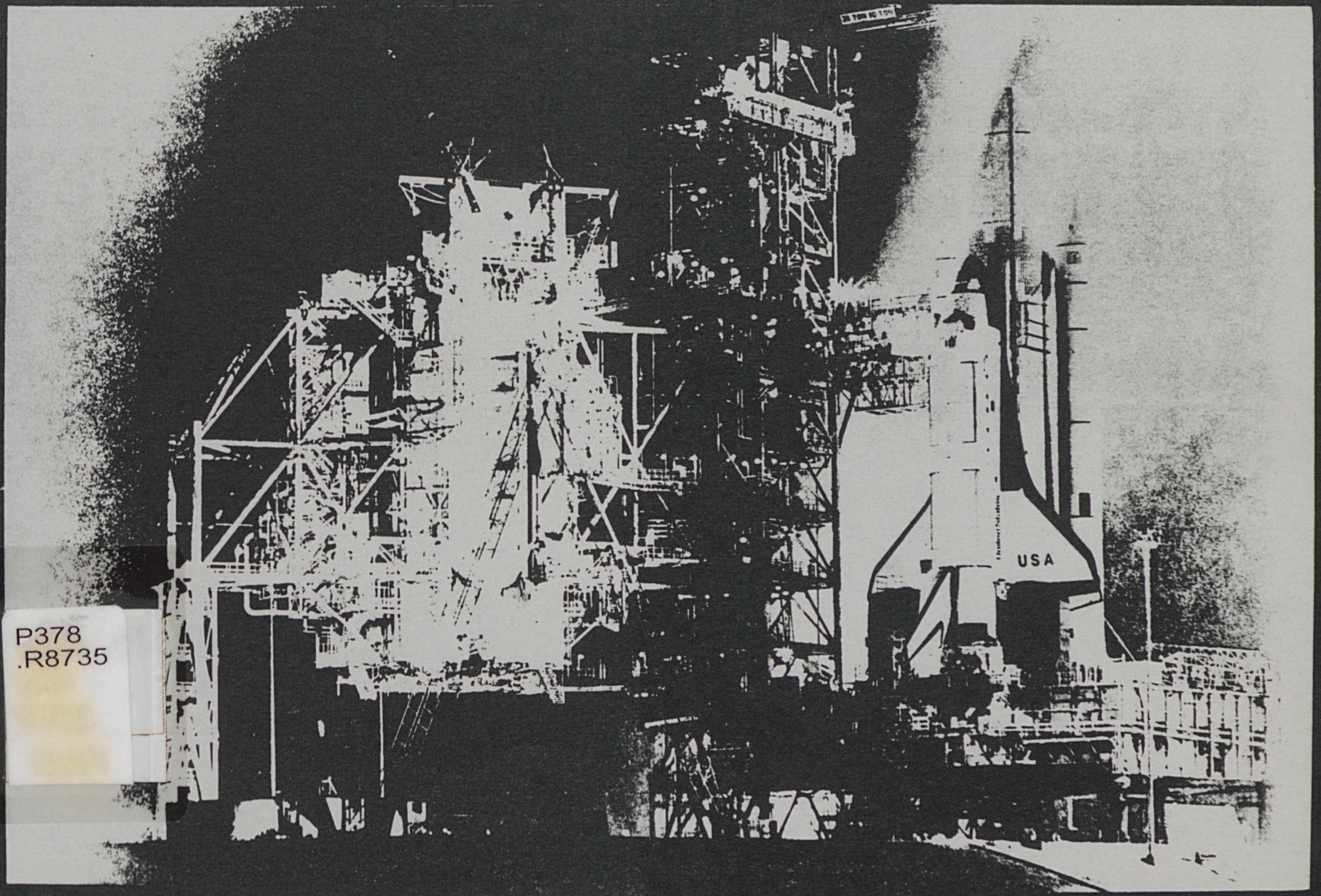
A CONFERENCE CENTER

THE STRATEGIC EXPLORATION OF SPACE

FOR THE LIST INSTITUTE FOR



P378
.R8735

A CONFERENCE CENTER

FOR THE LIST INSTITUTE FOR THE
STRATEGIC EXPLORATION OF SPACE
in Colorado Springs, Colorado
by

Charles W. Runge, Jr.

An Undergraduate Thesis in Architectural Design
submitted in partial fulfillment
of the requirements for the degree
of
BACHELOR OF ARCHITECTURE

Tom Wood
Thesis Advisor

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Robert C. Utzinger
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Montana State University
Bozeman, Montana
June, 1986

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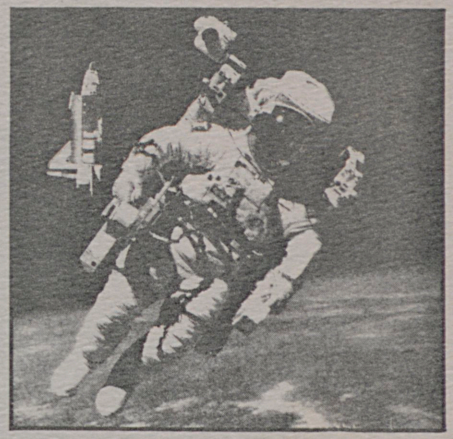
For my father. Thanks Dad.

In memory of the seven men and women who dared to break the bonds of Earth--who lost their lives on January 28, 1986, searching for the secrets of the universe. Their deaths will not be in vain, for we still carry their dreams, their hopes, their ambitions. When we reflect upon their courage, along with that of the pioneers of the past, it will surely prompt future explorations in the attempt to seek out still awaiting unknown secrets.--

--Astronauts Ellison S. Onizuka, Christa McAuliffe, Gregory B. Jarvis, Judith A. Resnik, Michael J. Smith, Francis R. Scobee and Ronald E. McNair.

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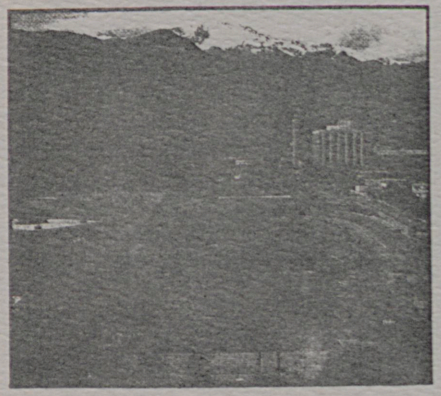


I N T E N T I O N S

I have always had a personal affinity toward Space. Mankind has already greatly benefited from the technology given to us by that frontier. However, there is still an insurmountable amount of technology yet to be developed from future discoveries. While space travel and exploration is difficult and expensive, it is more necessary now than ever. Space is offering us infinity. We must not allow the challenges we face today to deny us that offering. It is therefore my intent to create an architecture that will metaphorically bridge the gap between Earth and Space; an architecture that will further enhance the exploration, discovery and learning processes available in that next frontier.







COLORADO SPRINGS

To the west of Colorado Springs towers the city's greatest landmark--Pikes Peak, a 14,110 feet mountain set in the Rocky Mountain Range. To the north, south and east, the city is bordered by the gently rolling high plains. The people of Colorado Springs enjoy a healthy economy in a setting of unparalleled splendor.

Colorado Springs currently has a population of 360,000 people. Many of these people were attracted to the city's tourist, high-tech, military, and recreational industries. It is estimated that one out of every nineteen workers is employed by the tourist industry, and one out of every ten is employed in high-tech industry.

Perhaps one of the greatest economic bases in Colorado Springs is the military presence. These include Fort Carson, the Air Force Academy, Peterson Air Force Base, the North American Air Defense Command (NORAD), the USAF Space Command (SPACECOM), the Falcon Air Station, and the Consolidated Space Operations Center (CSOC). It is estimated that one out of five workers in Colorado Springs is either in the military or a federal civil service worker.

In addition to business attractions, Colorado Springs offers countless recreational activities, and is the official training site of the U.S. Olympic Team. Also, some of the world's best ski areas are a few short hours away.

Due to the Rocky Mountains to the west, the Air Force Academy to the north, and Fort Carson to the south, Colorado Springs' growth potential is oriented to the east. In fact, the city is expected to double in size in five to ten years. Furthermore, the rolling plains to the east offer an economical setting for growth.

INTRODUCTION TO PROJECT

Nine miles to the east of Colorado Springs is the site of the Consolidated Space Operations Center, CSOC (pronounced See-Sock). CSOC will have the role of being the operational nucleus of the United States Space Command. It will plan and control all of the Department of Defense Space Shuttle operations--almost half of the Space Shuttle's flights will be controlled on the ground by CSOC. In addition, CSOC will control much of the satellite activity.

In anticipation of the potential growth and needs produced by CSOC, ML Properties has set aside a 3,800 acre commercial industrial development to be called the Aerospace Centre. The center will serve the potential space oriented industries that will be drawn by CSOC. Furthermore, the Aerospace Centre has specifically set aside a research institute to explore the many facets of technology available in the exploration of space. This institute will be called the List Institute for the Strategic Exploration of Space, named after its founder, Dr. Martin List.

The first phase of the List Institute will include: a conference center, an academic research building, a space research information center, and a maintenance facility. For my thesis, I have decided to focus on the conference center. The following is a list of the facilities and activities of the conference center as dictated by the clients program, which I will be using as the given space requirements. These, along with the master plan for the Aerospace Centre, will set the parameters of the project.

It should be noted that an ideal program would involve the direct interaction with the client to determine needs. The nature of a thesis project however, does not lend itself very easily to this sort of professional/client relationship. The program developed from the following list then, will be evolved from a developmental process, based on my own intuition, research, and limited client contact.

Facilities/Activities:	Area (sq. ft.)
1. Adman/service/maintenance	7000
-offices	
-coat room	
-information ctr	
-duplicating ctr	
-non-conference areas	
2. Food Service	18200
-cafeteria (400 seats)	4400
-dining room (200 seats)	3000
-banquet room (small)	2000
-banquet room (large)/exhibit area	5000
-coffee shop	1800
-kitchen areas	2000
3. Meeting rooms (5 x 1200)	6000
4. Communications Lecture Hall (400-500 seats/stage)	20000
-lobby/circulation area	
-display/exhibition area	
-storage/lecture prep area	
-technicians area	

5. Miscellaneous	10000
-art gallery	
-mail center	
-restrooms	
-employee lounge/restroom	
-corridors	
-telephone conf. area	
-mechanical rooms	
-janitorial spaces	
-storage	
Conference Center Total Area	61200

Parking Area: 100,000 sq. ft.

<u>Conference Center</u>

Estimated Cost: $8.6 mil

60,000 to 70,000 sq. ft.

<u>Addition to Conference Center</u>

Estimated Cost: $5.0 mil

20,000 to 25,000 sq. ft.

Note: Area figures are only approximates and should not be considered as requirements.

My thesis will begin by formulating an understanding of the Conference Center and the other facilities of the Research Institute. This understanding of the overall network will facilitate in the choosing of the most appropriate site for the Conference Center. Various schemes for a Research Institute masterplan will be developed with the aid of a site model that encompasses both of the possible sites. The final scheme will be presented in this book.

Next, I will evaluate the functions and needs of the individual spaces, the needs of the client, and the responses to the immediate and adjacent sites. I will first examine the functional nature of the Conference Center, in order to attain a background and guidelines for my exploration of vision, image, and form.

Lastly, it is my intention that this process culminate in the realization of an architectural solution.

M A S T E R P L A N

Because the Conference Center is functionally the community center of the Research Institute, which is in turn an integral part of the Aerospace community, it will be necessary to first masterplan the Research Institute before choosing a site for the Conference Center. This will be done by first understanding the various facilities of the Institute and their interrelationships. By planning for the development, the Conference Center will be able to better serve the Research Institute. The masterplan will show the expected building and parking areas for the various facilities, which will be determined by first understanding the individual facilities, and later, the overall network. A road system will be planned so as to facilitate an efficiency of transportation, security, and accessibility.

SPACE RESEARCH INFORMATION CENTER/ LARGE MAINFRAME COMPUTER

PURPOSE

The Information Center will be an integral part of the Institute. It will be used to store the large amounts of data acquired and developed by the institute, as well as providing the means and access to computer hardware capable of supporting the analytical processing and access of the scientific information and data.

DESCRIPTION

The Information Center is based on two key elements: (1) a computer center and (2) a computer network information system. Both activities will be sheltered in the same facility in order to accommodate common computer support and interface requirements. The information center is made up of office space, conference rooms, programming prep areas, tech library, supply storage (classified and unclassified), and other necessary support spaces.

NUMBER OF USERS

The Information Center will be the nerve center of the Institute and will serve as a host computer that will connect to a network of machines around the world. Each individual researcher then, will have an on-line work station in his/her office (academic research building).

ACCESSIBILITY

The facility will utilize a "tempest" security system to prevent electronic eavesdropping on classified or proprietary research programs. A work station for each researcher in the academic research building will gain access to the mainframe computer via a work station in his/her office.

VISIBILITY

It is not important for the Information Center to be highly visible.

ACCESS TO VIEWS

Views to the outside are not mandatory and may in fact conflict with security requirements.

ADJACENCY REQUIREMENTS

The information center should be located near the research lab and the academic research buildings. However, its location should also facilitate an invulnerable security system.

APPROXIMATE BUILDING AREA

45,000-50,000 square feet

A C A D E M I C R E S E A R C H B U I L D I N G S

PURPOSE

Designed for research in specific space related industries, the Academic Research facilities will be divided into separate buildings. Each building will be appropriately designed for its field of study (i.e. medical, manufacturing, law, etc.)

DESCRIPTION

The research buildings will be made up of private office space, semi-private office space, conference rooms, and the necessary support spaces.

NUMBER OF USERS

Upon completion, the research complex will consist of six separate buildings. There will be approximately 200-250 distinguished fellows with another 750 research associates dispersed among the complex. Each building will be occupied by approximately 200-250 people.

ACCESSIBILITY

The research buildings are to be accessible to the researchers and their associates, along with distinguished visitors. For security purposes, each academic building will have a below-ground conference room/vault.

VISIBILITY

Each research building should be distinguishable from the next, however it is not important that these particular buildings be very visible from the roadway.

ACCESS TO VIEWS

The Academic Research buildings should utilize views to the outside. While each space within the facility may not require views, visual comfort for the office space might be maintained through views to the outside.

ADJACENCY REQUIREMENTS

Conference Center, Research Lab, Information Center

APPROXIMATE BUILDING AREA

45,000-50,000 square feet each

RESEARCH LABORATORIES

PURPOSE

The Research Laboratories are primarily intended for research in the basic scientific disciplines of biology, chemistry, physics, medicine, and the physical sciences as they relate to the space environment.

DESCRIPTION

A total of three Research Laboratories will satisfy the research operational needs. The laboratory should remain flexible to allow for variations in research projects, occupancy, and equipment configuration. The labs will also have research study areas, and an extensive and secure storage area. The research labs will require extensive mechanical services.

NUMBER OF USERS

The three Research Laboratories will be available to the expected 200-250 distinguished fellows and their respective research associates.

ACCESSIBILITY

The Research Laboratories are strictly reserved for their intended researchers. However the research labs should be accessible to emergency vehicles.

VISIBILITY

Visibility may be important for the aspect of image and identity but need not be considered for reasons related to accessibility.

ACCESS TO VIEWS

Views are not a consideration.

ADJACENCY REQUIREMENTS

Academic Research Buildings, Maintenance Facility, space research information center

APPROXIMATE BUILDING AREA

20,000-25,000 square feet each

S P A C E R E S E A R C H M U S E U M

PURPOSE

The Museum will be a scientific information exchange medium. It will attract technically sophisticated visitors who will use the museum as a means of direct visual/tactile interaction with space hardware, research projects, and the scientific precepts influencing the military and commercial exploration of space.

DESCRIPTION

The form and size of the exhibit mediums within the museum will vary, and will be dependent upon the nature and size of the display. Movable partitions or lightweight structures should be incorporated in order to allow for a greater diversity of space and flexibility.

NUMBER OF USERS

The Research Museum is intended to be used by the researchers and their staffs. It will not, for the most part, be a museum that is open to the public.

ACCESSIBILITY

Because the museum is intended to serve as a research tool, distinguished visitors will be permitted to see and touch the exhibits.

VISIBILITY

Because the museum is not a public oriented space, it need not be highly visible to the public. However, it should be easily distinguishable to the members of the Institute.

ACCESS TO VIEWS

Controlled natural lighting will be used, however due to the nature of its inward focus, the museum will not require any significant views to the outside. Any provisions for views and natural lighting should not hamper the security of the facility.

ADJACENCY REQUIREMENTS

Academic Research Facility, Research Laboratories, Space Research Information Center

APPROXIMATE BUILDING AREA

15,000-20,000 square feet

D I S T I N G U I S H E D V I S I T O R S
F A C I L I T Y

PURPOSE

The Distinguished Visitors Facility will provide a high quality, temporary lodging facility for visiting researchers who will be participating in projects for extended periods (one week to three months).

DESCRIPTION

The Visitors Facility will contain studio and one and two bedroom units. Each unit will have a living room, kitchen and laundry facilities, and an on-line work station linked with the information center. In addition the facility will incorporate common areas that will provide space for small group meetings.

NUMBER OF USERS

The facility will include 10 studio units, 12 one bedroom units, and 6 two bedroom units. In addition, each unit will have a garage, with additional parking for visitors provided.

ACCESSIBILITY

The Visitors Facility is restricted to a specific user group. Privacy should not be interrupted by persons not intended for the facility.

VISIBILITY

The Visitors Facility does not require a high degree of visibility. The site location should allow for some degree of privacy.

ACCESS TO VIEWS

Views to the outside are very important. The site location should permit views of the Rocky Mountains and/or the golf course.

ADJACENCY REQUIREMENTS

The site location for the visitors facility may be influenced by the off site hotel accommodations, as well as a desired adjacency to the Conference Center, Academic Research buildings, and the Recreational Facility.

APPROXIMATE BUILDING AREA

25,000 square feet

RECREATION FACILITY

PURPOSE

The Recreation Facility will provide a safe, healthful, and attractive atmosphere for a varied program of activities for adults of both sexes.

DESCRIPTION

The facility will serve as a golf clubhouse, and will incorporate areas for racquetball, handball, exercise equipment, indoor swimming, and tennis. The facility will also include storage areas, administrative offices, mens' and womens' locker rooms, showers, toilets, hot tub and steam room, and mechanical areas.

NUMBER OF USERS

The facility will jointly serve people from the List Institute and the Aerospace Centre complex. It is expected to serve an overall complex population of 8,000 to 10,000 people at maturity.

ACCESSIBILITY

Users will arrive to the facility by automobile or walking. It should be sited in a location that is accessible to the golf course, as it will also serve as the golf clubhouse.

VISIBILITY

The Recreation Facility should be readily visible from the roadway, and the greater part of the golf course.

ACCESS TO VIEWS

The outdoor recreational and public areas should accommodate views to the outside. The facility should overlook the golf course.

ADJACENCY REQUIREMENTS

Golf Course, Conference Center, Distinguished Visitors Facility

APPROXIMATE BUILDING AREA

20,000-25,000 square feet

M A I N T E N A N C E F A C I L I T Y

PURPOSE

The Maintenance Facility will contribute to the efficient operation and support of all equipment and personnel throughout the Institute.

DESCRIPTION

The Maintenance Facility will shelter fire equipment, snow removal equipment, ground maintenance equipment, carpenter storage, incinerator, plumbing shop, welding shop, paint shop with spray booth, and bench supply area. The internal needs will include office space, toilet and shower facilities, and a small four man dormitory for a 24 hour maintenance/fire fighting crew.

NUMBER OF USERS

The Maintenance Facility will service the Research Institute site with a crew of 25-40 person, four of which will be 24 hour residents.

ACCESSIBILITY

The Maintenance Facility need only be accessible to maintenance employees, however there is not a need to require restriction to its entry.

VISIBILITY

The Maintenance Facility need not be highly visible and should in fact remain discreet in its location.

ACCESS TO VIEWS

Portions of the facility may benefit from views to the exterior (for instance the living quarters). For the most part, however, views are not an important consideration.

ADJACENCY REQUIREMENTS

The Maintenance Facility should be sited in a location that will serve the entire Institute.

APPROXIMATE BUILDING AREA

20,000-25,000 square feet

C O N F E R E N C E C E N T E R

THE PREMISE OF FUNCTION

The conference center is to serve as the community center for the Research Institute. It will aid in unifying the separate entities into a working, living whole. The conference center will service the expected 1500-1800 people of the Institute. The lecture hall, meeting rooms, banquet, cafeteria, and dining facilities should all accommodate the functions of a single large group, or the functions of several smaller groups.

Those using the conference center will for the most part, be involved with the lecture hall, meeting rooms, cafeteria, and banquet facilities. It is important to extend certain support facilities to these groups and intermesh their activities within themselves and with those of the other groups. Comfort, interest, and education are all goals in stimulating the activities of the user.

C O N F E R E N C E C E N T E R

THE PREMISE OF FORM

The site for the Institute is approximately nine miles to the east of Colorado Springs. The vegetation is dry and the topography is minimal. These site elements, along with the clients desire to produce a bold new architecture, tend to discourage a building that is formally discreet. The views are directly west, consisting of the Rocky Mountain Range. It is the clients desire to decrease the harshness of the environment, and create and maintain a more interactive one.

There are 53 acres allotted for the Institute. The entire Institute upon completion will be approximately 650,000 square feet in building area. The character of the environment and its surroundings should be formal, and yet maintain a free open feeling. The proximity of the golf course to the Institute purposely enhances the quality of the environment.

The form of the Conference Center should not only functionally house its required facilities, but should aesthetically suggest its purpose by its appearance and design. Furthermore, the building should make an architectural statement that reflects the purpose of space research and the List Institute.

C O N F E R E N C E C E N T E R

THE PREMISE OF ECONOMY

The List Institute for the Strategic Exploration of Space will be formed and operated as a nonprofit organization. Initial funding will be provided by private donations and invested capital by ML Properties. Of the available funding, the conference center is allotted 8.6 million dollars.

The conference center, along with an academic research building, will be the first building on the Aerospace Center development. An expected total of 139.4 million dollars will be spent on three phases of the Institute.

By 1995, the Institute is expected to be financially independent. Operating and building capital will be provided by research generated revenue and grants.

C O N F E R E N C E C E N T E R

THE PREMISE OF TIME

The Institute intends to remain a dynamic social and functional organization. Research Fellow accession rate is estimated at fifteen per year. The last phase of the Institute is expected to be completed in 2007, at which time it is expected to have enrolled between 200-250 Research Fellows, 600-750 Technical Staff Assistants and 700-800 Support Personnel. Future goals for the Institute include hosting a National Space Conference in 1991 and an International Space Conference in 1992, and the recipient of a Nobel Prize laureate prior to 2000.

M A S T E R P L A N

THE FINAL SCHEME

The Conference Center was located on a highly visible portion of the site. Its location will also allow for access of views overlooking the rest of the Research Institute, the golf course, and the mountains to the west. Parking for the Conference Center will be located in a less visible portion of the site, directly to the north of the building area. Landscaping will serve as a buffer from the winter winds.

The Maintenance Facility is located on the highest elevation of the site. Its distance from the roadway will diminish its visibility and yet it will still have the ability to overlook the entire Research Institute complex. The slope near the Maintenance Facility is minimal, which will facilitate the efficient parking and storage of maintenance equipment. Views are also still available for the 24 hour live-in maintenance crew.

The Recreation Facility is located at the northernmost part of the site. Its location allows for a golf club house that can overlook the golf course, as well as an easy access from the roadway.

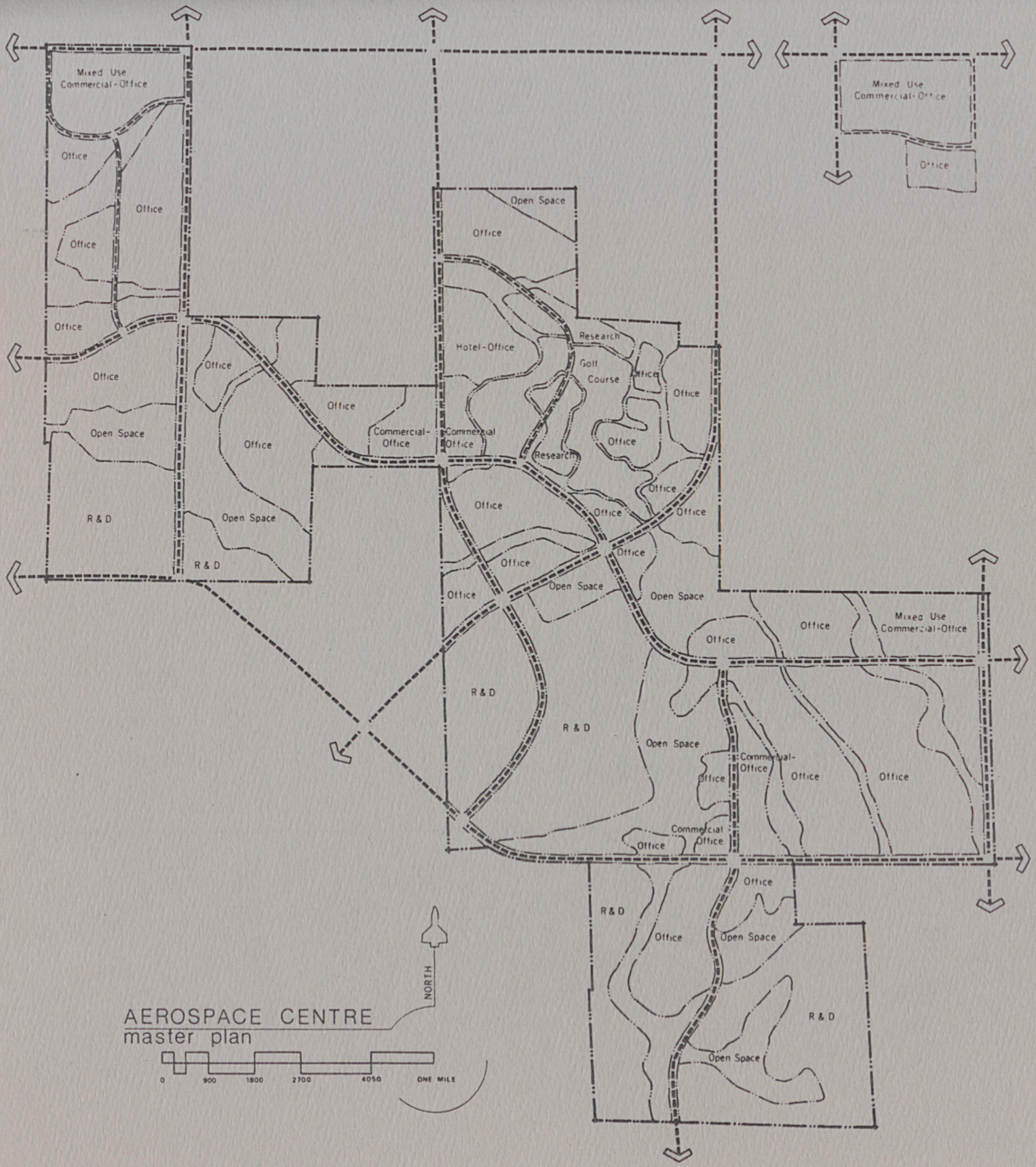
The Distinguished Visitors Facility is located juxtaposed to the Hotel-Office development of the Aerospace Centre. Its location offers views of the mountains to the west, the golf course to the south, and easy access to the Recreation Facility and Conference Center.

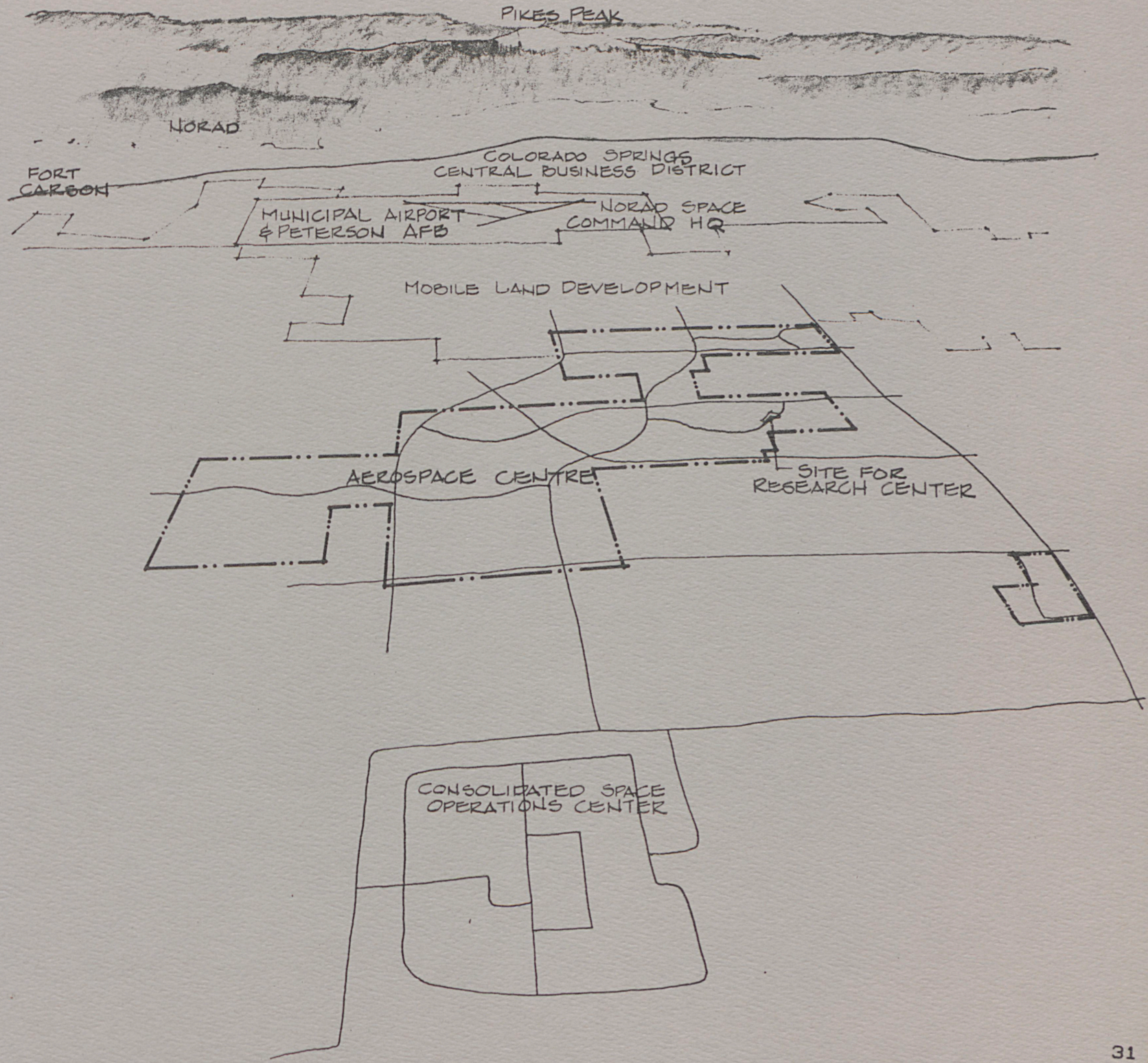
The Academic Research Facilities, Research Laboratories, Space Research Information Center, and Research Museum, are all located on the southernmost site. Their location with the golf course as a circumscribing buffer zone, initiates a more efficient security system. These areas require a tight security which will be enhanced by the separation of the site and the possibility to strictly control access.

