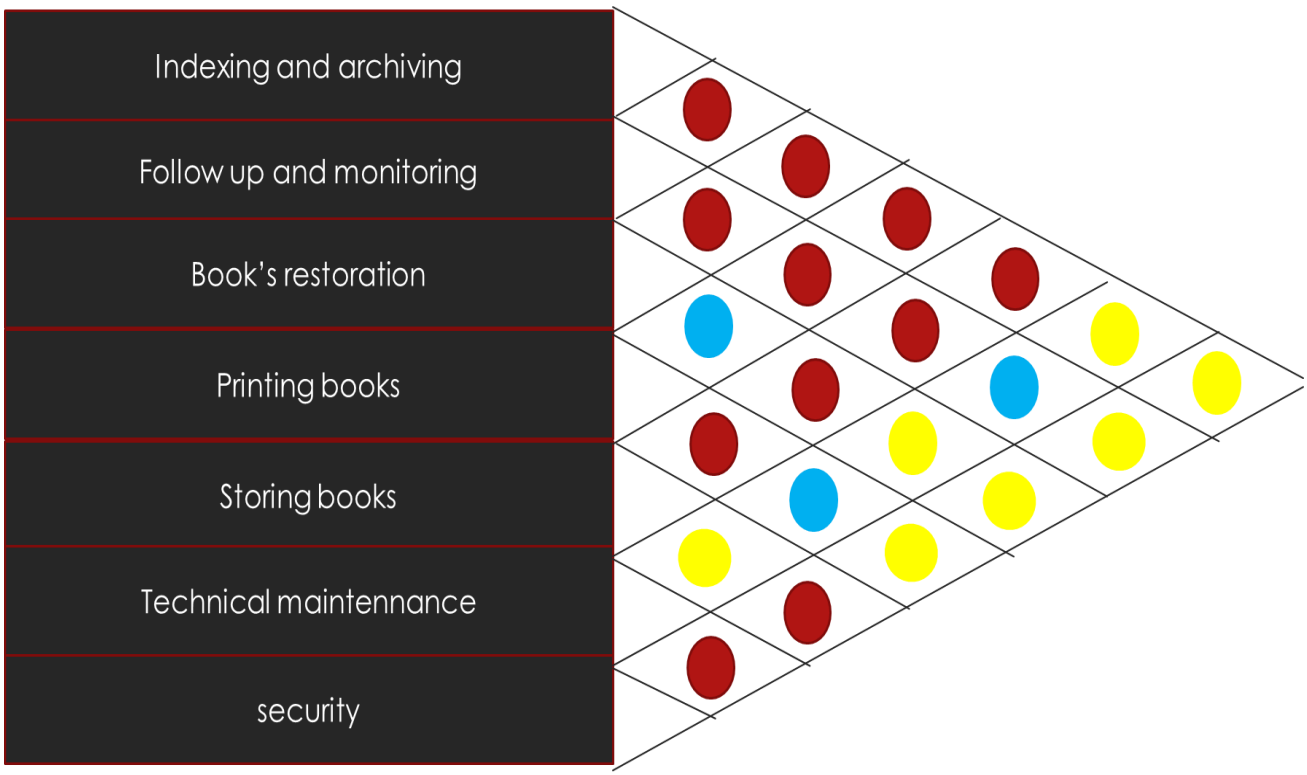
3-2-2EDUCATIONAL ZONE MATRIX :

3-2-3SOCIAL ZONE MATRIX :

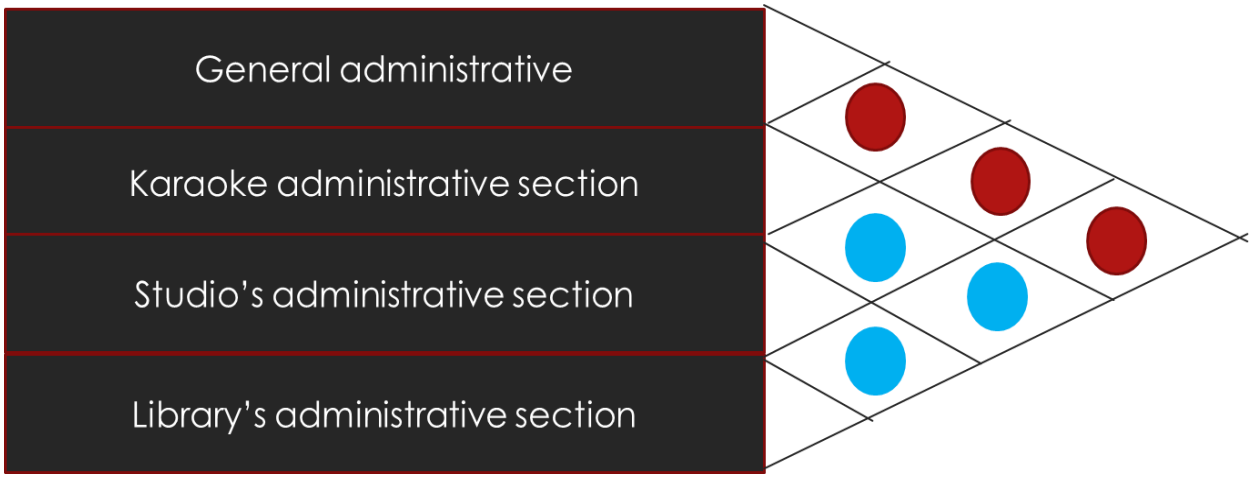
3-2-4ENTERTAINING ZONE MATRIX :



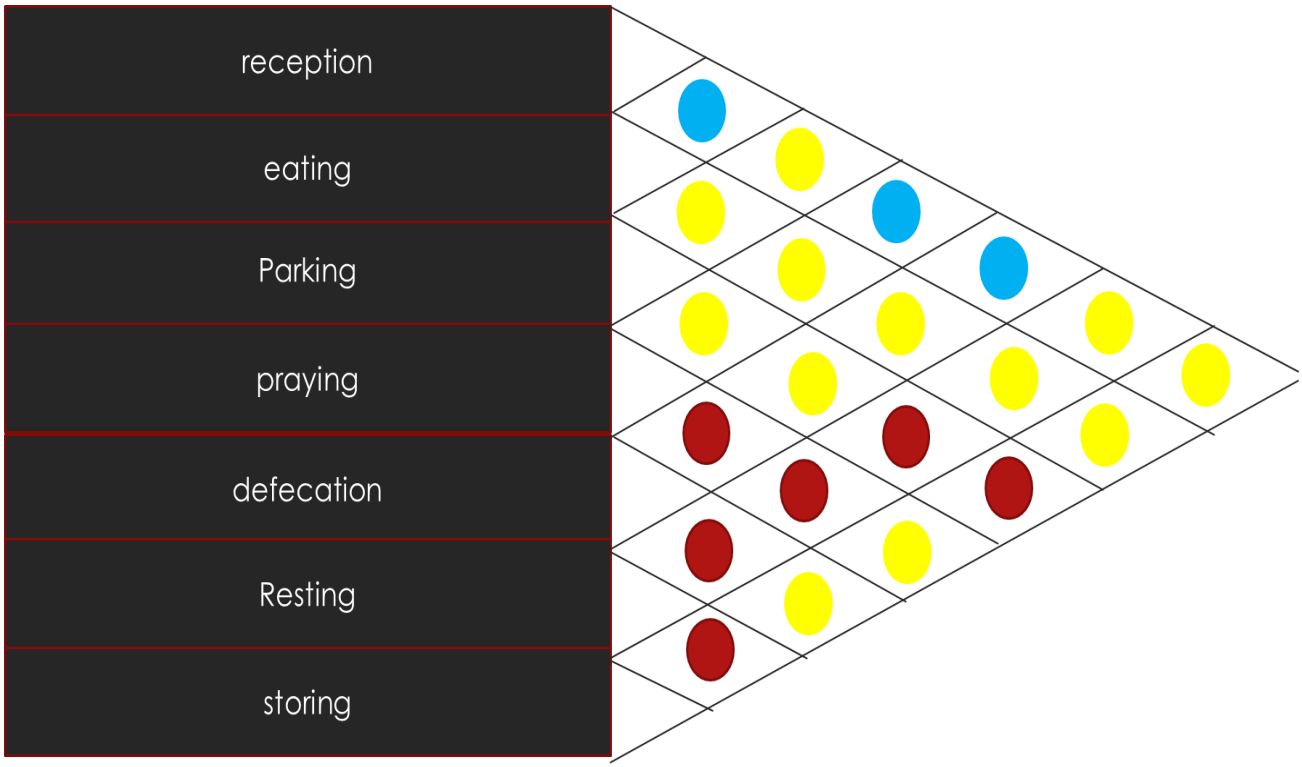
3-2-5LIBRARY'S SERVICES MATRIX :



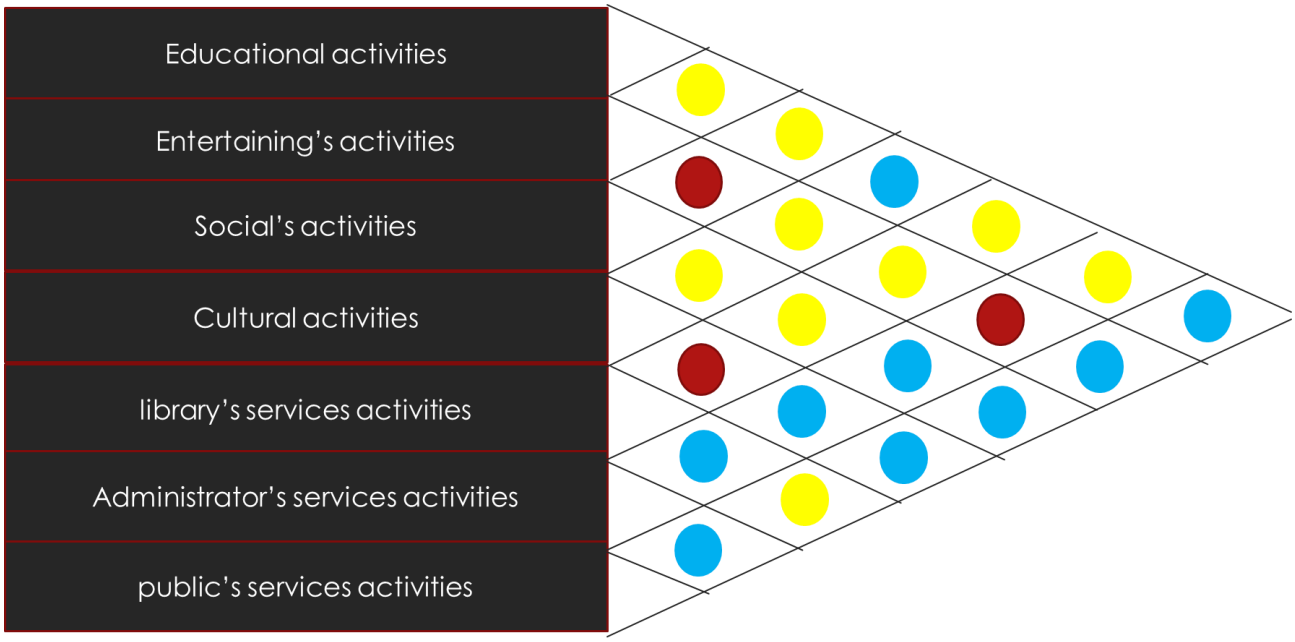
3-2-6ADMINISTRATOR'S SERVICES MATRIX :



3-2-7PUBLIC'S SERVICES MATRIX :

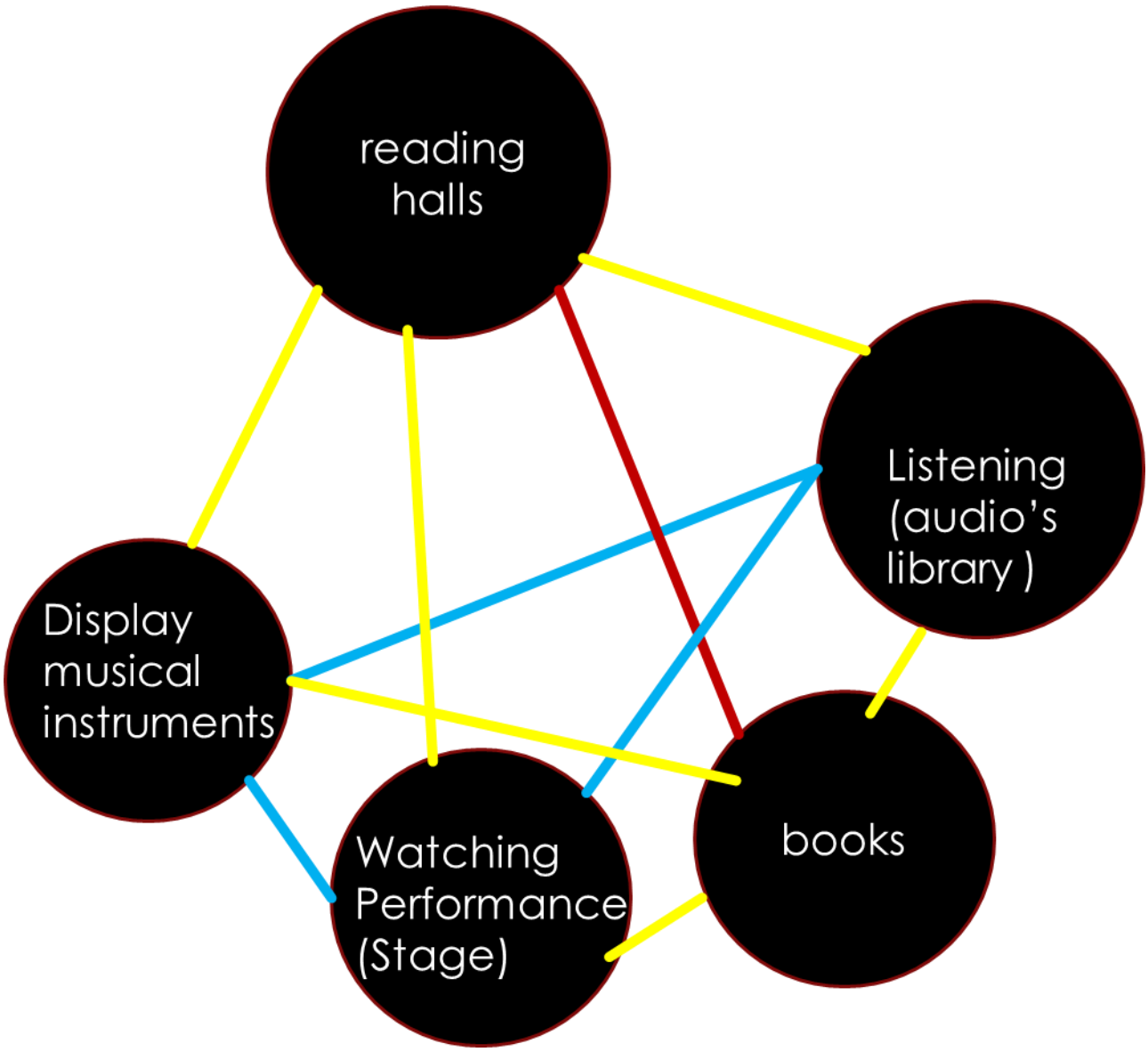


3-2-8GENERAL MATRIX :

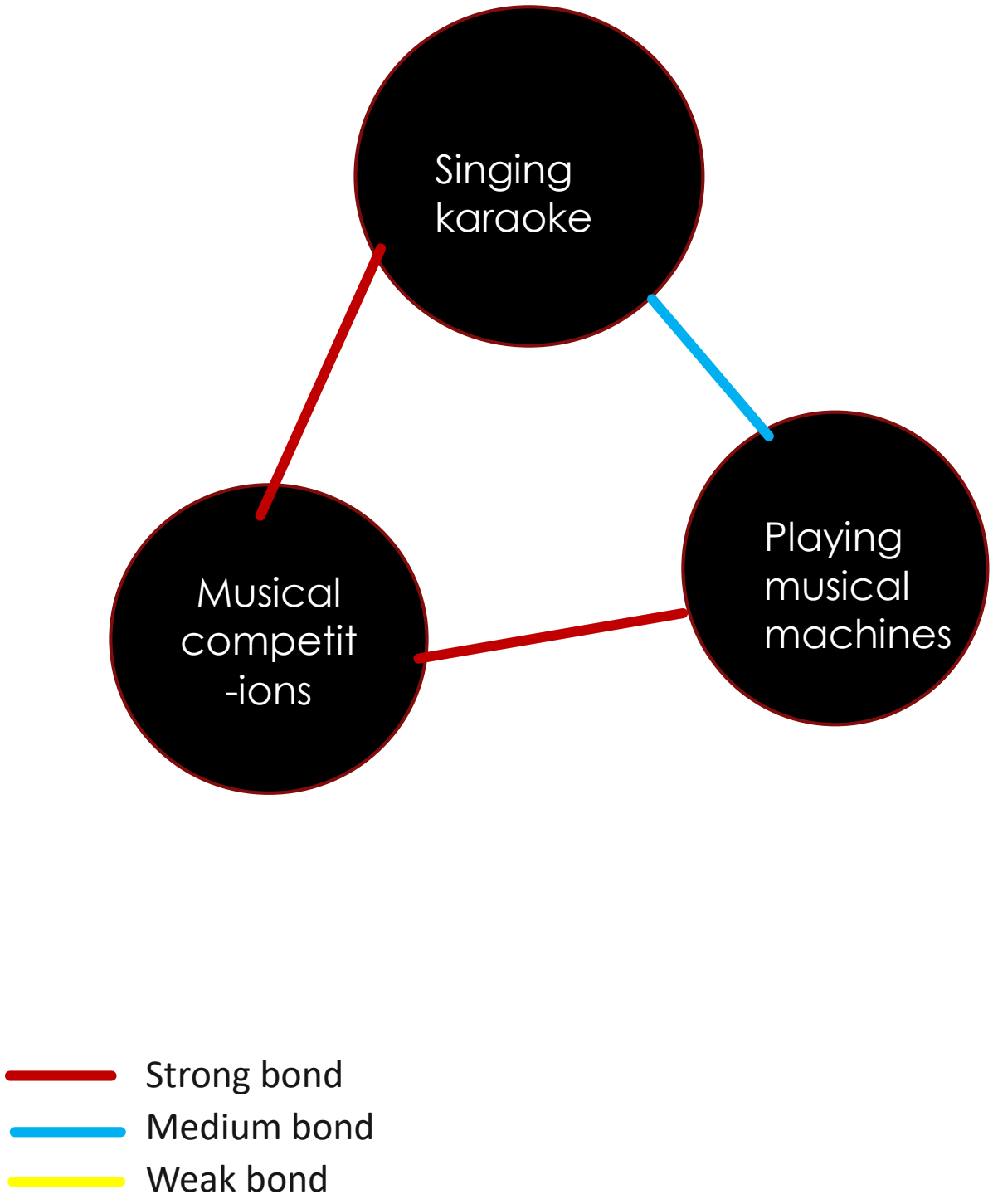


3-3RELATION BUBBLES DIAGRAM:

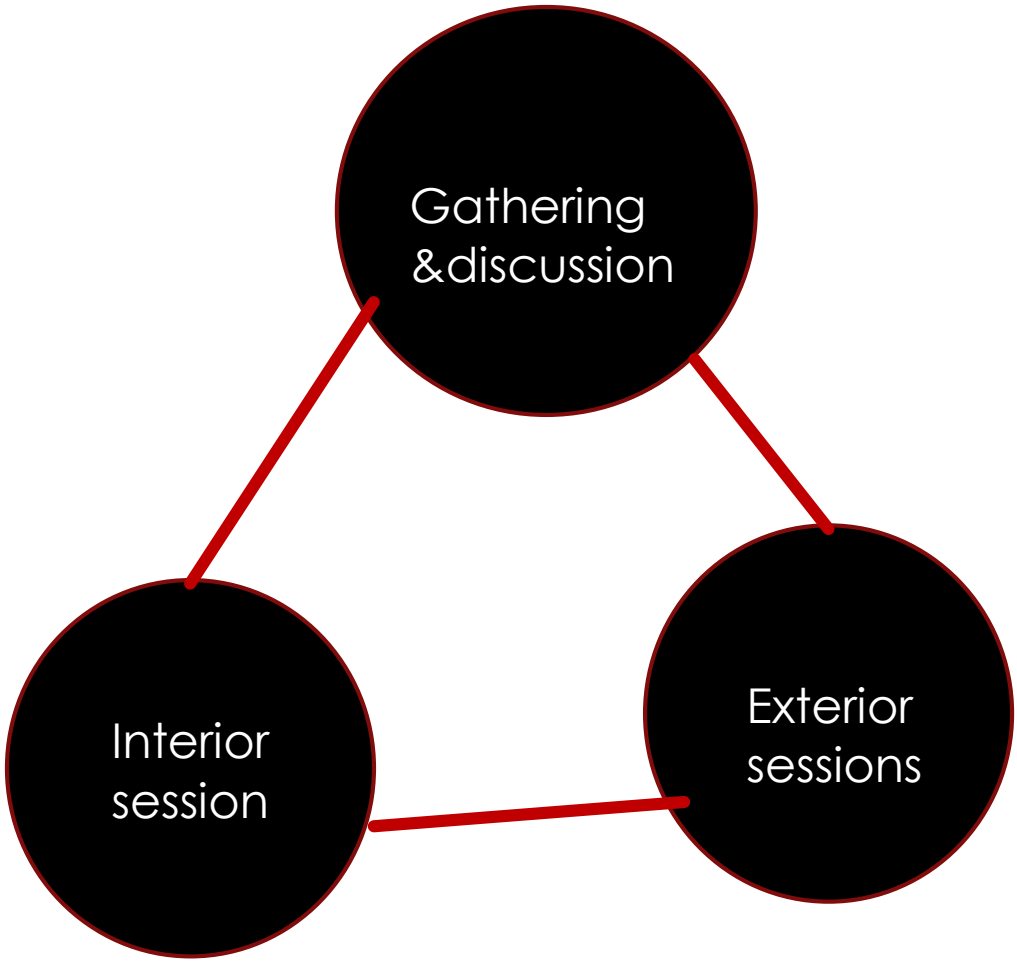
3-3-1CULTURAL BUBBLES DIAGRAM :



3-3-2ENTERTAINING'S BUBBLES DIAGRAM :



3-3-3SOCIAL'S BUBBLES DIAGRAM :

