MASS. INST. OF TECHNOLOGY
OCT 10 1967
LIBRARIES

A HIGH DENSITY RESIDENTIAL COMPLEX AT INDIA WHARF

by Richard Jay Solomon

A thesis submitted in partial fulfillment
of the requirements for the degree of
Bachelor of Architecture

Massachusetts Institute of Technology
1967

RICHARD JAY SOLOMON

LAWRENCE B. ANDERSON
Dean of the School of Architecture

26 Surrey Street
Cambridge, Massachusetts

Lawrence B. Anderson, Dean
Department of Architecture
Massachusetts Institute of Technology

Dear Dean Anderson,

In partial fulfillment of the requirements for the degree of Bachelor of Architecture I hereby submit the written portion of my thesis entitled: "A High Density Residential Complex at India Wharf."

Sincerely,

RICHARD JAY SOLOMON

TABLE OF CONTENTS

Abstract 3

Section I, The General Problem 4

Section II, The Specific Problem and the Formulation of a Program 15

- The Site 18
- The Number of Units 21
- Building Heights 22
- The Population and the Dwelling Units 23
- Secondary Spaces 29
- Lobby and Corridor Spaces 29
- Miscellaneous Data Concerning the Dwelling Unit Complex 30
- Parking 30
- Retail 31
- Building Codes 32

Section III, The Program 33

Section IV, Visual Site Data 35

Appendix A 51

Bibliography 53

ABSTRACT

The purpose of this thesis is to design one thousand residential units and their associated spaces on a limited site at the Boston Waterfront in a manner which satisfies the human, social, and functional needs of the residents, within a framework of the restrictions imposed by the economics of current high density development.

I

THE GENERAL PROBLEM

The general problem with which this thesis is concerned might be stated as: the design of one thousand functional and humane dwelling units and their associated spaces in a high-density situation as an integral part of the Boston Waterfront Redevelopment Project in a manner which will make this design thoroughly realistic by current standards. It is, however, a definition only of convenience. The actual problem which is being attacked is not that problem, but an abstract of that problem, constructed of certain germane and essential fragments of the whole.

In order to clarify the attempt it is necessary to dismantle the basic problem into several components, which although interrelated indicate specialized areasof concern.

First, the living situation under examination is urban, it is of high density. It seems unnecessary to justify at length the importance of this problem. High-density living is an essential function of modern urban life. The entire concept of the contemporary city demands it, and, in fact, economically requires it. Further, the process seems to be intensifying as time progresses. The number of new high rise apartment units begun in 1956 was 82,000. This number rose to 215,000 in 1959, 300,000 in 1961, and 400,000 (an increase in six years of nearly 500%!!)in 1962.[1] Yet the densities at which we are required

to build, and at which men are required to live today, were literally impossible a generation ago. Yet the cultural mechanisms which man has designed in order to survive in a social world, and which remain as our primary methods of analysis and ordering, as well as of psychological protection, are essentially of village scale. First generation (already obsolete) technology, and the forces of high-density living, have given us a world in which all of the primary forces of our social ordering and many of the forms of our personal ordering have become meaningless. Working with a fifty-year old vocabulary we cannot even describe today's city. It has become a place where people move from a 500 square-foot cubicle, to an automobile, to a 500 square-foot cubicle in an alien land which belongs to the elevator and the highway and the economies of construction, a land which is not their size nor their texture, which does not go at their speed, which is dangerous to their bodies and disconcerting to their minds.

This is partially a problem of cities but it is also, and perhaps more basically a problem of homes. The word home is a key word, because the concept which the word implies has not changed, but the physical form which it describes is entirely different. It we assume that Man, precisely because he is human, needs a home which fills human needs, then we must also admit that the contemporary

---

1. The Apartment House Market in the Sixties, Louis Winnick, p. 1.

apartment unit has failed in providing for these needs. This unit, like the city which contains it, is impersonal and anonymous. Rather than counteracting the negative and hostile alienating forces of the city, it reinforces them. The home, rather than being a refuge, has become one of the more dangerous places to live.

On the other hand the forces which have precipitated this failure are by no means imaginary. The economics of construction provide a severe limitation. The cost of producing a new high rise apartment unit seems to be just about equal to the amount which can be reasonable recovered by renting that unit at the high edge of the market. That is, one can afford to build a high rise apartment building only by providing what are essentially minimum spaces at what are essentially maximum prices. Present federal aid in the form of urban renewal financing seems only to allow one to provide slightly smaller spaces to high middle-income families, and public housing produces sub-minimum spaces with no concern for income. In twelve high rise, high income buildings in Chicago the difference in size between the largest and the smallest two-bedroom apartment unit is 182 sq.ft. Middle income units vary by only 10% from these figures. It seems reasonable to assume that only a 20% square footage interval divides what is unbuildable from what is unacceptable.

Similar restrictions apply to the quality of the spaces. Any spatial elaboration from the single repetitive

typical floor, of uniform height, enclosed by the minimum perimeter represents an increase in cost. If the amount of money returnable is fixed, and the amount of space provided minimum, this cost cannot be met.

There are, therefore, two clear ways to attack the basic issue, each of which would fulfill the function of a thesis. The first is to ignore the limitations of cost and to some degree, the limitations of density, and proceed with a solution based entirely on human and social factors. The other is to ignore the needs of humanity and society and attempt to produce a solution which is realistically functional by current standards. I choose (carefully) to do neither. That is, I take responsibility for both. In doing so I am bound to fail. That is I shall produce neither a totally realistic building, nor a totally humane one. It is possible, however, to make that inevitable failure meaningful, not only in terms of a personal exploration into the specific character of the problem, but in terms of the actual proposed solution, that is the physical designed complex, as well. The method of doing this involves the approximation and abstraction of reality. To reduce the full problem to a series of issues which are capable of being dealt with, and which will allow one to act. To do so, certain aspects of the real situation must be ignored. My contention is that this would happen anyway. That any possible solution would be academic. My hope is, however, that by generating this academic solution around issues which are basic, to produce

a "real" solution which has validity.[2]

The first stage in the production of a meaningful solution has been to design the problem in terms which can be encompassed by someone of my experience in the length of time allotted. The most difficult aspect has been the approximation of realistic economic restrictions. My ability to estimate construction costs is severely limited. What I have done instead is to rely on secondary parameters which are dependent on construction costs, namely parameters of area.[3] Thus I have taken for my program square foot areas which are derived from an evaluation of current

---

2. There is a real danger here, and the danger has already been encountered in this report, mainly the danger of out-of-scale emphasis. I have been very concerned here with economic problems, precisely because they are the problems with which I have the least general familiarity. Human design issues, on the other hand, have been the major content of my years of training and I have a tendency to allow them to remain assumed, even though they are of equal if not significantly greater importance. I excuse myself only by saying that the real issue of this report is to generate a program, to define edges, that is, to define limitations. To try to quantify and formalize the desired attributes of dwellings is one of the major provinces of architecture, and cannot really be attempted in a program of this scope. The generation of these issues lies in the province of design, rather than in program formulation.

3. The tacit implication here is that one whole range of possibilities for the solution of the problem will be generally ignored. It is certainly possible to begin to solve the problems herein outlined by the reduction in the original construction costs, by the development of new techniques and methods of construction. It is a whole area in itself, the topic of a second thesis "A New Construction System for High Rise Dwellings."

building practice, and hope through the restrictions of these areas to approximate the restrictions of construction cost.

Similarly I have chosen a site, and a density, which represent reality. In fact, the area of building required, 1,703,700 sq.ft., and the area of site, 69,470 sq.ft. of land, and 251,700 sq.ft. of water, provide one of the major constraints of this problem. There is enough building involved here to cover the entire site with a structure six stories high, or the entire proposed land area with a building twenty-four stories high!! The problem is a real problem for which a real solution is in the design phase, but this is high density indeed.

These two restrictions, that is, the number of units realistically proposed, and the square foot areas which they realistically imply, have been taken as absolute criteria and have been elaborated in the program. On the other hand there are certain economic restrictions which I have given much less weight although they are equally real. It is apparent that cost will increase if any of the following procedures are employed: building below ground, building beyond the proposed bulkhead line, increasing beyond the minimum the cubic foot area of any interior space, increasing beyong the minimum the exterior perimeter of the building. Cognizance has been taken that these

factors exist, but for the purposes of the present exploration they have not been defined with a hard edge. If the two restrictions above are made of steel, these are made of rubber. I am willing to bend these restrictions provided that it can be demonstrated that by doing so a commensurately better design will result, that is, that a more humane environment will thereby be produced.

In a similar fashion certain specific design considerations have been isolated. I have already indicated the problem of place. The two others which seem to be most important are the problems of repetition and scale. One thing can be said about the eventual solution, it will be high. It is already indicated by the program that no matter what form the solution takes, in some areas it will be very high, and a figure of four hundred feet is not at all unlikely. This figure is fifty times the height of an average man, and forty times the size of the next standard scale definition, namely a typical floor. The typical apartment complex is severely lacking in scale definitions between these ranges, that is smaller than ten feet and between ten and four hundred feet, yet it seems that by almost any acceptable design criteria definitions in these ranges are vital. It shall be a major concern of this thesis to attempt to incorporate these definitions in the final design. Several mechanisms shall be employed, but

perhaps most important (because it has effects on other aspects of high rise dwelling as well) is the elimination of the concept of a single repeated typical floor plan. It should be possible to evolve systems of unit flexibility, vertical zoning, and typical repetitions larger than a single story, to incorporate definitions which range between the ten and four hundred foot limits. Similarly, through an attention to detailing of individual units, it should be possible to give these areas a range of definitions which is human in proportion.

The social implications of high-density living must also be taken into careful consideration. The media of high rise apartments lends itself to an incomprehensible system of anonymous cubicles, yet this is precisely the condition which reinforces the alien quality of the high-density urban environment and produces an alienation between this environment and the people who live in it. On the unit level it will be consistently remembered that the dwelling unit is the home of the person who lives in it, and that as such it is his place. It should be capable of representing as much individuality as the high-density situation allows.

It must also be remembered that the individual lives in what can be considered a community of individuals. That the same scale criteria which were important in regard to the physical form of the building, must

apply to its social form as well. There must again be a range between the single family in its individual apartment, and the 1000 people as residents of the complex. Again the physical form, the floor, the megafloor, the zone, the "building" all provide physical divisions around which a social hierarchy can be encouraged.

As in the case of economic criteria, there are certain design criteria which have been given positions of lesser importance. It is understood that this complex does not stand in isolation, but rather is a part of a much larger social and physical hierarchy which includes first the Boston waterfront area, and second the entire city of Boston. Cognizance is taken of this situation, however further redevelopment of the surrounding area will not be attempted, and more weight will be given to the internal organization of the project than to its external associations. In this respect the problem becomes somewhat prototypical, but it is hoped that the increased simplification of the problem justifies this attitude.

I am aware that by restricting objectives and constraints to a somewhat limited list of areas of primary concerns I have rendered the problem slightly academic. However, it is also my belief that by doing so I enhance the possibility of arriving at a solution to problems in those areas, all of which seem to be of

basic importance to high-density building as a type and all of which, if solved, would contribute to the solution of the general problem stated in the beginning, namely the creation of realistic, functional, and humane dwelling units in a high-density situation.

II

THE SPECIFIC PROBLEM
AND THE FORMULATION OF A PROGRAM

The specific problem chosen for the exploration of high-density residential living is the India Wharf area of the Boston Waterfront Redevelopment.[4] This area comprises the high-density portion of an urban renewal project of considerable scope and a high degree of elaboration. It was chosen because of its interesting and exciting site characteristics, its proximity, the degree of density required, and the existence of a relatively formulated program for the site. The area was originally programmed by the Boston Redevelopment Authority, and then subsequently re-programmed by Dreyfus Properties in conjunction with I. M. Pei and Associates, who are undertaking the development of this area. The eventual program for this problem was arrived at through conversations with the two groups involved, and an attempt to slightly re-define the problem so as to take cognizance of the objectives outlined in Section I.

Before beginning with the specific aspects of the

---

4. It must be mentioned here that without the help of several individuals the formulation of anything approaching a real program would have been completely impossible. All of them gave freely of their time, and displayed an interest in my problems which went far beyond the requirements of social acceptibility. They are: Mr. S. Diamond and Mr. R. Loverud of the Boston Redevelopment Authority; Mr. L. Otis of I. M. Pei and Associates; and Mr. L. R. Solomon of Solomon, Cordwell and Associates.

India Wharf development, and the programmatic development which resulted, it is of interest to interject the following outline by the B.R.A. of the general requirements for the site, shich have been accepted as valid to this problem.

(1) Waterfront Central Area - Parcels A-2 to A-7

... Within this area, pedestrian traffic will receive paramount and careful consideration. As a result of this relocation, the central area - the heart of the waterfront - is brought closer to the downtown business district.

Within the framework of this large development area, ... the Plan has been formulated and designed with the purpose of stimulating the following development characteristics:

(a) A mixture of uses which will generate intense pedestrian circulation. It is desirable that the activities on the water of Boston Harbor be easily observed from the area, and that those activities in the lower stories of the buildings be visible from the outside.

.....

(c) The construction of tall buildings in an arrangement which defines the area by a three-sided visual demarcation, open to the Harbor on the east. The southern element of the demarcation could be provided by residential towers on India Wharf, the western element by a string of office and other buildings along Atlantic Avenue, and the northern element by a continuous line of buildings, both new and existing - to remain on Long Wharf. Buildings in this area should provide active frontages and maximum protection to pedestrians during unfavorable weather conditions through the use of arcades, overhangs or other architectural of landscape devices.[5]

---

5. Downtown Waterfront - Faneuil Hall, Urban Renewal Plan, B.R.A., April 1964, p. 7.

The Site

(Note: Formal documentation of the site is offered in Section IV. The following is merely an examination of particular problems associated with the site, and factors which led to its particular definition.)

The site comprises parcels A-2, D-4, D-5, and A-3 (to Milk Street) of the Boston Redevelopment Authority waterfront project. Of these the largest is parcel A-2, India Wharf. It is this parcel which was originally designated for the high rise apartment units which form the basis of this thesis. Parcel A-3 was designated "mixed use, general office, general business." In fact however, it has been allocated for a parking structure and appropriate retail which will service primarily the inhabitants of India Wharf, and only secondarily the surrounding area. Thus, the two parcels seem to be strongly interrelated. There is certainly a strong interrelation of functions. The combination of the two parcels into a single project area allows one to dispense with what becomes an arbitrary division between these functions and attempt to achieve a more homogenous integration between parking, retail, and dwelling.

The combination of these two parcels represents the situation of the project (in fact) in its present

stage, since both are under development simultaneously by the same developer and architect.