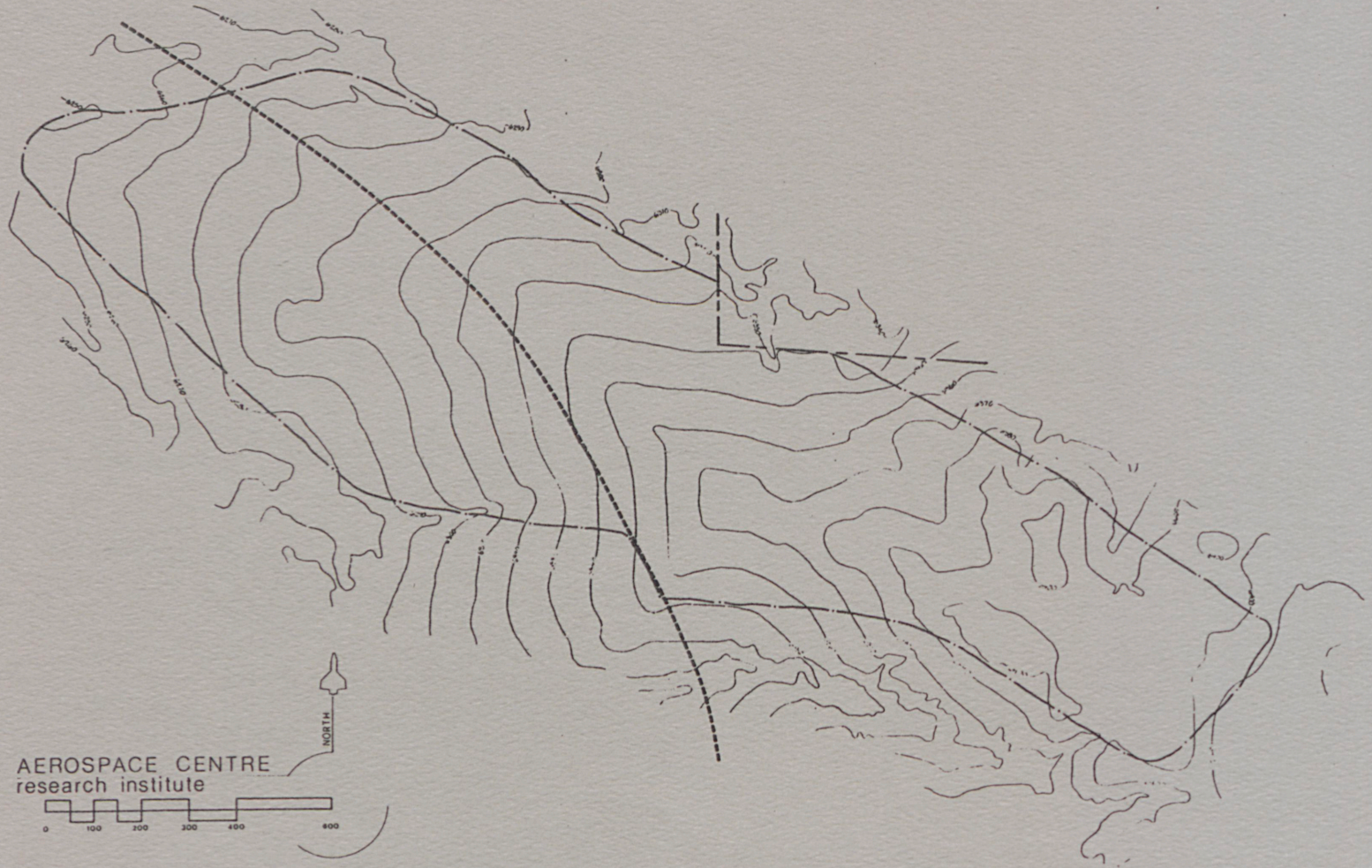
Each Research Laboratory will service two Academic Research buildings. Their locations will allow for the expected phasing of construction of the facilities. Parking will be located between the facilities and the roadway, in order to not disrupt the views of the mountains and the golf course.

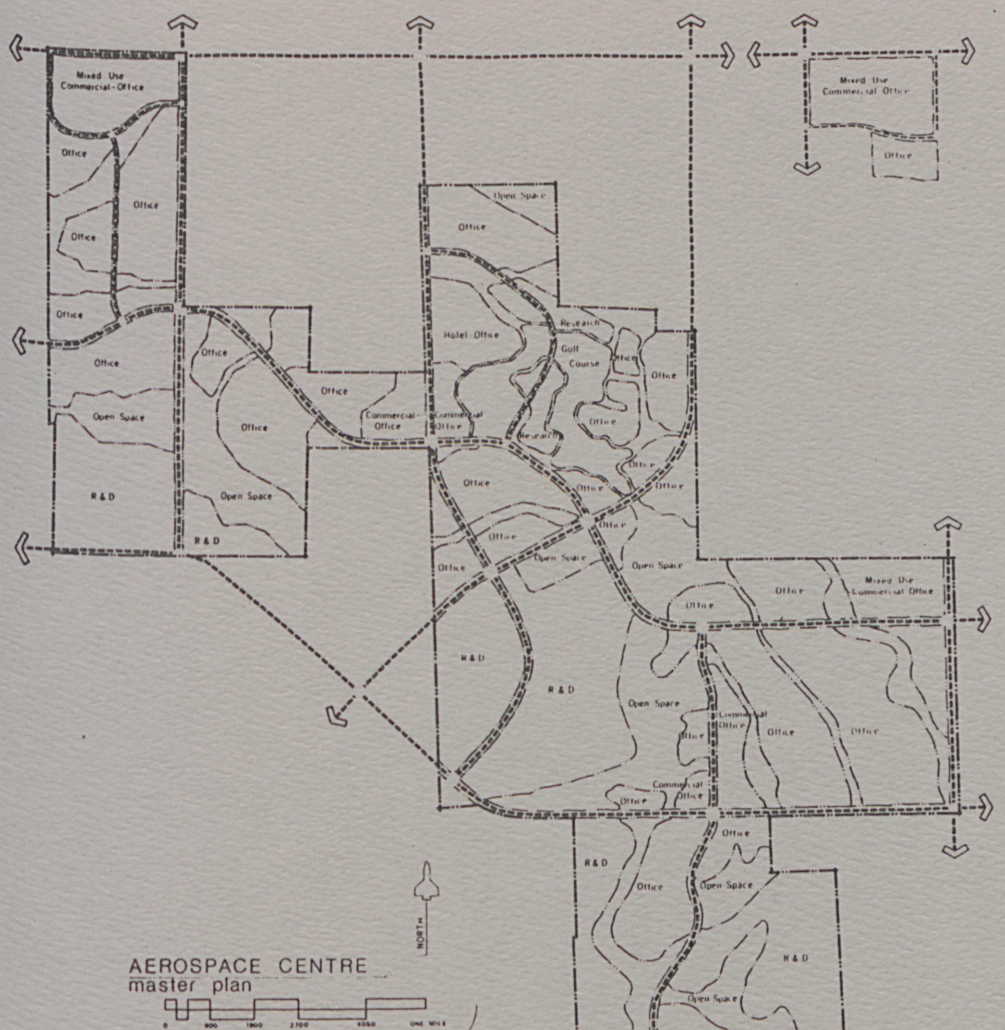
The Space Research Information Center is located in close proximity to the Academic Research Labs, and in a relatively centralized location in the Research Institute. Its location will facilitate a more efficient communication system.

The Research Museum is located as an addition to the Space Research Information Center, as it too will serve as a learning center.


Mixed Use
Commercial-Office
Office
Office
Office
Office
Office
Office
Open Space
R & D
R & D
Open Space
Office
Office
Commercial-
Office
Commercial
Office
Open Space
Office
Hotel-Office
Research
Golf
Course
Office
Office
Office
Research
Office
Office
Office
Office
Office
Office
Office
Open Space
Open Space
R & D
R & D
Open Space
Office
Office
Mixed Use
Commercial-Office
Commercial-
Office
Office
Office
Commercial
Office
Office
Office
R & D
Office
Open Space
R & D
Open Space
Mixed Use
Commercial-Office
Office
Office
NORTH
AEROSPACE CENTRE
master plan
0
900
1800
2700
4050
ONE MILE


PIKES PEAK
NORAD
FORT CARSON
COLORADO SPRINGS CENTRAL BUSINESS DISTRICT
MUNICIPAL AIRPORT & PETERSON AFB
NORAD SPACE COMMAND HQ
MOBILE LAND DEVELOPMENT
AEROSPACE CENTRE
SITE FOR RESEARCH CENTER
CONSOLIDATED SPACE OPERATIONS CENTER

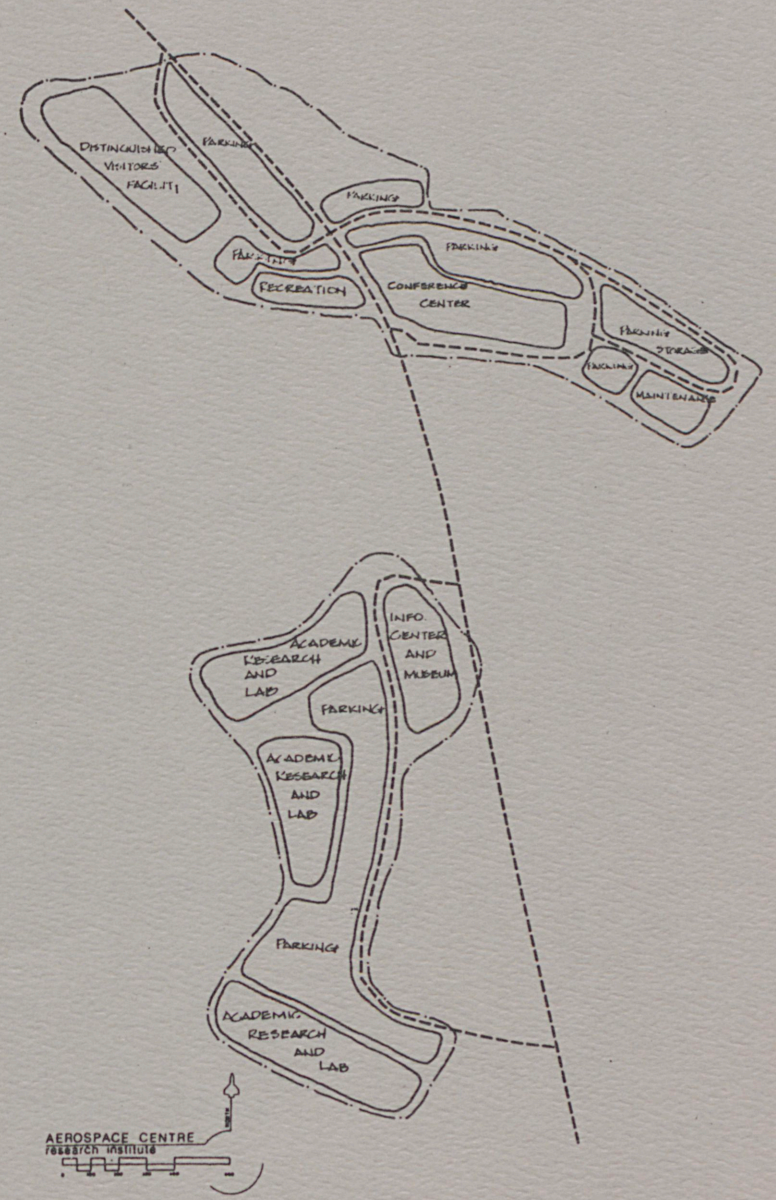

NORTH
AEROSPACE CENTRE
research institute
0
100
200
300
400
600



AEROSPACE CENTRE
master plan



AEROSPACE CENTRE
research institute


DISTINGUISHED VISITORS FACILITY
PARKING
PARKING
PARKING
RECREATION
CONFERENCE CENTER
PARKING
PARKING
MAINTENANCE
ACADEMIC RESEARCH AND LAB
INFO. CENTER AND MUSEUM
PARKING
ACADEMIC RESEARCH AND LAB
PARKING
ACADEMIC RESEARCH AND LAB
AEROSPACE CENTRE
research institute

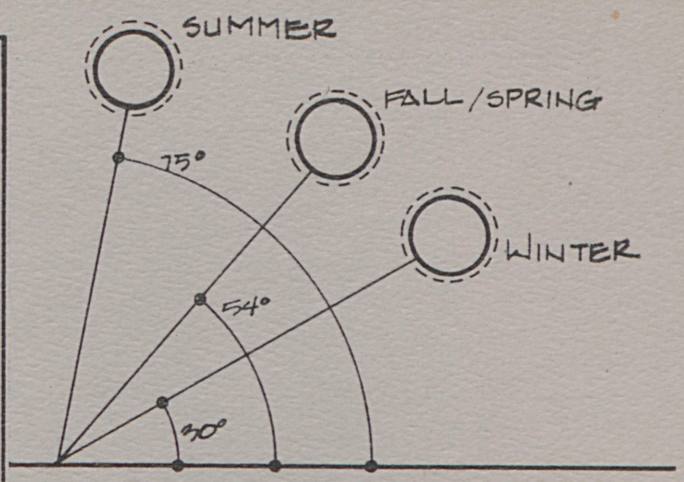
C L I M A T O L O G I C A L D A T A

LATITUDE.....	37 degrees North
ELEVATION.....	6,035 feet
AVERAGE DAILY TEMP.....	high of 61.4 degrees low of 35.4 degrees
AVERAGE WINTER TEMP.....	37.3 degrees
WINTER DRY BULB.....	-10 degrees
SUMMER DRY BULB.....	95 degrees
SUMMER WET BULB.....	65 degrees
DAILY RANGE.....	high
DAYS OF SUNSHINE.....	250 (annual average)
DAYS OVER 90 DEGREES.....	19
HOTTEST MONTH.....	July (temp. in degrees) average high of 84.8 average low of 57.1
COLDEST MONTH.....	January (temp. in degrees) average high of 42.0 average low of 15.8
ANNUAL AVG. HUMIDITY.....	high of 86% low of 38%
ANNUAL PRECIPITATION.....	15.73"

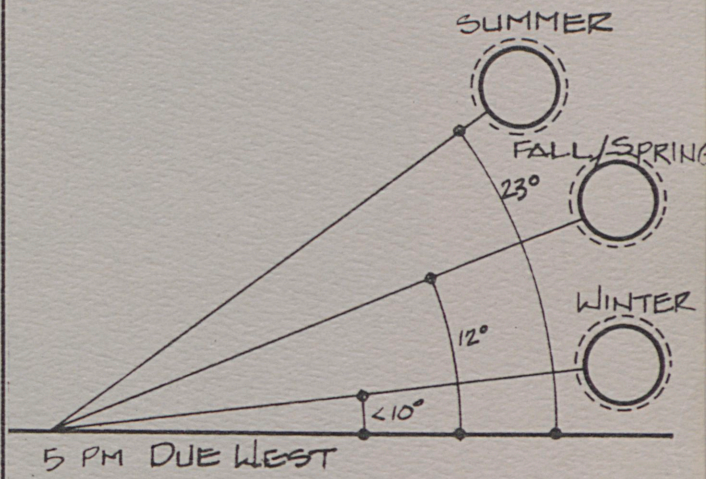
DEGREE DAYS..... 6254 total

JANUARY.....	1122
FEBRUARY.....	930
MARCH.....	874
APRIL.....	555
MAY.....	307
JUNE.....	75
JULY.....	8
AUGUST.....	21
SEPTEMBER.....	124
OCTOBER.....	422
NOVEMBER.....	777
DECEMBER.....	1039

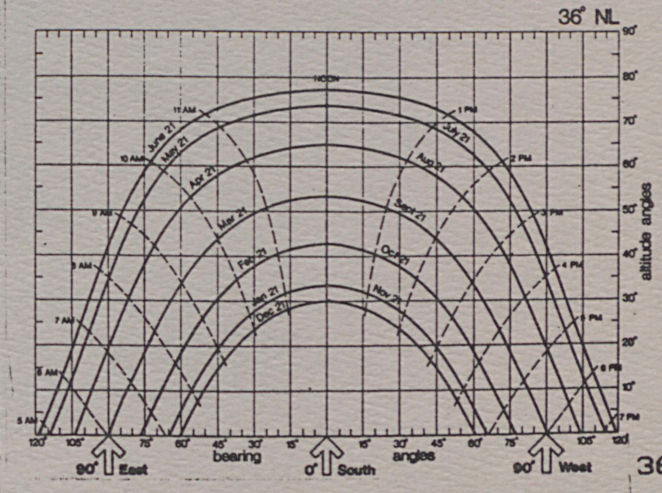
WINDS	direction	speed
JANUARY.....	NNE	9.5 mph
FEBRUARY.....	N	10.2 mph
MARCH.....	N	11.3 mph
APRIL.....	N	11.9 mph
MAY.....	NNW	11.4 mph
JUNE.....	SSE	10.6 mph
JULY.....	NNW	9.4 mph
AUGUST.....	N	9.0 mph
SEPTEMBER.....	SSE	9.5 mph
OCTOBER.....	NNE	9.7 mph
NOVEMBER.....	NNE	9.6 mph
DECEMBER.....	NNW	9.6 mph



12 NOON SOUTH



5 PM DUE WEST



SUMMER (JUNE 22)

SUNRISE (4:50 A.M.) BEARING = 120 EAST

SUNSET (7:10 P.M.) BEARING = 120 WEST

SPRING (MARCH 21 & FALL (SEPT 23)

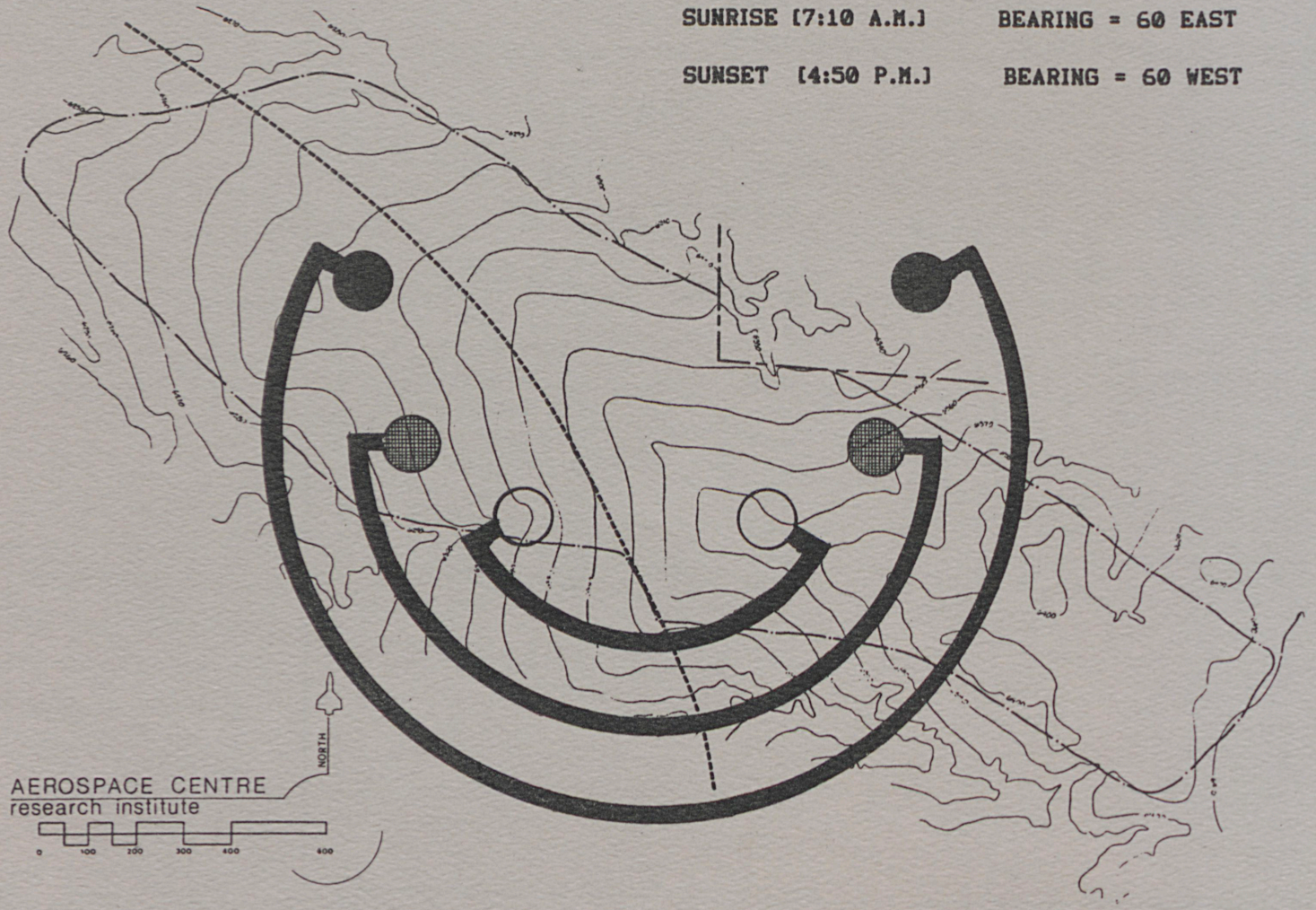
SUNRISE (6:00 A.M.) BEARING = 90 EAST

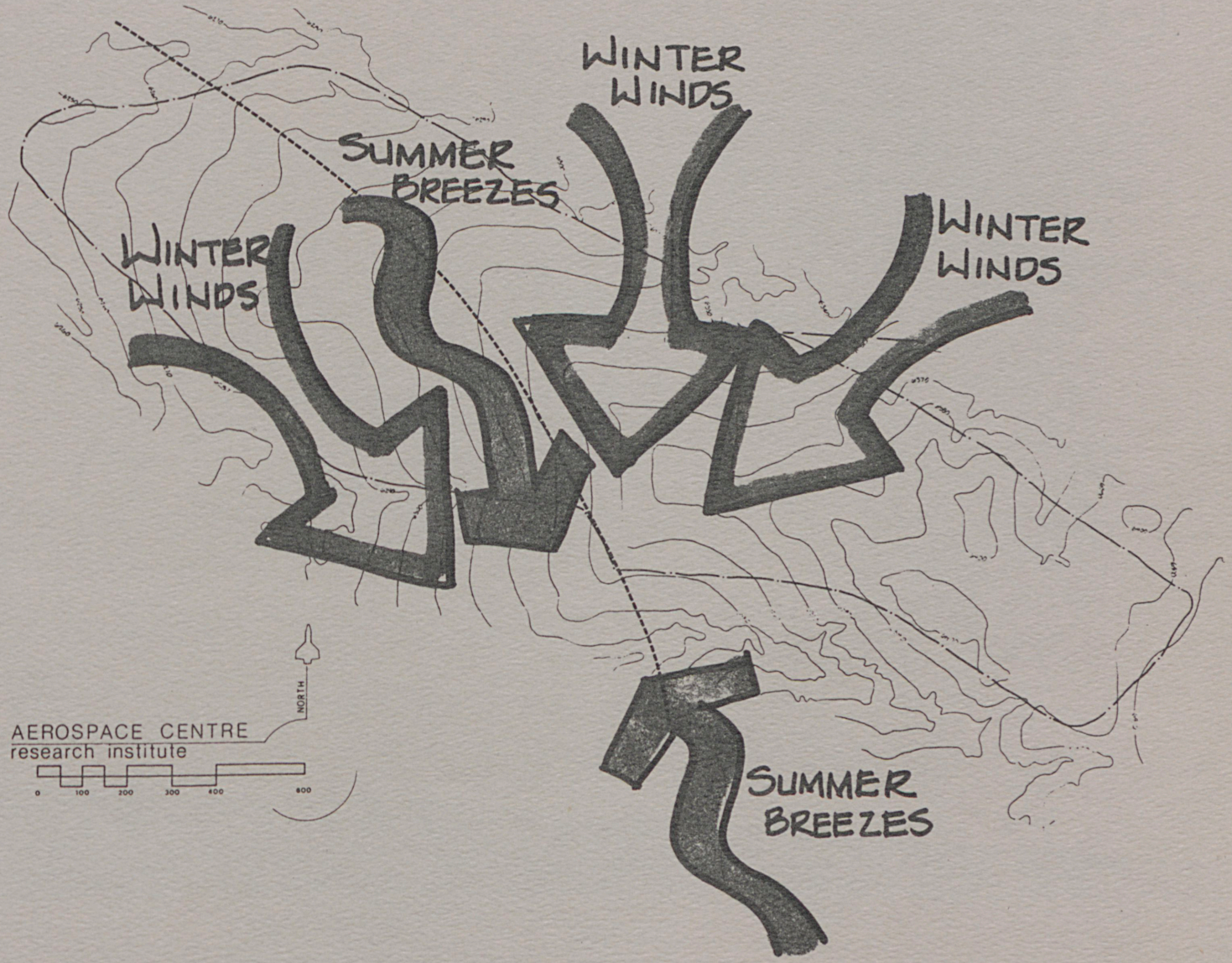
SUNSET (6:00 P.M.) BEARING = 90 WEST

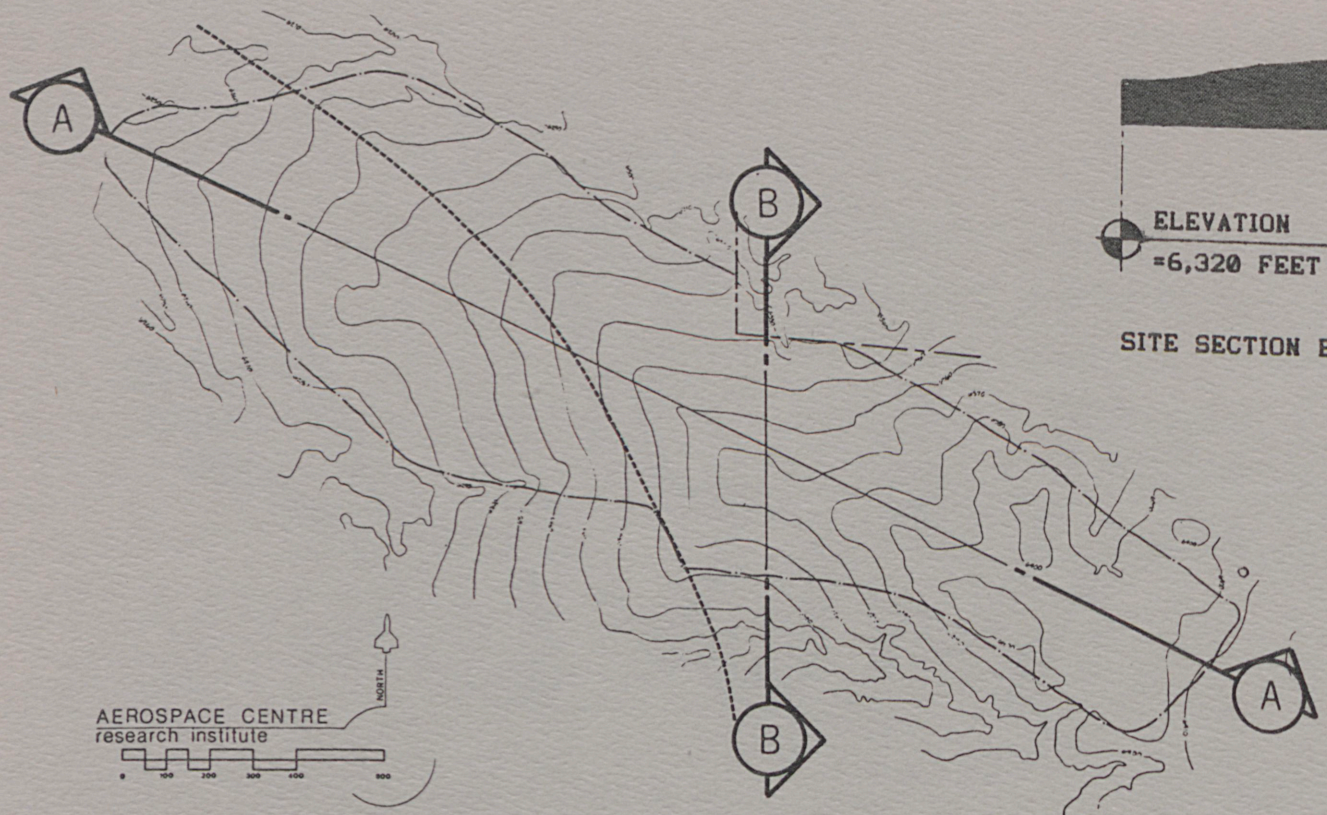
WINTER (DEC 22)

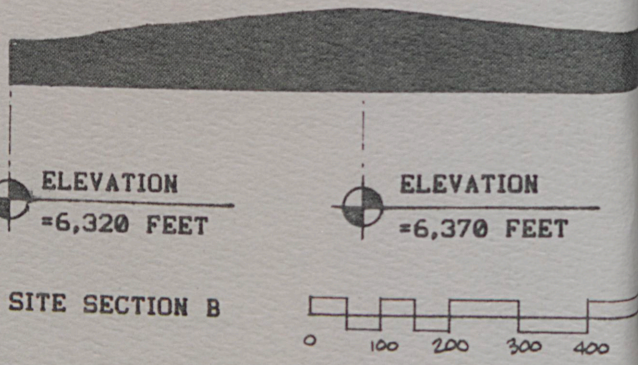
SUNRISE (7:10 A.M.) BEARING = 60 EAST

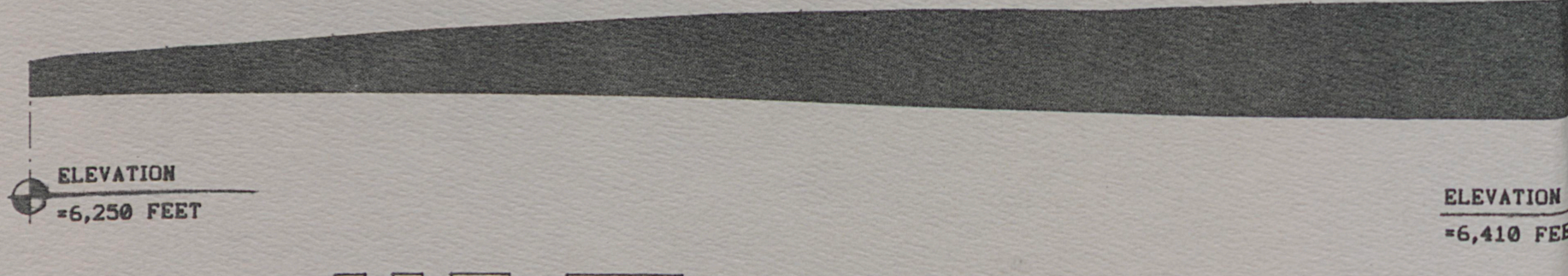
SUNSET (4:50 P.M.) BEARING = 60 WEST

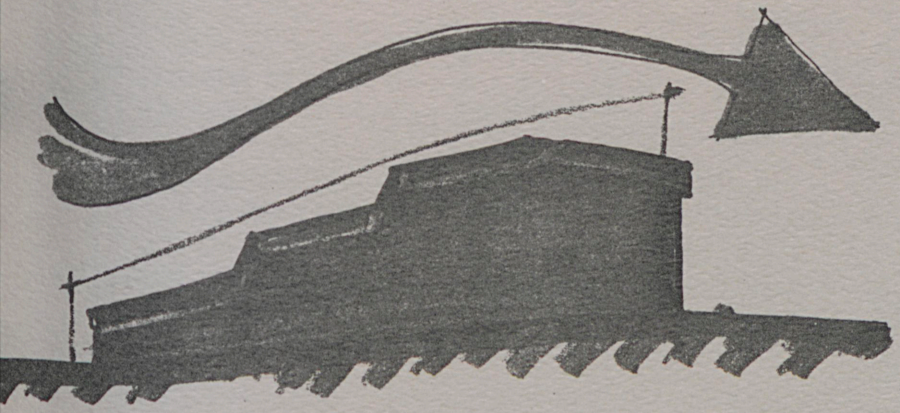



WINTER WINDS
SUMMER BREEZES
WINTER WINDS
WINTER WINDS
SUMMER BREEZES
NORTH
AEROSPACE CENTRE
research institute
0
100
200
300
400
800

