

A WORLD TRADE CENTER FOR BOSTON

by

Mary Stevens Fawcett

SUBMITTED IN PARTIAL FULFILLMENT  
OF THE REQUIREMENTS FOR THE DEGREE  
OF BACHELOR OF ARCHITECTURE

at the

MASSACHUSETTS INSTITUTE OF TECHNOLOGY  
1956

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May 21, 1956

Dean Pietro Belluschi  
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Dear Dean Belluschi:

In partial fulfillment of the requirements for the degree  
of Bachelor of Architecture this thesis, entitled "A World Trade  
Center for Boston," is herewith submitted.

Respectfully,

Mary Stevens Fawcett

ABSTRACT

"A World Trade Center for Boston".

By Mary Stevens Fawcett

Submitted in partial fulfillment of the requirements for the degree of Bachelor of Architecture at the Massachusetts Institute of Technology, May 21, 1956.

Exhibition and recreational uses characterize the twenty-five acre site along Atlantic Avenue. The World Trade Center exhibition hall encloses 40,000 square feet of uninterrupted exhibition space surrounded by a ring of related functions. A park opening 2400 feet of waterfront for public uses also gives a new interpretation to the dense urban geometry of the down-town office district.

The general treatment of the landscape and design of the exhibition building was to connect the present purposes with the area's past traditions.

## ACKNOWLEDGMENTS

I wish to thank each of the following people for contributing their particular skills and general interest to this problem:

Dean Belluschi,

The 1956 Thesis Committee;

Professor Beckwith,

Professor Brown,

Professor Newman,

Professor Jones,

Professor Anderson,

Professor Wiedlinger,

Thomas F. McNulty,

My classmates,

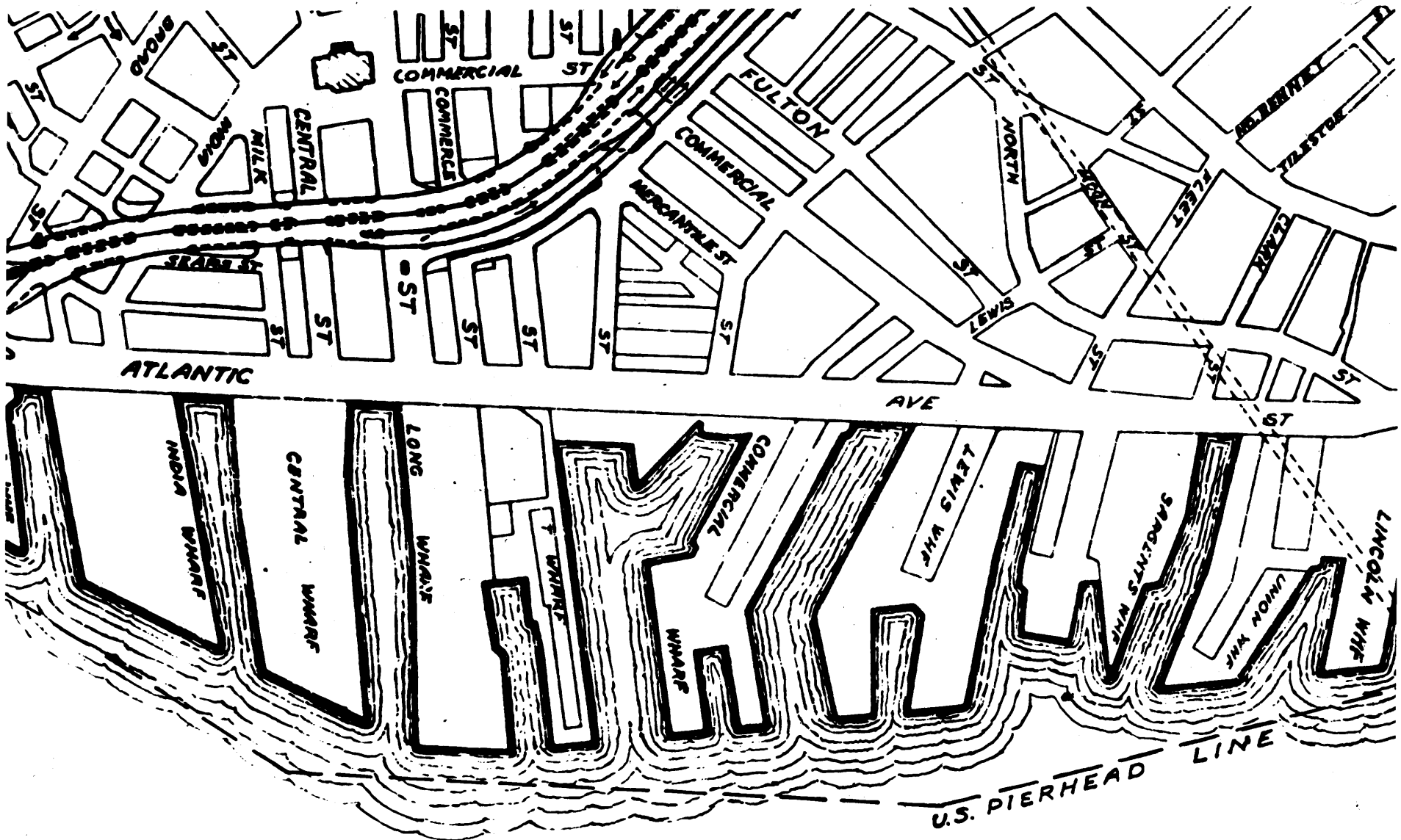
Members of the Committee to Establish a World Trade Center in Boston, especially David C. Adkins, Managing Director,

The Boston City Planning Board, especially Sydney M. Hodges and Barbara Devine who have worked on the city's proposal for the area's redevelopment, and

The M.I.T. Planning Students, who spent the fall term studying the area for redevelopment.

