

A CORPORATE FITNESS CENTER: AN EXAMPLE FOR THE
REUSE OF THE EMPIRE STORES, BROOKLYN, N.Y.

by

DIANE THEODORA GEORGOPULOS
B.A. ENVIRONMENTAL DESIGN
STATE UNIVERSITY OF NEW YORK AT BUFFALO
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Signature of Author
Department of Architecture, June 1982

Certified by
Gary Hack, Associate Professor of Urban Studies and Environmental Design

Accepted by
Edward Robbins, Chairman, Departmental Committee for Graduate Studies

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BOOK

TABLE OF CONTENTS

2

	<u>page</u>
I ABSTRACT	5
II ACKNOWLEDGEMENTS	6
III INTRODUCTION	8
IV METHOD	11
V ELEMENTS OF A FITNESS FACILITY	13
A. Range of Activities	
1. Educational Component	
2. Screening Laboratory	
3. Counseling	
4. Exercise Facility	
B. Incentives for Construction	20
1. Canadian Life Project	
2. American Industry	
C. Size of Facilities	26
1. Company Payroll and Space Requirements	
2. Peak Load Hours	
3. Gender of Workforce	
VI ASPECTS TO CONSIDER IN THE DESIGN OF FITNESS FACILITIES	30
A. 1. Exercise Areas	
a. running paths	
b. plunge pools	
c. cycling and stationary running	
d. handball	

	<u>page</u>
e. clocks, timers, meters	3
f. standard equipment	
g. sound system	
h. mirrors	
B. Ancillary Spaces	36
1. Locker rooms	
a. public-private realm	
b. clean-soiled clothes	
c. wet-dry areas	
2. Staff Offices	
VII PROGRAMMATIC CONSIDERATIONS	39
A. Site Summary	
B. Site History	
C. Recent Events	
VIII ARCHITECTURAL PROGRAM AND DESIGN RATIONALE	45
A. Site	
B. Empire Stores	
C. Fitness Facility	
D. Design Rationale	
IX DRAWINGS AND DIAGRAMS	57
Diagrams	
Site Plan	
First Floor Plan	
Second Floor Plan	

Third Floor Plan
Roof Plan
Structural System
Sections
Sections
North Elevation

4

X	OBSERVATIONS	70
XI	REFERENCES	72

A Corporate Fitness Center; An Example for the
Reuse of the Empire Stores, Brooklyn, N.Y.

5

by

Diane Theodora Georgopoulos

Submitted to the Department of Architecture in June, 1982, in partial fulfillment of degree of Master of Architecture.

ABSTRACT

The proliferation of over 500 fitness programs for the employees of American corporations marks a turning point for the way American corporations regard employee and corporate health. Typically, sports facilities were the province of recreation or education facility planners. A category of sports activities has been isolated, however, for its cardiovascular characteristics and is the basic component of a fitness program

The physiological characteristics which are of concern are those activities which contribute to the "training effect"¹ of the heart or the ability of the heart to pump blood and oxygen to the body. The benefits of this conditioning are manifold. Longitudinal medical studies^{2,3,4} indicate that there are positive relationships across a large population for aerobic exercises or exercises which demand oxygen and decreased risk of heart attack in later life.

While the correlation between exercise and good health seems merely the confirmation of good sense, it is a recent occurrence that this relationship has been quantified by corporations and utilized to increase "corporate health," through the construction of fitness facilities for employees^{5,6,7,8,9,10}.

The intention behind this thesis is to explore the existing information about fitness centers and design a facility as the reuse of an historic building in Brooklyn, New York.

Thesis Supervisor: Gary Hack

Title: Associate Professor of Urban Studies and Environmental Design

II ACKNOWLEDGEMENTS

I thank Jill Greenberg of MASCO and Dr. Robert Buxbaum of the Harvard Community Health Plan for their time and interest in introducing me to this new world of fitness programs. Through their auspices and the Association of Fitness Directors in Business and Industry I was able to visit fitness centers at Texaco, Pepsico, Mobil, the Executive Fitness Center and General Foods. And I thank the directors of those programs for spending time with me. I also thank Mr. Leon Schimmelfing of Fitness Systems, Inc., and Mr. Burt Perris, Program Evaluation Officer at the Ministry of Culture and Recreation, Sports and Fitness Branch, Canada, Barbara Reed, Rotch Library for her help, and Jenifer Simpson for her skills.

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1982

Αγαπημένοι μου γονεΐ.

Τό μπλο πέρτει πάντα
κάτω σή σή μπλιά...

Άρταμης Θεωδώρα

III INTRODUCTION

The paper written and fitness center designed as a partial requirement for a Master of Architecture degree is an effort to expose the writer to a completely new area. Unlike many papers written to satisfy the thesis requirement, this paper builds, in a less specific way on purely architectural skills, but rather more broadly focusses on layers of environmental concern.

The stages involved in bringing this paper to its form herein began by the writer responding to a proposal from the Urban Development Corporation of the State of New York. The proposal submitted was little more than some thoughts about what might happen to an historic building surrounded by an active industrial district in Brooklyn, New York. Having grown up in Brooklyn, the writer had some very strong memories of its past, beliefs about the reasons for conditions that exist, and an idea about the potential for the future. The paper is then a formal statement of an idea that seeks its expression through architecture.

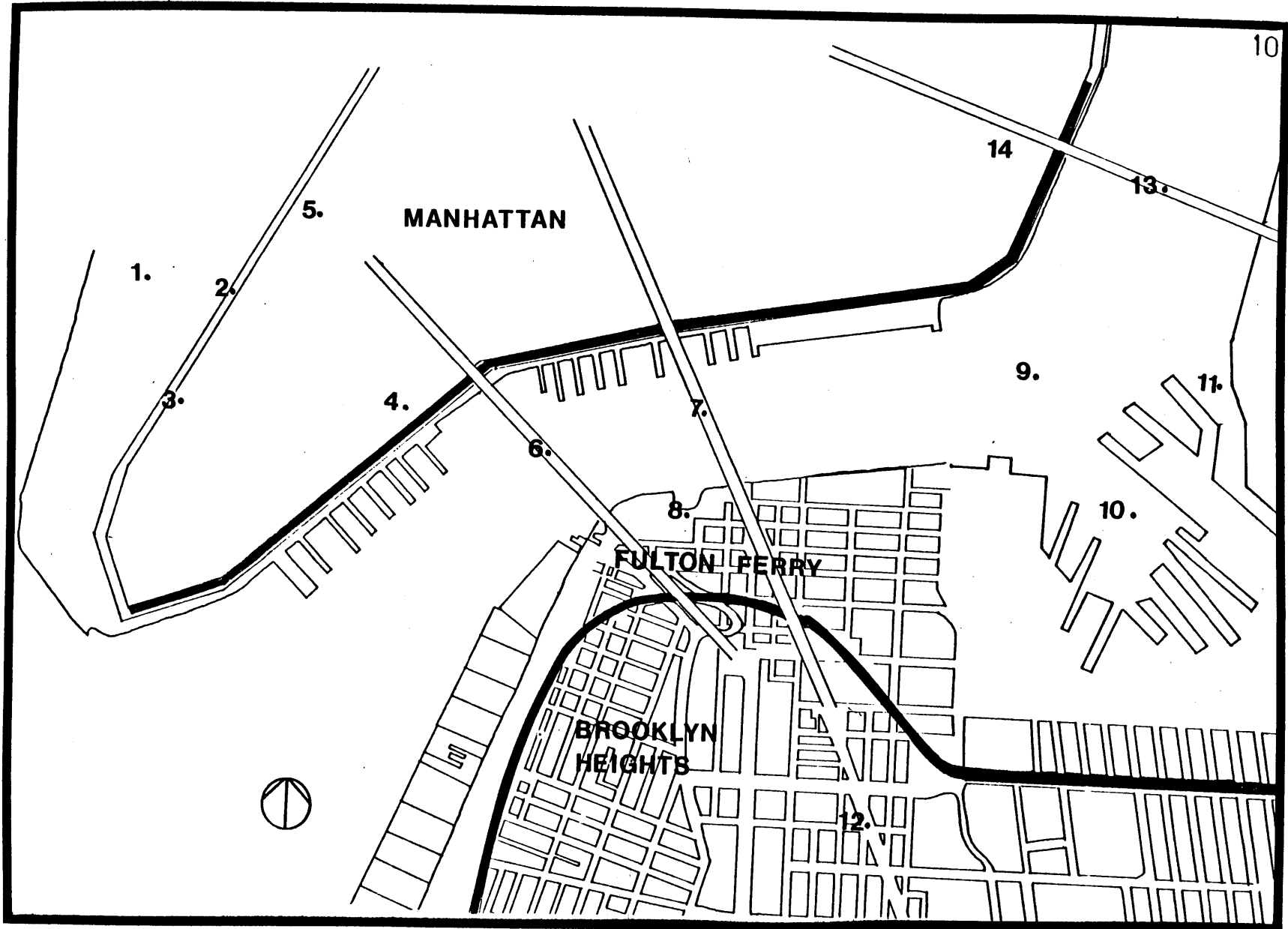
The method for determining the use of this historic building for a fitness center was not a systematic investigation of the economics or marketability of the idea. But rather an idea based

upon the notion of keeping the industrial base and its 2500 jobs in its existing location and encouraging new industrial activity rather than suggesting, as other respondents to the U.D.C. proposal did, the development of luxury housing or a large-scale commercial tourist attraction consisting of speciality shops and hotel.

The bias herein exposed is not so much against these ideas per se, but rather an attempt to place an activity appropriate to the area, innovative in concept, generative of a new life in continuity with the old.

KEY

- 1 WORLD TRADE CENTER
- 2 BROADWAY
- 3 WALL STREET
- 4 SOUTH STREET SEA PORT
- 5 CITY HALL
- 6 BROOKLYN BRIDGE
- 7 MANHATTAN BRIDGE
- 8 EMPIRE STORES
- 9 EAST RIVER
- 10 NAVY YARD
- 11 WALLABOUT CHANNEL
- 12 FLATBUSH AVENUE
- 13 WILLIAMSBURG BRIDGE
- 14 F D R DRIVE



The method employed in developing this paper and design involved the collection of information and the simultaneous development of an architectural program.

The architectural journals, traditionally used as a first source of data, did not supply any information regarding fitness centers.

The consultation of indices from leisure, applied psychology, public health, social psychology, exercise physiology and business management research journals pointed in a number of directions. The Canadian Life Project was the only research conducted specifically on fitness centers.

The areas where this literature search was most lucrative were under the headings of fringe benefits, stress, exercise, health and recreation.

Phone contact was made with a number of medical directors and physical fitness educators to find out what the range of programs was in industry.

Site visits to fitness centers were made and personal interviews with the directors were conducted.

Photographs of centers were taken. In some cases, floor plans were available.

In general, exposure to behavioral psychological field methods were of tremendous assistance, so that multi-dimensional data collection techniques were practiced, although without benefit of the rigor in standard research methodology involving the support or contest of a behavioral theory.

The development of the architectural program for the fitness center began by listing the basic activity components required in a fitness center. This wish list was continuously honed down, as it became clear through site visits, that what was desirable in the designer's eyes would not be desired by the client, hypothetical or not.

The design work itself had two basic stages involving a 5-acre site and a building of 350,000 square feet. The fitness center was a component of the building. The fitness center program, and compatible uses for the larger structure are shown in the site plan and design work.

V THE ELEMENTS OF A FITNESS FACILITY

The features of a corporate health facility which makes it distinct from a private health club or community health center can be summarized as follows:

- A. range of activities
- B. incentive for construction
- C. size of facility.

A. Range

The range of corporate fitness programs extends from information dissemination about health to full-scale million dollar structures to house physical fitness programs. A major aspect of the corporate facility is its relation to the place of employment and the new definition fitness conditioning participation derives from this geographic association. While participation in corporate facilities by employees is voluntary, the use of the time is different from the concept of discretionary time used in recreational planning for private or community centers.

The essential elements of a complete corporate program include the following:

1. an education component
2. a screening or testing laboratory
3. a counseling staff
4. an exercise facility

A1. Education

The educational component of a fitness program will include the distribution of literature and classroom presentations that include, but are not limited to, the following topics;

- a. alcoholism
- b. back care
- c. breast self-examination
- d. cancer
- e. cardiopulmonary resuscitation
- f. choke savers
- g. coronary heart disease
- h. diabetes and hypertension
- i. flu inoculation programs
- j. heart attack prevention
- k. nutrition
- l. patients' rights -- access to medical records
- m. smoking
- n. stress management
- o. venereal disease.

A2. Screening/Testing Laboratory

The second level of a fitness program can include a place to survey the medical condition of employees prior to prescribing a voluntary exercise or dieting program.

The range of tests varies considerably, although the following would constitute a reasonable sample of what one might find in a complete screening/testing unit.

The laboratory would include examination rooms for the following purposes:

1. blood
2. hearing
3. lung function and body density
4. treadmill/electrocardiogram*
5. vision
6. X-ray*

Cardiovascular measures are emphasized in the screening/testing phase as a way of calculating how efficiently one's heart works to deliver required oxygen and blood to the body. Muscular strength, endurance and flexibility measures are also of importance in assessing physical health.

The screening process functions to indicate potential health problems prior to their actual occurrence. In industry, where coronary heart disease is the most costly health problem, screening can serve to identify high risk employees, who are then counseled in preventative measures.

Xerox Corporation estimates a loss of \$600,000 a year for each executive who must be replaced due

* Both the X-ray and electrocardiogram are considered by some physicians to be optional.

to cardiovascular disease. The American Heart Association estimates a loss of \$700 million per year to replace the 200,000 men aged 45-65 who die or are disabled from heart disease.⁷

A.3 Counseling

The diagnostic value of a screening program serves to alert both employer and employee of possible health hazards. A health counselor can describe the preventative steps one can take to decrease the likelihood of becoming afflicted or failing to control a variety of ailments. The prescription generally includes a regimen of exercise and diet.

Some corporations test their employees two times a year. Companies now use computers to record exercise performance. Employees can use a computer terminal in a fitness facility to see how their most recent results compare after exercise to their previous state of health. The computer has also been extended to include programs from personnel offices and medical departments of corporations.

The counseling session is intended to provide information which will motivate an employee to participate in an exercise or other fitness program. The screening and counseling are important

Wall Street Journal
 July 31, 1978 1:5
Hospitals Diversify Into
Selling Health-Promotion
Programs To Industry.
 For \$44 a head Skokie,
 Ill. Valley Hospital provides a group of workers with a computerized health evaluation showing how each person's habits affect his risk of dying in the next 20 years. It then teaches programs at the factory or office at \$750 a course on subjects such as how to quit smoking, control blood pressure, stop alcohol abuse and lower cholesterol levels.

in emphasizing the change in corporate health policy from providing health insurance benefits to "wellness."

A.4 Facilities

The range of fitness facilities extends from in-house desk side exercise breaks to multimillion dollar structures.

Corporations have hired instructors to conduct five-minute exercise breaks. These classes are held in the office, next to the employees' desk and are becoming popular.

Interim facilities are temporary structures such as trailers. These are being used as a test to ascertain the level of participation by employees before a corporation embarks upon a full-scale building program. It is also a short-term solution to providing a place to exercise.