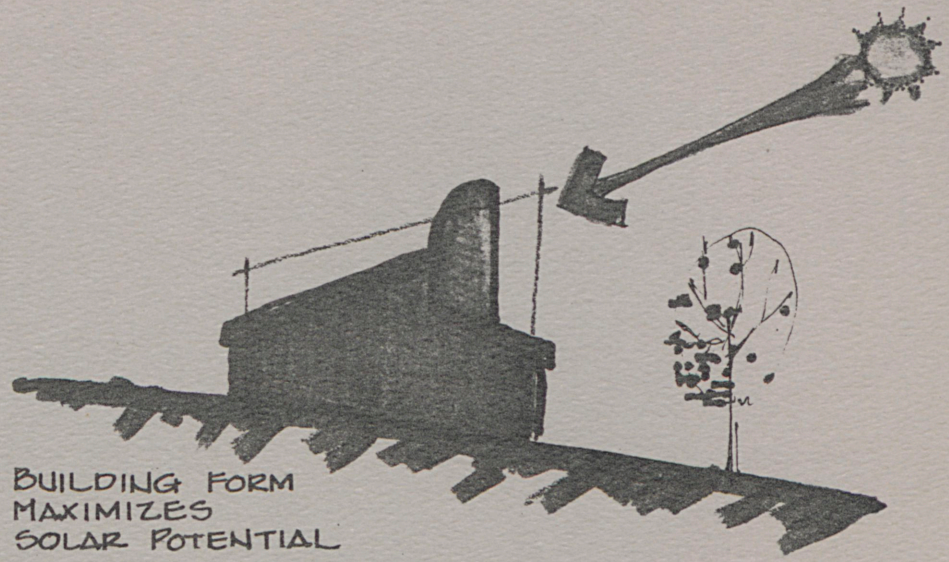

A
B
B
A
NORTH
AEROSPACE CENTRE
research institute
0 100 200 300 400 500


ELEVATION
=6,320 FEET
ELEVATION
=6,370 FEET
SITE SECTION B
0 100 200 300 400

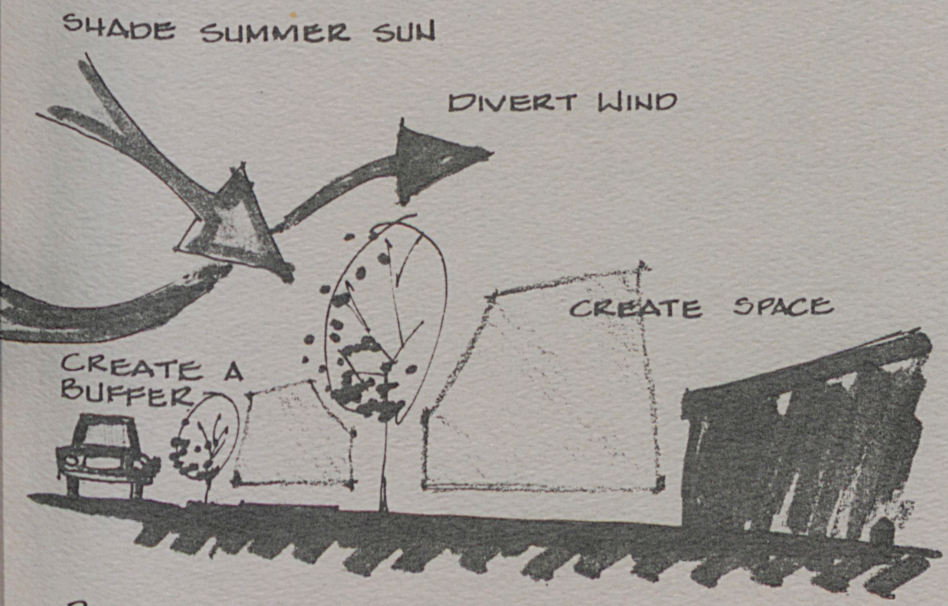

ELEVATION
=6,250 FEET
ELEVATION
=6,410 FEE
SITE SECTION A
0 100 200 300 400 600



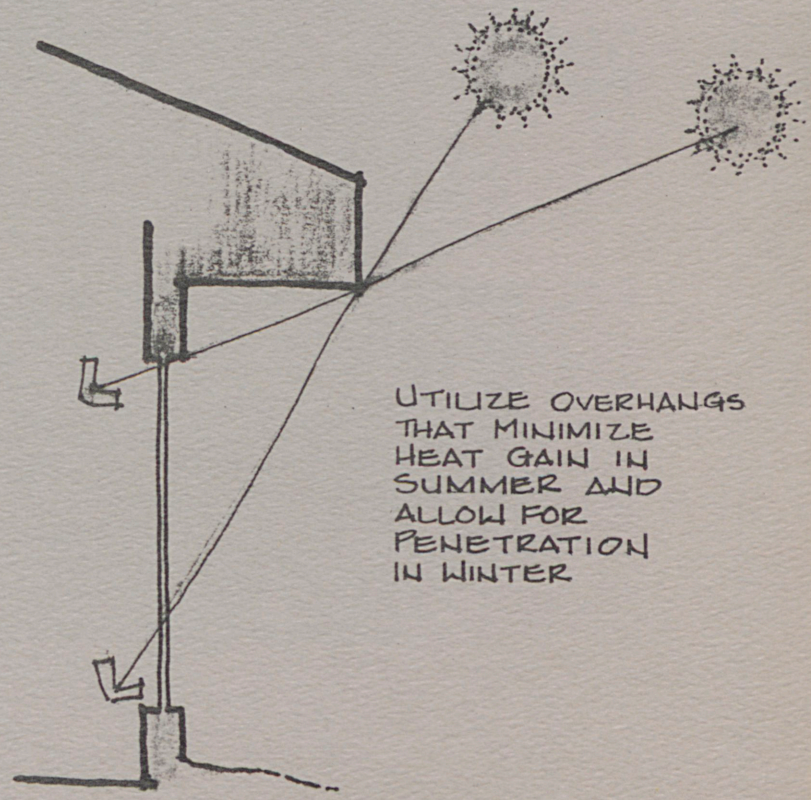
BUILDING FORM AIDS IN THE FLOW OF WINTER WINDS FROM THE NORTH



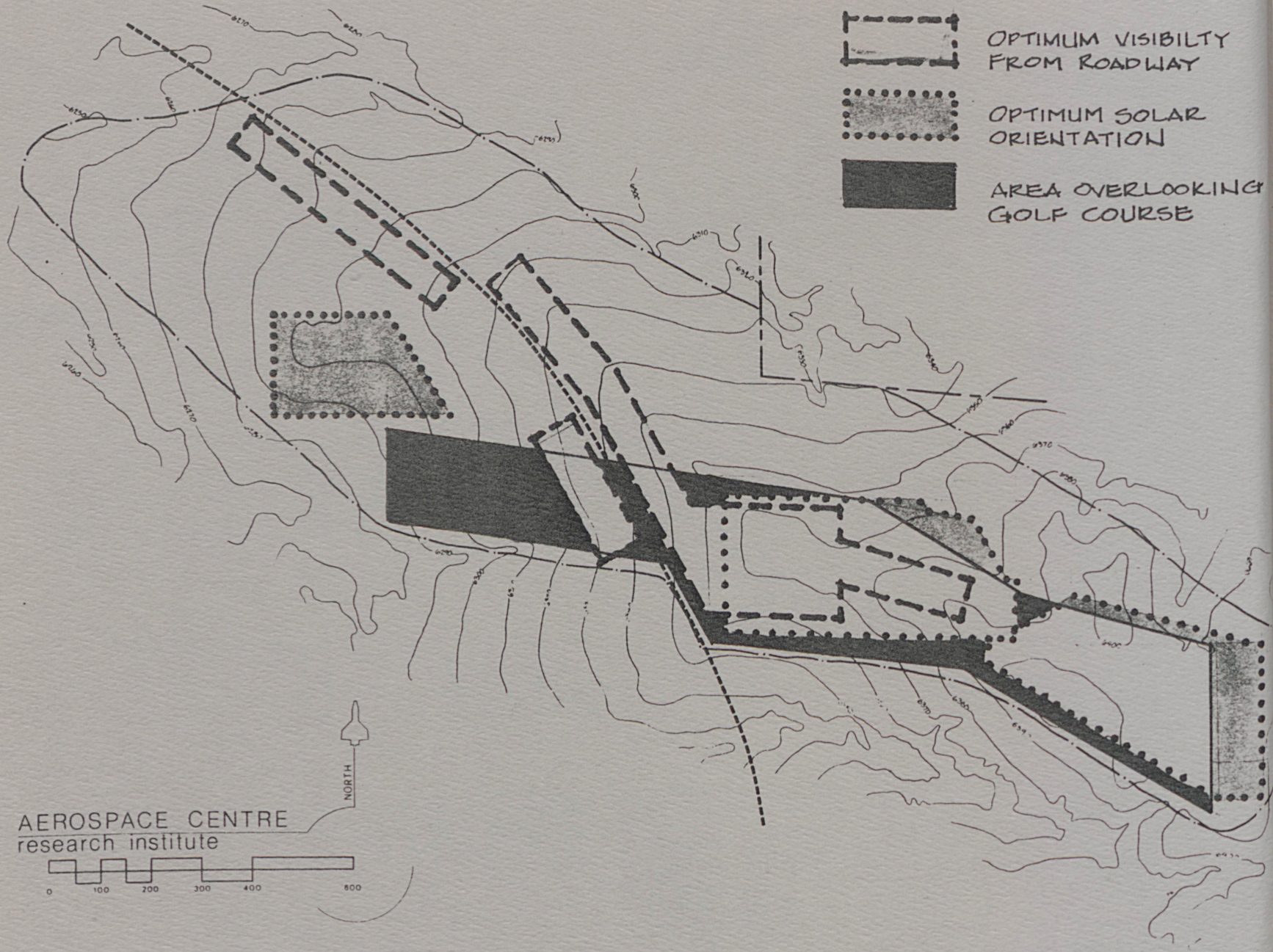
BUILDING FORM MAXIMIZES SOLAR POTENTIAL

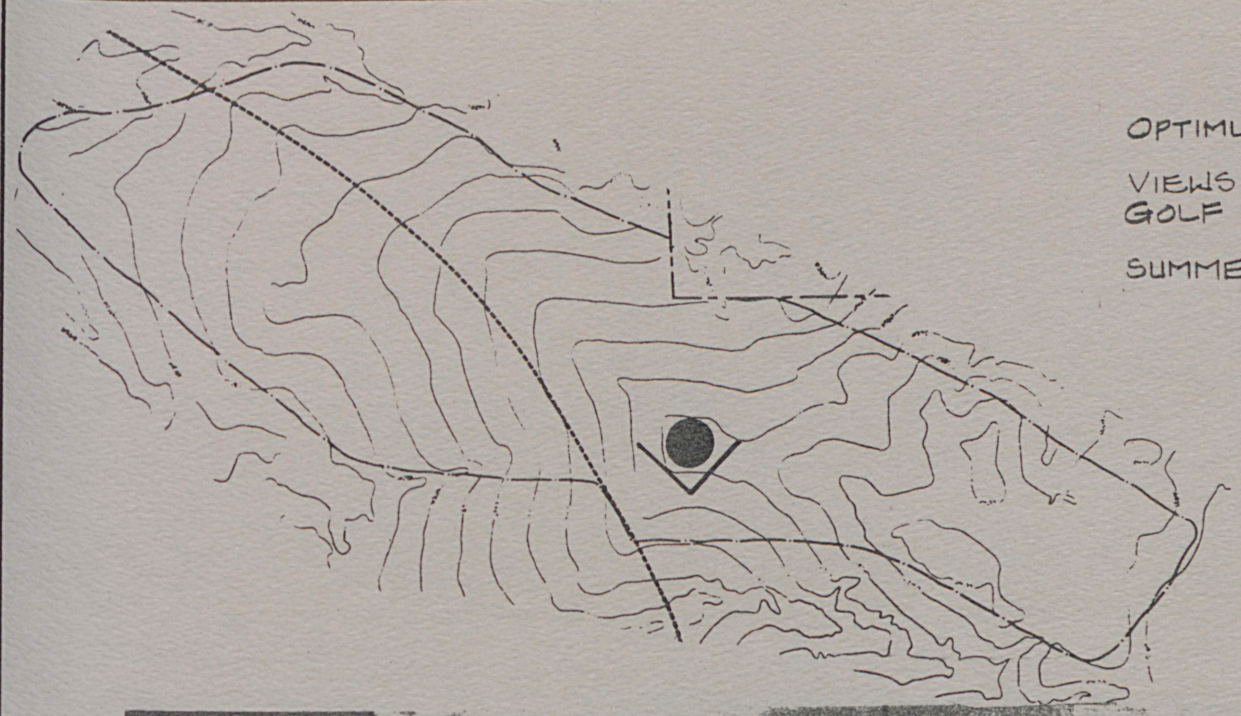


PLANTS USED TO CREATE SPACE AND MANIPULATE THE ENVIRONMENT



UTILIZE OVERHANGS THAT MINIMIZE HEAT GAIN IN SUMMER AND ALLOW FOR PENETRATION IN WINTER

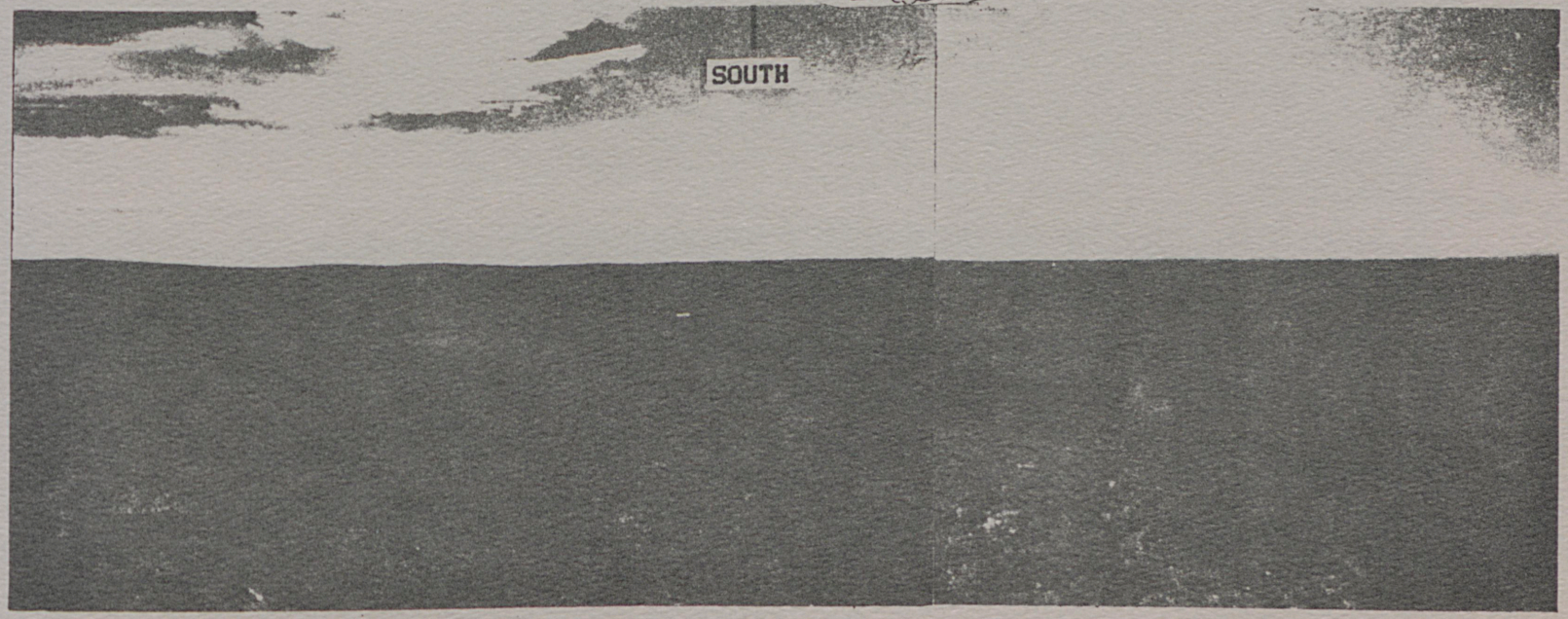

OPTIMUM VISIBILTY FROM ROADWAY
OPTIMUM SOLAR ORIENTATION
AREA OVERLOOKING GOLF COURSE
NORTH
AEROSPACE CENTRE
research institute
0
100
200
300
400
800

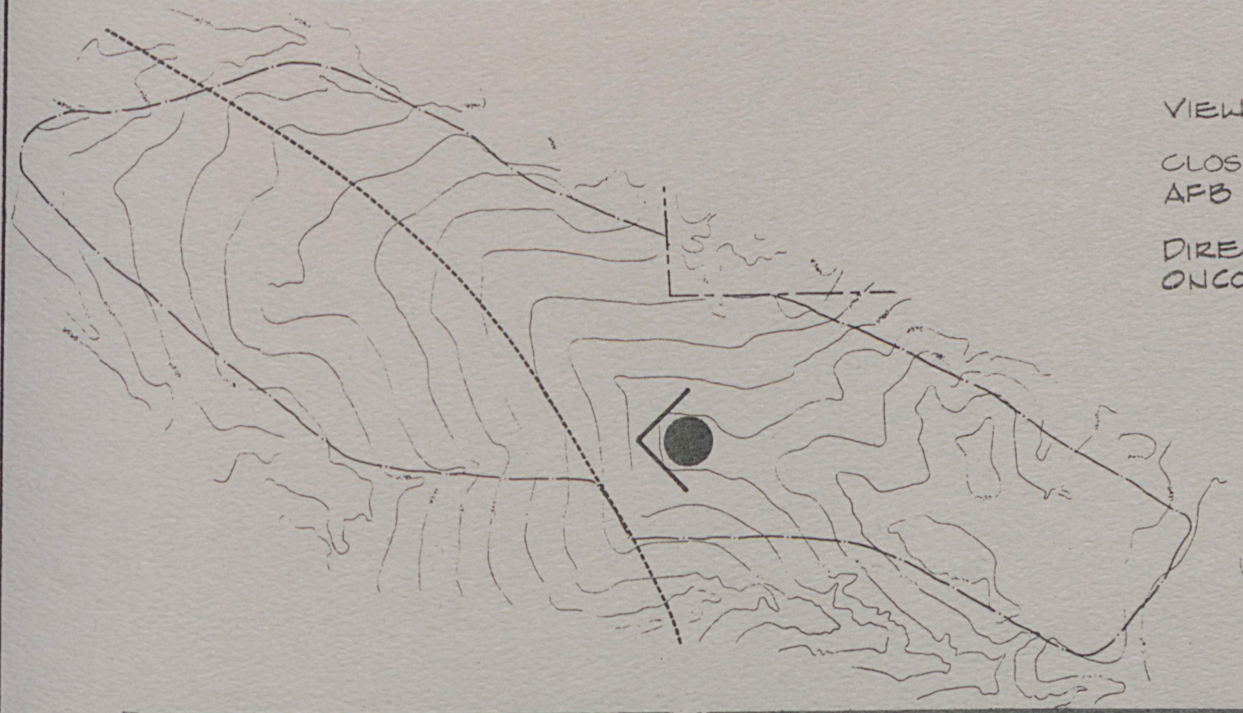


OPTIMUM SOLAR ORIENTATION

VIEWS OVERLOOKING THE GOLF COURSE

SUMMER BREEZES FROM SSE

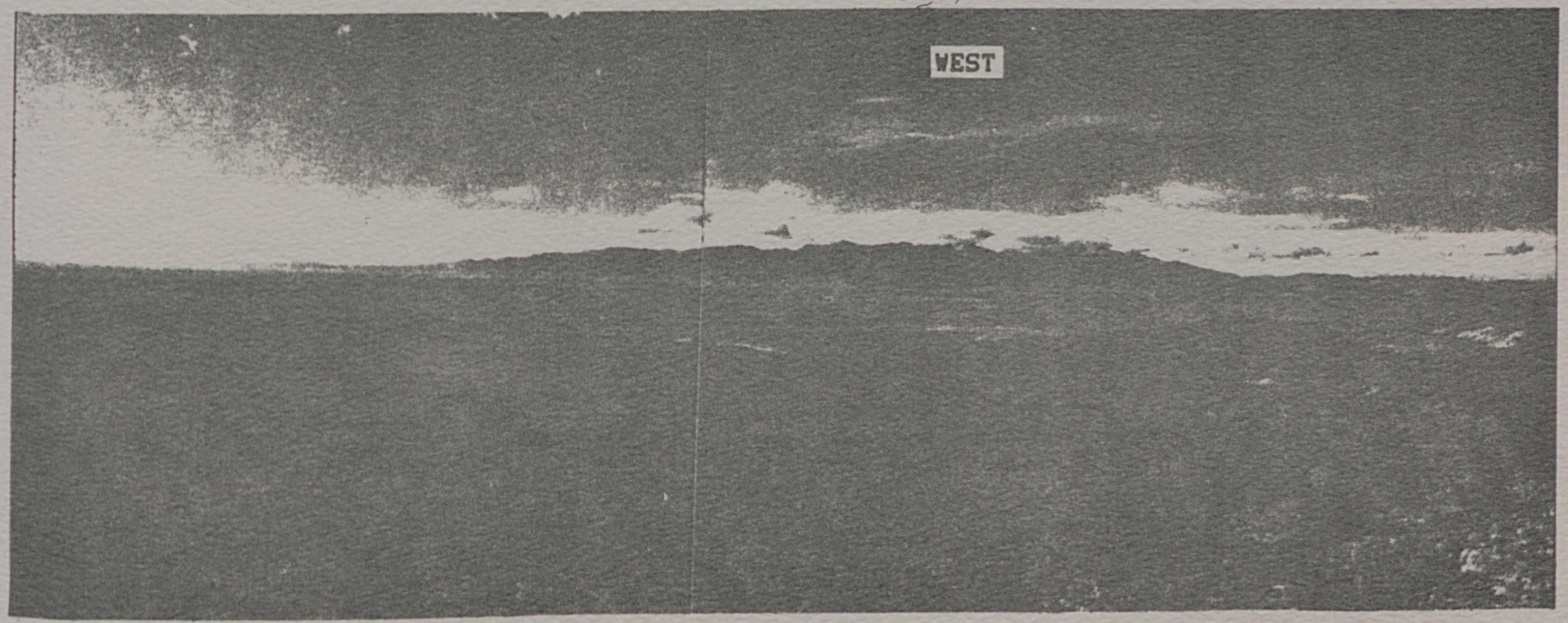


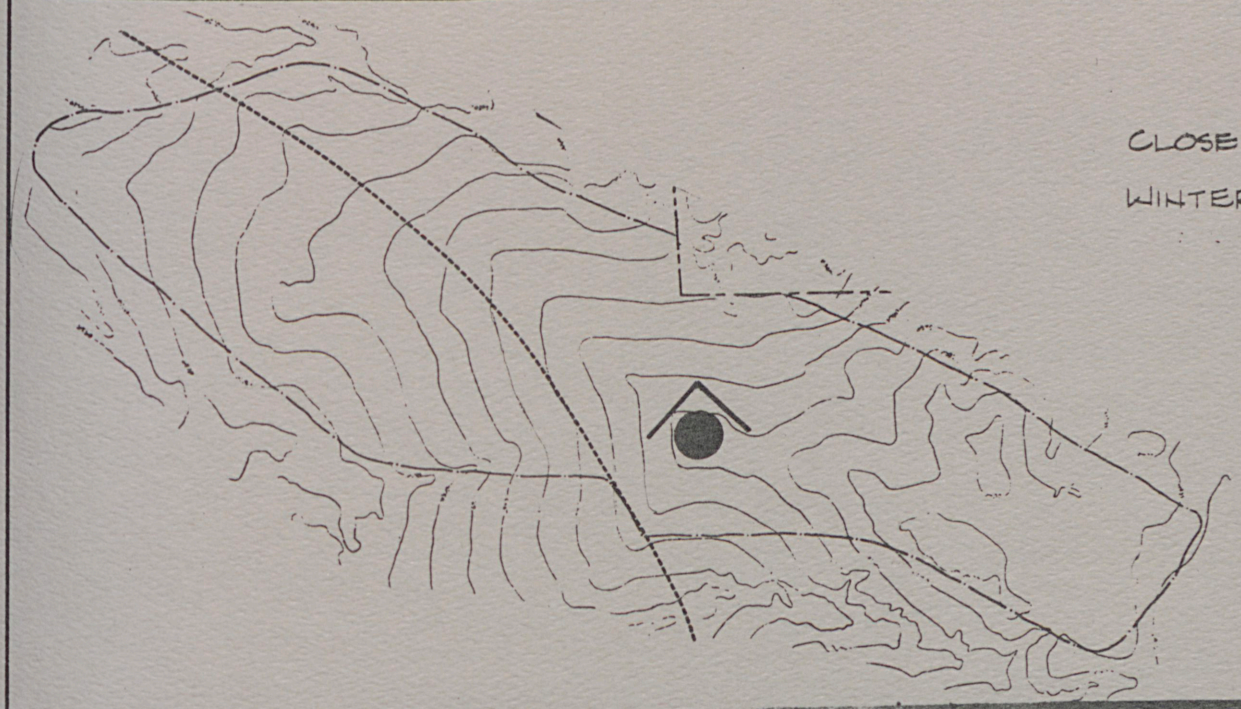


VIEW OF MOUNTAINS

CLOSE PROXIMITIES TO PETERSON AFB AND MUNICIPAL AIRPORT

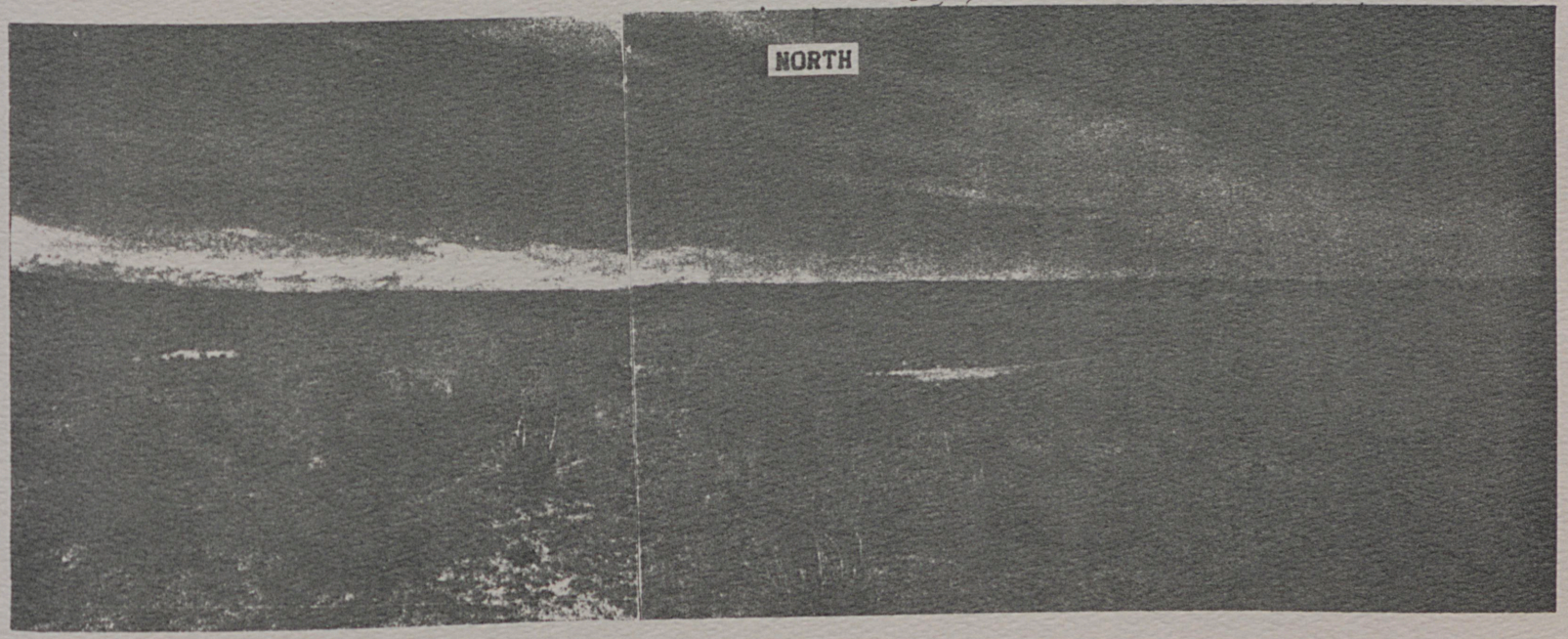
DIRECTION TO CITY CBD & ONCOMING GROWTH

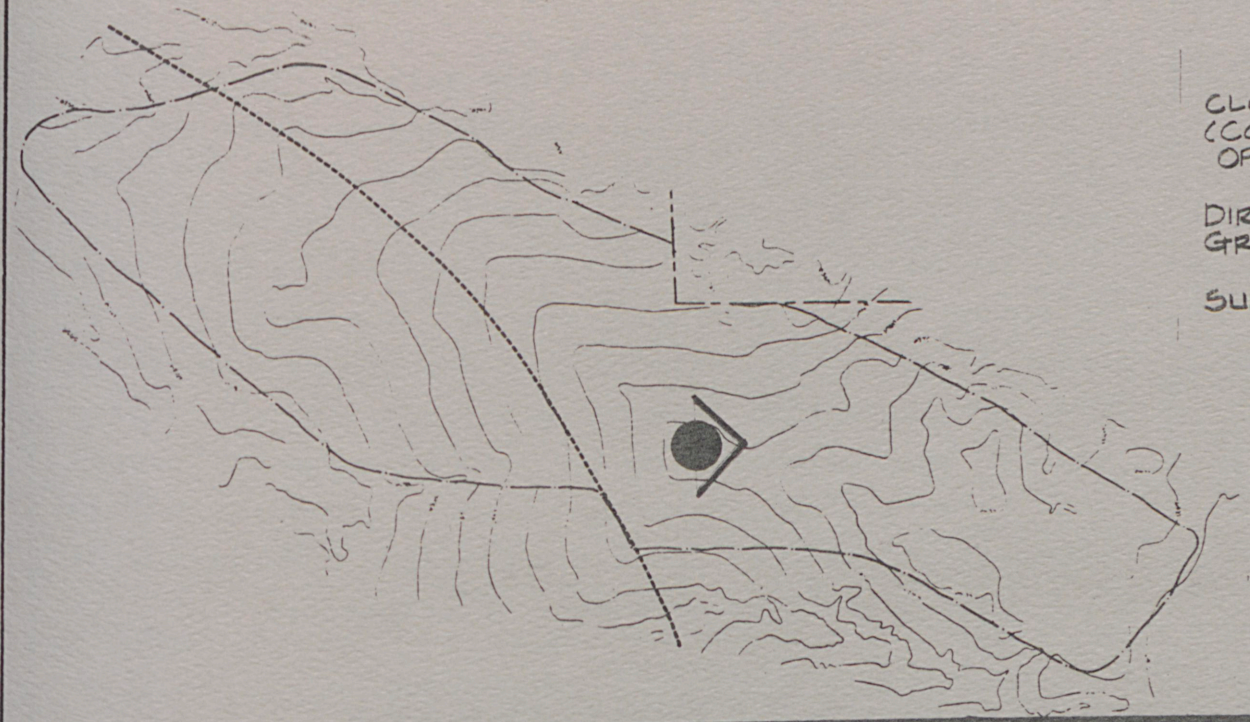




CLOSE PROXIMITY TO HIGHWAY 94

WINTER WINDS FROM NNE, N, NNW

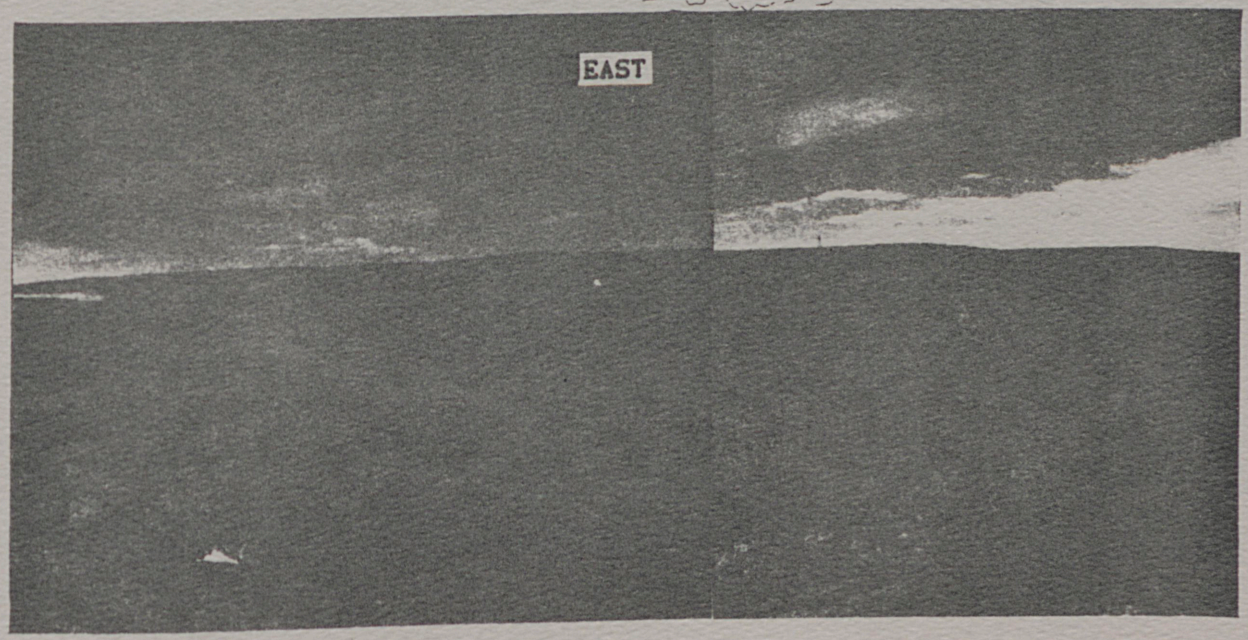




CLOSE PROXIMITY TO CSOC (CONSOLIDATED SPACE OPERATIONS CENTER)

DIRECTION OF FUTURE GROWTH OF CITY

SUNRISE 4:50 – 7:10 A.M.