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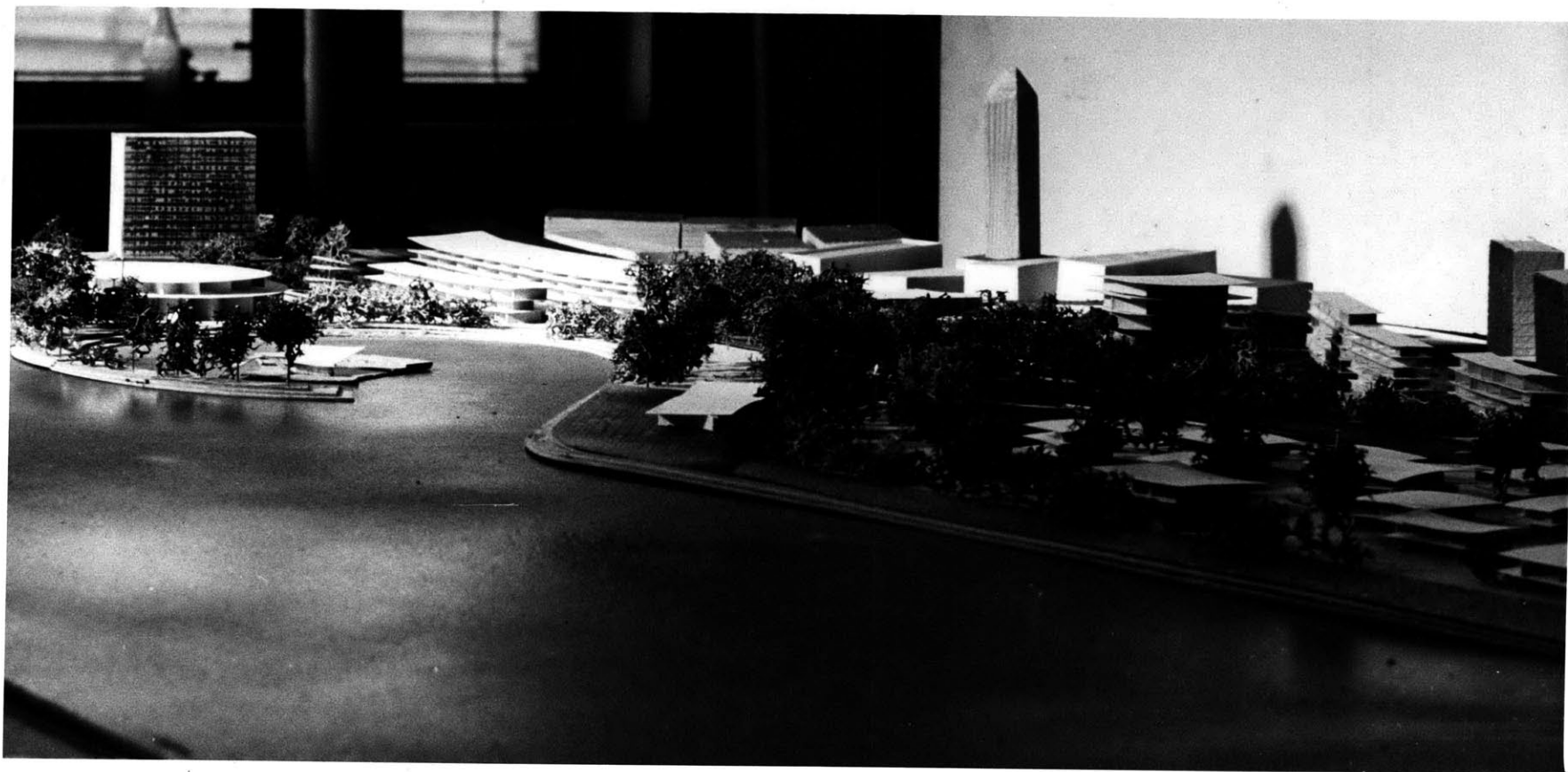
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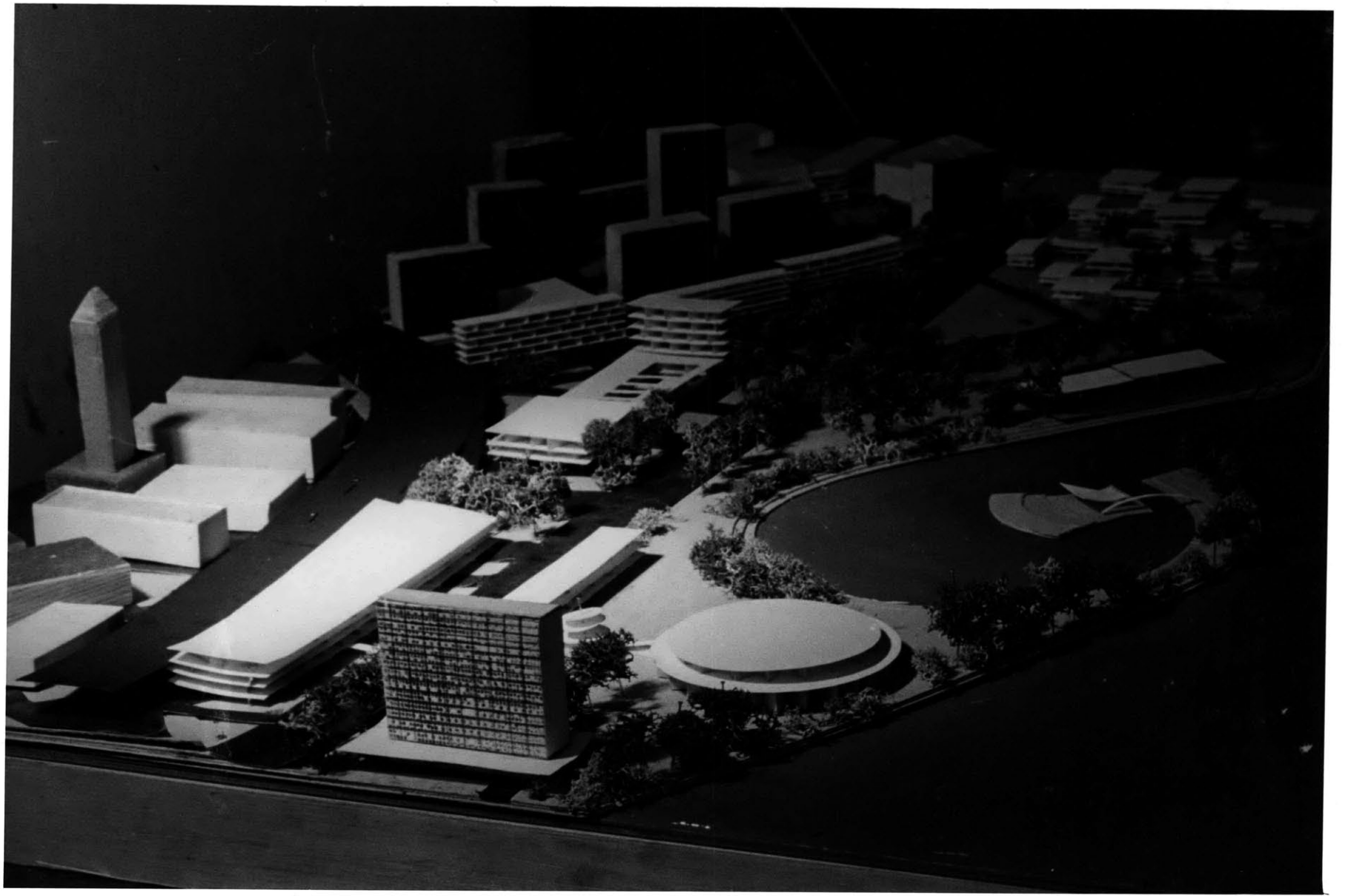