The location of Atlantic Avenue was seriously called into question by Mr. Otis of Pei's office, and just as seriously defended by Mr. Loverud of the B.R.A. As will be the general practice throughout the formulation of this program, situations where strong disagreement exists have been left open for further evaluation. The inclusion of the small parcels D-4 and D-5 in the site area has implicitly included New Atlantic Avenue within the site rather than left it as a site boundary, and thus allows for some alteration of its present designed location should that prove desirable.

All areas north of Milk Street, west of the Fitzgerald Expressway, and south of High Street shall, however, be considered as fixed according to the B.R.A. Urban Renewal Area R-77 plans of April 1965 (see Section IV, fig. 3,4).

A good portion of parcel A-2 is underwater (see Section IV, sheet 6). The small portion of land to be filled by the City of Boston will be considered as filled for the purposes of this project. The concept of building out into the water area immediately presents itself. Mr. Lauren Otis of Pei's office estimated that the additional cost of building a 264 unit tower beyond the bulkhead line was $1,000,000, which comes to approximately $3.00/sq.ft. additional. Pei's office

found that, although they were already building at the upper limit of the market, they could not absorb this extra cost and thus have built only up to the bulkhead line. Clearly then, the cost of building beyond the bulkhead line does not have sufficient economic advantages to make it reasible if privately financed.

There are, however, only three solutions to the density problem, to build up, to build below ground, and to build out into the water. All of them are expensive, and all provide design limitations when carried to the extreme. It seems possible, however, that building to a degree beyond the proposed bulkhead line might have design advantages of such significance to the entire area as to make absorption of the cost by the City of Boston realistic. Thus this program does not rule out the possibility of building beyond this line, but takes cognizance of the additional cost required, and designates that design advantages resulting from such a course of action be commensurate with that cost.

The B.R.A. statement deals primarily with the site as object, however several factors relating to the site as context should be considered. The situation of the site provides a nearly uninterrupted view in three directions (with the exception of the proposed office structure along Milk Street). To the west a hard edge is provided by the expressway, which, however,

allows for visual expansion above the ten-story height and pedestrian and vehicular movement, as well as visual penetration, at grade. It seems essential, precisely because the qualities of view are so propitious in this area, that full advantage of them should be taken.

Similarly the relation of this site to the water edge demands special consideration, and provides what is an almost unique opportunity for the creation of interesting and worthwhile spaces. In the process of site planning then, special consideration should be taken in deriving full potential from the opportunities of view, and in the articulation of spaces along the water edge.

The boundary edge provided by the expressway is another condition which demands special consideration. All indications from the B.R.A. demand that this be as permeable a boundary as possible. Devices for reducing the exactness of this edge should therefore be employed in site planning.

The Number of Units

The original B.R.A. proposal called for 1200 units on the India Wharf site. Conversations with Mr. Otis indicated that Pei's office, and, implicitly, the developer as well, had found that to be unfeasible. Their current scheme calls for 936 units. The number of 1000 has been accepted for this program as a

convenient compromise.

Building Heights

The B.R.A. provided the following restrictions for the use of Parcels A-2 and A-3: A-2, maximum height 300 feet, floor-area ratio 8; A-3, maximum height 125 feet, floor-area ratio 8.[6] Conversations with Mr. Loverud indicated that the 300 foot limitation in his opinion was excessive and that in order to maintain the proper relationship with existing buildings and to create an appropriate visual link with the downtown area, twenty stories, or 190 feet represented the maximum height. Comversations with Mr. Otis, on the other hand, indicated that the appropriate height, due to both design and market criteria, was in the order of 400 feet. The present scheme under consideration by Pei's office reaches a height of forty stories.[7]

Clearly then, the building height, while an

---

6. Ibid., p. 21.

7. Mr. Loverud's figure of twenty stories is not only unrealistic, it is impossible. Unfortunately I had not figured the required floor areas before I talked with him. I must assume that he meant that were it possible, twenty stories would be appropriate in relation to the skyline of the adjacent area of Boston. This is an inconsistency which is inherent in the B.R.A. program. They simply cannot have both the heights and the unit numbers indicated. I have accepted the latter condition as binding.

important design consideration, is at the present subject to alternative judgments and does not represent a fixed criteria. I propose to leave it in that position for the purposes of this problem. That is, remove the (apparently unenforceable) 300 foot limitation and leave the height as an independent variable, subject to the criteria of design.

The integration of parcels A-2 and A-3 in this project forces one to dieregard the 125 foot limitation for parcel A-3. A minimum floor-area ratio of eight will be accepted throughout. However, the total site area (land and water) will be taken, i.e. 321,170 sq.ft.

The Population and the Dwelling Units

The population of the India Wharf Development and the type of dwelling units provided are subject to numerous parameters. They are also in many ways reciprocal. That is, while the dwelling units should be tailored to the needs of an anticipated population, the actual population will be many ways be determined by the type of dwelling units available. Within any particular area, without specialized financing, the decisions which are made with regard to the type of units which will be provided are generally determined by what the market will bear, rather than by what type of units (or of occupants) would be appropriate to the area.

The Boston Waterfront Redevelopment does in a way represent specialized financing in that the City has cleared the land and is making on that land substantial public improvements. On the other hand the actual construction and management of the apartment complex to be built at India Wharf is privately financed by conventional menas. In practice, what seems to be the case is that the developer, while following guidelines set down by the B.R.A., is essentially following much stronger guidelines established by economic building practices.

The original statement by the B.R.A. was that the India Wharf apartments, while representing the most expensive residential units on the site, would still be in the middle-income range, renting for approximately $60.00 a room. The most recent statement from Mr. Otis indicates that the rental schedule proposed for the India Wharf apartments when complete will be approximately $100.00 a room, or $400.00 a month for a two-bedroom apartment.[8] Thus one can only deduce that India Wharf is being programmed for the high-income market.

---

8. I must mention here that getting any information on income from either Mr. Loverud or Mr. Otis was like pulling teeth from the proverbial hen. They were both very reluctant to talk about income considerations, and cannot be held responsible for any statements which I may make which have any relation to income considerations of the eventual tenants of India Wharf.

There is perhaps another more productive way of looking at this problem. The Boston Waterfront project will have within it a large range of housing types, ranging from re-converted existing property on one end to India Wharf on the other. No matter what the absolute rental scale is, India Wharf will represent the smallest units, the units with the least ground contact, and the units which involve the largest sq.ft. construction cost.

Similarly the Boston Waterfront project, because of its relation to the downtown area and its separation from adequate schooling, is likely to attract people who are more concerned with the relationship of the area to the central business district rather than people who are enamored with the area's child-rearing qualities. If then we assume a homogeneous population (with the child-rearing and space-requiring end somewhat cut off) we can assume that those people who wish to live in the Waterfront area and who have either large space requirements or low incomes, will be able to find housing in some other area of the development.

The situation is simply that young couples, with growing families, will not have either the income nor the inclination to live in these units.

What kind of people then will be living in the India Wharf units? They will be people with small space needs and substantial incomes, who desire to live close

to the central business district: single people, young couples where both are working and there are no children; older people or couples who desire the proximity of the downtown area, who have substantial incomes, and who no longer have children living with them.

Perhaps the largest unit size generally required would be a two-bedroom apartment. This type of unit could function for one couple, or one couple with one or possibly two children. This type of unit would also function as a shared apartment for several single working people. A single bedroom apartment should be able to function adequately for a couple or two single people. Studio apartments for single people would be appropriate.

Three-bedroom apartments are almost non-existent in apartment buildings of this general character (i.e. near to the central business district, high income) in the Chicago area. Dreyfus Properties, however, which is the developer of the present India Wharf scheme, seems to feel that there is some market for three-bedroom apartments and has included them in its program for the site. They have therefore been included in this program as well.

Within this rough framework (one bedroom, two bedroom, etc.), two types of flexability are definitely required. The first is interior flexability, that is,

it should be possible for the same unit package to serve two functions, dependent on the desires of those who reside in them. For example, the possibility of converting a large studio apartment into a small one-bedroom apartment is a definite program requirement. (Special importance is given to this particular change because it involves a change of kind, a qualitative rather than quantitative change.) Further flexability, for example the conversion of a large one-bedroom unit into a two-bedroom unit is also desirable.

There should also be a degree of flexability between the unit types, which would allow one to change easily the compositions of the units should the market requirements change. (for example the conversion of two two-bedroom units into a three bedroom and a one-bedroom). For the purposes of program the following statement is made: conversion by the tenant from a studio to a one-bedroom should be possible in twenty-five per cent of the units. Conversion in a similar manner from two-bedroom to three-bedroom should be possible in ten per cent of the units. The unit breakdown shall be as follows:[9]

10%	studio	500 sq.ft.
25%	studio (convertible)	650 sq.ft.
35%	one-bedroom	800 sq.ft.
20%	two-bedroom	1,100 sq.ft.
10%	two-bedroom (convertible)	1,500 sq.ft.

9. These figures were arrived at by an attempt to make the best of all possible worlds. Conversations with Mr. Otis yielded the following data:

25%	studio (convertible)	700 sq.ft.
25%	one-bedroom (convertible)	890 sq.ft.
25%	two-bedroom (convertible)	1,125 sq.ft.
25%	three-bedroom (convertible)	1,570 sq.ft.

Conversations with Mr. Solomon indicated:

20%	studio	420 sq.ft.
20%	studio (convertible)	520 sq.ft.
40%	one-bedroom	760 sq.ft.
20%	two-bedroom	1,100 sq.ft.

Marina City, in Chicago, which occupies a similar location, deals with a similar market and has the following breakdown:

	two-bedroom	1,162 sq.ft.
	one-bedroom	698 sq.ft.

Outer Drive East, also similar and also in Chicago, yields:

3.3%	studio
29.7%	studio (convertible)
39.6%	one-bedroom
26.4%	two-bedroom

The two buildings examined serve precisely the same market, i.e. high income, near the urban center. The two people questioned were talking about precisely the same situation. Clearly there are no set answers here, but with the flexibility discussed in the program I feel that my figures are in the correct region.

Secondary Spaces

Two types of secondary space exist. The first involves those spaces which are essentially associated directly with the dwelling complex. These have been designated in the written program. They were arrived at by taking three existing apartment buildings, measuring the size of existing secondary spaces, converting to a base of 1000 units where appropriate, and averaging. The clear design of most of these spaces demands an expertise in the specific functions which they serve. The approximations offered seem to be an adequate replacement of that expertise for the purpose of this problem.

The second type involves secondary spaces involved in filling certain functional needs of the complex dwellers which can be included in the general project area. These have been elaborated in the section designated "Retail."

Secondary Lobby and Corridor Spaces

The need for special concern in secondary lobby and corridor spaces is clear. These spaces represent a major definition of both the physical and social hierarchy implied in the building complex. They must be designed so as to fulfill this function as their primary requirement. Their area requirements have therefore

been ignored (except for the ubiquitous twenty per cent) pending further design analysis.

Miscellaneous Data Concerning the Dwelling Unit Complex

The dwelling complex will be centrally air conditioned and heated. However, operable sash in confirmation with the code cited below will be employed.

Two bathrooms will be provided in two-bedroom apartments.

Elevator service consistent with existing conventions of desirability will be offered.

Parking

The B.R.A. report indicated a desired parking ratio of 75% which would be 750 spaces. Conferences with both Mr. Loverud and Mr. Otis indicated that the parking structure would be of service not only to those living on India Wharf but also to surrounding functions as well (for example the aquarium and some downtown offices). Efficiency of the parking structure would be enhanced if its area of service were to be expanded. The Pei solution calls for 1500 spaces to service both the general public and the residents at India Wharf. I have had no indication that that figure is not appropriate and so have adopted it for my program.

Estimates by Mr. Otis on the cost of parking space construction indicates that above-grade parking will cost $2,500 per car, while underground parking will cost double that figure due to the costs of excavation and water proofing. It is thus essential that as much parking as possible be above_grade.

The parking structure should function so that it can easily service the public and those residing on India Wharf. There should be an enclosed connection of tolerable distance between the India Wharf dwelling complex and the parking for those apartments.

Retail

Conversations with Mr. Otis and Mr. Loverud indicated that a retail area of 50,000 sq.ft. would be functional for this area, and 25,000 minimal. The retail area, part of the parcel A-3 program, is seen as servicing both India Wharf and other residents in the project area.

In so doing it will generally have those amenities appropriate to a normal residential community of similar size. Places for the purchase of minimal necessities, groceries, drugs, etc. are necessary. Also places of minimal recreation, bars, restaurants, perhaps a cinema would be desirable.

For the purposes of this project the articulation of these retail spaces will be generally ignored,

although their location and ability to service both the exterior community and the residential complex will be an important design criteria.

Building Codes

While the concepts of safety, efficiency and minimum standards will of course by considered as criteria of design, it seems inappropriate (primarily because of the time available for the project) to allow a complete housing code to be an ultimate authority for this project. Thus the United States Federal Housing Administration's Minimum Property Standards for Multifamily Housing (FHA #2600, 1963) will be taken as a guide by which standards of safety, decency, and efficiency can be evaluated should the situation arise.

For absolute restrictions in this project, an abbreviated multiple family code offered by the Ruberoid Company[10] for a competition project of similar scope and situation to the current project shall be used. These limitations are listed in Appendix A.

---

10. Fifth Ruberoid Design Competition, 1963.

III

THE PROGRAM

I. Dwelling Units

No.	Type	Area	Total		
100	Studio	500 sq.ft.	50,000	sq.ft.	
250	Studio (conv)	650	162,500		
350	1 Br.	800	280,000		
200	2 Br.	1,100	220,000		
100	2 Br. (conv)	1,500	150,000		
			862,500	net	
	20% Circulation, service, core, etc.		172,500		
	Total				1,034,000 sq.ft. gross

II. Secondary Spaces (on the basis of 1000 units)

Electrical equipment space	1,000	sq.ft.	
Water meter space	520		
Boiler and mechanical space	9,000		
Secondary mechanical space	2,000		
Gas meter space	480		
Building Storage	1,800		
Bicycle and cart storage	1,000		
Tenant storage	15,000		
Incinerator space	1,600		
Receiving	8,800		
Mail room	800		
Building office	600		
Laundry	1,500		
Lobby	2,800		
Childrens play space	1,500		
Party rooms	1,500		
	24,800	net	
20% Circulation	4,900		
Total			29,000 sq.ft. gross

III. Parking

1500 spaces at 400 sq.ft. per space 600,000 sq.ft.