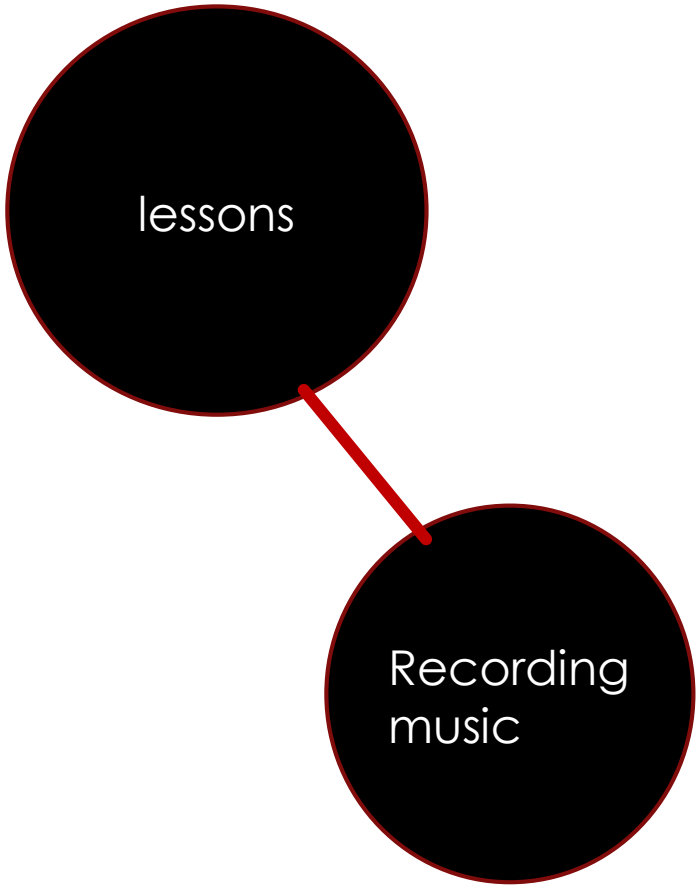


Strong bond

Medium bond

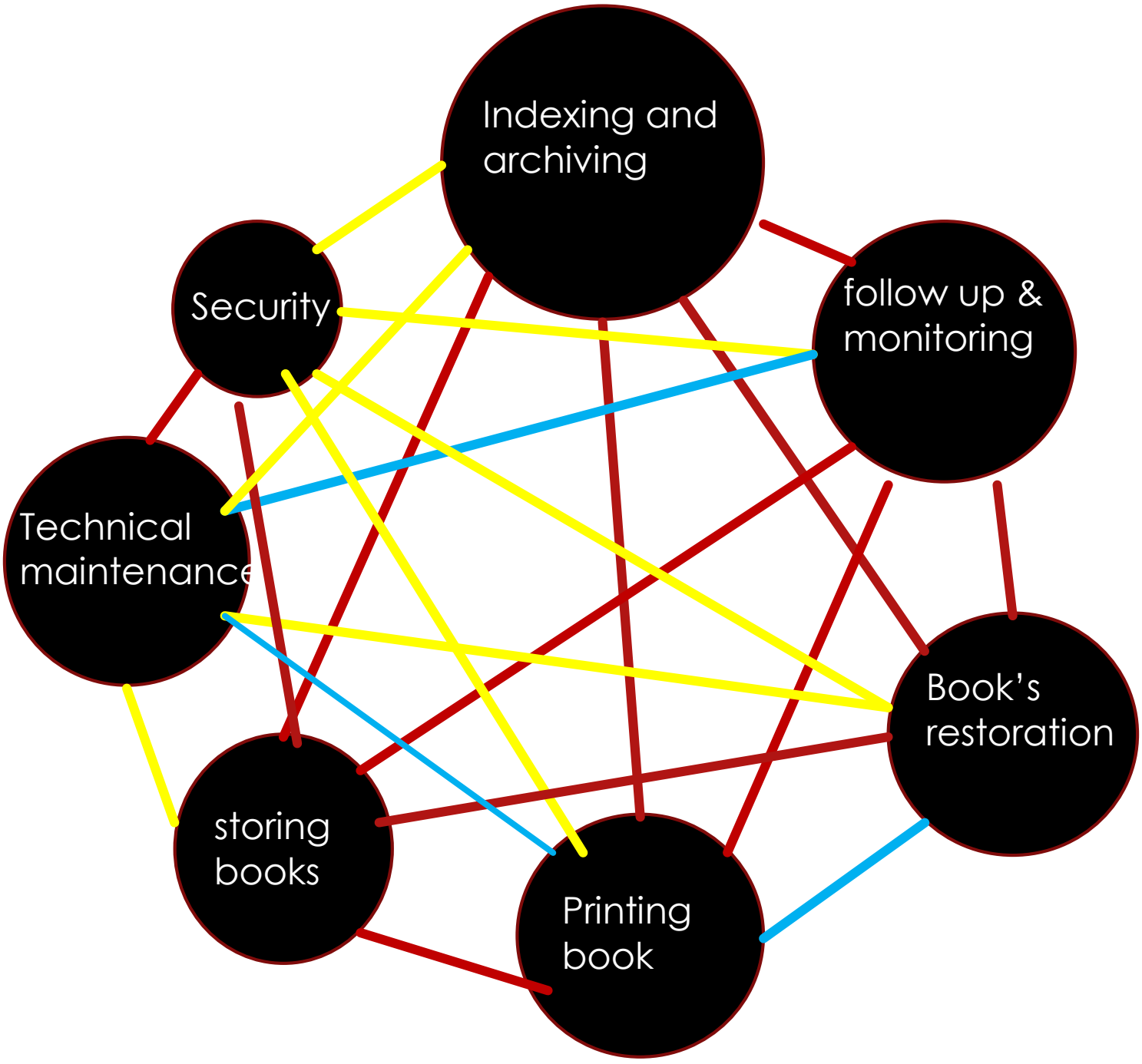
Weak bond

3-3-4EDUCATIONAL BUBBLES DIAGRAM :

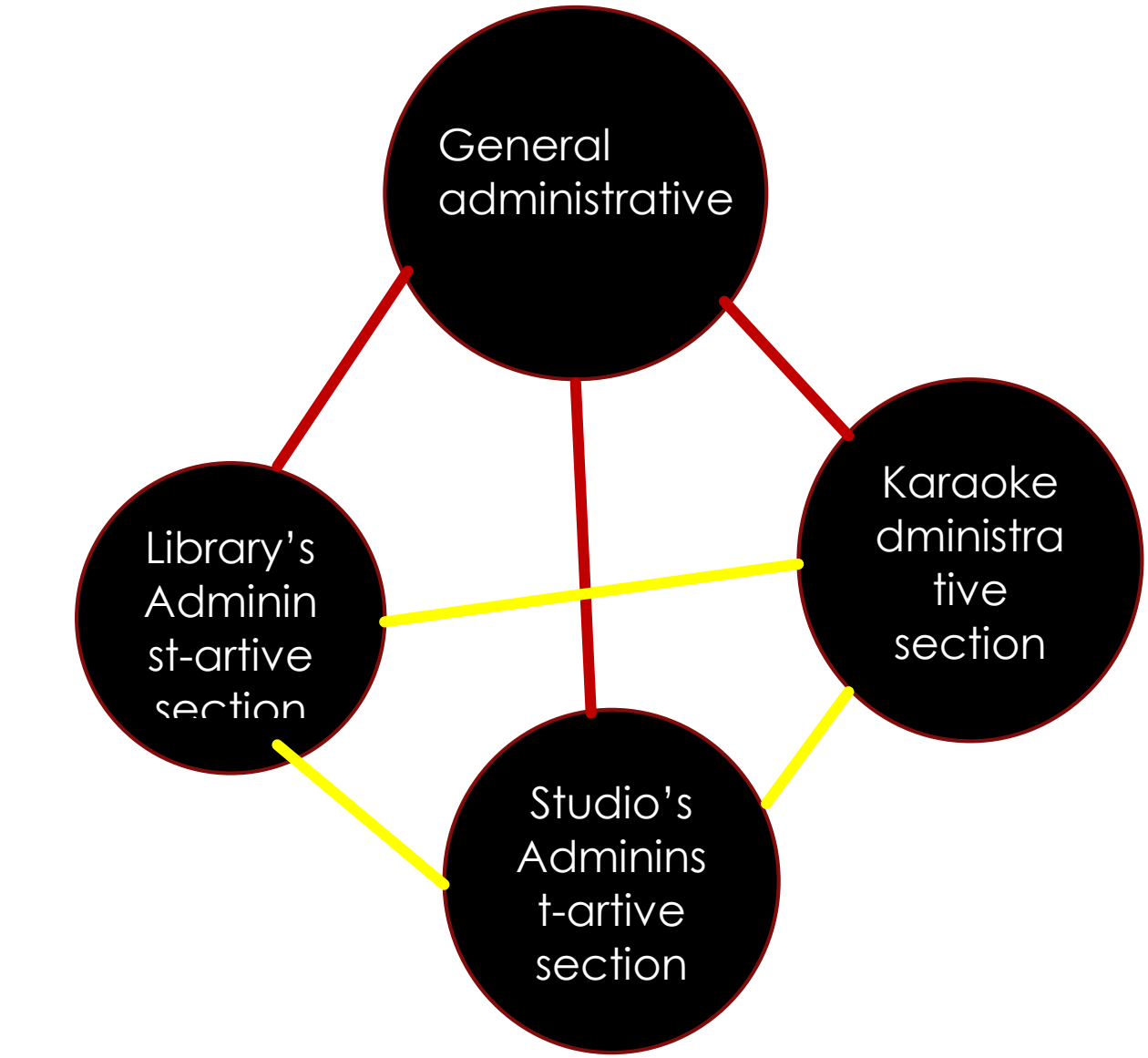


Strong bond
Medium bond
Weak bond

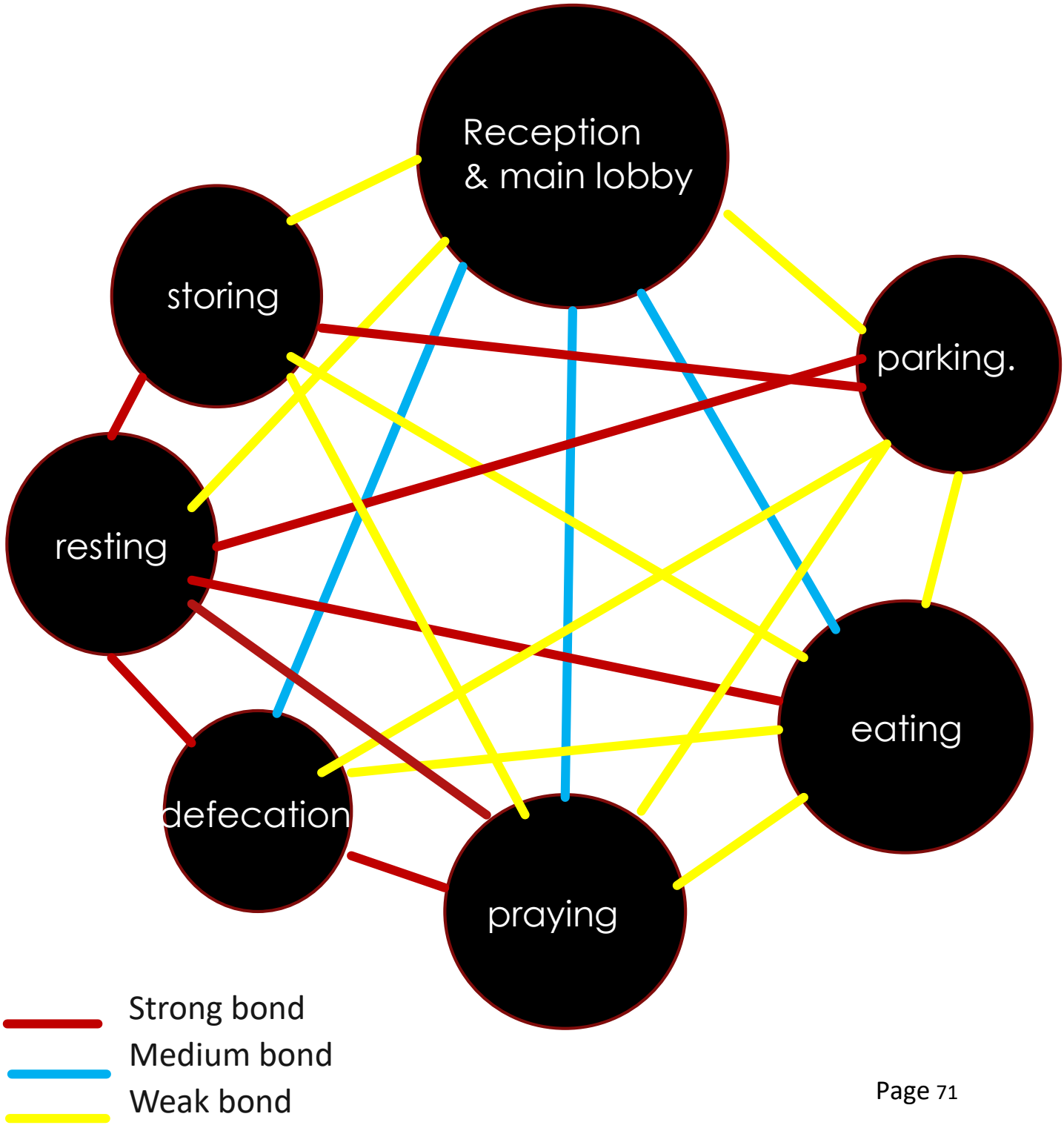
3-3-5LIBRARY'S SERVICES BUBBLES DIAGRAM :



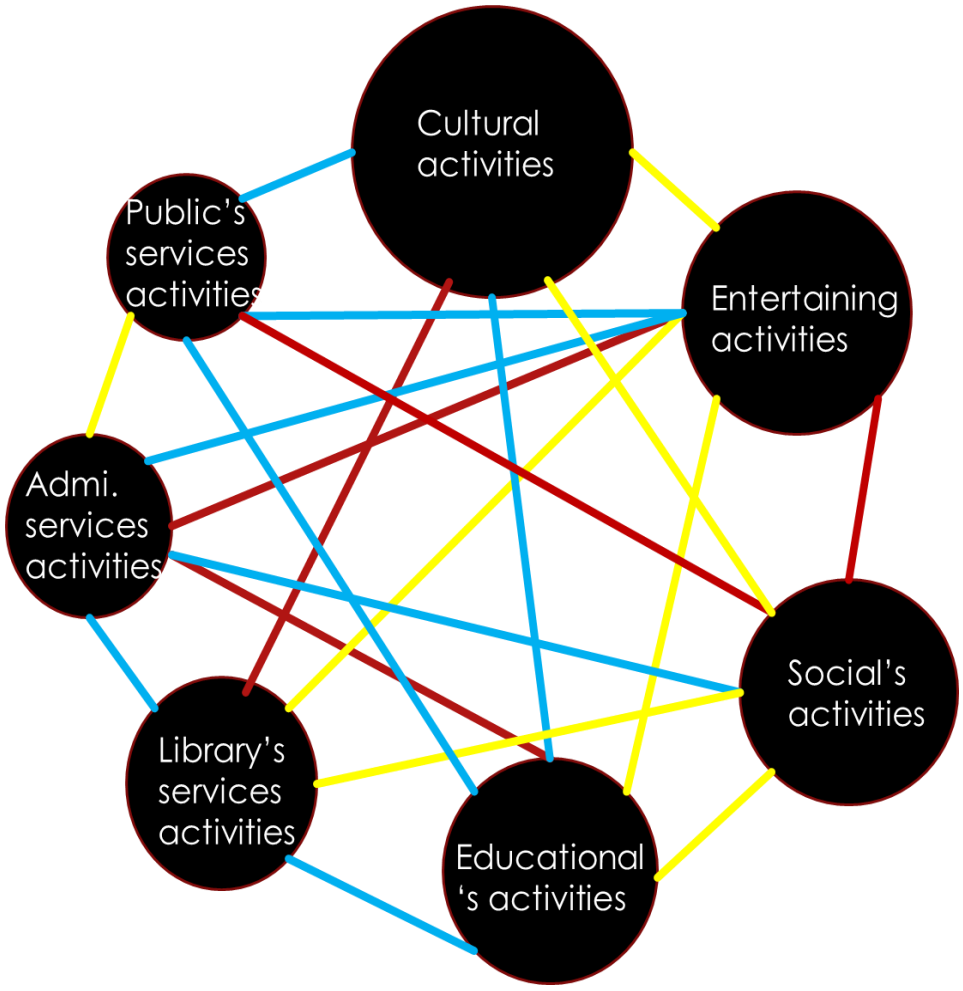
3-3-6ADMINISTRATION'S BUBBLES DIAGRAM :



3-3-7PUBLIC'S SERVICES BUBBLES DIAGRAM :



3-3-8GENERAL BUBBLES DIAGRAM :



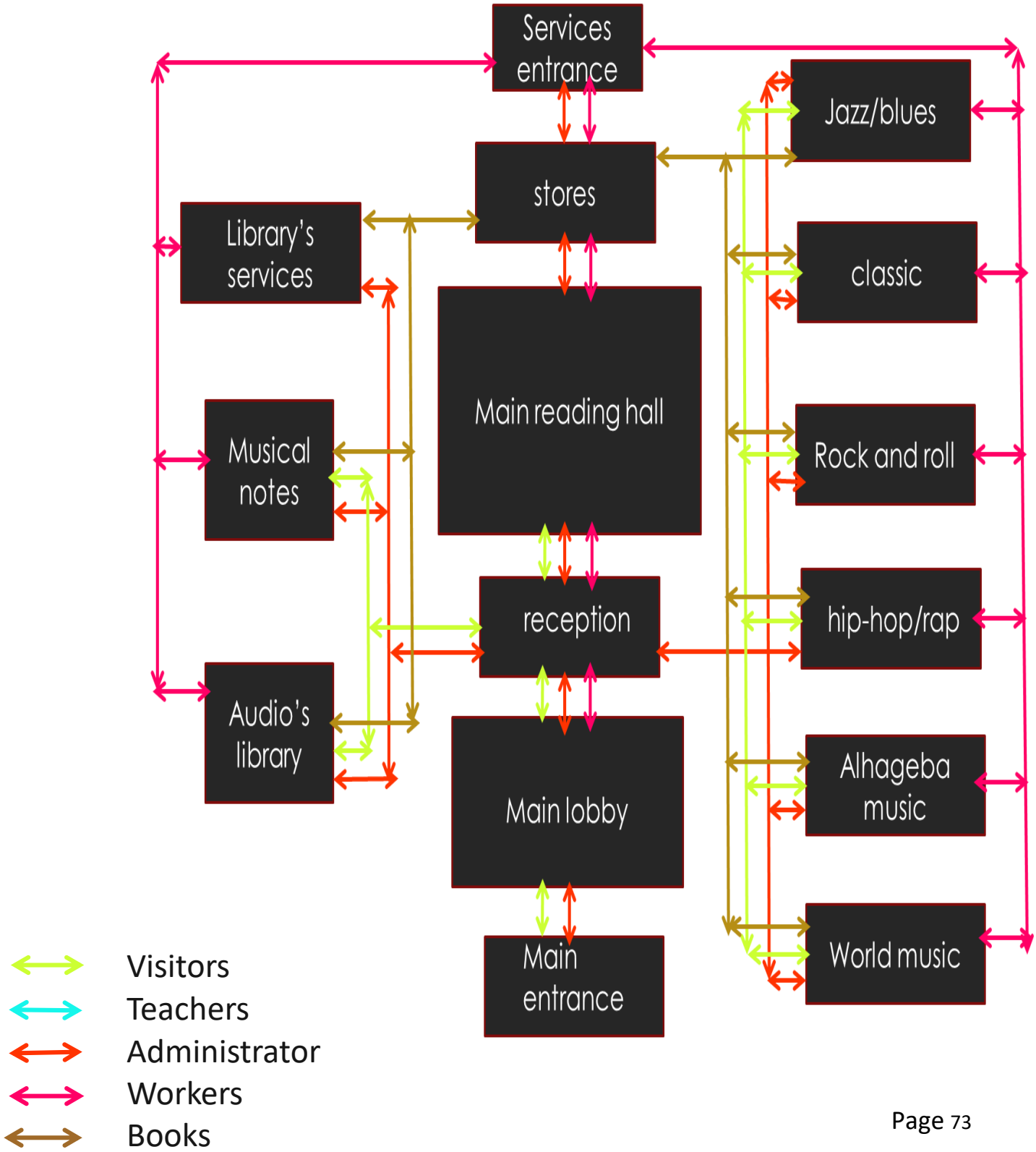
Strong bond

Medium bond

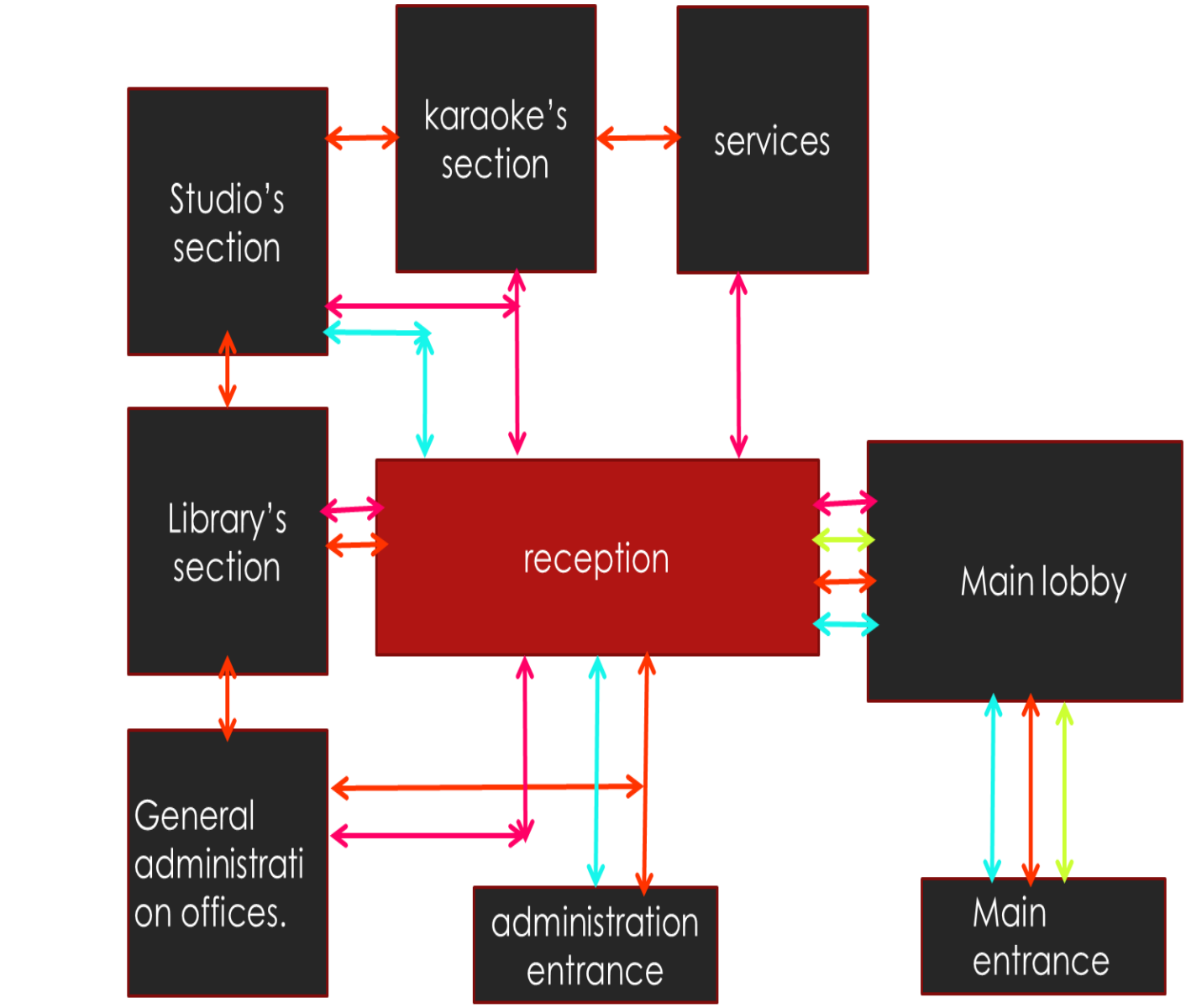
Weak bond

3-4MOVEMENT DIAGRAM:

3-4-1LIBRARY'S MOVEMENT SCHEME :