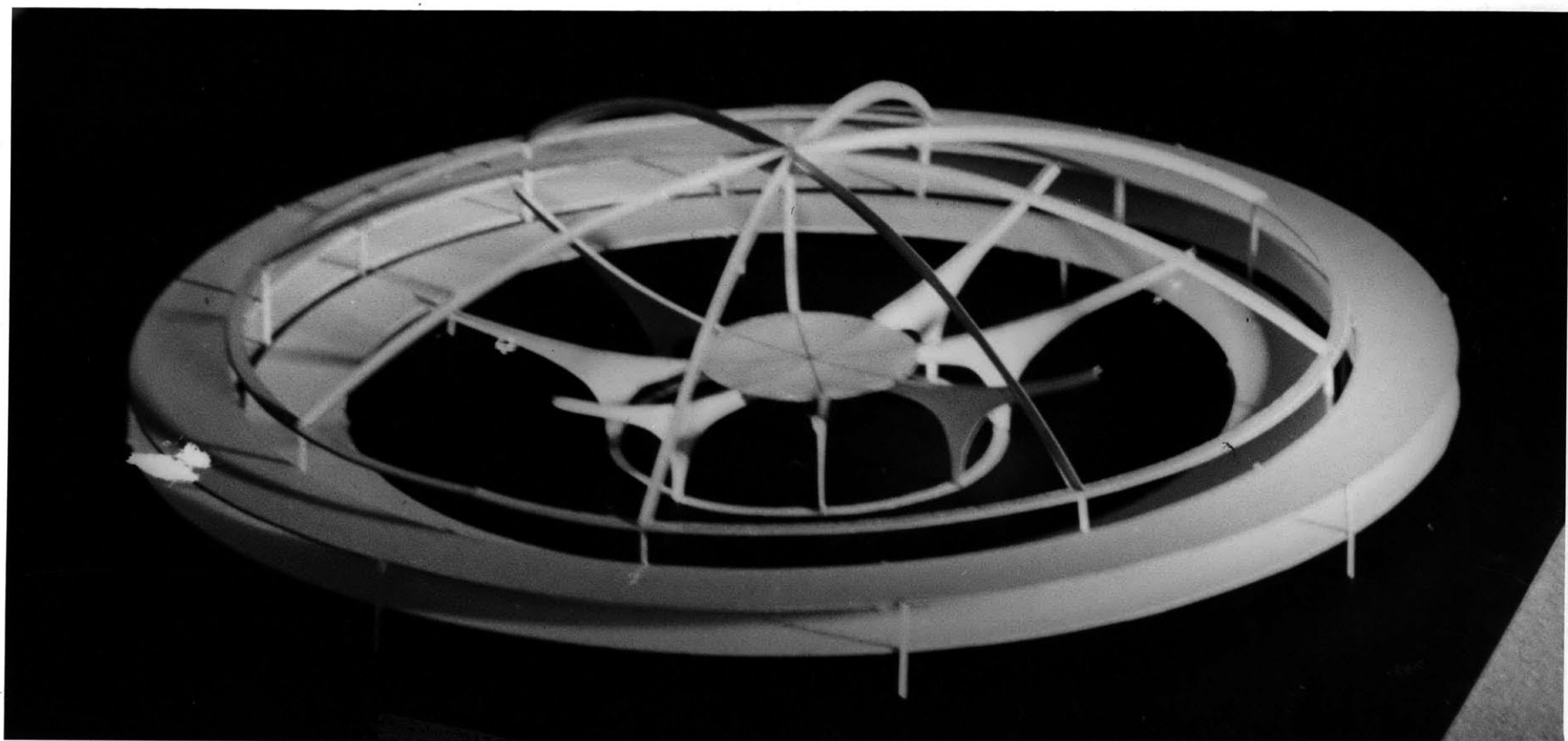














## INTRODUCTION

A World Trade Center has been projected for many cities, but only the original at New Orleans is now in operation. Since the International House and International Trade Mart function in reconverted business buildings, and the remodeling has not been entirely successful,<sup>1</sup> the first problem in designing was to analyse the functions of a World Trade Center, and its relationship to the Boston area. Several interviews with the Managing Director of the Committee seeking to establish a World Trade Center for Boston gave a general idea of the type of environment they wanted. To make a clear statement of these needs required these questions:

1. What types of activities will happen in the area?
2. How many people would be involved in the private, public and semi-public functions?
3. What kind of control would be suitable for these activities?
4. What relationship does a World Trade Center make with the local environment?
5. Should the environment be a city?
6. Where in a city?
7. What other activities are congenial in its area?

To answer the first questions, involved the more general one of designing in an urban area. Continuity and context are often lacking in a cityscape because the continuity of nature is substituted by conscious or chaotic human design. The City Planner is involved with overall land uses and densities, while the architect is competant to

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<sup>1</sup>See Appendix for a more detailed description.

work out specific buildings. The difference in the two scales is where the trouble, I found, arises. It is a no-man's land in design and one that seems to become critical in redevelopment programs for discarded city sections. Multi-story elevator buildings using new materials can easily seem out of place when seen against the older neighborhoods (in Boston characterized by brick and lowness). A World Trade Center is not only a new outward relationship to the neighborhood in which it would be built, but its purpose involves business men and the public of Boston with places and people of other nations. In so doing, it is affecting the character of a World Trade Center. The local environment with the world outside would be a case of exchange, principally of products, so that it must offer the public and trader a place to meet and exhibit. Accessibility would be pleasant and rapid, and there should be adequate car parking as well as swift public transportation.

A city is most recognizable as a network of transportation, financial and governmental centers, and social and cultural traditions. A World Trade Center is involved with these aspects of a city's life and could not be considered separately. Serving business men, in particular, and the public with special programs, a World Trade Center should be geographically near the financial center of Boston. (Banks and investment firms are strongly engaged in this type of activity). At the same time the World Trade Center should be oriented to public transportation facilities.

The daily activities involve

- 1) business men's luncheons and club meetings (up to 300 people),
- 2) private and semi private conferences throughout the day,

- 3) visiting foreign delegations and school children,
- 4) general public attendance at the permanent exhibitions.

The peak load functions are thought of as

- 1) Trade Fairs held two to three times a year,
- 2) visiting exhibits, like the G.M. Motorama,
- 3) crowd drawing speakers, such as political candidates and heads of other nations coming to Boston on good will tours,
- 4) conventions of business groups and political organizations held only occasionally.

The peak load could be up to 5000 people at one time so that restaurant, bar and lounging facilities are important in the circulation patterns. Stairs and elevators do not seem as suitable as ramps for this use.

A business man's hotel, similar in operation to the Statler, is suggested as a related element to the exhibition facilities. Large receptions and banquets would be put on by the hotel staff, as well as the traveling accommodations being made through travel agencies, in the lobby. A visitor from abroad would arrive first at the hotel from the air port (ten minutes by taxi).

The character of the exhibition hall is that of a large volume to contain

- 1) displays which can be either subdivided into the galleries and main floor area, or as one large space, and a permanent exhibition area for New England products at the entrance level,
- 2) press room and reading area,
- 3) public restaurants and lounges,
- 4) business men's clubs and eating facilities,
- 5) conference areas provided with translating facilities,
- 6) and for large crowds the main floor area can be used as an auditorium with temporary seating. The acoustic conditions



are not designed to be maximal, but should be capable of directing the speaker's voice through a public address system throughout the space with minimal disturbance and unintelligibility. No plays or musical entertainment of any high quality will be attempted in the open arena.

Research work, the library, and the direction of World Trade Center activities are to be handled in the consulate building, the third closely related element. The reason for separating the operating activities of the center from the exhibition hall is for privacy and quiet. The public space is thought of as being alive and noisy, whereas the research activities need an environment of reflection and solitude.

Press conferences and interviews would be held in the exhibition hall with facilities designed for newspaper communication.

The United Nations complex in New York is actually a closer parallel to a World Trade Center than the New Orleans facilities, where the improvised spatial arrangements conflict with each other and good display facilities are completely lacking. The lounge for the delegates to the Assembly or Security Council have the same quality of international exchange in an informal atmosphere as the business men's clubs and meeting areas should suggest in a World Trade Center. Since the World Trade Center is located adjacent to the business district, private office space can be handled in buildings there rather than in the World Trade Center itself. Exhibition space could be rented by the square foot in the display areas, similar to the practice in New Orleans. The chief difference would be that the exhibits would be planned and designed by the World Trade Center staff rather than left to individual firms. Greater clarity and coverage could be given to a subject of international trade in this manner than when it is left to untrained personnel from

various firms in the area. In order to arouse public interest in a foreign country, or in some aspect of international trade, the Trade Center should do more than display goods; it must somehow stimulate a sense of individual involvement with that country by presenting as many views as possible, visual presentation by photographs, manufactured objects, films, as well as synchronizing the exhibits with visiting delegates and important speakers. There is a fine opportunity to combine the functions of an art gallery with the roisterousness of a train station. The hand-picked limits of a museum do not have to be imposed here. Good taste and bad taste will be present in the objects designed. The exhibition designer can interpret this wide output and create a unique experience out of the gamut of energy and imagination of a nation, from its heavy machinery to dress materials; there is the possibility of conveying the living patterns of a society in a contemporary manner (a current anthropological survey not differentiated into cultural fragments, nor needing the translation of time.) A person in Boston can see how a person in another environment has handled a similar problem, and mutual exchange of these ideas may become as culturally valuable as that in the arts and sciences.