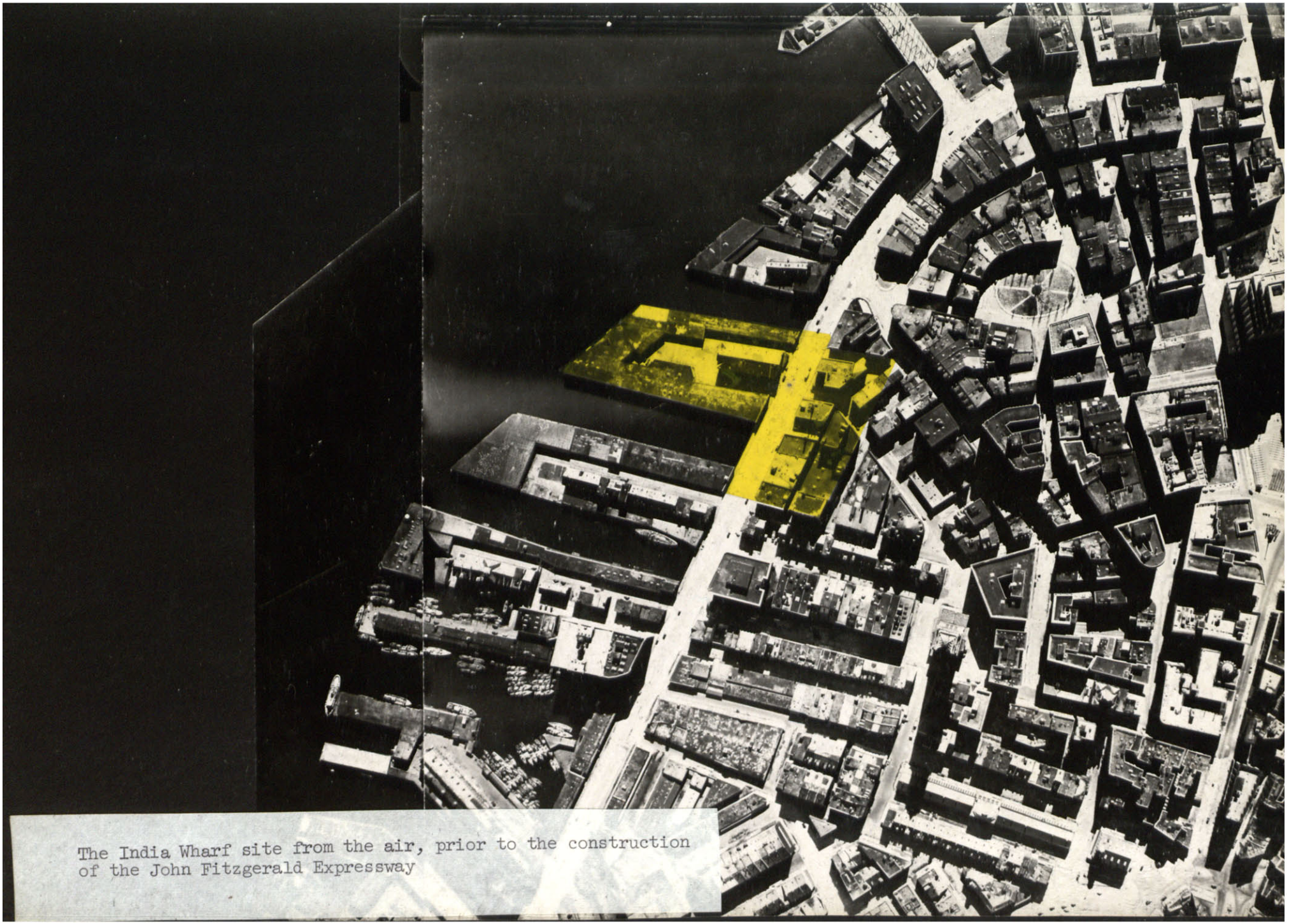
IV. Retail

Gross retail area 40,000 sq.ft.

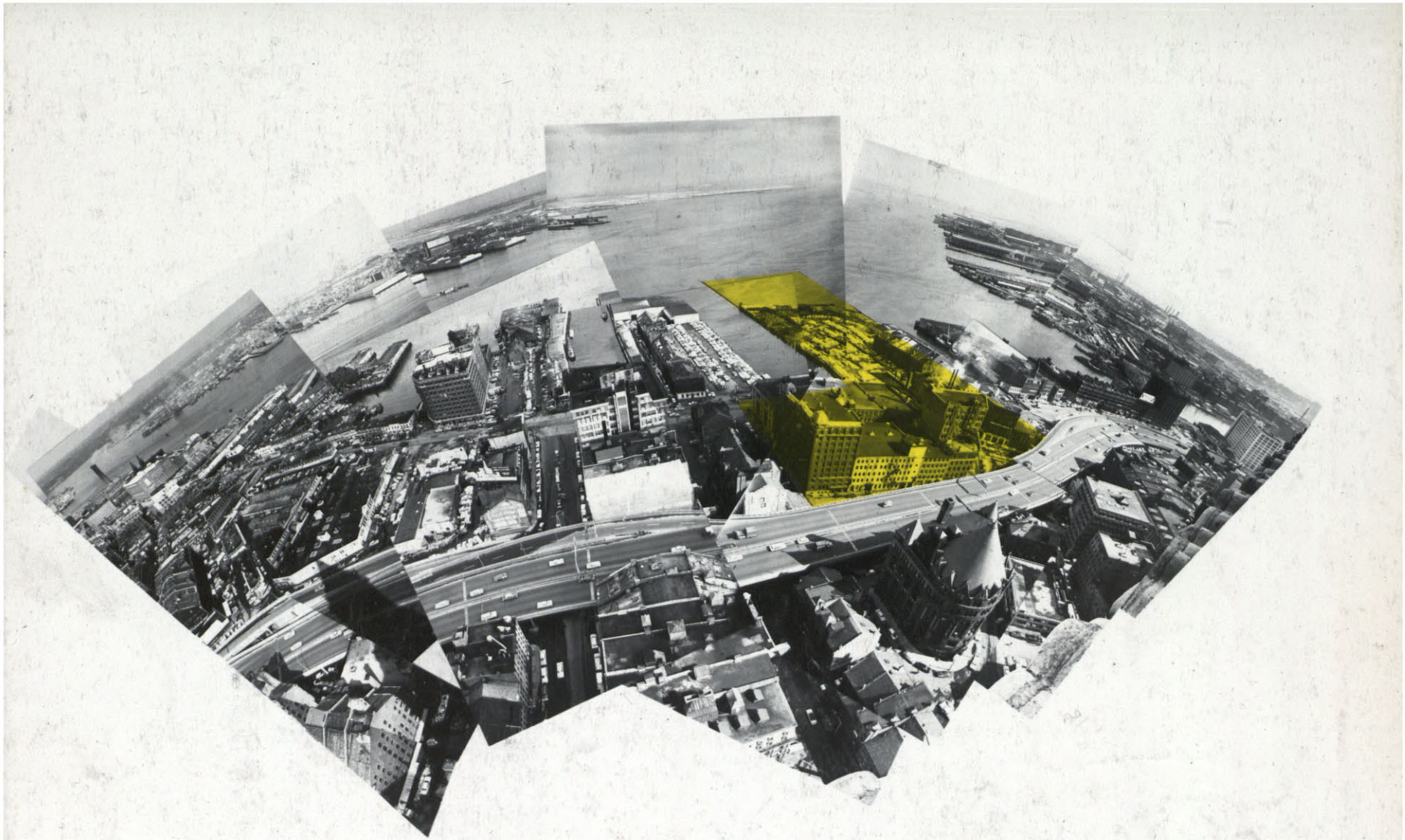
TOTAL GROSS AREA 1,703,700 sq.ft.

IV

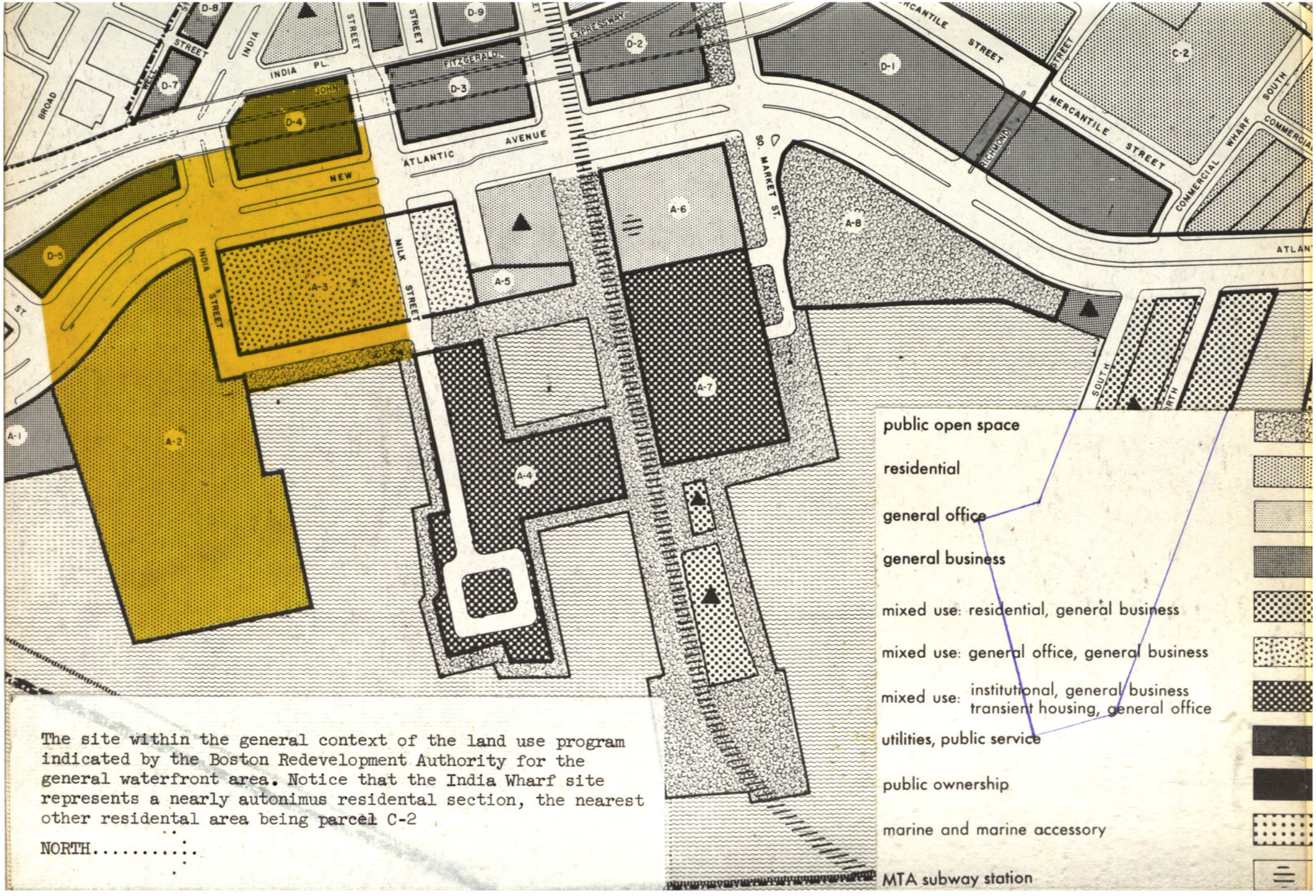
VISUAL SITE DATA



The India Wharf site from the air, prior to the construction of the John Fitzgerald Expressway

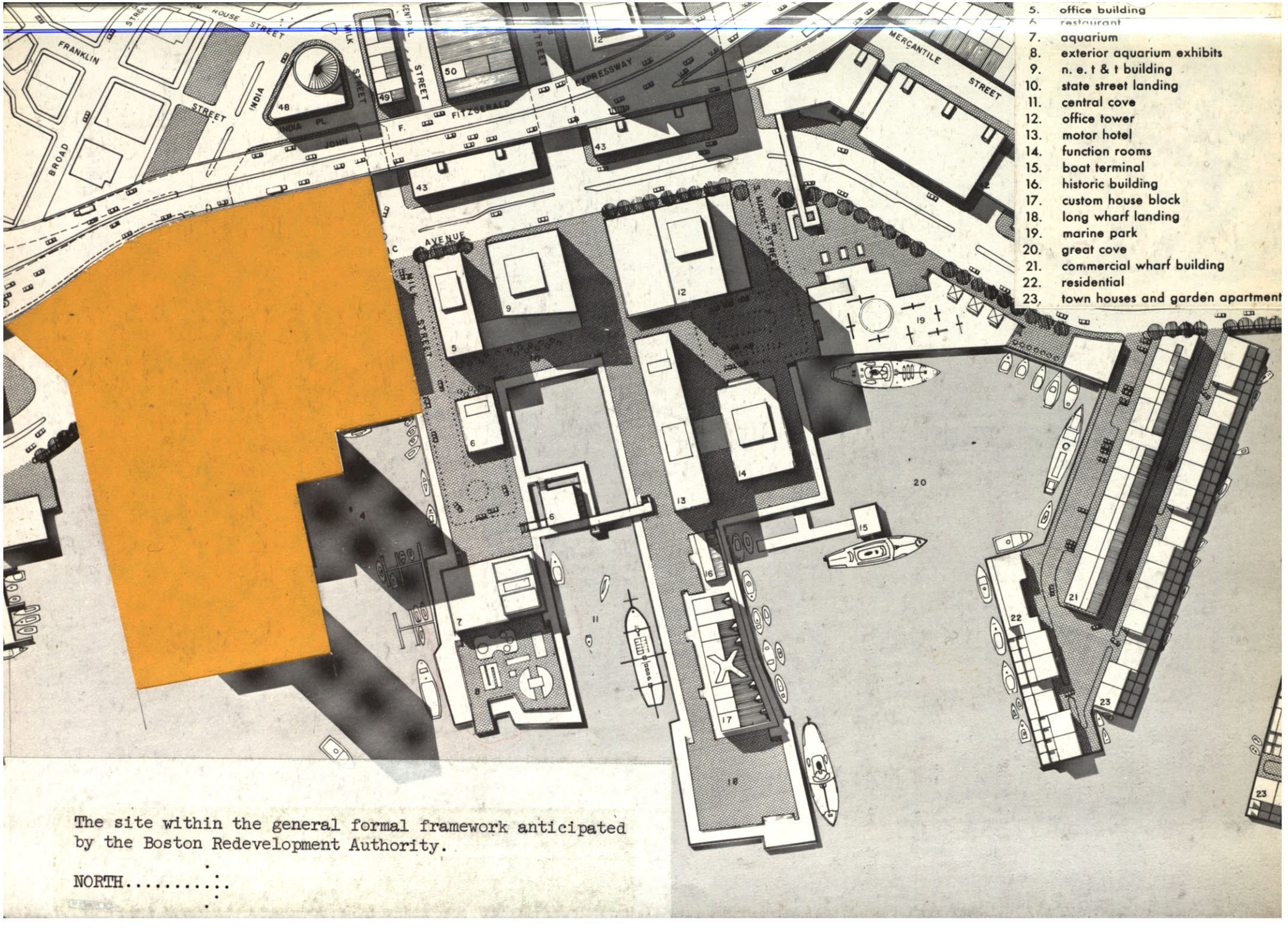


The existing India Wharf site, showing the location of the expressway. (Composite photo courtesy of I.M.Pei and Associates)