On-site facilities are most preferable however. Major American corporations have constructed elaborate facilities, including;

- a. Xerox, Leesburgh, Virginia, which has a \$3.5 million fitness center with tennis courts, squash courts, racquetball courts, sailing, skiing, scuba diving, horseback riding and judo.
- b. Xerox, Webster, New York, has 6 baseball diamonds,

putting greens, jogging and cycling path, lighted basketball court, archery range and skating rink.

c. Phillips Petroleum, Bartlesville, Oklahoma, has a 45'x100' swimming pool, gym, weight training room and a 12-lane bowling alley. The 3,000 families who use the center pay \$10 annually for membership.

d. Boston Five Savings Bank, Boston, Massachusetts, converted the 8th floor of their downtown office. 280 employees participate in the facility equipped with running track, universal gym, two stationary bikes, saunas, tanning booths, showers and assigned lockers. There are lunch hour and afterwork classes held in yoga, jazz exercises, aerobics and danceroberobics. The center is open seven days a week and an employee pays a \$10 annual membership. Officers and trustees pay more.

e. Prudential Insurance Company, Boston, Massachusetts, has converted the lower level of their downtown office building into an exercise area with showers, lockers, saunas, treadmill, bicycles, weights and mats. Of the 1500 employees, approximately 10-12% participate. The center is open during office hours.

f. John Hancock Insurance, Boston Massachusetts,

has an arrangement with the YMCA for reduced rate memberships for employees. Special afterwork hours are arranged. Hancock's medical department surveyed their employees and of the 350 respondents, 66% were primarily interested in fitness as a topic for health education. It is significant that the highest percentages of respondents were the youngest employees.

g. Exxon, New York, New York, on the 39th floor of their Manhattan headquarters, has an area for simple calisthenics, stretching exercises, stationary bikes, treadmills, jump ropes, medicine balls, rowing machines and weight training equipment.

h. Kimberly Clark, Neenah, Wisconsin, has a complete screening center plus indoor running track, swimming pool, whirlpool, sauna and exercise area.

i. Pepsico, Purchase, New York, has built an extension to their existing office headquarters which includes individual exercise equipment, running track, and a variety of other activities. Structured exercise class space is spatially located to afford a view out to the suburbs on office park grounds.

j. General Foods, White Plains, New York, has an

indoor running track, the center of which acts as a volleyball court and exercise area. The lower level of the structure includes lockers, offices, laundry, trophy cabinet and individual exercise area including hydragym equipment.

k. Mobil, New York, New York, on the 24th floor of their Manhattan headquarters has an area for stationary bikes, rowing machines, treadmill, and weight training equipment. Executives can use facilities any time during the day. Locker rooms are provided.

B. Incentive for Construction

American industry is interested in fitness because it can reduce its operating expenses by investing in fitness programs, or it is an idea that has the personal endorsement of an influential chief executive officer. No formal cost benefit analysis of the fitness center concept was available through American industry.

The Canadian government however, sponsored a study of employee fitness programs, which to date is the most accessible document revealing the economic and physiological benefits of fitness programs.

Wall Street Journal
September 24, 1980 3:4
It Pays To Stay Healthy
Under Bank's Pilot Plan.

Bank of America has started a pilot health care program that will pay employees if they stay healthy.

This month the bank began a test plan for its employees and their dependents in the Salinas Central Coast and Santa Cruz branches.

Under the program called Stay Healthy, the bank said it will give a year's free health coverage to employees who don't file medical insurance claims between September 1, 1980 and August 31, 1981. The free coverage will apply the following year.

B.1 The Canada Life Project: A government-sponsored study of employee fitness programs.

In 1977 the Fitness and Amateur Sport Branch of Health and Welfare, Canada, awarded a grant to the Department of Preventive Medicine and Biostatistics at the University of Toronto to conduct a study of the effects of a fitness program in a large corporation.

The objectives of the study included¹¹:

1. The definition of current fitness levels in a selected subpopulation of "healthy adult office workers."
2. The determination by controlled trial of whether current fitness levels of the adult worker relate to job productivity, and whether productivity can be increased by a well-regulated employee fitness program.
3. The determination of the relationship between fitness levels and health costs, and to test whether health costs can be reduced by participation in an employee fitness program.
4. The examination of the possible contribution of an employee fitness program

to job satisfaction and general well-being in the adult population.

The Canadian Life Assurance Company (CALACO) and North American Life Assurance Company (NALACO) were chosen on the basis of their willingness to cooperate in the study, the similarities of the companies and the feasibility of implementing a fitness program.

NALACO was chosen as the control company and baseline data on fitness levels, absenteeism, worker satisfaction, productivity and health experience were collected. CALACO initiated a fitness program and similar baseline data were collected.

Essentially, across the four groups which were identified on the basis of their regularity of participation, there were no differences in physiological state, although fitness program adherents, or those attending all sessions consistently, did have a decrease in body fat, and increases in flexibility and oxygen intake. Absenteeism was decreased in high adherents, as was job turnover. In terms of measured productivity, an increase was indicated in program adherents. Morale was also positively influenced.

The economic impact of the Canadian Life project indicated that the reduced turnover could produce annual savings of \$510,000, considering the average cost of hiring and training a new employee was \$6,250. Further savings would also be gained by the decreased absenteeism for the 1.3 days per year per employee which was indicated in the study. At \$50 per day, a direct annual savings of \$91,000 could be produced.

The table below, taken from the Canadian Life study, shows the potential savings a company of 1,000 might achieve with a 20% participation rate.

TOTAL SAVINGS FROM EMPLOYEE FITNESS PROGRAM IN COMPANY HAVING 1,000 WORKERS (BASED ON CANADA LIFE DATA)⁵

Item	Savings	Total Sum
		n=1,000
Absenteeism	1.3 days	13,000*
Turnover	13.5%	168,750*
Hospital days	.57 days	57,000
Medical costs	\$28.50	28,500
		<u>267,250</u>
	PROGRAM COST	<u>50,000</u>
	SAVINGS	\$ 217,250

*20% of workers

Wall Street Journal
 May 3, 1979 1:5
 "The great American
 'exercise ethic' will
 help push sales of sport-
 ing goods, currently
 about \$2.3 billion an-
 nually to nearly \$7 bil-
 lion by 1990."

B.2 American Industry Decides on Fitness Because of the Economics of Health Care

24

Where the decision is made to have a program upon an economic justification, the size and extent of a facility is derived, working back from a desired level of productivity. For an employee whose annual compensation rate is \$30,000, and at an average cost of \$300 per year per participant in a fitness center, the company would have to see a 1% improvement in that employee's productivity to pay for the fitness program. It is not uncommon to find a 15-20% rate of improvement in cardiovascular function. What percentage transfers from improved physical condition to worker productivity is not quantified, although the likelihood of a reasonable return on investment seems high, based on results from the Canadian Life Project.

In the Peat, Marwick and Partners study for the Canadian Ministry of Culture and Recreation the economic benefits of physical fitness programs were assessed based on results of the Canadian Life Project. The variables considered included:

- absenteeism and turnover
- recruitment
- corporate healthcare
- individual productivity

Wall Street Journal,
July 24, 1979. 1:5
United Auto Workers Bargainers Propose A Novel Health Benefit In Early Talks With Ford Motor Company. They call for preventive medicine clinics near each plant to detect problems related to hypertension, cholesterol levels, blood disorders and lung ailments. The union believes the program's cost would be offset by savings from less work time lost due to preventable illness.

The aspect most dramatically affected by fitness programs was absenteeism. The evaluation estimates the cost of a day's absenteeism as

"... a day's pay times a factor of 1.75. This number takes into account various direct and indirect costs of absenteeism including compensation for time not worked, cost of replacement, cost of recruiting and/or training others to fill in; cost of routine overstaffing; value of lost output when work is not made up; lower output and/or productivity due to disruption and inexperience of replacements; discontent among those who must carry extra work; cost of failure to meet delivery dates and resulting larger inventories; cost of extra recordkeeping, and bottlenecks."⁶

These arguments are of concern to architects insofar as the rationale for justifying expenditure hinges upon active participation by employees. There is another side of the coin, however; a general manager of an office park with a newly-located fitness center remarked that the New England Executive Park's fitness center was open no later than 8 p.m. on weekdays because "We don't want it to become a singles' hangout."²¹

B.3

In the second case, the most common rationale



Wall Street Journal
May 2, 1978. 1:5

Profits Move Over-
Physical Fitness Be-
comes a Big Corporate
Goal

To keep employees healthy and productive Time Inc., pays \$400 of the \$500 fee for those over 35 who sign on for jogging and exercise at New York's CardioFitness Center.

behind the decision of a corporation's Board of Directors to embark upon an employee fitness program is generally through the efforts of a progressive chief executive officer. This individual may jog or play squash, but is a fitness advocate himself, and can, on the basis of his own credibility, establish a program. While this is an appealing mythology, the recent economic environment dictates that cost-effectiveness is a prime consideration for any investment. Where there is a contracting budget, how do decisions about which programs get cut, get made? If the cost/benefit rationale behind a fitness program cannot be made, or the chief executive officer leaves for another position, will the fitness program continue?

C. Size of Facilities

The Canada Life Project study has generated data which has been refined into standards for planning fitness facilities. The standards have been adopted in the United States by private fitness facility planners, a new entrepreneurial area.

C.1 Company payroll and space requirements

Essentially the determining factor for the size of facilities lies in the size of the given corporation. A rule of thumb of 30% participation

Wall Street Journal,
January 18, 1979 1:5
"Good health was termed
the most important
thing in life by 70% of
the persons queried in
a recent Pacific Mutual
Life Insurance Company
survey, next closest
was "peace of mind"
favored by 39%. Way down
on the list, most im-
portant to only 8% of
the respondents was "a
high standard of living."

in fitness programs, indicates that the peak hour traffic through a center will be 30% of the total company employee payroll. Handicapped employees should not be neglected in this percentage. While 30% of the total payroll constitutes the high side of actual participation levels as documented in fitness programs in both Canada and the United States, 60% is the high side of the planned participation levels. Some "overbuilding" is probable with the 60% figure.

In general, 65 square feet per person is an industry average for group exercise programs, with a maximum number of 35 people per class. Given the most effective conditioning workout of three times a week for thirty minutes^{13,14,15,16}, one can calculate actual square footages required based on the number of classes to be offered, space available and number of employees. Ancillary spaces for locker rooms, circulation, mechanicals, etc., are planned at 50% of this figure. Group exercise areas are best when longer than wide (80' x 30', for example) as the benefits of aerobic training derive from intensive movement.

For planning individual exercise programs which include pieces of exercise equipment such as bench presses and treadmills, industry uses a 400

Wall Street Journal
June 14, 1979. 23:2
"Executives are more likely to think their work is stressful but it is the secretaries and garment workers who are more likely to suffer the mental and physical symptoms of stress." This is one of the findings of a survey of six occupational groups carried out under the sponsorship of the American Academy of Family Physicians."

square foot + 100 square foot ancillary space minimum or 1 square foot per participant, whichever is greater. In this last calculation, however, the assumption is made that each participant exercises one hour per week, and that peak loads amount to 4 hours per day, and that 400 square feet can accommodate 40 people per hour. This assumption however does not conform with the prevailing thought in exercise physiology. Consequently adjustments to that space standard should be made.

C.2 In general, peak loads are the hours before and after work and the 12 to 2 p.m. period at lunch time. Where there are a larger number of married people with families for example, less participation may be expected after work. Where 45 minute lunch hours are scheduled, women will not participate as actively because of the short time they have to regroom themselves.

C.3 In some jobs the number of women will greatly outweigh the number of men. In general, where there is an executive fitness program, the number of women is significantly smaller. The area, therefore planned for female lockers is scaled down. Where a fitness center serves executives and non-executive ranks, and where there is a more equitable

Wall Street Journal
April 2, 1979 1:1
"Contrary to popular belief the executive suite isn't the most likely place to find severe stress in American life. Executives like everyone experience stress, but as a group they seem better able to cope with life's strains. Instead the National Institute of Mental Health survey found "psychic stress was more prevalent among women than men and more common among the lower economic groups and blacks."

ratio of male to female employees, one expects that the participation ratio of male to female to be more equal.

29

Wall Street Journal,
September 17, 1980. 33:4
"It's a major concern for
employers and insurance
companies," says Andre
Maisonpierre, V.P. of
the Alliance of American
Insurers, a trade group.
It warns that psychiatric
injury awards "could
have some major cost im-
plications."

15 states have had court
decisions to have disabili-
ty payments in cases
where severe anxiety dep-
ression or other mental
problems have been caused
by work stress.

The average mental stress
victim is a "rank and file
employee", such as a
teacher rather than an
executive, Ny Grady says,
administrative director
of California's accident
division.

A psychiatric claim
"would pretty well kill"
an executive's career,
Mr. Grady observes. "And
psychiatrists say there's
more frustration and stress
in lower level jobs be-
cause there's no upward
mobility."

VI ASPECTS TO CONSIDER IN THE DESIGN OF FITNESS FACILITIES

30

The model of physical well-being in terms of exercise physiology is stated as a relation between oxygen consumption in millimeters, body weight in kilograms and time, expressed in minutes. This model has been outlined in the book "Aerobics," by Dr. Kenneth H. Cooper. Although aerobics is not a new idea, Dr. Cooper specifies how many minutes of a given exercise must be performed to earn a required number of points building up to physical well-being. The required thirty points is the level of activity to insure the heart's conditioning. Increased stroke volume or amount of blood processed with each contraction of the cardiac muscle and lowered pulse rate which is a measure of the heart's efficiency, are the goals of aerobic conditioning.

A.1 Exercise Areas

Those activities which provide the most effective cardiovascular conditioning are running, swimming, cycling, walking, stationary running,⁴ handball, squash and basketball.¹ These are, therefore, basic activities to a fitness center.

a. Running paths have recently been planned with exercise stations en route. The stations are

Wall Street Journal
September 8, 1978 37:5
Regular Exercise Has
Fringe Benefits For Policy-
holders

Occidental Life of North Carolina is betting that regular running, swimming or bicycling will help people live longer. The insurance company, a subsidiary of M&M Corporation, is offering discounts of up to 20% on most of its whole life policies for people who have been jogging, running, swimming or bicycling at least 20 minutes three times a week for the past year. Thomas A. Smith, Senior Vice President, said Occidental is the first life insurance company to take into account the effects of aerobic exercise in setting premiums.

designed to give the enclosure, physical equipment and instructions for exercises that complement running. The stations also provide incentive to the stroller on the path, to bend and stretch without running. The surfaces of running tracks are banked and generally cushioned to relieve the impact of running.

b. The plunge pool is 4 feet deep and can be as long as the 165 feet of an Olympic size pool. This depth allows participants to walk in the water, which is a rehabilitation exercise for cardiac patients, and 4 feet is also deep enough to swim lengths.

c. Cycling, walking and stationary running are activities found in the smallest fitness centers, through the use of stationary bicycles and treadmills. Both pieces of equipment have been designed to regulate the intensity of exercise as well as duration. When positioning equipment toward blank walls, televisions, video displays or magazine stands are often provided in close proximity. It is preferable to position equipment toward a good view.

d. Handball and squash courts are included in only the most extensive fitness centers because they are an extremely large facility for relatively few



Wall Street Journal
 May 2, 1978 1:5
Profits Move Over
 Deseret Pharmaceuticals,
 Inc. has six exercise
 bicycles strategically
 placed at its Sandy,
 Utah headquarters for
 use by its 2,000 employ-
 ees. The firm's co-found-
 er gives cash incentives
 to employees who diet.

few participants. Basketball courts are included only in large facilities, because of the space requirements.

e. Clocks, timers and meters which monitor performance must be located in close proximity to exercise equipment. Writing surfaces should also be accessible so that entries to progress charts can be made conveniently. Computer terminals may also be used for recording exercise performance. The terminals may be located near individual activities or in a bank near the locker rooms where progress charts are stored.

The ability to monitor progress is essential to supporting participation. Staff for reviewing progress and following up on performance of employees is an important component of a successful program. The staff should be highly accessible to the participant, so that direct contact can be made easily.