## SITE SELECTION

An important consideration in determining the World Trade Center was the need of easy access with the least disturbance to traffic on existing streets. Parking facilities near major expressways or avenues should be designed integrally with the exhibition facilities.

These four conditions were taken into account:

- 1) parking conjoined with traffic routes,
- 2) adjacency to the business center of Boston,
- 3) a site where people either naturally pass through, or with enough drawing interest (to partly be determined by the range of activities) to bring them to the area by public and private transportation,
- 4) and a site which can be given some civic importance and elegance, a city "gateway".

I examined several areas in Boston which seemed appropriate.

a) Copley Square. It fulfills conditions 3) and 4) very well, but it is not related to the business district itself, but to retail stores and high priced office space. Traffic congestion is now critical and would be almost impossible to handle on existing streets with the World Trade Center requirements. Parking and servicing would dominate the design and result in a bad conflict with the exhibition spaces (both indoor and outdoor). The hotel situation is excellent as well as public transportation. Land cost is high so that the project would either be resolved on a smaller scale or at a higher investment. The practical state of New England thrift made this seem unlikely.

b) The Back Bay area. The location of the Back Bay Center design would offer plenty of low cost land to develop and would provide for as much parking as required. It could be directly connected with

routes skirting Boston, and the servicing and congestion problem would have none of the difficulty of the Copley Square site. Its relationship to the business district is, however, even more remote so that interest in supporting and attending functions in a World Trade Center by business men would be limited. In New Orleans business men use the eating and club facilities habitually as the International House is convenient to the downtown offices. The Back Bay location would favor the public to the sacrifice of the clients and the working core of a trade environment.

c) The waterfront area at the end of State Street and running along Atlantic Avenue. This is a redevelopment area which the Boston City Planning Board has been studying for five years and recently proposed a 13.5 million dollar solution for. The existing activities are the remnants of the shipping industry (most of the firms and servicing functions having moved to East Boston which is being developed by the Port of Boston Authority.) A 10 million dollar improvement plan for the East Boston facilities is being made up at present for presentation to the city government. Passenger ships as well as freighters would be serviced at docks there. The area is directly opposite to the Atlantic Avenue site across about 1500 feet of water. The shipping activity is therefore visible from the State Street-Atlantic Avenue site.

Like the Back Bay area, land costs along Atlantic Avenue are low, parking facilities good, relation to major transportation routes (the artery, Sumner tunnel, North and South Stations) direct, and the use of Atlantic Avenue (100 feet wide) as an avenue for both service and passenger vehicles would be easy to accomplish with only minor surface and landscaping improvements. There is a railroad side line along the avenue now, but its importance in present distribution systems is limited.

Exhibition material would be unloaded from ships at East Boston and trucked to the site, trucked to the site from Logan Air Port, or brought from North or South stations. Outdoor exhibition space and general use of the site has marvelous possibilities.

The main difficulty is the limited pedestrian access. The artery is a barrier visually separating Atlantic Avenue and the waterfront area from the heart of the city. The business district is physically adjacent, but the psychological impact of the arterial wall gives the area a feeling of isolation. This can be largely overcome by the treatment along Atlantic Avenue. Between the artery and the water, buildings should be kept low and out of the way of human sight lines along State Street to the water. Trees and public seating areas can be an introduction to the waterfront land use. Besides the people working in the business area, housing projects from the North End are proposed at the northern edge of the site, so recreational facilities could serve as a playground area for children living in the housing area as well as providing waterfront facilities for the general city populations.

The considerations of the Boston City Planning Board for the redevelopment of the Atlantic Avenue area were more restricted than mine because of the difference in approach. Existing buildings in fairly good condition had to remain in their schemes, and they also felt it highly improbable that the city would support a radical change in the existing wharf forms. Bulkheads are a major difficulty in changing the shape of the land. I tried to keep the existing bulk heads as a base without retaining the wharf shapes in new land. The marina and its related services are a major part of their program, whereas I felt, after some study and discussion with the Thesis Committee that those

functions could be better handled in a harbor more protected from Northeast storms and more accessible to yachtsmen commuting to work during the summer from the suburbs of Boston. Using the center space for a park differs from their design, as I wanted the recreational facilities to be enjoyed by the business and retail shopping district as well as by the abutting housing. The marine museum in their plan I also discarded in my proposal after discussing the area with the M.I.T. City Planning students, especially Mel Levine. This elaboration is not intended to deprecate their solution, but to state the difference in the assumptions underlying the two proposals. Their specialized training in City Planning and the five years of study invested in the problem, gives their solution a practicality mine never attempted. The need of stating a problem of urban design in ideal visual terms motivated my study.

Garage facilities for people traveling into the city from neighboring towns or states as well as for local traffic is provided off the artery at the same level. The artery is directly connected to the air port so if a visitor rented a car in advance he could drive it from the air port to the garage and then cross Atlantic Avenue above street level to the hotel. The garage connection with the artery prevents a traffic congestion from arising. Facilities for 1500 cars are provided by three separate garages. To prevent a bottleneck before and after a major performance, as many points of entrance and egress as possible (within the existing street and artery layout) was thought necessary. Through that, visually the space between the garages could become a frame to see the waterfront development at the artery level. Now one

drives between tight clusters of old buildings. The direct contrast with a large openness would be a dramatic introduction to the site by automobile. Coming by taxi, Atlantic Avenue would be lined by trees in a regular rhythm behind which the simple garage buildings and a few stores to serve to local needs of the surrounding housing developments would give a quiet background. Attention would then go to the waterfront and the park, the curved bay, and central exhibition building. From all three approaches I could try to suggest a city "gateway."

Needless to say, in view of the general merits of the investigated sites, the Atlantic Avenue-State Street site was chosen.

## THE PROBLEM

The relationship of the site with older surrounding neighborhoods is dramatically focused on the Custom House Tower rising 250 feet in the air along the State Street access. It is a beautiful tower and should not be faced with competition by the placing of high buildings in front of it. The Old State House at the opposite end of State Street from the site is blocked from direct view by the artery. Faneuil Hall and the market district are physically close to the Atlantic Avenue site, but building and street barriers make pedestrian access remote and unpleasant. State Street and Commercial Street are the only passageways (for cars and pedestrians) through the arterial wall. Thirty-five feet above street level, it is impossible to differentiate the two traffic routes by ramping one up or down. An automobile entrance to the artery at State Street further impedes pedestrian access to the site from the business district. The limitations are, therefore, severe on any significant treatment of traffic coming from the State Street direction. Widening the side walk and planting a double column of trees are surface treatments which can visually improve the pedestrian's approach. The element of change can also be used as a means of drawing people to the site. From the chaos of the streets and difficult traffic conditions, the motorist or pedestrian should suddenly come into an open and planned area which focuses on the water, the bay area, and beyond to the opposite shore of docks and large freighters and passenger ships. This design approach of building up to a climax in an open civic space is a familiar technique in European cities. Since this area of Boston exhibits the same characteristics of the dense, narrow winding streets with a happen-



chance relationship of old and newer buildings, a similar spatial treatment might turn the apparent barrier into another "gateway" to the site.

Display and recreational areas characterize the site, and since the land is relatively flat and a majority of it is filled land with an elevation of + 16 feet above mean low tide (Boston has 9 foot tides, and any building must allow for flood tides during the vernal equinox as well as for fall hurricanes), distinction of use can be handled by 1) the outline form of the filled land where it meets the water, and 2) by circulation patterns along the water front. The park section seemed a good transition zone between the World Trade Center complex, and the recreational facilities. The form of the park is a spiral encircling a bay area. Small yachts, outboards, and rowboats could use the protected area for boating during the summer months, and in the winter the curved bay would be a visual form to enjoy while driving along Atlantic Avenue or when coming from the artery. The peninsula acts as a partial breakwater against Northeast storm waves, and it gives the pedestrian the experience of walking out on a strip of land with water on both sides. The dished out shape of the land as it connects with the water allows for walking at the water edge at both high and low tides. The end of the peninsula provides a quieter and more contemplative environment than the active circulation routes along the Atlantic Avenue side of the bay.