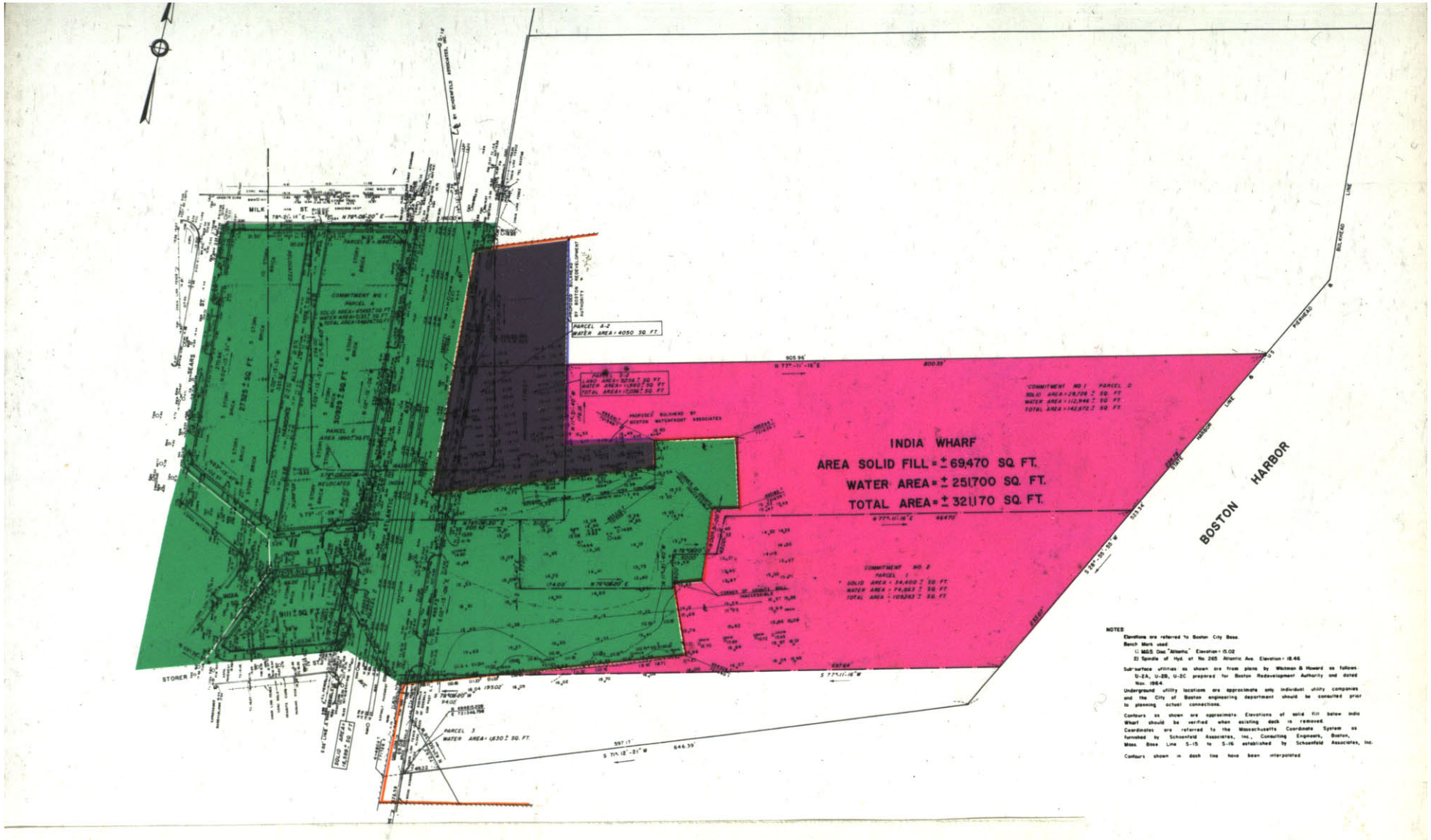
The site within the general context of the land use program indicated by the Boston Redevelopment Authority for the general waterfront area. Notice that the India Wharf site represents a nearly autonimus residental section, the nearest other residental area being parcel C-2

NORTH.....

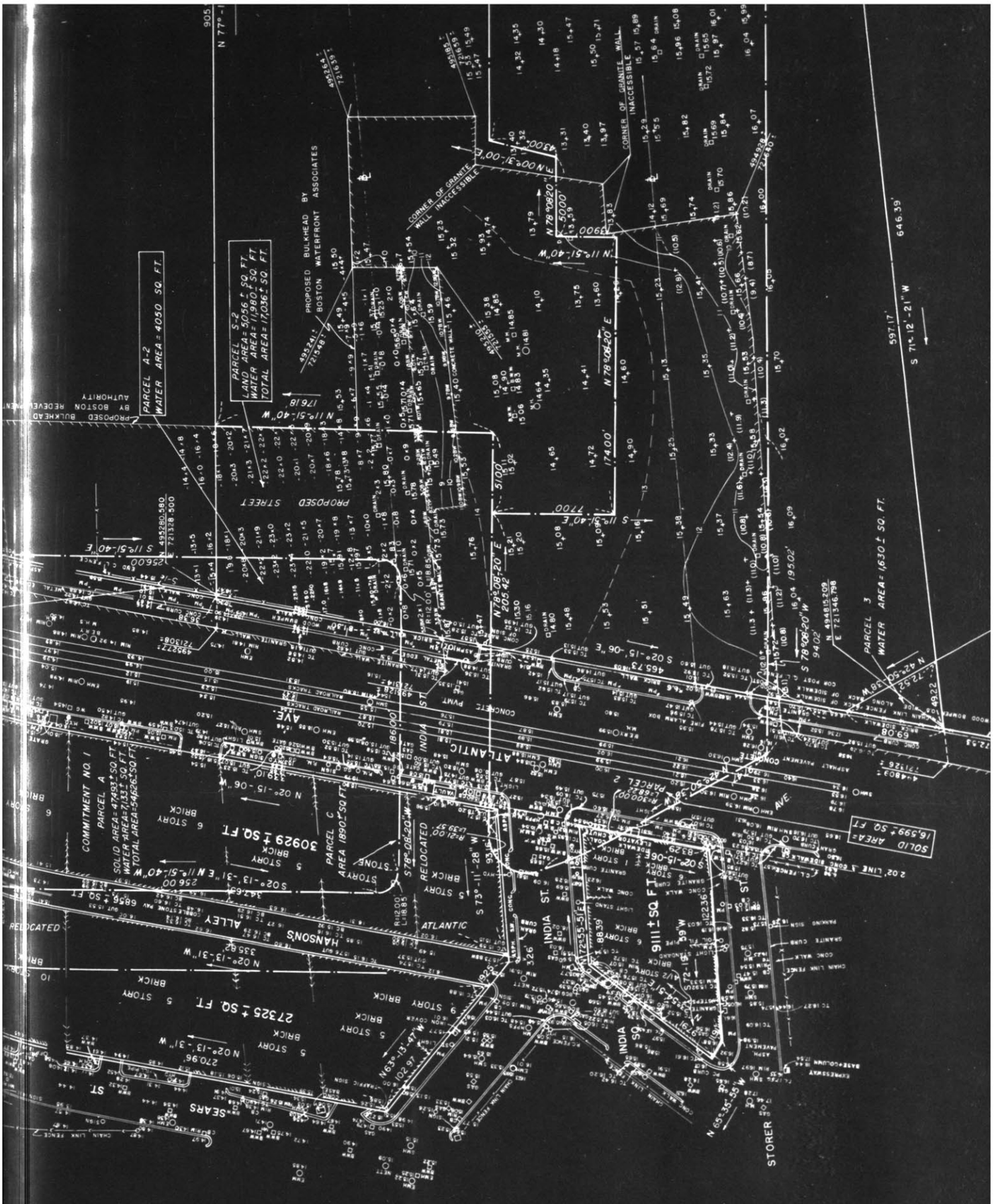


The site within the general formal framework anticipated by the Boston Redevelopment Authority.

NORTH.....



Survey of the site, defining its precise edges and indicating those areas which are currently filled (green), which will be filled by the city of Boston prior to the construction of a housing development on India Wharf(gray) and those areas which are expected to remain water(purple). The orange line indicates an existing granite sea wall which may be considered as one of the aesthetic atributes of the site.



Survey of the site, showing, edges, areas, contours, existing buildings, gas and oil pipes, lamp posts, and other significant information

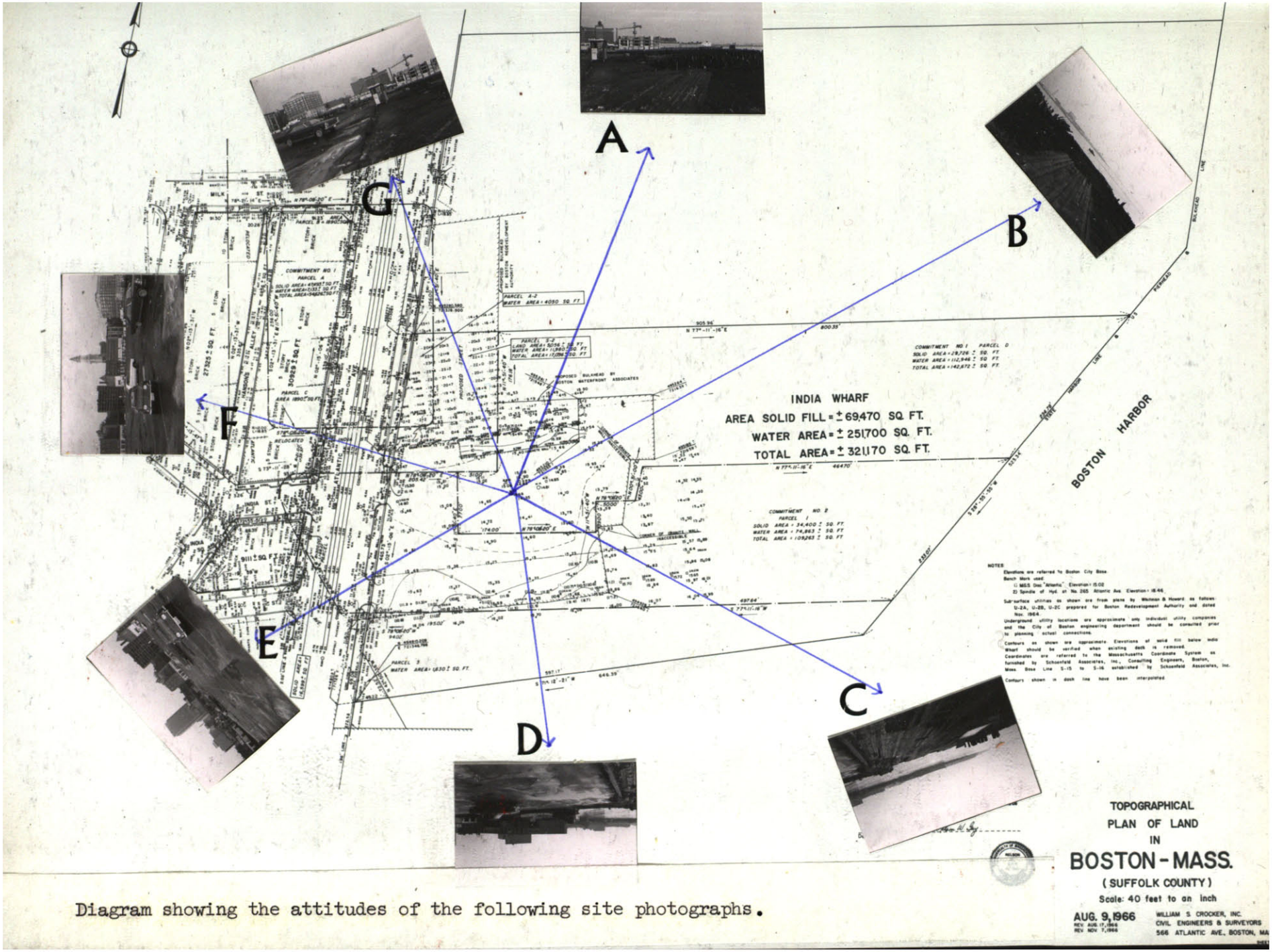
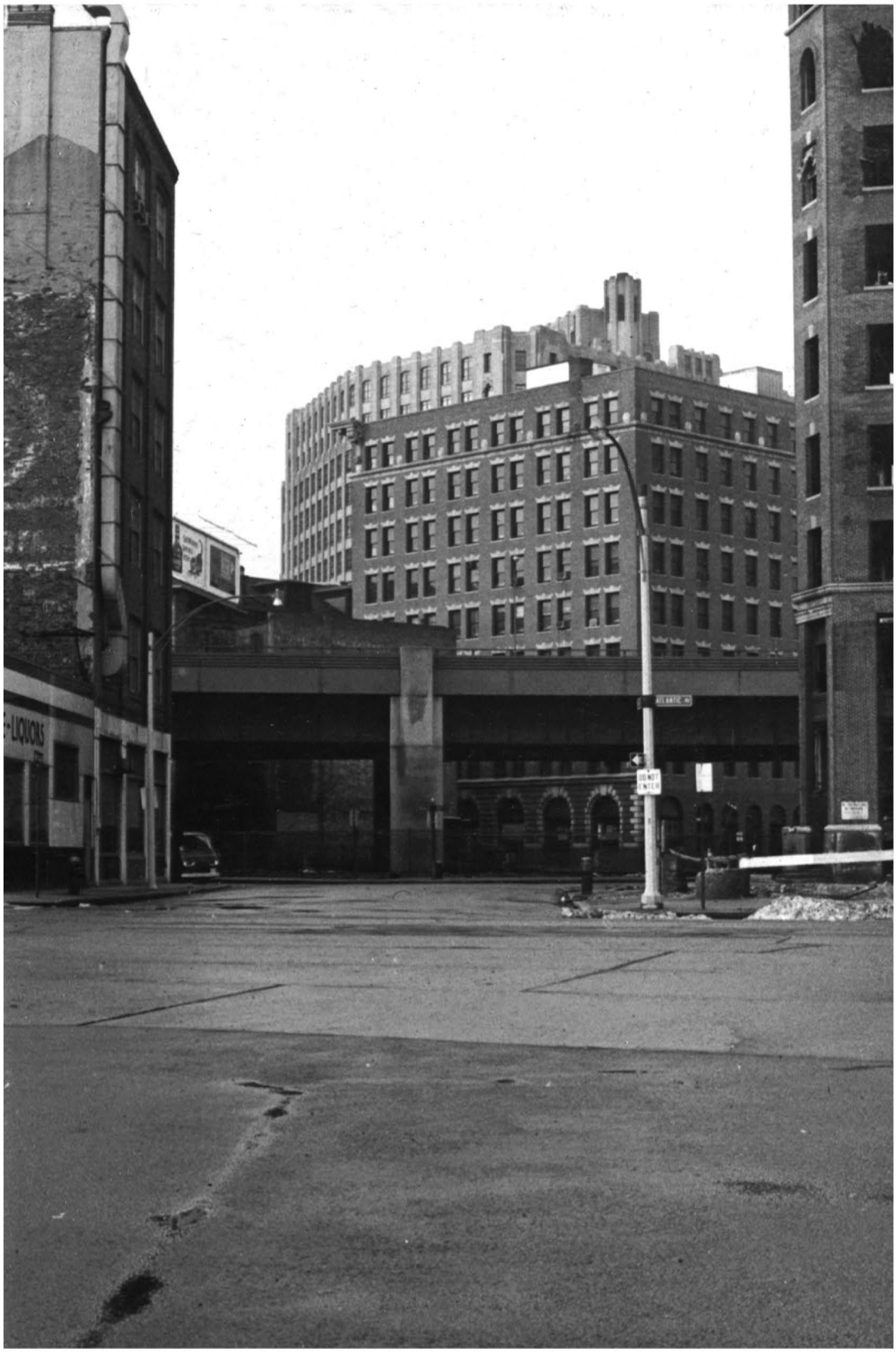


