12-1985

A Transportation Museum

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A TRANSPORTATION MUSEUM

by Athena Hassiotis

A terminal project submitted to the Faculty of the College of Architecture, Clemson University, in partial fulfillment of the requirements for the degree of

BACHELOR OF ARCHITECTURE

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DEDICATION

DEDICATION

Dedicated to my parents, George and Despina, and my sisters, Sophia and Olga, for their support and encouragement throughout the years.

ACKNOWLEDGEMENTS

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I would like to express my appreciation to the faculty and students of the College of Architecture. I especially thank Professors Lynn Craig, Dale Hutton, and John Jacques for their guidance. I would also like to acknowledge Steve Herring, Kety Jabbour, Al Lindsay, and other friends for their help in the completion of this project.

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS
(concluded)

ABSTRACT

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This work involves the design development and solution of a transportation museum in downtown Albuquerque, New Mexico. The museum is part of a Master Plan proposed by the City of Albuquerque in the development of a festival market place. It was designed to accommodate southwestern transportation exhibitions, beginning with that of the first inhabitants of the area to today's developments. The building fits in the general area through the use of scale, color, and material. Reinforced concrete walls were stuccoed to give a feeling of adobe.

The museum is perceived from the northbound train as a series of strong bold forms. It softens up

at the pedestrian side on the northwest, and opens up to views of a park. Design considerations within the museum include the separation of the public and private spaces, the comfortable skylit lobby, and the use of water and a central courtyard for the comfort of the visitors.

INTRODUCTION

INTRODUCTION

The word "museum" has a number of meanings rooted in history. The term is derived from the Greek word "mousion," which was used to describe a place dedicated to the muses, the nine daughters of Zeus who came to be associated with the arts and sciences. This place depended on the abstract general atmosphere rather than on concrete features. It was a place where man could go to remove himself from the problems of everyday life. Both Roman and Greek authors used the word museum in the Old Greek sense to refer to the environment suited for creative inspiration.

Today museums provide information and stimulation by means of objects as well as experiences generated by symbols and the written or spoken

word. Generally, museums fulfill three main functions. They serve as depositories devoted to the preservation and conservation of objects of particular value, they are centers of research, and they are centers of education. Some institutions are exclusively devoted to a single function, while others serve two or all three. The prime consideration of museums is focused on the appeal to the eye and the sense of touch. They are also unique in offering the people the viewing of objects of authenticity. The main characteristic of museums is their flexibility for growth and display. They serve a wide variety of interests and are utilized in different ways by a variety of people.

Modern museums are institutions of relatively recent origin, with the earliest ones being

founded in the last quarter of the eighteenth century in both the Old and the New World. Preceding the museums, collections were associated with places of worship, belonged to groups of people who shared a common interest, or, in their majority, belonged to private individuals.

HISTORY AND BACKGROUND

The idea of private collections was familiar to ancient Greeks and Romans. While the wealthy collected objects of costly materials and fine craftsmanship, some scholars collected specimens such as archeological and biological artifacts for scientific purposes. Greeks had several opportunities to see objects displayed. Shrines such as Dephi or Olympia contained a variety of trophies and sculptures. The agora in Athens displayed shields taken in war with the Spartans, while the Parthenon had a hall of paintings as described by Pausanias. With the Romans the collection of art or valuables had lost its original ritual character and was used to reflect the wealth of individuals or institutions that purchased valuable objects as investments.

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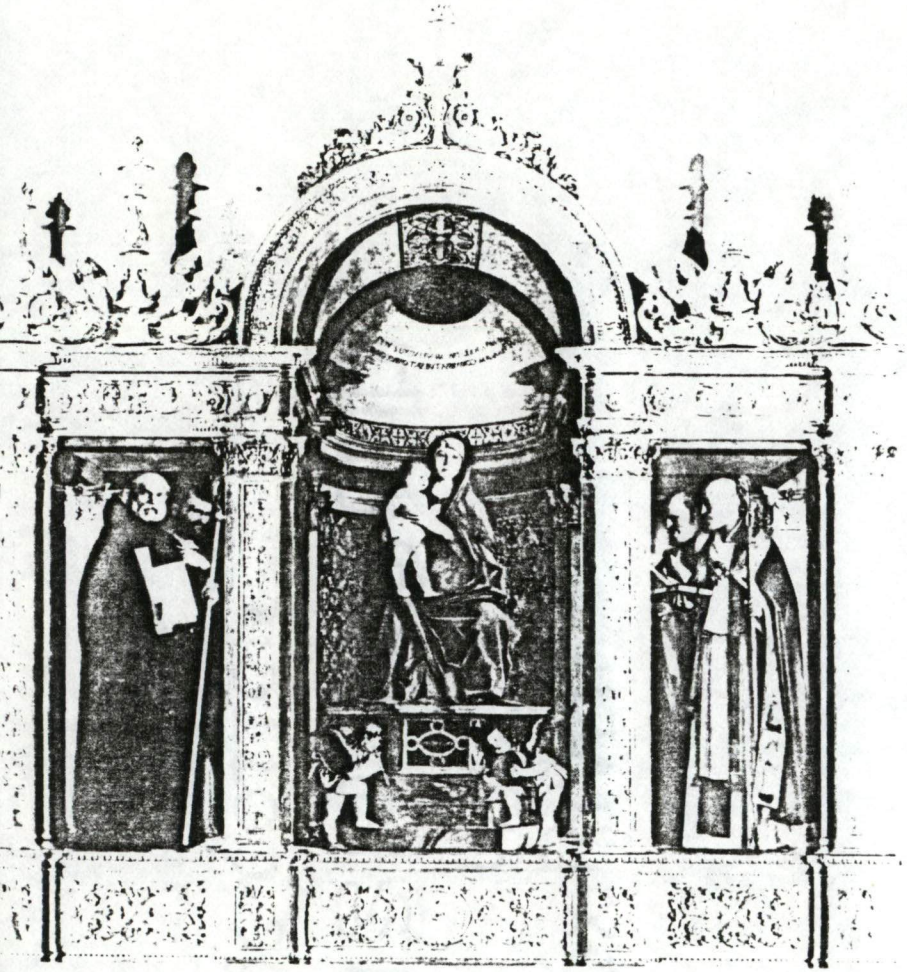


Religious Art

In Western Europe, during the Middle Ages, wealth was more often in the form of precious objects than of money, as a result of the absence of a stable system of money and banking. Such objects were largely in the hand of the rich aristocrary and the Christian church. The Christian church, being the dominant institution of that period, had its treasures displayed in temples and cathedrals. In an age when only the priviledged few had access to books, the church relied on visual education of religious art and sculpture. While the Middle Ages had collections and exhibits, the term museum was part of the classical culture, and was largely forgotten.

During the Renaissance, a period of social, economic, and political change, private collections assumed a new role. The Renaissance once more

Palace Hallway

cherished objects as sources of enlightenment and pleasure. The collections were moved from vaults to rooms where they could be viewed, admired, and studied.

Although the wealthy began to enjoy their collections, progress in public exhibition did not advance. Churches were still the only place were people could view art and rarities.

Because of the increasing number of collections, the works of art could not fit into the rooms originally designated to house them. To solve this problem, long narrow, well-lighted hallways were built in the palaces, such as the Uffizi palace, where paintings and sculpture could be exhibited. These rooms were called galleries, and were the prototypes for the art museums as we know them

today. The Greek myth of the muses was rediscovered and once again the name museum began to be associated with collection.

The seventeenth and eighteenth centuries saw the birth of the first public museums. For the first time, the concept of collections housed in public institutions was formed. Three reasons seem to have greatly contributed to this development. The first was the growing interest in science and humanities. More people, from all social classes, used the collections to study science and its applications. The second was the strong movement to organize existing knowledge through: (a) the study, (b) the classification, and (c) the systematization of the various objects. The third was the growing pressure by the common man on the government for public access to the collections.

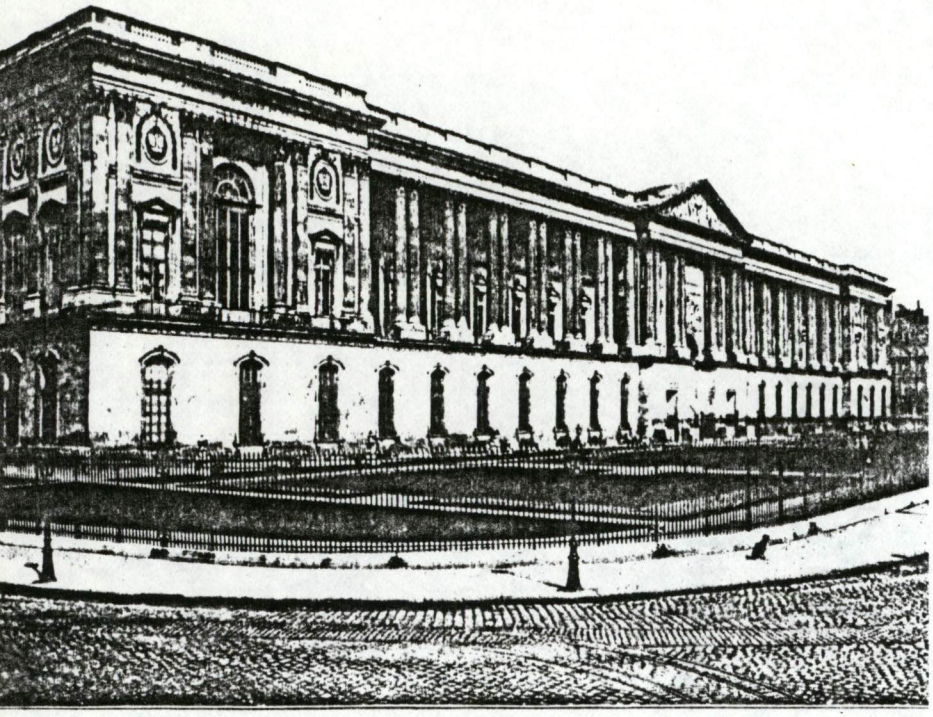
The first public museum was formed when John Tradescant willed his private collection of natural history to Elias Ashmolea, who in turn added his own collection and gave both collections to Oxford University in 1683. Keeping with the spirit of the time, European monarchs began to allow the public limited access to royal collections of art. It was the French revolution that brought about the first public art museum with the opening of the Louvre in 1793 by the Republican government.

The museum idea reached America in the 1700's, but no American museum achieved full public status until later. Many colleges, such as Harvard, had collections as early as the 1750's. Different societies also began to form collections at about this time. Thus, before the 1800's the public

museum as an institution and a name was well established in Europe and was beginning to root in the United States.

Many of the largest and most important existing museums were founded in different parts of the world during the nineteenth century. By this time education became a recognized function and activity. This, combined with the rising movements of the time, led to the founding of new museums. Some of these movements included: (1) nationalism, which brought about the growth of historical museums; (2) colonialism, which led to the ethnological museums; and (3) Darwinism, which aided in the development of natural history museums.

A powerful influence on the continually evolving museum was made by international expositions such



The Louvre

as the Crystal Palace, which assembled for the first time a collection of products and new technological developments from around the world.

Such expositions led the way to the founding of new museums and developed alternative exhibit techniques that later museums adapted to their needs. Two examples of museums of this period are: (1) the Louvre, which reflected the interest of the rising middle class of the time and set an example for many of the public art museums; and (2) the Arsenal Museum in Denmark, which was the first historical museum to be arranged chronologically.

By the end of the nineteenth century, public museums had become familiar features in many cities. They had established reputations for

their scholarly work and educational services. However, the museums had failed to capture the interest of the majority of the people, and remained public, but not popular.

The twentieth century brought developments at a faster pace, especially after World War I. Museums already in existence expanded. Bigger collections demanded an increase of staff, which in turn instituted new programs of educational and cultural activities.

SETTING

SETTING

Introduction

In this section, Regionalism, the City, and the Site will be discussed. Regionalism includes a brief summary of the development of the regional style of architecture in New Mexico. This is attributed mostly to climatic and cultural influences. A historical development of the City of Albuquerque is then introduced. Finally, a discussion of the location of the proposed project within the City of Albuquerque is presented.

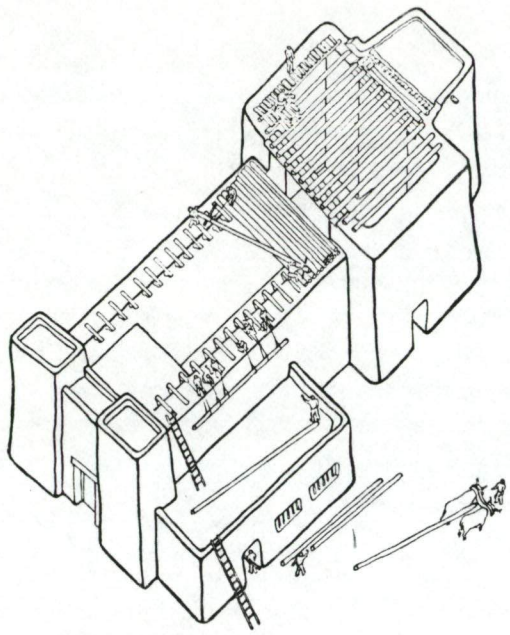
Southwestern Architecture

Regional

• Development of Southwestern Architecture

Regional styles of architecture in America evolved out of necessity. They were a direct response to the climatic conditions and availability of materials. Such architecture gave the saltbox house to New England, the breezeway and veranda to the South, and the adobe house to the Southwest. Although we will probably never return completely to these reasons of style development, some architects around the country are looking back at older traditions and reinterpreting them in fresh and innovative ways.

The style of architecture in the southwest was mostly a direct result of the climatic conditions there. For example, Albuquerque, although located



Adobe Construction

on a high plateau where the air is relatively dry, experiences a wide seasonal variation of temperature. In the winter it often stays below zero, while 100° F or more is common in the summer.

Designing for this climate is not an easy task. One has to build for high as well as low temperatures, the reason the massive adobe building has traditionally been such a good solution there. The small window openings dictated by the material make the building a fortress against the environment. In the summer, it takes the massive walls all day to absorb the heat, which they gradually give off during the chilly evenings. In the winter the same walls act as a very efficient insulator against the cold.