ADMINISTRATION

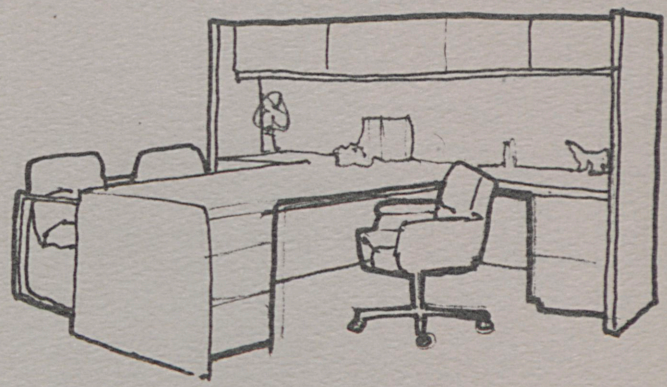
A minimum of two offices will be required for the purpose of effective communication, supervision, and operation. Scheduling and news letter publications will also be a part of the duties of the administration. There should be a secretarial area servicing the offices, and a receptionist area located near the main lobby. Supporting spaces for the administration are a coat room, an information center, a duplicating center, and an employee lounge. The progression through these spaces requires observation by the receptionist, yet the privacy of the individual offices should be maintained.

MEETING ROOMS

The purpose of the meeting rooms is to provide a flexible space for holding small to medium sized meetings or discussions. Flexibility might be obtained by using movable furniture and partitions. However, at least one of the meeting rooms should incorporate the same security measures used in the lecture hall.

The rooms should be designed to hold between a couple to fifty persons. Privacy should be maintained, but allowance for an informal discussion place might be considered. A natural progression in which one space is not interrupted by persons leaving another is a must. Also, the meeting rooms should be easily accessible from a gathering space, perhaps a lobby.

OFFICES



PURPOSE

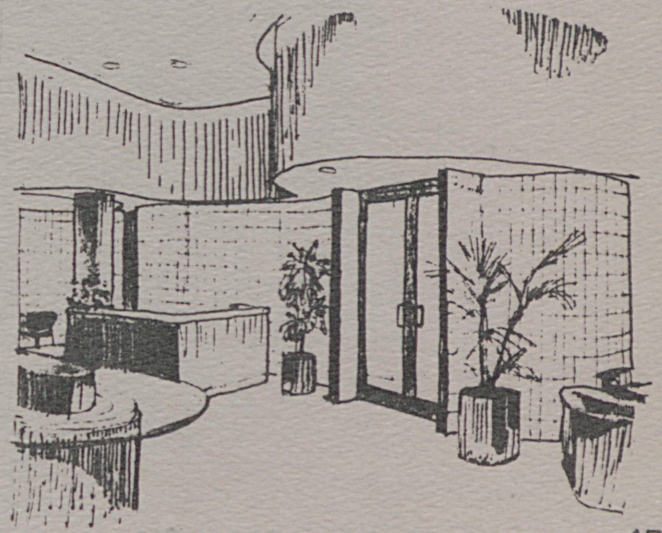
The administration offices will be for the purpose of controlling and conducting affairs at the institute. A permanent secretary will have the responsibility of organizing meetings and related events.

DESCRIPTION

The offices will operate much like a corporate office. The spaces should provide particularly nice views to the outside and maintain a professional atmosphere.

NUMBER OF USERS

Each office will be for one individual, but should accommodate groups as large as four of five people for impromptu meetings.



ENTRY CONTROL

The office will be entered through the reception area but may utilize a private entrance as well. Entry into an office will require clearance from the reception/secretarial area.

CIRCULATION

Circulation between the office and secretarial-reception area should be brief and efficient, but allow for a separation of the spaces.

EQUIPMENT

The offices will contain a desk, file cabinet, office chair, and two conference type chairs. The secretarial space will contain a desk, file cabinet, and a word processor.

ENVIRONMENTAL CONTROLS

Natural lighting is recommended, but caution must be used to avoid excessive heat gain. HVAC systems should be supplemented with operable windows. Artificial lighting should be user controllable.

SERVICEABILITY AND MAINTENANCE

Periodic maintenance will be limited to vacuuming and dusting.

ADJACENCY REQUIREMENTS

The offices should be located near the secretarial area, reception, and lobby areas. They should also be within a reasonable distance to the meeting rooms.

C O A T R O O M

PURPOSE

The coat room will be used for the purpose of hanging coats and storing boots. It will be used by the employees and visitors of the conference center.

DESCRIPTION

The room could best be described as a large walk-in closet, although it could be a counter arrangement. It should be organized in a way that prevents confusion. Coats will be hung on hangers from a rod that runs the length of the wall. Boots will be stored in racks.

NUMBER OF USERS

The coat room will be used daily by the employees of the conference center. In addition, one coat hanger should be allowed for each seat in the lecture hall and banquet facilities.

ENTRY CONTROL

Entry into the coat room should be visible by a receptionist.

CIRCULATION

The coat closet will be located near the entrance of the building so that it will be available to all users of the various parts of the building. It should be set back at least 4 feet from the circulation space.

EQUIPMENT

Allow linear space for coat storage. Coats will be hung on hangers on rods, boots will be stored in racks.

ENVIRONMENTAL CONTROLS

not important

SERVICEABILITY AND MAINTENANCE

Hard surface flooring is recommended. The closet will require periodic sweeping and mopping.

ADJACENCY REQUIREMENTS

The coat room should be located near the entry and the receptionist area, and preferably adjacent to the toilet facilities.

NOTES

Allow 0.85-1.0 square feet of space per seat for the coat room. If a coat room counter is used, allow 0.25 linear feet per seat.

INFORMATION CENTER

PURPOSE

The information center will function much like a library. It will contain the literature and multi-media information pertinent to the studies of the institute. It will provide the storage space of research information until the Space Research Information Center is built.

DESCRIPTION

A quiet professional atmosphere is desired. The space will be a working storage area. Access of the materials will be by the intended user. Comfortable reading areas with possible views to the exterior are recommended.

NUMBER OF USERS

The information center will be used by up to 50 people at one time. However, it may be necessary to enlarge this space in the future.

ENTRY CONTROL

Entry into the information center is restricted and should be closely supervised by a receptionist. Inside of the information center should be a supervisor's desk. The supervisor will aid in the obtaining of research materials, and will function much like a librarian.



STUDY DESK

CIRCULATION

The information center is contains a variety of media. These zones should be separated into 'spaces within a space'. The distance from media storage to its appropriate user space should be minimal. The different media zones should not conflict with one another.

EQUIPMENT

Provide 100 linear feet of book storage shelves, 10 study desks, 3 large tables with chairs, 10 lounge chairs, 3 computer terminals, 2 television screens with video cassette recorders, 1 microfilm reader, 1 microfiche reader, newspaper and magazine racks, flat files, card catalogues, supervisors desk, and appropriate media storage facilities.

ENVIRONMENTAL CONTROLS

Natural lighting is not recommended. Lighting in reading areas should be controlled by the user. Due to the potential heat output of equipment, air-conditioning with dust and humidity control is necessary.

SERVICEABILITY AND MAINTENANCE

Periodic maintenance will occur during the regular working hours.

ADJACENCY REQUIREMENTS

reception, offices, meeting rooms, and duplicating center

D U P L I C A T I N G C E N T E R

PURPOSE

For reproducing information obtained from the information center and regular copying duties of the secretary/receptionist.

DESCRIPTION

The duplicating center will contain all of the necessary equipment and supplies for routine methods of reproduction.

NUMBER OF USERS

The copy room will not be used by more than two qualified personnel at a time, however provisions for storage of materials to be copied should be made.

ENTRY CONTROL

Entry should be limited to qualified personell only and controlled by the administration secretary.

CIRCULATION

Entry into the duplicating center will be by persons specifically using the space, therefore the circulation from the offices, the secretarial area, and the information center should allow for easy access to that space.

EQUIPMENT

Allow enough space for 2 photocopy machines (approx. 2'X 3' each), storage shelves for paper and other printing materials, collating and binding space, and room for additional equipment to be added in the future.

ENVIRONMENTAL CONTROLS

Lighting should be user controlled. Natural lighting is not recommended. HVAC system should allow for efficient exhaust.

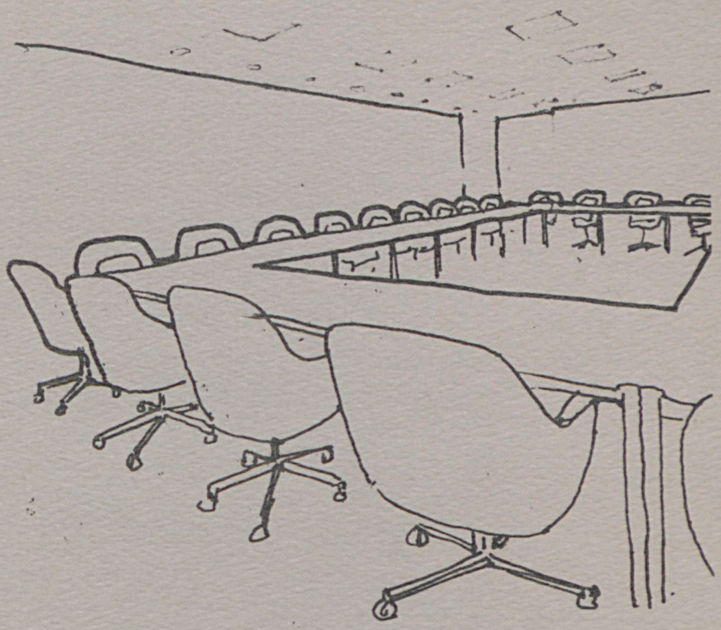
SERVICEABILITY AND MAINTENANCE

Allow for the disposal of used printing materials. Maintenance will be routine, but allow space for the serviceability of the equipment.

ADJACENCY REQUIREMENTS

receptionist, information center, offices

M E E T I N G R O O M S



PURPOSE

The meeting rooms will allow for small to medium sized panel discussions, lectures, and small conferences that do not require a space as large as the lecture hall.

DESCRIPTION

The meeting rooms are much like classrooms, and include the latest in teaching aids. Seats are generally arranged in a U formation.

NUMBER OF USERS

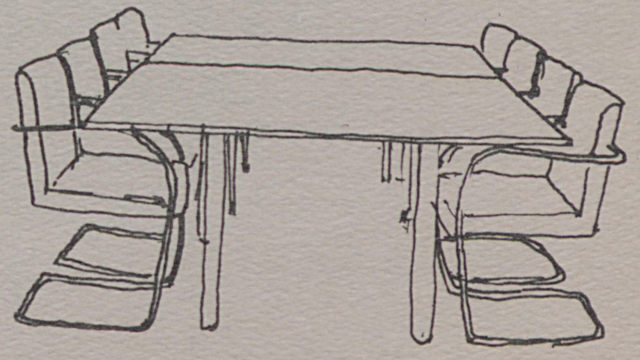
The meeting rooms should accommodate groups as small as 10 people and as large as 50-60 people.

ENTRY CONTROL

Provide for at least 2 of the 5 meeting rooms with a measure of security and control of entry.

CIRCULATION

The circulation to the individual meeting rooms should allow for the privacy of the other rooms. The rooms should be grouped around a foyer that will allow for the efficient dispersion of the groups.



EQUIPMENT

Provide chalkboards, tables and seats, projector screens, and for audio-visual compatibility. Less private rooms may utilize the use of movable partitions to adapt to larger spaces.

ENVIRONMENTAL CONTROLS

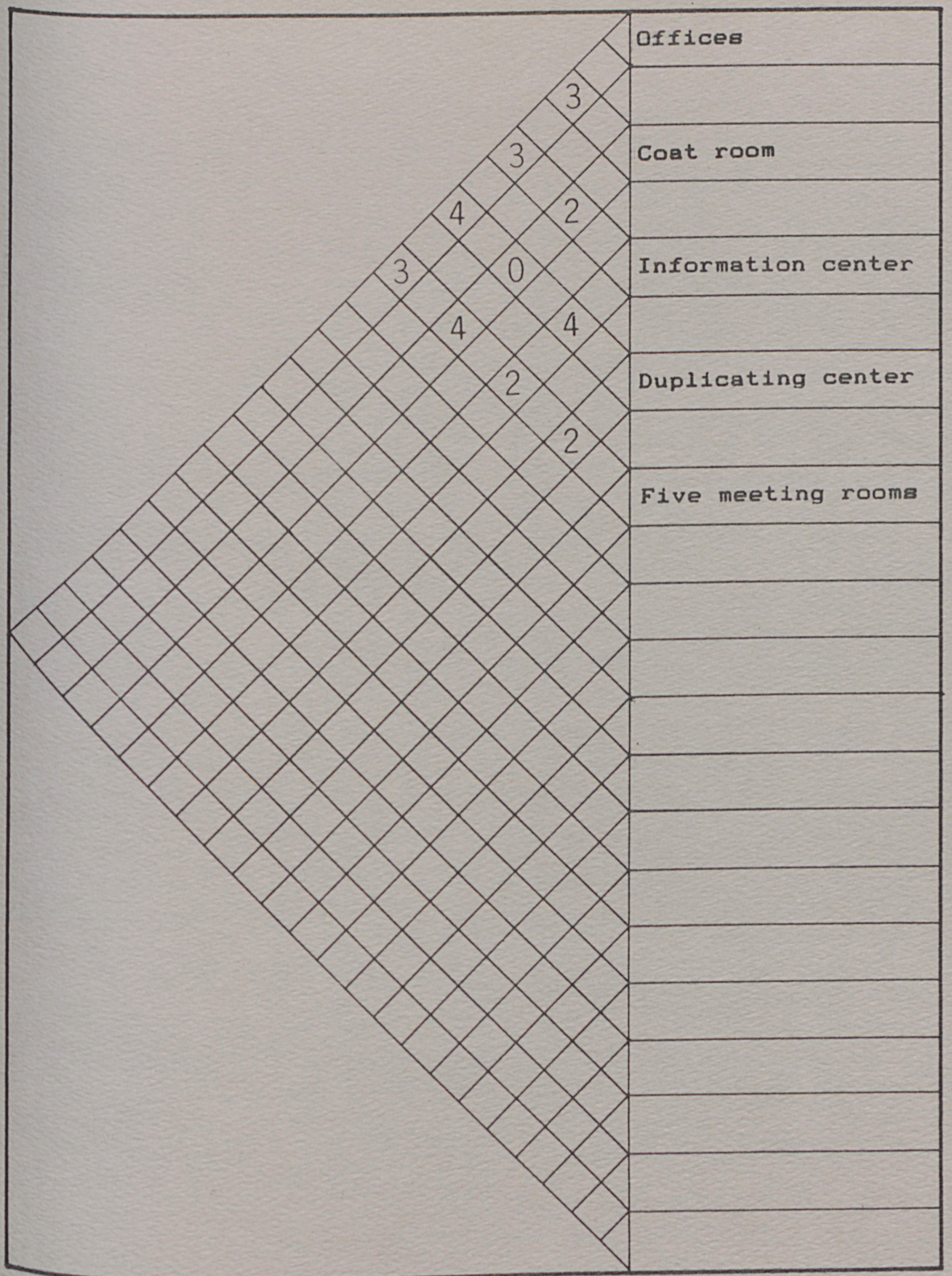
Supply 1.25 c.f.m. of fresh air per sq. ft. of space. Meeting rooms, especially those requiring privacy, should be acoustically enclosed. Natural lighting and views to the outside are unnecessary.

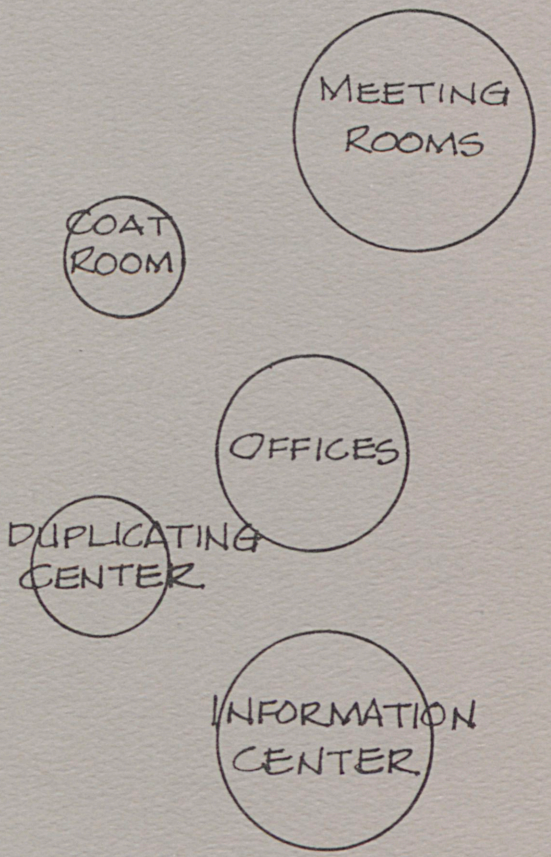
SERVICEABILITY AND MAINTENANCE

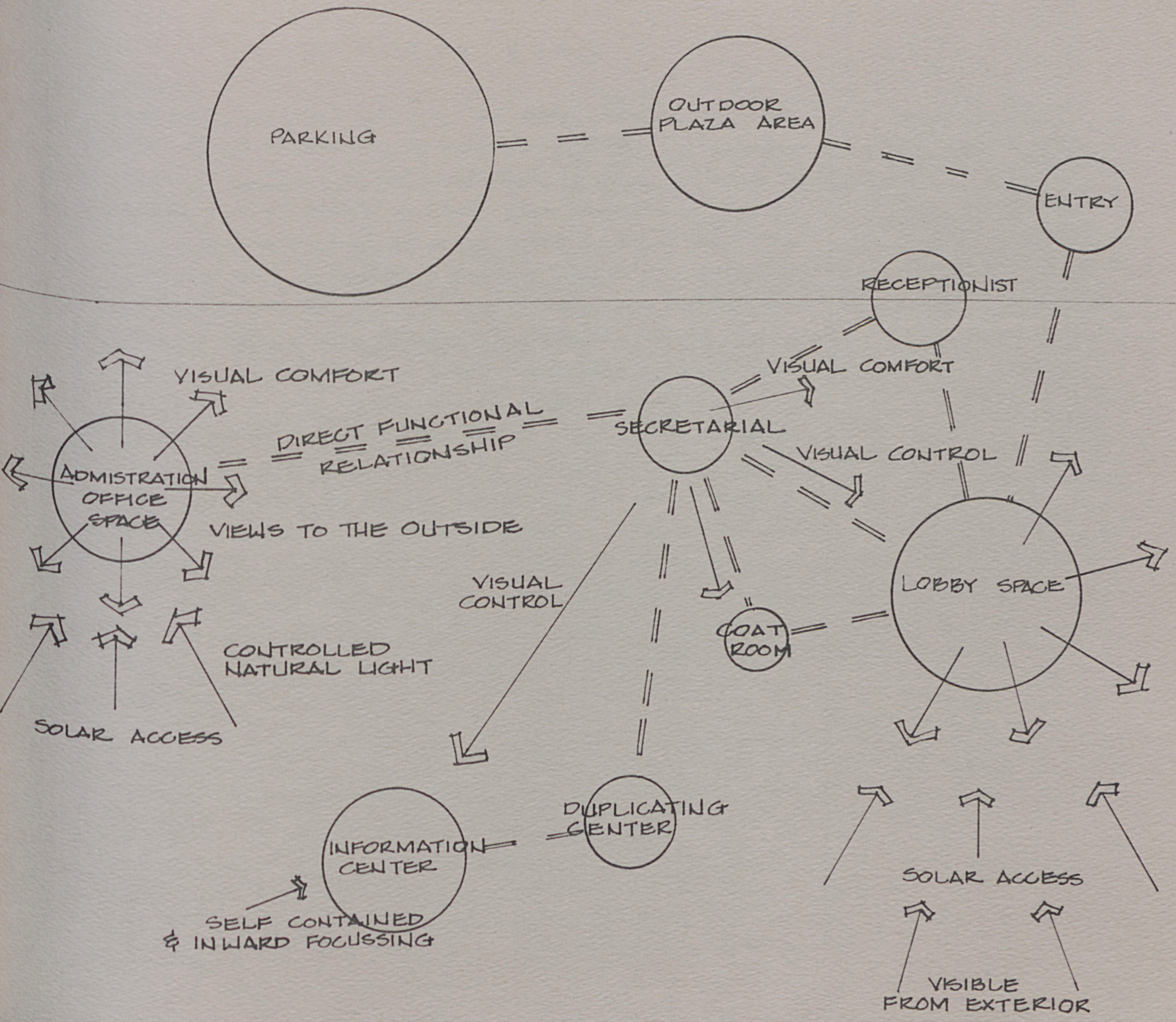
Maintenance will occur after hours and will consist of vacuuming the carpet.

ADJACENCY REQUIREMENTS

The meeting rooms should be adjacent to at least one other meeting room. The lecture hall, and office administration spaces should be relatively adjacent.


Offices
3
3
Coat room
4
2
3
0
Information center
4
4
2
Duplicating center
2
Five meeting rooms


MEETING ROOMS
COAT ROOM
OFFICES
DUPLICATING CENTER
INFORMATION CENTER


PARKING
OUTDOOR PLAZA AREA
ENTRY
RECEPTIONIST
VISUAL COMFORT
VISUAL COMFORT
DIRECT FUNCTIONAL RELATIONSHIP
SECRETARIAL
VISUAL CONTROL
ADMISTRATION OFFICE SPACE
VIEWS TO THE OUTSIDE
VISUAL CONTROL
LOBBY SPACE
COAT ROOM
CONTROLLED NATURAL LIGHT
SOLAR ACCESS
DUPLICATING CENTER
INFORMATION CENTER
SELF CONTAINED & INWARD FOCUSSING
SOLAR ACCESS
VISIBLE FROM EXTERIOR

FOOD SERVICE

The requirement of a food service is best understood if one compares the Conference Center with a student union building on a college campus. Kitchen services will support a cafeteria, a dining room, and a small and a large banquet room.

The cafeteria eating places should be informal, and do not necessarily have to be grouped in one large area. It may be useful to create several areas for informal eating. The dining room will be a more formal space, and will be used when formality is desired. The large and small banquet rooms are for banquets and other meetings that may include a dinner. These are not as formal as the dining room. A coffee shop separate from the cafeteria kitchen will provide a choice for those persons who wish to have a light snack and/or beverages.

C A F E T E R I A

PURPOSE

The cafeteria provides a self service counter arrangement of food. Eating will occur during the normal working hours and before and after lectures.

DESCRIPTION

The cafeteria is usually zoned into three areas. These are the kitchen, serving, and dining areas. The cafeteria provides a self service arrangement, where the patron usually carries a tray and silverware and generally chooses from a variety of already prepared food. Before entering the dining hall, the patron pays a cashier who surveys the selection of food and totals up a bill.

NUMBER OF USERS

The cafeteria will serve a maximum of 400 people at one time. However, the cafeteria will be available to the Research Institute and the Aerospace Center (approx. 1800 people).

ENTRY CONTROL

Entry into the dining hall need only be restricted at the cashier location upon leaving the serving area. This will allow patrons with sack lunches to eat with fellow colleagues. However, the design of the serving and kitchen areas may include the use of screening, to allow for alternative uses of the dining hall.

CIRCULATION

Entry into the cafeteria will occur in the dining hall zone. The patron will then proceed toward the serving area. The serving area should be as linear as possible to avoid confusion, and more than one linear path should be created to aid in the efficiency of serving. A separate beverage counter should be provided. All patrons will exit the serving area by passing the cashier area. Provide two cashiers to further increase efficiency. Circulation into the eating area must not be hampered by that of the circulation into the serving area. The eating area must allow room for people to find a table, and after eating, properly dispose of their trays and efficiently exit.

EQUIPMENT

A location must be provided for the storage and access of trays, silverware and napkins. The serving area will require stainless steel counters fitted with a tray slide. Counters are typically 25-30 feet in length. The area for each counter, serving space and back counter is approximately 200 square feet. Also provide two cashier counters, 100 tables with four chairs each, and a tray disposal system. For information on kitchen equipment, see "KITCHEN AREAS".

ENVIRONMENTAL CONTROLS

The lighting system in the dining hall should allow for a flexible layout of eating tables. Natural lighting and views to the outside are recommended. Also balance the HVAC systems to allow for a flexible arrangement. Air in the serving area will require efficient exhausting. Provide 10-12 c.f.m. of fresh air per occupant in the dining area. HVAC systems may be supplemented with operable windows.

SERVICEABILITY AND MAINTENANCE

Trays, and other eating ware will be placed in mobile storage racks after use. Workers will move these racks to the back dish washing room. Maintenance will occur frequently, usually after main meals. A hard surface flooring is recommended, especially in high traffic and serving areas. Tables and chairs are not fixed to allow for flexibility and ease of maintenance.

ADJACENCY REQUIREMENTS

The cafeteria should be located adjacent to the kitchen area, service entrance, and banquet facilities.

NOTES

The cafeteria is approximately 4400 square feet.

D I N I N G R O O M

PURPOSE

The functions of the dining room include eating lunches and dinners, and holding business meetings, lectures and private parties.

DESCRIPTION

The dining room will be a large formal space, and will serve dinners selected from a menu. It should have the nice atmosphere of a good restaurant.

NUMBER OF USERS

The dining room will serve a maximum of 200 people.

ENTRY CONTROL

There should be a waiting area before the dining space, to meet the peak loads of high density occupation. It will also serve as a buffer/transition zone before entering into the dining room.

CIRCULATION

Employees should be able to circulate freely and efficiently. The circulation within the dining room should be designed to allow the private areas. Entry of employees in and out of the kitchen area should be screened.

ONE POST OFFICE SQUARE
BOSTON, MASSACHUSETTS
JUNG/BRANNEN ASSOC.,
INC. ARCHITECTS



EQUIPMENT

Allow space for 10 tables and chairs for groups of six people, 20 tables for groups of four people, and 30 for two people.

ENVIRONMENTAL CONTROLS

HVAC systems should have a wide range of adjustment to accommodate different densities. Concentrate air flows over or under windows to compensate for heat loss/gain, and balance systems to allow for the exhaust of cigarette smoke and fumes. Soft incandescent lighting is recommended. Natural lighting and views to outside, if provided, should be limited to particular areas to allow for a more diverse space.

SERVICEABILITY AND MAINTENANCE

Maintenance will occur regularly; employees will clean tables after use, and vacuum floors after closing hours. Dish washing will occur during working hours--and accommodations should be provided.

ADJACENCY REQUIREMENTS

kitchen area, banquet areas, service lobby or corridor

B A N Q U E T / E X H I B I T I O N
F A C I L I T I E S

PURPOSE

The banquet room is a multi-purpose space that serves balls, formal receptions and exhibitions in addition to banquets.

NUMBER OF USERS

The small banquet room will serve approximately 150 people for banquets and 300 people for receptions. The large banquet room will serve approximately 450 people.

ENTRY CONTROL

Entry into the banquet room will be preceded by a foyer, this will accommodate the different entry controls needed for the various functions served by the banquet room.

CIRCULATION

The banquet/exhibition space will not have a fixed circulation within the space due to the need for flexibility. However, the large numbers of people who will be using the space need a relatively quick exit directly to a large gathering space or to the outside of the building.

EQUIPMENT

Equipment will include movable chairs and tables (preferably foldable), exhibition partitions, banquet serving carts, and movable space dividers. Storage for the above equipment must be provided for.

ENVIRONMENTAL CONTROLS

The HVAC system must take into the consideration the flexibility of the space and its food serving nature. Ventilation must not be hampered by exhibitions or space dividers.

SERVICEABILITY AND MAINTENANCE

Maintenance will occur after the room's use. While maintenance is an important consideration, the materials used must not sacrifice the integrity of the space. Quality materials are a must.

ADJACENCY REQUIREMENTS

kitchen area, service lobby

NOTES

The small and large banquet rooms are approximately 2000 and 5000 square feet respectively.