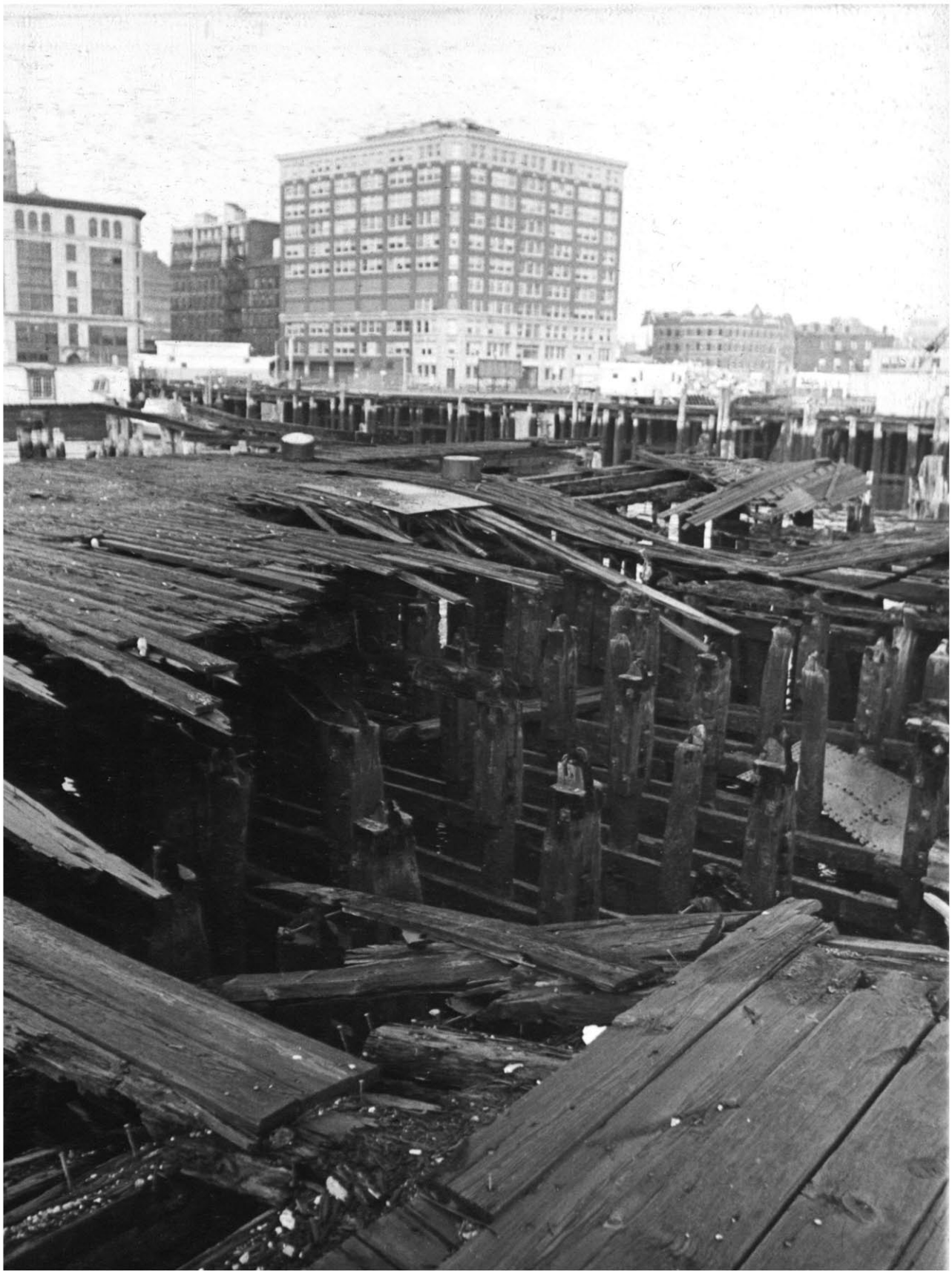
Diagram showing the attitudes of the following site photographs.

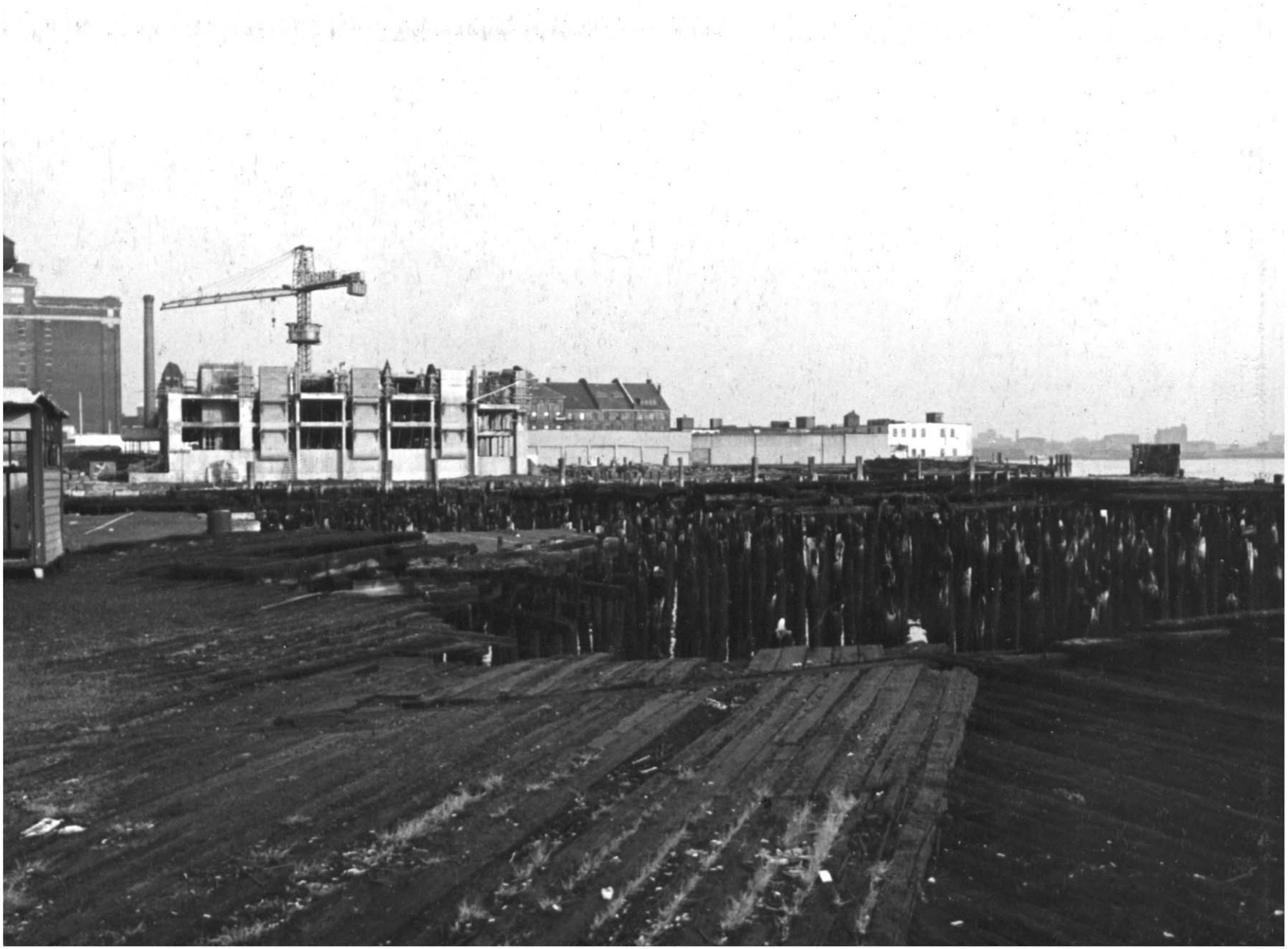
Atlantic Sea Grill
Coca-Cola

CRUISES
PRAY

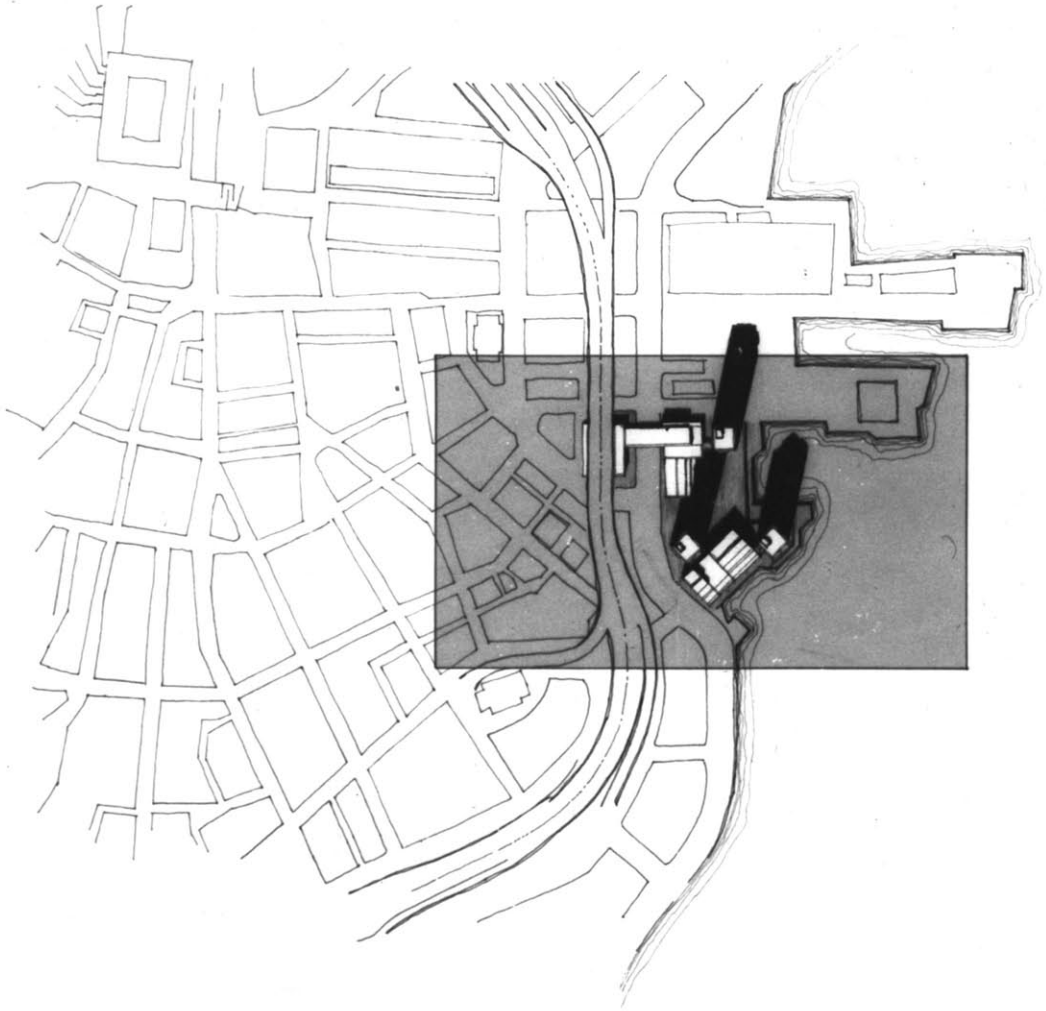

LIQUORS
ATLANTIC
DO NOT ENTER

business equipment
corporation
SN2059





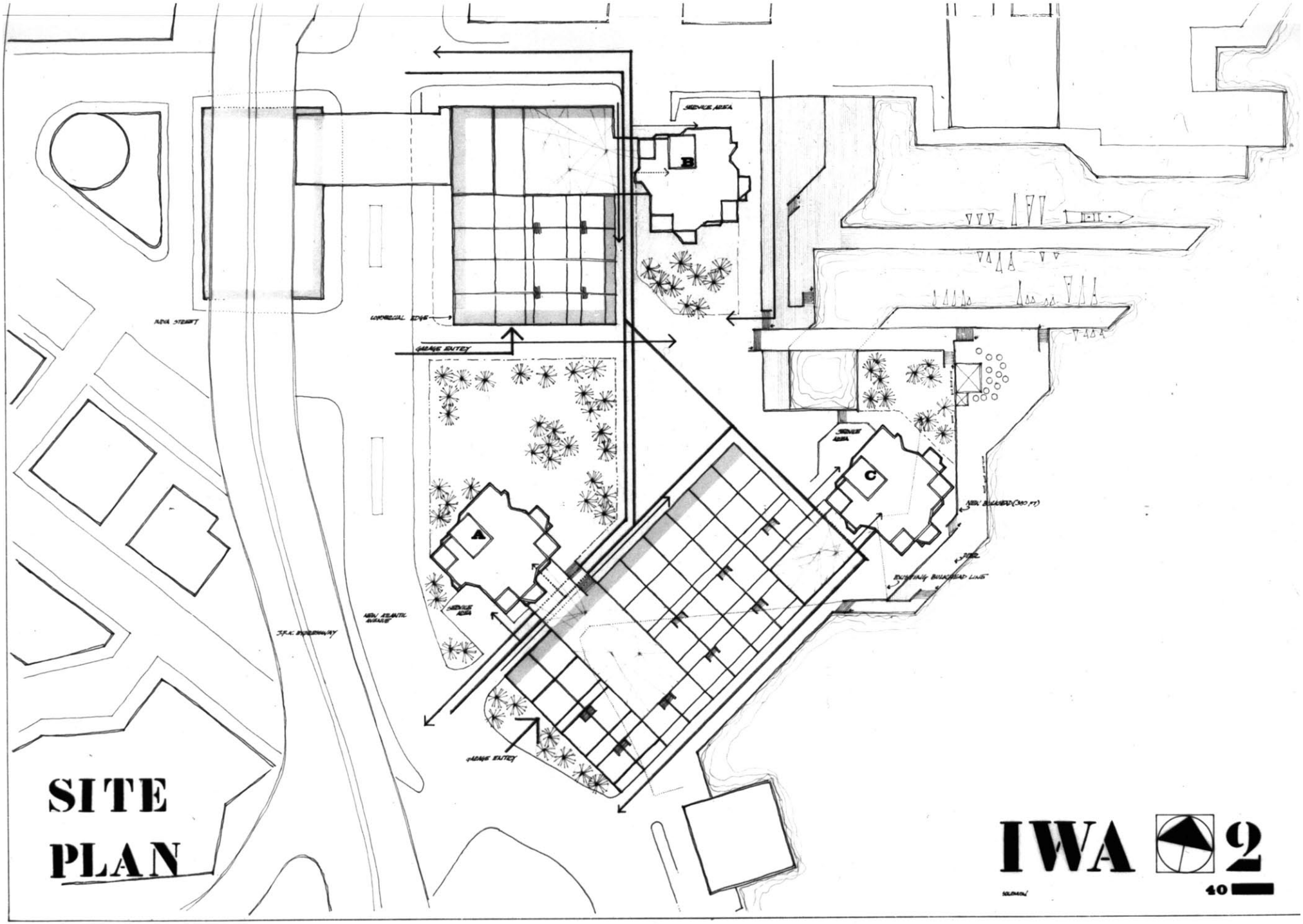
STATE STREET BANK
AVENUE CAFETERIA
SN2059