The area also has intense dust storms in the spring that sometimes last for weeks. The dust penetrates everything, so one has to protect against it. Fortunately, the sun and wind come from the same direction, so the massive adobe walls that shield from the sun and deflect the wind rarely have windows facing the south and west sides.

Old Town

The City

Albuquerque was founded in 1706 when 36 families failed to pass between the Sandia and Manzano mountains to the east. The town was named for the Duke of Alburquerque, then a viceroy of New Spain, and became an important trading center on the Chihuahua trail from Mexico. After 1800, growing trade on the Santa Fe trail brought settlers to the state. After U.S. occupation in 1846, an army post was established there, and during the American Civil war the town was captured by the Confederates, but remained loyal to the union.

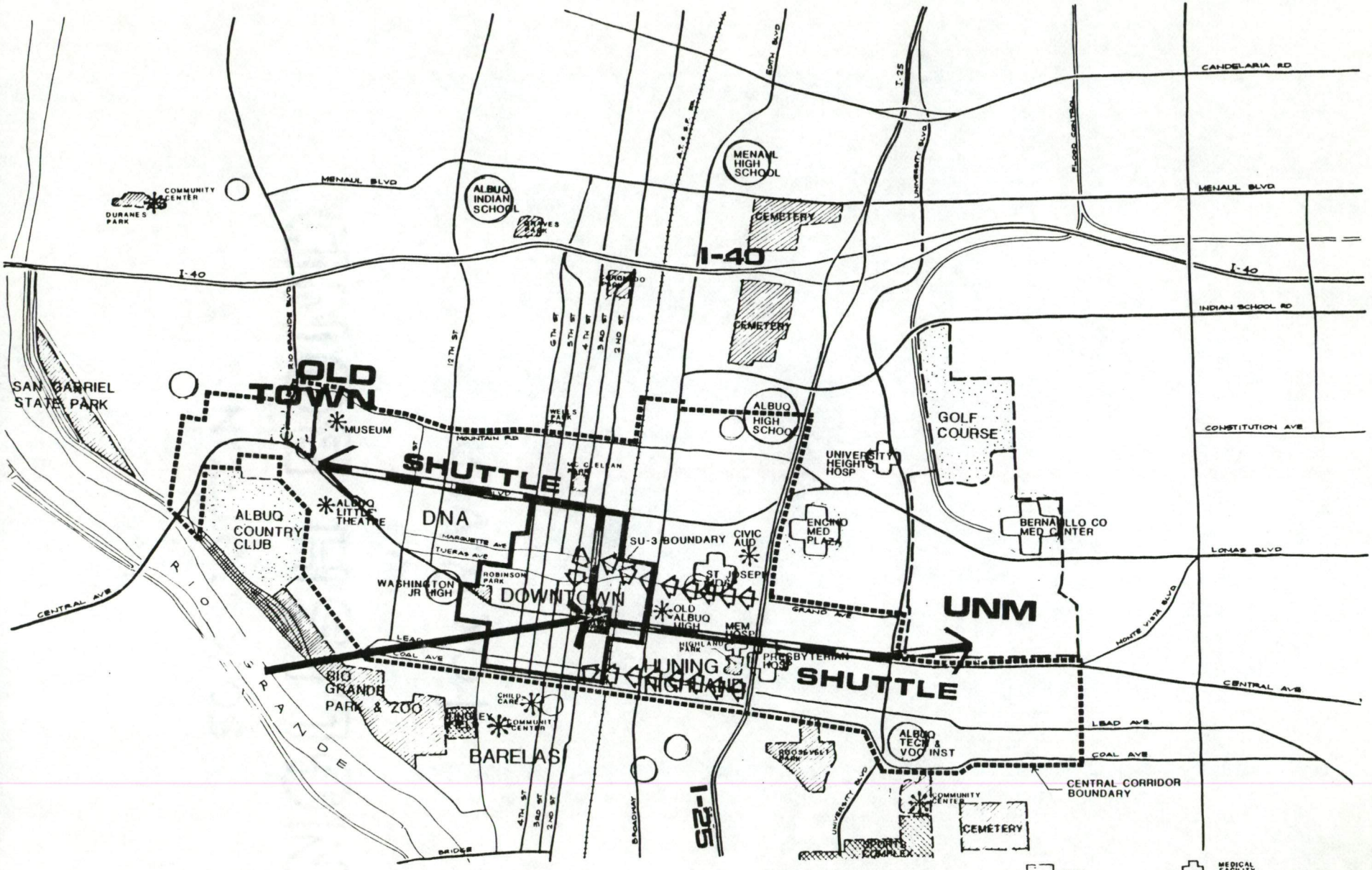
The original plaza was the town's center until 1880 when the Atlantic-Pacific railroad laid its tracks one mile east of the plaza. A small town was formed around the railroad and was connected to the plaza with a streetcar line. From this

San Felipe de Neri

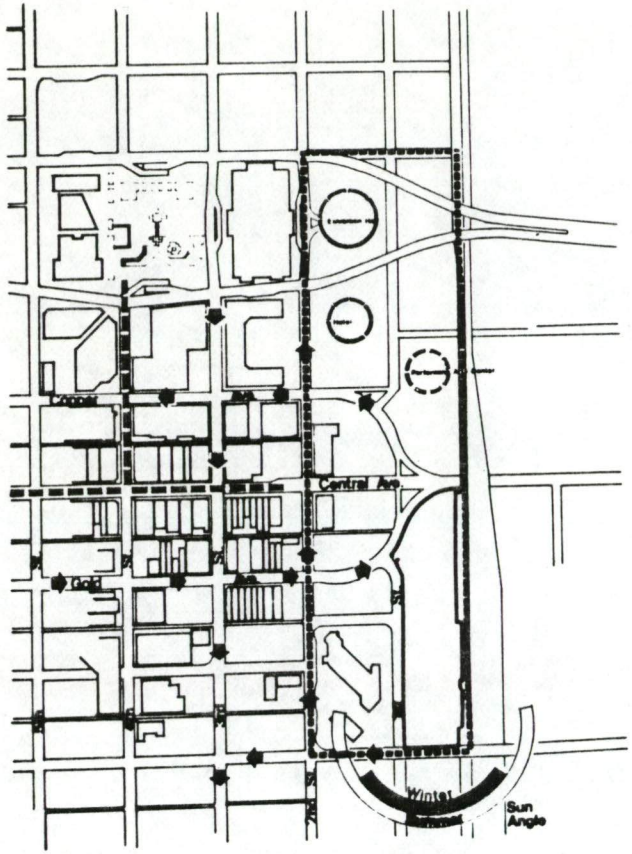
point Albuquerque began to spread eastward. It was incorporated as a city in 1890. The characteristically Spanish "old town" that contains the Mission church of San Felipe de Neri (1706) still survives and is an important tourist attraction.

After 1900, as New Mexico's sunny and relatively dry climate became favourably known for the treatment of tuberculosis, new citizens came. Another population increase resulted from the numerous federal government agencies that were established in the 1930's and 1940's for nuclear research.

Today Albuquerque has numerous light industries and is the seat of the University of New Mexico. Due to its dry climate and the large proportion of daily sunshine it has a reputation of a health resort.



Downtown Albuquerque



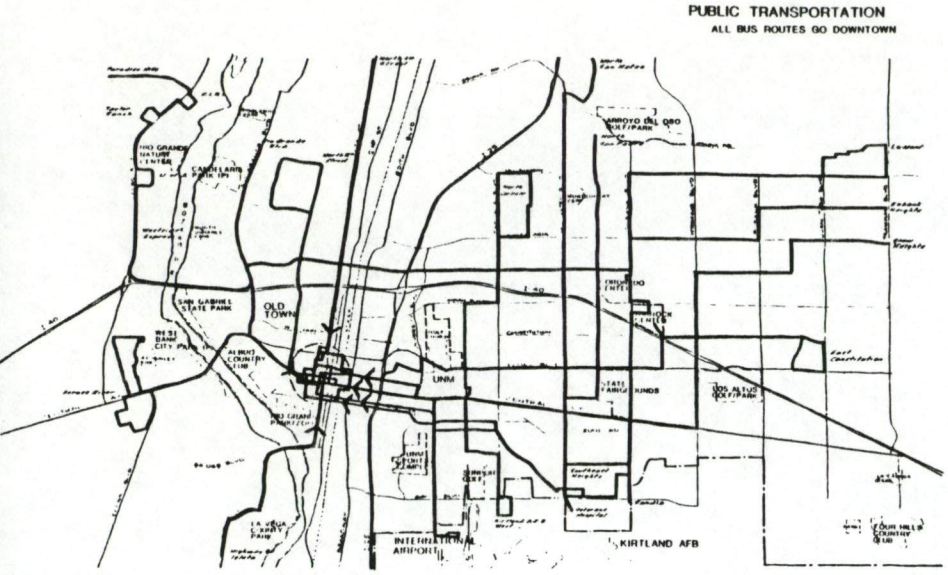
Site-Existing

Site

• Existing

The proposed project is located in the eastern part of downtown Albuquerque, and is part of the old railroad station complex, once the most important transportation focus in the old Southwest. The site is spanning from the Exhibition Hall and a public parking area on the north end, to the proposed museum on the south end. On the west boundary, along Central Avenue, is an existing retail strip, and a major pedestrian avenue. On the east is the railroad, which provides daily rides between Albuquerque and Santa Fe.

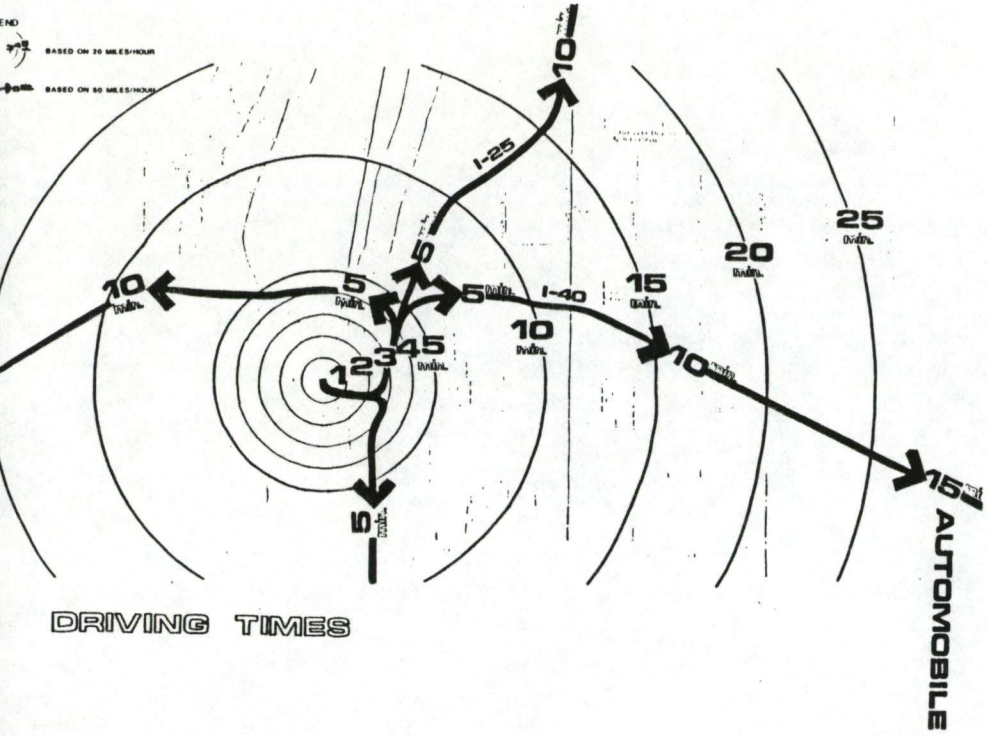
Adjacent to the site is the city bus terminal, central to many bus routes connecting with other parts of the city. Within five minutes of driving time are the historic Old Town, almost all the



LOCATION PLAN

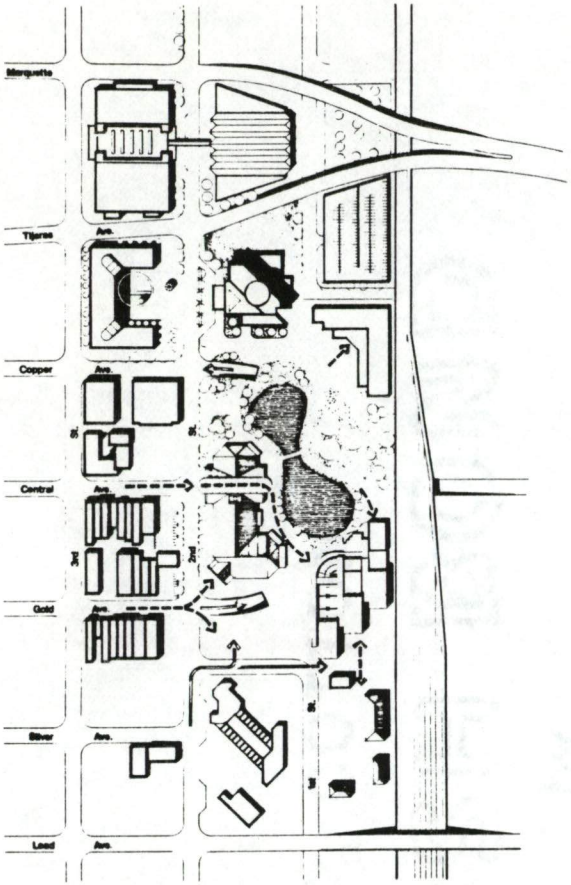
city's major hospital complexes, the University of New Mexico with about 25,000 students, and the Rio Grande Zoo. Looking at the metropolitan area as a whole, the site is perfectly located central to both the established neighborhoods to the east toward the Sandia Mountains and the growing west side developments across the Rio Grande River. No part of the city is more than 30 minutes away from downtown. Both the north/south and east/west freeways focus on the downtown, providing easy access.

The proposed project contains about 22 acres. Of this about 12 acres are owned by the city, and the remaining 10 acres are owned by two private parties, both of whom have indicated their property is available. In this area there are only two existing buildings, and the remainder is vacant land, now being used solely for surface parking.



DRIVING TIMES

This site is proposed by the City for the development of a Festival Market Place. The changes proposed will be discussed in the next section.