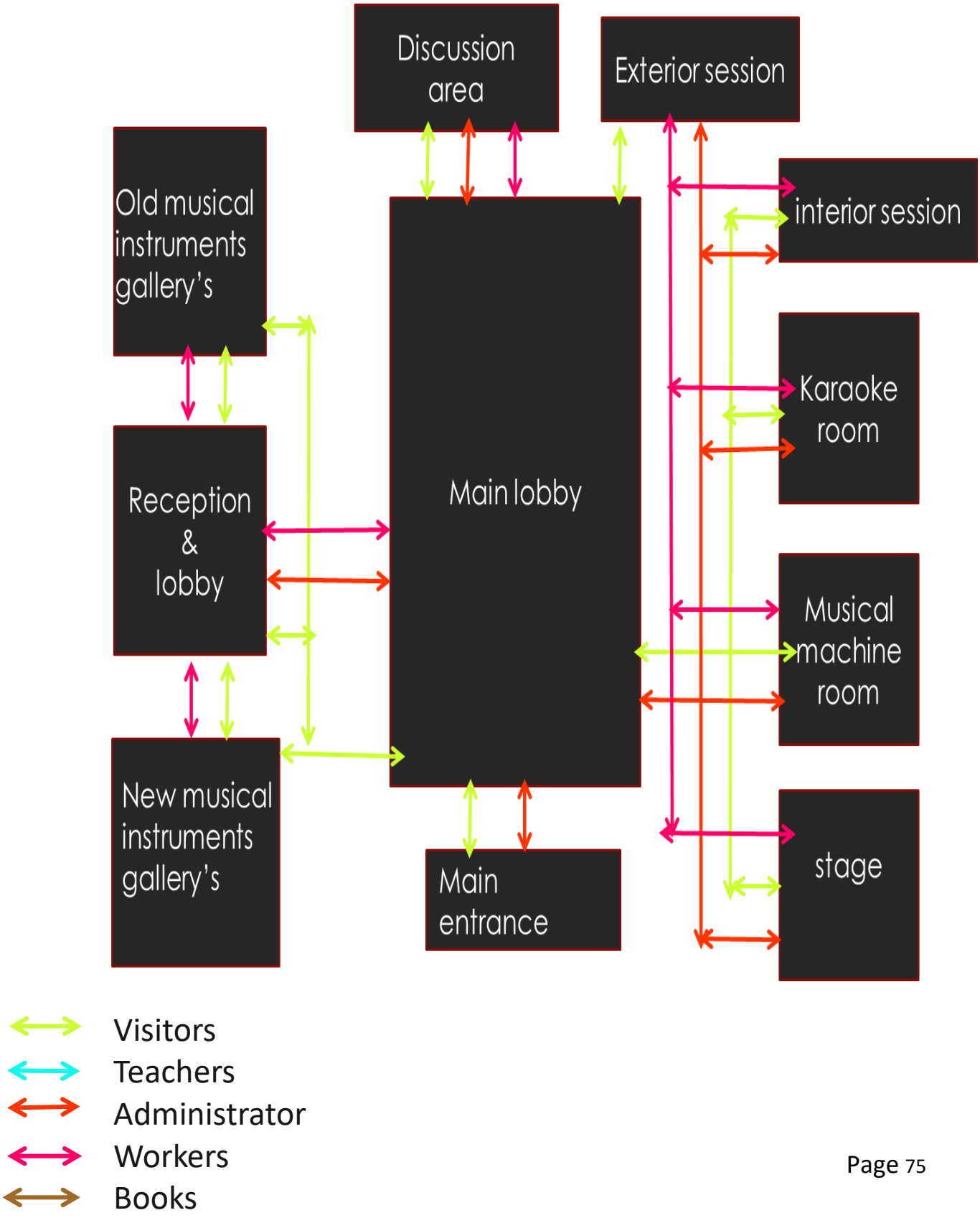


3-4-2ADMINISTRATION'S MOVEMENT SCHEME :

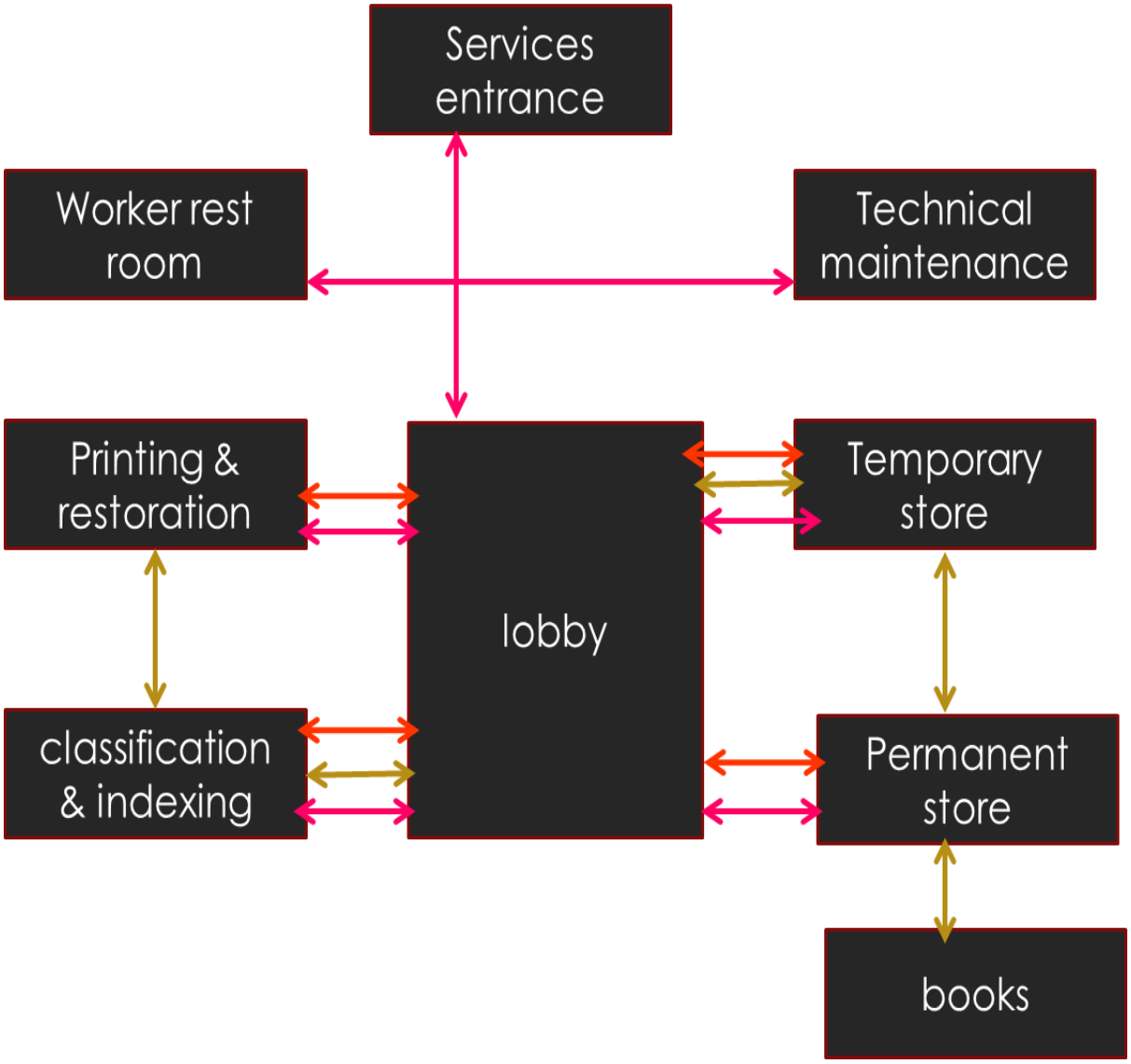


Visitors
Teachers
Administrator
Workers
Books

3-4-3INTERACTING MOVEMENT SCHEME :

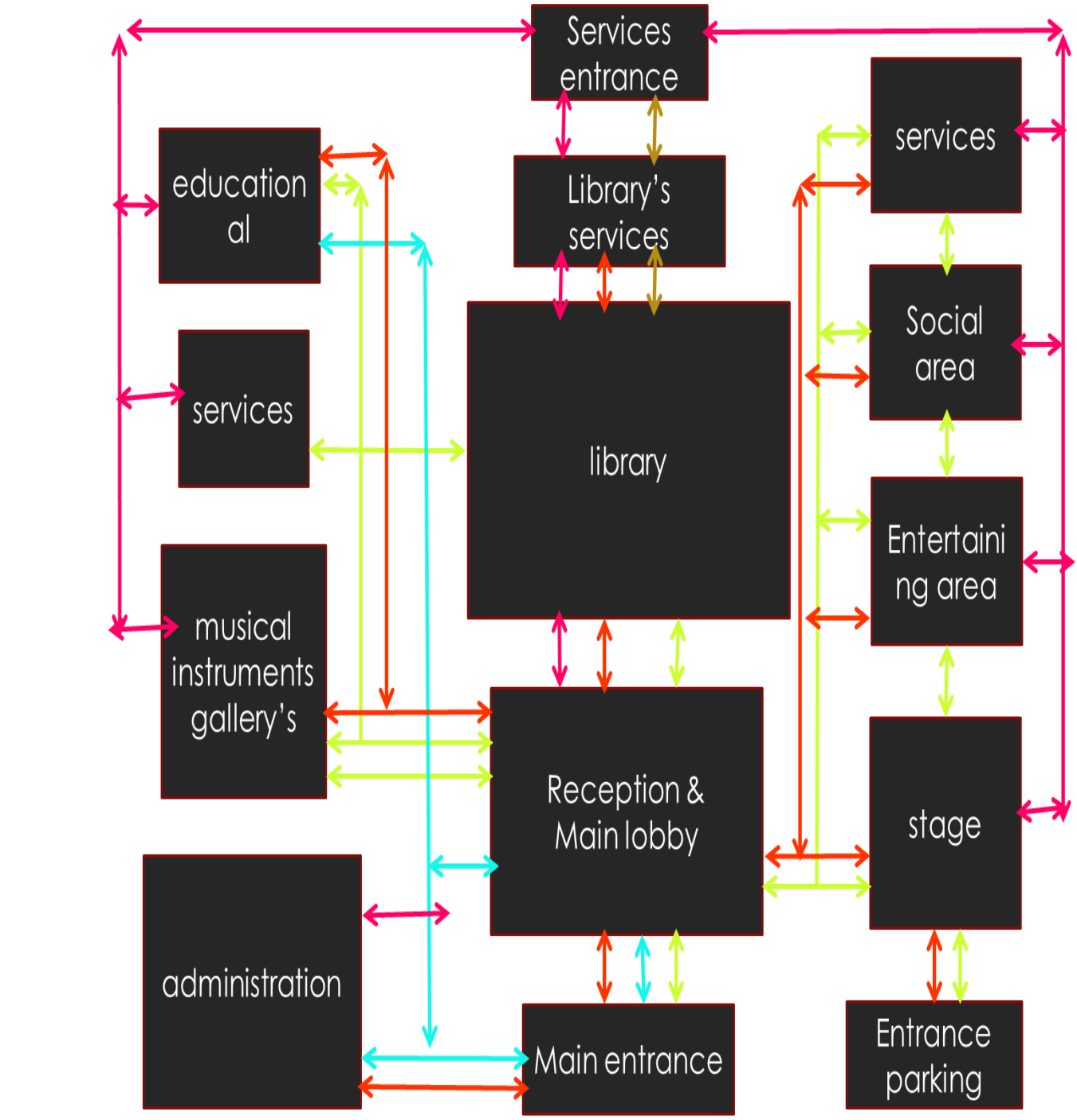


3-4-4LIBRARY'S SERVICES MOVEMENT SCHEME :



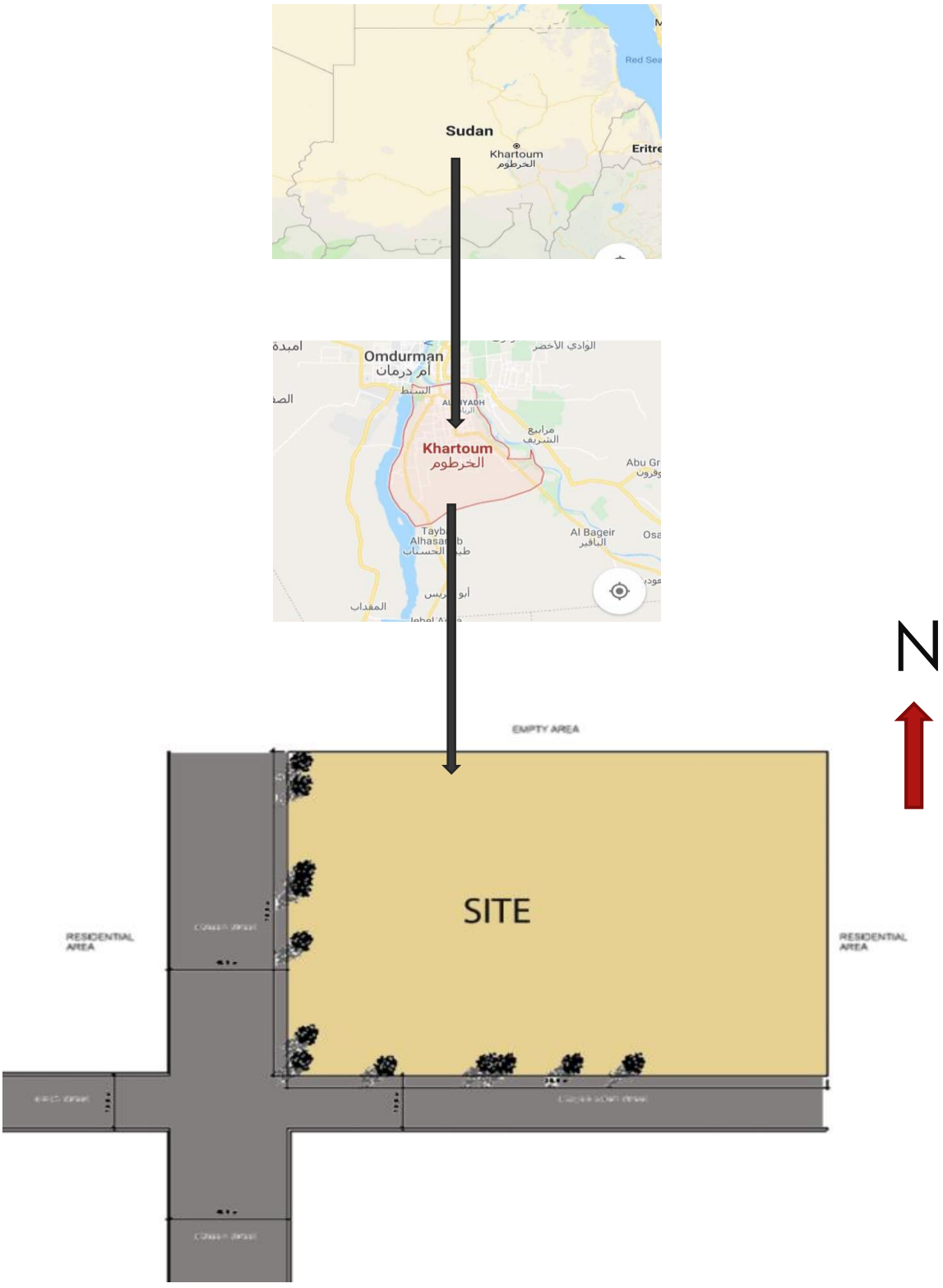
Visitors
Teachers
Administrator
Workers
Books

3-4-5GENERAL MOVEMENT SCHEME :

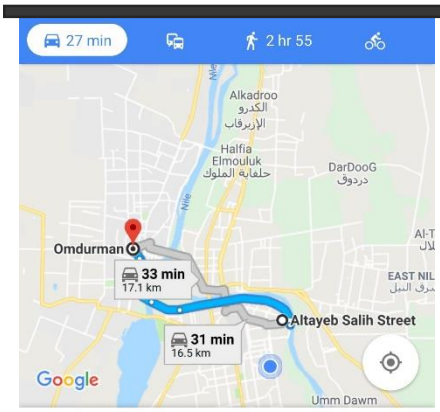


3-5SITE ANALYSIS :

3-5-1SITE LOCATION :

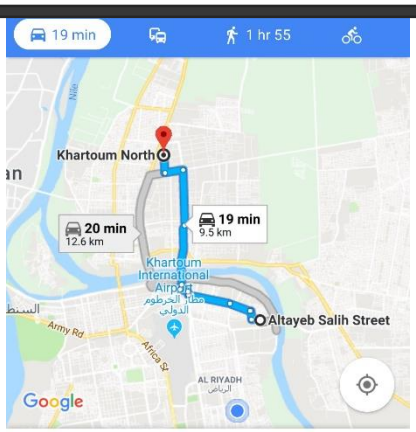


3-5-2ACCESSIBILITY :



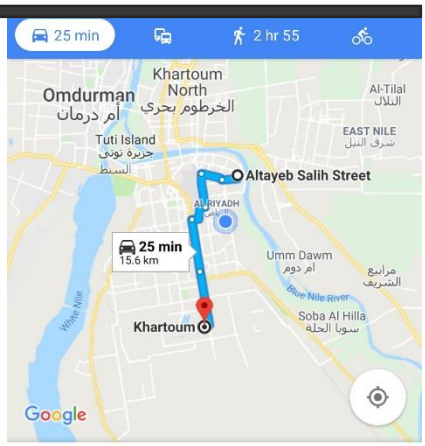
27 min (17.3 km)

Via Nile St



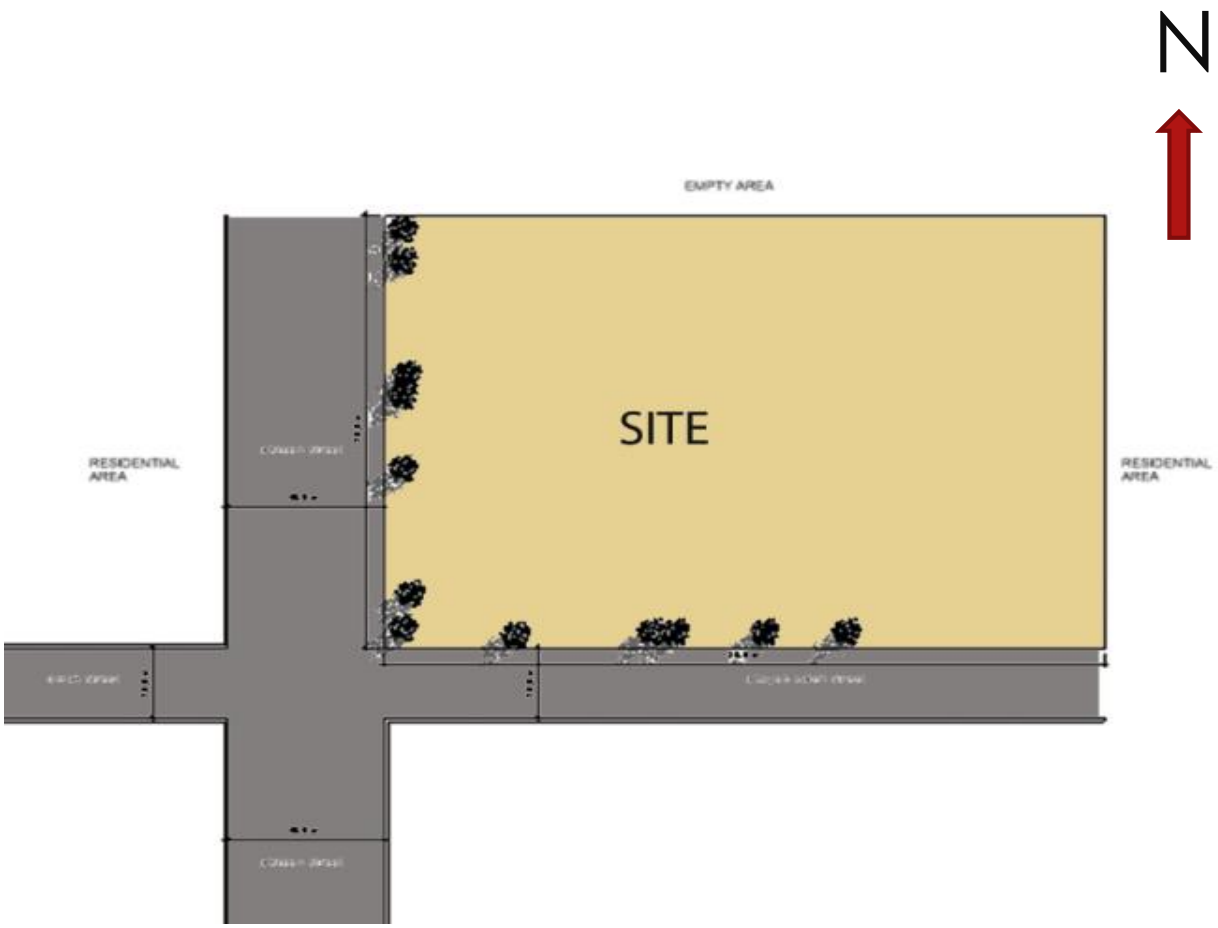
19 min (9.5 km)

Via شارع المنطقة الصناعية

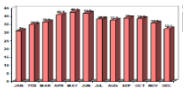
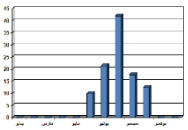
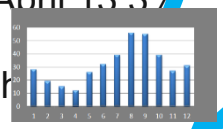


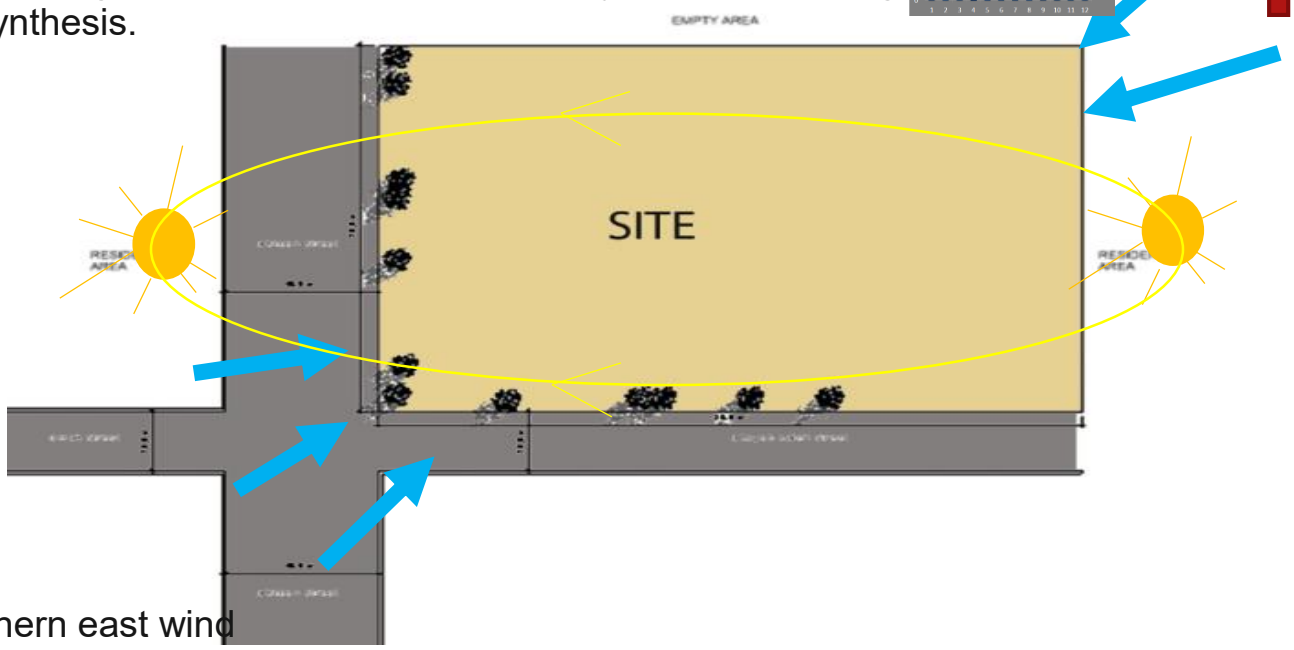
25 min (15.6 km)