INDIA WHARF APARTMENTS

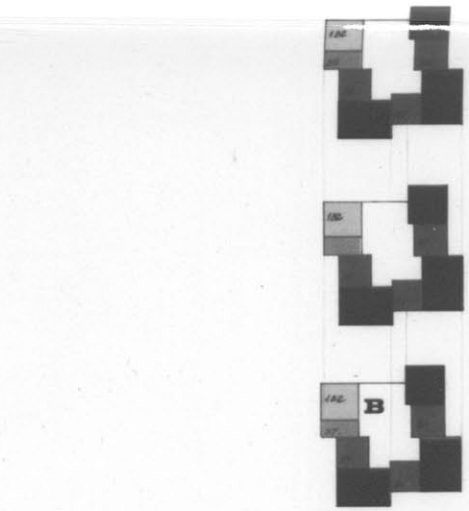
UNDERGRADUATE THESIS M.I.T. 1967

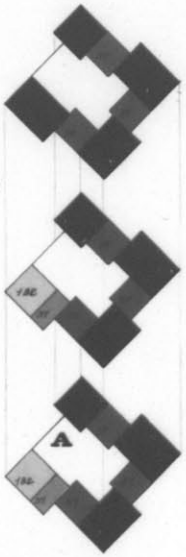
richard jay solomon

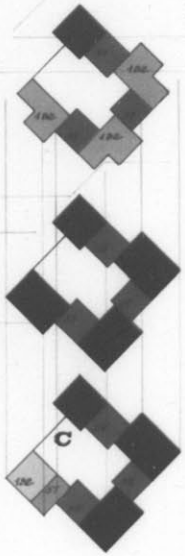


SITE PLAN

IWA 2



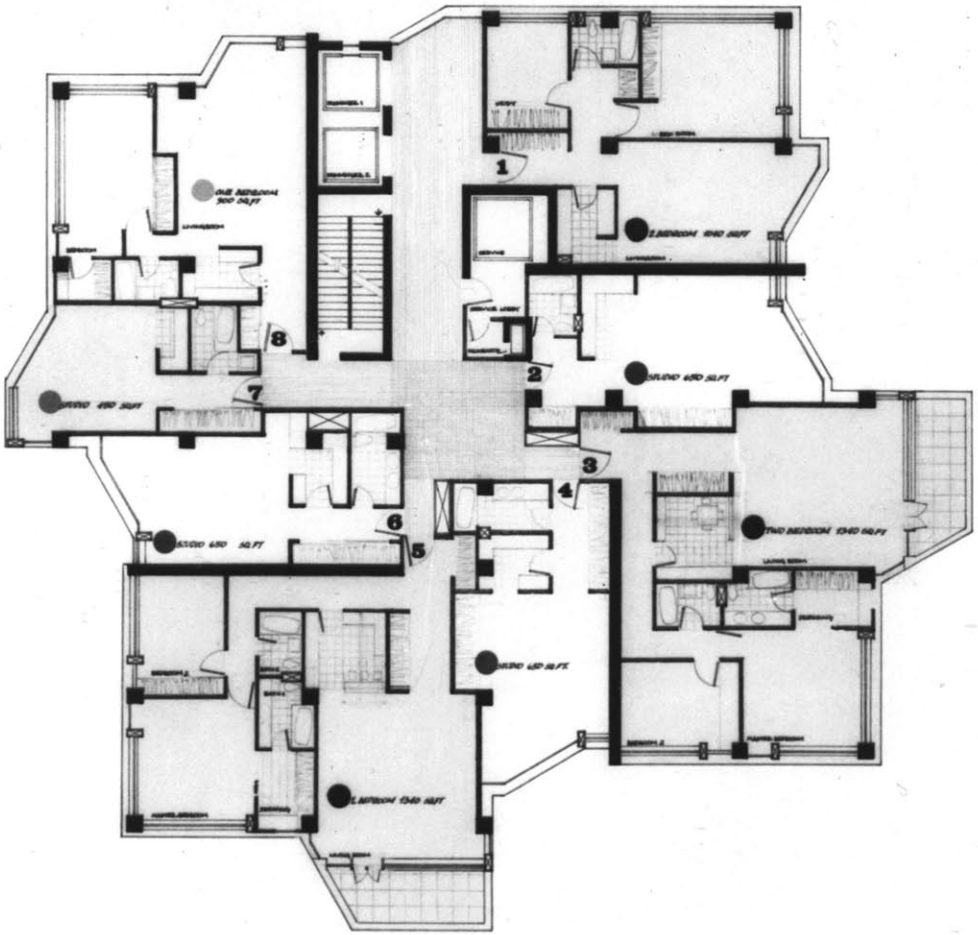




	LOW	A	B	C			
studio		121	144	138			403
1 br	81	24	36	66		57	264
1-2 br		36	36	42	114		
2 br		84	60	36		57	237
duplex	15		6	12			33
							948