These major circulation routes relate;

- 1) the hotel to the exhibition hall across the main plaza,
- 2) the hotel, auditorium and exhibition hall along the water edge of the plaza,
- 3) the consulates' building and exhibition hall by the Atlantic

Avenue entrance,

- 4) the exhibition building and park area with the subway entrance to the site at the end of State Street,

At this point the sidewalk becomes integral with the park and bay. By the spatial arrangement of the hotel, exhibition, and auditorium buildings around a central plaza, their functional association is strengthened. During conventions the hotel, auditorium, and exhibition buildings would be used together, and for smaller numbers of people coming to the site to attend an exhibit or foreign film, lecture, or dramatic production, the hotel and exhibition hall's restaurant and entertainment facilities (such as a night club on the hotel roof) could be enjoyed at intermission, and before or after the performance. International Trade Fairs, Governors' Conferences, meetings of the New England Council or the Boston Chamber of Commerce, and General Motors' Motorama, are current examples of the type and size of groups I had in mind as using the complex as one unit.

The building for the consulates, World Trade administration, library, and research activities carried on by the staff is not thought of as part of the interrelated hotel, auditorium, exhibition functions. The consulates' building fronts along Atlantic Avenue and is directly across from a garage and close to the subway entrance, as well as being accessible to State Street. The daily use of this building by a permanent staff, and the frequent conferences with bank directors from the major Boston Banks located in the State Street neighborhood, warranted this site location.

A clear distinction between the working and spectator activities in a World Trade Center is intended by their separation into two buildings. The private and reflective atmosphere of the research and administrative unit is kept out of conflict with the lively, reverberant exhibition

hall. A good library on international relations is intended by the clients, and the rarer periodicals and less public information would be kept in the consulate building. International magazines, such as the London Illustrated News, Illustration, etc. would be publically available in the exhibition hall's reading and lounge areas. A spatial relationship between the two buildings is, however, desirable as foreign visitors will use both buildings when they come to the Trade Center. The Atlantic Avenue entrance along the axis of the exhibition hall creates a minor plaza between it and the staff building which could be used as outdoor exhibition space during the summer.

#### Exhibition Hall

Since the exhibition hall is integral in each of the four major circulation routes, it was natural to think of it as a circular form relating each of the specialized buildings. Its size (280 feet in diameter) with the major space covered by a dome (240 feet in diameter) suggests a huge container in which galleries and open floor space are connected by ramps, and where a person coming out of an office, restaurant, or conference room grouped around the circumference would suddenly experience the whole volume of the building in the center open area. It is the use of empty space as the most positive visual feature.<sup>2</sup>

Some of the problems in designing the Exhibition Hall were:

1) to maintain control of the circulation while allowing for several entrance points and random use of facilities within the building,

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<sup>2</sup>Gyorgy Kepes in a lecture on the modern art movement, expressed this idea.

(a directional circulation pattern would limit flexible use of the main floor and galleries for exhibitions),

2) providing privacy for the consulates and business men's clubs and conference areas while still associating them with the exhibition activities. A display area for the permanent exhibition of New England products was requested by the client as being a means of keeping local business men interested in and attending World Trade programs. The consulates of foreign countries would be directly involved in the exhibits of their national products, and the individual business contacts made during business luncheons or conferences have proved the most valuable influence of the New Orleans Trade Center. The consulates would be equally involved with the trade development programs initiated by the World Trade Center staff.

3) giving a sense of scale to products as varied in size as heavy machinery and perfume, and to types of exhibit, from semi annual trade fairs or cross sectional display of a nation to a multitude of unrelated products. The exhibition designer on the staff could control some of these possible conflicts, but the frame of reference will be "built in."

4) the many differences (structural and psychological) of a circular form from rectilinear systems. Its non directional character must at times be carefully sublimated to specific circulation requirements. The psychological feeling of being surrounded by walls equidistant from a common centre point could be disturbing. Acoustically the problems of a circle or dome are more troublesome than those of cubes because of focusing and continuous reflectance of sound waves back to the circle's center.

5) mechanical equipment, storage, servicing and the discriminating use of materials. These are details which can bring out the character desired in the building or do much harm in their interference with the larger architectural ideas.

## SOLUTIONS

The following are the solutions to the problems listed in the preceding section.

1) By capitalizing on the symmetry the entrance breaks into the circle become extremely strong elements. The motion of people at these points tends to underplay the non directional nature of a circular form. Structurally the circular form can be made use of for the dome's tension ring. The ring of offices etc. is supported by its own columns at the outer circumference and tied at the inter-circumference to the concrete columns supporting the dome. The inner gallery, twelve feet wide, is cantilevered from these columns. The two sets of columns, very different in size, define a loggia of interior and outdoor circulation. A wall, free of the structural system, is used to control access to the hall. The building sits on a slightly raised dias (one and a half feet) above the main plaza, so that the entrance point can be clarified by a few steps. On the bay side, the ramped walk along the water is broken into by steps leading to the platform and a second entrance; the relationship of the building to the land is, therefore, designed to work with the entrance points and to strengthen or weaken, depending on the condition, its inherent symmetry.

2) The business men's and consulate facilities are located on the second floor gallery which removes them from the main stream of public circulation, but gives them immediate access to the exhibition area. From this level a view of the site and the harbor front, both the Atlantic Avenue and East Boston shorelines, is clear and can provide a dramatic outlook from the restaurant and club areas. At the moment,

the European nations are trying to interest Americans in traveling to their countries so that the consulates, besides their promotion of international trade with local business men, are available to the public to give information not presented by exhibition programs.

3) By designing the exhibition space to be used separately or for one total display, a variety of settings can be made for products. The galleries are treated on a small scale while the central arena is left open so that large machinery, house units, motoramas, etc. can be exhibited in an uncramped setting.

4) A loud or alive space is good for an exhibition hall so that the acoustic problem of reverberation time is not serious. The reflectance and focusing problems can be overcome by a) expressing the dome structure on the inner surface so there is no smooth curve and b) providing reflecting and absorbing surfaces on the side walls and ceiling. The exhibitions and people will help the absorbant problem below, and hanging panels (flags, banners etc.) may be necessary under some conditions. The breaks in symmetry for psychological reasons will also help solve the acoustic condition of sound being reflected continually back to the center.

5) The materials of construction and mechanical equipment can refine an architectural idea or impede human circulation, and the visual and structural delineations.

Structure. The exhibition hall should express in material form the social period in which it is fulfilling needs. I investigated means of constructing the dome and discarded a concrete monolithic shell because of the difficulties in pouring and forming it. One builds a scaffolding

which is then duplicated in concrete, which is expensive and does not make use of our technological development in prefabrication and mass production. On the other hand, a sheet material, such as aluminum, used as skins for the Civic Center in North Carolina and for the recent dome at the General Motors Research Center in Detroit, must be welded in sections and conceal the structural ribs beneath them. A sheet material is not best used in this way. Lighting, either direct or translucent, into the space below can be a feature of new building forms by using a plastic skin. Professor A. G. H. Dietz, Associate Professor in Building and Construction at the Institute, has made these comments:

"For forming large spans, curved forms could be built of reinforced plastic, as a type of sandwich panel with a foam core, which would have sufficient bulk, and be covered by reinforced plastic skins.