In one program, progress cards are color coded to indicate the cardiac risk or capacity of an employee. Tee-shirts indicating physical fitness capacity have also been used to provide an incentive for continuing participation.

f. The range of individual exercise equipment included in a fitness center stresses cardiovascular



Wall Street Journal
February 19, 1978 1:5

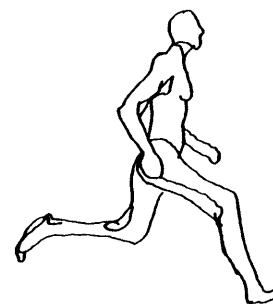
Fitness Finance: Employees of Hospital Corporation of America, Nashville, receive \$2833 in bonuses for exercising in a company fitness program. They were paid four cents a mile for bicycling. 16 cents a mile for running or walking and 64 cents a mile for swimming. It's part of an experiment in containing health insurance costs.

and skeletal muscular conditioning. The apparatus one would find more frequently include: treadmills, stationary bicycles, resistance conditioning machinery and/or weight-lifting equipment, rowing machinery, universal gym equipment, and Nautilus gym equipment. Hydra-gym equipment, a new concept based on hydrodynamics is also beginning to appear in new facilities. In general the dimensions of the equipment range for stationary bicycles and treadmills is 4'x8' to the larger units of Nautilus equipment at 6'x8'.

Determining equipment mix is based upon a percentage of the total number of male and female employees.

Women prefer lower body toning exercises and men, upper body toning exercises. The determination of equipment by sex is linked to the physical differences between men and women perhaps more by reason of advertising and fashion than by physiology.

An individual's use of circuit equipment is prescribed by an exercise physiologist who can determine a desired level of activity based on the results of the screening phase. This diagnosis may specifically indicate the frequency, intensity and duration of exercises on particular pieces of



Wall Street Journal,
April 18, 1978. Page 1.5
Jogging The Mind. A
University of Wisconsin
psychiatrist says em-
ployers should encourage
jogging among its employ-
ees to help relieve on-
the-job depression. Jog-
ging was found to be just
as effective as psycho-
therapy in treating
moderate depression.

equipment, or the individual may select among activities provided the cumulative effect coincides with the desired level of conditioning.

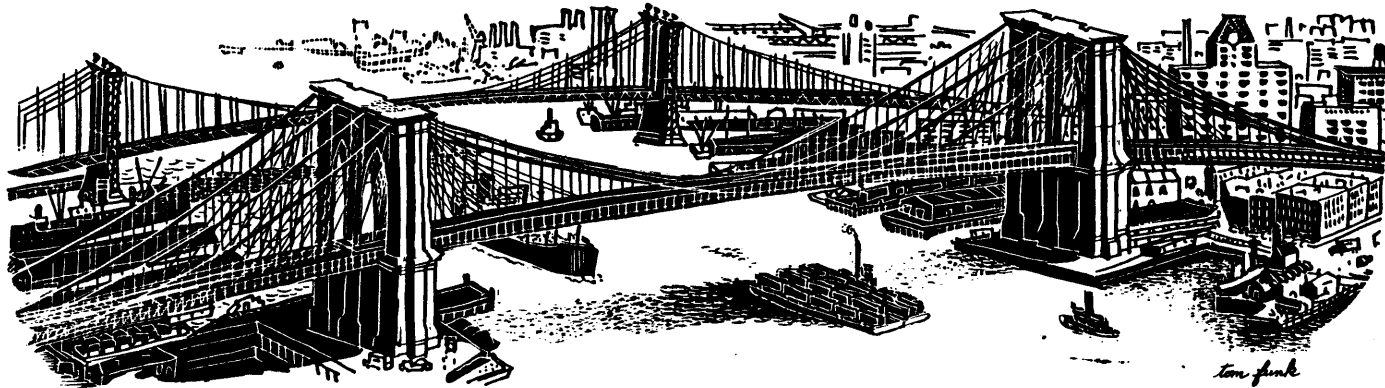
The physical plan of equipment in the facility should be coordinated with the progress charts that individuals use to record performance. This will insure, to some degree a reasonable progression in terms of exercise for the individual and spatial continuity for circulation. This coordination of progress charts and physical plan should not prohibit free movement to all activities, however.

g. In an evaluation of the Canadian Fitness pilot program the participants rated the use of music as a very important feature of contributing to the program's success¹⁷. A good sound system and acoustic barriers are essential.

h. Full length mirrors within the exercise areas are standard equipment. The reflective qualities contribute to ambient lighting levels.

i. The inclusion of saunas, whirlpools, tanning booths or steam baths is controversial. Saunas and whirlpools have been included in a number of fitness centers although the cardiovascular condi-

tioning effect of these particular facilities
cannot be demonstrated to satisfy their inclusion
in the architectural program.



B. Ancillary Spaces

1. Locker Rooms

The locker room is a key component to a fitness facility. With lockers individually assigned, the participation rate seems better than in facilities where no lockers or unassigned lockers are provided. In organizing a fitness center, one may elect to decentralize locker facilities to serve activity areas. Surveillance of access to locker rooms is essential, to insure the security of valuables temporarily stored while participants exercise.

The organization of lockers involves the separation of public and private realms, clean and soiled linen, and wet and dry areas.

a. Public-private realm:

The locker primarily functions as a private place to disrobe. The entry, accessible to the major public path should include enough of a transition zone to provide a visual lock into the changing area, as well as link to the laundry which services participants with exercise clothes, towels etc. An access point to the activity area should also be provided to prevent crisscrossing of street-clothed and exercise-clothed participants.

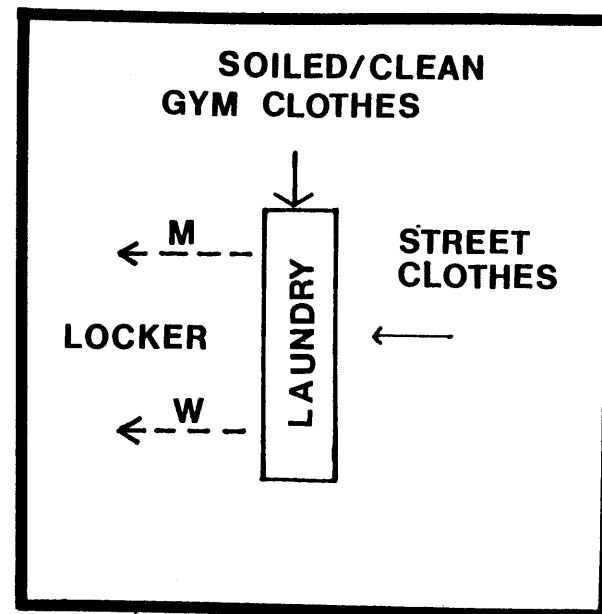
Wall Street Journal
May 5, 1978 1:5
Profits Move Over - Physical Fitness Becomes a Big Corporate Goal
And at San Francisco's Public Advocates all six lawyers and twenty-five clerks run. "We're a small poverty law office without a retirement fund or stock options, but we do have a shower and a locker room--that's essential," says attorney Sid Wollinsky.

b. Clean and soiled clothes

Upon entering or leaving the locker area several transfers take place.

A participant will pick up exercise clothes, etc., hang up his/her coat in a vestibule, and proceed to the changing area. Upon leaving, the participant will deposit soiled exercise clothes into hampers and pick up his/her coat and exit. The location of the laundry will facilitate this transfer if located at the entry to the locker area. Where there are multiple locker rooms, chutes or hampers should be provided or hampers in proximity to the entry for easy collection by laundry attendants.

A coordinated system of lockers and net laundry bags has been used in several fitness centers. Essentially, the locker number is indicated on a small metal disk which is fixed to a net bag. When laundry is clean, the attendant will hang the bag on a similarly numbered peg board near the entry. The participant, upon entering, goes directly to the board and picks up the appropriate bag. Upon leaving, soiled clothes are put back into the net bag and deposited in a chute or hamper which goes directly to the laundry. The laundry attendant then deposits the entire bag



into a washer and dryer and then back onto the peg board when complete.

c. Wet and dry areas

Upon completing exercising a participant will enter through the activity access point of the locker and disrobe, in a small changing booth (3'x4') and proceed to the showers. If saunas are included in the program, they should be located directly across or next to shower stalls. The route to the showers should be distinct from the route through the locker room so that water will not create a hazard on locker room floors, or wet dry clothes.

The number of shower heads for educational facilities is 10 heads for the first 30 persons and 1 head for every 4 persons, the recreational standard is 1 shower for every 10 lockers, the fitness center uses 1 for every 100 employees.⁹

2. Staff Offices

The position of offices for instructors or the fitness director should be in direct view of the activity areas. It is crucial that supervisory personnel have an unimpaired view of exercise areas to insure the participant's welfare using intricate exercise equipment.

VII PROGRAMMATIC CONSIDERATIONS

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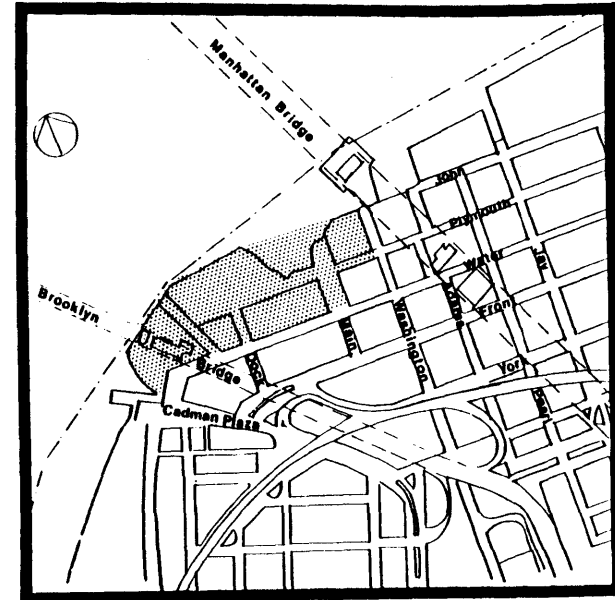
In developing the architectural requirements an appraisal of existing facilities was conducted to assess site conditions. The site summary, 18th and 19th century history and 20th century history of the site give some background to understanding the physical context of the design work.

A. Site Summary

1. Slope - 4%, considered flat
2. Soils - landfill adjacent to sandy silts
3. Water - mean tide of 4'2"
4. Climate - 55°, winds from the northwest off the East River
5. Air - high levels of particulate emissions due to overhead traffic from Brooklyn and Manhattan Bridges and subway trains traversing Manhattan Bridge. Dense truck traffic on local streets.

B. Site History

A boat, the Brookland Ferry, was established in the mid 1700s at the foot of the site, Main Street, and continuously crossed the East River to the lower Manhattan financial district until the 1920s. The connection between Manhattan and Brooklyn was necessary because of Brooklyn's



STUDY AREA

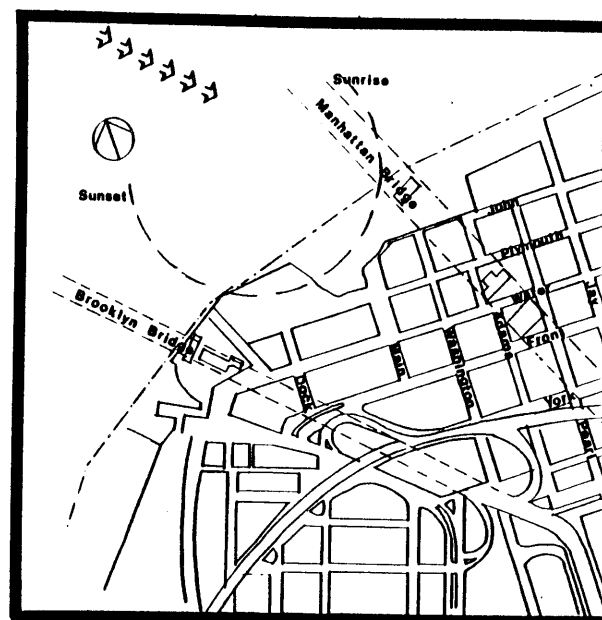
suburban advantages and flat land that hosted the homes and farms of a thriving immigrant population.

The institutional connection between Manhattan and King's County as Brooklyn was known, was formalized in 1898 when Brooklyn was incorporated into the City of New York.

In the period between the 18th and 19th century the development of shipping and railroads constituted the economic mainstay of northeastern business life and the Fulton Ferry was happily located in the heart of these two important activities. In 1833, the Brooklyn Bridge was completed and commercial life in the site ended as commuters were routed over the site on the approach to the bridge.

In 1840 the area adjacent to the dock landing on Main Street was landfilled, priming the area of construction. In 1850 the first stage of the Empire Stores were built. In 1869 a fire destroyed the area surrounding the Stores, and may have also been responsible for the two-story structure (in which the fitness center is proposed). In 1878 the buildings on Water Street were expanded and in 1855 the five-story buildings were completed.

In construction documents from the period, an agreement was struck for party walls 24" thick, a



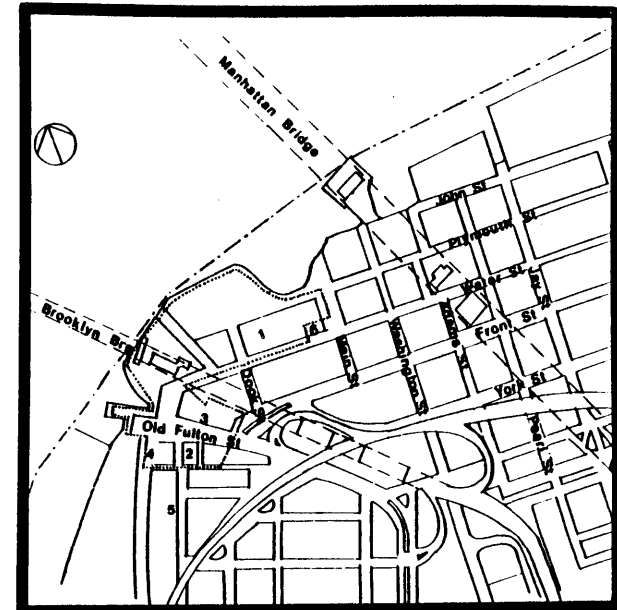
NATURAL CONDITIONS

Sun
Winds

peaked roof, and a brick cornice with iron shutters over arched openings. For their time, the Stores were considered enormous, although by today's standards they are dwarfs compared to the surrounding industrial complex. Raw materials, coffee, beans, animal hides, grains, sugar and molasses from Africa, South Africa and Cuba were warehoused in the Stores.

One of the nostalgic elements of the site that can be evoked from longtime Brooklyn residents is the memory of the aroma of freshly-ground coffee one would smell upon crossing the Brooklyn Bridge. It was also possible to smell cinnamon and other spices stored in adjacent warehouses. Even today, on a walk down Water Street, the spice cleaning and drying houses function, although on a much smaller scale.