SCHEDULE

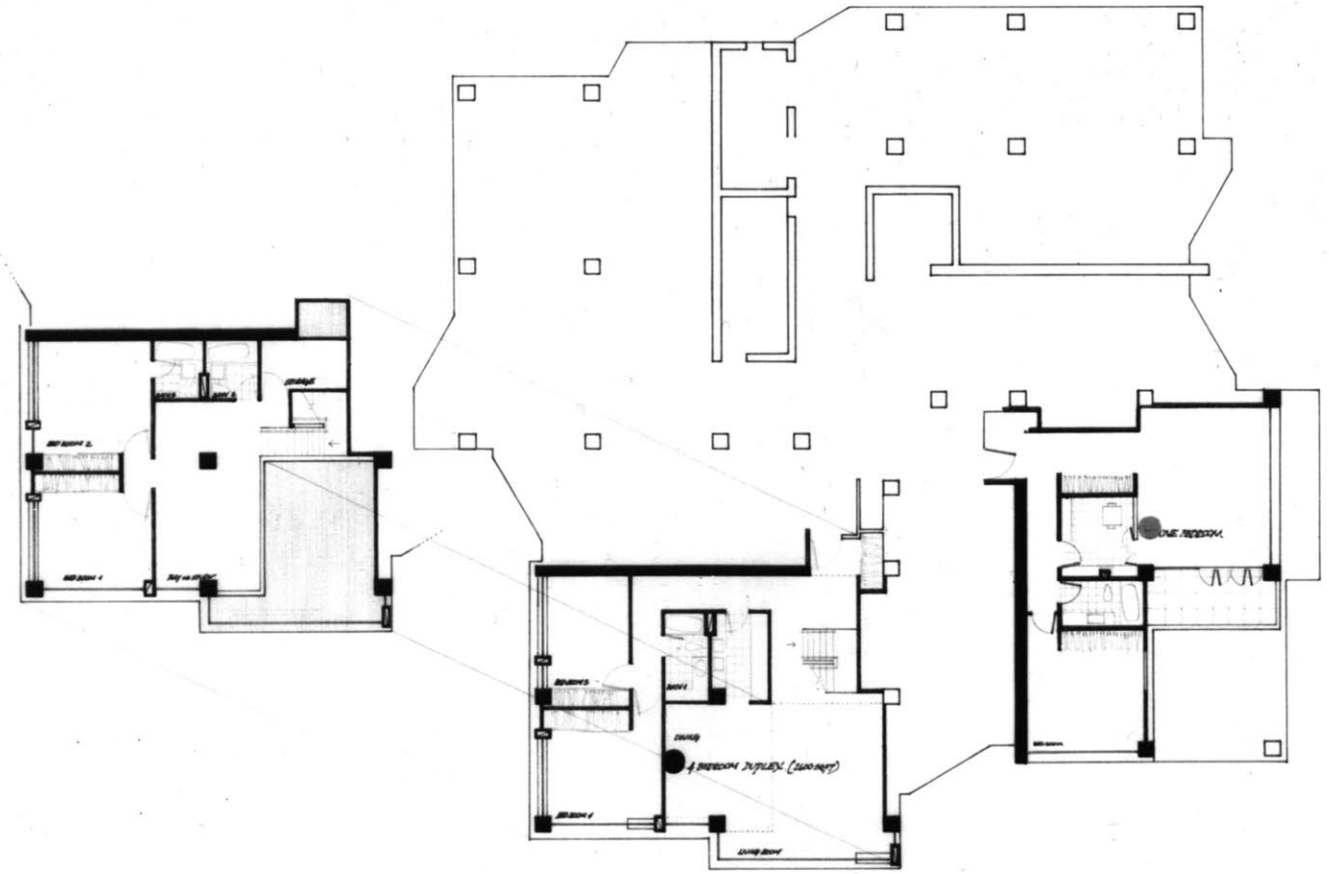
IWA 3



TYPICAL

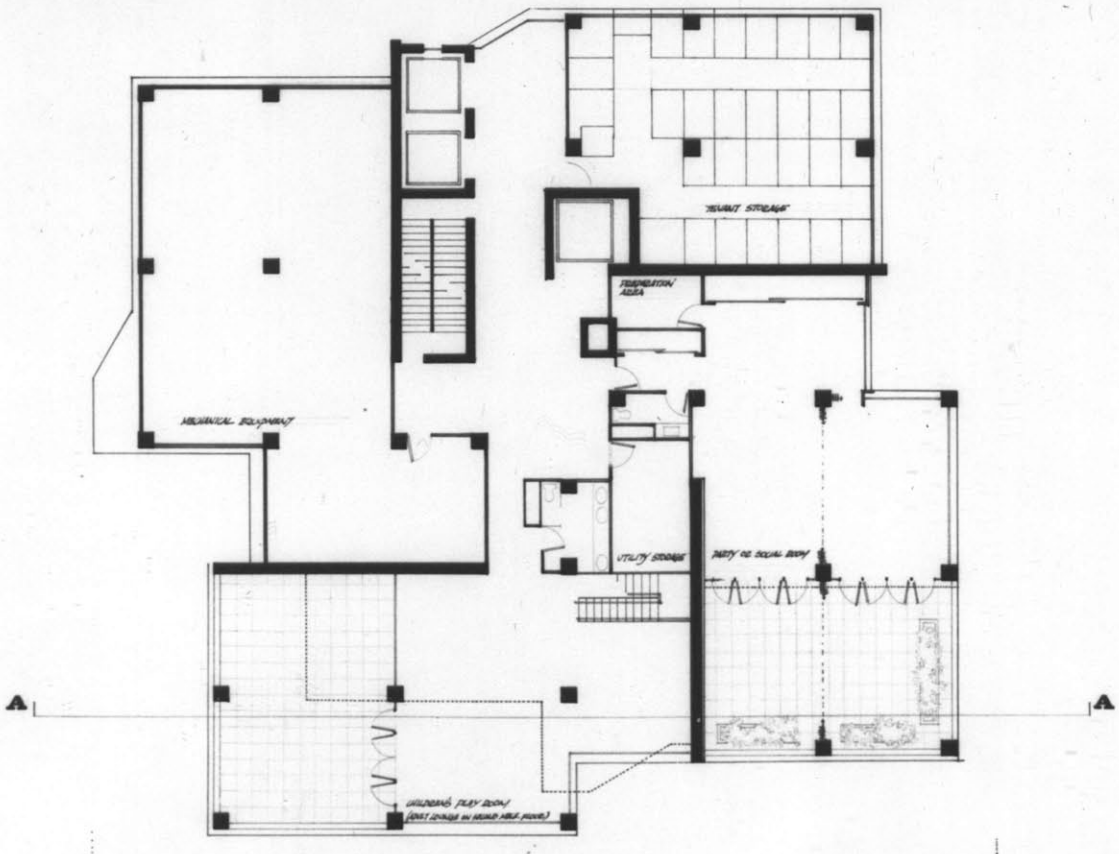
IWA 4

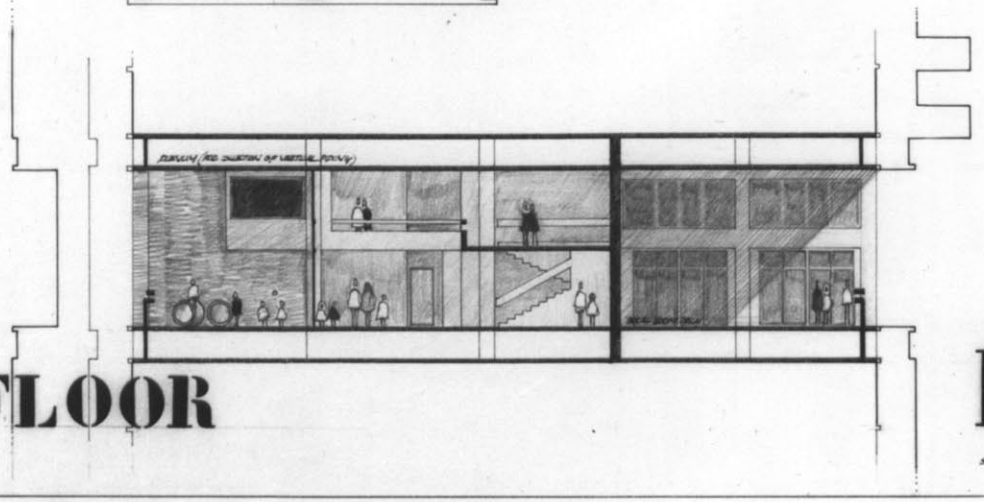
8



TYPICAL 2

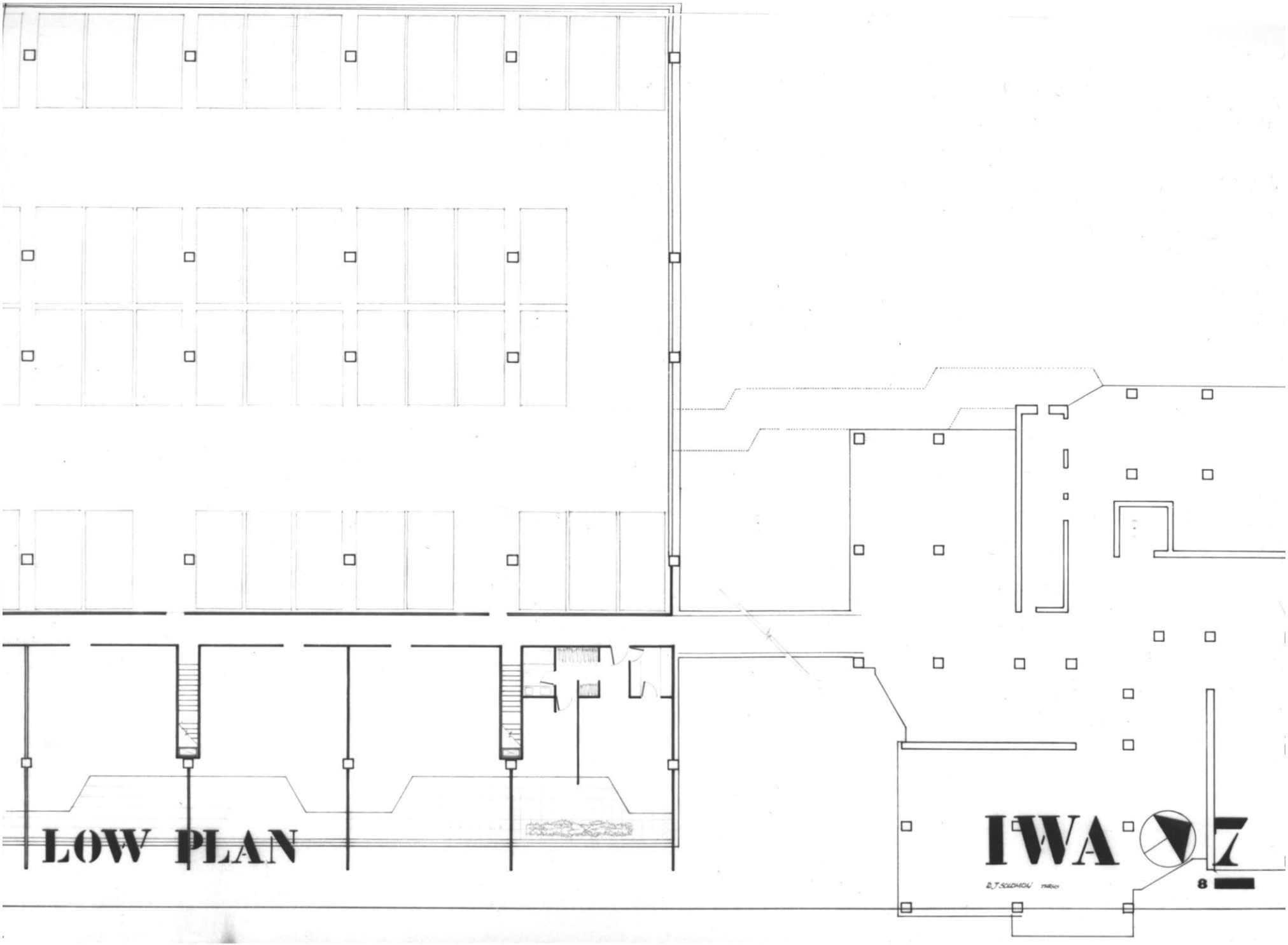
IWA 5

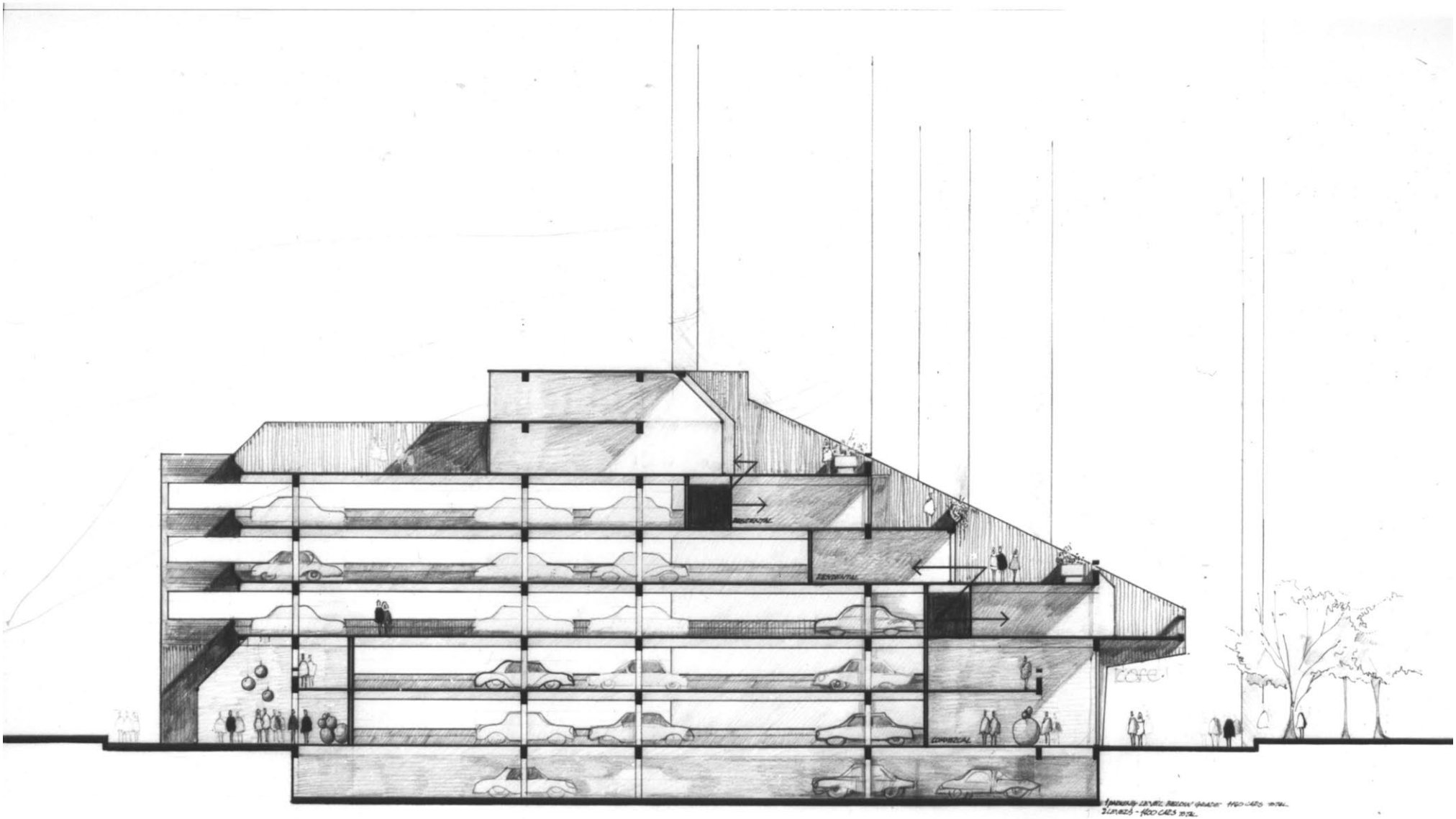




COMMUNAL FLOOR

IWA 6


LOW PLAN
IWA
8



A-A

IWA 8

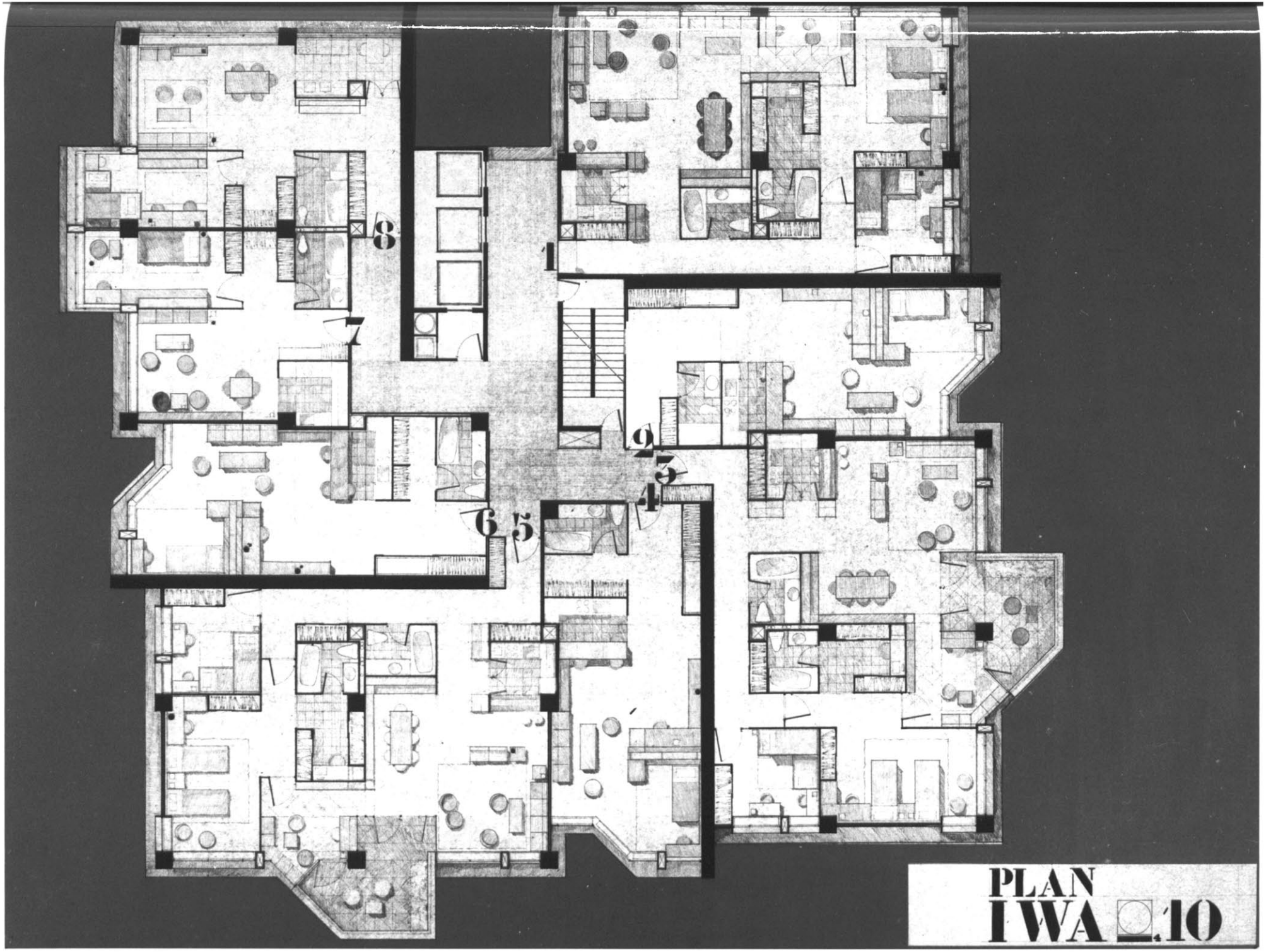
MIT Libraries
Document Services

Room 14-0551
77 Massachusetts Avenue
Cambridge, MA 02139
Ph: 617.253.2800
Email: docs@mit.edu
http://libraries.mit.edu/docs

DISCLAIMER

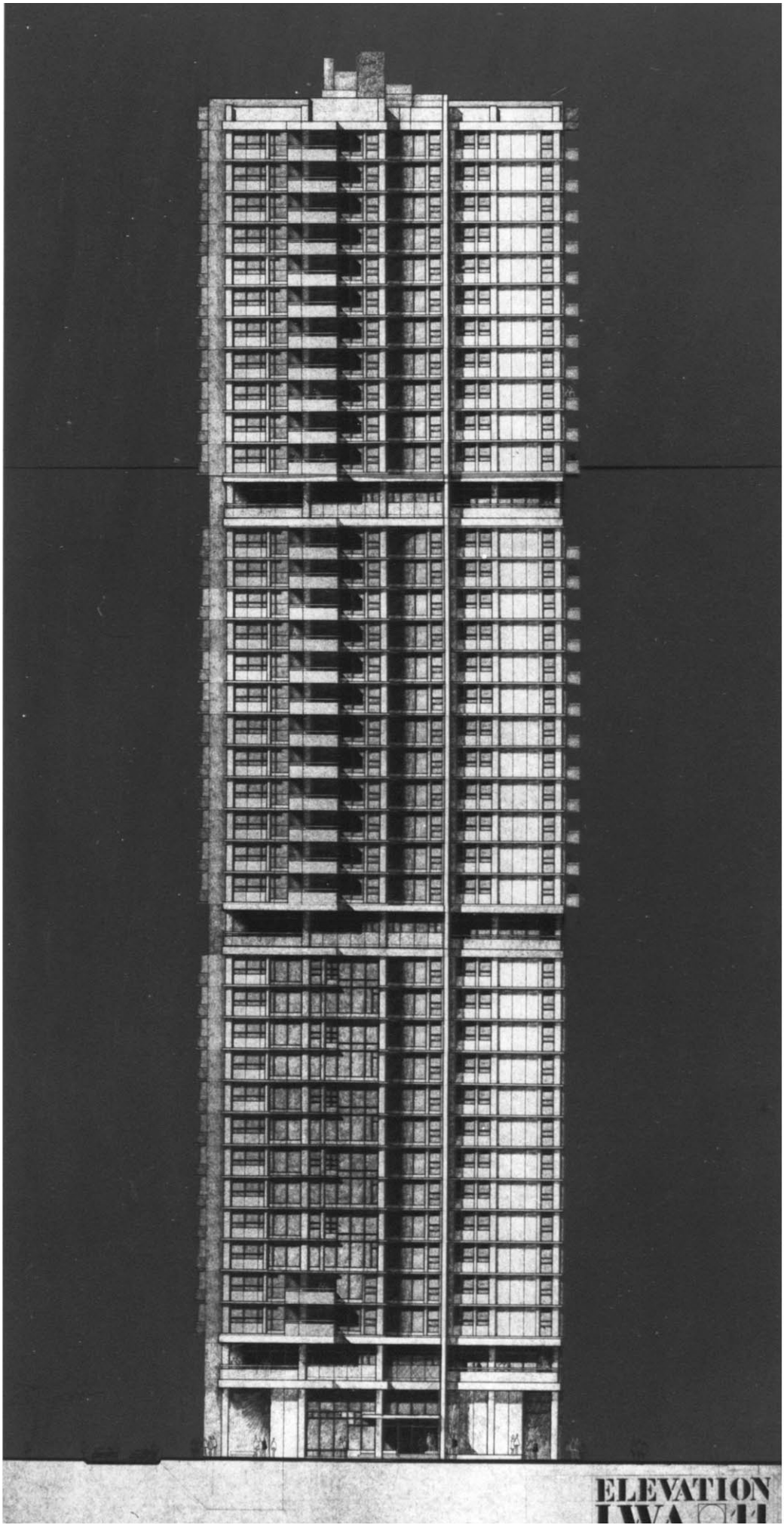
Page has been ommitted due to a pagination error by the author.