Via Africa St



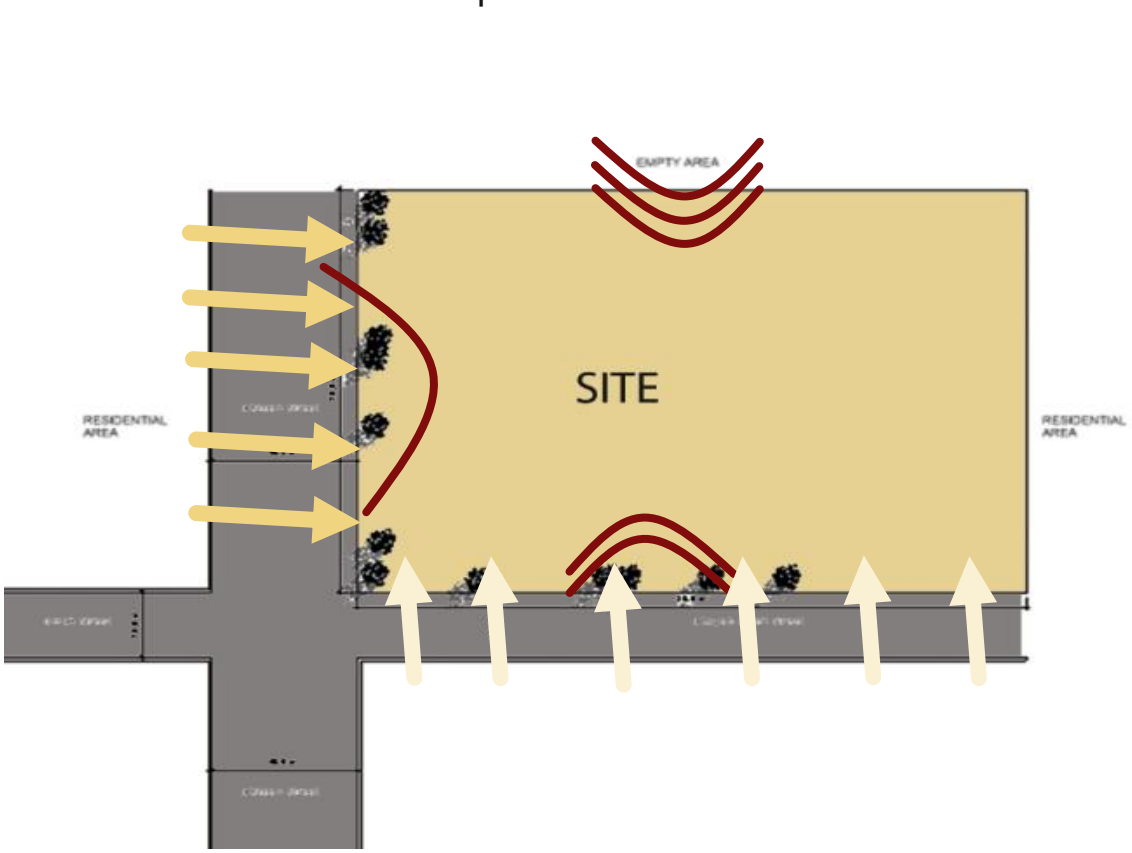
3-5-3ENVIROMENTAL ANALYSIS:

Solar radiation:
The maximum average solar radiation in April 300wh/m2.
The minimum average is in July and December 200wh/m2.
Result:-
Put the hig-hrise buildings in the eastern elevation to take advantage of the shadow.
Distribution of activities and spaces according to their need for the sun.
Use afforestation to reduce the radiation ratio.
Wind:
Highest wind speed is during June ,the lowest is during November.
Result:
Take advantage of northeastern wind for ventilation.
Use afforestation in the eastern and western streets to protect  nds and dust.
The maximum temperature is in May , the minimum is in Janu
Result:
Use interlock in paving streets due to their susceptibility to heat absorption.
Topography:
The soil in Khartoum is a rocky soil.
Rain :

Rain falls in July and August.
Humidity :
Highest humidity rate is in August 51%, Lowest humidity is in April 13.3%
Result:

Increased vegetation to balance the humidity in the air through photosynthesis.



NOISE POLLUTION:

Noise is increasing in the western side .
Result:
Remove the spaces that need to be quiet away from western side.
Environmental pollution:
Pollution is increasing in the western side.
Result:
Use afforestation in the western to protect from dust.



High noise

Medium noise

Low noise

Environmental pollution

Environmental pollution

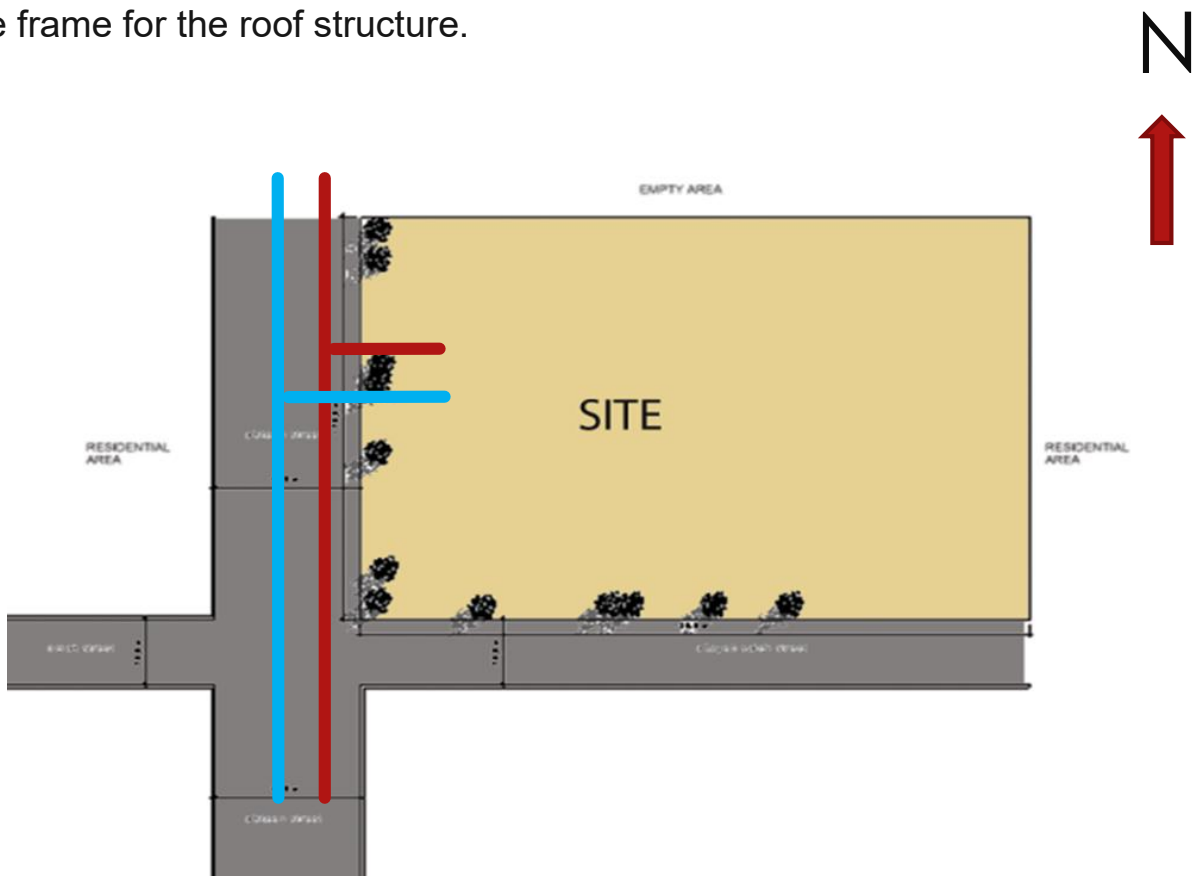
3-5-4INFRA STRUCTURE :

Water supply:
The main water line of the city will be inserted from the main line directly by 6 inches and to the building by 4 inches.

Electricity :
The main line will be inserted to the site by 415v and to the building by 220v.

Sewage:
We will use the two-axle system.

Structure:
Open web joist frame for the building structure ,skeleton.
Space frame for the roof structure.



3-6SPACE STUDY:

3-6-1LIBRARY'S SPACE STUDY:

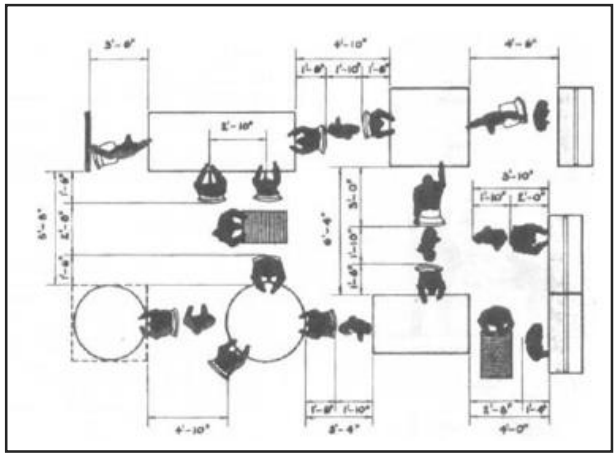


FIGURE 3-1 library's space study

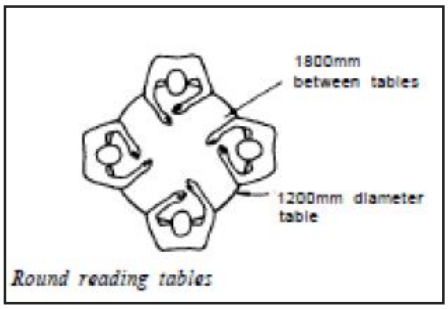


FIGURE 3-2 library's space study

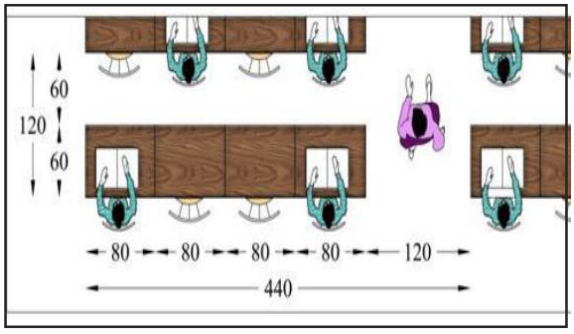


FIGURE 3-3 library's space study

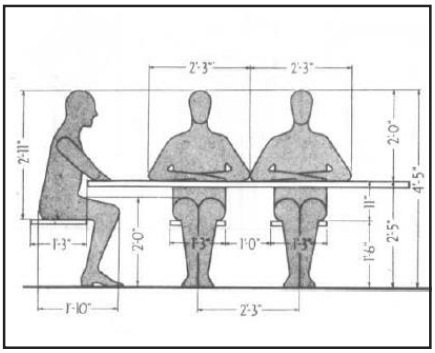


FIGURE 3-4 library's space study

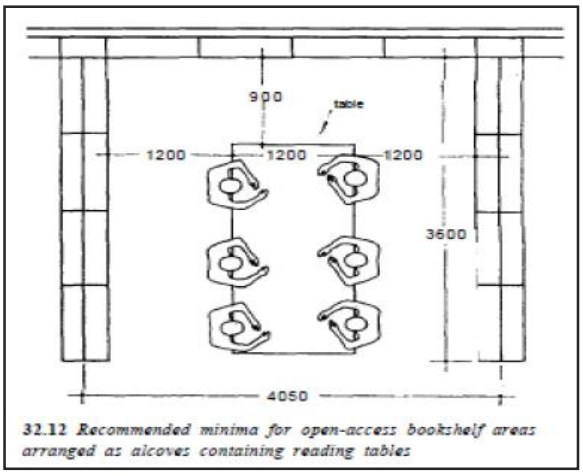


FIGURE 3-5 library's space study

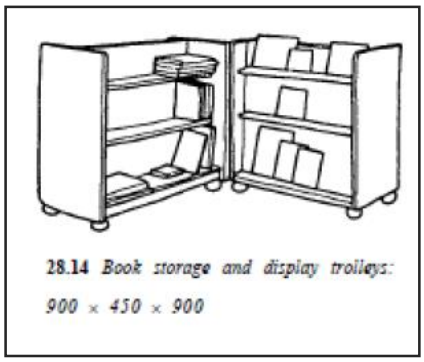


FIGURE 3-6 library's space study

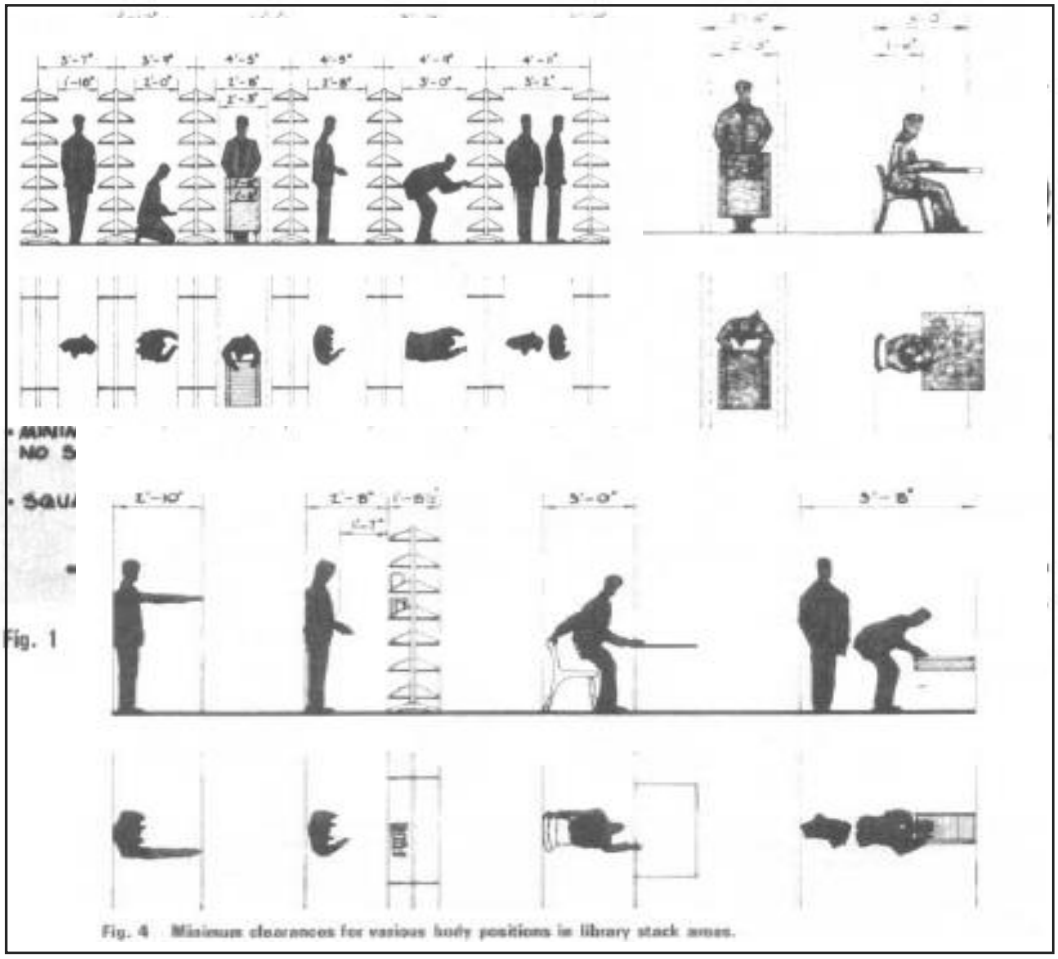


FIGURE 3-7 library's space study

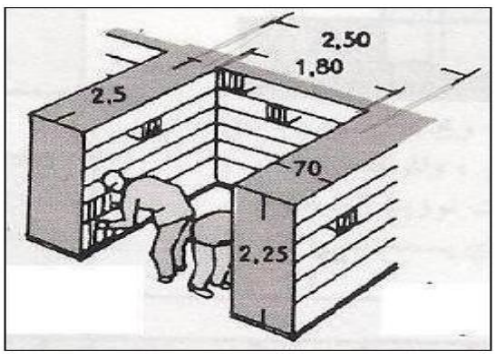


FIGURE 3-8 library's space study

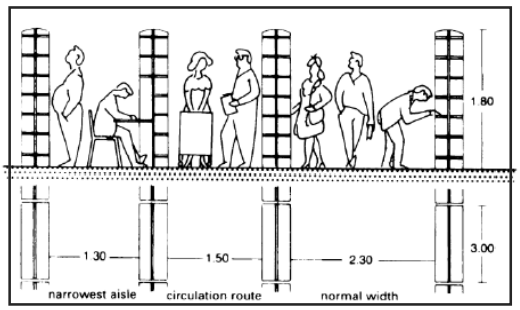


FIGURE 3-9 library's space study

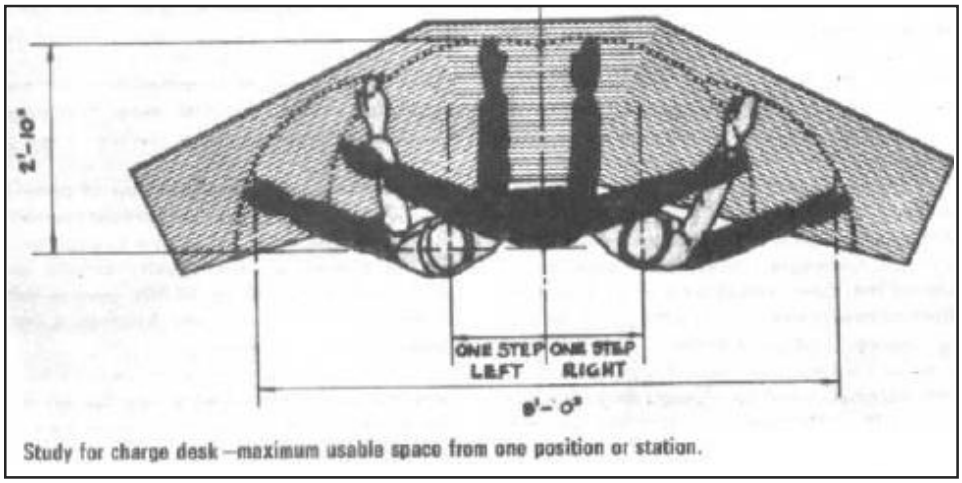


FIGURE 3-10 library's space study

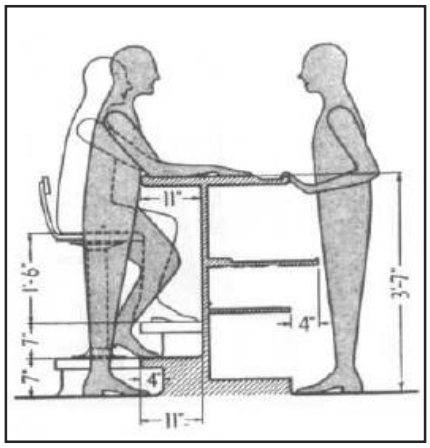


FIGURE 3-11 library's space study

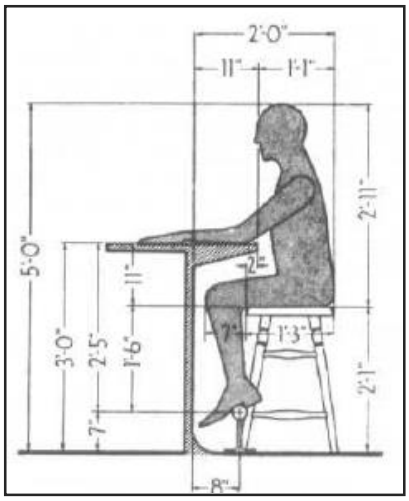


FIGURE 3-12 library's space study

3-6-2PARKING SPACE STUDY:

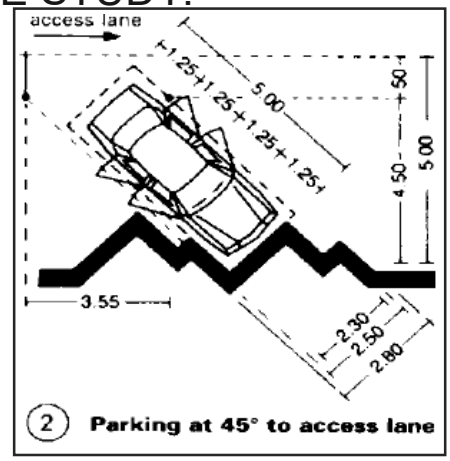


FIGURE 3-13 parking space study

3-6-3CLOSED CARRELS FOR SOUND AND VISUAL EQUIPMENT:

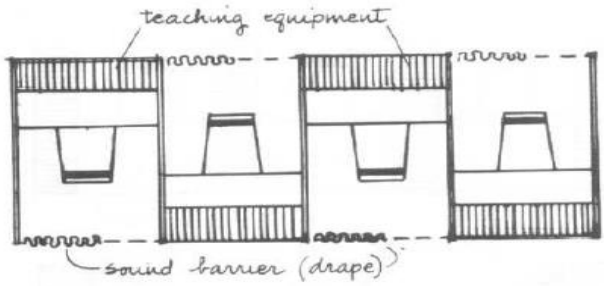


Fig. 11 Closed carrels for sound and visual equipment.