In terms of physical association, structures of similar scale and style are more prevalent directly across the East River on the New York shore. The Fulton Street Fish Market and the South Street Sea Port was soon to be developed as a 19th century commercial historic reuse tourist attraction, such as Faneuil Hall. The Empire Stores, however, are not included in that development plan, and the question arises of the

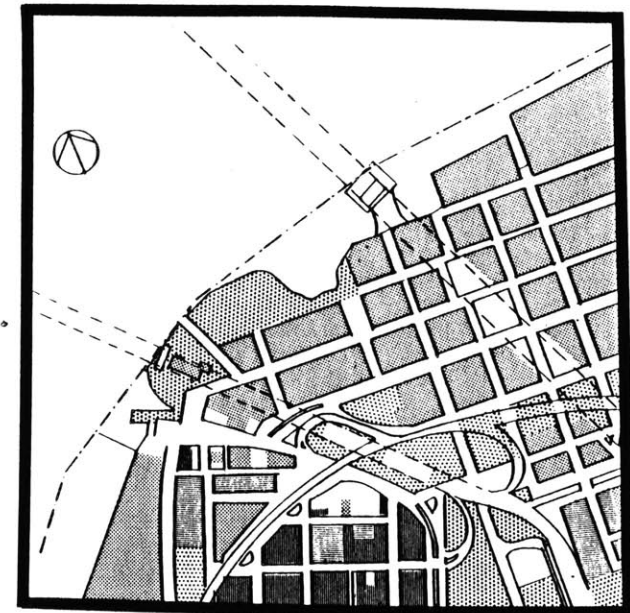


FULTON FERRY HISTORIC DISTRICT

- 1 Empire Stores
- 2 Eagle Warehouse
- 3 Fulton Street Frontage
- 4 Brooklyn Railroad
- 5 48 Columbia Heights
- 6 85 Water Street

appropriate and compatible reuse for the Stores.
C.

In 1963 Consolidated Edison, a major utility for New York, purchased the Empire Stores, with the intention of demolishing the structures and siting an electric generating station. In 1967 a proposal for relocating the Atlantic Avenue Meat Market was entertained but declined when local opposition was voiced from Brooklyn Heights residents. In 1971 a proposal for a commercial center was made, but sufficient support was lacking and the proposal was dropped. In 1974, the Empire Stores were listed in the National Register of Historic Places. That same year, a proposal for a Maritime Museum, with library, administrative space, meeting rooms and a mix of museum galleries and commercial space was made. The proposal was dropped until 1977 when the New York City Board of Estimate approved the designation of the Fulton Ferry Historic District. A developer who had plans for a commercial and recreational area which had been enthusiastically received by the Community Board had begun negotiation with Con Ed for the buildings. However, with the historic district designation, the value of the property in the 1970s fell from \$1,000,000



LAND USE

- Industrial** 
- Residential** 
- Open Space** 
- Institutional** 

to \$750,000 because of the constraints on re-development. Con Ed sold the Stores to the State Office of Parks and Recreation who now own the Empire Stores.

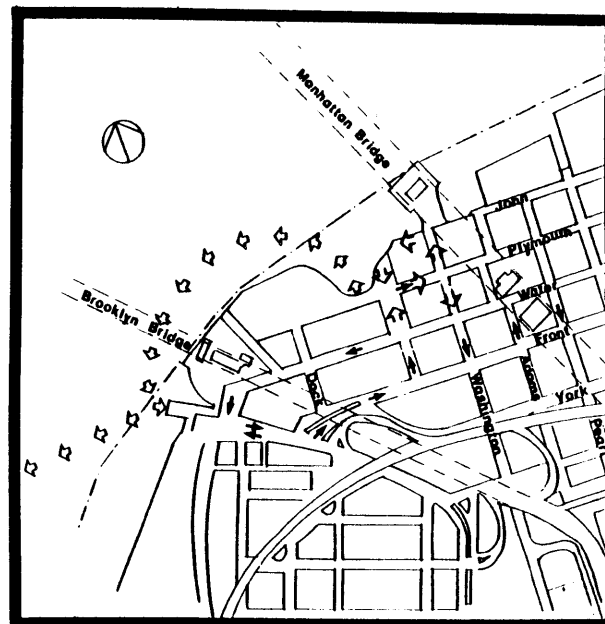
In this modern history of the area, the stage for future development has been set by the proposal solicited by the New York State Urban Development Corporation.

The State proposed to develop the area as an urban cultural park. In June 1981 their solicitation indicated that they would entertain a mixed use facility provided that the developer pay all land preparation costs, use the Landmarks Commission guidelines for reuse, make payments in lieu of taxes and arrange private financing.

The buildings surrounding the Empire Stores, particularly the buildings constituting the Gair Industrial Complex, became extremely important in considering the future prospects for the site.

The controversy to be mediated in the future revolves around the use of the Gair Buildings. Should they remain as industrial buildings or be converted into residential use?

The political backdrop unfolding during the writing of this thesis prevents an answer to this question. This thesis however, is based on the

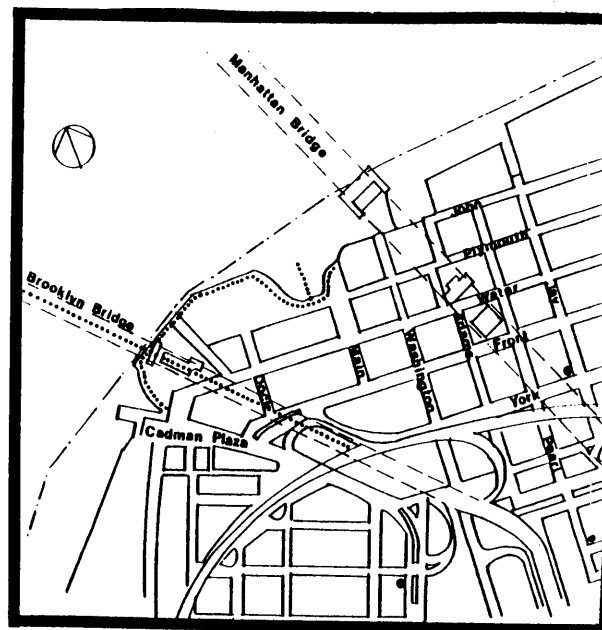


TRANSPORTATION

Existing Traffic Flow
Proposed Traffic Flow
Proposed Ferry Link



assumption that the industrial users will remain in the Gair buildings, and that a fitness center will serve to enhance the desirability of the area and support location of new industrial and manufacturing interests. Public access to the waterfront is also a concern that was a priority in the design phase.



PUBLIC ACCESS

Pedestrian Promenades
Subway Stations •

VIII ARCHITECTURAL PROGRAM

A. Site

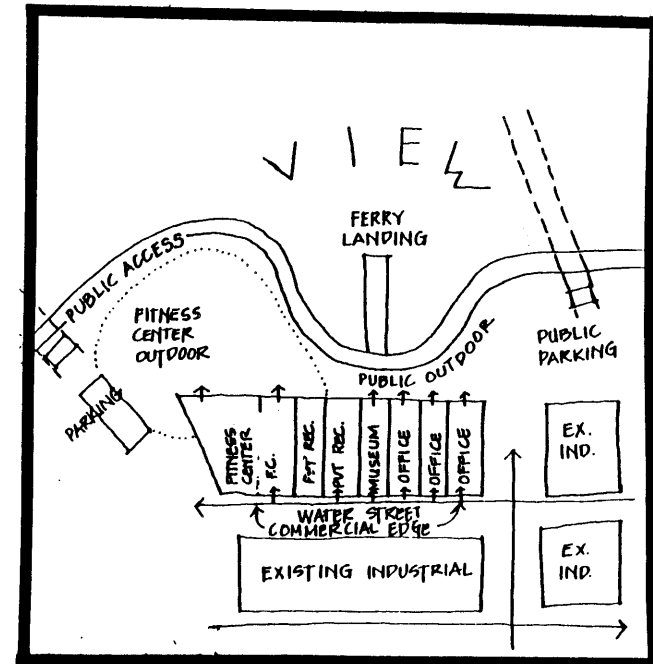
1. Public Outdoor Facilities

- a. Bi-level waterfront promenade for jogging and walking at elevation-2', and cycling at elevation-3' Connection of existing Fulton Ferry Park, Brooklyn Bridge Anchorage, proposed naval museum ferry landing and Manhattan Bridge anchorage (24 x 2000)

48,000 square feet

Continuous sea wall defines public path and includes exercise stations for jogging path and landscaped sitting areas

- b. Recreation pier connecting to (32x128) 4,100
 naval museum (48x190) 13,700
 and outdoor garden for naval artifacts display (48x96) 4,600
- c. Snack bar and boat house at elevation-3' 500
- d. Public ground for vendors or public events, fairs, exhibitions, celebrations includes area for cafe at elevation-3' 14,000
- e. Short-term parking overlook to lower Manhattan skyline, Statue of Liberty,



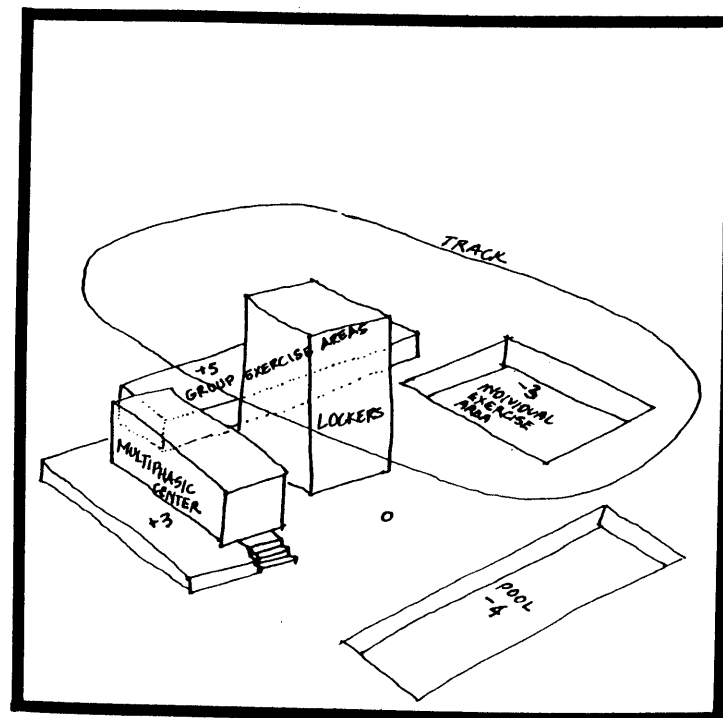
SITE DIAGRAM

Governor's Island and Upper New York Bay (21 spaces)	3,600 square feet
f. Parking	
(i) 3 landscaped bays dimensionally suited for alternative use as tennis courts (78 spaces)	24,00
includes ground for snow removal from roadways	
(ii) general parking (47 spaces)	16,900
B. <u>Empire Stores</u>	
1. Retail Facilities (ground floor, Water Street)	
a. Restaurant (river view, ground floor)	5,000
b. Restaurant (river view, roof)	5,000
c. Bar-noisy	2,000
Bar-theme	2,000
Bar-good view	2,000
d. Pro shop, book store	1,500
e. Drug store, soda fountain	1,500
2. Private Recreational Facilities	
a. 12-lane bowling alley	14,250
b. squash and racquet club	28,500
3. Office Space	
Cooperative administrative core, serving satellite office space	134,460

- 4. Light industrial space suitable for warehousing, or gallery space 67,230 square feet
- 5. Fitness center 54,300
- 6. Naval museum 17,500
 - a. display area
 - b. gift shop
 - c. office space
 - d. educational facility

C. Fitness Center

- 1. Multiphasic testing center 4,860
 - reception and waiting area
 - staff offices for consultations
 - secretarial area and records
 - nurses station and storage
 - examination rooms
 - changing rooms
 - conference room
- 2. Indoor facilities
 - a. swimming pool
 - (6 lanes, 4' deep) (48x144) 6,912
 - b. individual exercise area/multi-purpose area (60x100) 6,000
 - c. large group exercise area (80x32) 2,560
 - d. small group exercise area (60x32) 1,920
 - e. running track (12x587) (9x 1mile) 7,044



FITNESS CENTER DIAGRAM

f. staff offices (5 at 8x10)	400	square feet
g. lockers (including laundry)		
(2 male + 2 female)	9,216	
h. health food bar (48x64)	3,072	
i. solarium (192x24)	4,608	
j. roof exercise area (96x80)	7,680	
	<hr/>	
	54,272	
k. parking - indoor (existing		
Purchase Building) (100 spaces)	35,840	

3. Outdoor Facilities

a. ice skating rink (elevation 4')		
including snack bar, ice clearing		
bulldozer garage, rental pavilion,		
and overlooking balcony which con-		
nects to public promenade (144x24)	34,560	
b. 12 platform tennis courts (128x192)	24,576	
c. garden (64x96)	6,144	
d. outdoor activity area for		
structured classes (128x96)	12,288	
	<hr/>	
	77,568	square feet

RATIONALE FOR THE DESIGN WORK

The Site

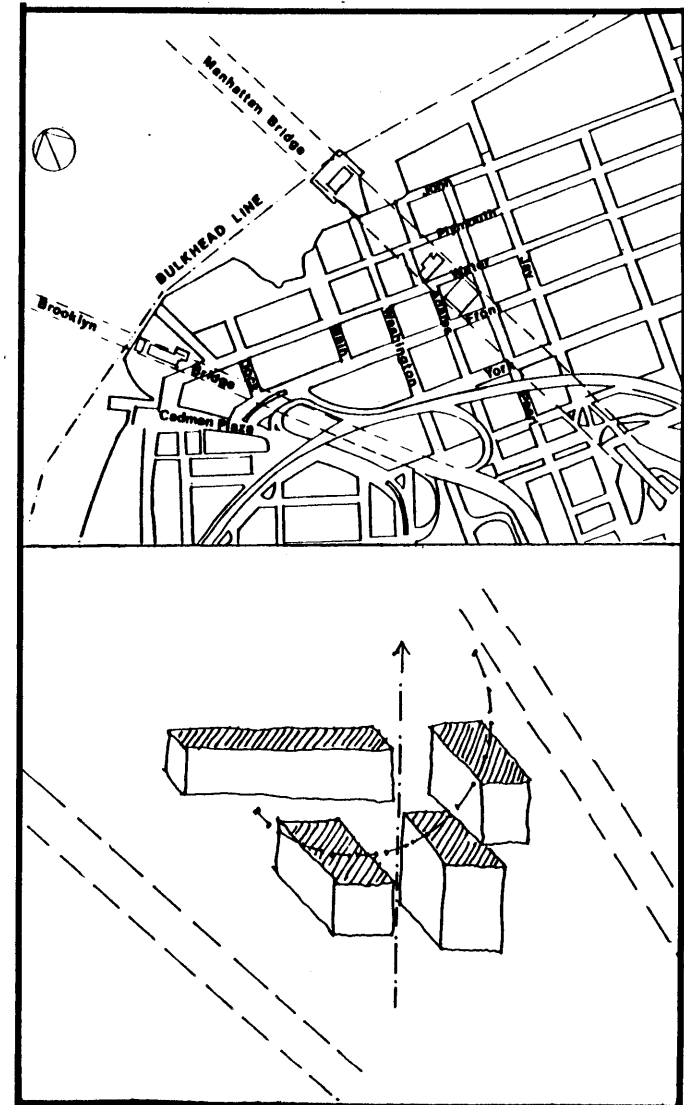
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The aspects of the site which were considered in the placement of activities included:

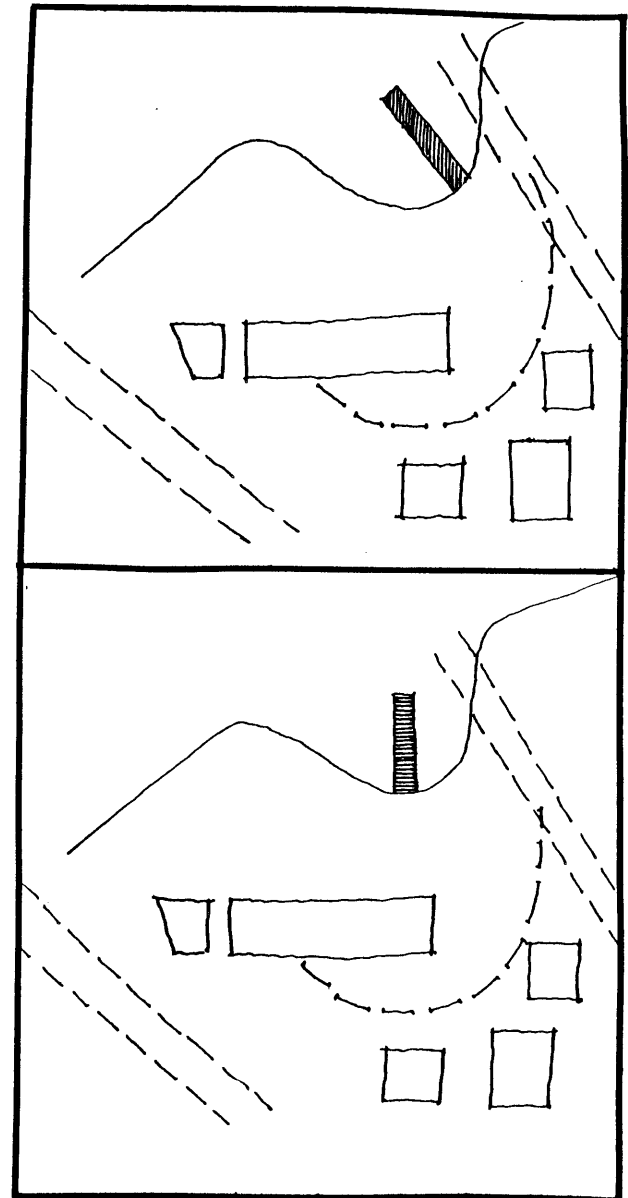
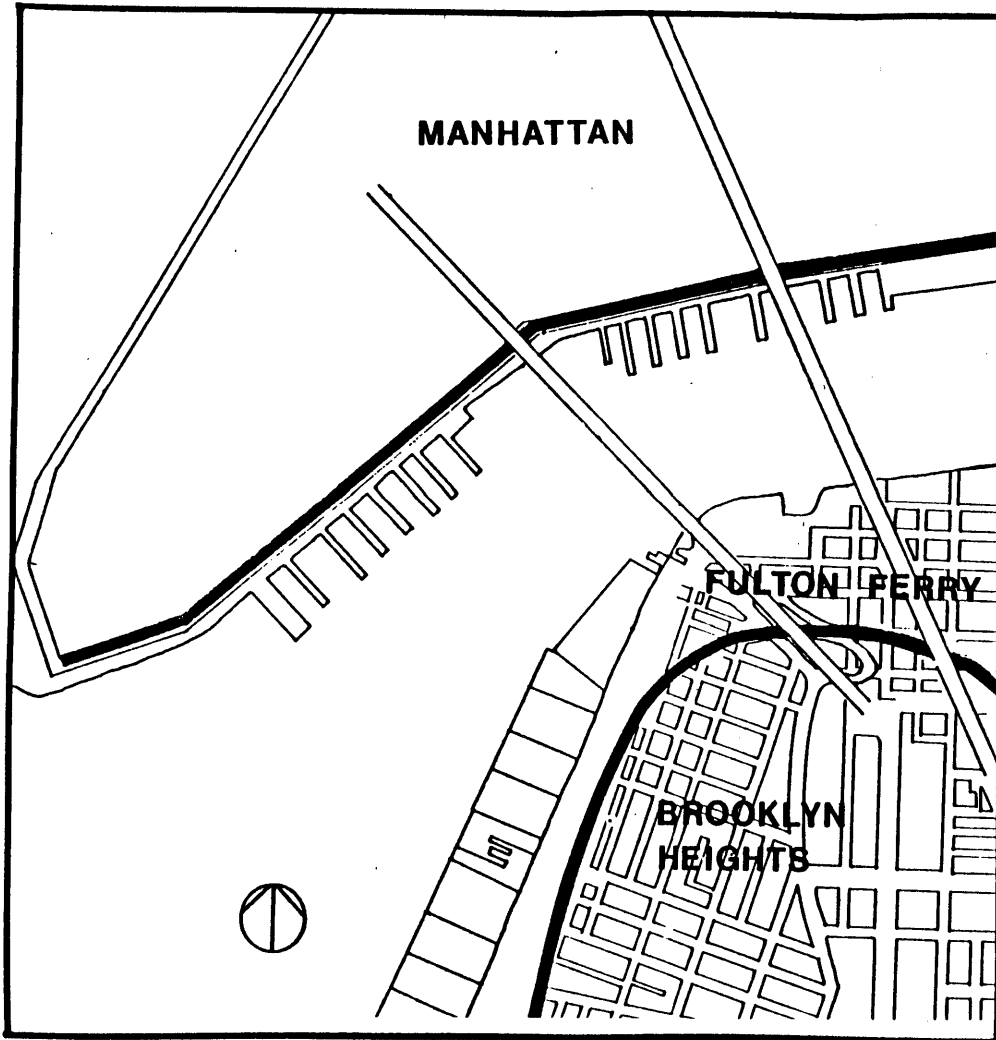
1. The shoreline of the East River as a public amenity;
2. The direction and the elevations of the bridges crossing the East River;
3. The dimension and use of the surrounding buildings;
4. The nature of traffic on the site;
5. Relation of the nature of fitness center activity to prevailing industrial activity.

The major direction of the site is east-west moving with the East River. The roadbeds of the bridges diagonally intersect the site and the Brooklyn Bridge serves to frame the views from the site to lower Manhattan. The height of the surrounding buildings cluster at the southeastern corner of the site at Main and Water Streets, and form a cup. This cup coincides with the widest street, Main Street, which is the major way into the site.

The bulkhead line establishes how far out into the water one might build. The pier which might have



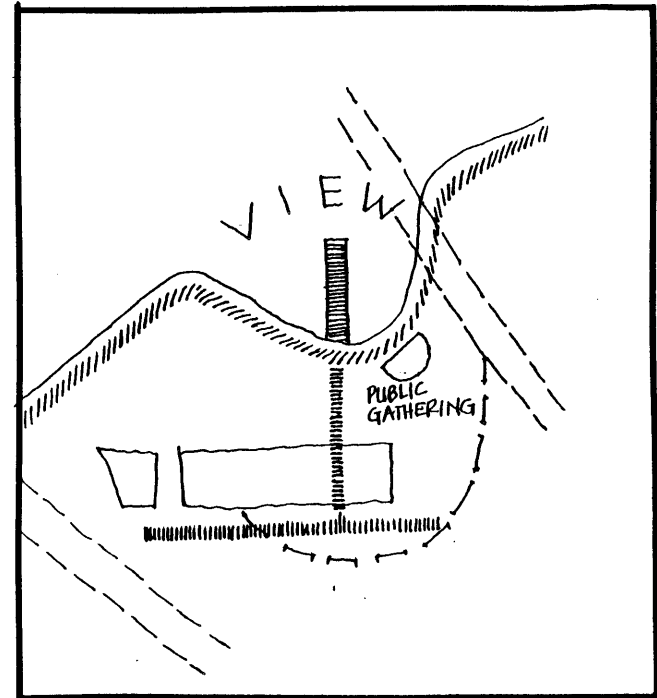
otherwise been planned to take advantage of this cup and diagonal direction of the bridge, in fact is designed in correspondence with the prevailing vocabulary of perpendicular piers along the shoreline.



The depth and shallowness of the shoreline in relation to the Empire Stores northern walls created several opportunities where placement of public or private activities facilitated a continuous public access path along the shoreline.

Placing the fitness center to the west and public activities to the east was done to afford an area for commercial activity adjacent to the water's edge, parking, with controllable outdoor space for the fitness center, while simultaneously providing a public promenade along the shoreline, which begins at the existing Fulton Ferry Park and extends to the Manhattan bridge anchorage.

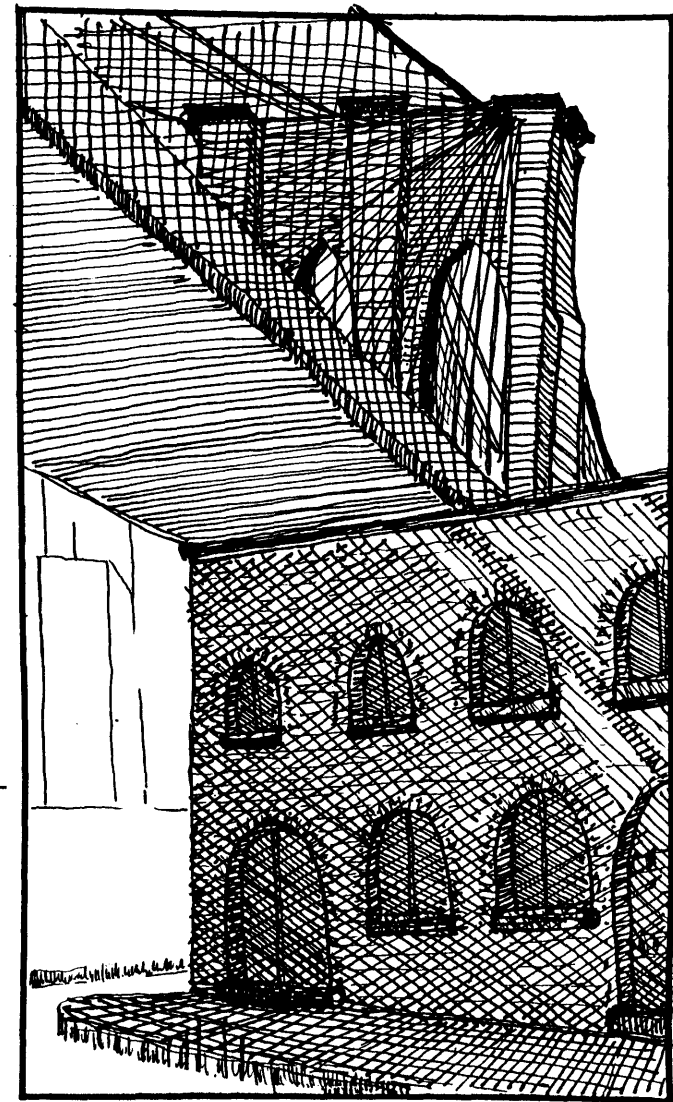
The museum is placed to provide a public facility whose circulation passes through the urban wall, created by the Empire Stores, to the water's edge. Locating the ferry pier at this junction provides a lateral circulation path which supports the activity along the promenade. Locating the public gathering area in the protection afforded by the height of surrounding buildings that make the cup links the ferry landing, promenade, museum, parking area and view to lower Manhattan.



The siting of the skating rink was made by analyzing site lines and the direction of the Brooklyn Bridge. The skating rink is an activity area not impaired by ambient noise. This consideration was particularly important because the grill roadbed of the bridge vibrates with traffic. The water's surface reflects some of this noise and the incipient hum of traffic makes an obnoxious environment for any outdoor activity. Skating, however, can be accompanied by music, thereby serving to camouflage the high noise level.

An early idea to use the Brooklyn Bridge roadbed as an horizontal reference level was explored and subsequently dropped. The running track included in the architectural program was more like a mountain climb if designed to reach the level of the bridge roadbed. A suggestion was made that the bridge in its dominating presence might, more usefully, be analogous to a sculpture, rather than a reference level. Thus, the bridge was something one could understand in the context without unduly restructuring the ground of the site. Thankfully, the bridge is as beautiful as it is, so the sculpture analogy seemed appropriate.

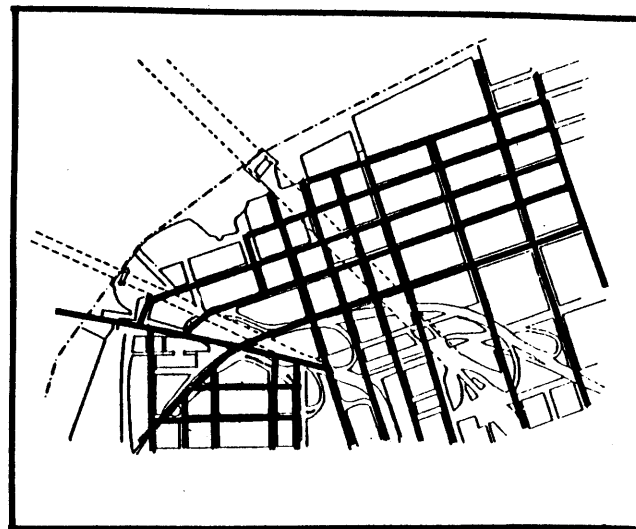
The medieval wall was the analog used for conceptualizing the site, whereby the industrial



activity was an uncontrollable force which could threaten the existence of the more natural setting near the water's edge. The continuous surface of Water Street strengthened the concept if one considered the prevailing street pattern and its movement down to the Empire Stores, where it stops. The continuous surface acts as the only force strong enough to stop the grid occupying the ground at the water's edge.

The joining of the two buildings to make one continuous wall, was part of the analog's impact in the design. The entrance to the fitness center is then understood as a gate.

Thus, the distinction between the nature of fitness center activity and industrial activity was built, by using the medieval wall as an analog. The design attitude essentially defends the natural environment along the river by use of the urban wall. A niched promenade wall along the shoreline sews the edge of the site in granite and cast iron grill



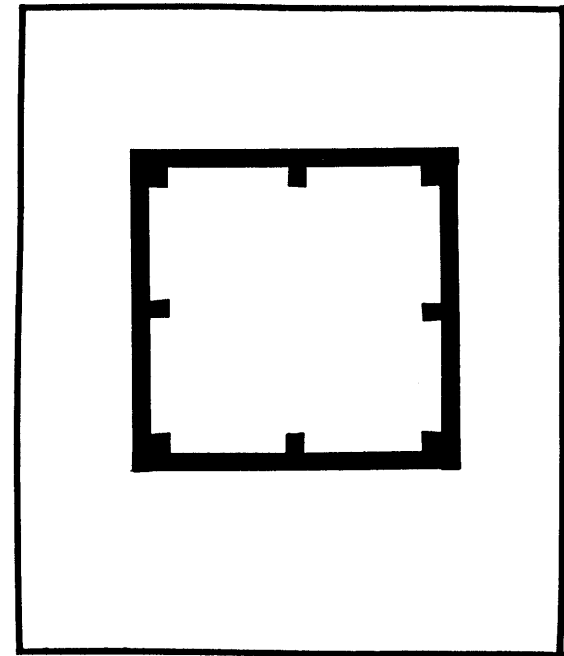
work and completes the physical definition of this little city.

The Fitness Center

Decisions made to design the fitness center involved consideration of the buildings' existing condition, their formal relationships and the differences in the site in terms of public and private attributes.

The columns within the fitness center attach to the bearing walls of the existing structure, to brace the walls.

This decision was made in consideration of the deteriorated condition of the walls. A structural analysis of the buildings, conducted by the New York State Office of Parks and Recreation, revealed that the existing wooden posts are supporting the structure and not the bearing walls, and that the building would need to be completely underpinned to prevent its collapse.