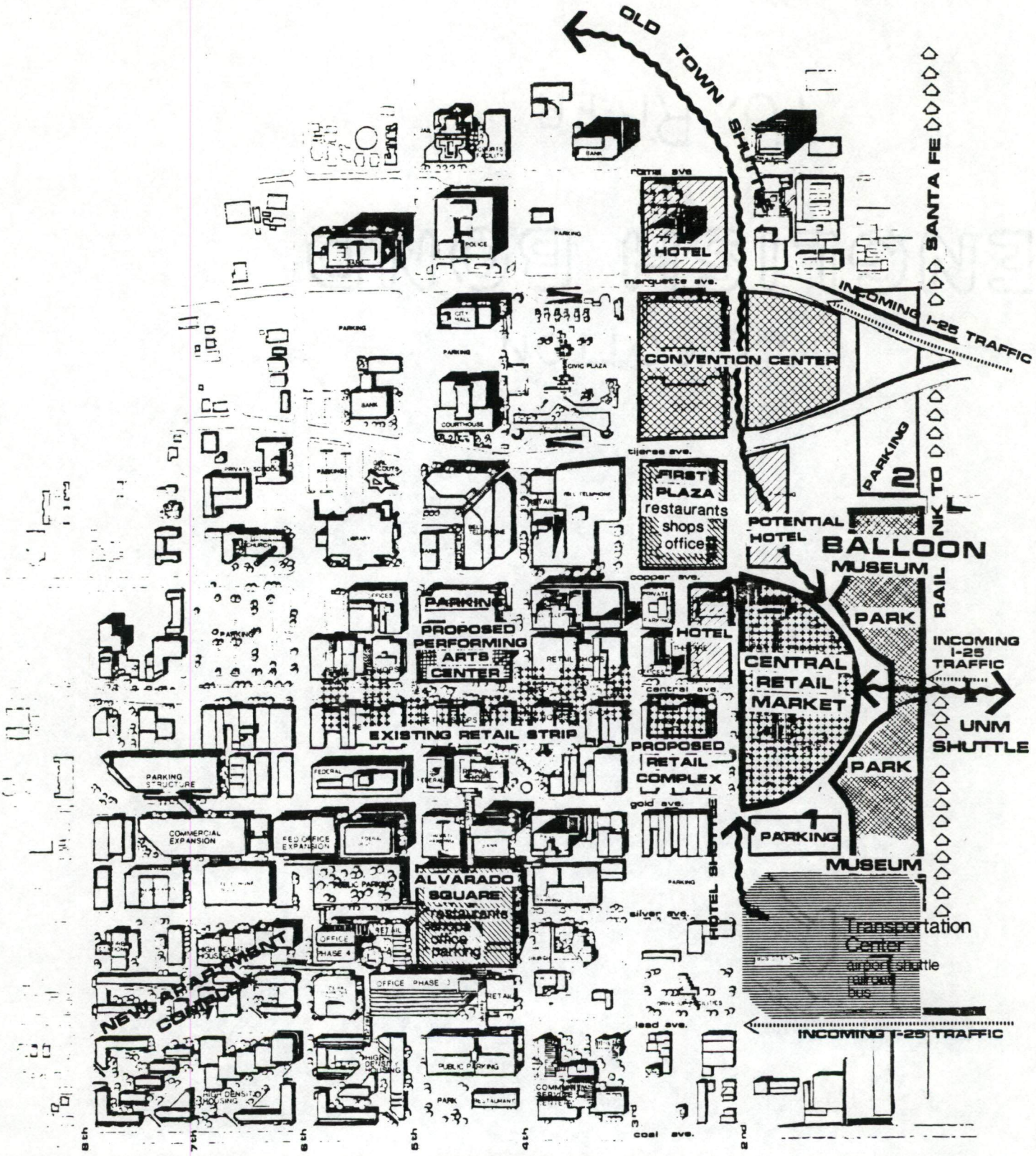
Site-Proposed

• Proposed

The Festival Market Place is based on a park theme with a large water feature as the focus. The water brings comfort in the long hot summers, while in the winter it can be used for winter sports such as ice skating and hockey. The park is landscaped with grass, trees, pedestrian walk-ways, and a balloon launch area, a favorite sport of the people of Albuquerque. Around the park, a parking garage, a high-rise hotel, a performing arts center, and a transportation museum are pro-posed to be built.

The site today is used for surface parking, and in order to accomodate this need a parking garage will be built on the north end. The area will also include a high-rise hotel, a performing arts center, and a transportation museum.

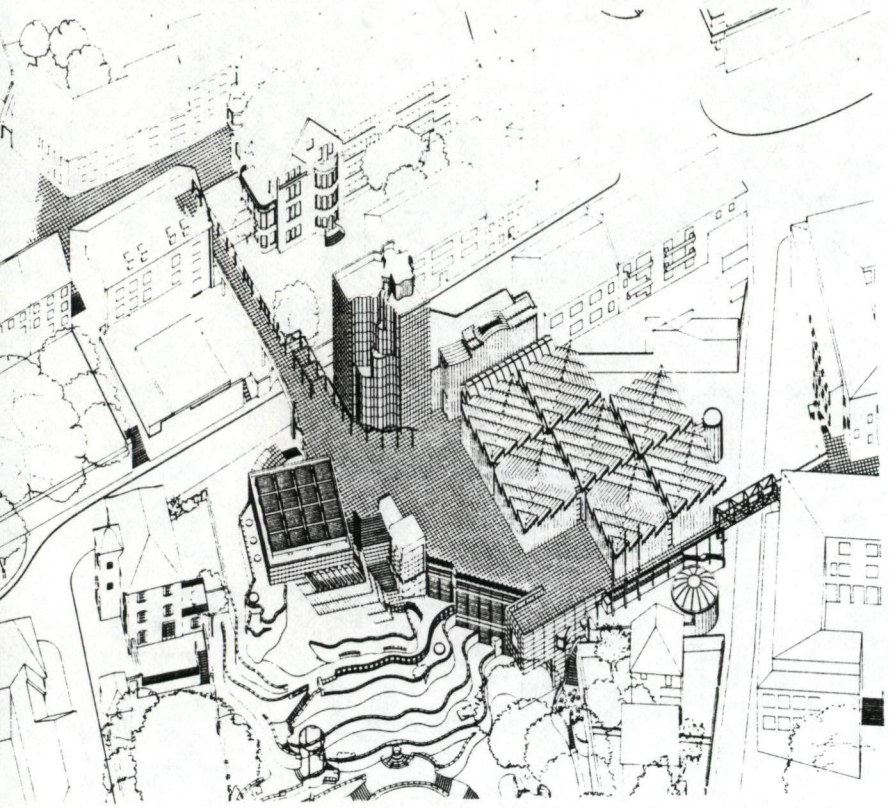
In order to accomodate the proposed plan, the existing site will change as follows. The Gold and Copper Avenues will be sunk under the park on the west side of the site and resurface behind the railroad on the east. The two existing buildings on site will be demolished, and Central Avenue will be stopped on 2nd Street. Vehicular traffic will be diverted while pedestrian flow will continue through the Festival Market building and into the park.



PROPOSED DEVELOPMENT PLAN
DOWNTOWN ALBUQUERQUE

SCALE

CASE STUDIES



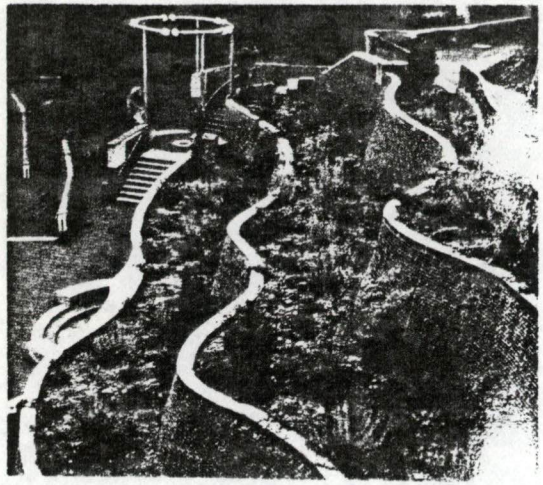
The Municipal Museum

Hans Hollein--The Municipal Museum

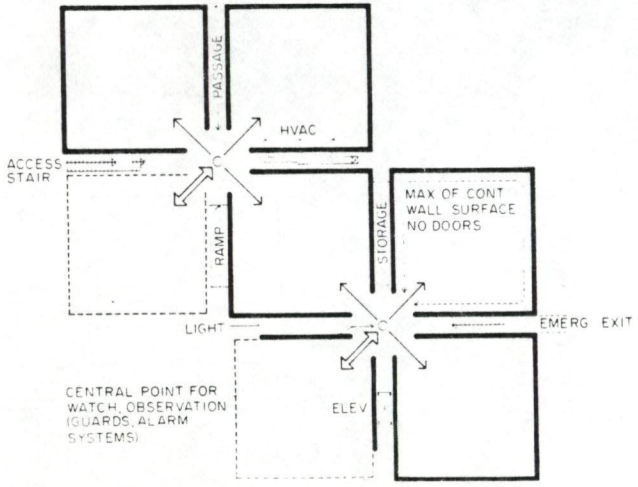
Abteiberg Mönchengladbach
Mönchengladbach, West Germany

The new Municipal Museum is located at the old Rhenish textile town of Mönchengladbach in northwestern Germany, near the Dutch and Belgian borders. Although the town was badly damaged in World War II, important landmarks remain which, in addition to the steeply sloping hillside, form the urban context of the new museum.

Hollein designed the museum to form an outdoor pedestrian pathway linking the town's commercial center at the top of the hill with the newer city below. The landscape begins with a curvilinear brick wall which matches, in color and texture, the bastions of the old town. Rich-textured, and



Terrace

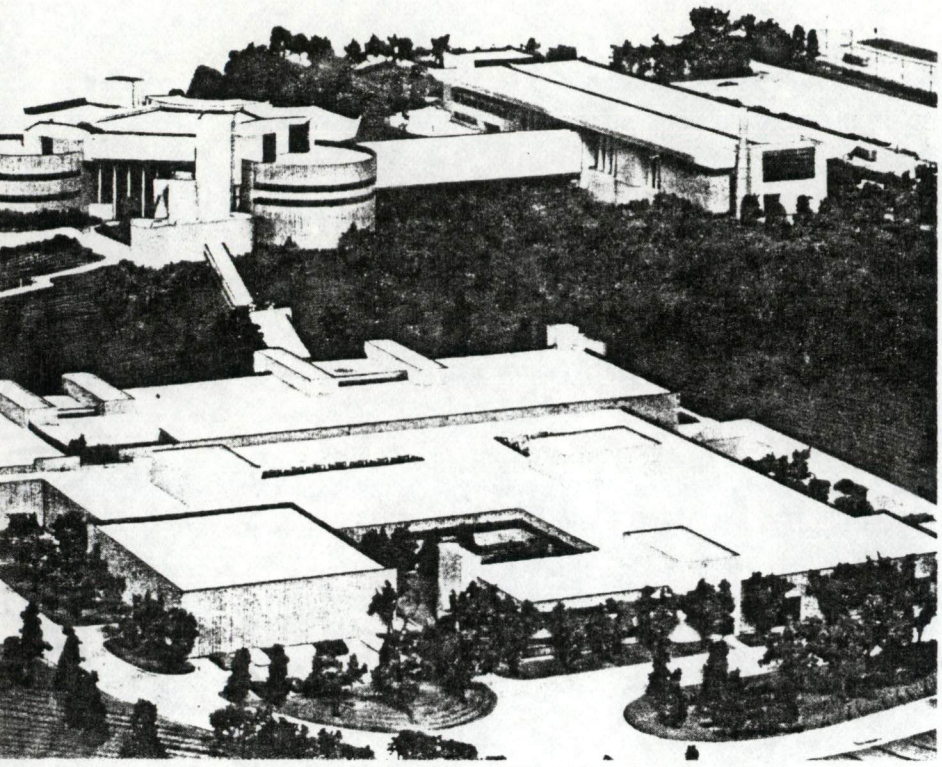


Organizational System

appearing old, they seem to contrast the high-tech building they support.

The building is concrete frame combined with concrete bearing walls, with finishing material based on their esthetic properties such as marble and zinc. Bavarian sandstone used on the terrace, the steps, and most of the windowless wall surface. Other exterior skins are of alluminum and glass.

To meet the program onto the site a tower was built for the administrative and curatorial staff. The organizational system of the building forms a grid with chronology going one way, and style the other. Five rectangular three-story gallery modules have been built so far, with five more proposed for expansion.