C O F F E E S H O P

PURPOSE

The coffee shop provides fast service of a limited food variety. It serves beverages, snacks, and light meals, which generally require a minimal amount of cooking.

DESCRIPTION

Eating areas are separated by screens and planters. Furniture may be fixed, and a bar counter is usually provided. The coffee shop may have its own kitchen.

NUMBER OF USERS

A maximum of 100 people will be served by the coffee shop.

ENTRY CONTROL

Entry into the coffee shop is not restricted.

CIRCULATION

The coffee shop is serviced by a waitress/waiter, and seating is selected by the patron. Efficient circulation should be provided to allow for quick service.

EQUIPMENT

Provide approximately 25 tables, a grill, and a bar counter. For kitchen equipment, see "KITCHEN AREAS".

ENVIRONMENTAL CONTROLS

Allow for spot lighting over established eating tables. Design of HVAC will be based on a permanent room arrangement.

SERVICEABILITY AND MAINTENANCE

Regular maintenance will be done by employees. Hard and smooth surfaces are recommended.

ADJACENCY REQUIREMENTS

kitchen area

K I T C H E N

PURPOSE

The kitchen area(s) fulfills the food requirements demanded by the banquet rooms, the dining room, the cafeteria, and the coffee shop. Its primary function is the production of prepared food.

DESCRIPTION

The kitchen contains all of the necessary grills, oven, refrigerators, storage facilities, etc., needed in order to service the requirements of the various food services. The design may either be one of a large kitchen that supplies food to the banquet, dining, cafeteria spaces, and coffee shop spaces, or one of four smaller kitchens, one for each requirement. This aspect will be discussed later.

NUMBER OF USERS

The amount of food preparation is dependent upon the number of users. Typically, the cafeteria will serve a maximum of 400 people at a time, the dining room will serve a maximum of 200, the small banquet room will serve a maximum of 150 people, and the large banquet room will serve a maximum of 450 people. The design of the kitchen(s) must allow for the variability and fluctuation of the number of users.

ENTRY CONTROL

Entry into the kitchen is permitted to employees and authorized persons only. Doors into the kitchen should be a double swing type with a viewing window and no knobs. Furthermore, supervisors should be located in strategic areas where they have a commanding view of the more important operations. Refrigerators and storerooms should be located in places which are open and visible to the management.

CIRCULATION

The kitchen should remain visually separate from the facilities it services. However, circulation from the kitchen to those facilities is a very important considerations. The transportation of food must be efficient and remain somewhat discrete. A service lobby or corridor connecting the kitchen to its auxiliary spaces would increase the efficiency and create a noise reducing buffer zone. Access through this space will include wheeled carts for transportation on one level, and service elevators if more than one level is employed.

Just as important, is the consideration of the kitchen's internal circulation. The first considerations are the source of supply and the method of delivery. The delivery or receiving area should be serviced by a service drive which is separate from the other public vehicular circulation.

Adjacent to the receiving area, generally are refrigerated, frozen, and dry storage areas. These areas should also be readily accessible to the preparation facilities. Smaller storage areas and refrigerators could be strategically located throughout the processing area to further facilitate efficient circulation.

Next is the thought to the flow of the sequences through the kitchen. Traffic aisles should not interfere with the work space, and should be made to serve two departments. This may be achieved by utilizing a double loaded aisle, versus an aisle that is against the wall or around the perimeter of the kitchen. However, traffic should not be routed so that it dissects two adjacent work areas that are integrally involved.

EQUIPMENT

Equipment will be dispersed between various zones. The zones will include: cold storage, dry storage, vegetable preparation, meat preparation, bake shop, cook's unit, salad and sandwich unit, short order, fountain service, pot and pan washing and storage, dishwashing, garbage pickup, can and truck washing, janitors facilities. The design and layout of these zones will be dependent upon the decided nature of the kitchen (i.e. one large central kitchen which services all the food facilities, or smaller kitchens. The kitchen is a major project in itself, therefore in the interest of brevity, the design of the kitchen need only incorporate the functions of the various zones.

ENVIRONMENTAL CONTROLS

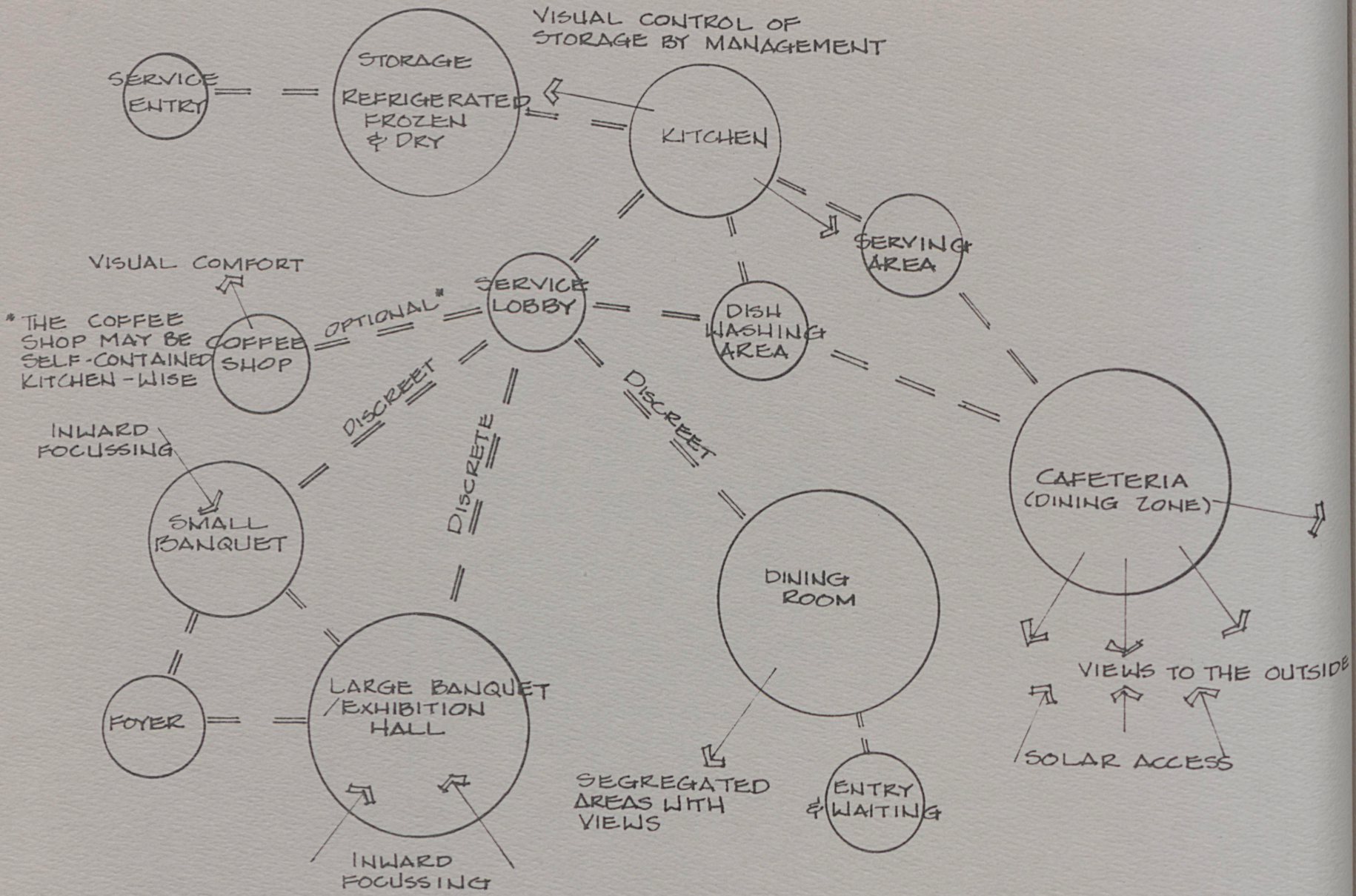
The design of the HVAC system relies greatly on the design of the kitchen layout. Adequate exhaust and supply air systems must be arranged to adequately remove kitchen odors and heat, and supply fresh air.

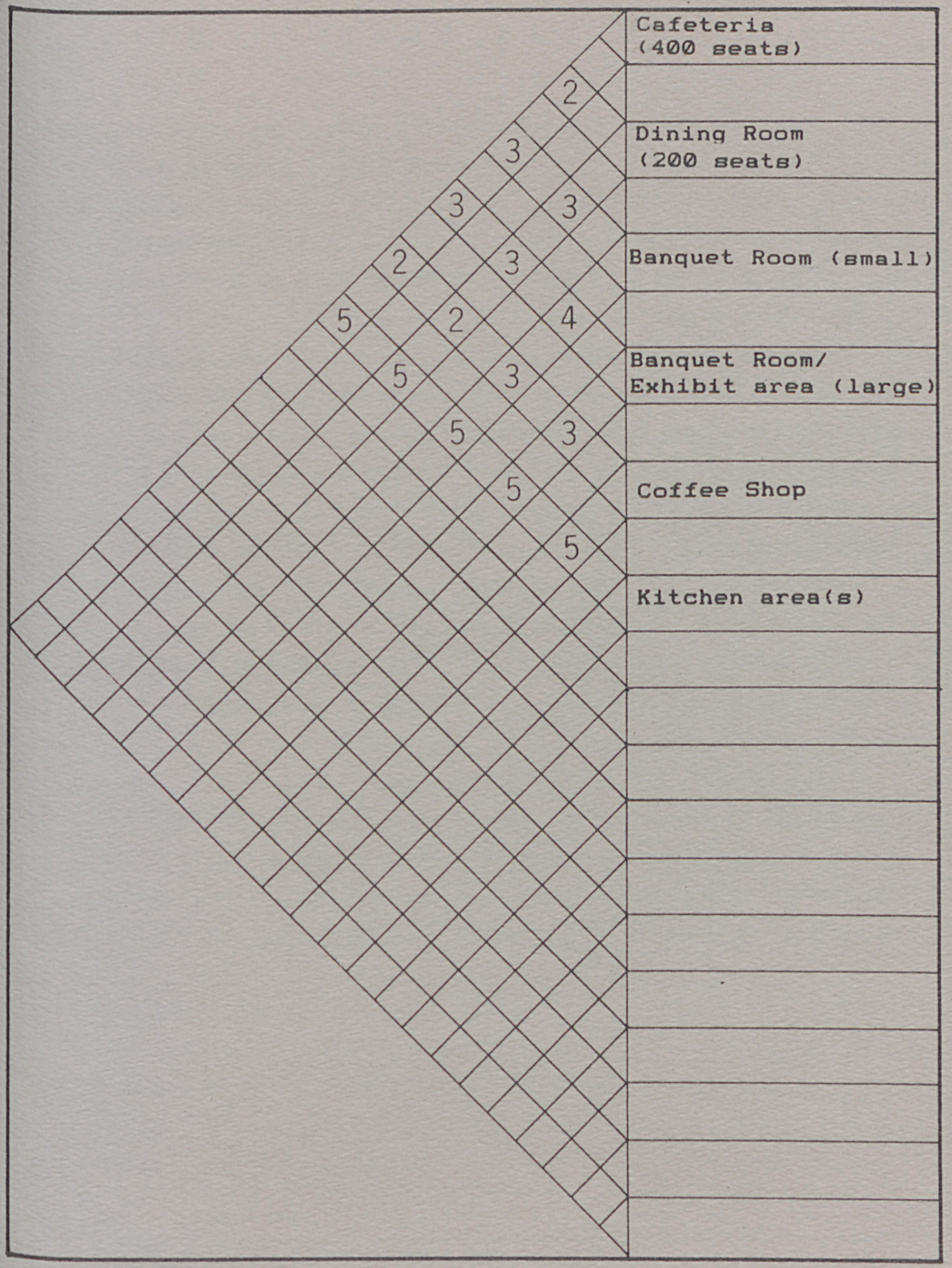
SERVICEABILITY AND MAINTENANCE

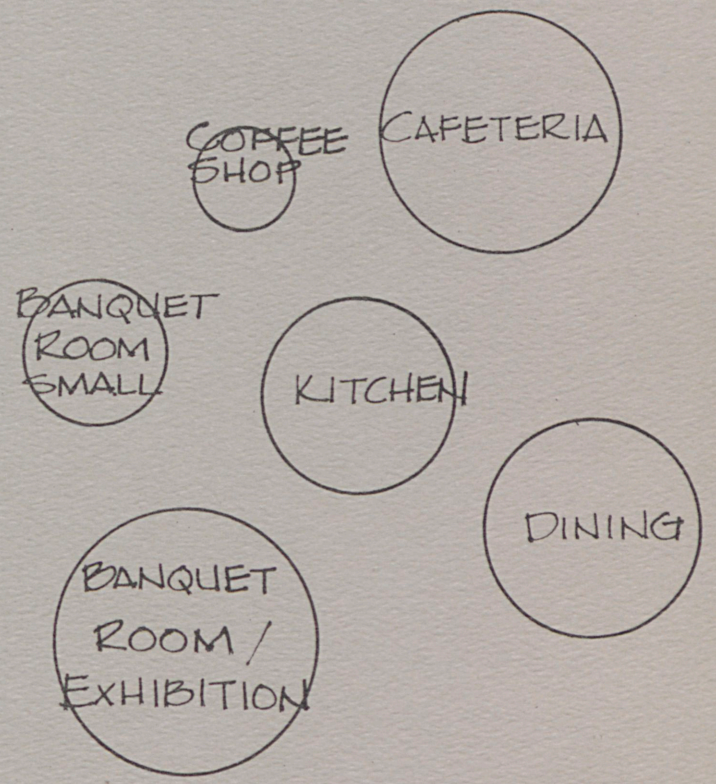
The kitchen will be cleaned periodically throughout the day, with the majority being done at the end of the day. It is important to use materials that can withstand the constant soiling and cleaning, as well as giving ease to the maintenance. Hard surfaces are recommended.

ADJACENCY REQUIREMENTS

The kitchen should be located near the serving area for the cafeteria, a service corridor for the banquet facilities, and the dining area (if a separate kitchen is not employed for the dining area). Also locate the food storage and service drive near the kitchen


SERVICE ENTRY
STORAGE
REFRIGERATED FROZEN & DRY
VISUAL CONTROL OF STORAGE BY MANAGEMENT
KITCHEN
SERVING AREA
VISUAL COMFORT
* THE COFFEE SHOP MAY BE SELF-CONTAINED KITCHEN-WISE
COFFEE SHOP
OPTIONAL*
SERVICE LOBBY
DISH WASHING AREA
DISCREET
DISCRETE
DISCREET
INWARD FOCUSSING
SMALL BANQUET
CAFETERIA (DINING ZONE)
DINING ROOM
VIEWS TO THE OUTSIDE
FOYER
LARGE BANQUET /EXHIBITION HALL
SOLAR ACCESS
SEGREGATED AREAS WITH VIEWS
ENTRY & WAITING
INWARD FOCUSSING


Cafeteria
(400 seats)
Dining Room
(200 seats)
Banquet Room (small)
Banquet Room/
Exhibit area (large)
Coffee Shop
Kitchen area(s)
2
3
3
2
3
5
2
4
5
3
5
3
5


COFFEE SHOP
CAFETERIA
BANQUET ROOM SMALL
KITCHEN
DINING
BANQUET ROOM / EXHIBITION

COMMUNICATIONS LECTURE HALL

The lecture hall is an important part of the conference center and the Institute as a whole. It will house 400-500 people for the purpose of listening to guest lecturers, viewing movies, etc. It should however remain a comfortable space for even medium sized gatherings.

Entry and dispersion should be carefully viewed. Attention to progression from one space to or into another must also be considered. In addition, the user should be informed, educated, or reminded about the significance of the Research Institute.

Security is a concern and should be considered for the entire center and for individual functions such as the lecture hall. At times, there may be discussions of space research that are classified for only certain persons.

Parking for the lecture hall will be an important functional and aesthetic issue. The parking must not present a supermarket or mall image, and yet the user must be a part of the natural progression and experience of the building.

S E A T I N G A R E A

PURPOSE

The seating area provides seating for the viewing of lectures, films, etc..

DESCRIPTION

The lecture hall is the largest space in the building. It has a great potential to be one of the more interesting spaces, because its function demands a unique form. For instance, the floor may slope downward, and the ceiling may reflect acoustical treatment.

NUMBER OF USERS

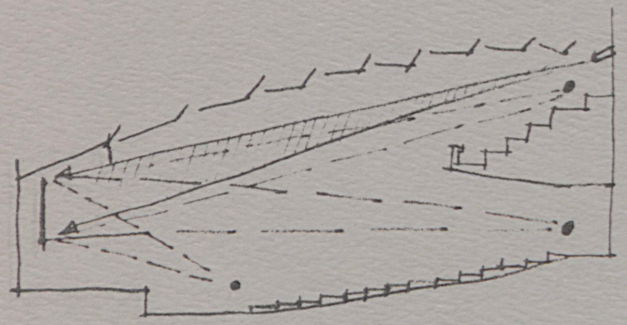
The hall should accommodate groups ranging in size from 100 to 500 people.

ENTRY CONTROL

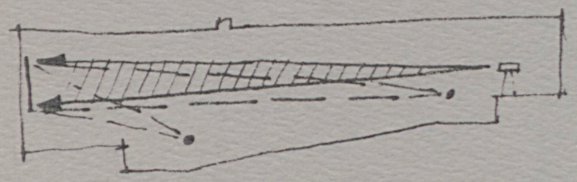
Entry into the lecture hall will require entry points that can allow for either a restricted or an easy passage.

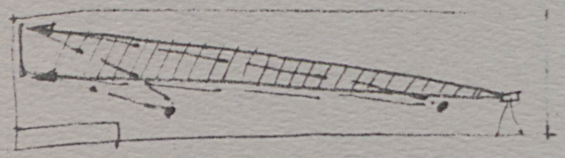
CIRCULATION

Provide aisle ways around the perimeter and dissecting the seating area. If steps are used, they should be shallow and handicapped access should be provided.



PROJECTION





EQUIPMENT

400-500 theater seats, permanent loud speakers, lighting system, projection booth

ENVIRONMENTAL CONTROLS

Provide 10-15 c.f.m. of fresh air supply per occupant. Natural lighting is not recommended. Supply both fluorescent and user controllable incandescent lighting. A panel box should be provided to allow for the adjustment of lights. The seating area should be acoustically designed.

SERVICEABILITY AND MAINTENANCE

Maintenance will occur usually only after the lecture hall is used. This will consist of sweeping and occasionally mopping the floor. Selected materials should reflect the fact that the space will be accommodating large groups of people.

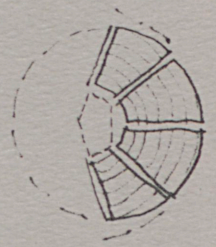
ADJACENCY REQUIREMENTS

lobby, main entry

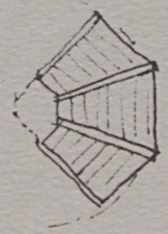
NOTES

Suggested arrangements for seating:
(Source: Lawson, F. (1981). Conference, Convention and Exhibition Facilities, The Architectural Press: London, p. 133.)

Wide arch: up to 135 degrees for command. Lines of sight may limit use of side seats--particularly for screen viewing. Used with thrust stage. Typical in drum-shaped buildings without balcony seating. Provides large seating capacity.

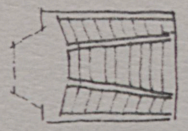


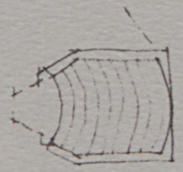
90 degree arc: side and rear wall configurations vary and may approximate to an octagonal plan. Ensures good direct sound but the side seats may be obscured by a proscenium or for screen viewing. Usually includes balcony provision.



60 degree hexagon: a common arrangement in many multi-purpose theatres allowing flexibility in the stage and proscenium. Fixed seating may be kept to the perimeter and balcony leaving a flat central area for alternative uses. In the traditional theatre this may be modified to a 'horseshoe' shape.









Rectangle: Most multi-purpose halls are rectangular with an internal or extended stage. The side walls may be inclined towards the stage--this elongated 'shoebox' shape is traditionally favoured for concert halls. Side walls contribute to lateral reflections but require faceting or acoustic treatment.

Fan shape: the angle of splay varies up to 60 degrees. This shape is preferred for lecture theatres, giving best direct sound and screen viewing. The curved rear wall must be acoustically treated.

S T A G E

PURPOSE

To allow a place for speakers to address a group and to hold debates and award ceremonies, etc..

DESCRIPTION

The stage is ideally viewable from all points in the seating area. The shape of the stage is contingent upon the shape of the seating area.

NUMBER OF USERS

The stage should accommodate a maximum of 20 people for panel discussions or debates.

ENTRY CONTROL

Entry onto the stage should be made available from the audience, to allow for speakers to rise from among the lecture seating area.

EQUIPMENT

movable podium, spot lighting, movie screen (approx. 15 x 15), speaker system, lighting control panel

ENVIRONMENTAL CONTROLS

Use a separate mechanical system for stage area to meet fire safety requirements. Use no natural lighting.

SERVICEABILITY AND MAINTENANCE

The hard surface flooring will require maintenance after use.

ADJACENCY REQUIREMENTS

seating area, lecture prep., storage, technician area

L O B B Y

PURPOSE

The purpose of the lobby is to collect and disperse the users of the lecture hall area.

DESCRIPTION

The lobby is an open space that is capable of efficiently containing and directing groups of people, especially to and from the lecture seating area. It is a transition zone that precedes the lecture itself, and should psychologically prepare the user.

NUMBER OF USERS

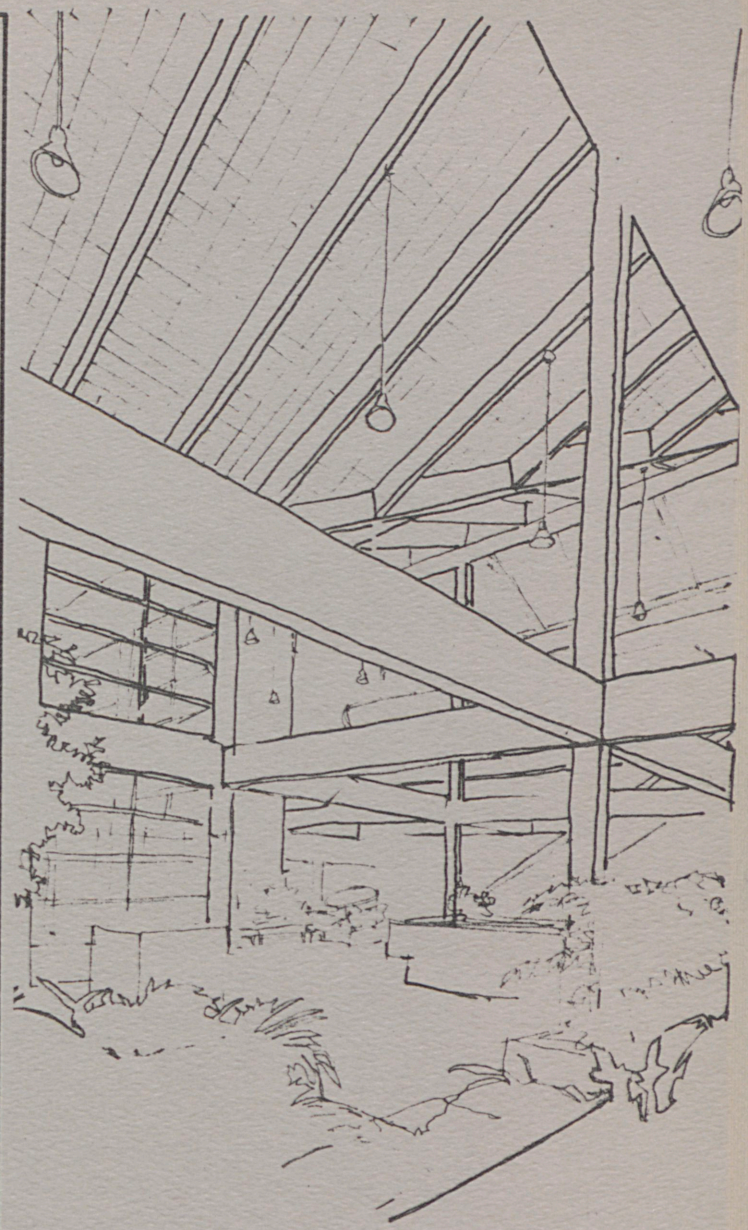
The lobby should have the ability to contain close to 100 people at one time.

ENTRY CONTROL

Entry into the lobby should be directly linked to the outside or to the main entry of the building. Due to its large scale and need for efficiency, control at the lobby level is not recommended.

CIRCULATION

The circulation must be unhampered and free flowing to facilitate efficiency in the dispersion of the lecture hall. There should be at least 2 paths of exiting.



EQUIPMENT

The lobby should contain a small seating area and special areas for display purposes.

ENVIRONMENTAL CONTROLS

Use an entry vestibule if the lobby is to be linked directly with the outside. Natural lighting is preferred and views to the outside are recommended. Provide 8-10 c.f.m. of fresh air per sq. ft. of space.

SERVICEABILITY AND MAINTENANCE

Maintenance will occur periodically. High traffic carpeting and/or hard floor surfaces are recommended. Allow for a separate storage closet for cleaning equipment and supplies.

ADJACENCY REQUIREMENTS

lecture seating area, reception area, main entry

D I S P L A Y / E X H I B I T I O N A R E A

PURPOSE

The purpose of the display area is to entertain and educate the user.

DESCRIPTION

It is a comfortable space with wall and/or movable partitions that will be used for displaying exhibits. It will also display freestanding or hanging exhibits.

NUMBER OF USERS

The display area will be occupied by a maximum of 30-40 people at one time.

ENTRY CONTROL

Entry into the display area does not need to be controlled. It should be easily accessible from the lobby space.

CIRCULATION

The circulation throughout the display area should be linear to facilitate efficiency. Entry and exit points should be different, to prevent backtracking.

EQUIPMENT

track lighting and accessories, movable partitions

ENVIRONMENTAL CONTROLS

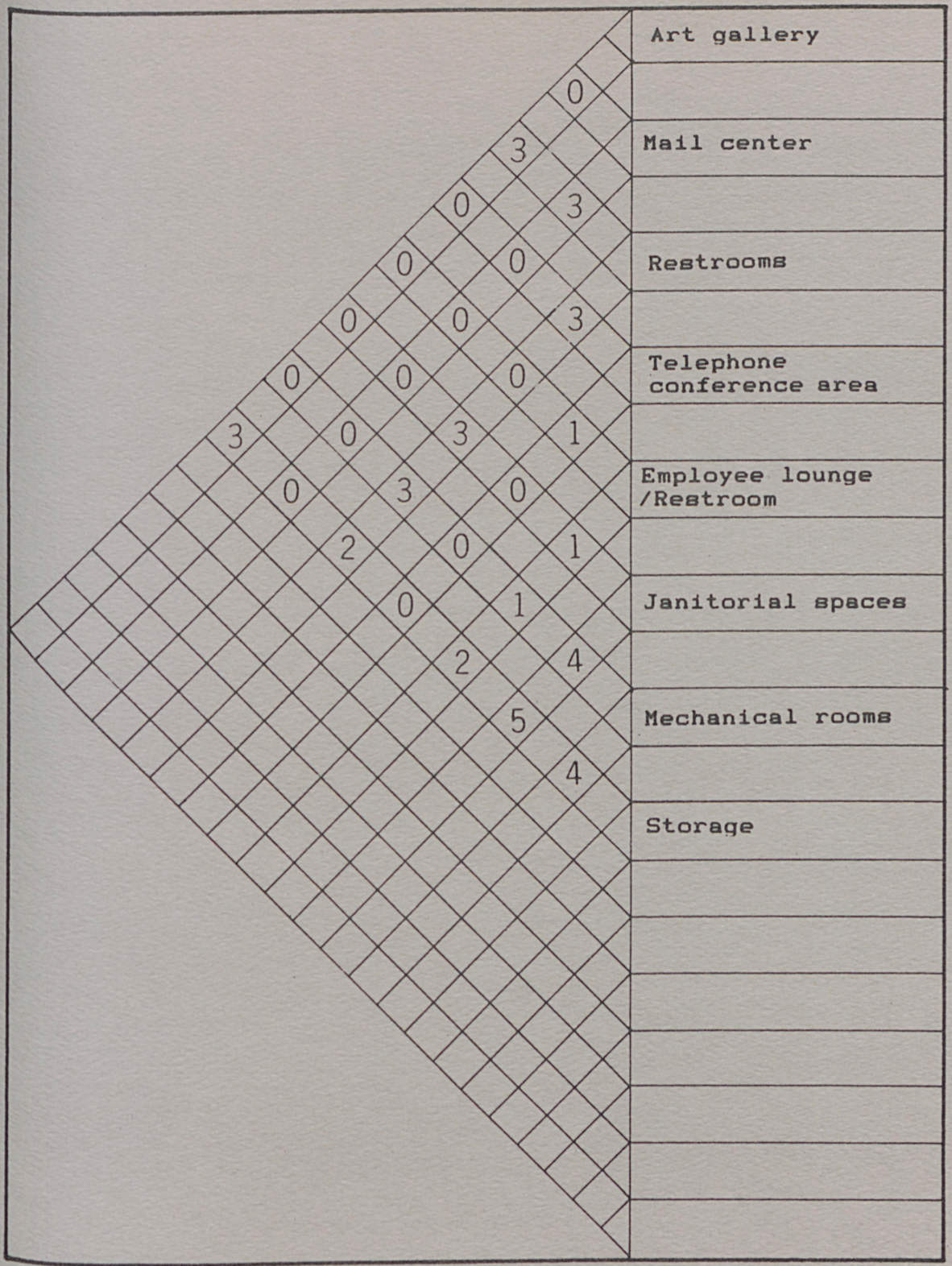
incandescent lighting

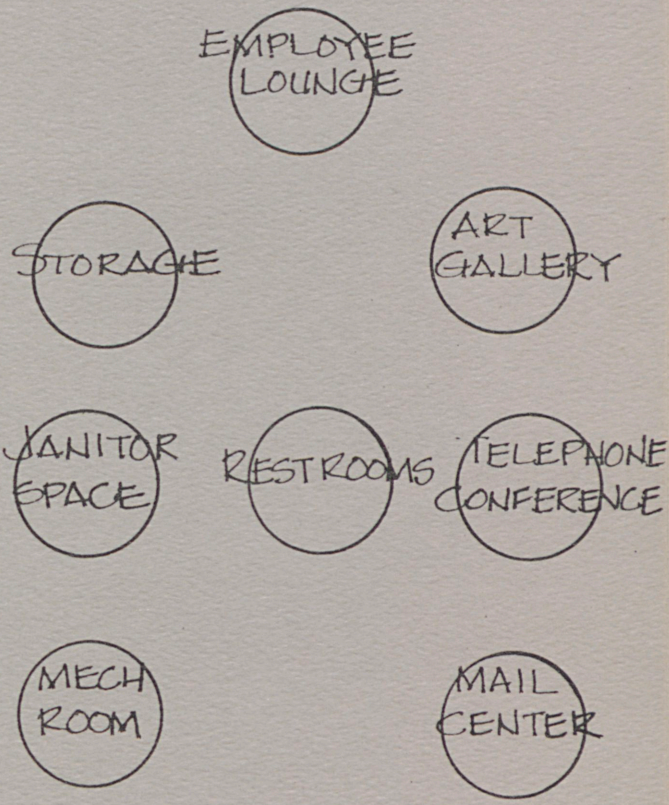
SERVICEABILITY AND MAINTENANCE

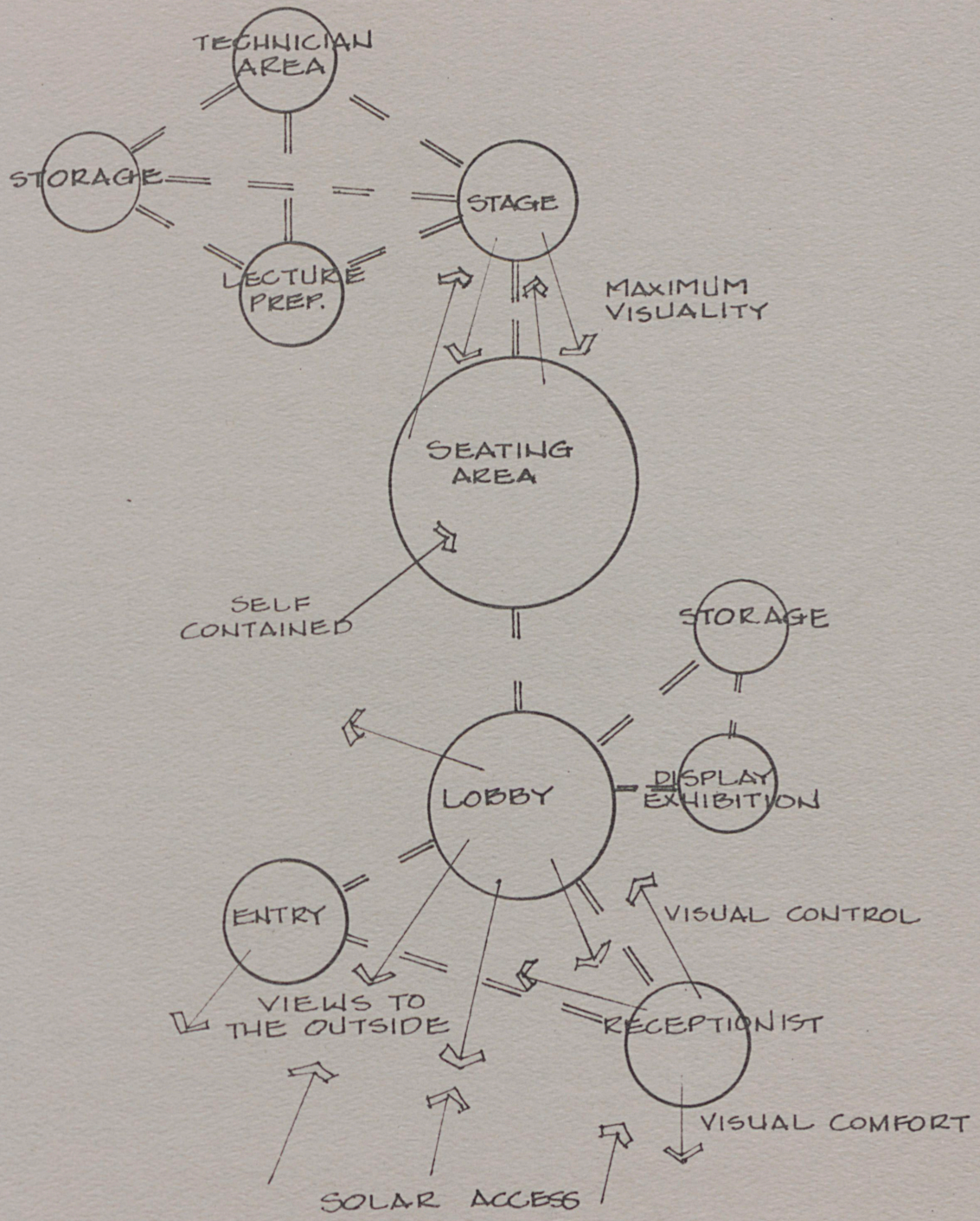
Unhampered maintenance should be allowed for so that it does not endanger exhibits.