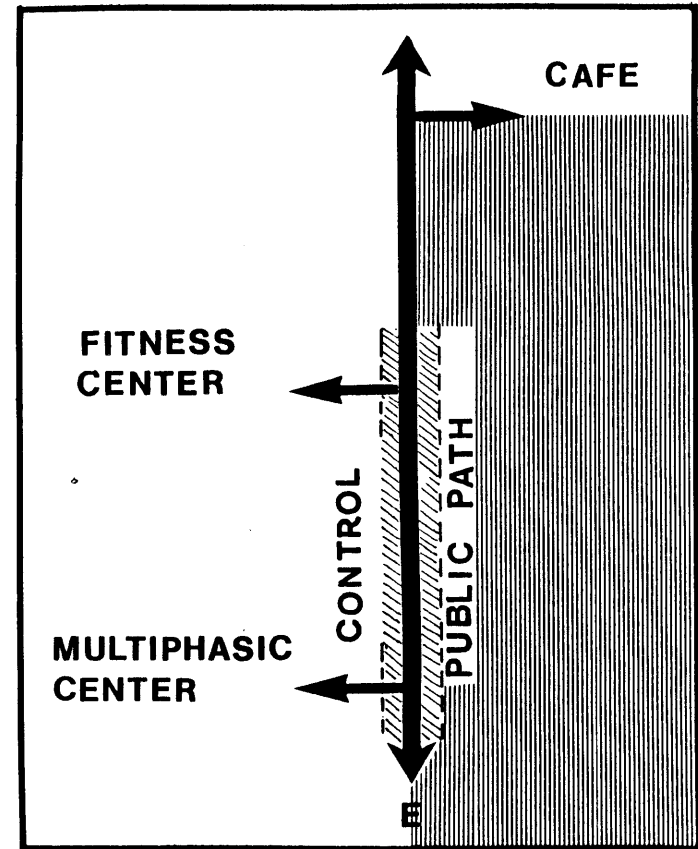
The placement of activities within the fitness center was based upon the different conditions of

the street and water edges. The multiphasic testing center located at the Water Street entrance was thought the most public activity. The fitness facility has lockers positioned at the control point of the entrance, laundry and vertical circulation, within the body of the building. A cafe is located at the private side, to afford an opportunity to move outdoors during warm weather.

One could understand the stepping of building heights as an indicator for where vertical circulation should be placed. The two-story building was thought the area for the beginning of vertical circulation because one might expect to climb up, using the shortest step first. The pair of stairs was used to afford the legal and programmatic requirement for separation of men's and women's lockers. In this instance, the stair is understood as a virtual extension of the plane of the wall and therefore moves in the same direction as the wall.

The second vertical circulation path within the exercise areas was placed relative to the dislocation of the two grids used to support the walls, and upper levels. One might expect to find a different activity at a dislocation of this sort.

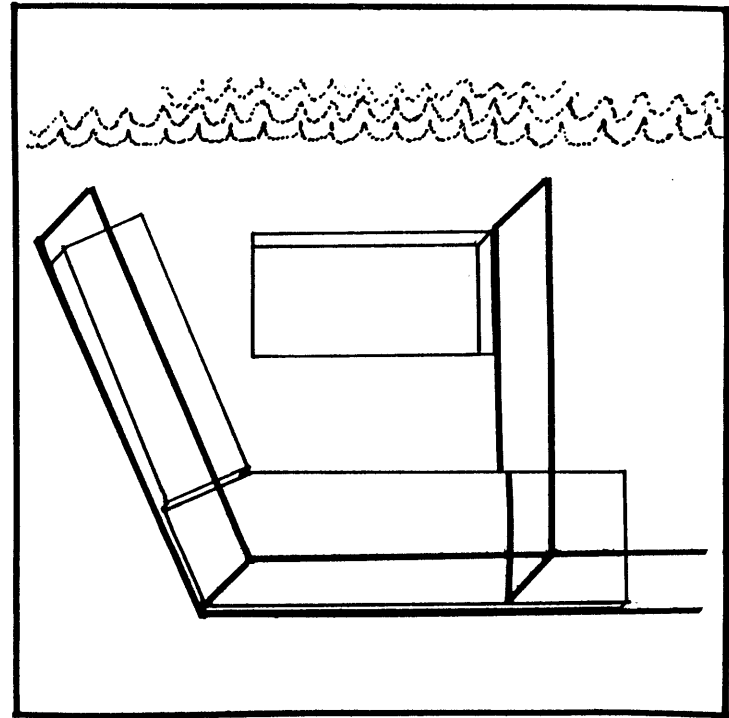
A third stair at the dislocation of the grades near the multiphasic testing center and locker rooms

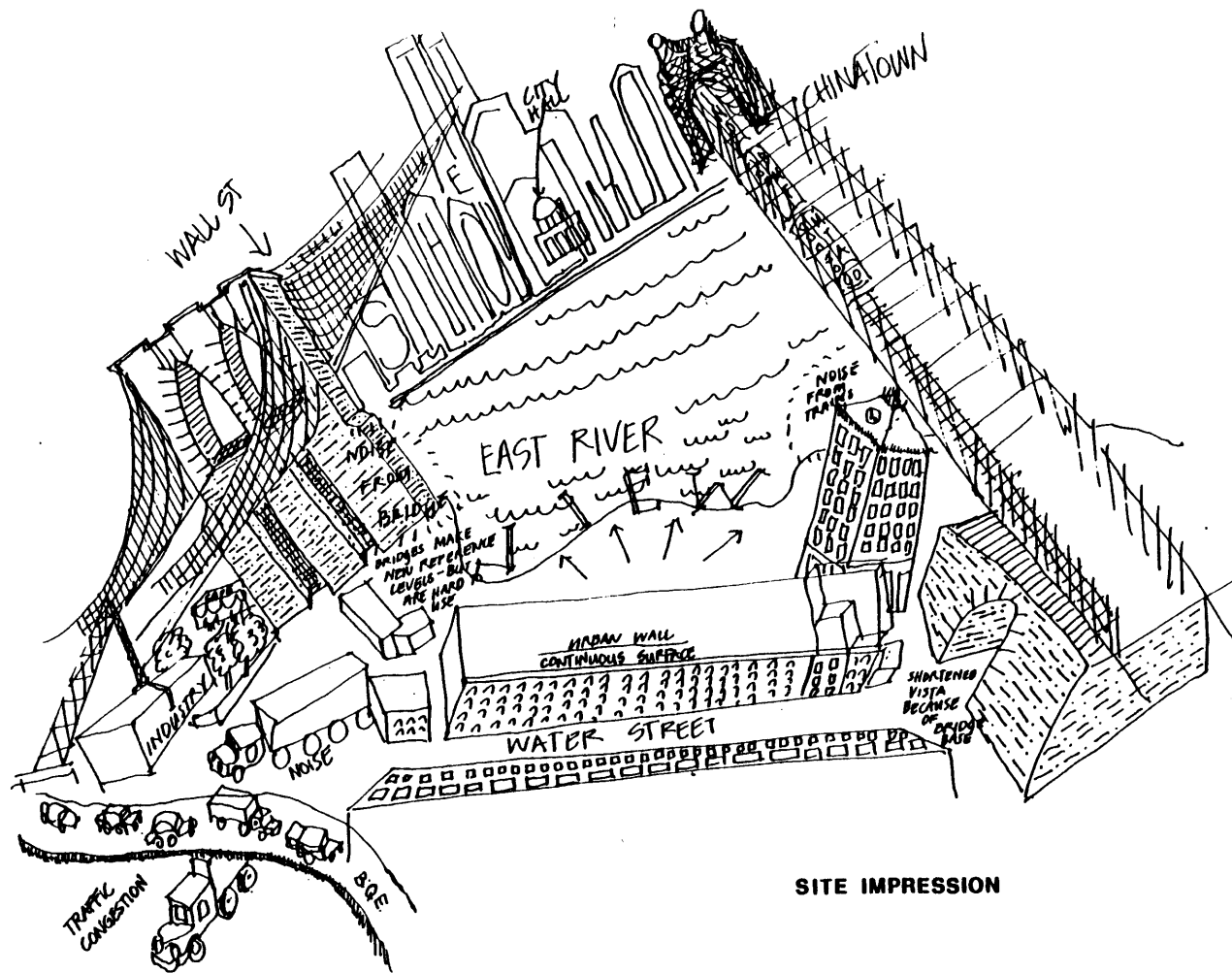


on the ground floor was considered and eliminated.

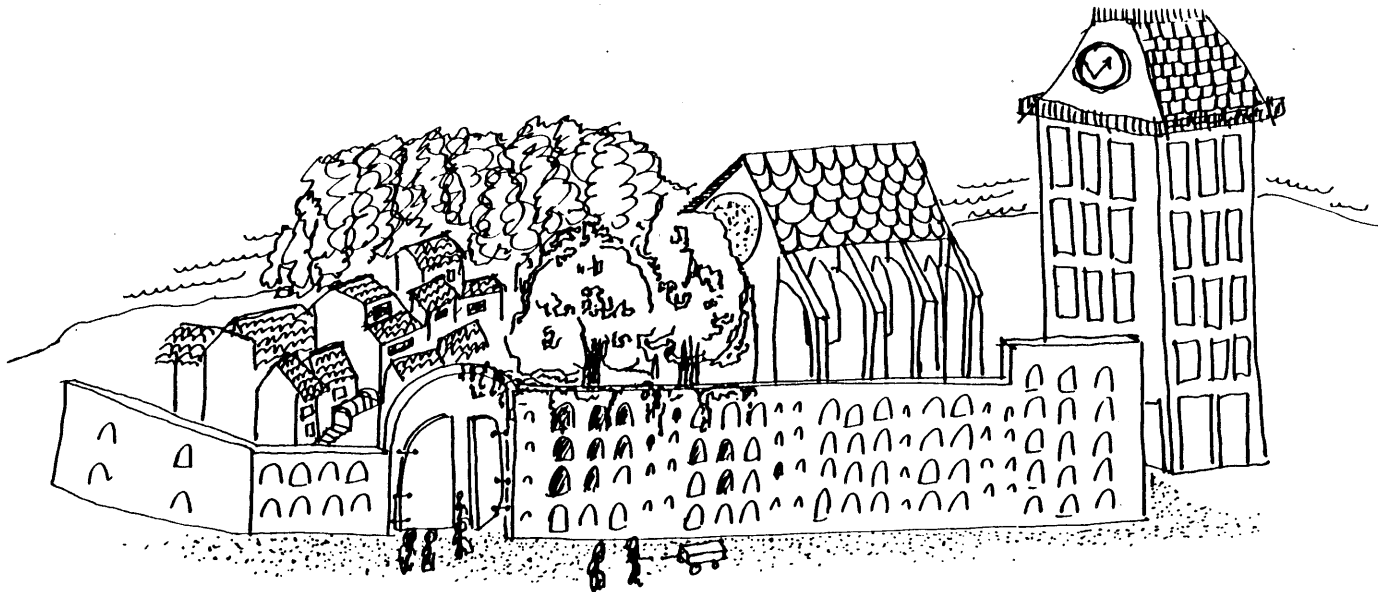
In general, decisions about levels within the fitness center were derived from the existing arched openings in the walls. Secondary ground form decisions were based upon understanding the direction of the walls and building to extend the outdoors on the interior. Therefore, the section builds along the Water Street wall and leaves the river side open.

The playpen analogy was used to conceptualize the variety of activities that can go on simultaneously in the same place.