FIGURE 3-14 Closed carrels for sound and visual equipment:

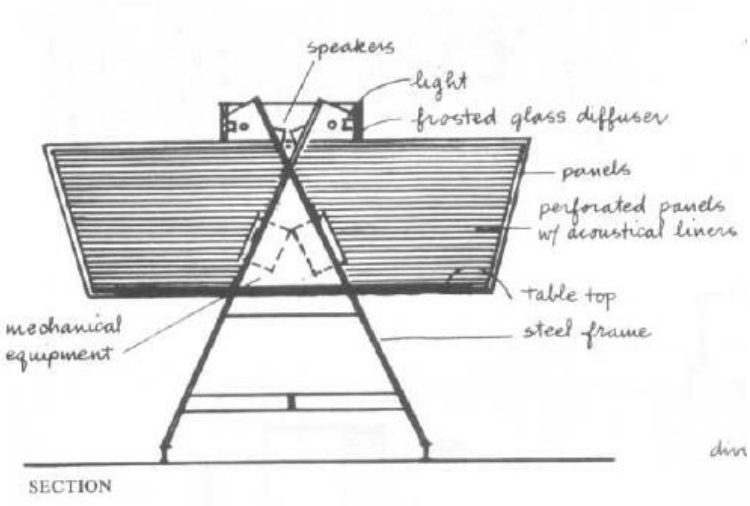


FIGURE 3-15 Closed carrels for sound and visual equipment:

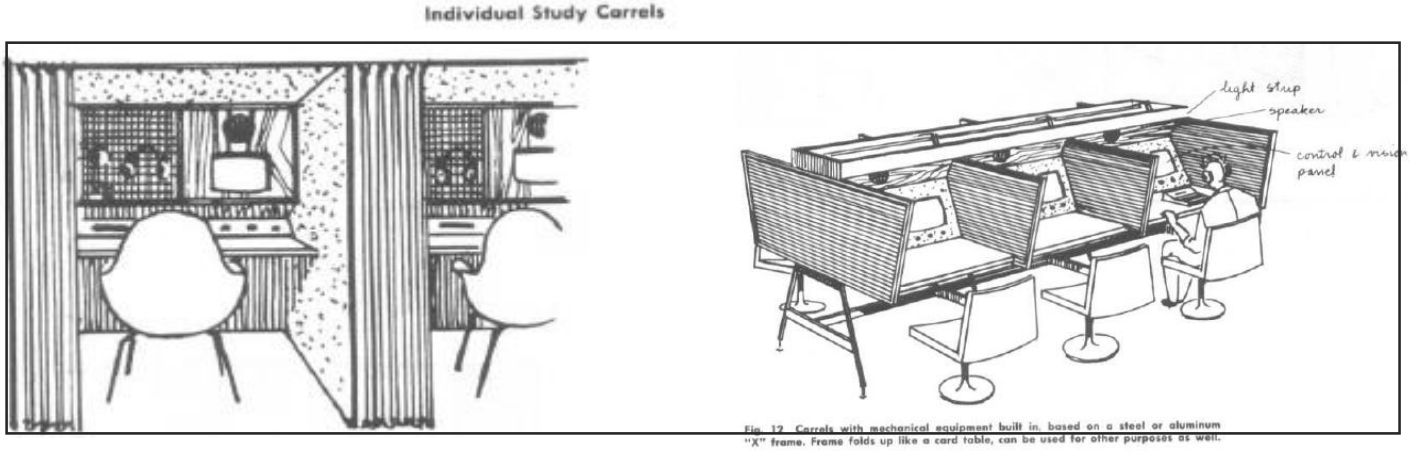


Fig. 12 Carrels with mechanical equipment built in, based on a steel or aluminum "X" frame. Frame folds up like a card table, can be used for other purposes as well.

281

FIGURE 3-16 Closed carrels for sound and visual equipment:

3-6-4CLASSES SPACE STUDY:

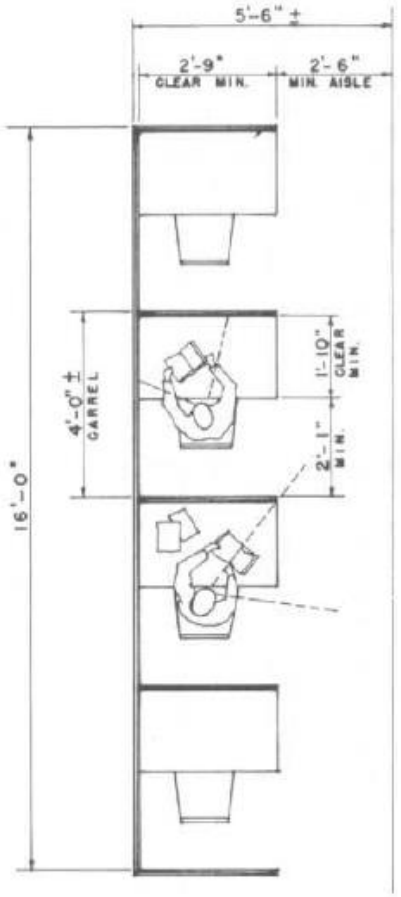


FIGURE 3-17 Classes space study:

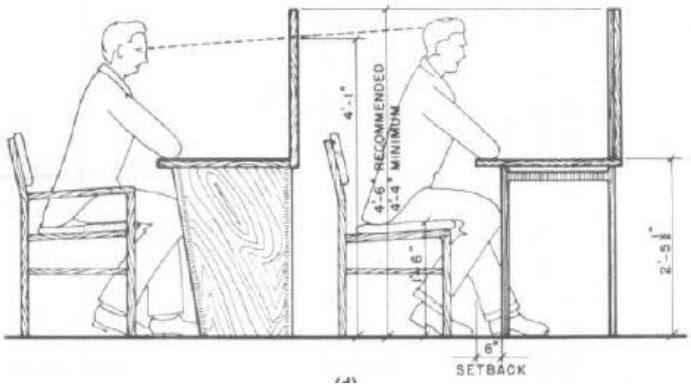


FIGURE 3-18 Classes space study:

3-7SPACES TABLE :

spaces table :

Activities	General section	Space's name	Number of users	Unit space	Number of spaces	Area (space)
cultural	Reading section	M reading hall	70	500	4	2000
		Audio's library	120	1000	1	1000
		Books	50	300	1	300
	total					3300
	Events s	Stage (indoor)	500	1000	1	800
		M .instruments gallery	-	1000	1	1100
	total					1900
Activities	**General section**	**Space's name**	**Number of users**	**Unit space**	**Number of space**	**Area(space)**
Entertaining	Entertaining section	Karaoke rooms	60	42	6	252
		Musical machines room	20	9	20	180
	total					432
Social	social section	Discussion room	50	140	2	280
		External session	60	156	1	156
		Indoor session	30	78	1	78
	total					514

TABLE 3-1 SPACE TABLE

Activities	General section	Space's name	Number of users	Unit space	Number of space	Area (space)
Edu	Educational section	classes	25	40	6	240
	Educational section	studios	10	96	4	384
	total					624

Activities	General section	Space's name	Number of users	Unit space	Number of space	Area
services	Library's services section	Book store	5	10	2	20
		Instrument's store	5	20	1	20
		Indexing room	5	85	1	85
		Classification room	5	85	1	85
		Book's print	10	35	1	35
		Packaging room	10	38	1	38
		Monitoring office	5	30	1	30
		Tec-maintenance	7	50	1	50
	total					373
	public's services section	reception	1000	350	1	350
		Resturant	100	250	1	250
		Praying room	200	160	1	160
		Bathroom	70	10	20	200
		Worker rest r	20	108	2	216

TABLE 3-2 SPACE TABLE

Activities	General section	Space's name	Number of users	Unit space	Number of space	area
services	public's services section	Store	5	10	3	30
						1206
	total					
administrator	Administrator's services section	General administrator	4	144	1	144
		Studio's section off	3	30	2	60
		Library's section off	3	30	3	90
		Karaoke's room	1	30	1	30
		Meeting room	7	66	1	66
	total					390
						8739

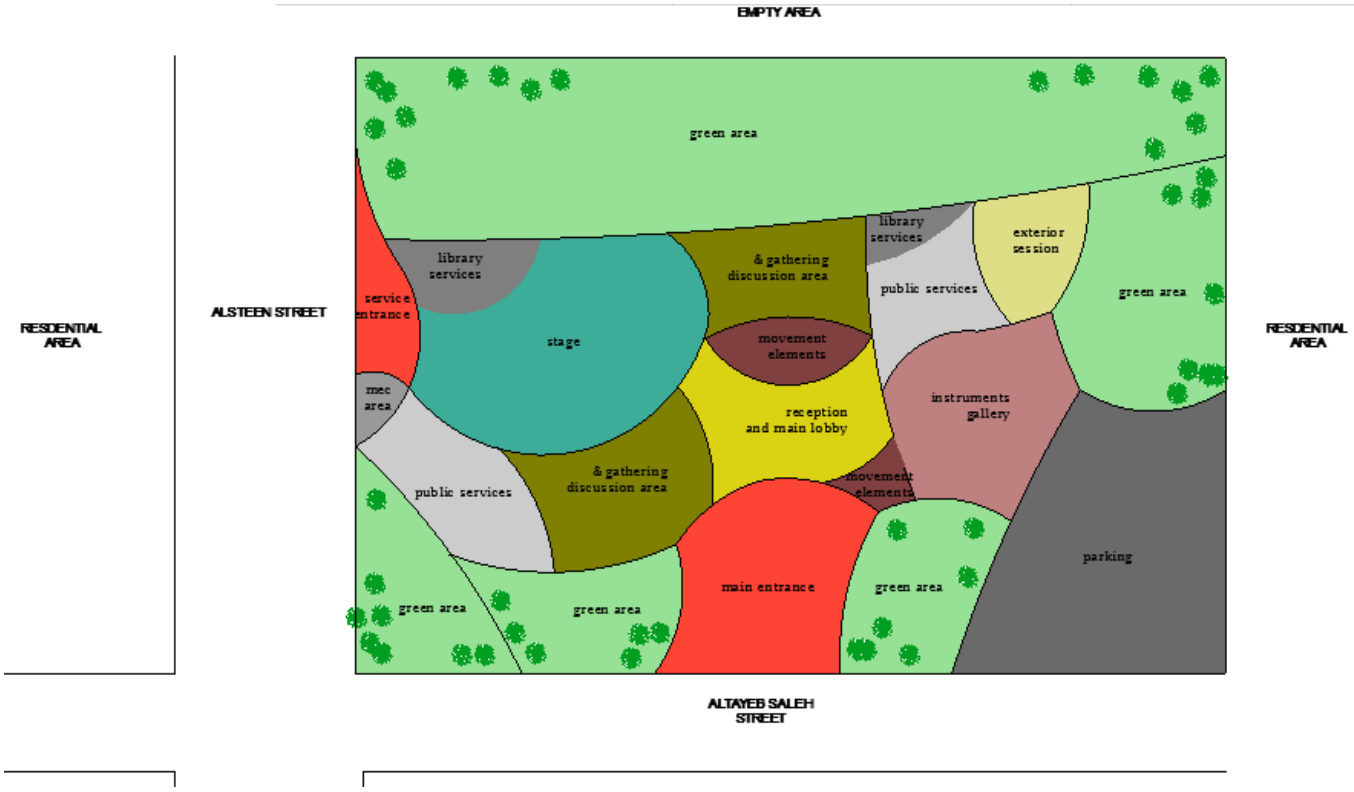
TABLE 3-3SPACE TABLE

3-8INDICATORS AND GUIDE LINES:

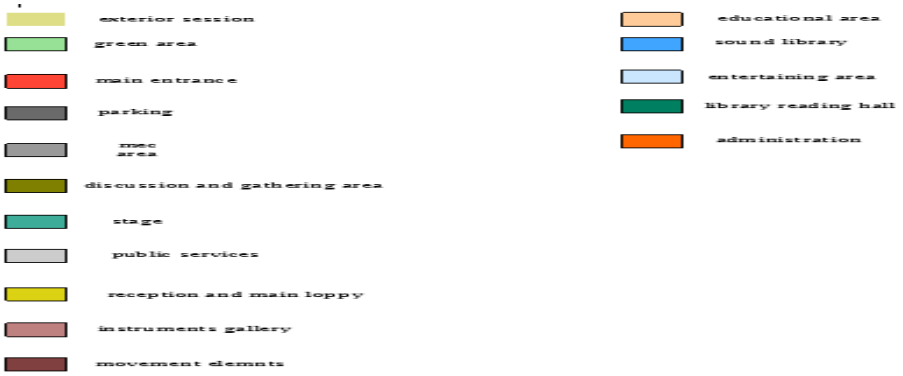
Indicators	Guide lines
Easy to access because of the main roads in the western and southern sides.	Put the main entrance in the southern side. Put the high-rise buildings in the eastern or western elevation to take advantage of the shadow. Distribution of activities and spaces according to their need for the sun. Use afforestation to reduce the radiation ratio.
There's a drainage and sewage in the area.	Increased vegetation to balance the humidity in the air through photosynthesis.
Noise is increasing in the western side.	Remove the spaces that need to be quite away from the western side.
Environmental pollution increasing in the western side.	Use afforestation in the western and southern side to protect from dust. Take advantage of northeastern wind for ventilation.
Near to NASRALDEEN university.	

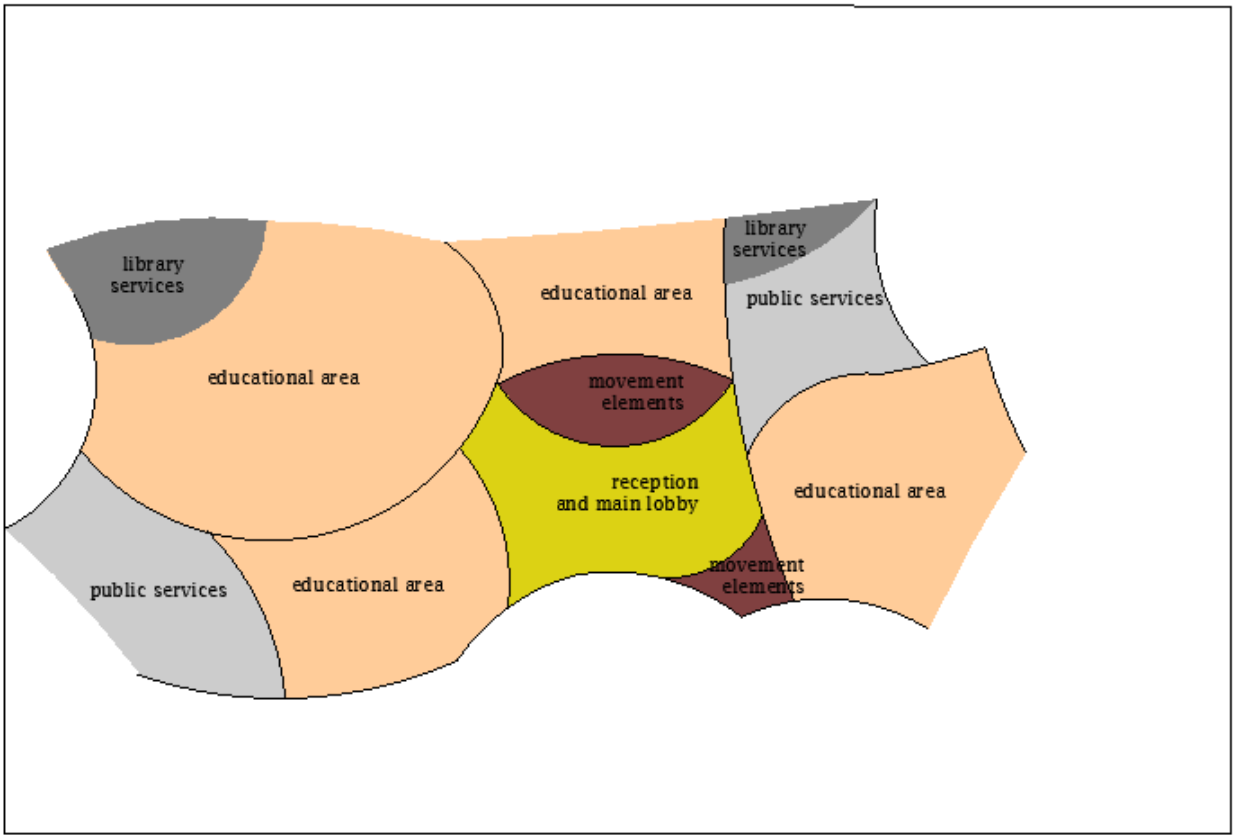
TABLE 3-4 Indicators and guide lines:

3-9ZONING:

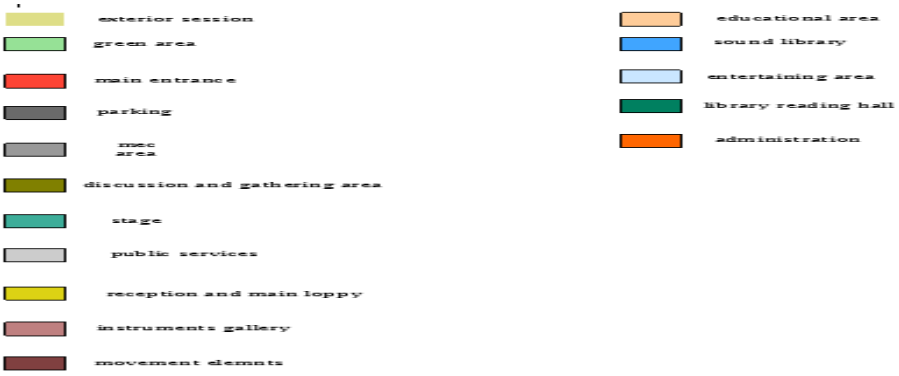


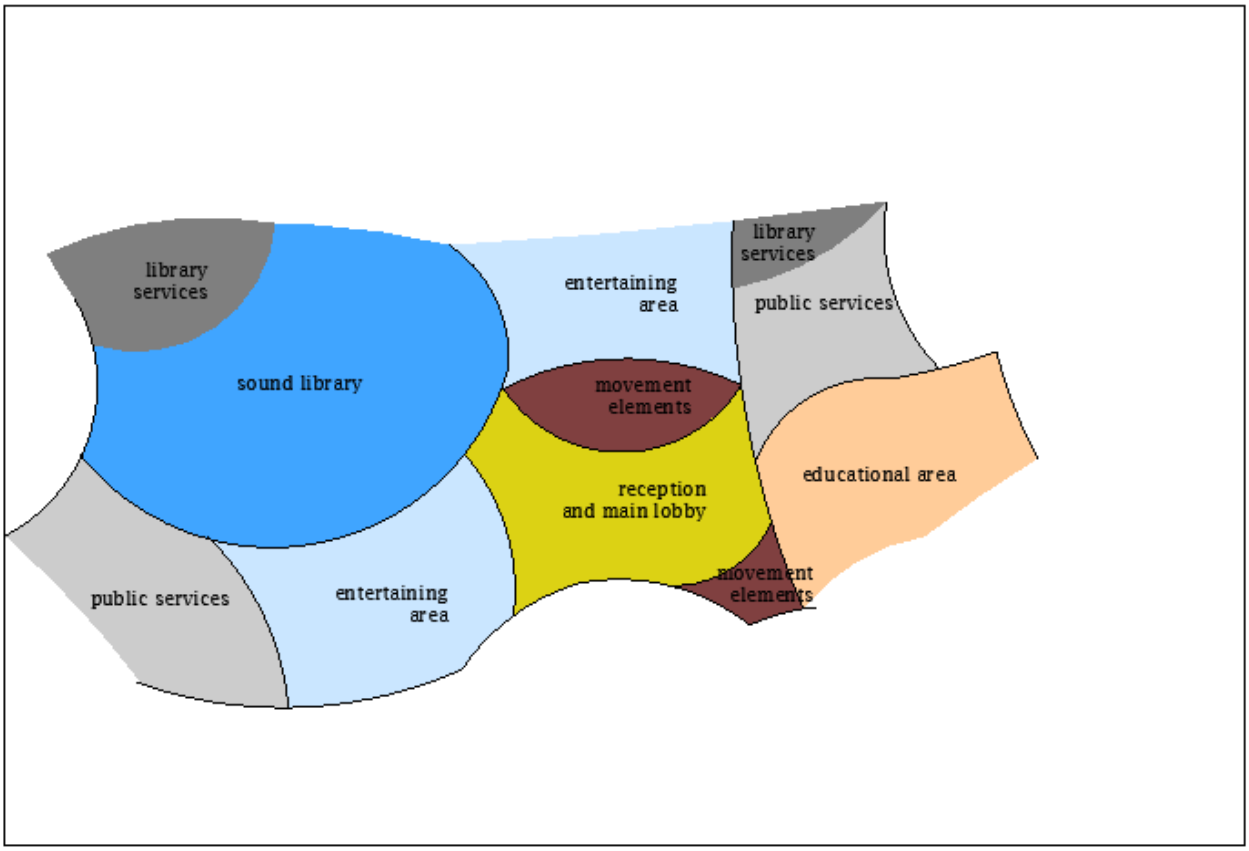
GROUND FLOOR PLAN



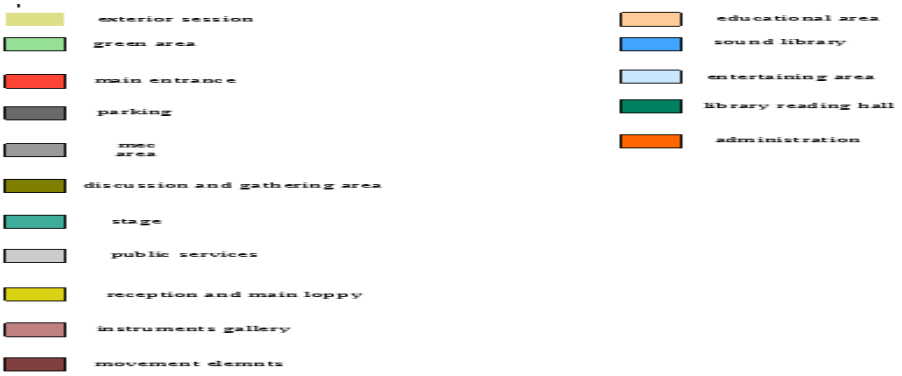


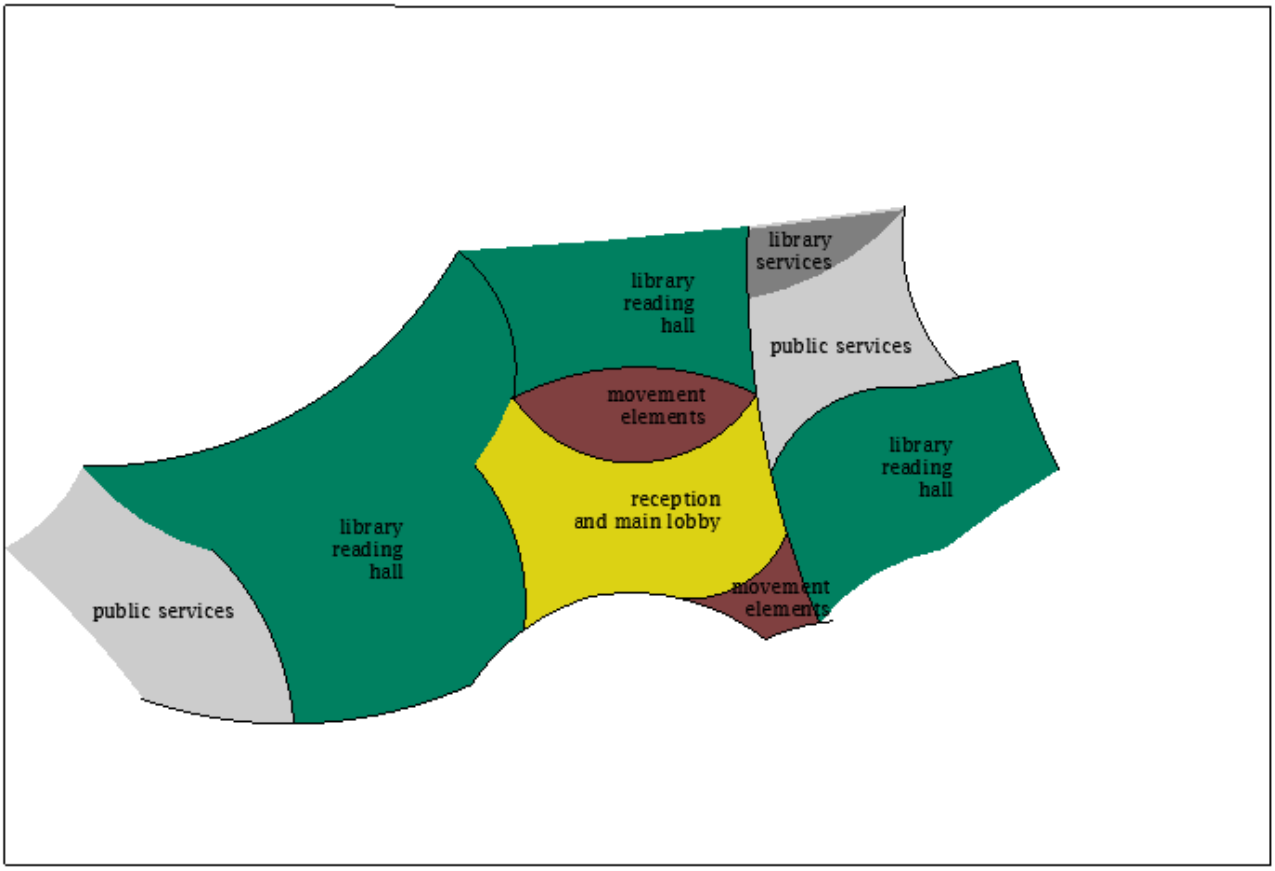
FIRST FLOOR PLAN



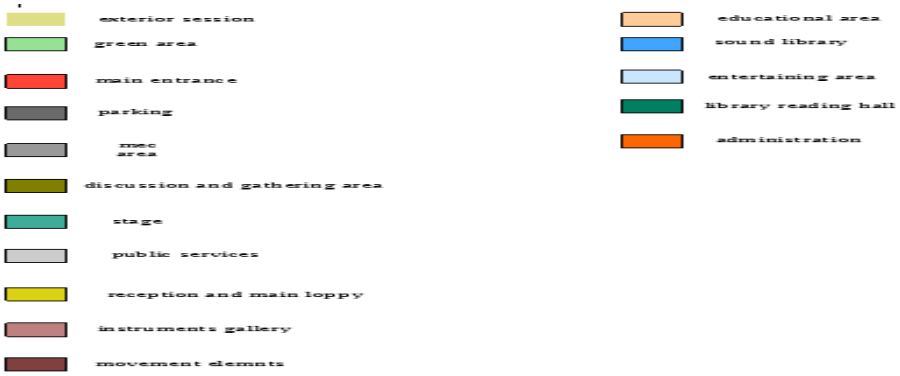


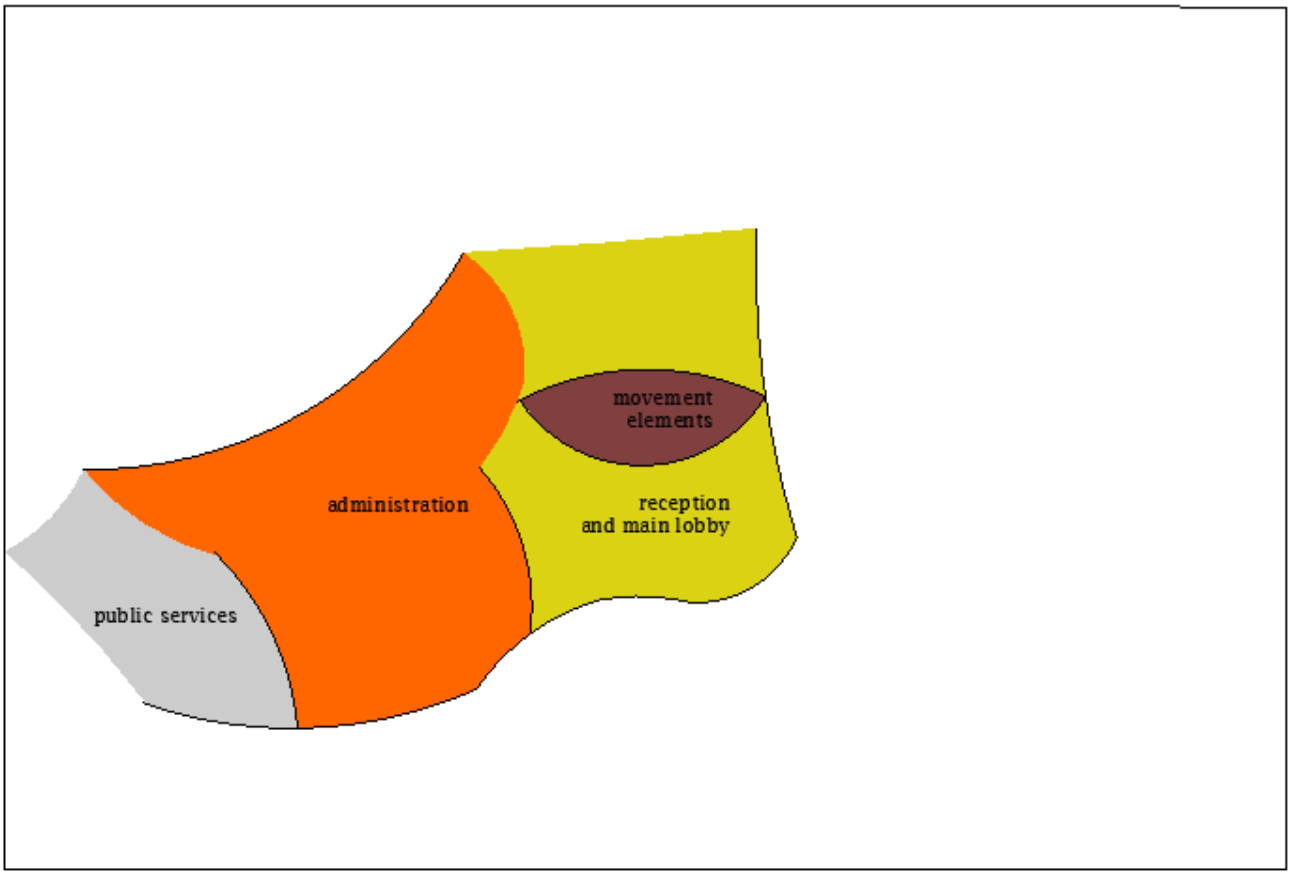
SECOND FLOOR PLAN



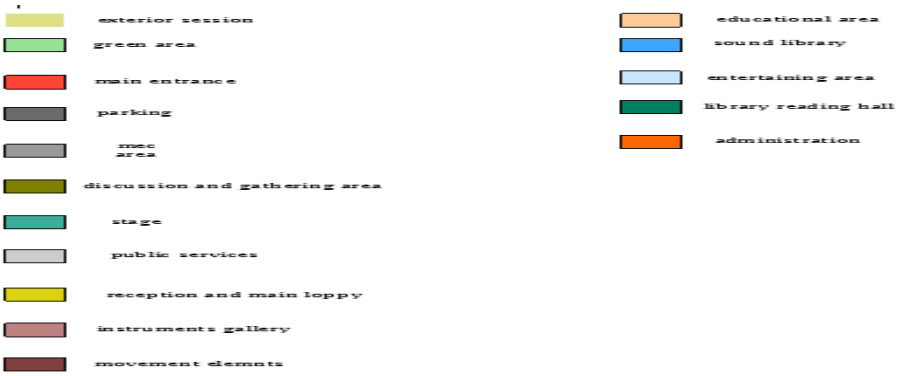


THIRD & FOURTH FLOOR PLAN





FIFTH FLOOR PLAN



CHAPTER FOUR: (DESIGN PROCESS)

CONTENTS:

ABSTRACT:

Chapter four includes the whole architecture designing process which contains the design philosophy (concept) and how the beginning of the architectural form and then to modify the design and problems which existed and the ideas for solving it down till reaching the develop design and finally the technical solution for the project in terms of the method of selecting appropriate structure for the project and which achieves requirements and treatments for the project plus the services and the method of prevision and distribution.

4-DESIGN PROCESS:

4-1CONCEPT:

- IDEAPHILOSOPHY :

IT is based on providing a funky _quiet enviroment for all the users.

- FUNCTION.
- FORMING.
- ENVIROMENTAL.

4-2PRELIMINARY IDEA SUBMISSION:

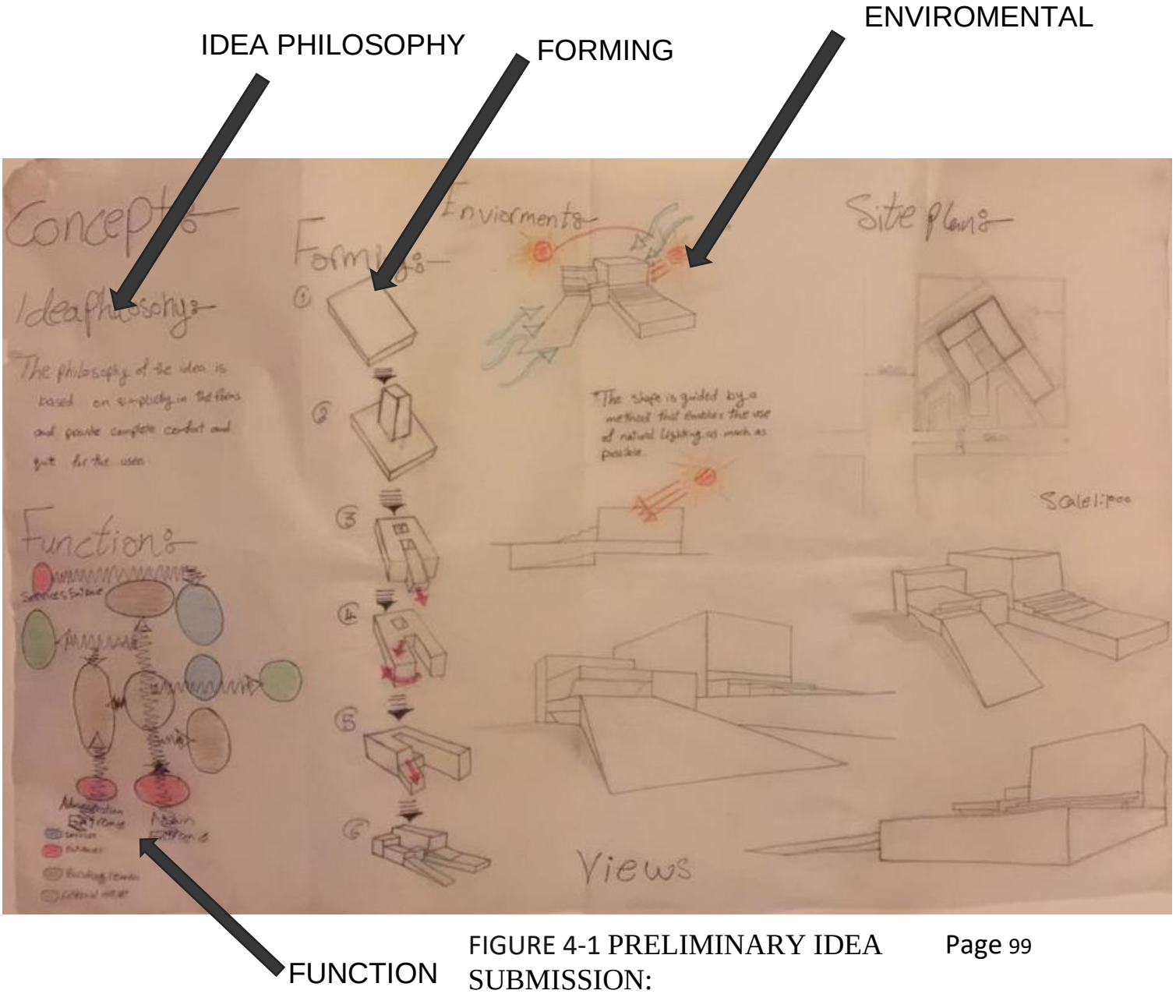


FIGURE 4-1 PRELIMINARY IDEA SUBMISSION:

After further design the initial formation phases several adjustment:

- Due the simplicity of the first design.
- It didn't accomplish the designs functional purpose.
- Further spaces were added along the development process.
- It didn't achieve the satisfaction of the design elevation.

GROUND FLOOR PLAN

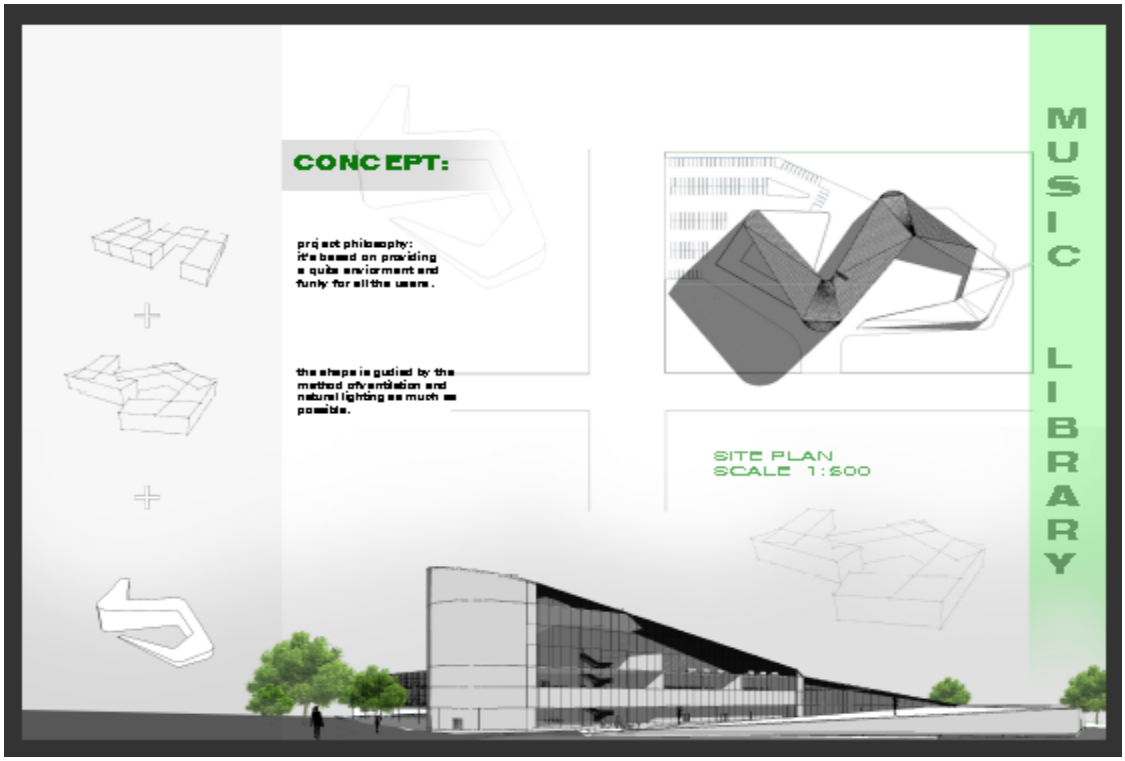
FIRST FLOOR PLAN

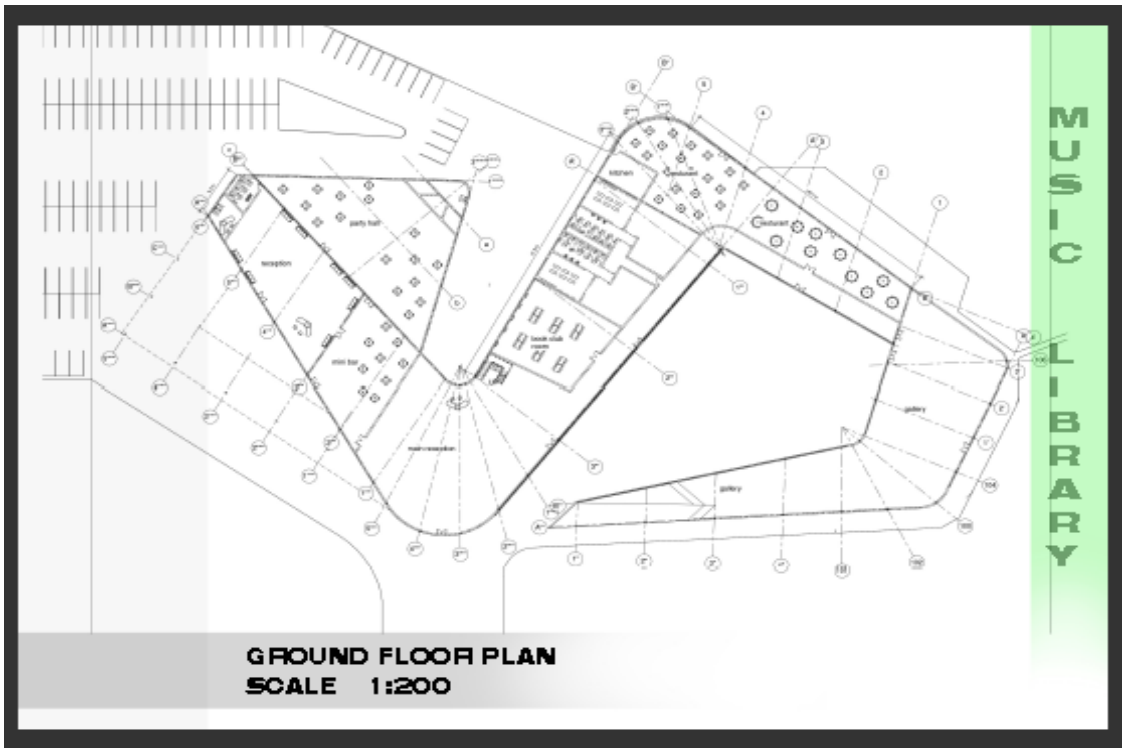
SECOND FLOOR PLAN

THIRD FLOOR PLAN

FIGURE 4-2 PRELIMINARY IDEA SUBMISSION:

4-3DEVELOP THE PRELIMINARY IDEA SUBMISSION:





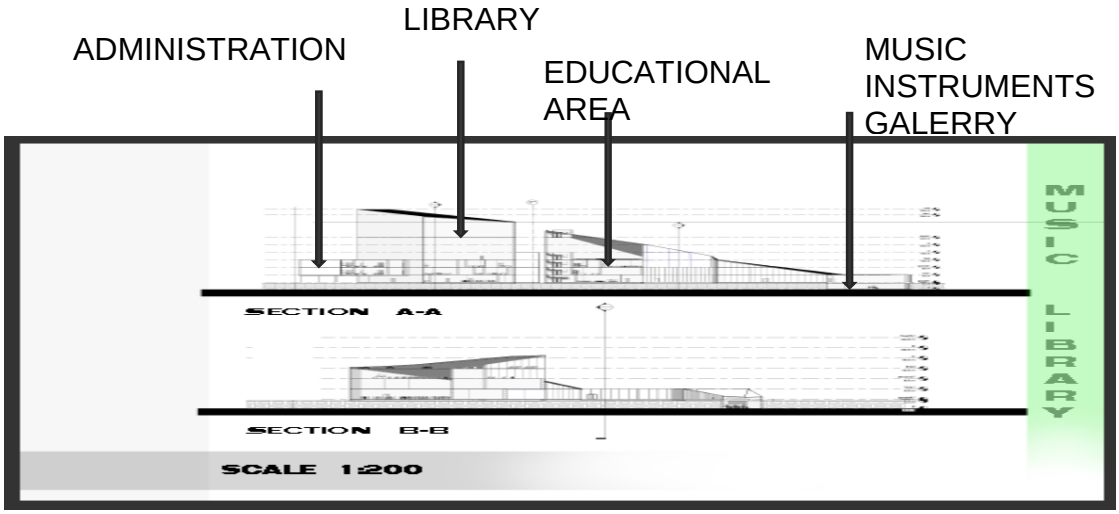


FIGURE 4-5 DEVELOP THE PRELIMINARY IDEA

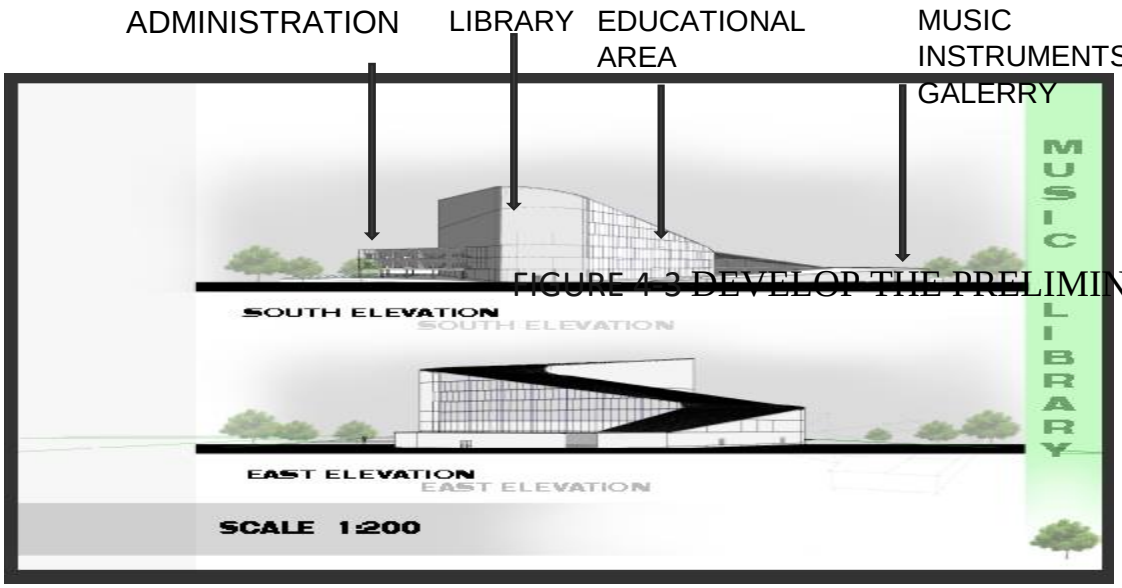


FIGURE 4-3 DEVELOP THE PRELIMINARY IDEA

FIGURE 4-6 DEVELOP THE PRELIMINARY IDEA

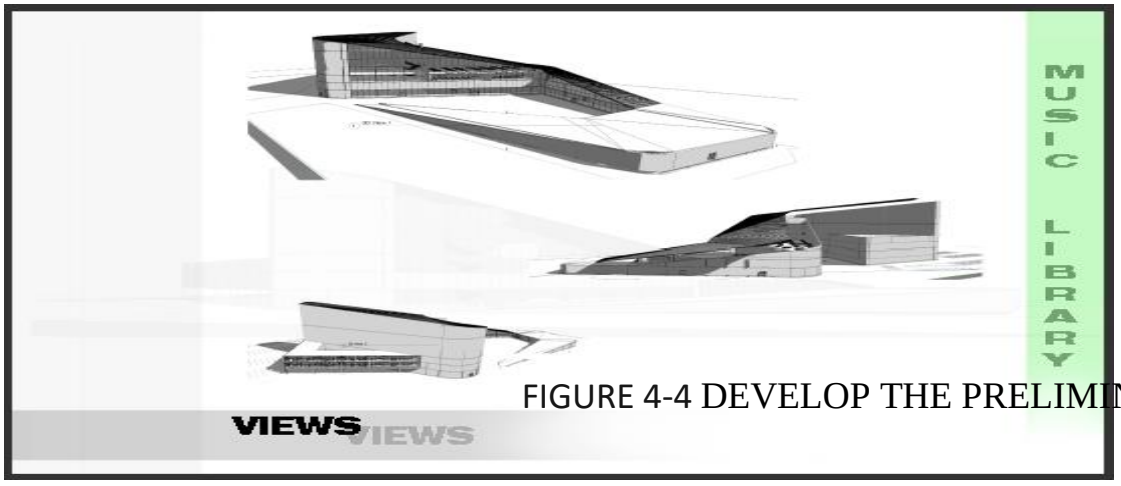


FIGURE 4-4 DEVELOP THE PRELIMINARY IDEA

FIGURE 4-7 DEVELOP THE PRELIMINARY IDEA

4-4DEVELOP STAGE SUBMISSION:

FIGURE 4-8 DEVELOP STAGE SUBMISSION:

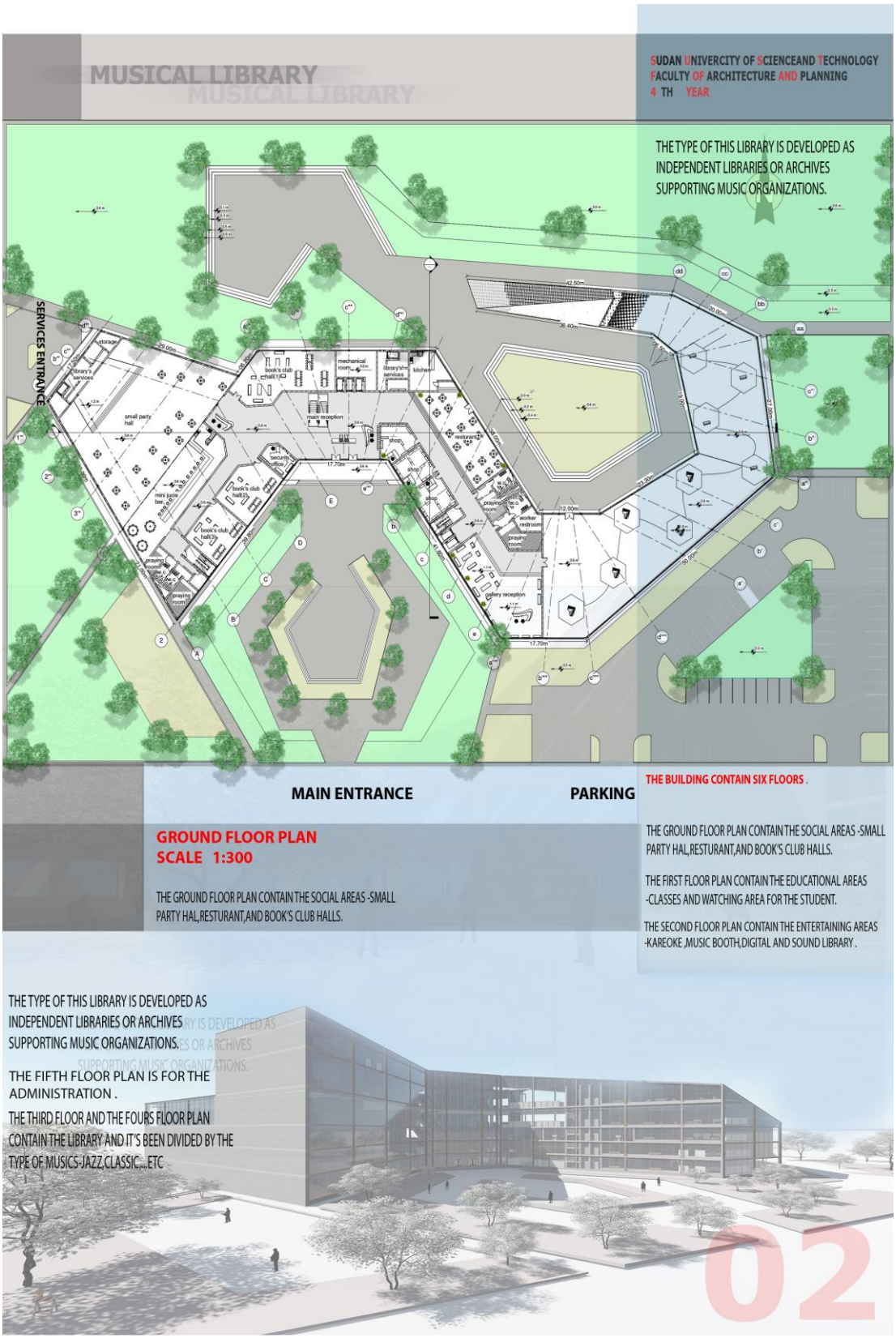


FIGURE 4-9 DEVELOP STAGE SUBMISSION:

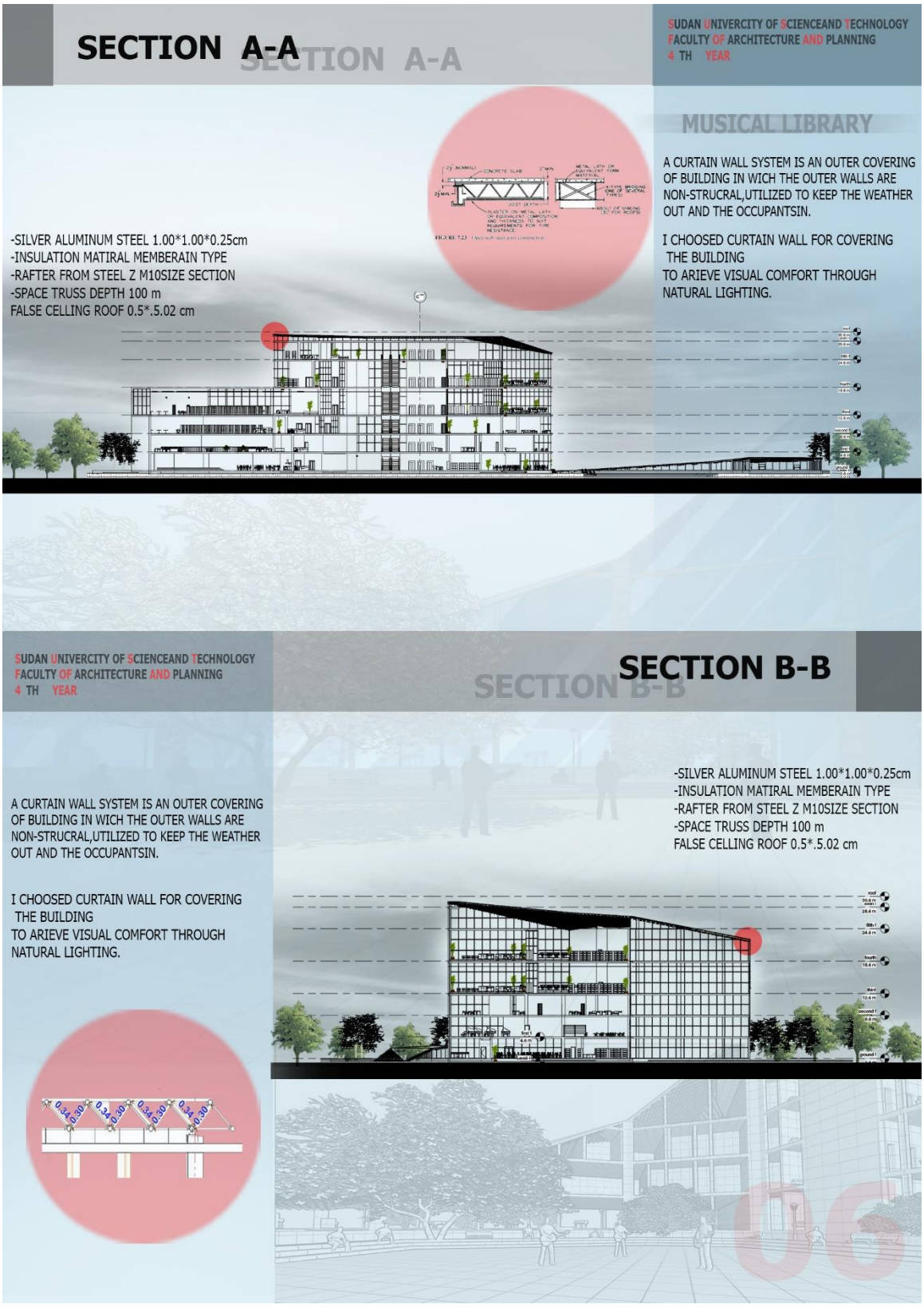


FIGURE 4-10 DEVELOP STAGE SUBMISSION:

FIGURE 4-11 DEVELOP STAGE SUBMISSION:

4-5TECHNICAL SOLUTION STAGE SUBMISSION:

4-5-1STRUCTURAL SOLUTIONS:

THE TYPE OF STRUCTURAL SYSTEMS USED IN THE PROJECT:

Open web joist framing : the choice of steel frames instead of concrete is due to the large spans of the building.

FIGURE 4-12 STRUCTURAL DETAIL

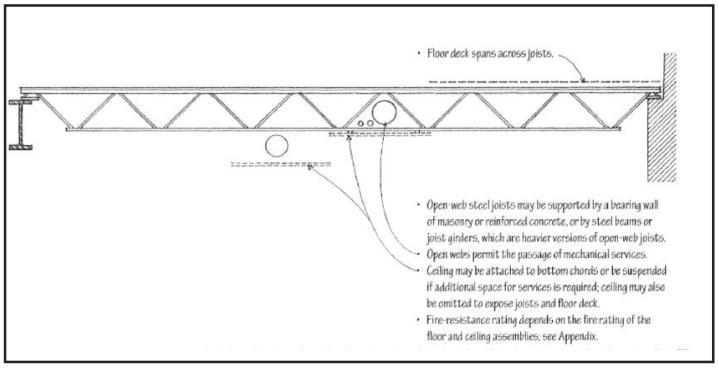


FIGURE 4-13 STRUCTURAL DETAIL

Reasons of choosing the structural systems:

- The need of long spans in the project without any columns in the middle .
- Flexibility in design .
- Ease of constructing.

The system is consists of:

Foundation:

Spread footings are structural members used to support columns and walls and to transmit and distribute their loads to the soil.

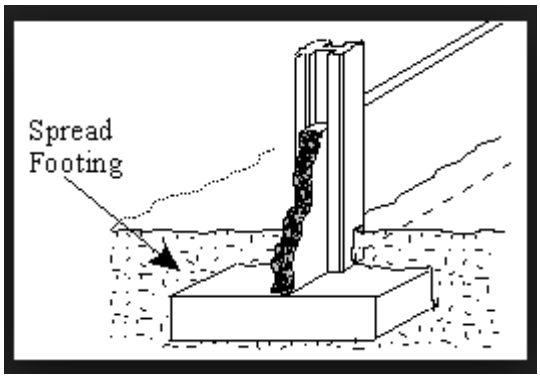


FIGURE 4-14 STRUCTURAL DETAIL

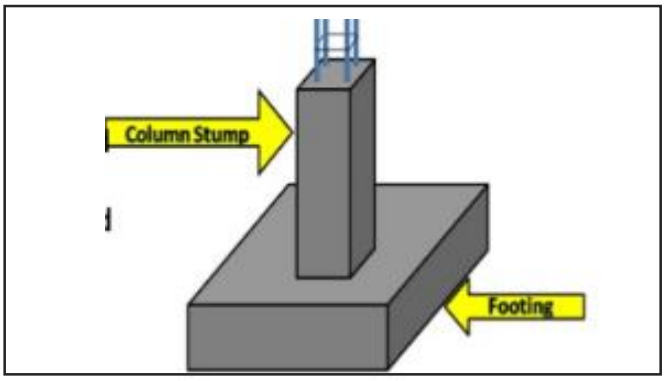
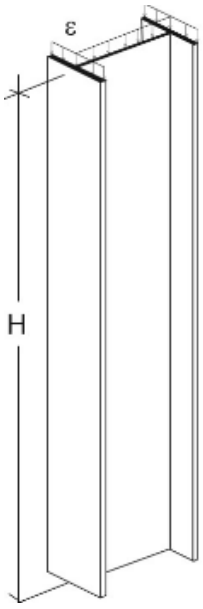


FIGURE 4-15 STRUCTURAL DETAIL

COLUMNS:

The columns in the project are all I section steel columns covered by concrete to insulate the steel and give it more strength to resists fire.



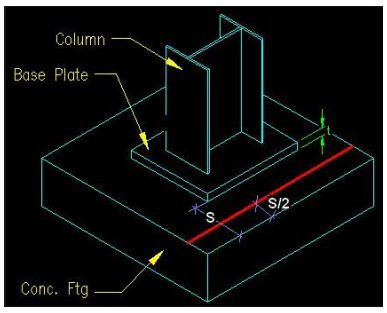


FIGURE 4-16 STRUCTURAL DETAIL

ROOF:

Space frame structure :

- In architecture and structural engineering ,a space frame or space structure is a truss –like ,lightweight rigid structure constructed from interlocking struts in a geometric pattern.
- Space frames can be used to span large areas with interior supports .
- Like the truss ,space frame is strong because of the inherent rigidity of the triangle.

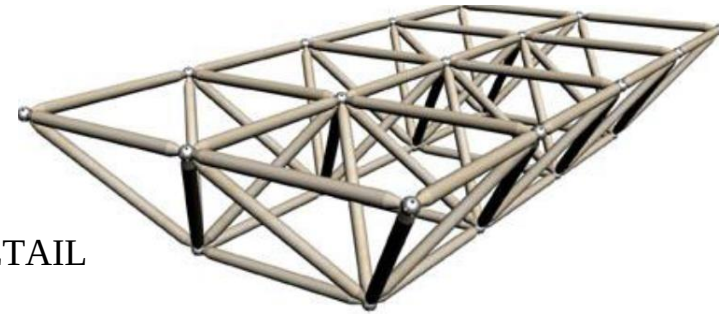


FIGURE 4-17 STRUCTURAL DETAIL

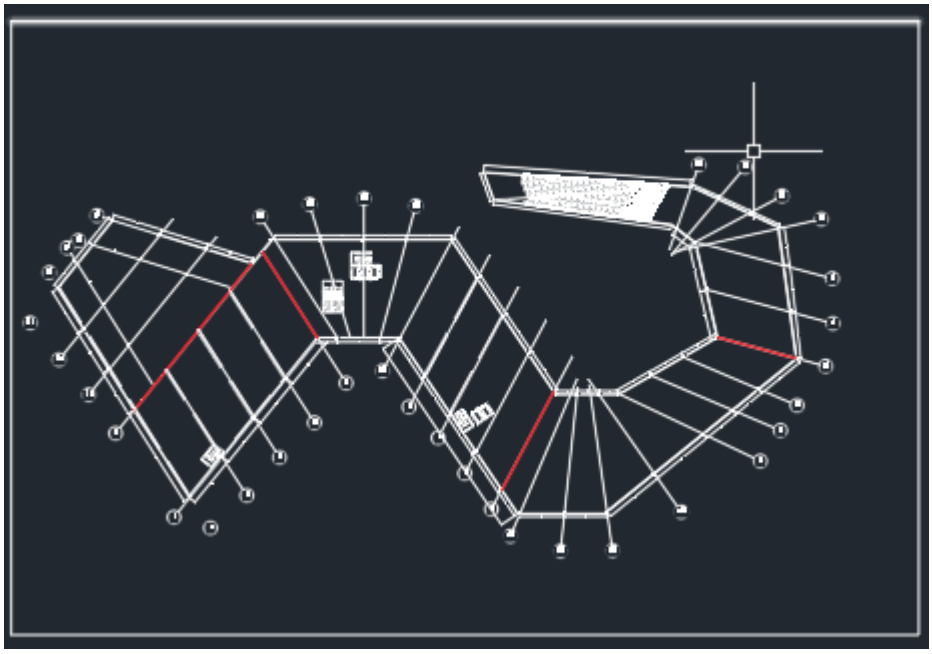


FIGURE 4-18 STRUCTURAL GROUND FLOOR PLAN

4-5-2WATER SUPPLY, ELECTRICAL SOLUTION, DRAINAGE AND SEWAGE SOLUTION:

Water supply system :

- Calculation of the amount of water =daily usage of water +fire fighting water.
- Daily usage of water=personal usage +irrigation water.
- Consumption of the all institute users =24 gallons per day.
- Total consumption=number of users *daily consumption.
- 24*1700=40800 gallons per day.
- 40800*4.4=179520 liter.
- Garden irrigation:
- Each square meter needs 5 liter daily .
- Consumption of irrigation=5243.4*5=26217 liter per day.
- Total consumption of the daily usage =179520+26217=205737.

The system that used for the water supply :

Water is supplied to the building with the use of a pump and an upper water tank to keep the water pressure stable for all the floors.

Water is supplied to the site by 6 inch diameter pipe.

The electricity supply:

The main line that supply the electricity in the site is located in the western side of the site .

The electric current is 415 volt the electric currents gets distributed to the main control panel.

sympol	Discribtion
	ground tank
	spare tank
	fire fighting tank
	upper tank
	valve
	pump
	non return valve

TABLE 4-1 WATER SUPPLY KEYS

SYMPOL	DISCRIBTION
	MAIN LINE 1100 V
	SUB LINE 415 V
	TRANSFORMER
	GENERATOR
	MAIN ELEC. DIS.BOARD
	LIGHTING
	SUB ELEC. DIS BOARD
	CIRCUT BREAKERS

TABLE 4-2 ELECTRICITY SUPPLY KEYS

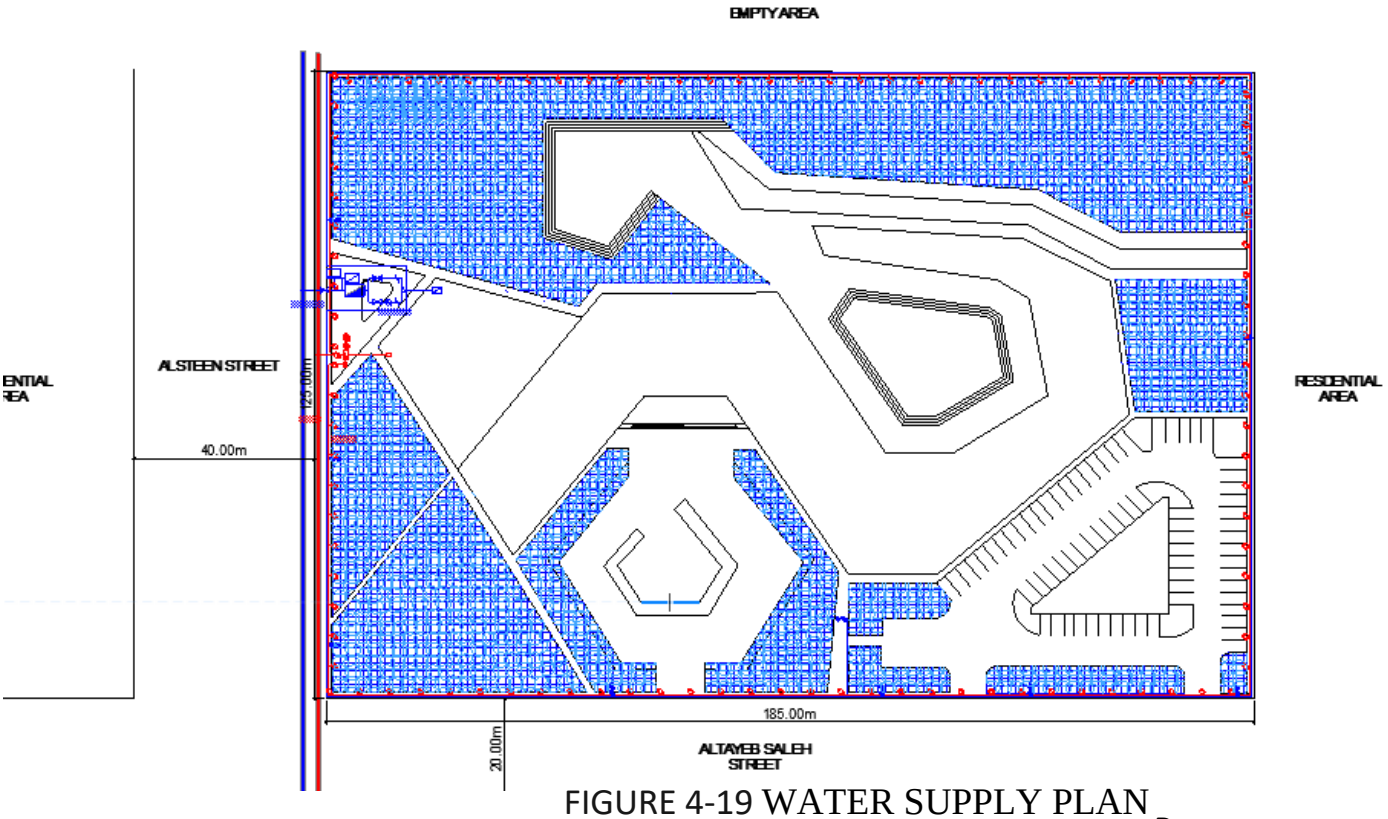


FIGURE 4-19 WATER SUPPLY PLAN

FIGURE 4-20 BATHROOM SEWAGE

Sewage system :

The two pipes system is used for the sewage of the bathrooms to get rid of the smell and to make sure that the pipes don't get closed ,by helping to maintain the air pressure inside of the pipes ,then the waste is transferred into manholes till it reach the general sewage system.

TABLE 4-3 SEWAGE KEYS

KEYS:	
	main clean water supply pipe 1" pvc type
	main hand wash basin waste pipe 4D PVC TYPE
	ventelation pipe 2D pvc type
	main toilet waste supply pipe 4D pvc type

Drainage system :

Draining the water from the roofs by slope of 1:100 directing water towards the down pipes ,the water will be drained towards the landscape of the project and then outside.