DRAWING 9



PLAN
IWA 10

ELEVATION
IWA 8 11


ELEVATION

APPENDIX A

Abbreviated Building Code

1. Incinerators must be provided for buildings over 4 stories high and/or containing over 12 apartments.

2. Buildings over 6 stories in height must be of fireproof construction and have at least two stairways of 3'-0" clear minimum width.

3. "Scissor type", adjacent or interlocking exit stairs are permitted provided their entrance doors are a minimum of 15'-0" apart.

4. Distance from an apartment door to at least one stairway is limited to a maximum of 75'-0".

5. Multi-level apartments require either exit corridors at each level of a balcony or similar device to permit exit into an adjacent apartment in case of fire.

6. Public corridors and stairs may be entirely interior.

7. Size of windows shall be at least 10% of the total floor area of each room of which ½ shall be openable. Minimum size of windows, except for baths, is to be 12 sq.ft.

8. Minimum ceiling height in any apartment shall be 8'-0".

9. Any building over 3 stories in height is to be provided with an elevator.

10. Interior kitchens and baths are allowed, provided there is mechanical ventilation.

11. It is not necessary to have direct vehicular access to entrances of each building for ordinary traffic, visitors, deliveries, etc. However, vehicular ways may not be more than 200 feet from the entrance to any building.

12. Access for fire-fighting and emergency equipment must be provided, though not necessarily in the form of streets.

13. The minimum distances between principal facades of buildings parallel or perpendicular to each other

shall be 50 feet for a one-story building with an increase of 5 feet for each additional story.

BIBLIOGRAPHY

I. Interviews

Mr. Stephen Diamond, Boston Redevelopment Authority, Boston

Mr. Robert Loverud, Boston Redevelopment Authority, Boston

Mr. Lauren Otis, I. M. Pei and Associates, New York

Mr. Louis R. Solomon, L. R. Solomon, J. D. Cordwell and Associates, Chicago

II. Texts

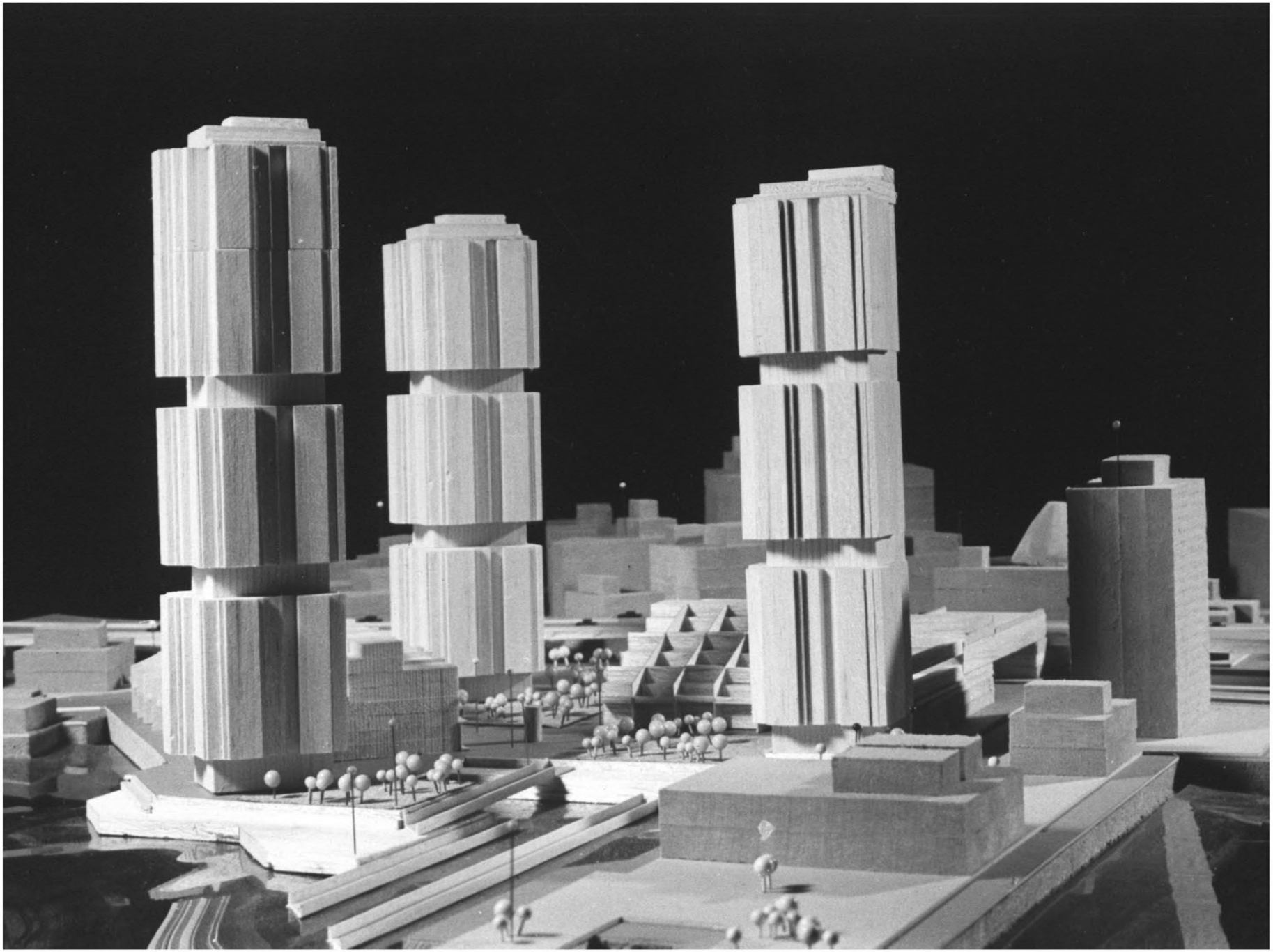
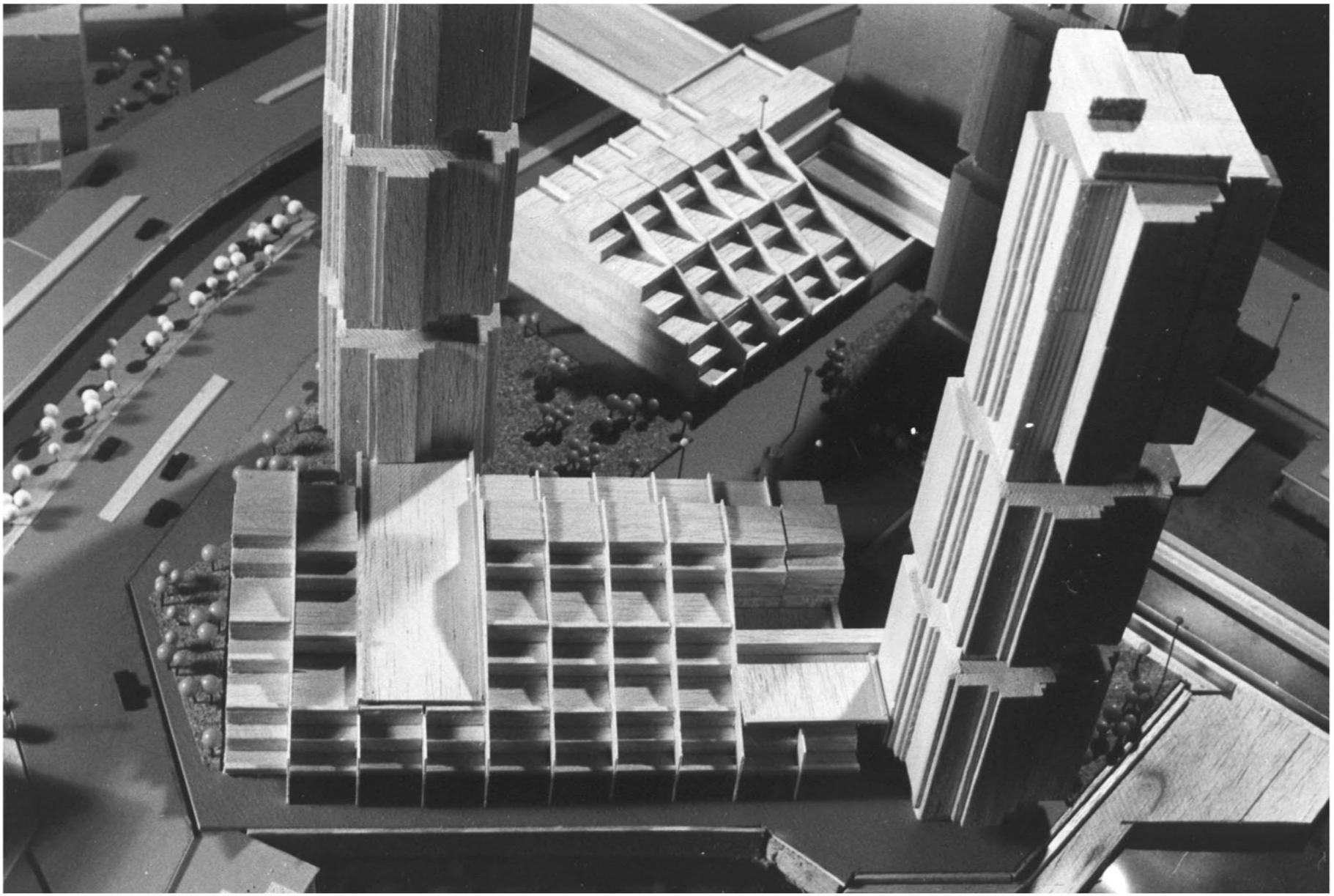
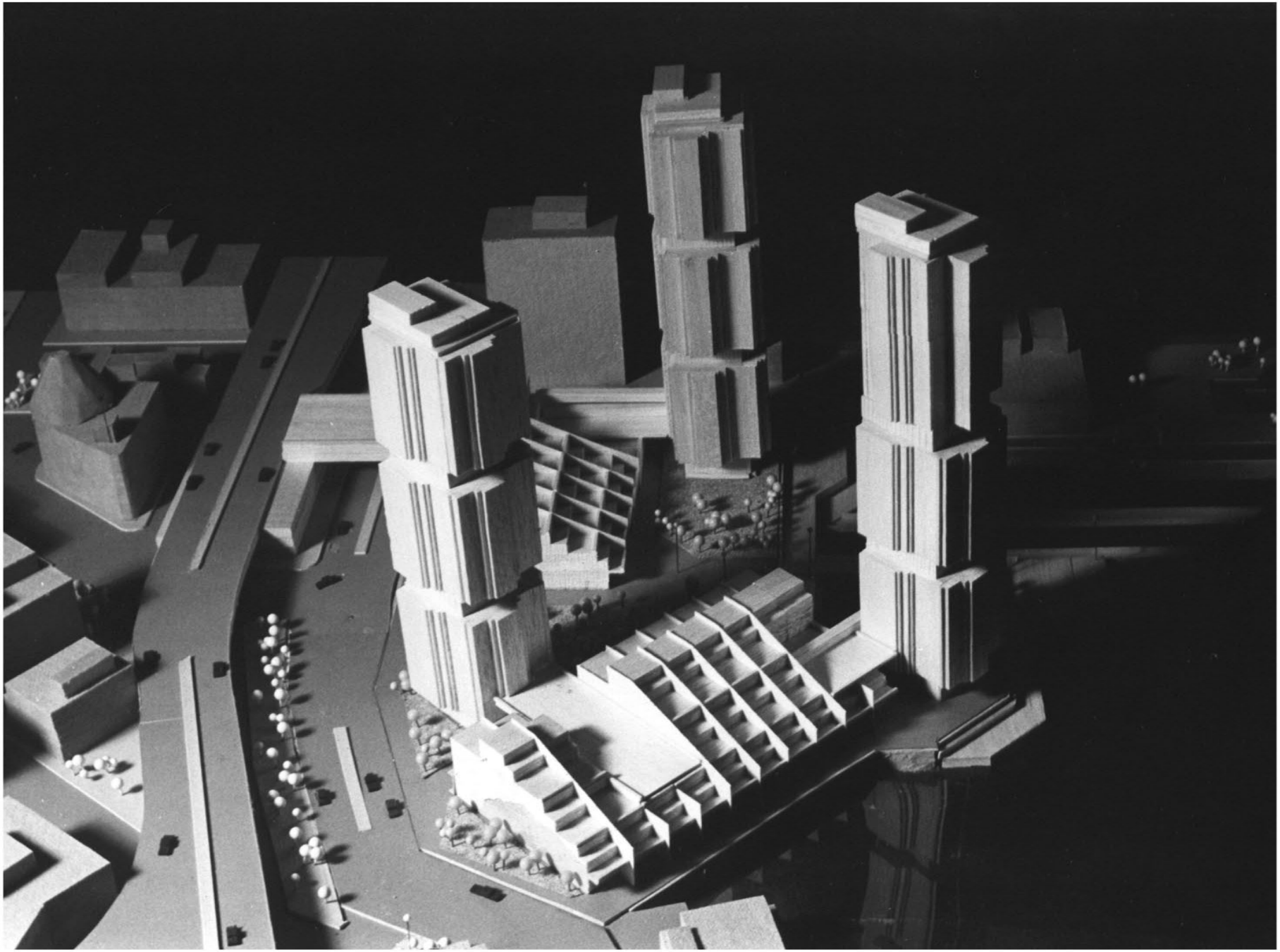
Boston Redevelopment Authority, Downtown Waterfront - Faneuil Hall Urban Renewal Plan, B.R.A., Boston (1964).

Chermayeff and Alexander, Community and Privacy, Coubleday and Co., Garden City, N.J. (1965).

Katz, Robert D., Intensity of Development and Livability of Multi-family Housing Projects, F.H.A., Washington (1963).

Pei, I. M. and Associates, unpublished program for Boston Waterfront Development (Jan. 1966).

Ruberoid Company, Fifth Ruberoid Architectural Design Competition (1964).

Solomon, Cordwell and Associates, unpublished data on Apartment Units in the Chicago Area (1964).

Winnick, Louis, The Apartment House Market in the Sixties, Lecture (Jan. 1965).