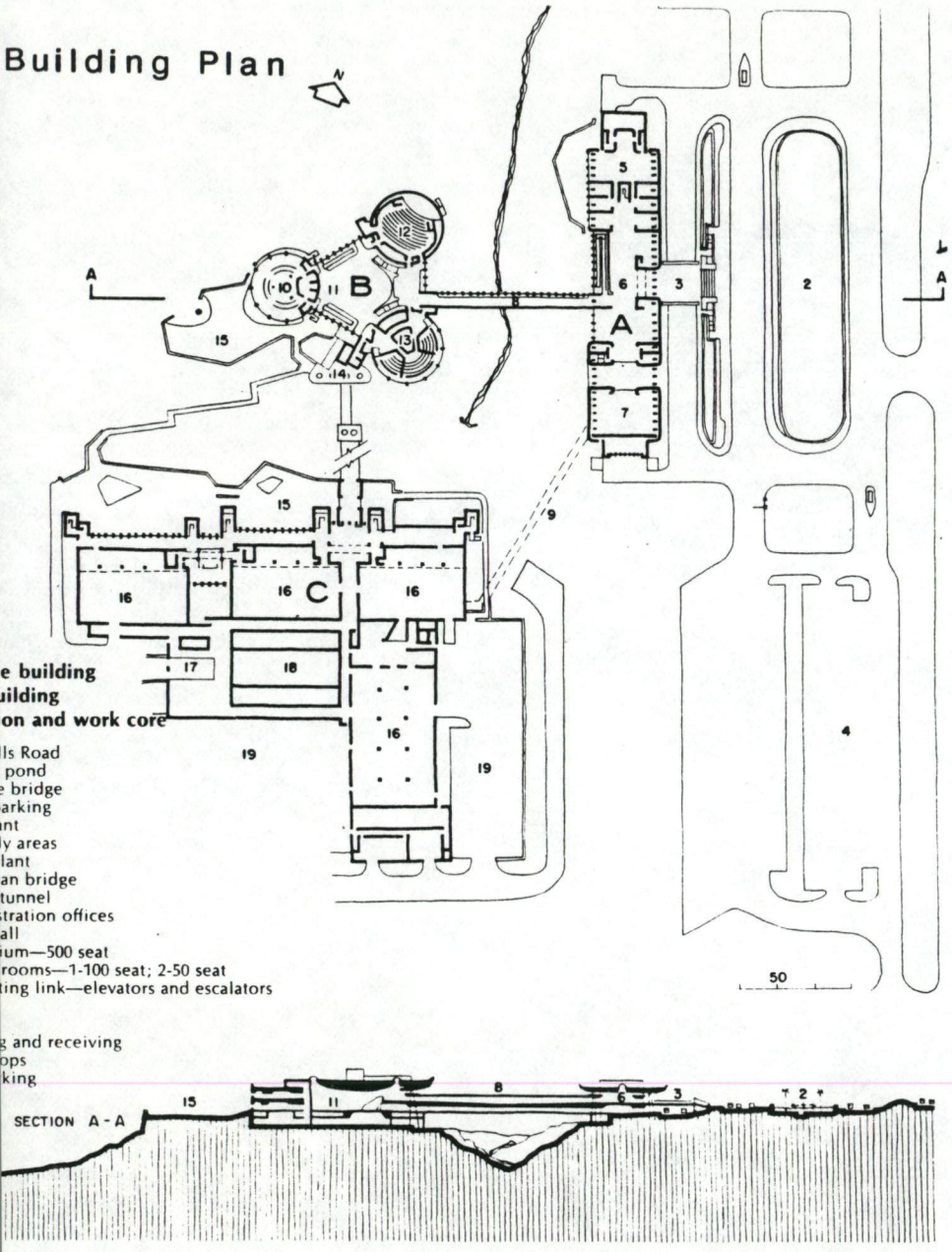
Ontario's Participatory Museum

Raymont Moriyama--Ontario's Participatory Museum

Ontario Canada

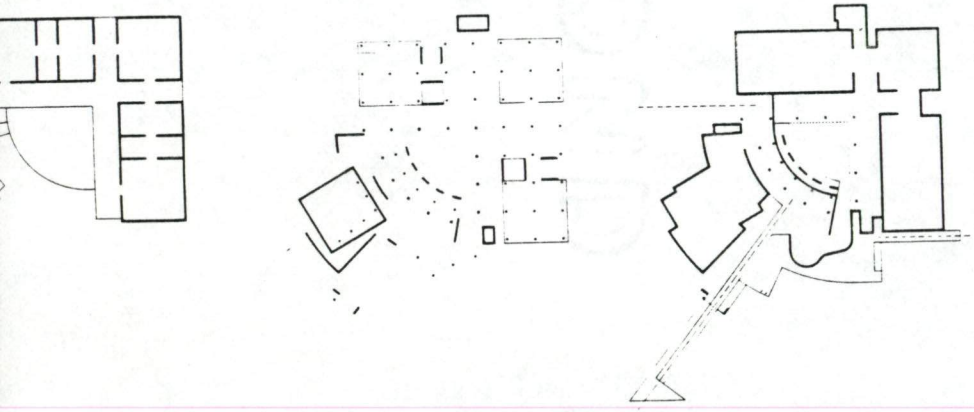
The Ontario science center is a museum of popular science and technology, a place where visitors may become involved physically in each display, "operating" the display for entertainment as well as education.

The architecture consists of three buildings which do different things. The first structure is the entrance building which introduces the visitors to the center. The second structure is the ceremonial and symbolic center of the complex. The third structure is the science center and is the largest of the three. The architecture here is understated with the exhibits creating the interest. The building is filled with audience participatory exhibitions.



Visitors enter the upper story of the entrance building through a series of wide, low steps, then across the main pedestrian bridge and into a simple space. This is the coat and orientation room. The next step is the core building, entered through a long bridge. From there escalator and stair enclosures bring the visitors to the exhibition building.

Both interior and exterior walls are concrete, with very rough and bold vertical ribbing.



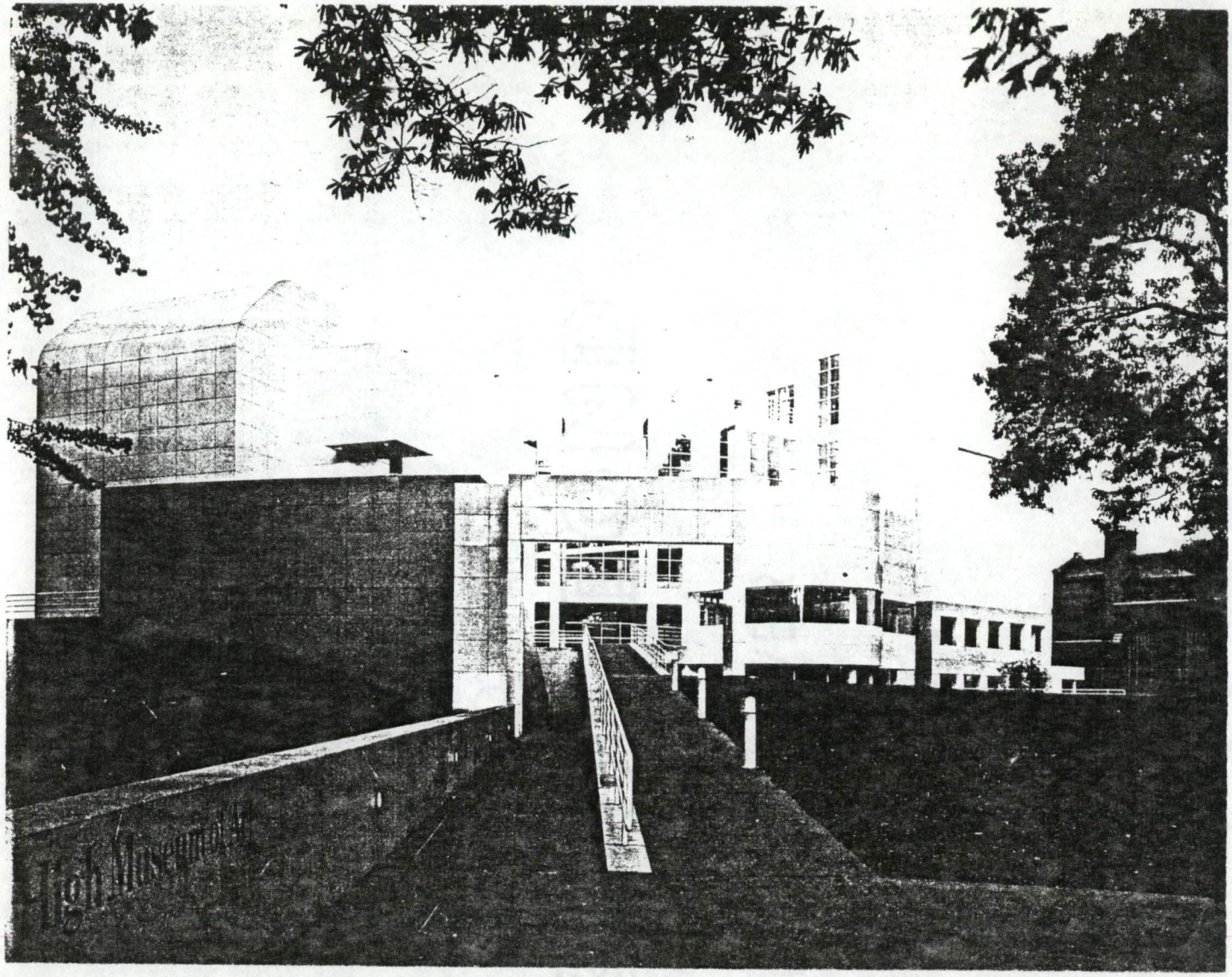
Richard Meir--Atlanta's High Museum

Atlanta, Georgia

The High Museum of Art is located at the northern Peachtree about two miles from downtown Atlanta at a gently sloping corner lot between the Atlanta Memorial Arts Center and the red brick First Presbyterian Church.

The geometry is that of three cubes plus the quarter cylinder of the four-story atrium. A fourth cube, the 250-seat auditorium, is detached from the main mass and rotated 45°.

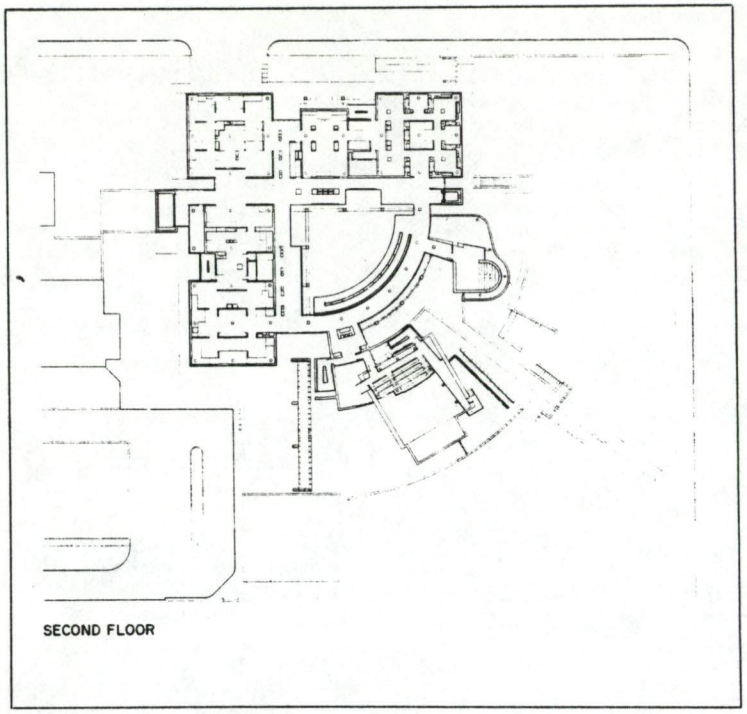
Entry begins at the street, where a long ramp brings the visitors through a progression, directly diagonally to the building, into a piano curved reception lobby. The lobby opens inward to a fan-shaped, four story atrium, which is the focus of the interior space. The arching glass



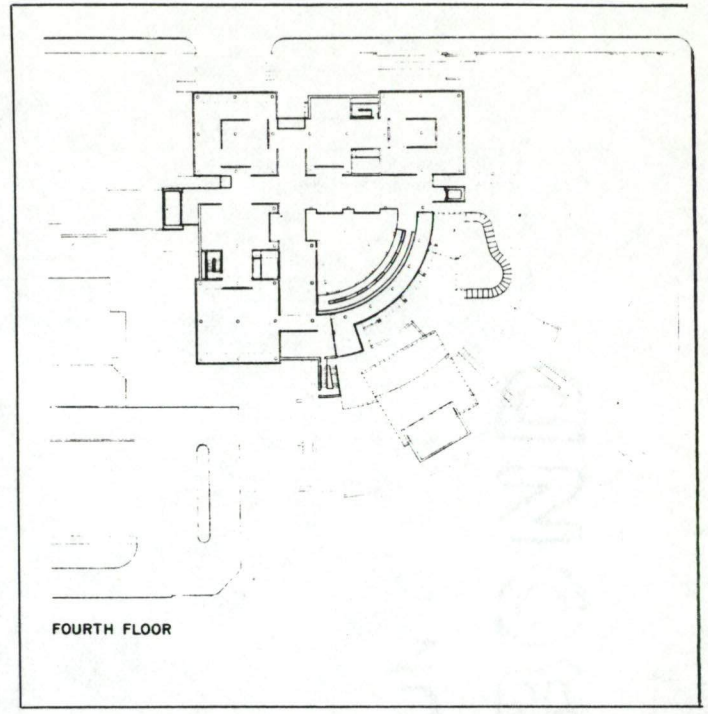
walls of the atrium dominate the museum's principal facade. The four level gallery spaces are rotated around the atrium. Independent spaces are indicated by lowered or latticed ceilings and pierced or absent walls.

Ramps coming around the atrium space serve as the museum's principal vertical circulation, with its only apparent supplement being a single elevator. The only problem with the ramps is that they are too narrow for two-way traffic. Meir meant for visitors to walk up and ride the elevator down.

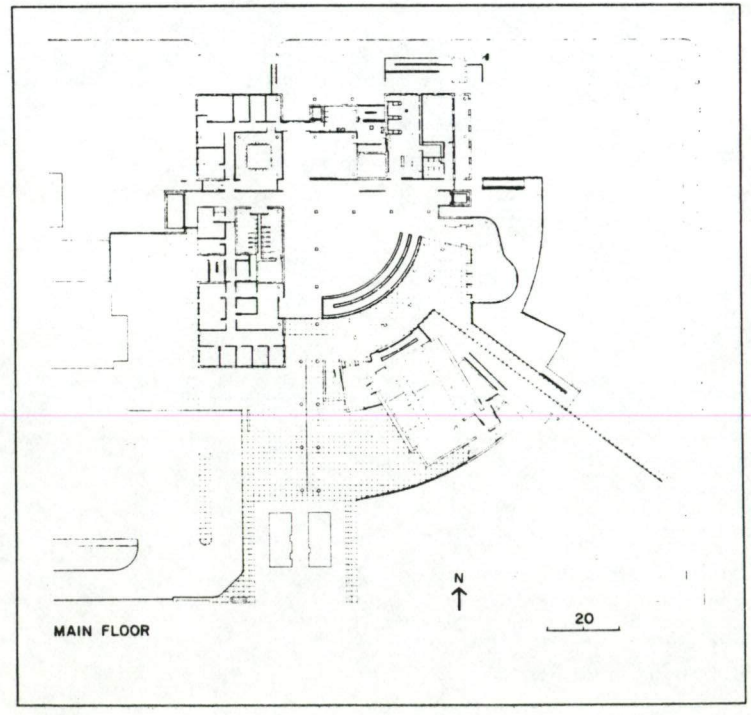
Three-foot square panels of porcelain enamel were used for the exterior, with a granite base.