TABLE 4-4 DRAINGE KEYS

	MANAHOLES
	GULLYTRAP
	TRANCH

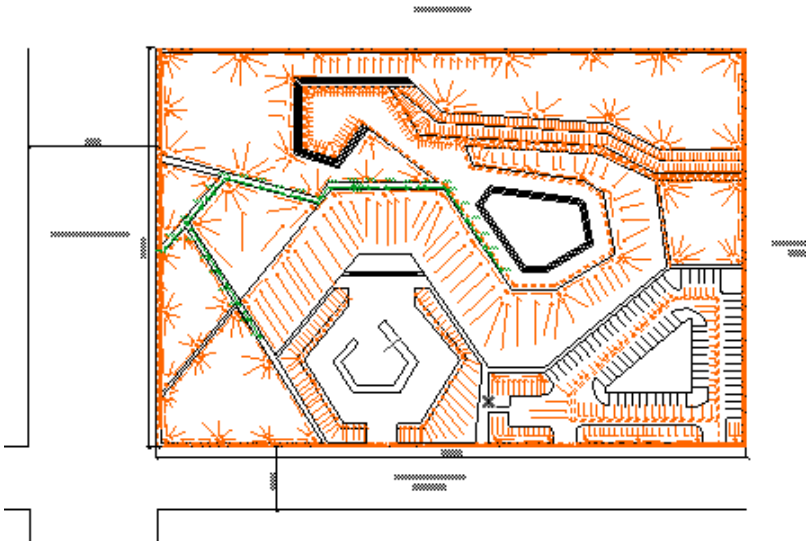


FIGURE 4-21 DRAINGE SYSTEM PLAN

name	height	width	depth
MH1	45	45	45
MH2	45	45	55.2
MH3	75	57	65.4
MH4	75	70	75.6
MH5	75	70	85.8
MH6	100	75	100
MH7	100	75	110.2
MH8	100	75	120.4
MH9	100	75	130.6
MH10	100	75	140.8
MH11	100	75	150.0
MH12	100	75	160.2
MH13	100	75	170.4
MH14	120	75	180.6
MH15	120	75	190.8
MH16	120	75	200.0
MH17	120	75	200.2
MH18	120	75	200.4
MH19	120	75	200.6
MH20	120	75	200.8
MH22	125	80	300.0

TABLE 4-5 MANAHOLES

4-5-3SITE TREATMEANTS :

SITE FINISHING AND TREATMEANTS:

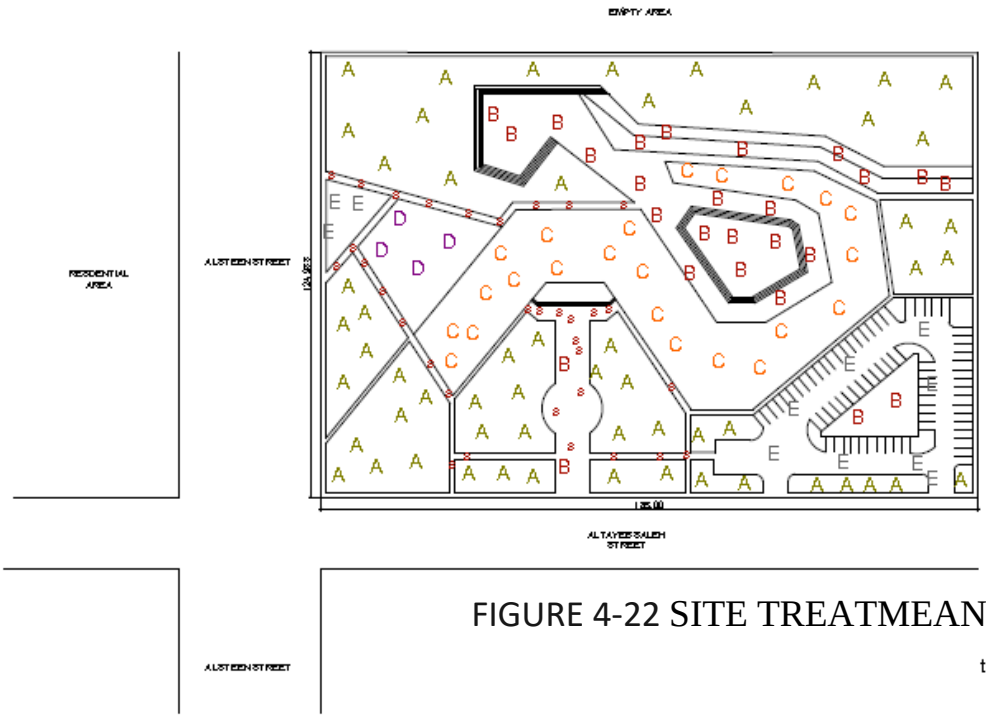


FIGURE 4-22 SITE TREATMEANTS PLAN

A

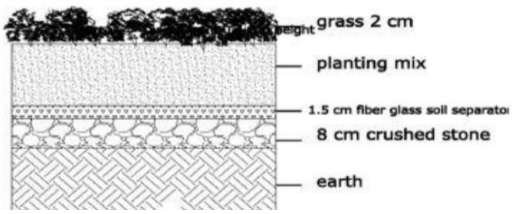


FIGURE 4-23 SITE TREATMEANTS DETAIL

B

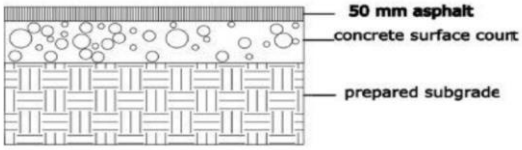


FIGURE 4-24 SITE TREATMEANTS DETAIL

E

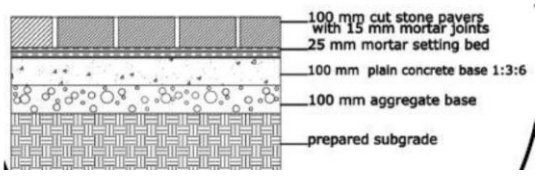


FIGURE 4-25 SITE TREATMEANTS DETAIL

C

silver aluminum steel60*60*60-
insulation material membrain typerafter
from steel zm 100size sectionspace
truss depth100m

FIGURE 4-26 SITE TREATMEANTS DETAIL

D

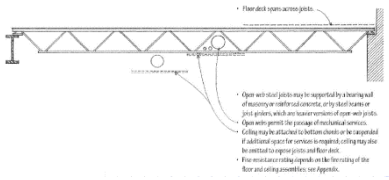


FIGURE 4-27 SITE TREATMEANTS DETAIL

4-5-4HAVC SYSTEM :

The determination of the HVAC system depends on specifying the buildings with its parts and sectors.

Building Specifications

Space Function Type		Main Use of the AC System		Important Requirements		Less Important Requirements		AC Control System		Spaces Sizes	
*	Large main space	*	Cooling or heating	*	Temperature		Temperature		Central		Large
	Multiple Spaces		Cooling or heating big quantities		Air recycling	*	Air recycling	*	Single space control	*	small
		*	Variable temperatu re	*	Quiet sounding		Quiet sounding				
					Humidity	*	Humidity				
					Sterilized Air		Sterilized Air				

TABLE 4-6 ***Building Specifications***

Air Condition System Selection:

Space Function Type		Main Use of the AC System		Important Requirements		Less Important Requirements		AC Control System		Spaces Sizes	
	Large main space		Cooling or heating	*	Temperature		Temperature		Central		Large
*	Multiple Spaces		Cooling or heating big quantities		Air recycling	*	Air recycling	*	Single space control	*	small
		*	Variable temperatur e	*	Quiet sounding		Quiet sounding				
					Humidity		Humidity				
					Sterilized Air	*	Sterilized Air				

TABLE 4-7 ***Air Condition System Selection:***

- For the air conditioning system, the all air system (AAS) has been chosen.

The Definition of the All Air System

This type of system only use the flow of air in the operation of cooling or heating, the air cycle goes with direction the exhausted air outside, and then supplying the building interior with fresh air that flows through ducts to all the sectors of the building.

The Components of the (AAS)

- An outdoor air handling unit (AHU) horizontal type.
- An interior variable air volume unit (VAV) inlet.
- Air ducts (squared, Round and flex).
- Air terminal diffuser.

FIGURE 4-31 HAVC COMPONENT DETAILS

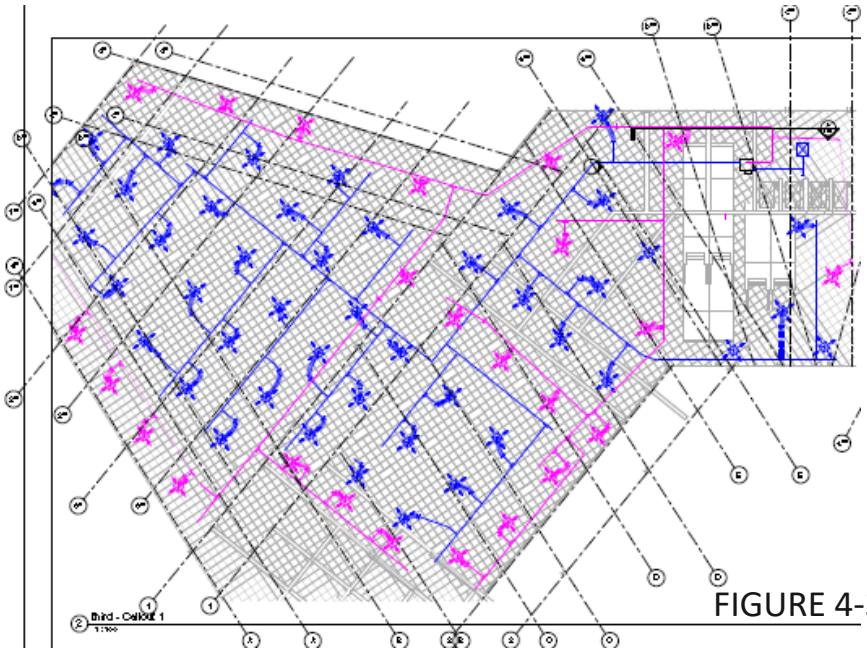


FIGURE 4-28 HAVC PLAN

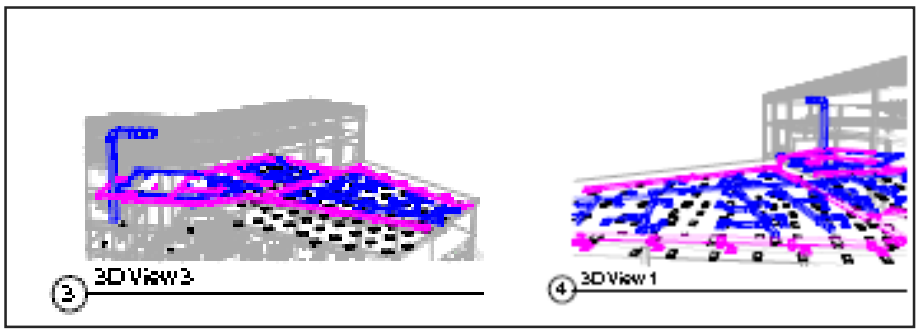


FIGURE 4-29 HAVC VIEWS

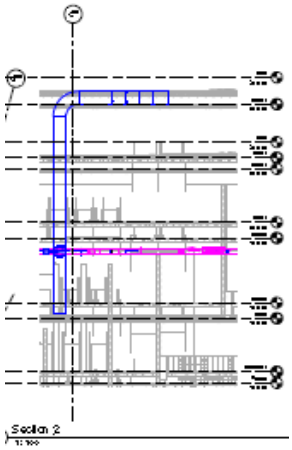


FIGURE 4-30 HAVC SECTION

4-5-5FIRE FIGHTING SYSTEM:

Building Specifications:

Building Masses		Building Risk Users Rating		Building Risk Components Rating		Space Function		Fire Rating Material Type		Building Dimensions	
*	Single Mass		Theater, Restaurants, Hospitals, Airports		High Hazard	*	Storing	*	A Hard carbon materials		2 floors with 1000 m^2 of area
	Single main mass + Scattered masses		Banks, Universities	*	Ordinary Hazard	*	Education Admin Housing and Hosting		B Flammable Liquids		5 Floors (Wet Pipes)
		*	Schools and Kindergartens		Light Hazard		Quiet sounding		C Electrical Equips	*	Above 5 Floors (Dry Pipes)
			Factories				Industry		D Metallic and chemical Materials		
			Laboratories								
			Prisons								
			Commercial Buildings								
			Laboratories								
			Houses and Hotels								
			Warehouses								

TABLE 4-8 Building Specifications:

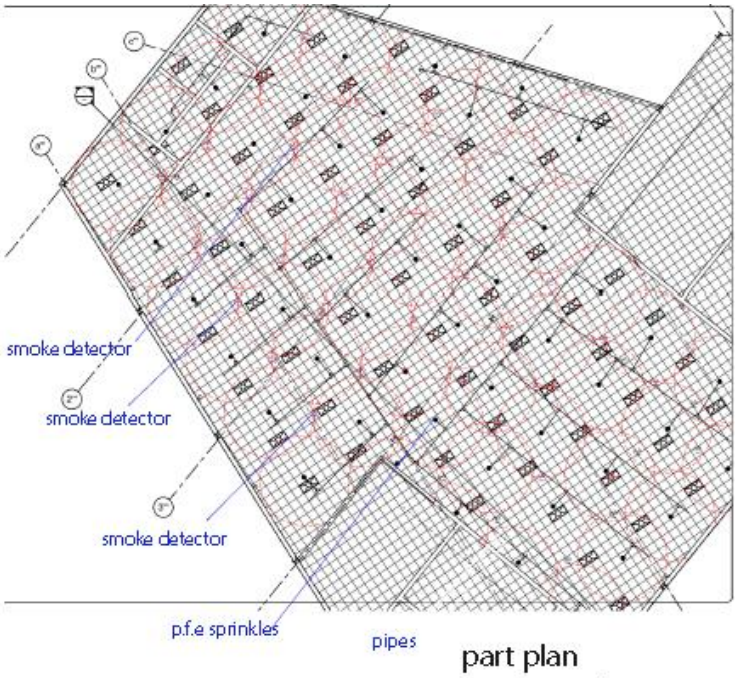


FIGURE 4-32 FIRE FIGHTING PLAN

FIGURE 4-33 FIRE FIGHTING SECTION

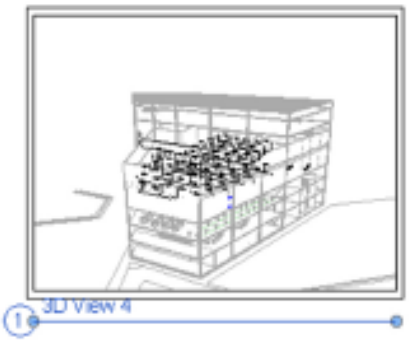


FIGURE 4-34 FIRE FIGHTING VIEW

4-5-6VERTICAL CIRCULATION SYSTEM SELECTION:

Small Homes & Health Centers	***Medium Size Apartment Building & Small Hotels***	***High Rise Residential Building & Office Buildings***	***Large Buildings with special Sectors***	***Crowded Buildings 6 floors maximum***
Internal control system lifts	*Down Aggregation Lifts*	*All Aggregation Lifts*	*Lifts allocation system*	*Escalator System*

TABLE 4-9 Building Specifications:

Initial Estimating of lifts Number:

No of Lifts	Service Rate
1 every 3 stories	Good
1 every 4 stories	Acceptable
1 every 5 stories	Low

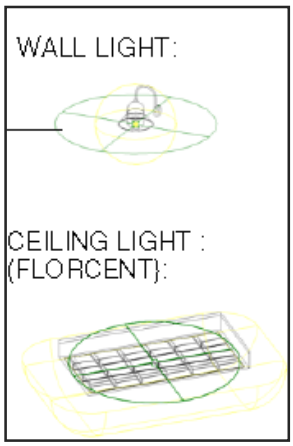
TABLE 4-10 ***Initial Estimating of lifts Number:***

- For the vertical circulation in the building looking at his specs both **Lift allocation system** and **Escalator system** had been chosen.

4-5-7LIGHTING:

fluorescent lamps were used,and for the diversification of lighting wall lamps also used.

The reflection of the walls should be 80% and the floor and tables 30%.



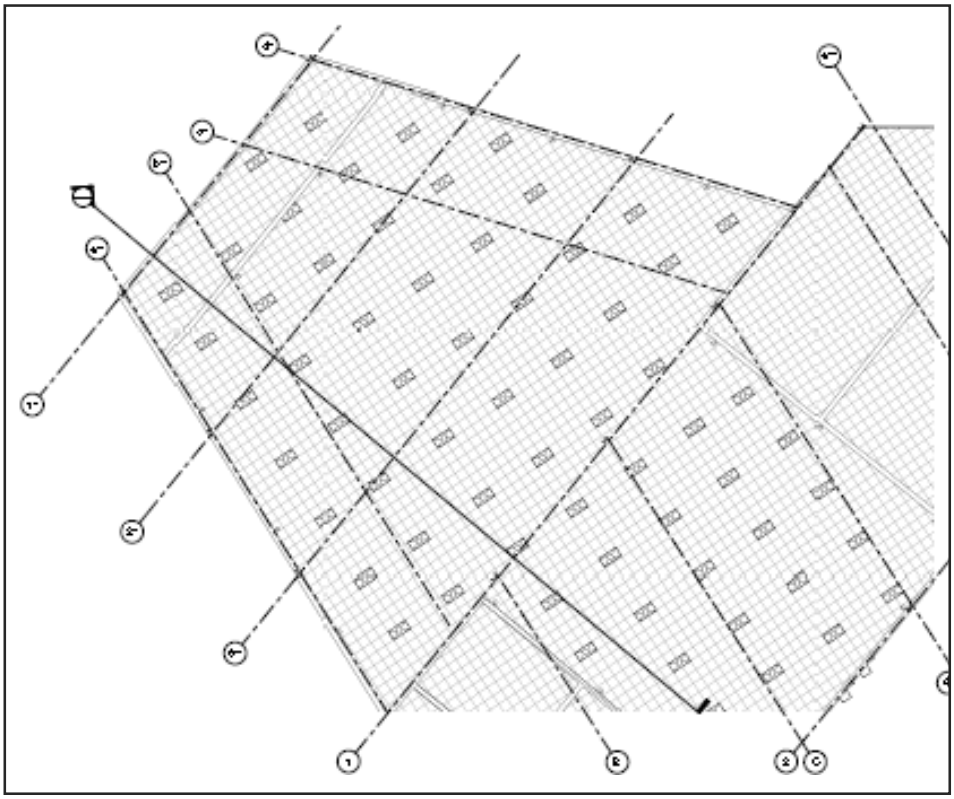
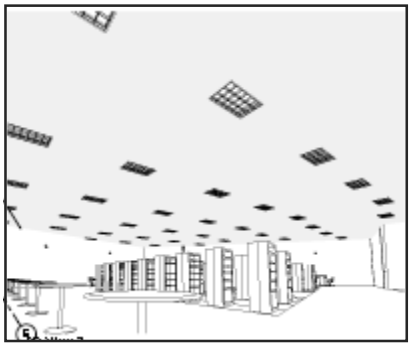


FIGURE 4-35 LIGHTING PLAN

FIGURE 4-36 LIGHTING SECTION



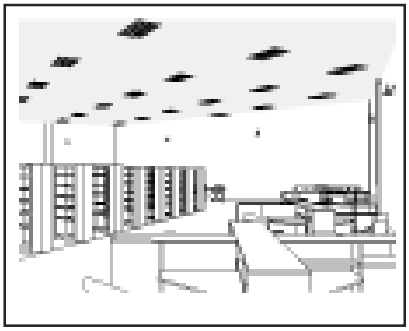


FIGURE 4-37 LIGHTING VIEWS

4-5-8FINISHING SOLUTION:

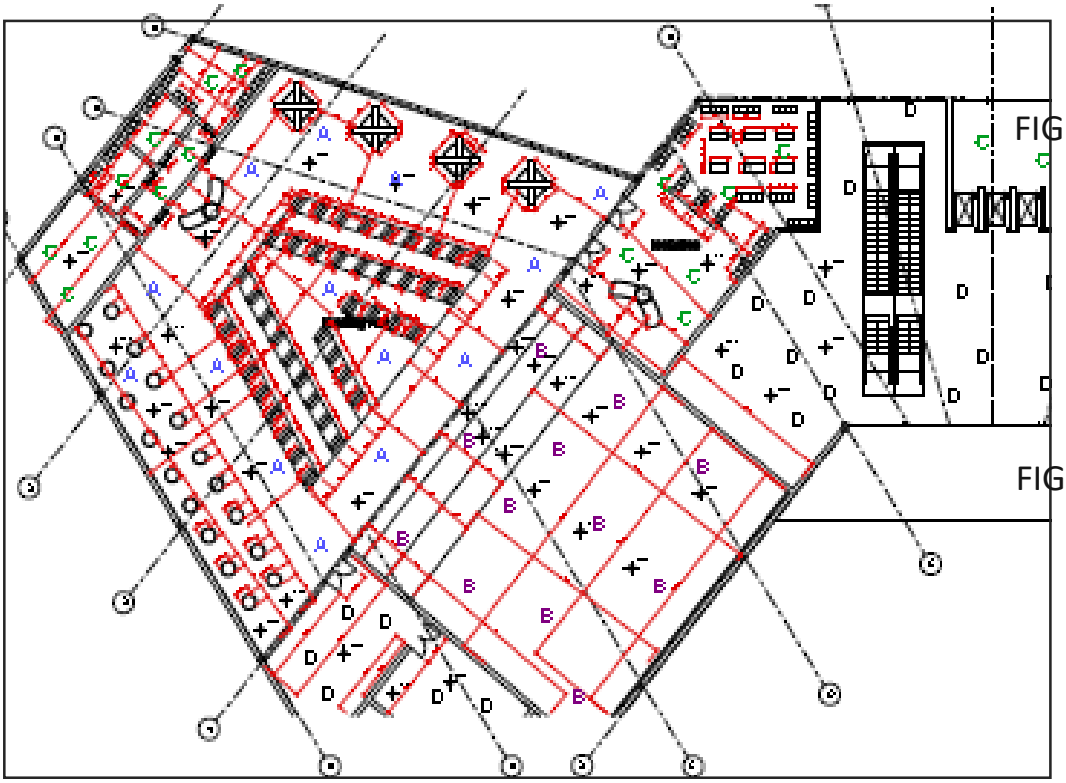


FIGURE 4-38 FINISHING PLAN

FIGURE 4-40 FINISHING DETAIL

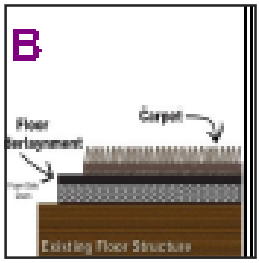


FIGURE 4-41 FINISHING DETAIL

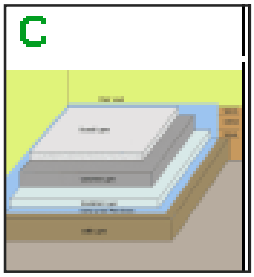


FIGURE 4-42 FINISHING DETAIL

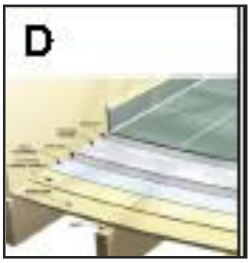


FIGURE 4-43 FINISHING DETAIL

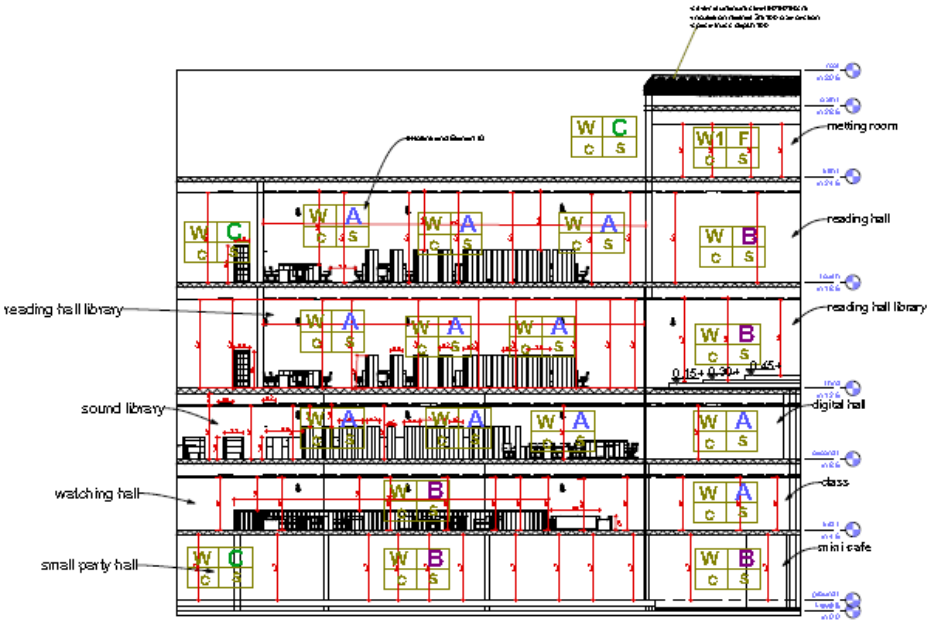


FIGURE 4-39 FINISHING SECTION

W	
W1	
F	
C	
S	

TABLE 4-11 FINSHING

REFRENCES:

- ARCHITECTS HANDBOOK.
- TIME –SAVER STANDARD FOR BUILDING TYPES.
  -MCGRAW-HILL BOOK CO SINGAPORE FOR MANUFACTURE AND EXPORT
- ARCHDAILY.
- PINTEREST.
- WIKIPEDIA.
- GOOGLE.
- MINISTRY OF NATIONAL PLANNING IN KHARTOUM.
- RADIO OMDURMAN 2018.