ADJACENCY REQUIREMENTS

lobby, circulation area


Art gallery
0
Mail center
3
0
3
Restrooms
0
0
3
0
0
0
Telephone conference area
3
0
3
1
0
3
0
Employee lounge /Restroom
2
0
1
0
1
Janitorial spaces
2
4
5
Mechanical rooms
4
Storage


EMPLOYEE LOUNGE
STORAGE
ART GALLERY
JANITOR SPACE
RESTROOMS
TELEPHONE CONFERENCE
MECH ROOM
MAIL CENTER


TECHNICIAN AREA
STORAGE
STAGE
LECTURE PREP.
MAXIMUM VISUALITY
SEATING AREA
SELF CONTAINED
STORAGE
LOBBY
DISPLAY EXHIBITION
ENTRY
VISUAL CONTROL
VIEWS TO THE OUTSIDE
RECEPTIONIST
VISUAL COMFORT
SOLAR ACCESS

MISCELLANEOUS SUPPORT SPACES

The art gallery will serve as an auxiliary space of the corridors to add interest. It will enlighten and entertain the user. It may have partial direct sunlight, but a part of this area should be controlled so as to preserve certain artworks. The gallery will contain art and sculpture that will reinforce the link of space and Earth.

A mail center will be needed for the distribution of mail to the specific research scholars and employees. It will also be used for the purpose of mailing materials.

Restrooms will be necessary and should be located in places where they will add to the efficiency of the progression. Drinking fountains may also be located nearby.

Exterior decks for the purpose of dispersing large groups or holding informal meetings may also be considered.

A R T G A L L E R Y

PURPOSE

Entertain and educate the user--with special emphasis toward extra-terrestrial space.

DESCRIPTION

The gallery will display artwork (both wall mountable and sculptural). It is a passive space.

NUMBER OF USERS

A maximum of 30 users in space at one time.

ENTRY CONTROL

The art gallery should be provided with a locking gate to prevent entry after hours. While entry into the gallery does not have to be carefully watched, it should be within visual distance of a receptionist.

CIRCULATION

The gallery will be a small node off of a circulation corridor, lobby space, or some other public or semi-public area.

EQUIPMENT

Wall surfaces should be of a material that is suitable for mounting artwork. Also allow for artwork that is to be suspended from the ceiling.

ENVIRONMENTAL CONTROLS

Track lighting will be used. Natural lighting may be used in a way that does not interfere with an area that cannot be exposed to direct sunlight. The acoustics should provide a quiet space.

SERVICEABILITY AND MAINTENANCE

Unhampered maintenance should be allowed for so that it does not endanger artwork. Floor material may be carpet and/or a hard surface.

ADJACENCY REQUIREMENTS

reception area

M A I L C E N T E R

PURPOSE

The mail center is a miniature post office. It will receive and distribute mail to and from researchers and the administration.

DESCRIPTION

There are two parts to the mail center. The first is the office itself, where the mail is sorted and distributed. The second is the mail box location, which is provided with wall type mail boxes.

NUMBER OF USERS

The mail center will serve as a mail pick up location for 300-500 persons and a mail drop off location for the 1500-1800 persons of the Aerospace Centre.

ENTRY CONTROL

The mail center should be accessible during regular hours; access to the mail boxes should be available at all times. The mail center should be locked up to prevent entry after hours.

CIRCULATION

A separate circulation should be provided for users wishing to pick up mail from their boxes. This will facilitate better security for the mail center.

EQUIPMENT

Allow for 3 large outgoing mail boxes, 300-500 small (4"X4"X10") mail boxes, storage racks for mail bags and packages, and a service counter. Also allow for the storage of postal equipment (scales, cancellation stamps, etc.).

ENVIRONMENTAL CONTROLS

Use normal HVAC systems and acoustical systems for mail center (not as important for mail box area). Natural light recommended.

SERVICEABILITY AND MAINTENANCE

Use hard surface floor material. Mail center maintenance will be during regular working hours.

ADJACENCY REQUIREMENTS

Should be located near administration and public circulation, and a service entrance for mail drop off and loading.

EMPLOYEE LOUNGE

PURPOSE

The lounge is a place for relaxing and eating for administration, researchers, and support personnel.

DESCRIPTION

It should be a physically and visually comfortable retreat from the normal work space. Activities may include board games, TV watching, music listening, eating, and light conversation.

NUMBER OF USERS

10 to 50 persons

ENTRY CONTROL

Accessibility should be limited to employees only and it should be easily monitored.

CIRCULATION

The lounge will be used for several purposes, therefor the circulation should accommodate for several 'spaces within a space'.

EQUIPMENT

Allow space and accommodations for the following: TV, stereo, sink, dishwasher, counter top, cabinets, 5 lounge chairs, 2 couches, 2 coffee tables, 5 end tables, 2 large tables with chairs, and a coat closet.

ENVIRONMENTAL CONTROLS

Provide for natural lighting and views to the outside. The lounge should be acoustically enclosed and separate from surrounding areas. Artificial lighting should be user controlled. HVAC systems may be supplemented with operable windows.

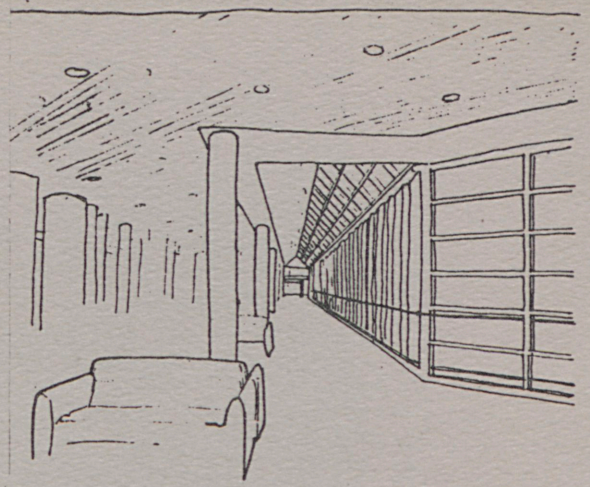
SERVICEABILITY AND MAINTENANCE

Carpet flooring will require periodic vacuuming. Maintenance will occur after hours.

ADJACENCY REQUIREMENTS

administration and reception areas

C O R R I D O R S



PURPOSE

The corridors are a pedestrian link connecting spaces.

DESCRIPTION

They should provide efficient movement from one space to another. Allow for locations of visual interest to outside or gallery spaces, and avoid long corridors and large areas of impersonal space.

NUMBER OF USERS

The corridors should allow for 2 persons to easily walk abreast. They should be planned to prevent excessive traffic buildup during busy hours and after lectures.

ENTRY CONTROL

Corridors to security or private areas will require security gates. Semi-private areas should be visually controlled.

CIRCULATION

Circulation is the primary purpose of the corridor. However they also meeting places, and nodes should be created around potential 'bottle neck' areas such as drinking fountains and restrooms.

EQUIPMENT

display cases, fire extinguishers, drinking fountains

ENVIRONMENTAL CONTROLS

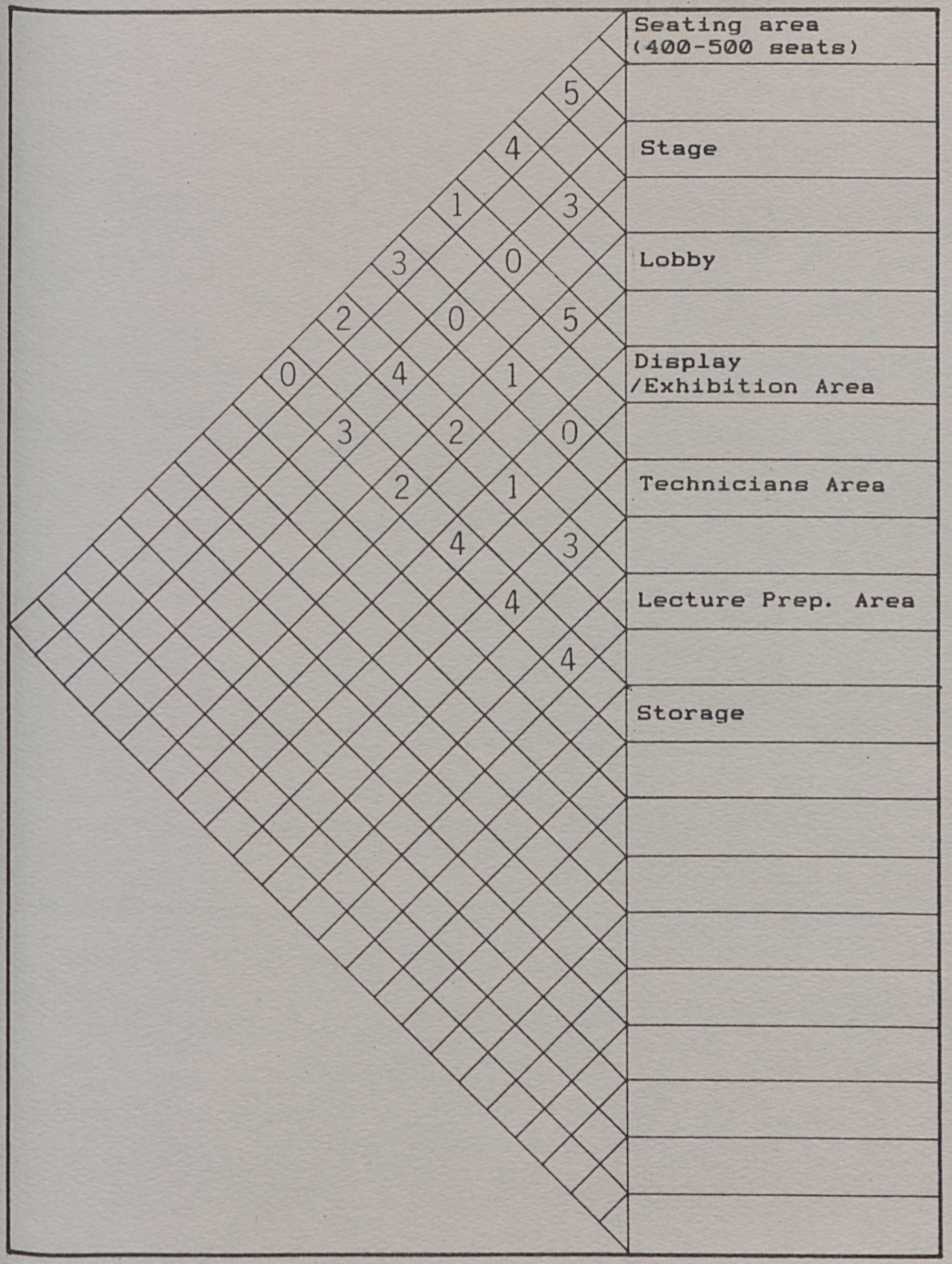
Artificial lighting should be efficient, as those areas will remain lit during the working hours. Lighting will be reduced by about 50% at night. Natural lighting is preferred where attainable.

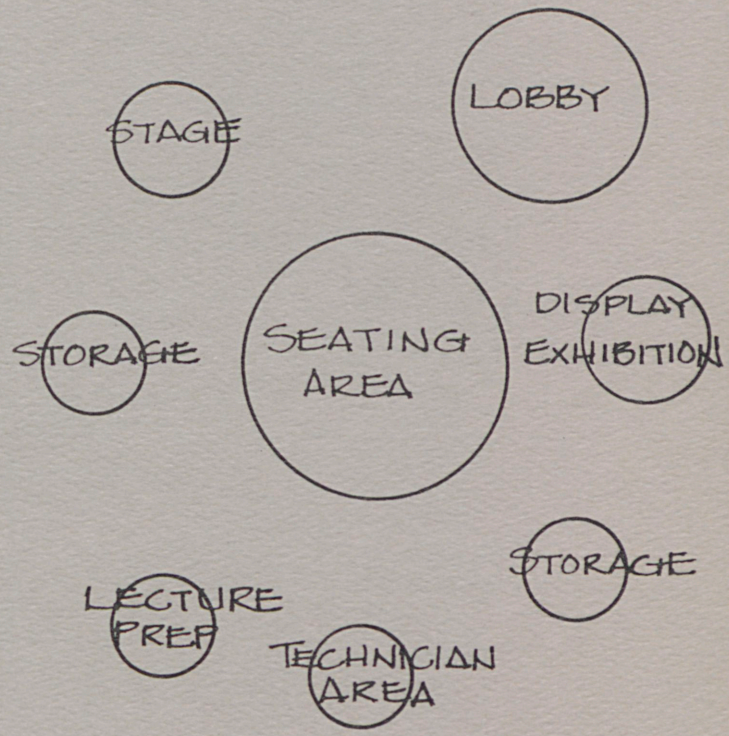
SERVICEABILITY AND MAINTENANCE

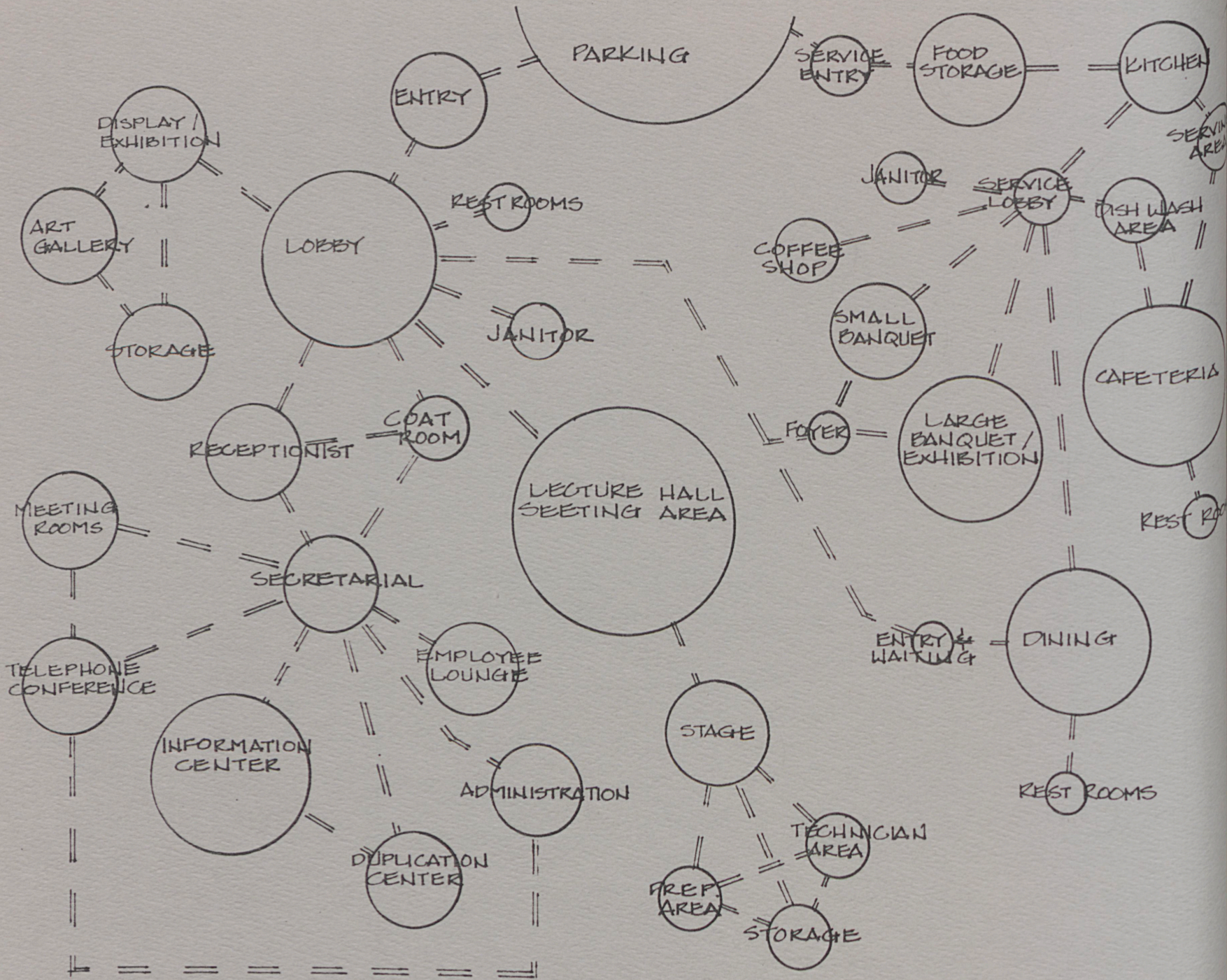
Hard surface floors will need periodic cleaning and waxing. Provide a scuff resistant wainscoting. Maintenance will occur after hours.

ADJACENCY REQUIREMENTS

entry and exit points


Seating area
(400-500 seats)
Stage
Lobby
Display
/Exhibition Area
Technicians Area
Lecture Prep. Area
Storage


STAGE
LOBBY
STORAGE
SEATING
AREA
DISPLAY
EXHIBITION
STORAGE
LECTURE
PREP
TECHNICIAN
AREA


PARKING
ENTRY
SERVICE ENTRY
FOOD STORAGE
KITCHEN
DISPLAY / EXHIBITION
ART GALLERY
STORAGE
LOBBY
RESTROOMS
JANITOR
JANITOR
SERVICE LOBBY
DISH WASH AREA
COFFEE SHOP
SMALL BANQUET
CAFETERIA
RECEPTIONIST
COAT ROOM
FOYER
LARGE BANQUET / EXHIBITION
MEETING ROOMS
LECTURE HALL SEETING AREA
SECRETARIAL
ENTRY & WAITING
DINING
TELEPHONE CONFERENCE
EMPLOYEE LOUNGE
STAGE
INFORMATION CENTER
ADMINISTRATION
TECHNICIAN AREA
DUPLICATION CENTER
PREP. AREA
STORAGE
REST ROOMS

P E R T I N E N T L A N D U S E
R E Q U I R E M E N T S

DESIGNATION:

Planned Industrial District (PID)

PURPOSE:

This district is established for the purpose of providing for a limited group of professional, administrative, research andmanufacturing uses which may have unusual requirements for space, light and air, and the operations of which are to a considerable extent clean, quiet and free from any objectional or dangerous nuisance or hazard.

PERMITTED PRINCIPAL USES:

1. Laboratories
2. Light Manufacturing
3. Offices
4. Warehouses

USES REQUIRING SPECIAL APPROVAL (SPECIAL USES):

1. Outside Storage
2. Warehouse (flammable material)
3. Health Club

DEVELOPMENT REQUIREMENTS:

1. Minimum gross area of land to be included: Twenty (20) acres.
2. Minimum lot size: One (1) acre.
3. Maximum structural coverage of lot: Thirty-five (35) percent.

4. Maximum structural height: Forty-five (45) feet.
5. Setback requirements:
    a. Front yard: Fifty (50) feet.
    b. Side yards: Thirty (30) feet.
    c. Rear yard: Fifty (50) feet.
    d. Minimum building setback distance from any residential district: One hundred-fifty (150) feet.
6. All operations shall be conducted within enclosed buildings.
7. An opaque screening wall, fence or hedges at least six (6) feet in height shall be required when the PID abuts any residential zone.
8. The fencing of, or storage of material is not permitted within the front yard setback.

PARKING REQUIREMENTS:

The following are the minimum requirements for parking spaces to be maintained in connection with the uses indicated (A parking space shall be one hundred eighty (180) square feet:

a. Library, museum, art gallery and similar uses: 1 space per 600 square feet gross leasable area.
b. Office buildings and professional services: 5 spaces per 1000 square feet gross leasable area.
c. Restaurants, night clubs, bars: 1 space per 3 seats.

d. Theaters, auditoriums, stadiums, assembly halls, gyms, and similar uses: 1 space per 4 seats or 1 space per 150 square feet gross floor area, whichever is applicable.

e. Transportation terminals: 1 space per 4 seats for waiting passengers.

There shall be sufficient space for turning maneuvers, as well as adequate ingress and egress to the parking area.

The parking area must be provided on the lot as or within five hundred (500) feet of the principal structure or use.

The parking area for any use other than single family or duplex shall be paved if there are more than five (5) spaces.

Owners', tenants', or employees' parking will not be permitted on any street. Each owner shall provide off-street parking facilities within the property lines and in the rear of the front line of any buildings constructed on the property.

There shall be provided on each lot one parking space for every two employees, plus an adequate amount of space for all persons who may be expected to visit such establishment at any one time.

All off-street parking areas shall be paved.

Front yard: Visitor parking area permitted up to thirty-five (35) percent of the required area of the front yard. No other parking shall be permitted. All the remaining front yard area shall be landscaped.

Side yard: All types of parking are permitted, except that a fifteen (15) foot landscaped strip must be maintained at the property line.

Rear yard: Same as side yard.

All employees and visitor parking is restricted to the premises.

No loading or maneuvering areas permitted in any required front yard, nor in any required yard abutting a residential district or an existing or controlled access highway.

In parking lots of one acre or more, at least five (5) percent of area of parking lot shall be devoted to landscaping within the interior of the parking area.

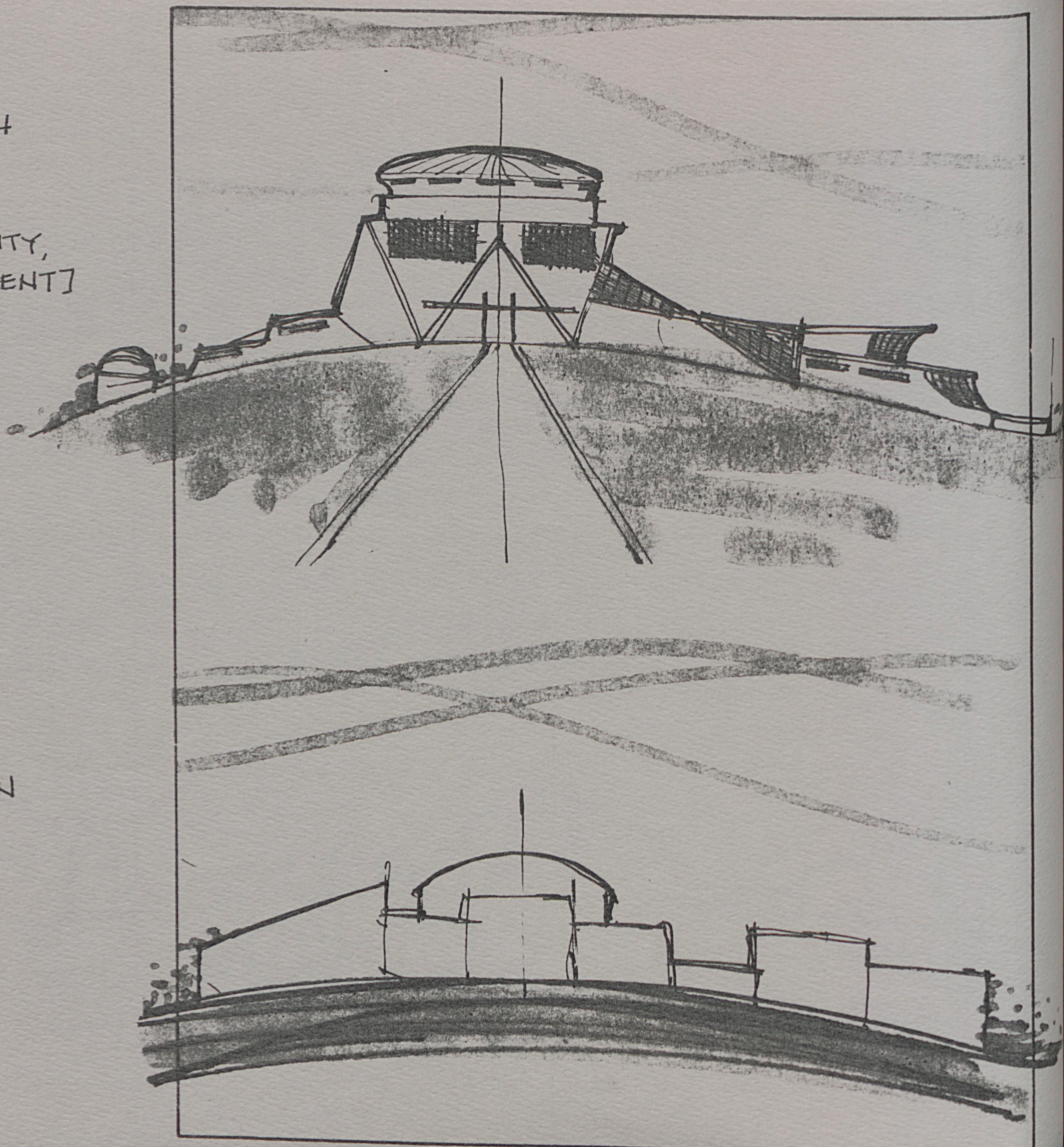
Lighting facilities shall be required for all employee parking areas. No luminaires on parking lots shall be more than twenty (20) feet above ground level, and shall be arranged to reflect light away from adjacent residential areas.