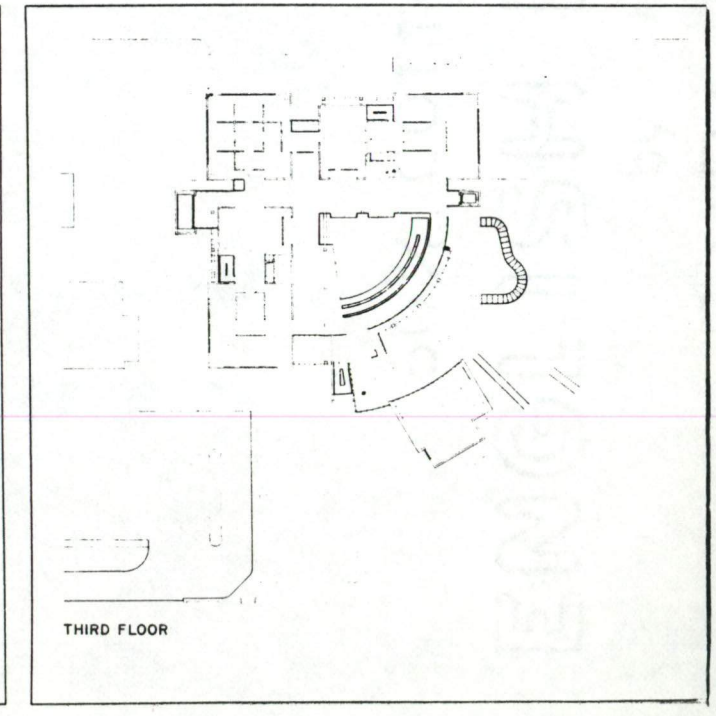
SECOND FLOOR



FOURTH FLOOR



MAIN FLOOR



THIRD FLOOR

PROBLEM STATEMENT

PROBLEM STATEMENT

This terminal project will present a well organized transportation museum for the Albuquerque area, serving to entertain, educate, and enlighten its visitors. Paying proper respect to its collections, as well as its environment, and being well equipped for purposes of preservation, storage, exhibit, and display, the Albuquerque transportation museum will be a beneficial addition to the cultural facilities presently serving this area.

PROGRAM

Activity	Sub-Activity	Space Needs	Relationships	Character
SOCIAL	• Members'	1600	• Close to entrance • Visible from entry	• Elegant
	• Restaurant (150-200p) (15-20 sf/p) (lounge/kitchen/ storage)	2400	• Public access even if museum is closed and/or outdoor dining?	• May have multiple dining experiences
	• Reception room	900	• May be part of lobby or separate	• Handsomely furnished for evening events
	• Toilets			• Private
	Total	5300		

Activity	Sub-Activity	Space Needs	Relationships	Character
ADMINISTRATION	• Lobby/wait	500 sf	• Separate entry for staff • Easily accessible to visitors • Not highly visible • Indirectly related to exhibits	• Defined entry • Natural lighting
	• Secretarial	225 sf	• Access to Director & Assistant Director	• Conference capability
	• Director's Office & Work	400 sf	• Controls & operates museum	• Conference capability • Well-lighted
	• Assistant Director	225 sf	• Close to director	• Same as above
	• Conference	400 sf	• Close to director • Meeting place for staff & business	• Elegant • Conference capability
	• Staff Lounge	400 sf	• Close to offices	• View to outside
	• Staff Toilets/ Lockers	500 sf		• Private
	Total	2650		

Activity	Sub-Activity	Space Needs	Relationships	Character
EDUCATION	• Lobby/wait	600 sf	• Sequence from ? (outside? lobby?)	• Open, inviting • Indirectly related to exhibits
	• Seminar rooms (3)	1200 sf	• Close to classrooms & lobby	• Work area must be quiet, well-lighted, airy
	• Classrooms (3)	1200 sf	• Near lobby	• Same as above
	• Auditorium (200 p)	3500 sf	• Accessible even when museum is closed • Sloped floor for optimal viewing	• Comfortable seating • Stage to be used for multi-media shows & demonstrations
	• Library/ research	3500 sf	• Office, slide room, research room, stacks, reading room	• Quiet, well-lighted
	• Toilets	500 sf		• Private
	Total	10500		

Activity	Sub-Activity	Space Needs	Relationships	Character
EXHIBITION	1. Pre-Machine	15000 (total)	• Easily accessible to to public	• Natural lighting
	• Man--alone	3000		• Some exhibits could be outdoors
	• Animal-drawn	12000	• Educational for everyone	
			• Needs places for rest	• Especially designed for children (touch, play, ride)
	2. Machine	12000 (total)	• Flexible space	
	• Rail	6000		
	• Auto	4000	• Proper circulation	(APPLICABLE TO ALL EXHIBITION SPACE)
	• Bicycle	2000		
			• Proper lighting	
	3. Air/Space	9000	(APPLICABLE TO ALL EXHIBITION SPACE)	
	4. Balloons	4000		
	5. Children's & Exhibition	6000		
	Total	46000		

Activity	Sub-Activity	Space Needs	Relationships	Character
SHIPPING/ RECEIVING	• Shipping/ Receiving	1600	• Clarity of entry(ies) • Close to departmental storage	
	• Office	400	• Close to storage area	
	• Temporary Storage	2400		
	• Permanent Storage	2400	• Easily accessible to vertical circulation	• Large space for storage
	Total	6600		
SERVICE	• Mechanical	2000		
	• Janitorial	600	• Located throughout	
	Total	2600		
GRAND TOTAL (NET)		97650		
		19,530	+ 20% (to account for circulation space)	
GRAND TOTAL		117,180		

DESIGN STATEMENT AND SOLUTION

Architecture

The new museum attempts to fit into the general atmosphere of the site, city, and region. It does this by relating in various ways to surrounding buildings, geography and climate. The museum recalls existing buildings through the use of scale, color and material. The outdoor exhibits help tie the museum to the existing buildings on the site. These older buildings on the south end of the site will be used for exhibitions and expansion.

Since the entire proposed Downtown Festival area includes a park, the side of the museum facing the park will respond to it. That side of the museum will be softened by curving walls and it will be

open to views of the park. As a contrast, the strong, bold forms of the gallery barrel vaults and stuccoed walls will dominate the opposite side.

A covered walkway leading from the drop-off will bring visitors along the building to the entrance and main lobby. The skylit lobby will be one of the main focii, with the entrance and large, open, central gathering space occurring here. From the entrance, visitors can proceed into the exhibition, administration, or education areas. One of the programmatic features of this museum is the ability to utilize one part of the building while another is closed. This is the reason there is a separate entrance for the auditorium and restaurant.

The railroad spur that exists on the east side of the museum will provide entertainment and interest for visitors. The museum opens up to the train by providing a station, waiting area, covered entrance, and paved walkway.

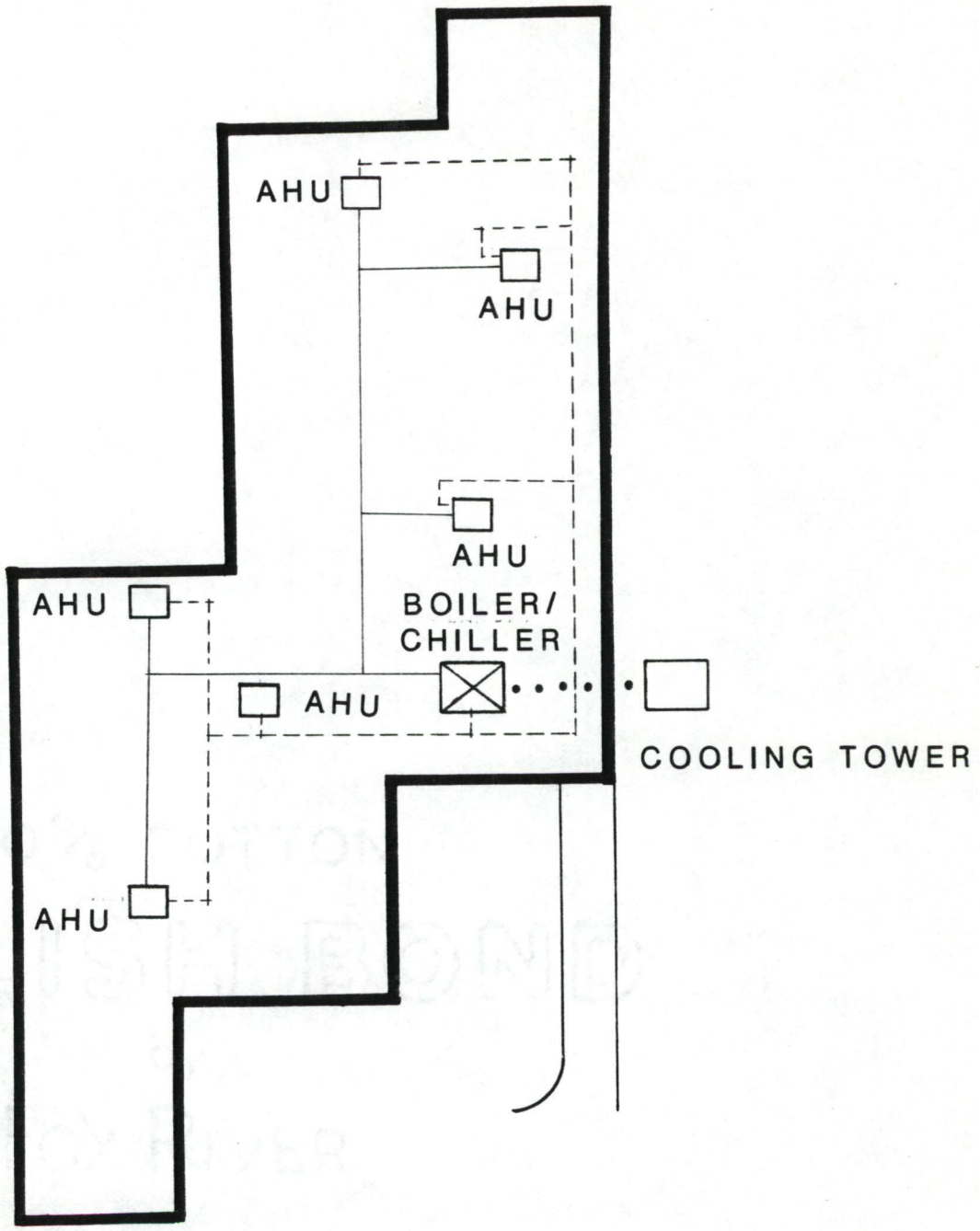
A museum experience can be tiring and often visitors need a visual or physical relief. A central courtyard provides a shady area for relaxation through the use of trees and water.

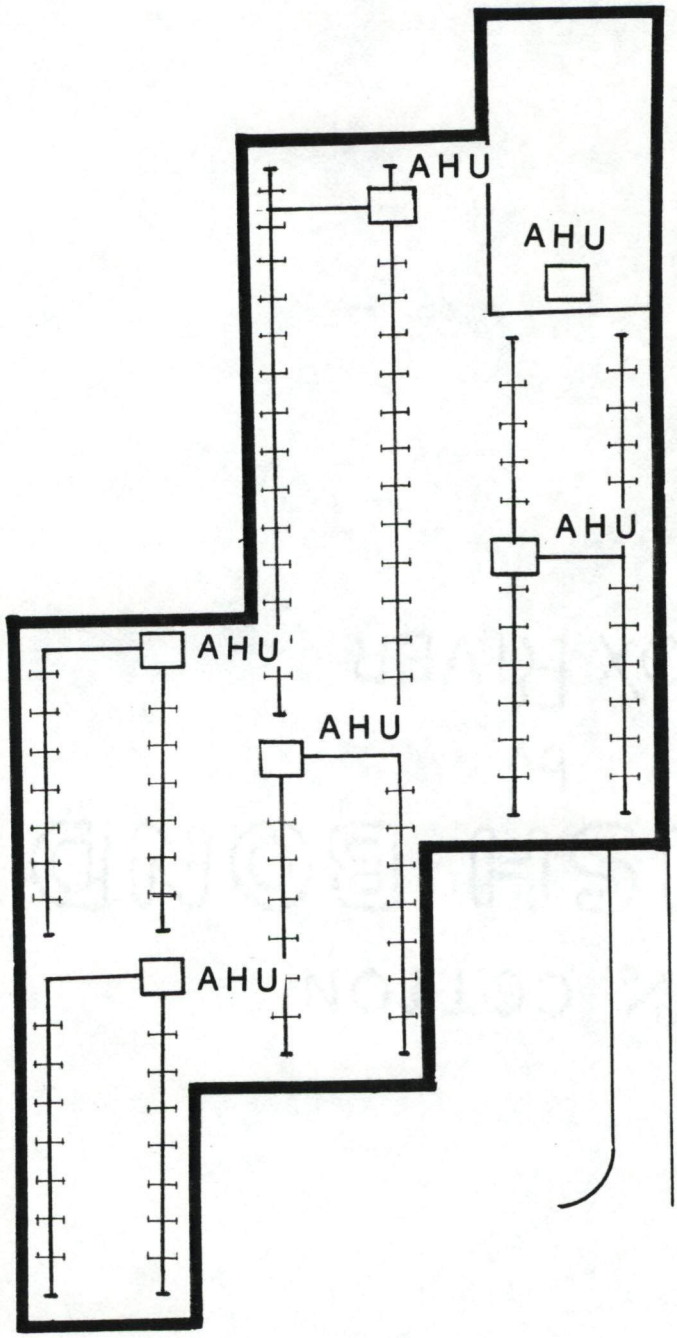
Mechanical

The major considerations in the design of the mechanical system for the new museum facility were the comfort of the visitors and the protection of the exhibits. The system is divided in a multi-zoned system using a central mechanical plant with six-pipe service. Four pipes serve the interior of the building while the other two release the air to the exterior.