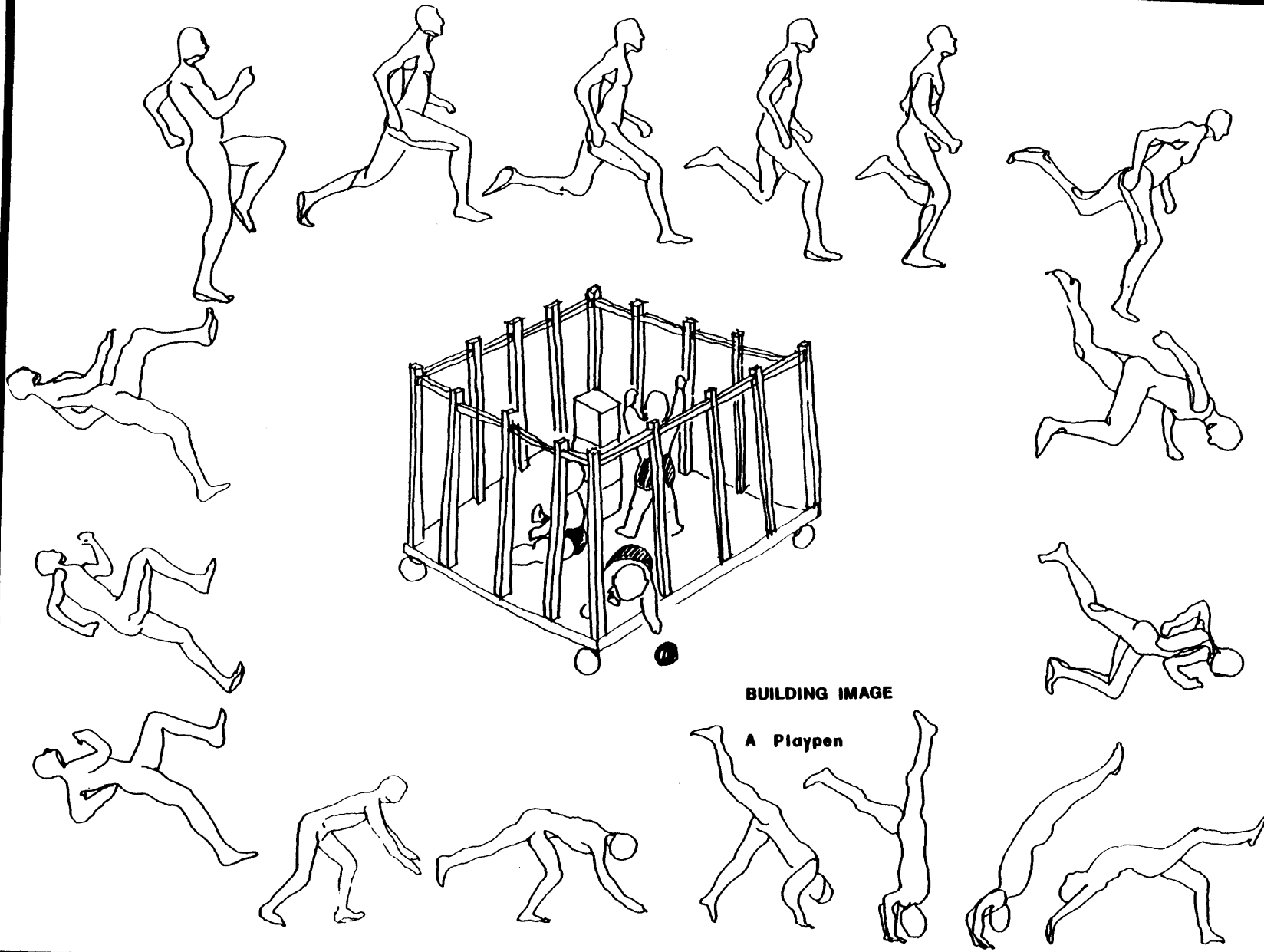


SITE IMPRESSION



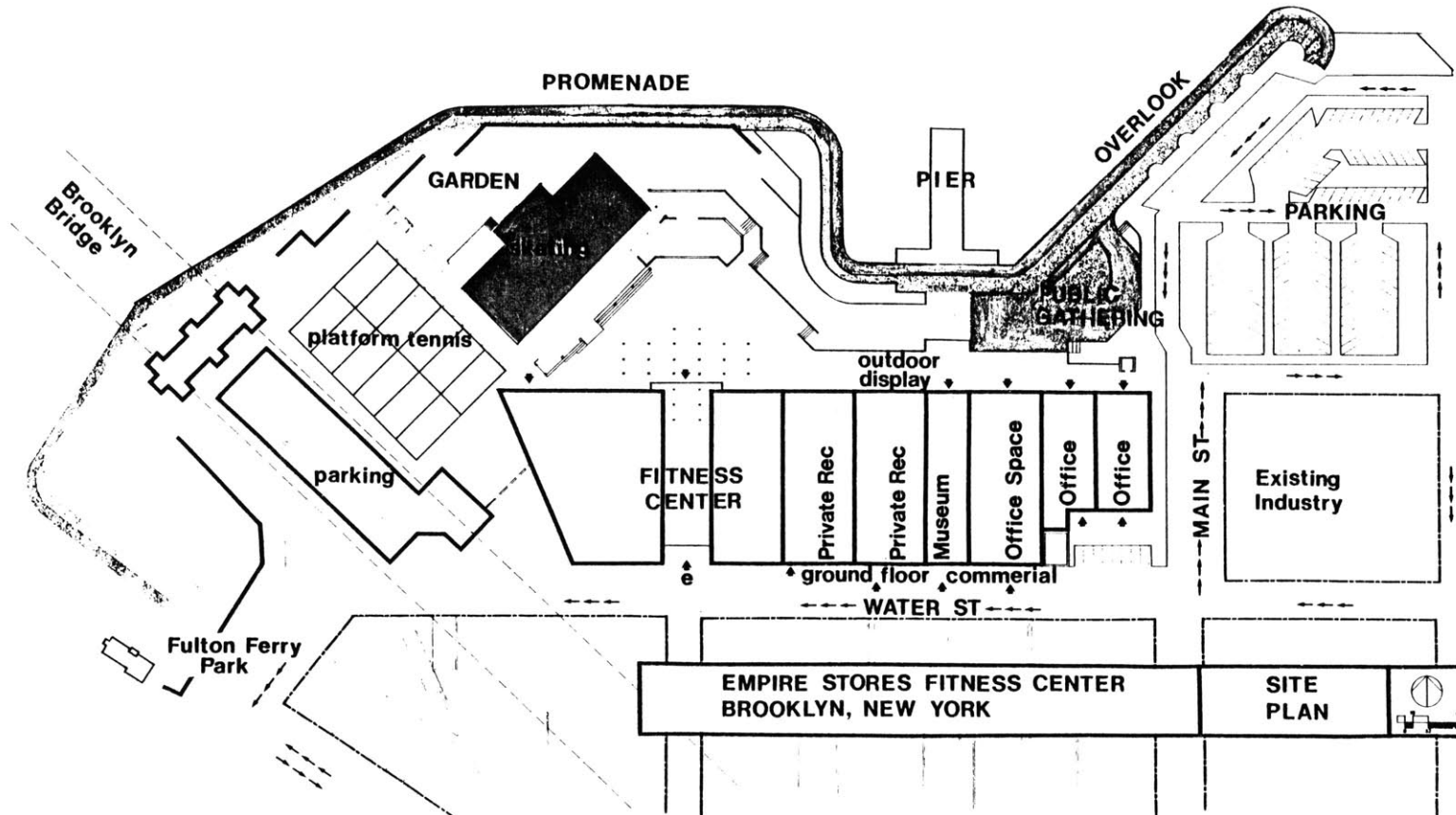
SITE IMAGE

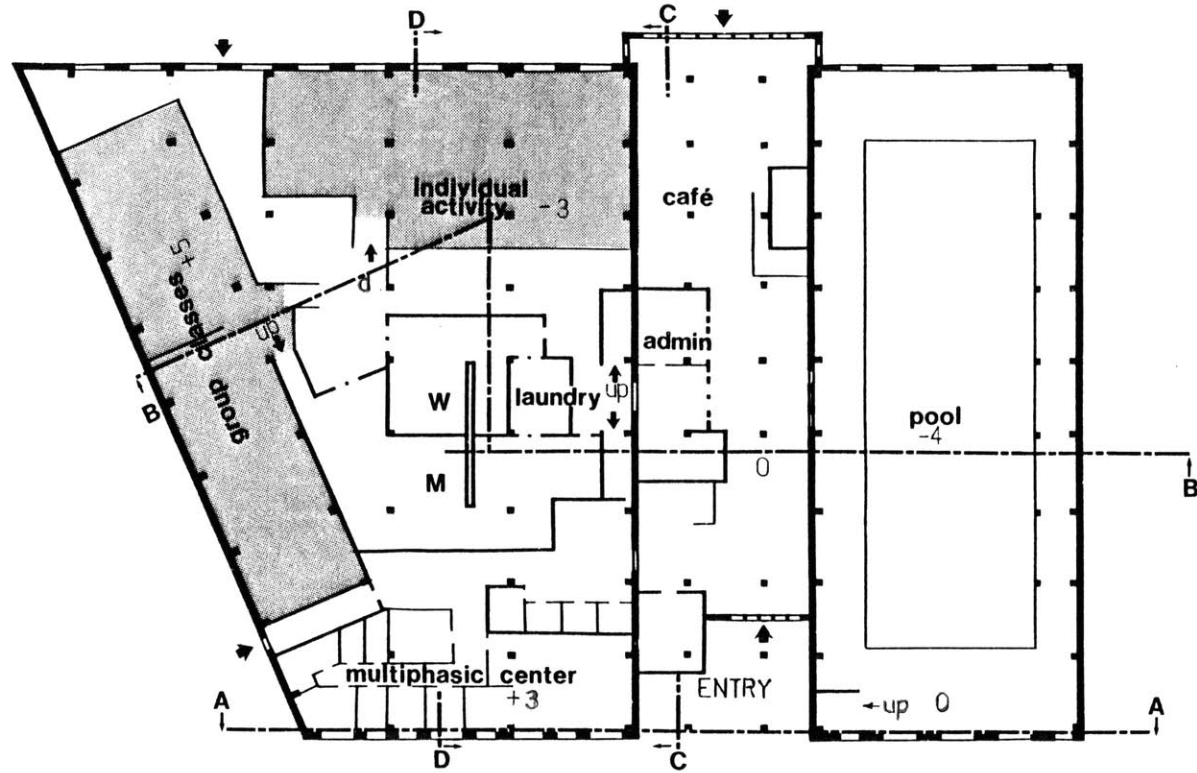
A Medieval Walled City

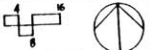


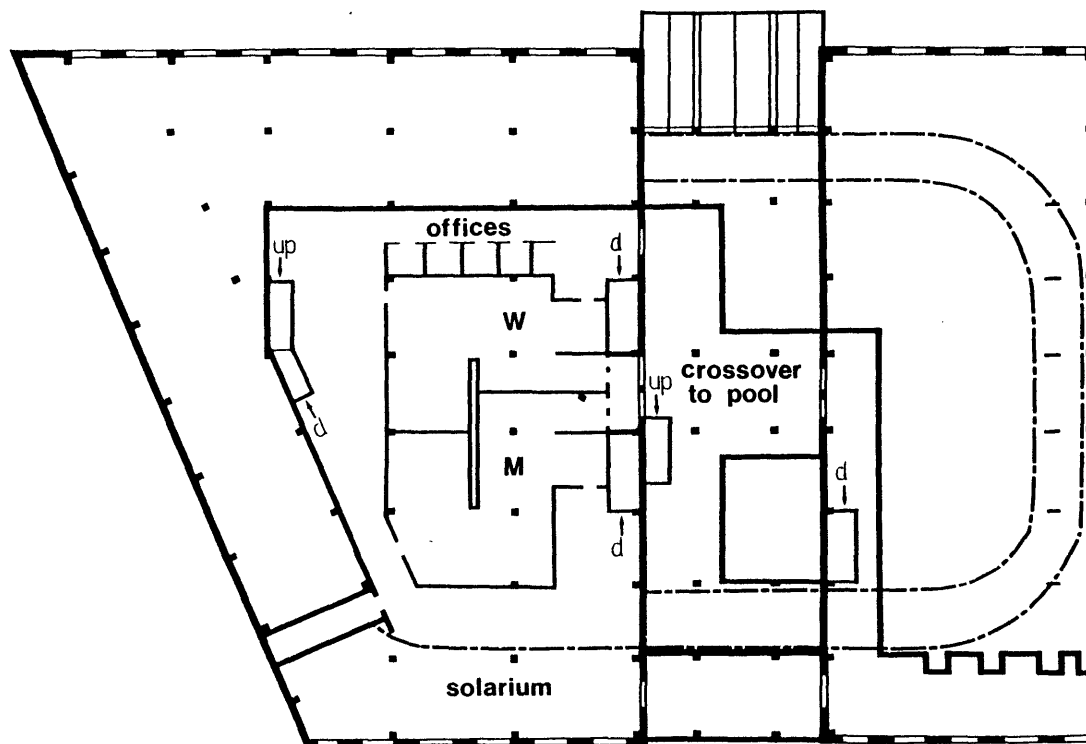
BUILDING IMAGE

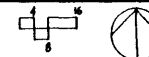
A Playpen

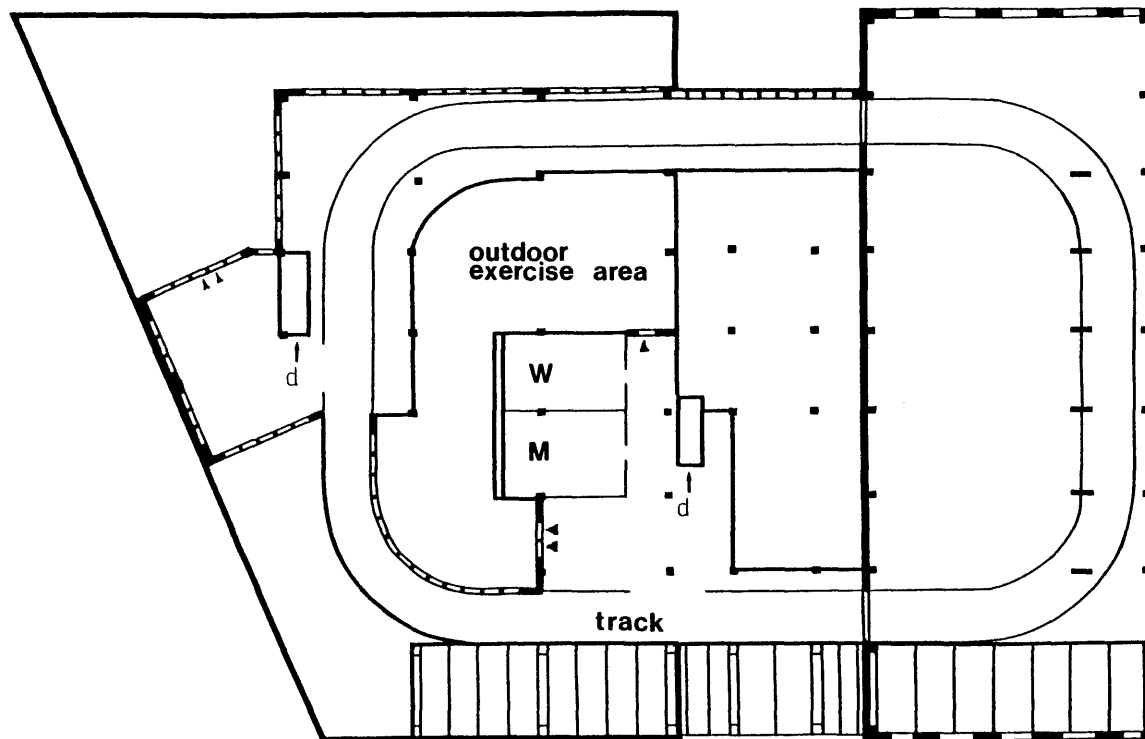


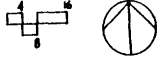


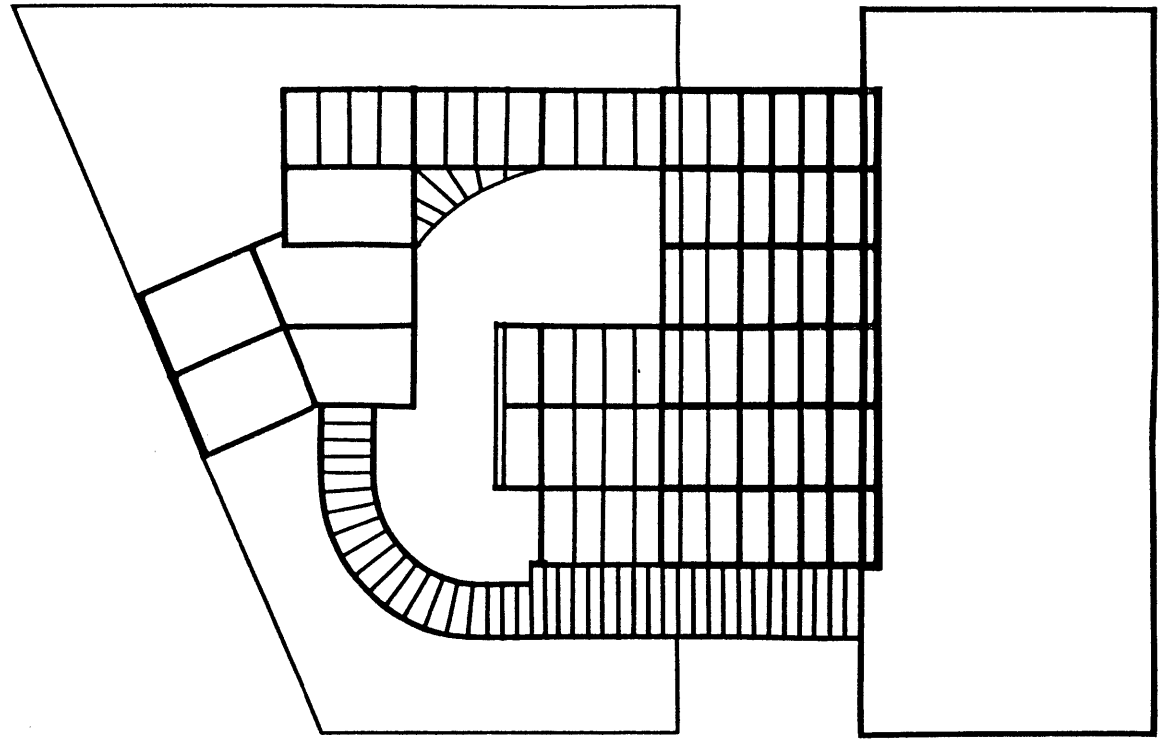
EMPIRE STORES FITNESS CENTER BROOKLYN, NEW YORK	FIRST FLOOR PLAN	
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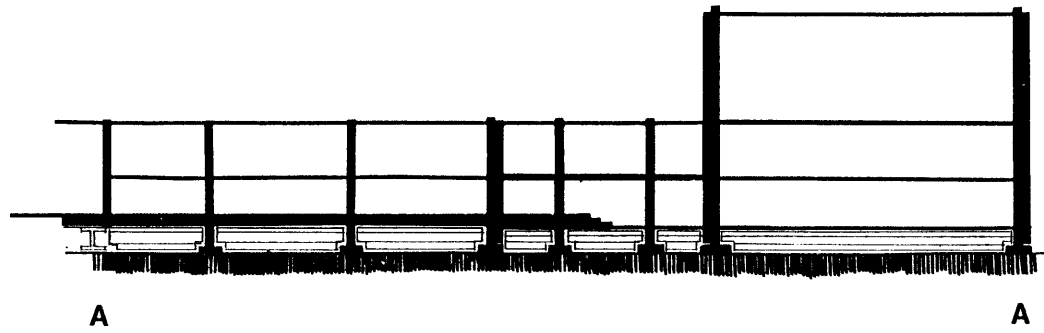
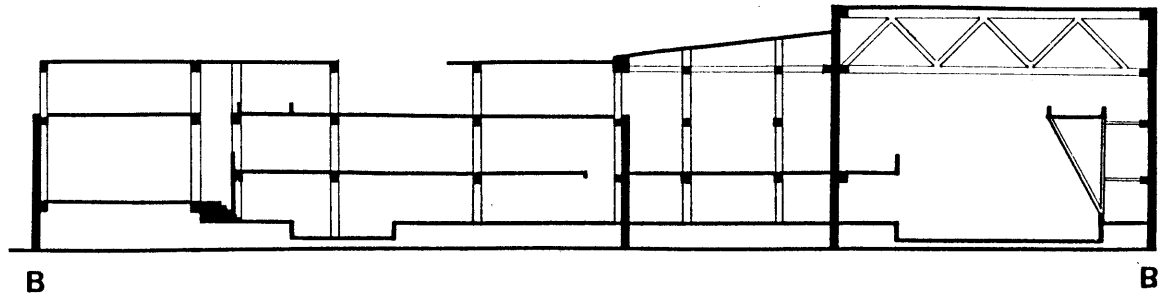
<p>EMPIRE STORES FITNESS CENTER BROOKLYN, NEW YORK</p>	<p>SECOND FLOOR PLAN</p>	
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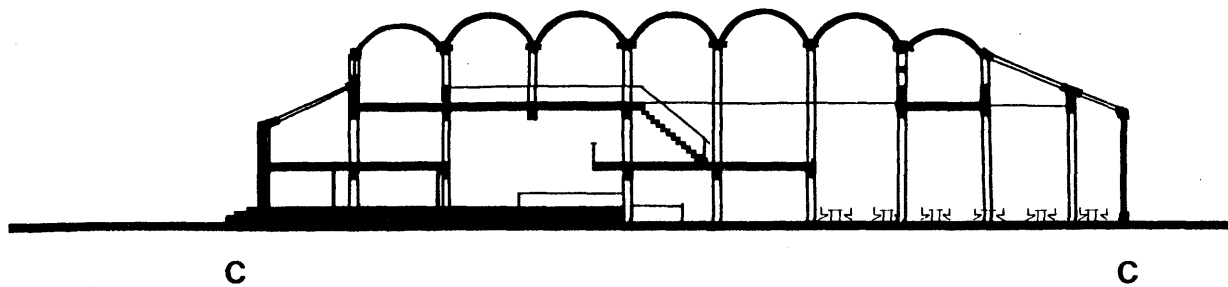
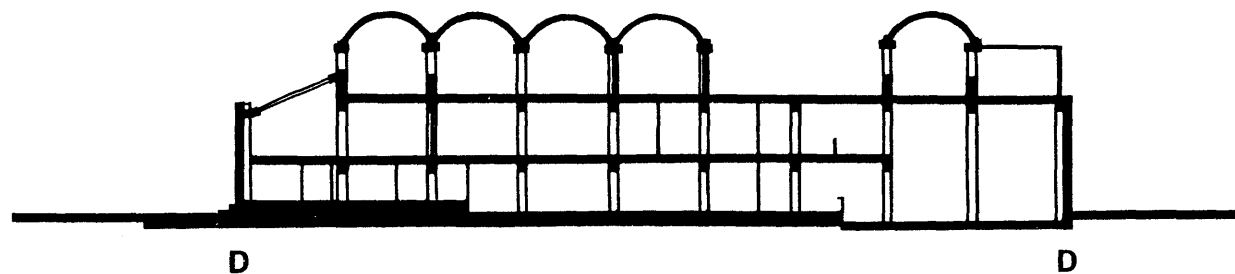
<p>EMPIRE STORES FITNESS CENTER BROOKLYN, NEW YORK</p>	<p>THIRD FLOOR PLAN</p>	
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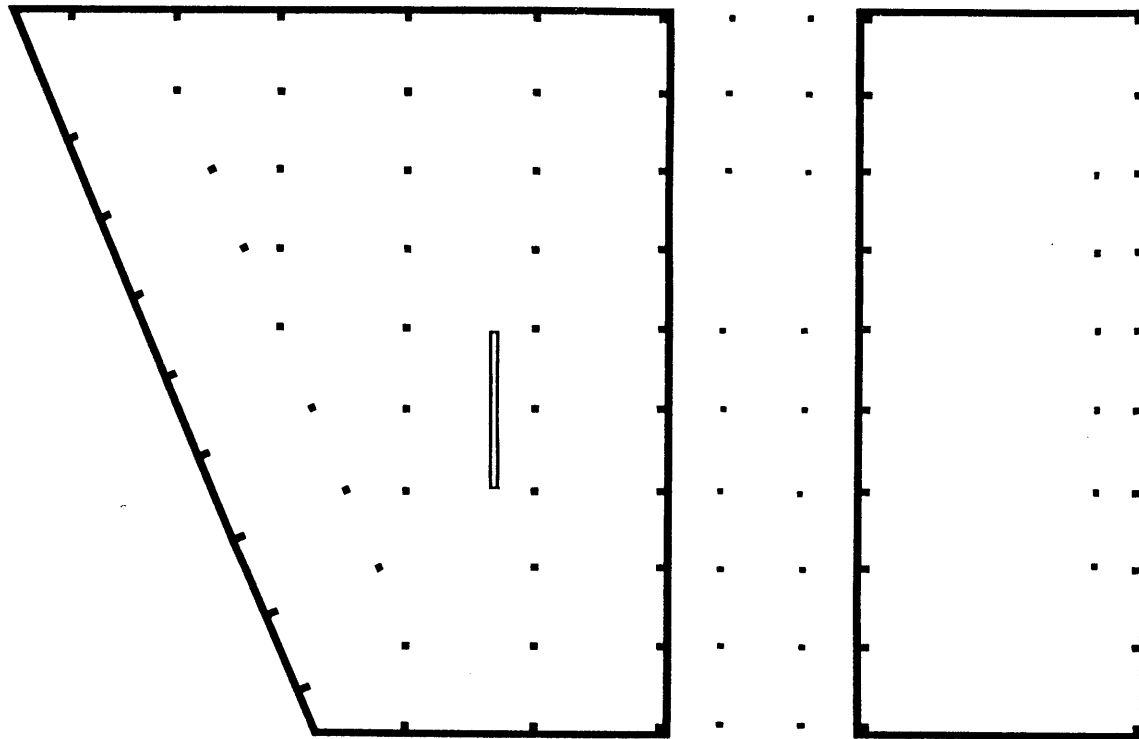
<p>EMPIRE STORES FITNESS CENTER BROOKLYN, NEW YORK</p>	<p>ROOF PLAN</p>	
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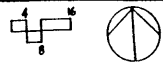


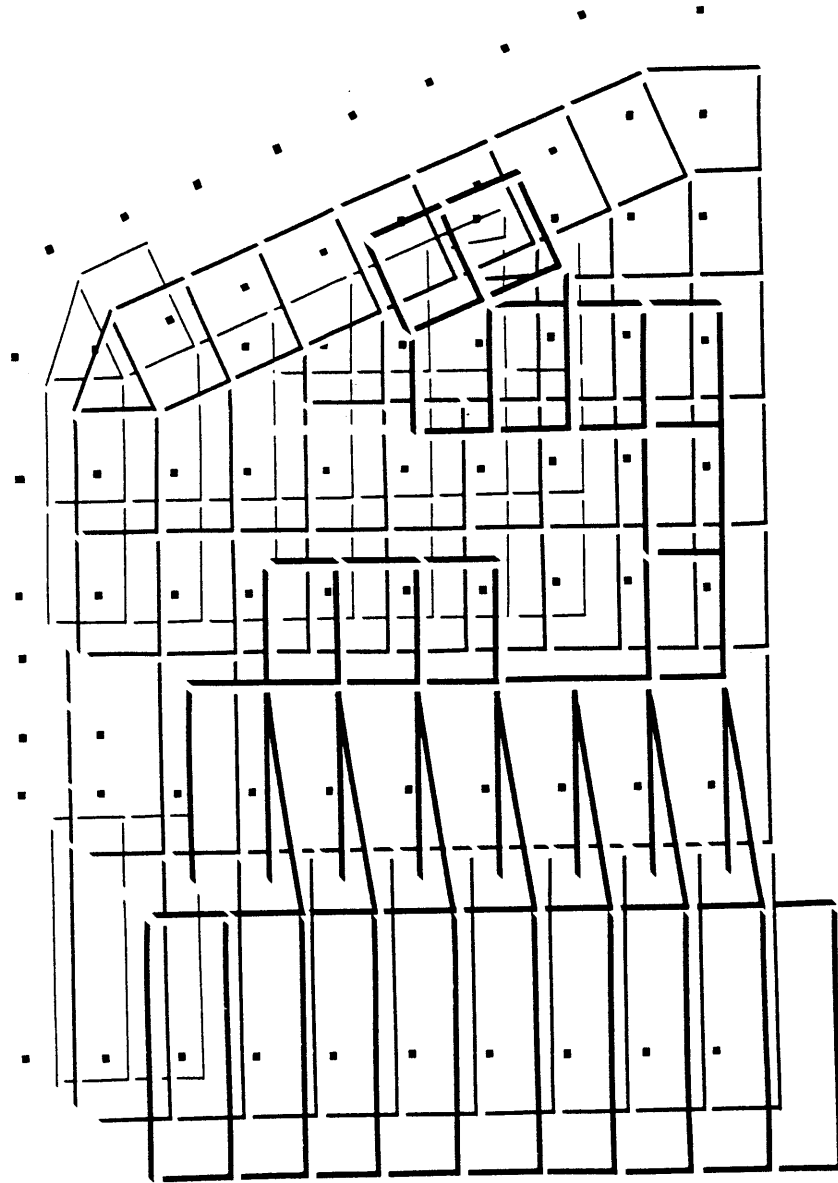
<p>EMPIRE STORES FITNESS CENTER BROOKLYN, NEW YORK</p>	<p>SECTIONS AA, BB</p>	
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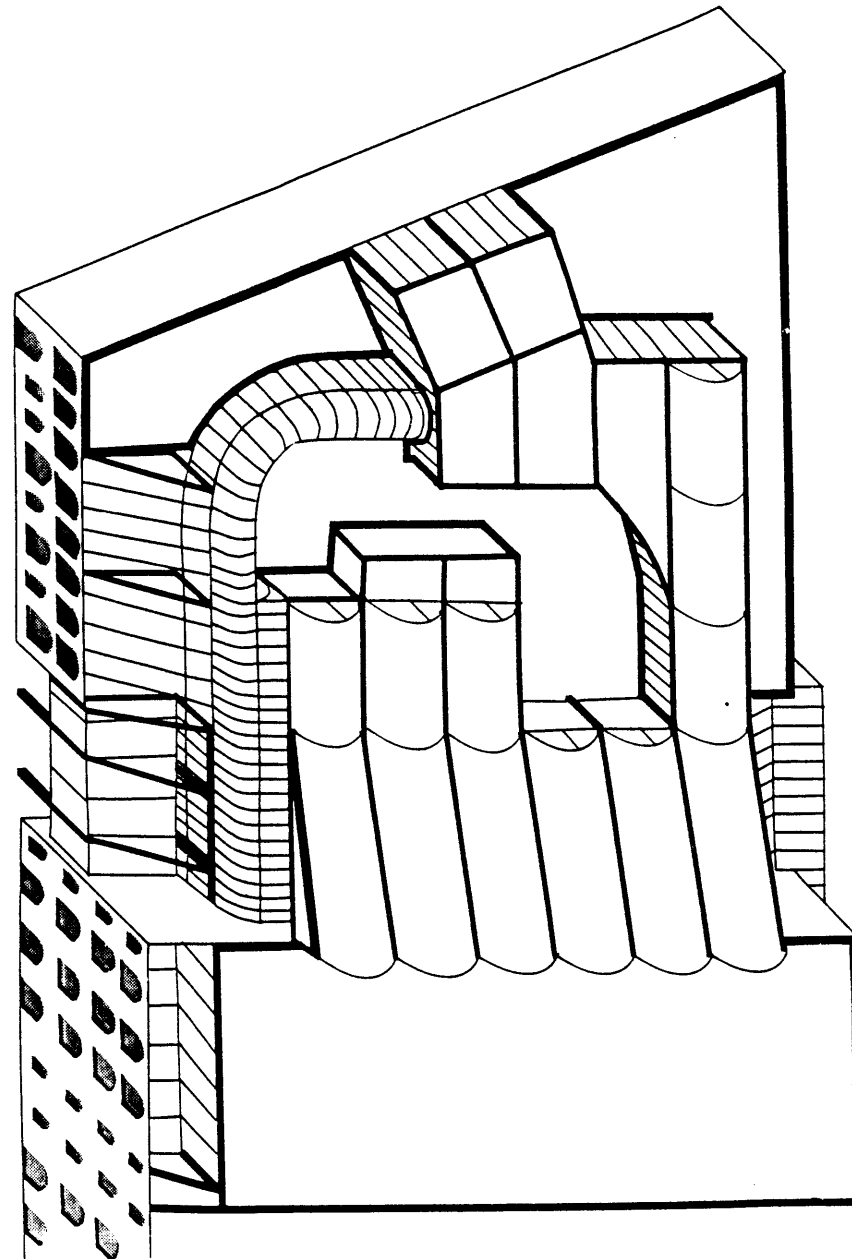
<p>EMPIRE STORES FITNESS CENTER BROOKLYN, NEW YORK</p>	<p>SECTIONS CC, DD</p>	
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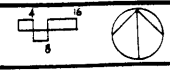


EMPIRE STORES FITNESS CENTER BROOKLYN, NEW YORK	STRUCTURAL PLAN	
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EMPIRE STORES FITNESS CENTER	STRUCTURAL AXONOMETRIC	