GROWING OUT OF RIDGE

HI-TECH [MACHINE]

REFLECTING BOTH
TECHNOLOGY
&
EMOTION [SERENITY,
WONDERMENT]
OF
SPACE



THE BUILDING
INVITES
EXPLORATION



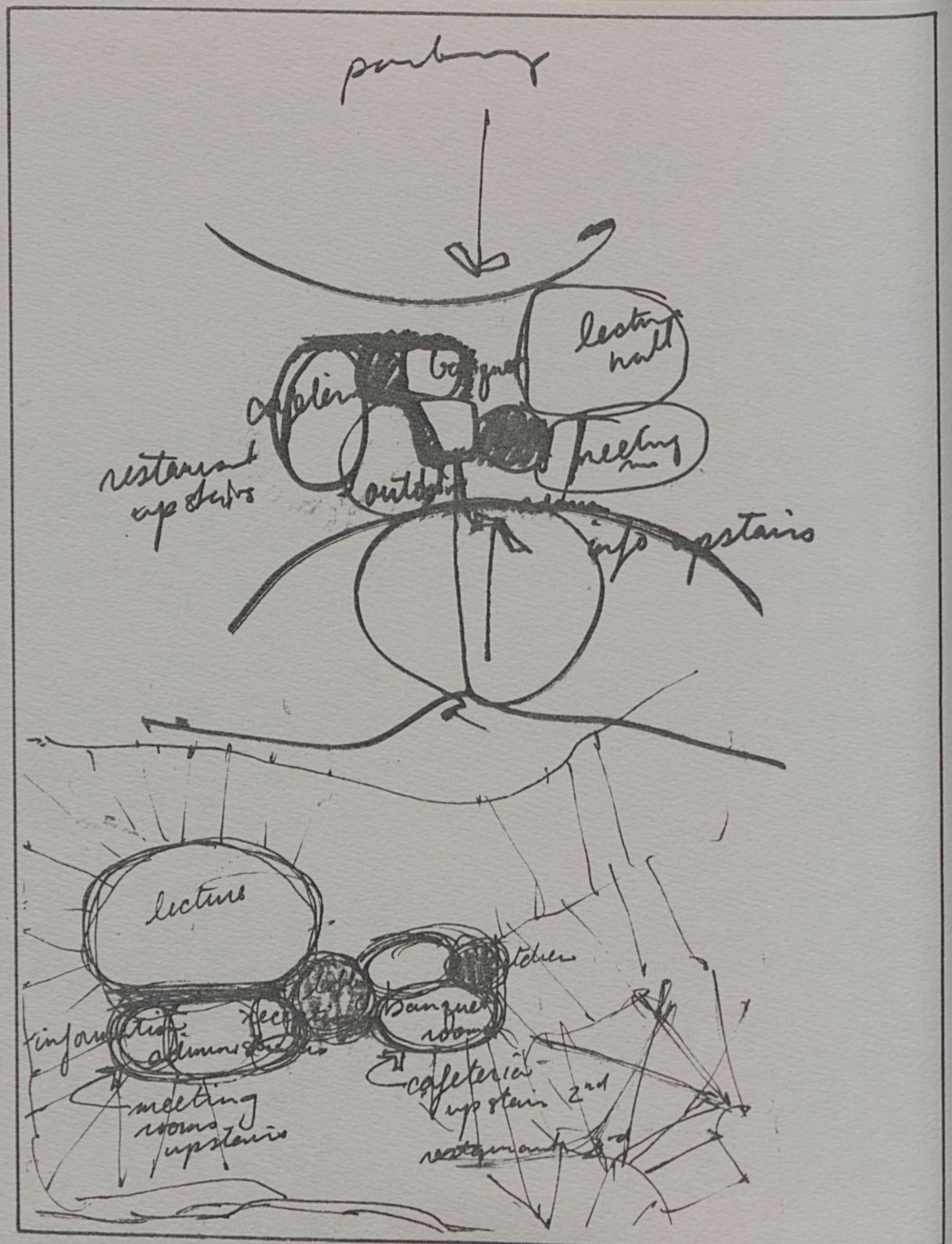
"SPACE SHIP"
BUILDING QUALITY
EXPRESSED THROUGH
STRUCTURE AND
MATERIALS

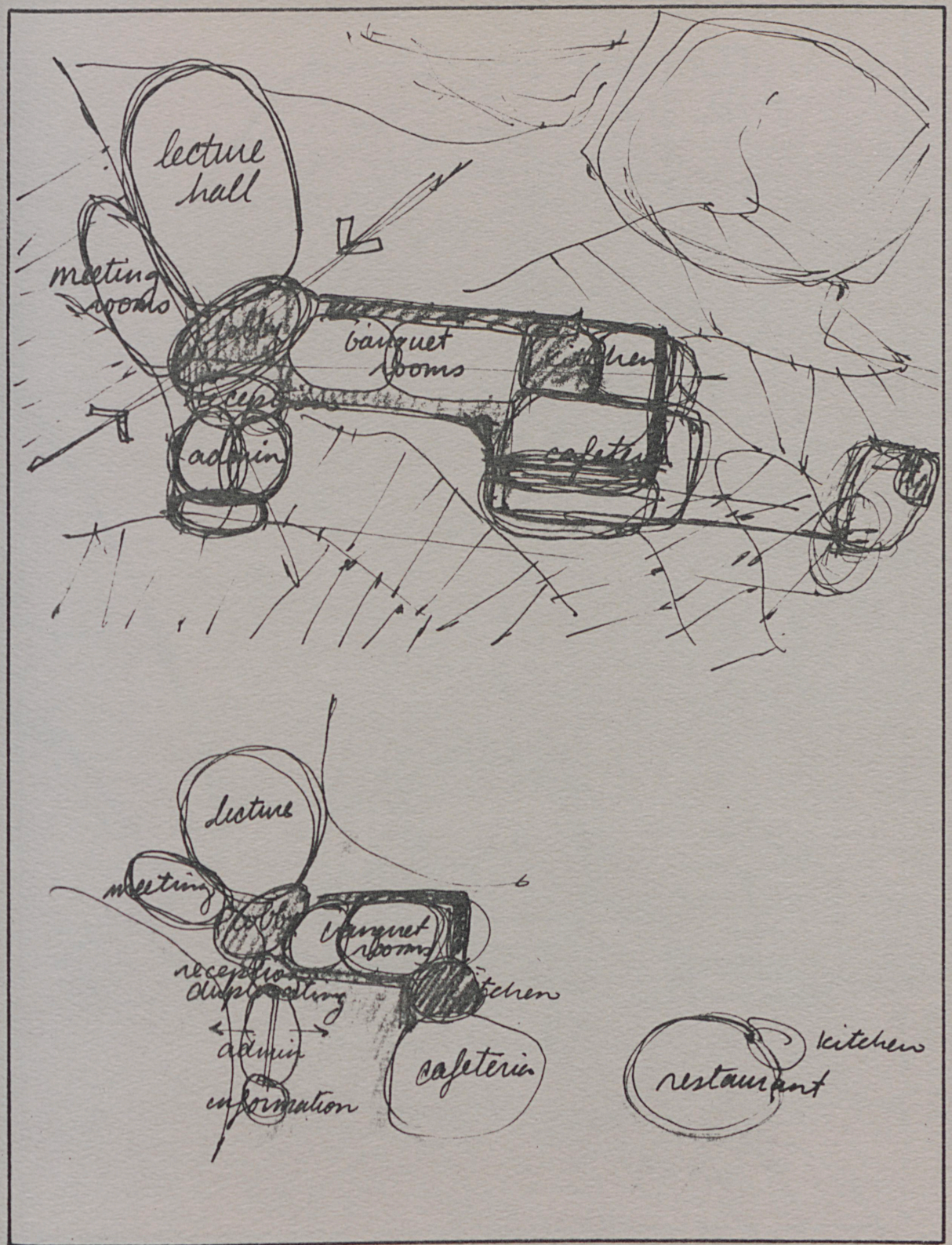
NOT NECESSARILY
OF THE ENVIRONMENT

[THE BUILDING IS
SIMILAR TO DISCOVERING
A WRECKED PLANE IN
THE JUNGLE — PROVIDING
CONTRAST & WONDERMENT]

DOUBLE ENTRY

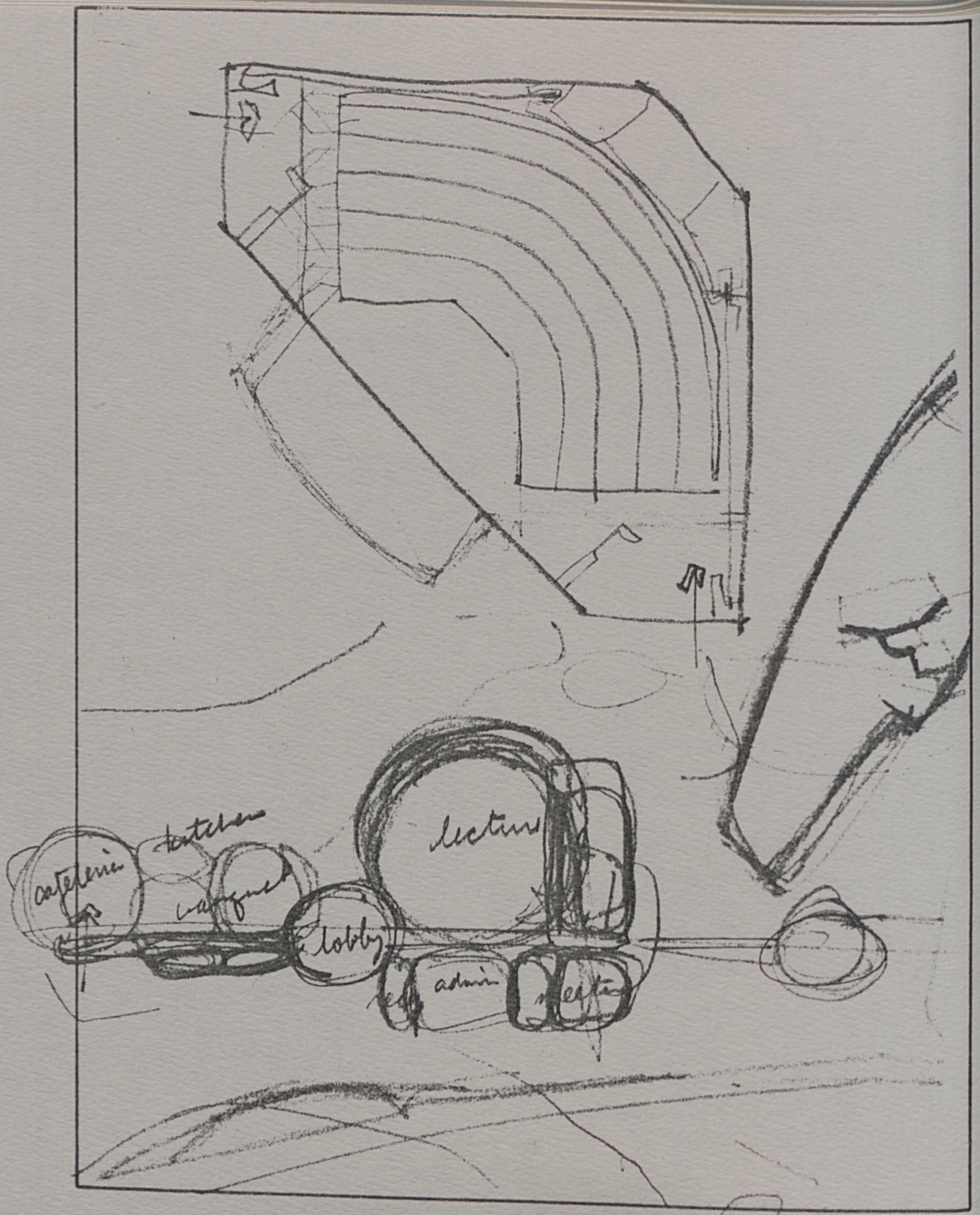
[FORMAL & PARKING]

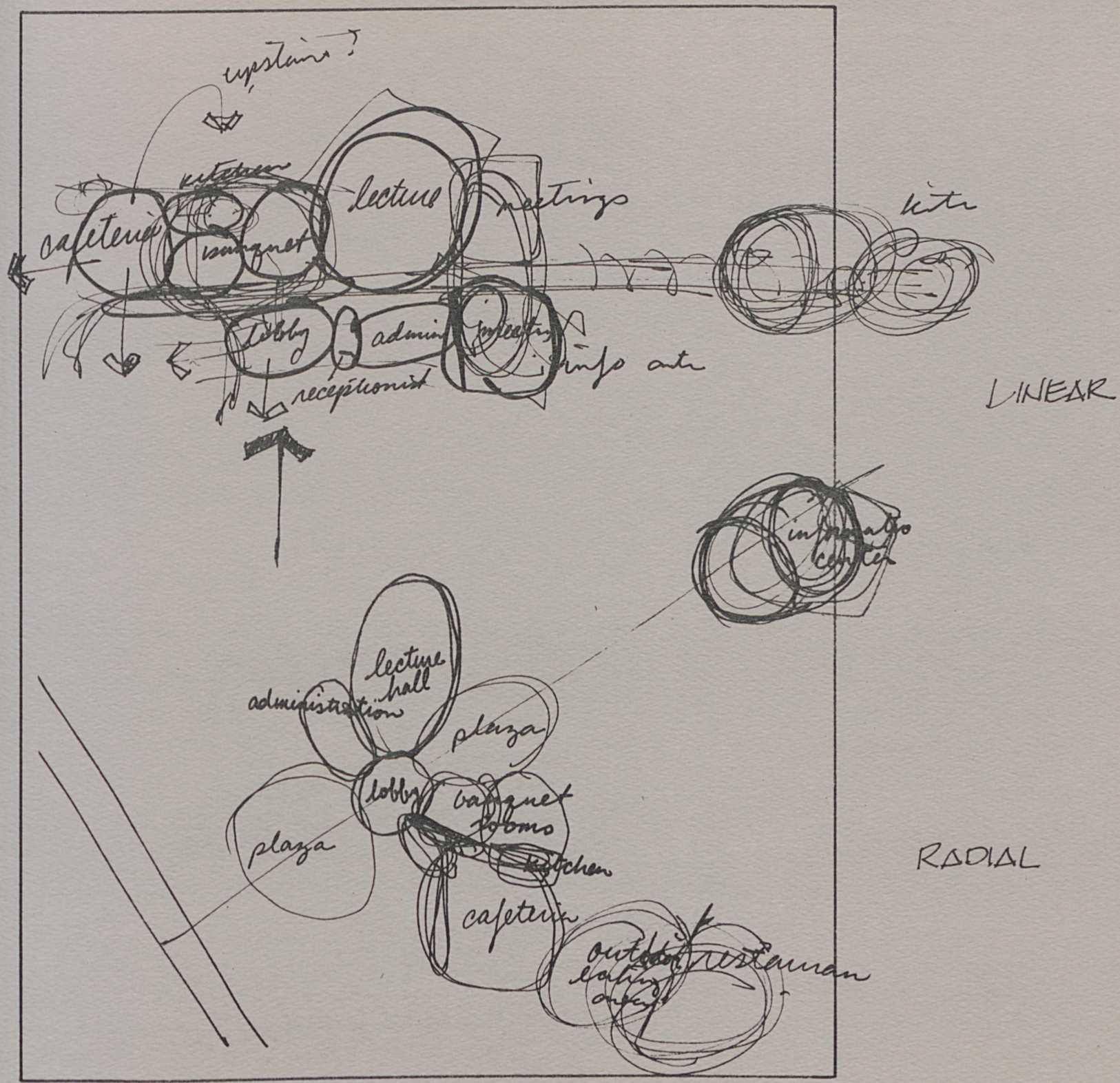


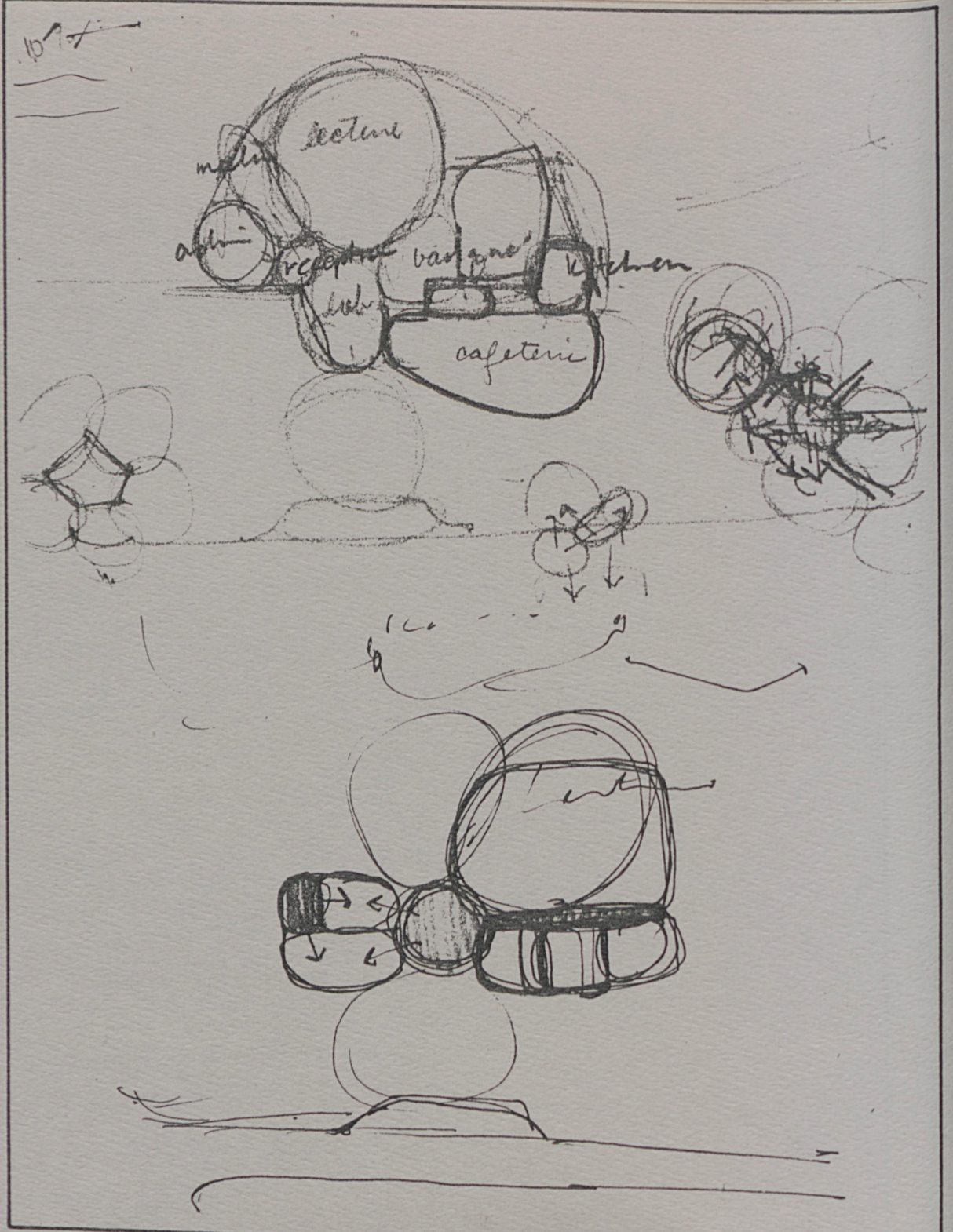


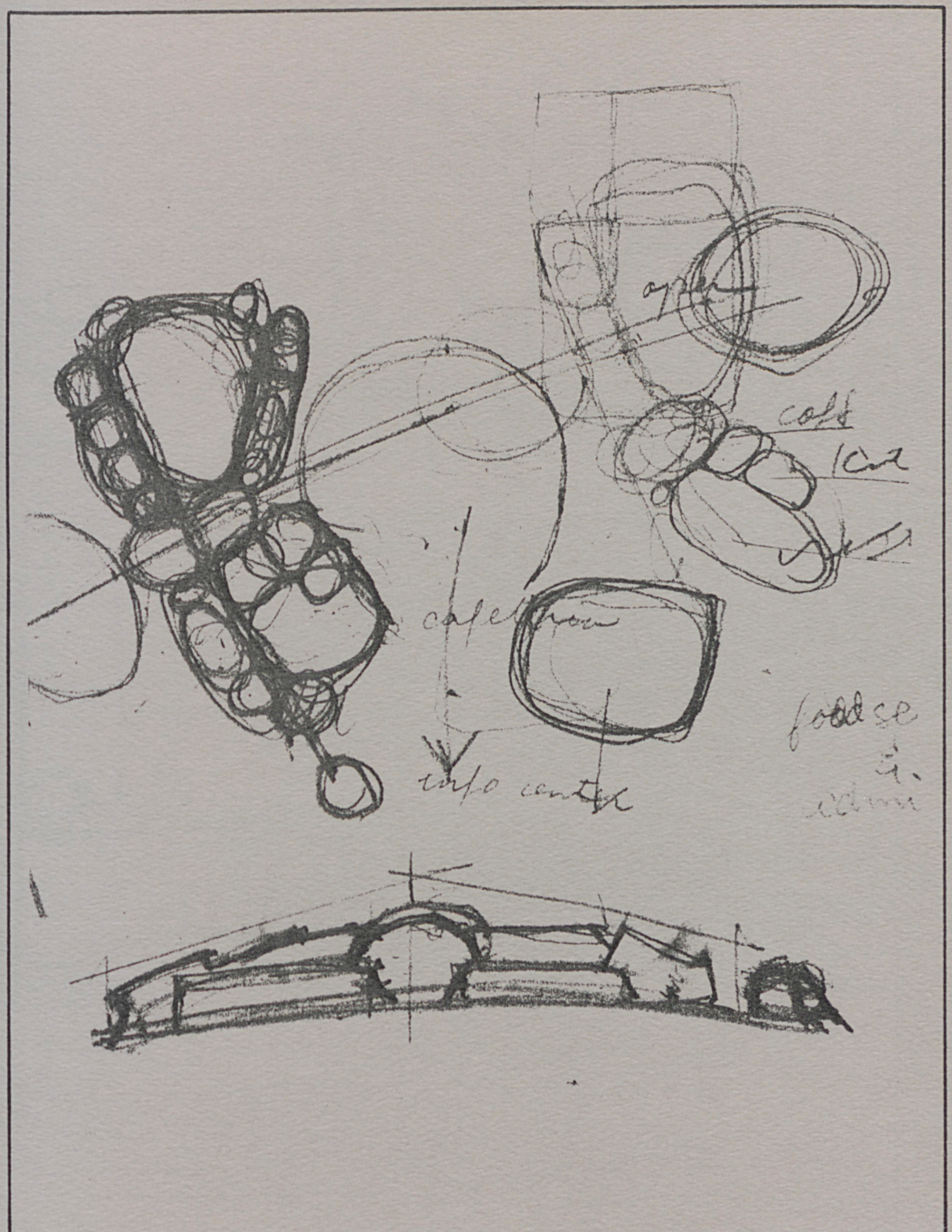
LECTURE HALL
TAKES ADVANTAGE
OF SITE SLOPE

SPREAD
ALONG
RIDGE

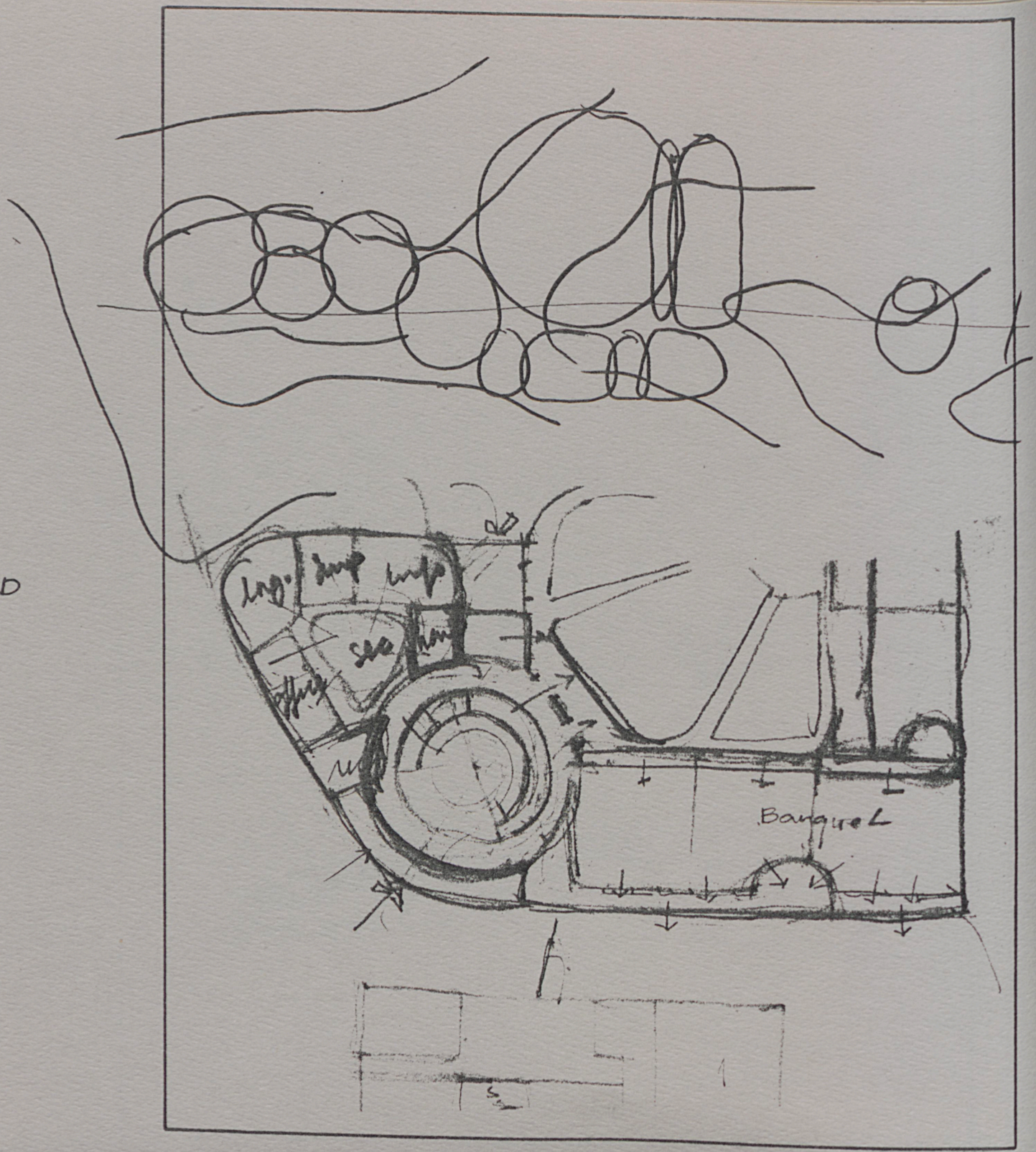

cafeteria
kitchen
lobby
lecture
admin


upstairs
kitchen
lecture
meetings
cafeteria
banquet
kitchen
lobby
admin
meeting
info ctr
receptionist
LINEAR
information center
lecture hall
administration
plaza
lobby
banquet rooms
plaza
kitchen
cafeteria
outdoor eating area
RADIAL