"Concrete and the plastics can well be used together to take advantage of their common plasticity.

"The savings on cost would be the elimination of form work, and if a symmetrical curve, like a dome, was used only a few molds would be required. Either fibreglass and the polyesters, or the acrylics could be used as the skin material for a concrete ribbed structure.

"Plastics can be destroyed by fire, but these two mentioned are self extinguishing (meaning that when the flame is removed the fire goes out). Using a concrete frame, there would be no danger of failure in case of fires since the plastic, when the construction is completed, acts only as a skin....During construction of each section the plastic molds are held by light scaffolding while the concrete ribs are poured in place. When the scaffolding is removed, after the concrete has developed its strength, the plastic sections support only their own weight."

Professor Dietz has been kind enough to go over my particular design problem and give advice on the size and span of members. His knowledge in the fields of material, and his conviction that such a



building method is not only reasonable, but possible to practice at the present time, seemed enough justification to propose this solution for the major exhibition hall structure. Concrete columns would take the compressive load brought by the ribs to the edge beam around the outer circumference. The tension ring itself can be prestressed concrete.<sup>3</sup>

Mechanical Equipment. Mechanical equipment for heating and ventillating the central open space and the surrounding contributory areas would be in the basement of the exhibition hall. A zoned system would probably be better, so that units composed of small auxiliary fans and thermo-static controls would be placed in strategic areas around the outer ring of partitioned spaces, but the compressor and major conditioning of the air would be done in the basement section.

Service. Servicing the restaurants and exhibition spaces would be done by trucks driving into the service area and unloading directly onto the freight elevator. Exhibition structures could be built in the basement and carried up by elevator to the main floors; those traveling exhibits in sections could be erected in the exhibition area itself. The 60 foot height at the center of the dome allows for any sized product to be shown.<sup>4</sup>

Materials and Landscaping. The retaining walls used along the water edge would be preferably granite, although the quarrying costs and cutting make it no longer a common masonry material in this area. The importance of conveying a building down motion to the water by walls and

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<sup>3</sup>The use of concrete "in tension" was tried out successfully in the hangar at Logan Air Port.

<sup>4</sup>The recent New York Coliseum has used this procedure on a much larger scale.

ramps can, even at the slight slopes involved, do a great deal to contrast with and emphasize the flatness of the filled land area.

### Method

To study the inclusive site uses and treatment, I built a model at 1" = 80' as a master plan. This enabled me to see all views of the site and the relative massing of the city and arterial highway which would affect the type of treatment given to the area. Connections with the business district could be studied accurately in three dimensions as well as relationship of buildings on the proposed site.

To insure that the large plan would also work at a human scale, I built a model of the exhibition hall at 1" = 20'. Both models were never viewed as end products but as a method of studying the part in relationship with the whole.

Drawings of plans at 1" = 40' and sections through the building at 1" = 20' accompanied the model development in order to study circulation and structural considerations in greater detail.

As a method of study this use of model and drawings at a variety of scales was harmonious with the design problem itself. Not predetermined, the procedure began as an experiment to overcome the "site plan" limitations I saw in the maps and statistical data at the City Planning Board. From consciously elaborating on the interplay of models and drawings, I found another meaning in Frank Lloyd Wright's term, "organic architecture". An idea expressed in architectural terms must always stay whole, and yet its refinement is absent or lost if it is not studied in great detail. I do not presume, however, that this

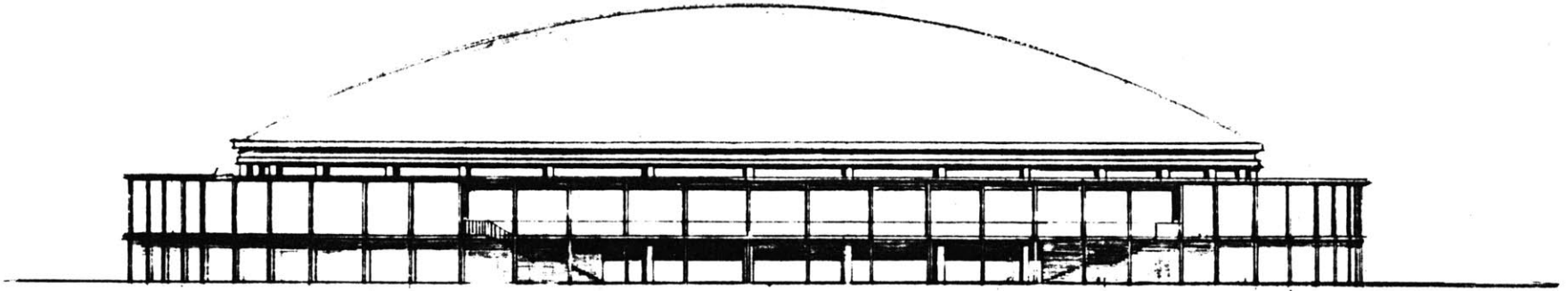
is a general method applicable to any design problem. In this case I had two equally weighted design areas--the visual outline of the whole area and the particular design of the exhibition hall. In cases where either the whole or the parts were secondary considerations, other methods would better apply. The significant value, I think, is that when the method of study is integrated with the architectural image, a unity happens in the design which is not predicated from either the idea or procedure alone. Conversely, an unbalance in either the method or concept will, if they are united, mutually affect the other so that a more disturbing condition is generated than when they develop autonomously. The studies illustrate this point.

#### Studies

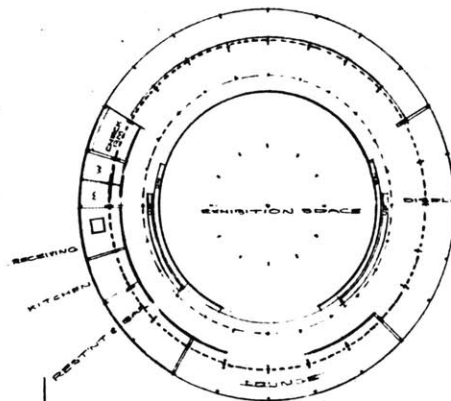
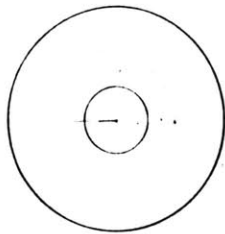
1) In order to insure frequent public use of the outdoor space, I thought of holding summer concerts in the bay area. People could sit or stand along the water edge, and an open shell for the orchestra and several hundred seats with good hearing conditions would satisfy the acoustic conditions. An island with pedestrian bridges seemed a workable solution. Difficulty with circulation and the kind of island which would work well formally with the large exhibition hall and curvature of the bay could not be overcome. The traffic on Atlantic Avenue and the arterial highway negated the seemingly good acoustic conditions. When the idea was discarded the island did not seem essential, and the strong form of the bay regained its purity. The pattern of boats and the tree line can provide the visual excitement hoped for in the island. The peninsula becomes a stronger idea as a remote spot in an otherwise

busy area without the confusion of bringing large numbers of people to a space designed for the loitering and private enjoyment of a few people.