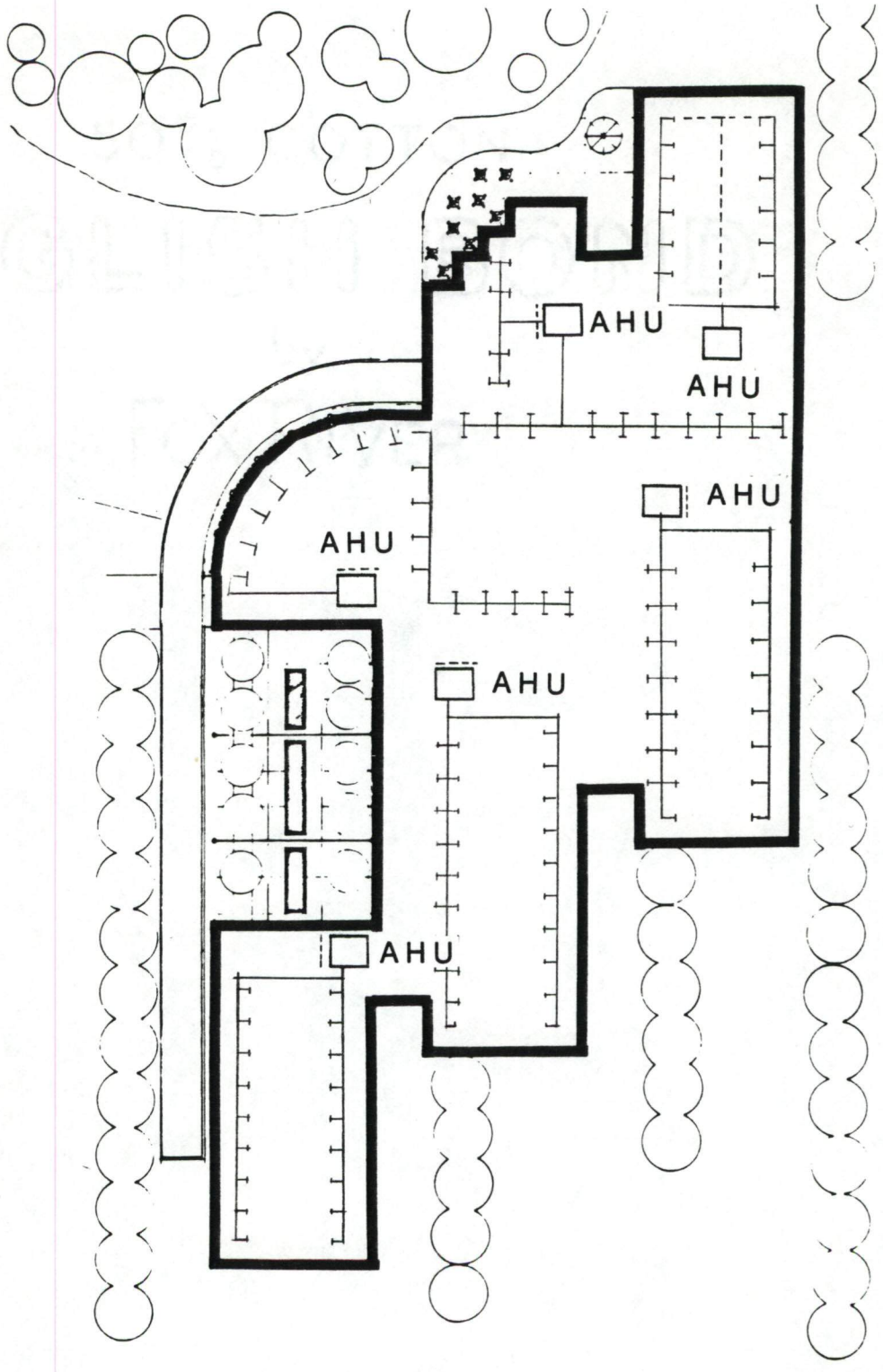
The chiller and boiler for the entire building are located in the mechanical plant at the basement of the building. From there the four pipe system carrying hot and cold water serves each of the air-handling units at various points in the building (as shown in the diagram). Each of these units controls a separate area so that it can be turned down or off when that part of the building is not in use.

The air-handling units contain heating and cooling coils, filters, and humidity controls. Close to that point a grill is located for return air. From the air-handling units an overhead supply of air serves the separate areas. This system is designed for maximum environmental control, for visitors' comfort and for the protection of the exhibits.


AHU
AHU
AHU
AHU
BOILER/
CHILLER
AHU
AHU
COOLING TOWER
SUPPORT
SUPPLY
RETURN



SUPPORT-DUCT SYSTEM



TYPICAL FLOOR PLAN

SUPPLY ———

RETURN — — —

Structural

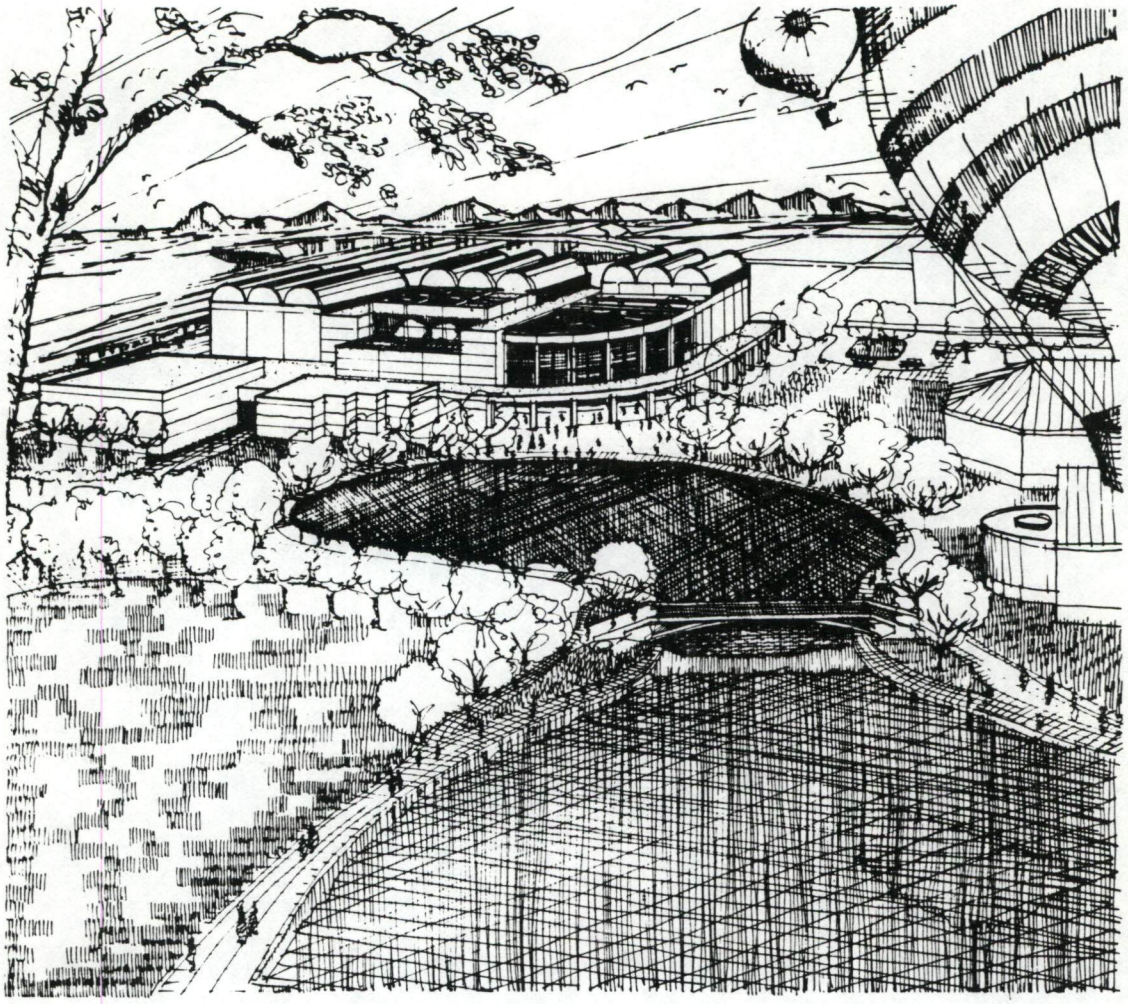
The structure of the new museum is reinforced concrete with the exception of the lobby skylight area, which is steel. The concrete columns which support the upper portions of the structure rest on spread footings. The roof is drained through the columns, and electrical conduits and plumbing travel vertically through the columns. Columns are spaced on a 20'x40' grid in the galleries to allow maximum flexibility, while the remainder of the building uses a 20'x20' grid.

The lower floor is a poured in place slab on grade. Grade beams have been added for additional support. Upper floors are constructed of precast tee beams with a poured in place topping. The roof system is also supported on tee beams.

Flat roofed areas use a built-up system. Gallery roofs are made of three precast concrete barrel vaults. The center vault of each gallery contains a skylight.

Exterior walls consist of an infill between columns made up of a double layer of hollow clay tile tied together by means of wall ties. Insulation is placed in the void. A layer of stucco on wire lath is applied to the exterior of the wall. Interior finishes are either plastered or painted, depending upon their location.

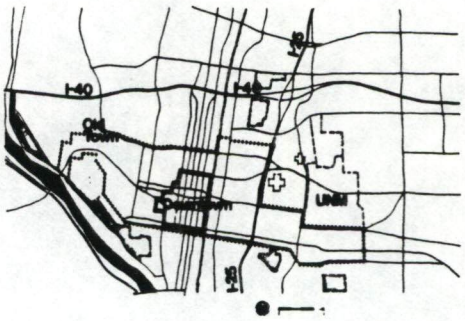
The entry skylight is the only part of the building constructed using steel members. Structural mullions are 8" square sections and other mullions are 4" steel members.