lecture
cafeteria

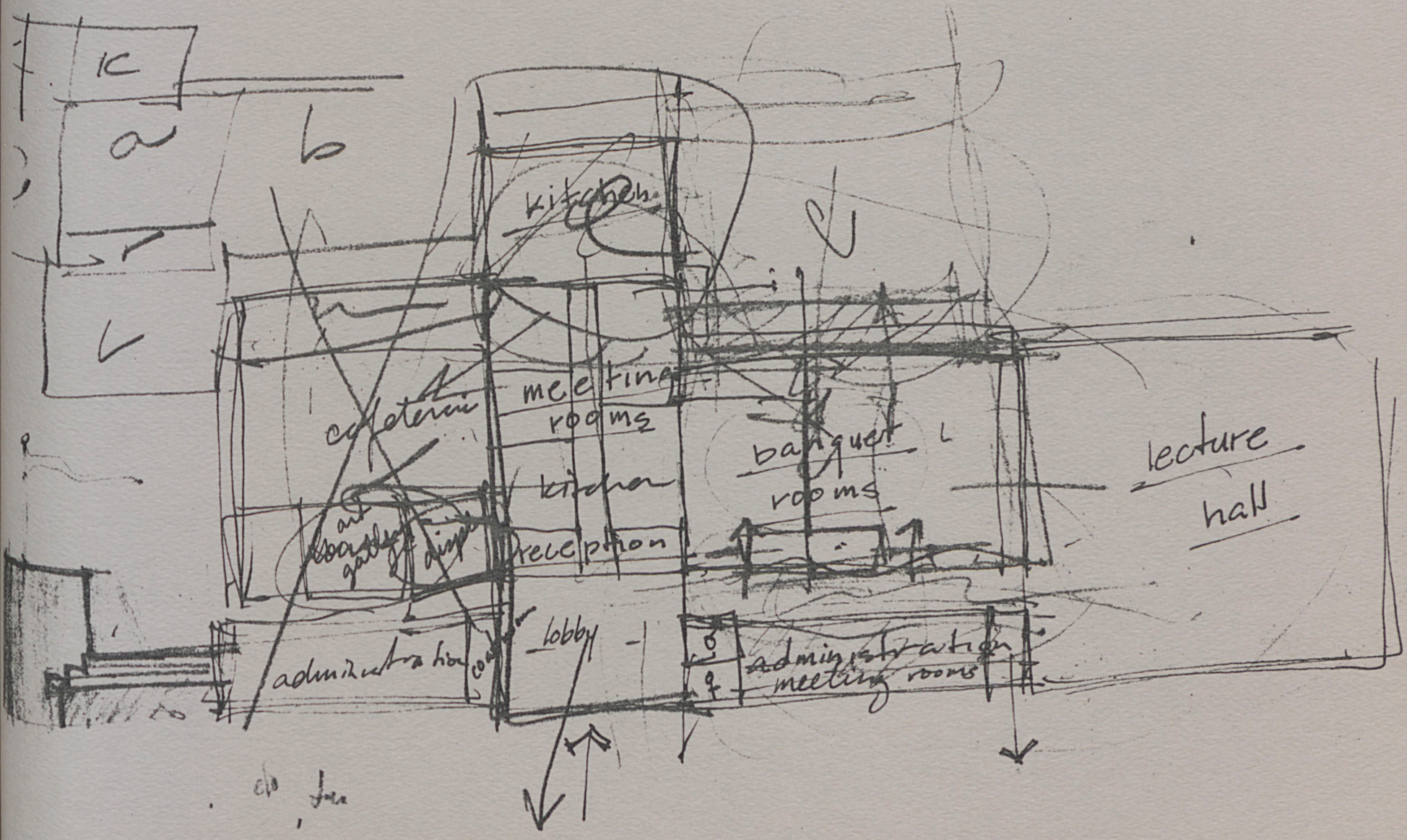


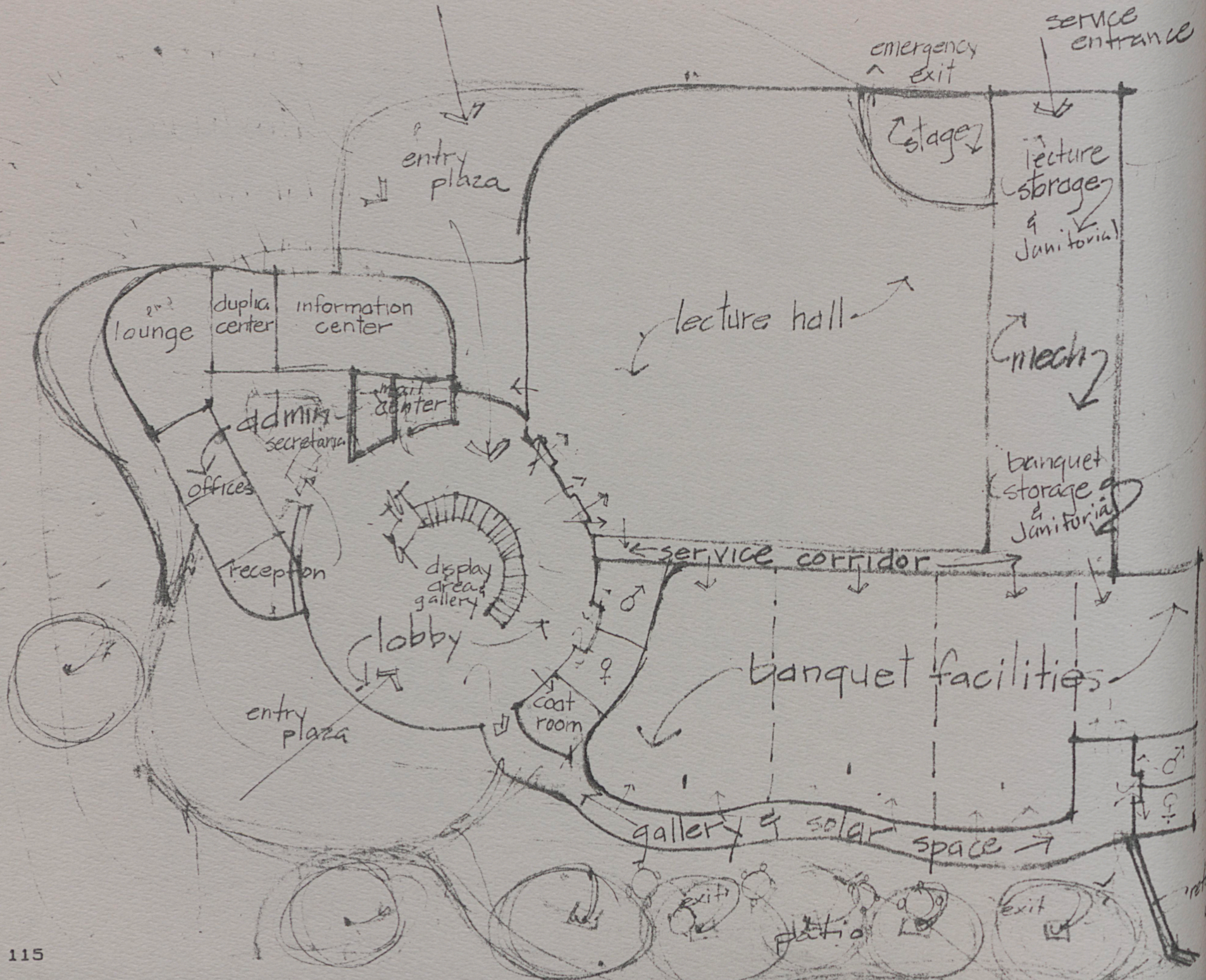
HIERARCHY

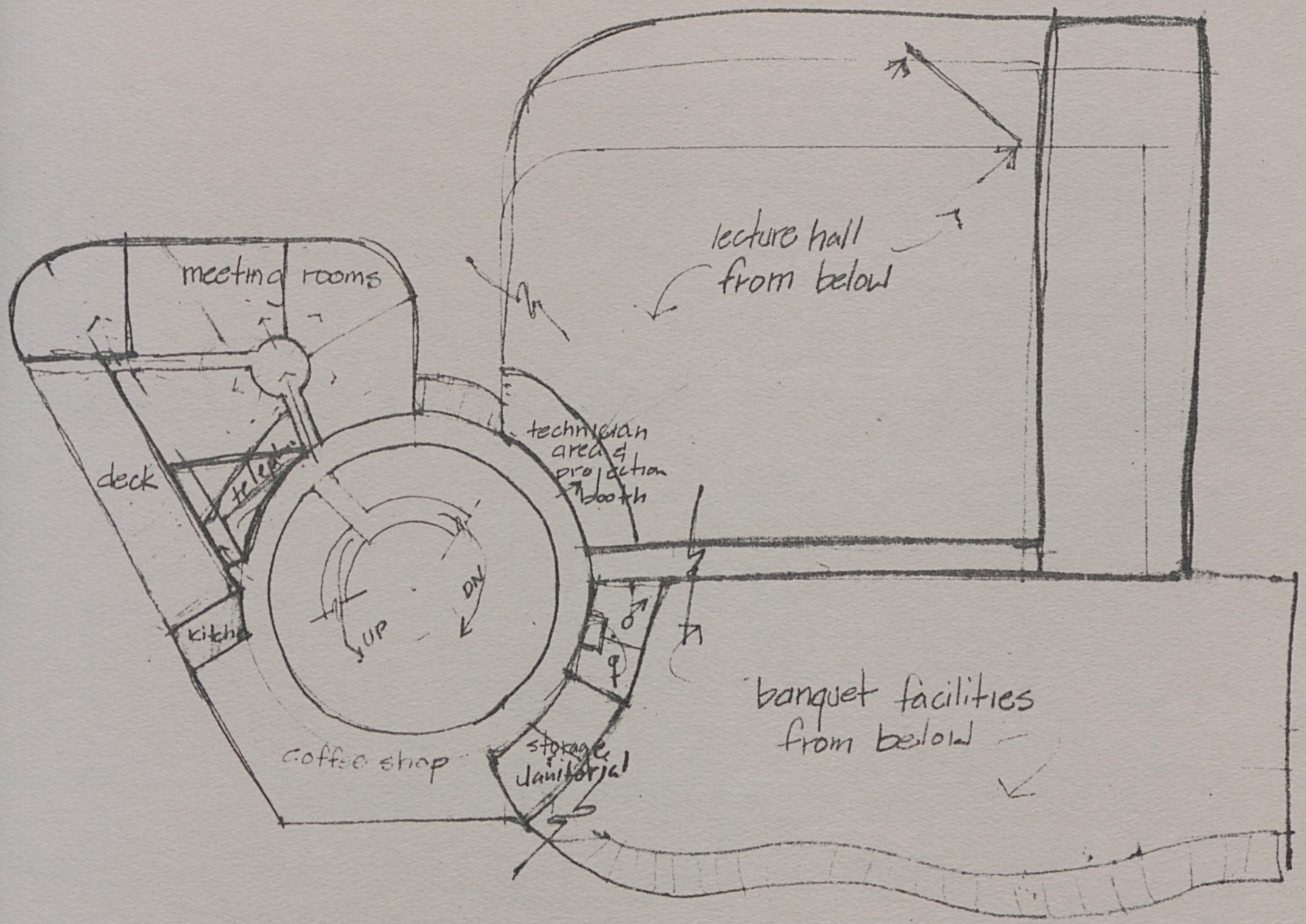


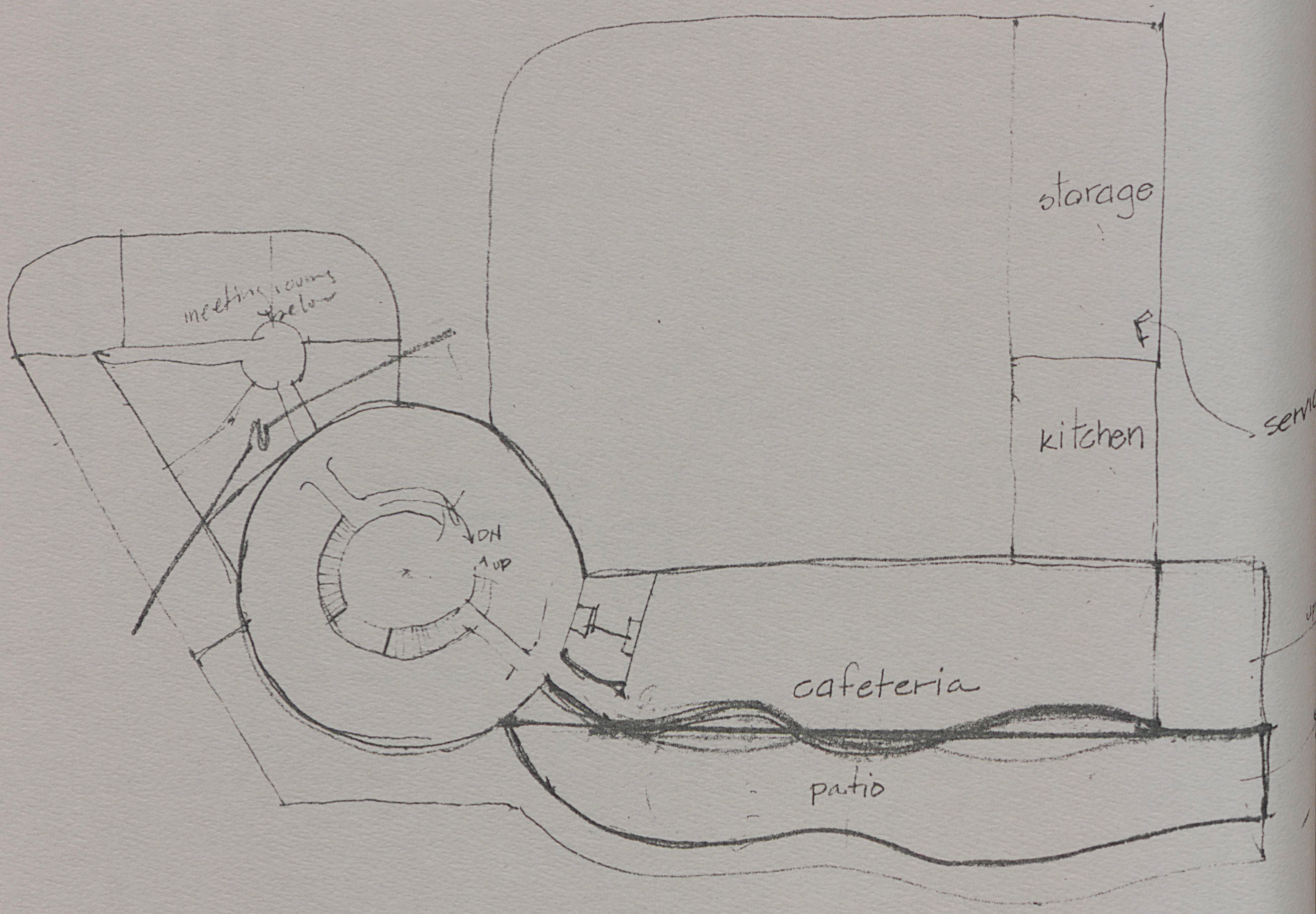
BUILDING ZONED
INTO PARTS

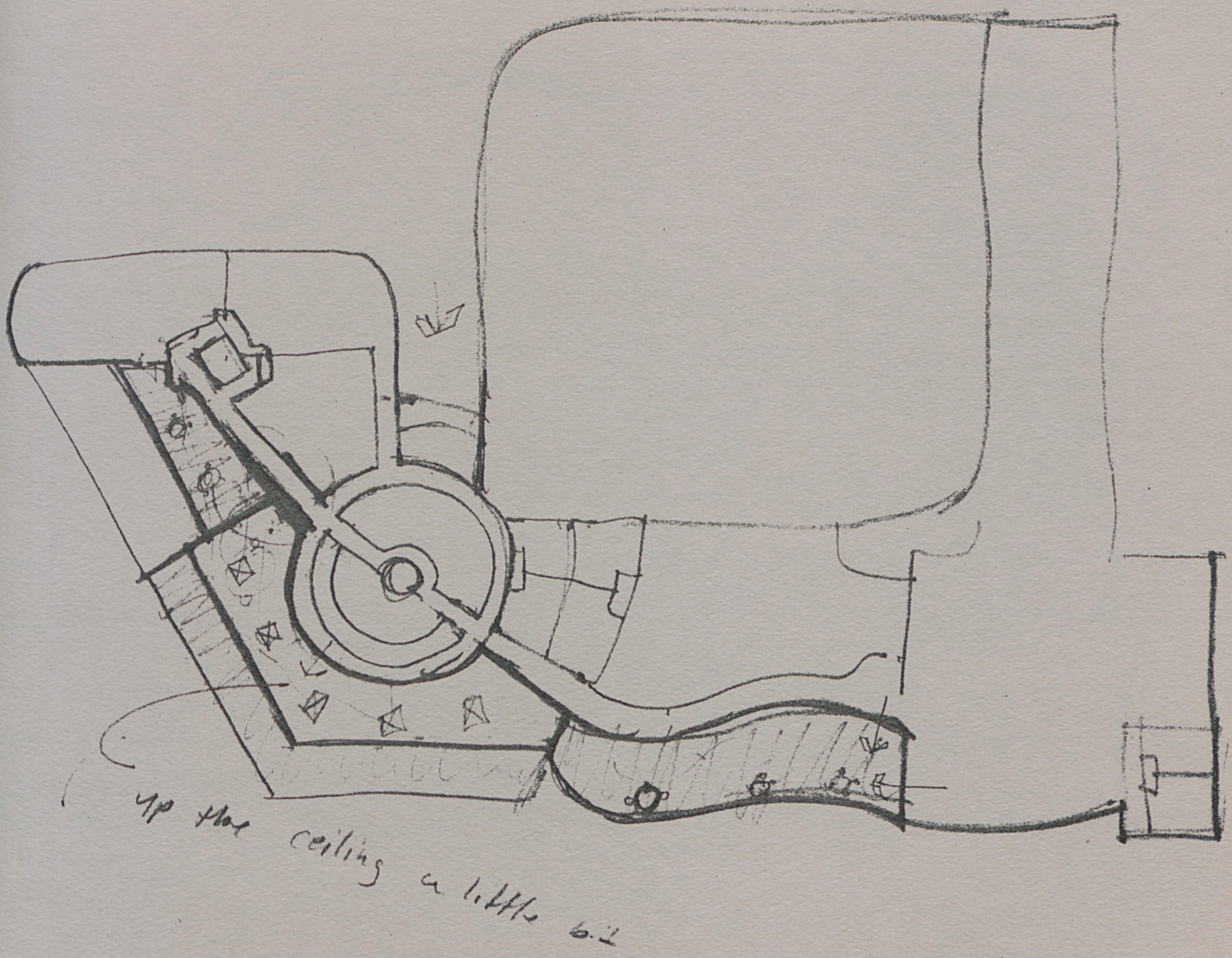
ORGANIZATION

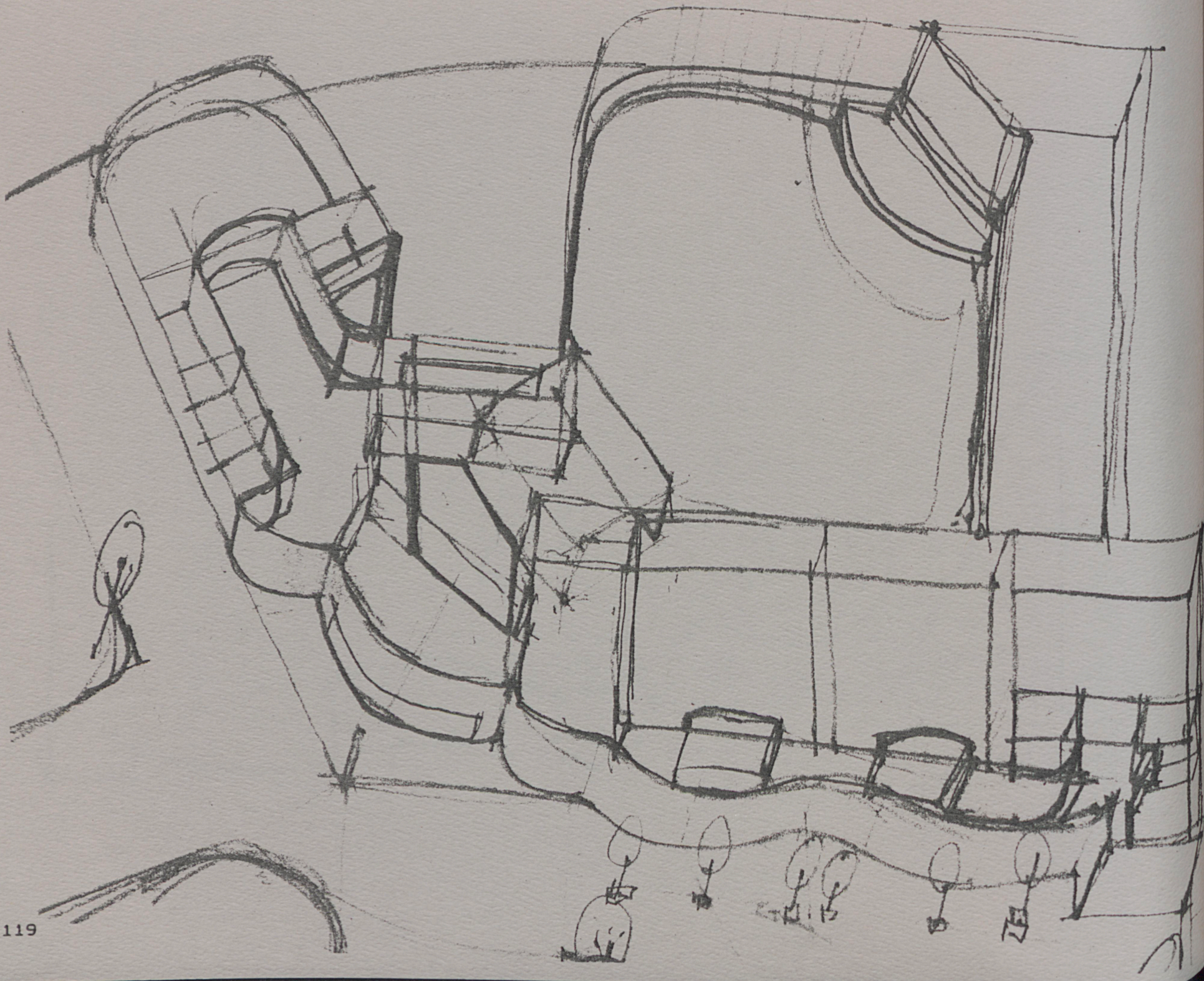


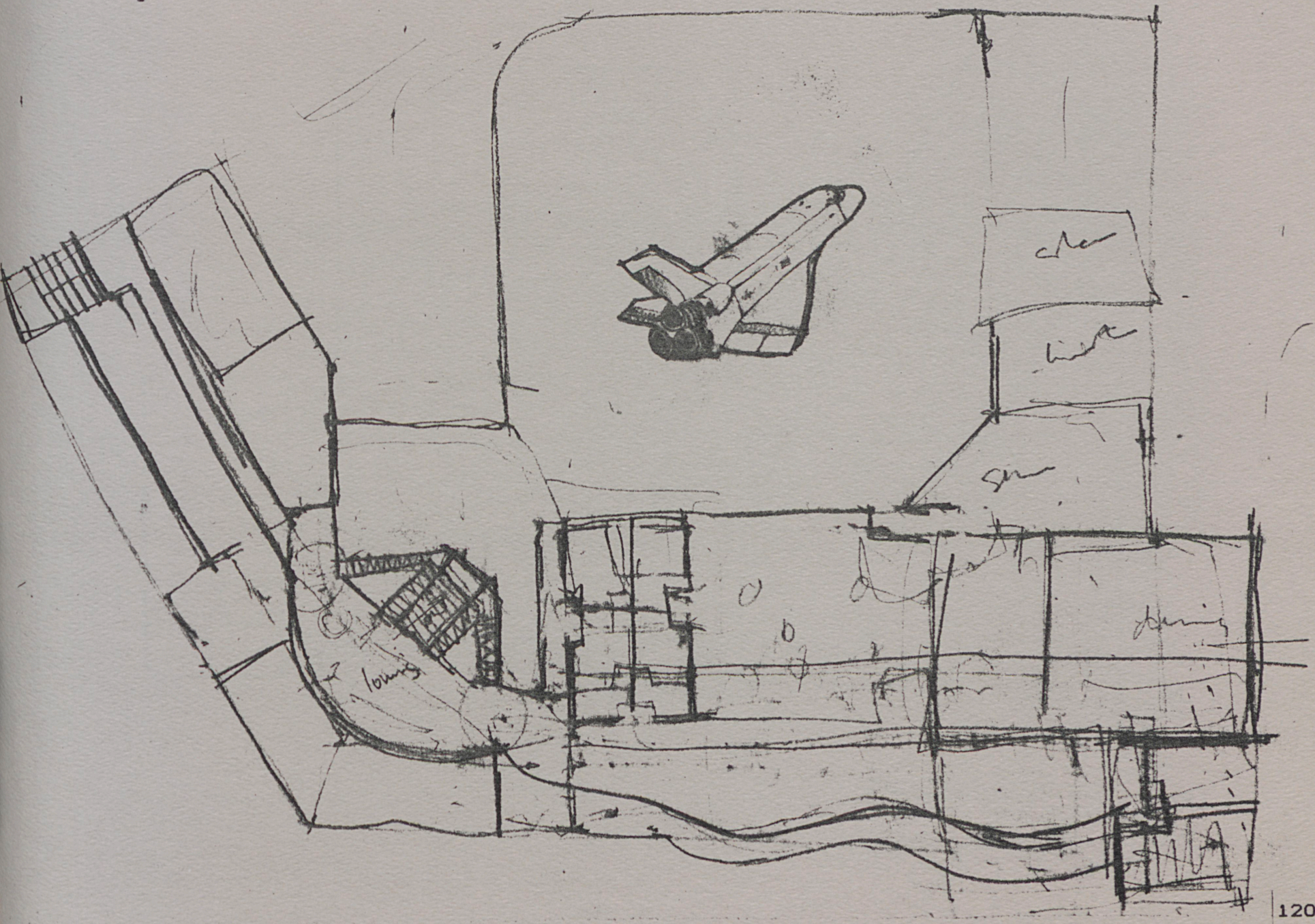

emergency exit
service entrance
entry plaza
stage
lecture storage & Janitorial
lounge
duplic. center
information center
lecture hall
mech.
admin.
secretaria
mail center
offices
reception
display area gallery
banquet storage & Janitorial
service corridor
lobby
banquet facilities
coat room
entry plaza
gallery & solar space
exit
exit
patio

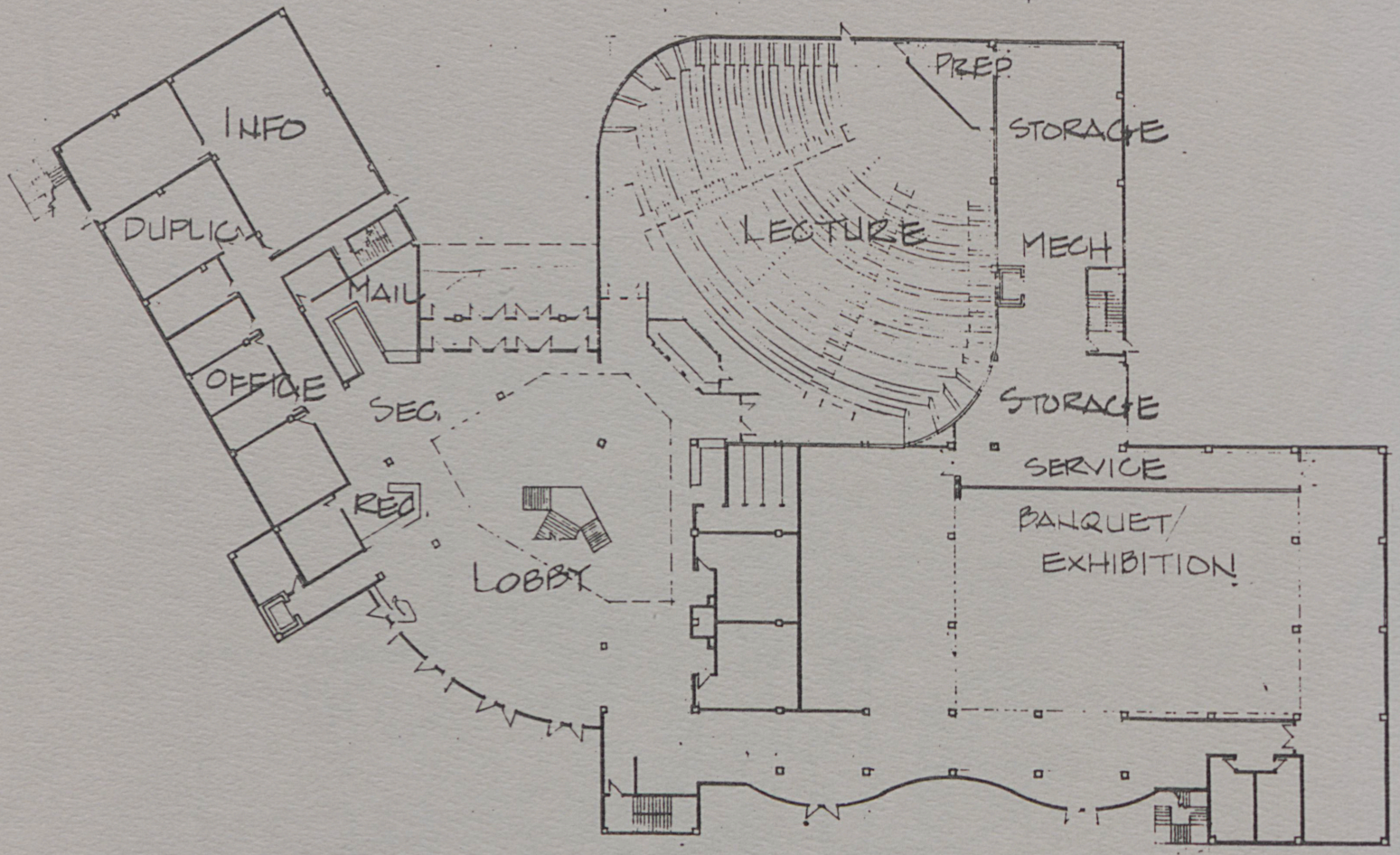

meeting rooms
lecture hall
from below
deck
technician
area &
projection
booth
UP
DN
kitchen
coffee shop
storage
janitorial
banquet facilities
from below


meeting rooms
below
DN
UP
storage
kitchen
cafeteria
patio


up the ceiling a little bit

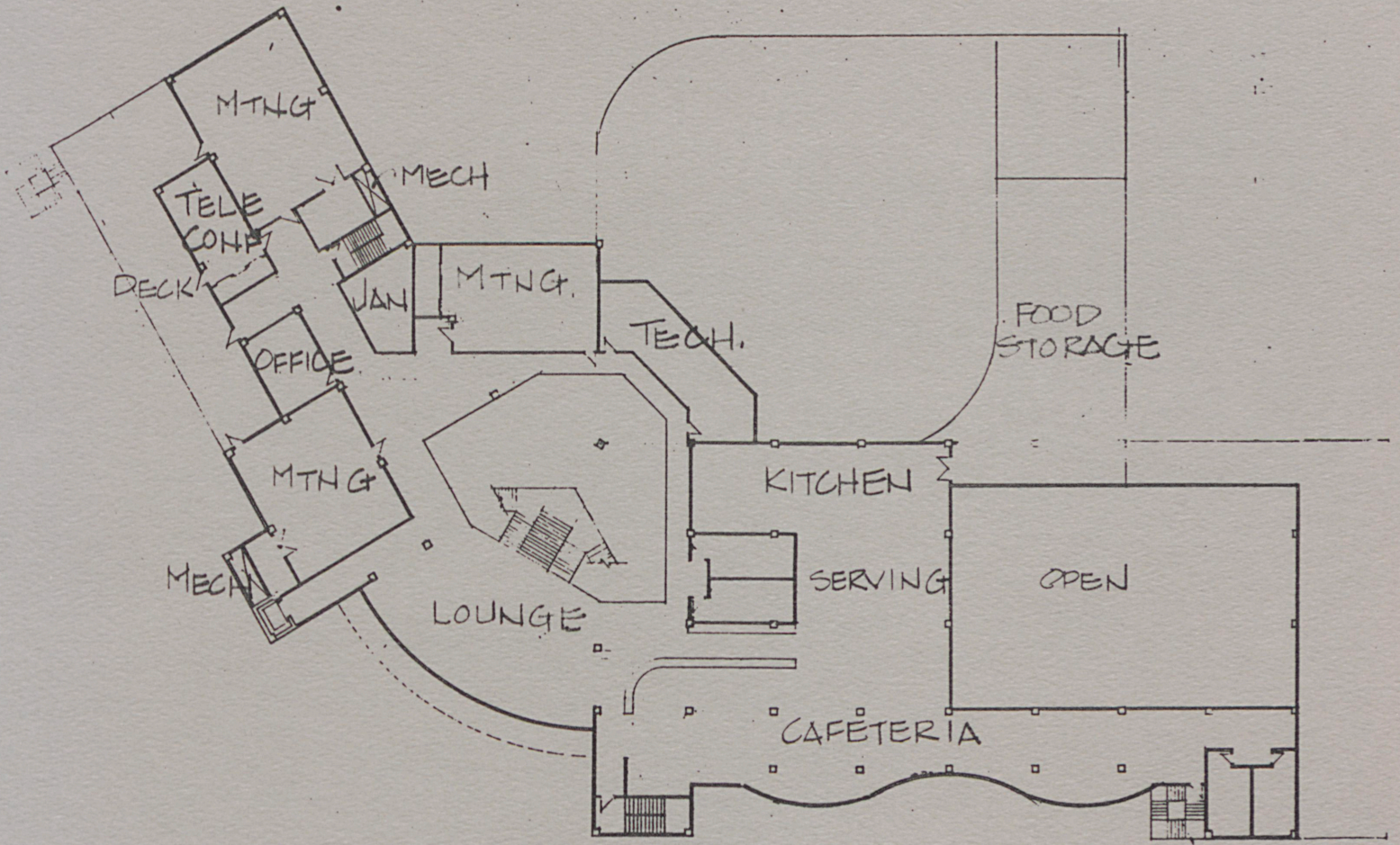






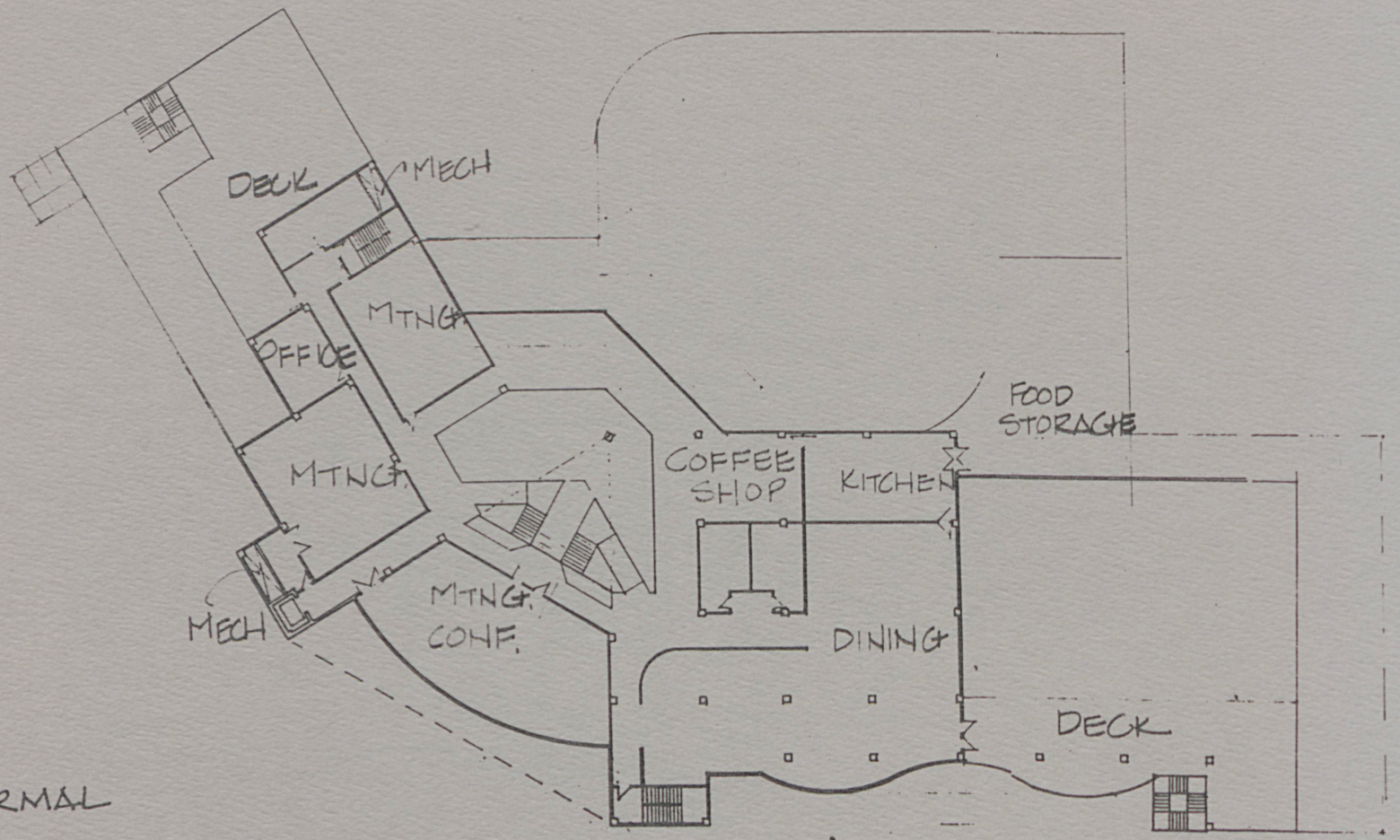
EXPOSED STRUCTURE

CLEAN, WHITE SURFACES



CRISP WINDOW

EXTERIOR IS USER ACTIVE



FORMAL

MULTI - LEVEL

STEEL PANELS PAINTED
WITH ENAMEL

MONTANA STATE UNIVERSITY LIBRARIES
3 1762 10079559 8