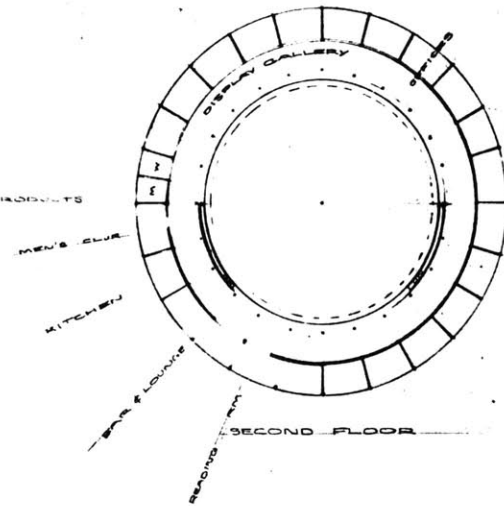
2) A conflict between the auditorium and exhibition hall developed when I tried to put the auditorium as a free standing unit under the dome. Difficulties in acoustically isolating the two areas from each other showed a deeper conflict, that of filling the open space with a large permanent structure. The whole was being destroyed for the part. The idea which originally excited me was one of setting a quiet area in the middle of a noisy exhibition space, and the overlapping lobby and rest room facilities seemed a practical solution. When the auditorium was removed from the exhibition hall and placed as an intermediary function with the hotel, a much closer relationship between the three units developed, and in the final solution, the World Trade Center elements are suitable for a wide variety of particular and collaborative combinations.



1" = 20'-0"

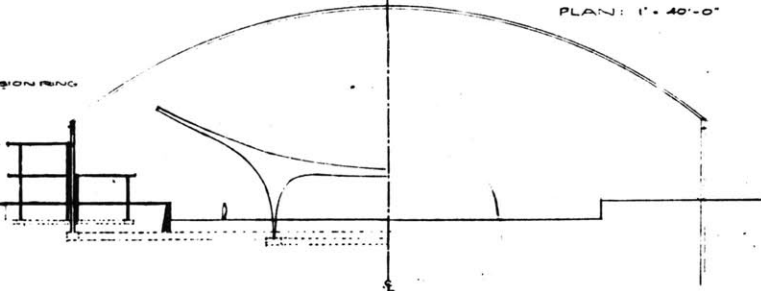


PLAN: 1" = 40'-0"



SECOND FLOOR

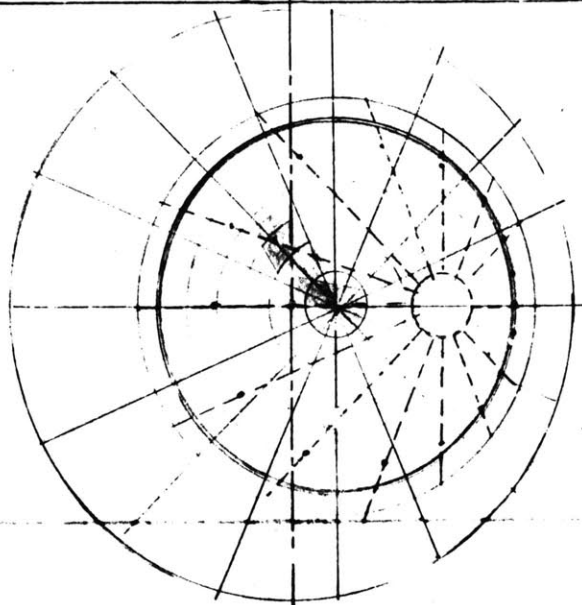
TENSION RING



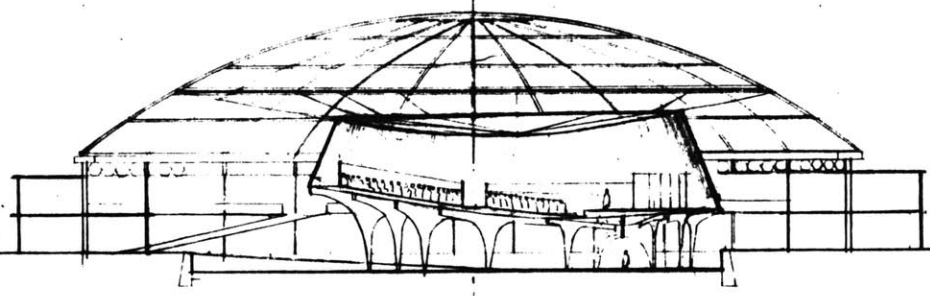
SECTION 1" = 10'-0"

WORLD TRADE CENTER EXHIBITION HALL

1/15/55 D.S.R.



WORLD TRADE CENTER  
5/9/56 M.S.F.



SECTION A-A



## CONCLUSION

These were the purposes of the whole project.

1) I wanted to create a suitable environment for a World Trade Center and relate the new functions to significant buildings and continuing traditions of the area.

2) Enough parking had to be provided for the hotel, auditorium, and exhibition uses, and to minimize congestion on surrounding streets.

3) Once having chosen the waterfront area along Atlantic Avenue as a promising site for a World Trade Center, it was necessary to relate its functions to other development on the site, such as the hotel and park.<sup>5</sup>

4) It was from consulting with the actual and potential planning professionals that I realized that there is this area of design where neither the planner's nor the architect's scales quite meet. Understanding the whole context while designing a related part, involves not only an idea but a method of solution. Simultaneously I needed a master plan on which to study the overall design decisions and, a means of quickly translating these effects on the individual building into a scale large enough to make the human being visible. The telescopic and microscopic views are often difficult to superimpose, but the experience of using both together provoked many new architectural insights.

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<sup>5</sup>The development of new uses and buildings between Atlantic Avenue and the artery, and the type of housing which would connect with the North End housing redevelopment program is only suggested in outline. It was important to consider this area so that continuity between the existing land uses and the proposed scheme could be made by a smooth transition. The Boston City Planning Board and the M.I.T. City Planning students were my reference advisors.



The best one, perhaps, was that I happened upon the beginning rather than the end to a problem, and that the satisfactory balance between these two approaches to design will not only become increasingly important in professional practice, but can help us connect with past architectural traditions.

## APPENDIX

Boston World Trade Center

Despite the potentialities of international exchange, New Orleans has been singular in making use of them. Miami, Houston, and Boston are considering extending international services along the lines of International House and the International Trade Mart, but the problems of organizing industries and businesses concerned slow down initial enthusiasm. The lack of a non-political port authority has put Boston down to 16th place as a port. For four years the port has been unstuck from political pork barrels, but appropriation for port services and freight benefits has been ridiculously small. At the moment (end of November, 1955) a bill is being submitted to the Massachusetts State Legislature to create a Port of Boston Authority, similar to New York's. Unless Boston reestablishes itself as a port before the St. Lawrence seaway is built and New York further absorbs the shipping business, New England, with Boston as its "hub" will fall back in relation to the growing regions of the country.

Aware of this real threat, a Boston Committee to Establish a World Trade Center for New England Products, Inc., has formed, and in two years it has raised \$75,000 from seventy-five founding members (primarily composed of the largest banks, insurance companies, investment firms, shipping companies, hotels, export-import firms, etc.) and leased temporary quarters in the Sheraton building on Atlantic Avenue. David C. Adkins of the Lynn Chamber of Commerce, executive director of the committee, has written a report and exposition of purposes for the

committee, from which the following excerpts are taken.

"The increasing inter-dependence of the free nations of the world makes necessary the creation of new agencies and new channels to promote and to develop international trade, and to foster understanding among the people of all nations." (Perspective).

"The activation of a World Trade Center in Boston will not only generate a new and positive spirit in the New England business-industrial community, but it will serve as the pilot project for the establishment of this dynamic and practical media of free enterprise in other strategic areas of the free world." (p. 4).

"The plan outlined herein is concerned with the establishment of a non-profit association (under Chapter 180 of the General Laws of Massachusetts) that will serve New England industries and businesses, and the region as a whole, as

1. A World Trade Center
2. An international (human) relations institute
3. An agency to cultivate and to develop markets for New England products
4. An agency to reestablish Boston as a major port....
5. An agency to foster and harmonize relations among the peoples of the world through the cultivation of trade and commerce between the United States and the nations of the world.
6. An agency to coordinate planning and to activate programs directed toward the exercise of the principles and techniques of free enterprise in the economic development of underdeveloped areas of the free world..."