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EMPIRE STORES FITNESS CENTER	AXONOMETRIC	
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X OBSERVATIONS

70

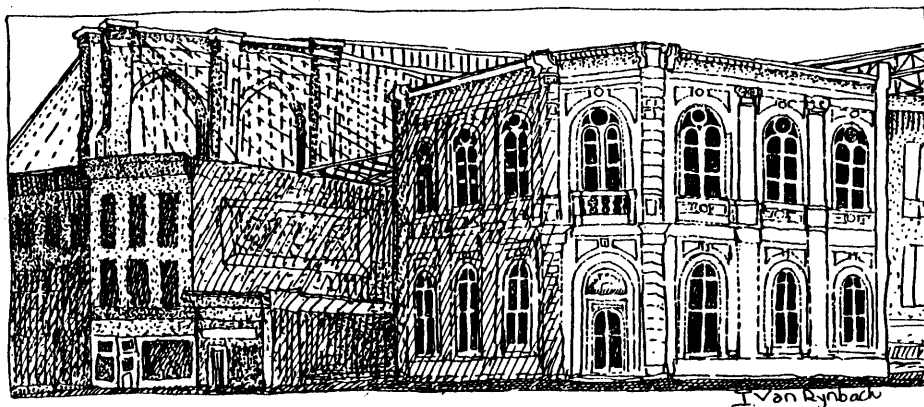
Collecting information to put this idea together was done with the spirit of discovery, rather than justifying the idea. The underlying issues concerning the development of such a fitness center provoked interesting questions, some of which are not strictly architectural..

One such issue centers around the rapid proliferation of these centers. Over time, could the demand for public recreation or health care decline, or will public dollars to maintain or build new parks, recreational centers, clinics and hospitals, diminish to such a degree that corporate fitness facilities operate to provide the only source of continuously maintained recreational and health care opportunities?

Within the realm of architectural research, the preservation aspects involved in the reuse of historical structures is of major concern. How much of an historic building must be preserved for it to maintain the dignity our society now awards to it, yet take on an active life today, earning its reputation through daily use?

The number of recycled historic buildings provides a huge resource. When analyzed, perhaps results may indicate that certain attri-

butes of style must be maintained for the sake of preservation, but that other architectural features can be given up without losing the building's historical significance. Enhancing its character in continuity with its previous life, as well as within a modern context provides a challenge both in technical proficiency and aesthetic sensibility.



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72

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