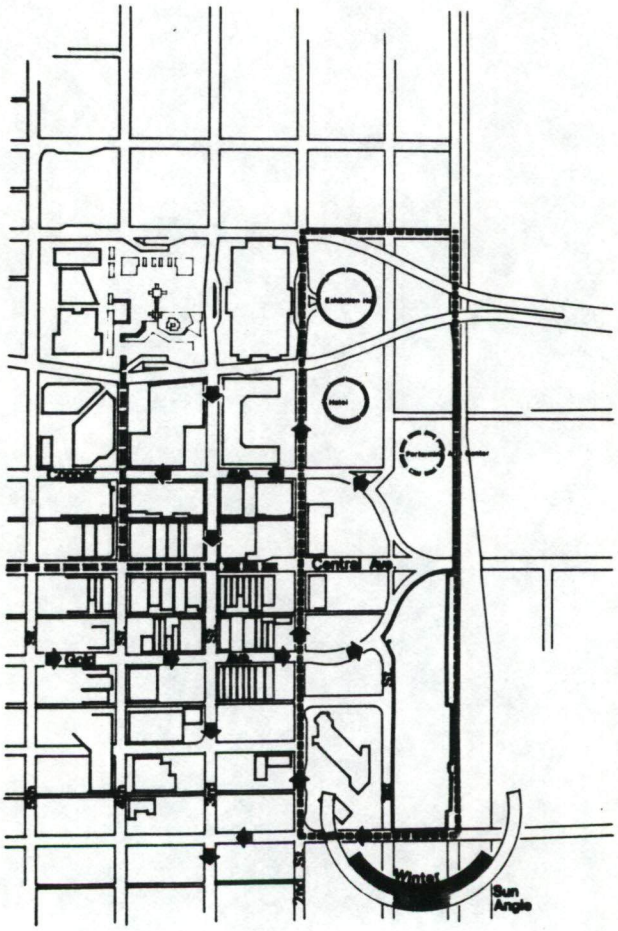
A TRANSPORTATION MUSEUM

ALBUQUERQUE, NEW MEXICO

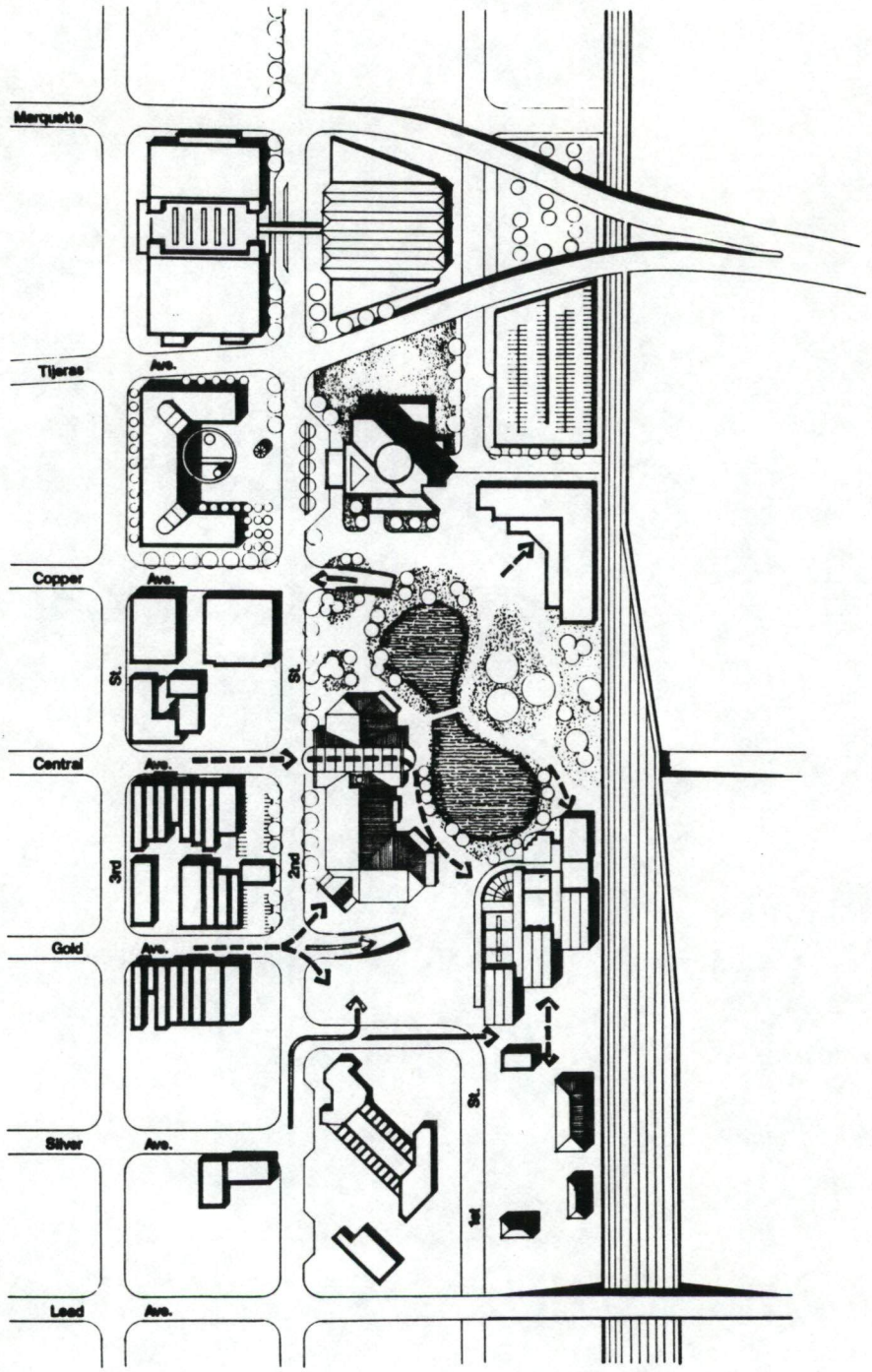
Location



Vicinity Plan

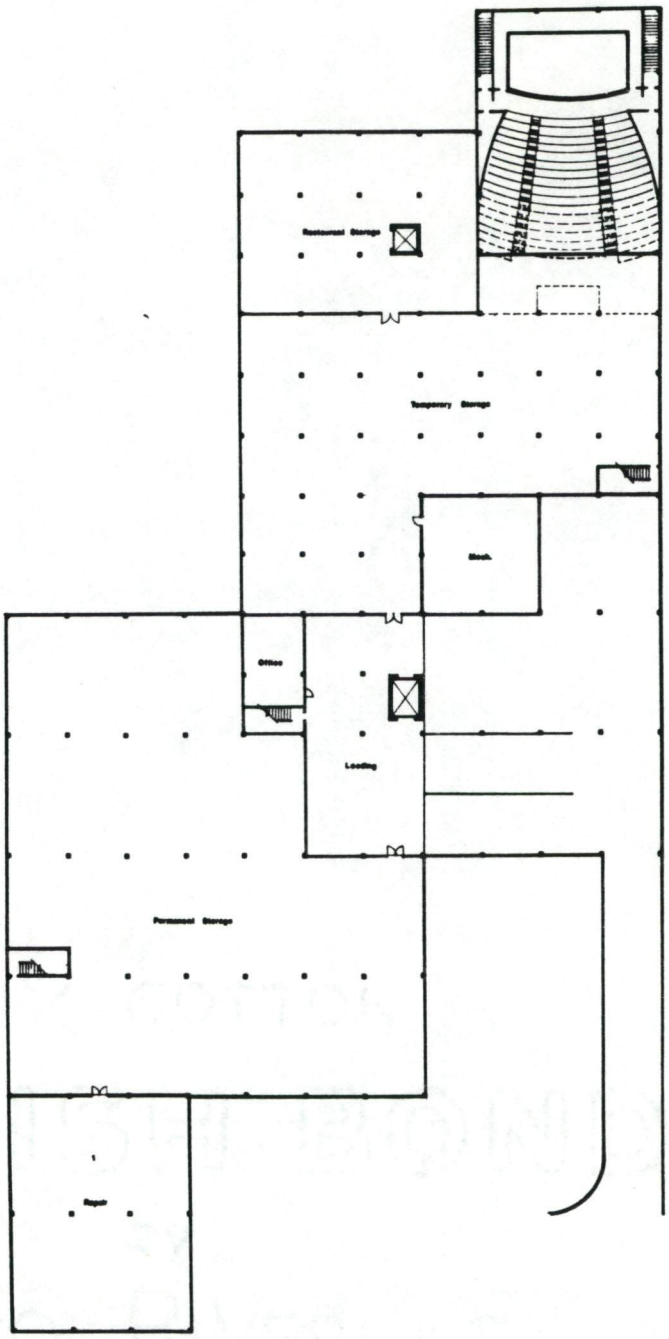


context

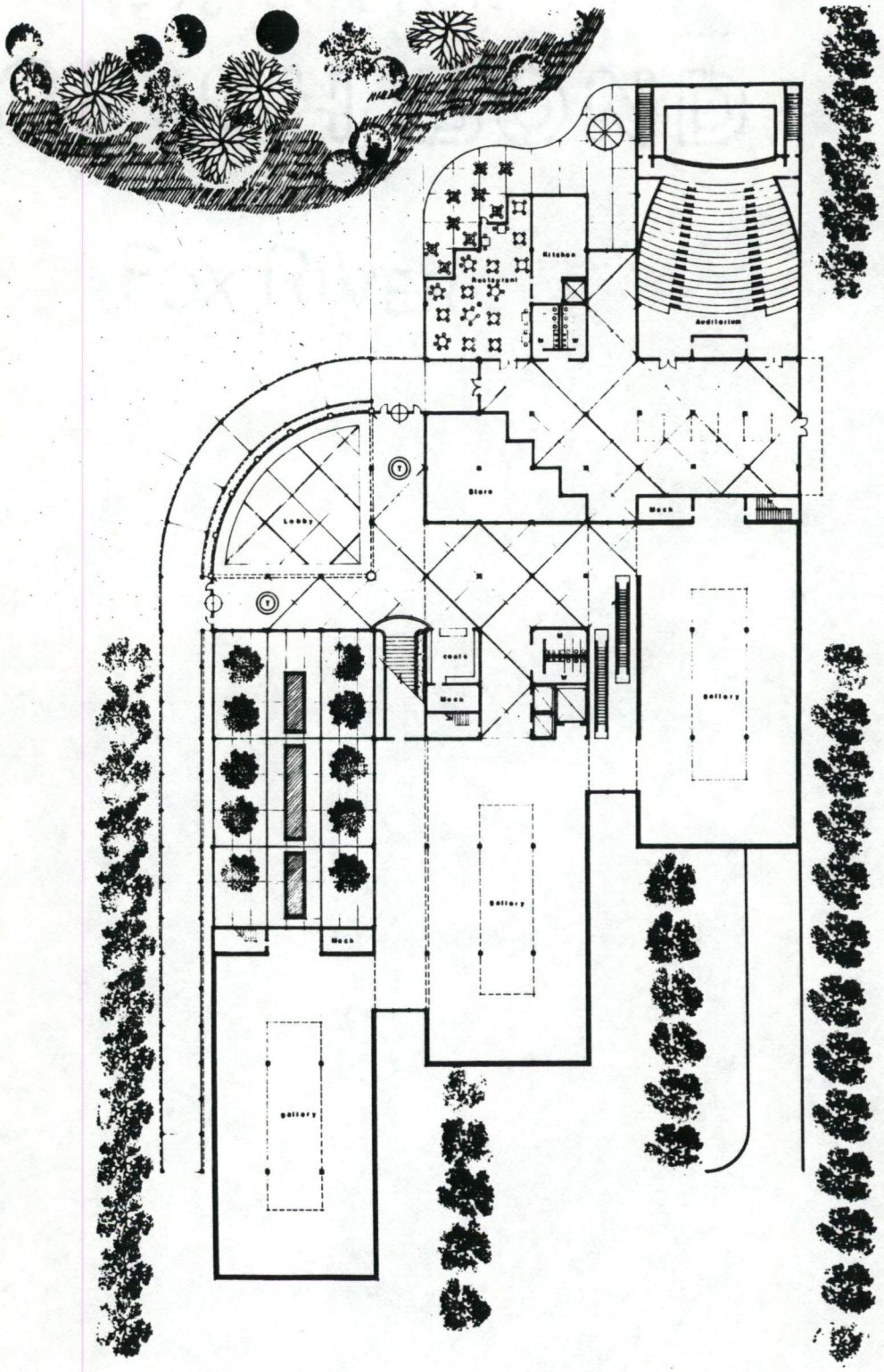


site analysis

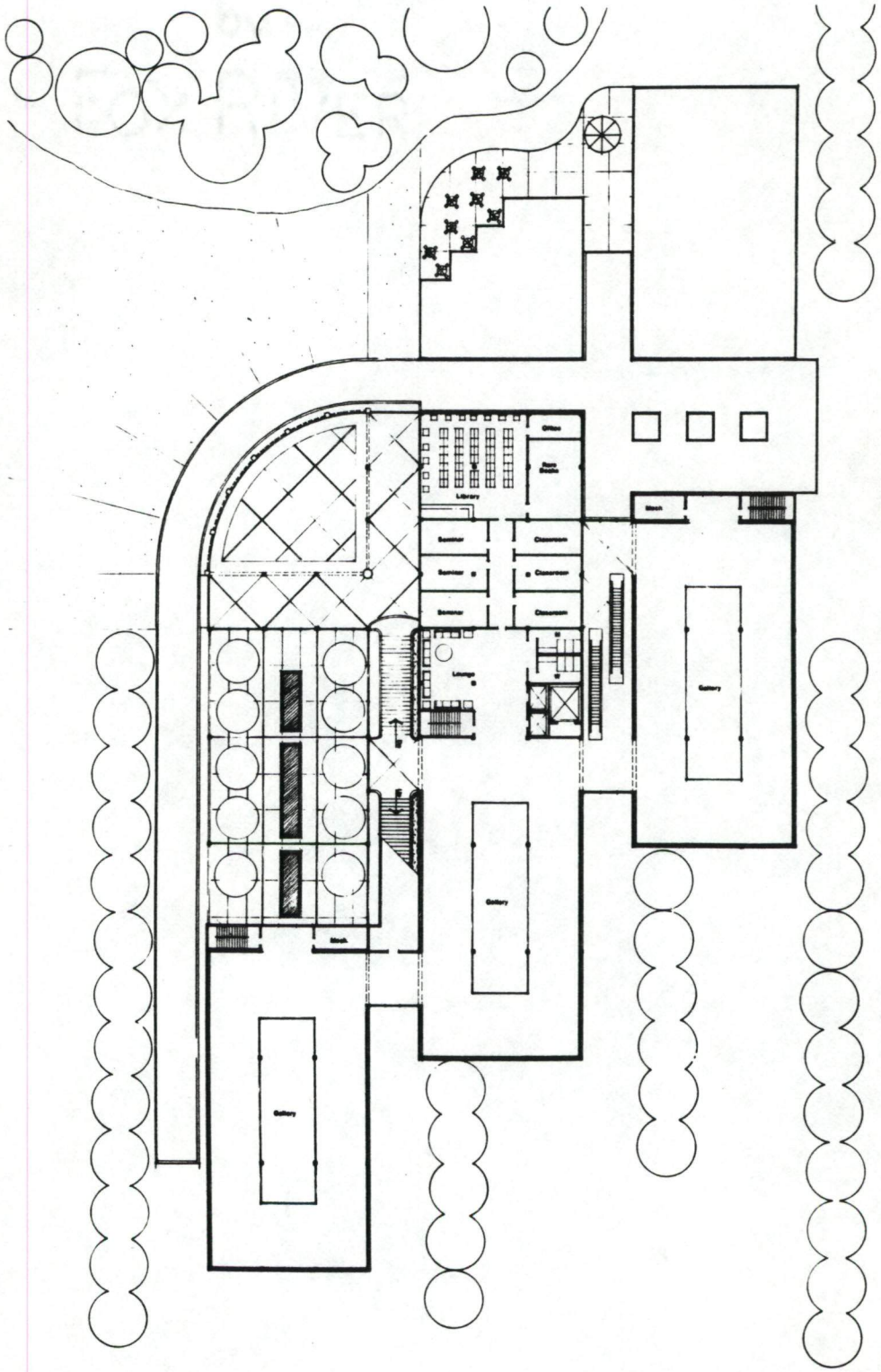
site plan



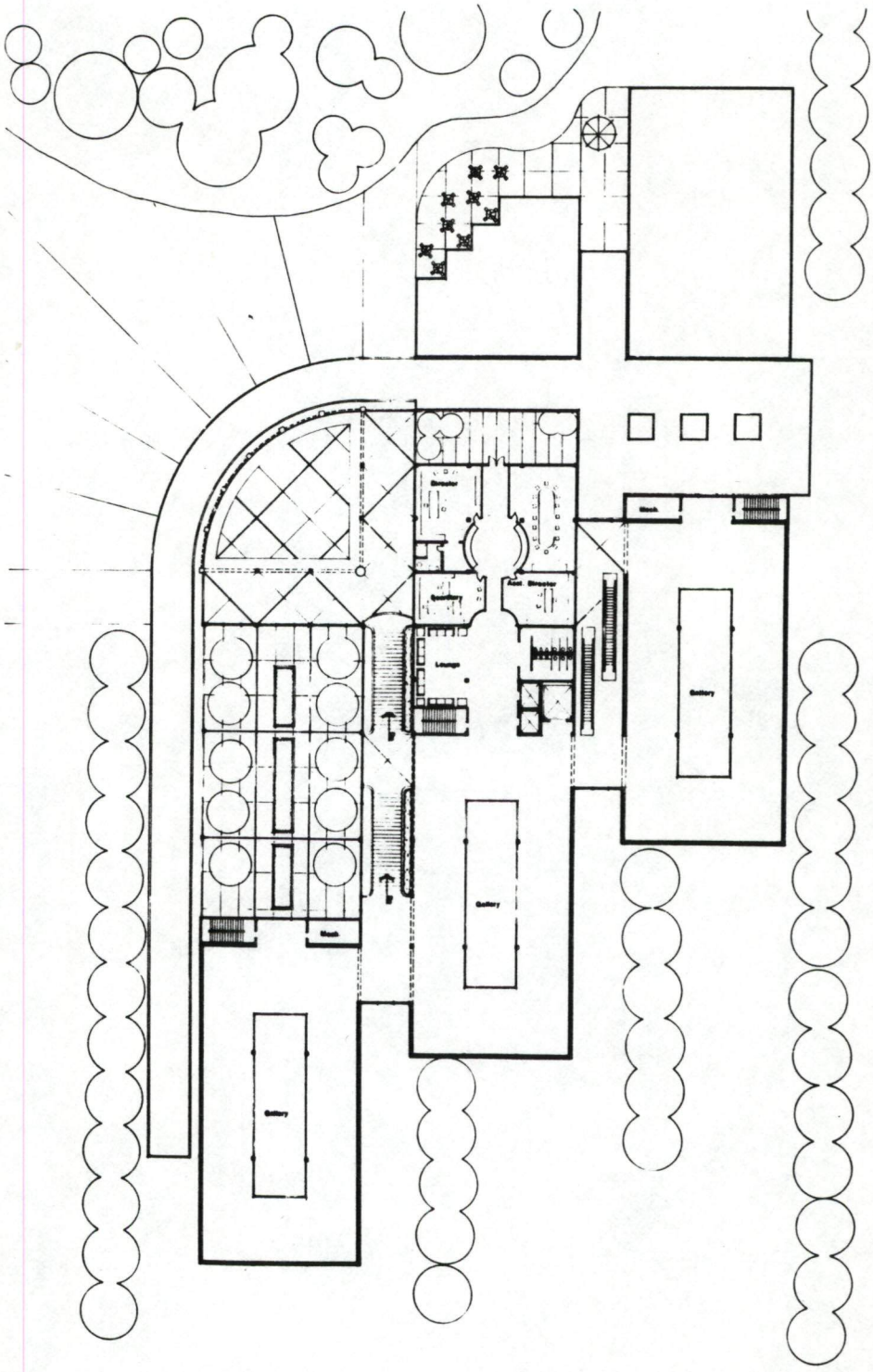
support


Kitchen
Restaurant
Auditorium
Store
Lobby
Mech
coats
Mech
gallery
gallery
Mech
gallery