#### "Outline of Operating Program

1. International Center--Physical Premises
  - A. Provide facilities for conferences and meetings; encourage the use of the Center for all public and private activities of an international nature.
  - B. Provide dining and club facilities for members, their guests, and for foreign visitors.
  - C. Activate plans to remodel and adapt the building (Sheraton Building) to the functions of a combined International House and International Trade Mart.
2. International Relations Program
  - A. Greeting and guidance services for foreign visitors.
  - B. Provide bi-lingual stenographic services.
  - C. Activate foreign language courses.
  - D. Publicize visiting personalities and serve as contact headquarters for them while in the United States; arrange travel and other accommodations.

- E. Arrange conferences on trade and human relations on an international scale.
- F. Establish educational and information programs, lectures, movies, seminars, exhibits, on world trade and economic development....
- G. Activate cooperative projects with universities and colleges, research and development agencies to enlist the active participation of the leading institutions and professional agencies in the program of the Center.
- H. Activate cultural programs of an international character; sponsor feature events that will add prestige and increase the usefulness of the Center in the New England community."

Since the writing of the report (above) several aspects peculiar to Boston's situation have qualified some of the intentions. There are also some basic questions.

1) The failure of the Boston City Center project over the Back Bay tracks have made Boston business men wary of new projects. The investment in these international facilities seems high in return for general good will and an unknown quantity of new trade contacts to the small import-export firms. New Orleans' International House and International Trade Mart claim to have had a part in 300,000 transactions since their founding. The skeptical businessmen feel that New Orleans would have boomed anyhow and that Boston cannot recover its position as a major port.

2) Ralph Binney, Executive Vice-President of the First National Bank of Boston, business leader of the trade center project, is trying to relate the Port of Boston Authority with the World Trade Center. He and Mr. Crafts, his assistant, feel that the two are inter-dependent, and therefore their development should be parallel. For this reason the interim period in the Sheraton building is estimated at between three and ten years, or probably five (Mr. Adkins' estimate) when the

emancipation of the port from political control and the establishment of the World Trade Center on a minimum scale will be enough secured to contemplate their mature size and functions.

3) In order to promote the large view of a World Trade Center for Boston, this thesis will try and work out the spatial requirements and site relationship to existing financial and cultural areas in the city, and will seek suggestions from the Boston City Planning Board, Mr. Adkins, Mr. Binney, and other members of the Committee, as well as directly conferring with the Thesis Committee at M.I.T. It is hoped that an independent opinion stated in architectural language may be of help to those people working selflessly for cultural and commercial exchange between Boston and the world environment.

Study #1 of Space Requirements for Boston's World Trade Center

<b>Public Facilities:</b>		25,000 sq. ft.
Lobby and exhibition space (i.e. 100 x 50)	5,000 sq. ft.	
Lounge	1,000	
Sales gallery for permanent display of New England products and semi-annual trade fairs, and reception of important foreign visitors (i.e. 200 x 50)	10,000	
Restaurants, bars, checkrooms, etc.	<u>4,000</u>	
	20,000 sq. ft.	
Utilities, circulation, kitchen, etc.	<u>5,000</u>	
	25,000 sq. ft.	
<b>Administration: Staff of 40 people*</b>		12,000 sq. ft.
Managing Director	600 sq. ft.	
Administrative Director	400	
Director of Operations	400	
Director of Public Relations	<u>400</u>	
	1,800 sq. ft.	
Circulation	<u>200</u>	
	2,000 sq. ft.	

World Trade Development Department:	
10 on staff*	3,000 sq. ft.
a) files on trade information	
b) facilities to aid transactions and accommodations of visiting business men	
c) space for research into export-import problems and student and business personnel exchange	
Publicity Department: 6 on staff*	2,000
a) publishing facilities for weekly journal and magazine reprints	
b) promotional layout space	
International Relations Division	
a) auditorium (300 people at 8 sq. ft. per person)	2,400
b) lobby and utilities	600
c) bi-lingual stenographic service (10 cubicles at 100 sq. ft. each; also used for small conference rooms)	1,000
	<u>10,000</u> sq. ft.
Circulation, utilities, lounge	<u>2,000</u>
	<u>12,000</u> sq. ft.
Office and Display Areas	<u>130,000</u> sq. ft.
	167,000 sq. ft.
100 office-display units at 500 sq. ft.*	50,000 sq. ft.
20 larger office areas for consulates and branch offices of New England corporations at 2,500 sq. ft.	<u>50,000</u>
	100,000 sq. ft.
Large conference room for 50 people	1,500
Dining room for 75 people	1,500
Cafeteria, grill room	2,000
Club facilities	1,200
Kitchen	800
Bar or Bars	2,000
Lounge	<u>1,000</u>
	110,000 sq. ft.
10 office-apartments for foreign visitors at 500 sq. ft.	5,000
Library (i.e. 20 x 50)	<u>1,000</u>
	116,000
Utilities and circulation	<u>14,000</u>
	<u>130,000</u> sq. ft.

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\*Figures based on New Orleans' International House or International Trade Mart requirements.

Note: By combining the functions of the Trade Mart and International House there is a rough saving of 60,000 square feet because of the weeding out of redundant facilities, as well as by scaling down the restaurant and club facilities by about one-third. The paying proportion of the scheme is increased, as the New Orleans' figure of 100,000 square feet, stated in Mr. Harvey's report as paying for the free services and annual budget, was kept in this proposal for the Boston International Trade Center. Rentable space to offices and consulates is about 60 per cent of the total area, and if the rates compare to those of the New Orleans' International Trade Mart (average about \$4.50 per square foot a year) the annual income from the rented space would be somewhere near \$450,000. The New Orleans' combined annual operating budget is \$475,000 (1953 figures). The Boston project, by eliminating overlapping staff and functions should substantially lower the operating overhead. As with the New Orleans International House and International Trade Mart, all profits are thought of as being put back into the project, either by repaying loans, or in extension of services and promotion.

#### Program for the Exhibition Hall

The program for the World Trade Center outlined in Study #1 was changed to adjust to the particular site conditions. The Exhibition Hall contains more display space than required in the original estimate, but its use has also been modified to include

conventions and exhibits not initially considered.

The breakdown of spaces into square footage is as follows:

Lobby	1,000 sq. ft.
Display space	40,000
Restaurants	10,000
Business men's clubs, bars	6,000
Galleries for exhibition, circulation	4,000
Ramps	3,000
3 Conference rooms at 40 x 25	3,000
Pressroom	1,500
Kitchen and service area	3,000
Rest rooms	1,200
Public lounges and reading area	2,000
Business lounge and reading area (space also used for interviewing visiting international personnel)	3,000
	<u>77,700</u> Total Estimate

Net Floor Areas and Cost Evaluation for the New Orleans Project

Net Floor Areas

International House (3 floors at 15,000 sq. ft.)	45,000 sq. ft.
International Trade Mart (5 floors at 16,000 sq. ft.)	<u>80,000</u> sq. ft.
	125,000 sq. ft.

Original Cost and Renovation Charges

International House (original cost and renovation of 3 floors only)	\$550,000
International Trade Mart Original cost	200,000
Renovation (all floors)	<u>1,500,000</u>
	\$2,250,000

Annual Operating Expenses from 1953 figures

International House	\$250,000
International Trade Mart	<u>225,000</u>
	\$475,000

Projected Cost if International House and the International Trade Mart  
Had Built a New Building or Complex of Buildings

International House 3 floors of club and restaurant facilities	45,000 sq. ft.
7 floors of rentable space to private firms	<u>105,000</u> sq. ft.
	150,000 sq. ft.