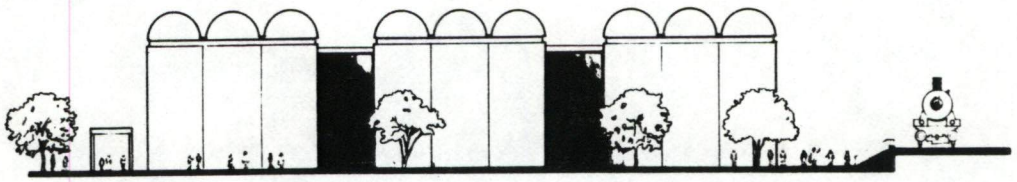
first floor



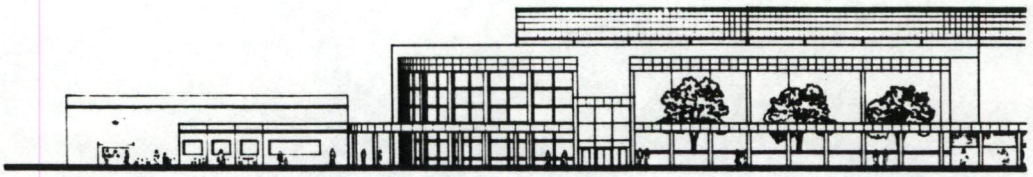
second floor



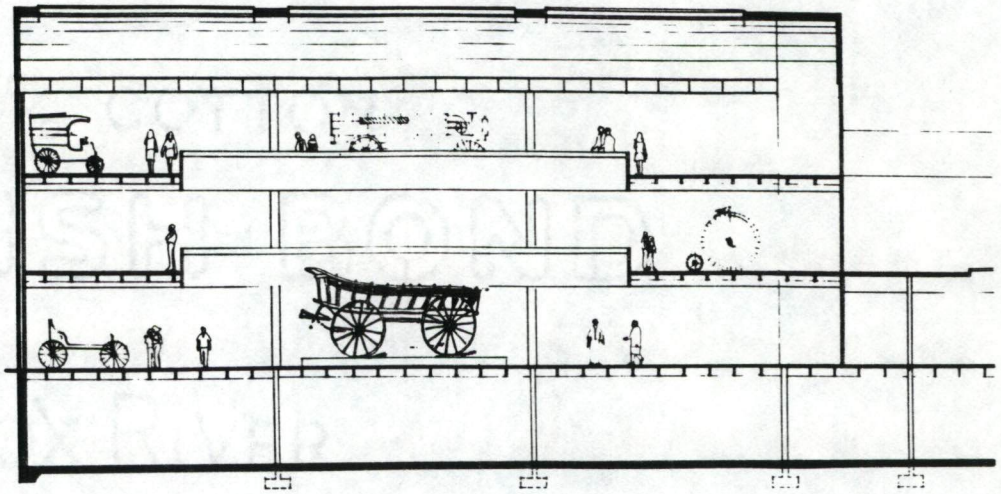
third floor



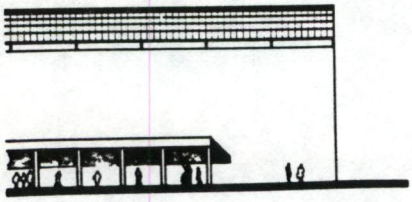
south elevation

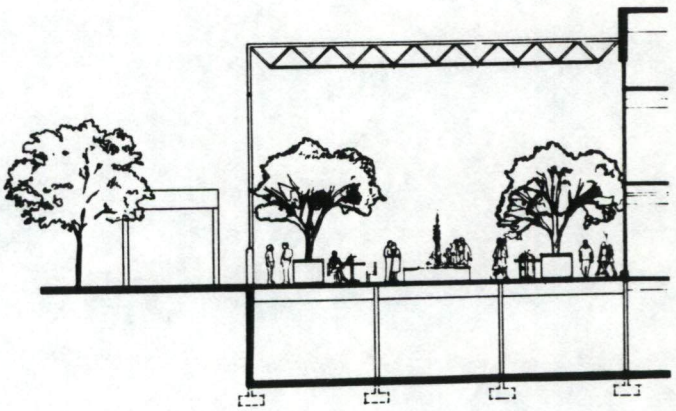


west elevation

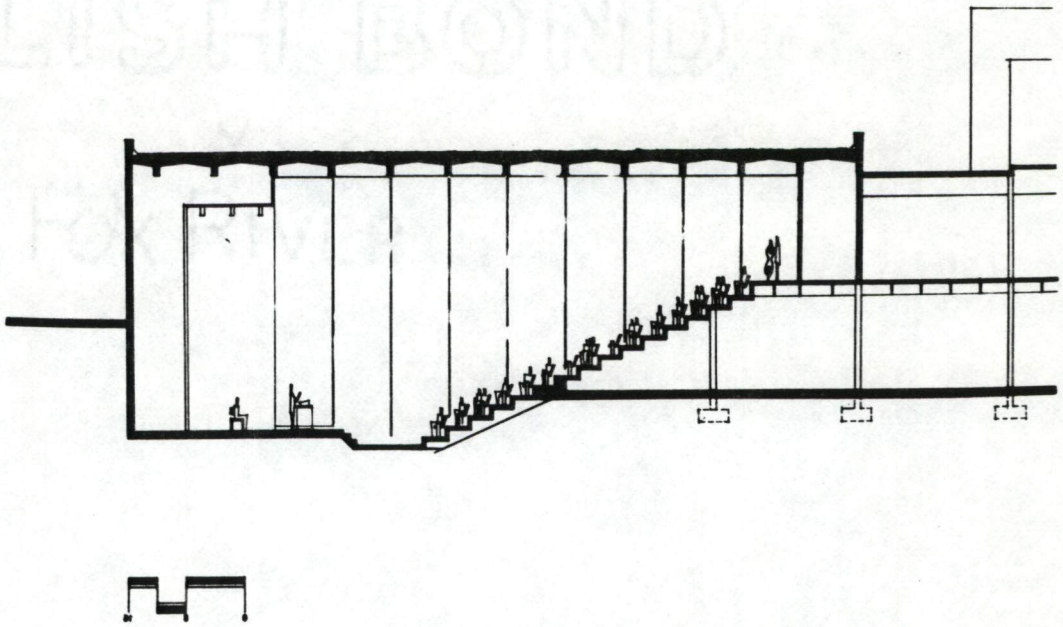


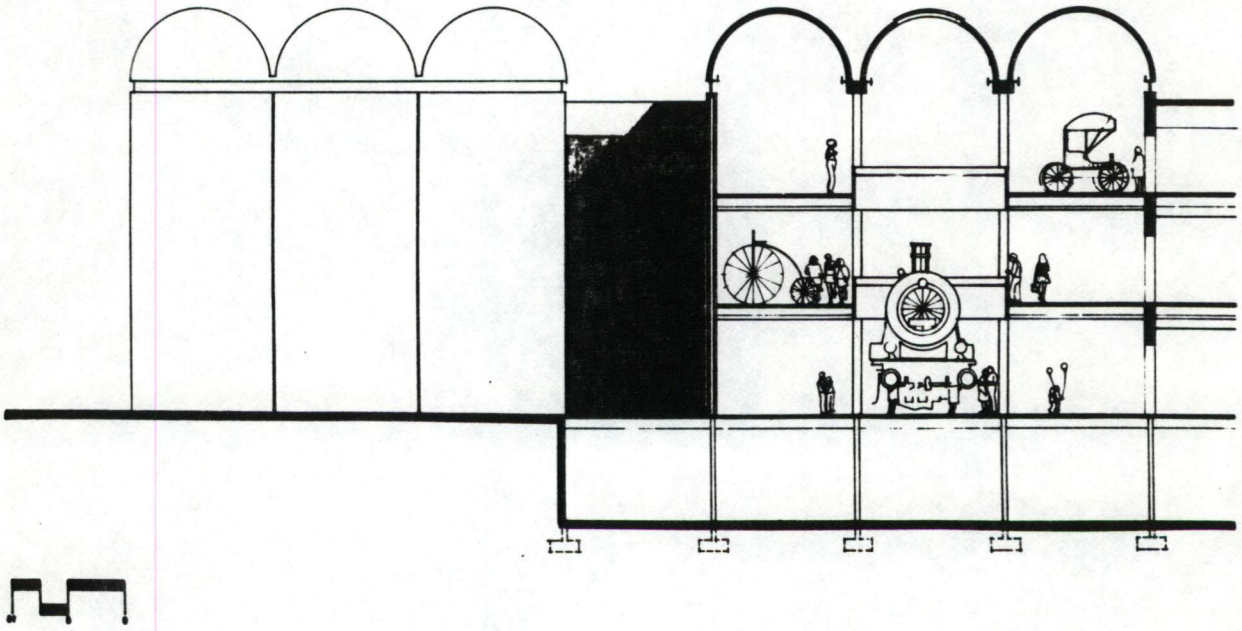
section a

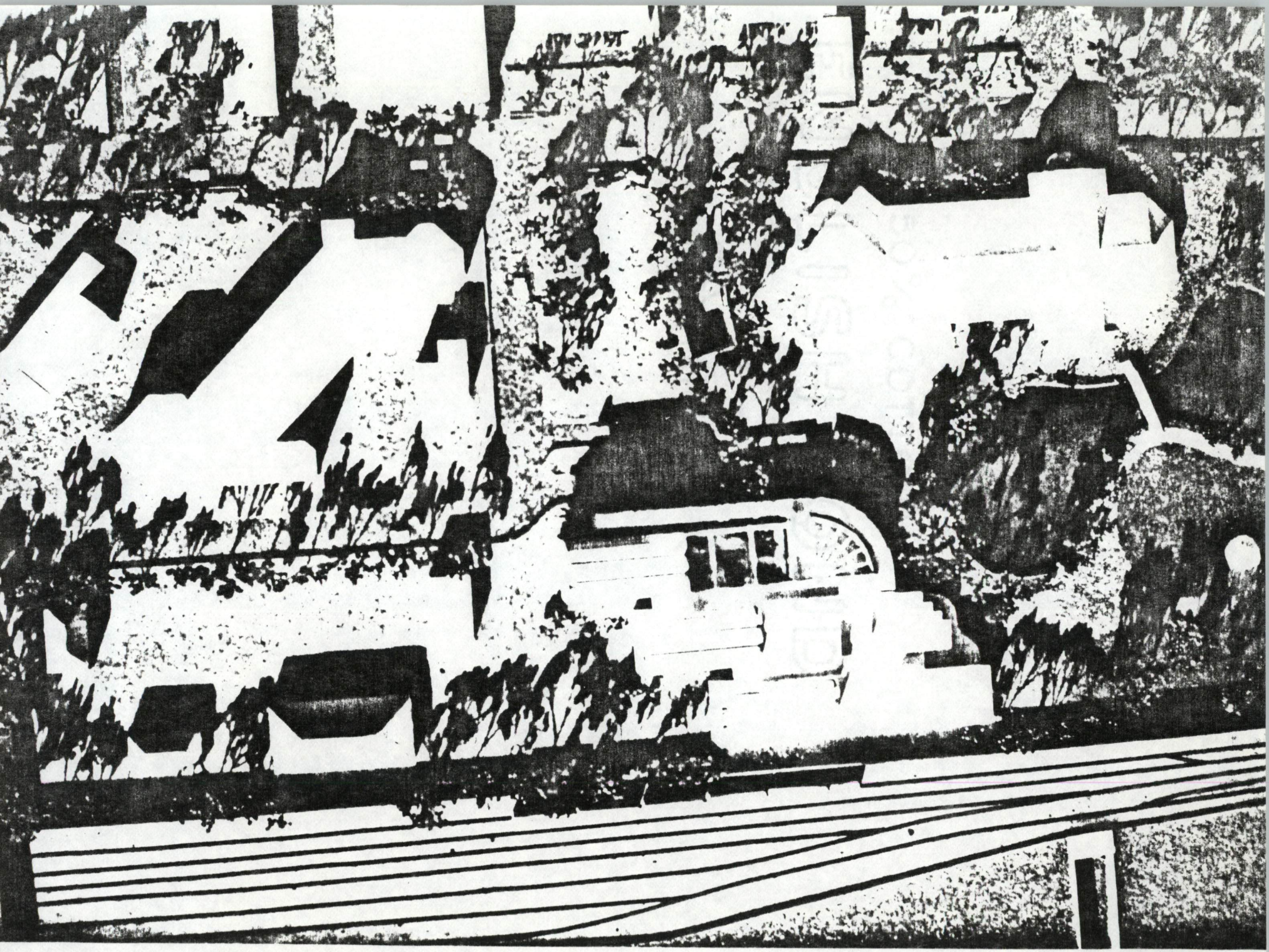




section b







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