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COMPILATION OF WORLD TRADE CENTER TECHNICAL AND PHYSICAL PLANNING DATA

→ East Side site project

April, 1961

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INTRODUCTION

The purpose of this Report is to collect and consolidate for future reference much of the basic technical data and information which was developed during the course of the World Trade Center Study. The information contained herein is not complete since much material and information concerning the project has previously been published in the World Trade Center Study Part I Report, the World Trade Center Study Public Report, which was released in March 1961 and in the Preliminary Engineering Report and supplemental material prepared by the Engineering Department.

All architectural drawings prepared during the Study have been properly designated, collected, filed and indexed. As a supplement to the basic material contained in this Report, a bibliography of pertinent memoranda and other related documents has been prepared. Copies of this material are available in the general files of the Port Development Department and also in World Trade Center files.

During the course of the World Trade Center Study several different plans and configurations for a World Trade Center were developed prior to the final design contained in the Public Report. Within the World Trade Center Study organization each of these designs carried separate designation such as Scheme A, Scheme III, etc. Some of these designs were discarded quite early when it was determined that they would not meet all of the required criteria. In this category were Schemes A, B, C and One. Several other designs such as Scheme II, Scheme III, and Scheme III REVISED were pursued and developed to an advanced stage. Some of the more pertinent information on these early schemes has been compiled and included at the end of this Report, together with the aforementioned bibliography of memoranda.

IV. ANALYSIS OF MAJOR COMPONENTS

After thorough investigation of the individual functions of the World Trade Center, it was ascertained that many of the organizational units required similar facilities, for example, United States Customs and Appraisers, Securities Exchange, Trade Mart, all required office space. The logical approach then is to combine these common needs as much as possible rather than build a series of smaller individual buildings for each prime function. The uniting of these common facilities is limited only by the ability of each prime unit to maintain its individual integrity, relationship of function and efficiency of operation.

The results of this approach are described in detail herein.

A. THE CONCOURSE

The Concourse consists of one level below street level and six above. Actually, the first three levels of the Concourse are what normally would be considered basement functions, but due to proximity of the East River parallel to the site for a distance exceeding 1,500 ft. it would not be economic for these levels to be located below grade. This apparent disadvantage has been turned into an advantage by allowing a complete physical separation of pedestrian and vehicular traffic via the platform concept.

What would normally be the "sidewalk" level is now the third level at elevation +25. All functions normally associated with the sidewalk level are located here, (i.e., the auto and taxi "drop off" points, the elevator entry lobbies, pedestrian circulation, consumer services, etc.).

The approach to the new sidewalk level, at elevation +25, begins at a point near Pearl Street on Wall Street. The existing elevation here is +6, therefore making the rise to the new level only 19 ft. This is easily accomplished with escalators.

This sloping grade condition also helps to minimize the "canyon wall" effect which could be created by a continuous multi-story platform. High rise structures above the Concourse are clearly in view from all of Wall Street, thereby providing a realization of this architectural composition from a portion of the downtown area.

As the Concourse covers most of the site, and functional criteria dictated many special features for this area, the design of the foundations and structural framing for this portion of the project demanded careful consideration. Rock varies from 30 to approximately 300 feet under the base. High rise buildings with their special foundation have to penetrate this area. It was determined that the base would be supported on friction piles driven into the firm sand stratum overlying the rock. This design provides a consistent economic foundation and would not interfere with the special foundations required for other structures.

The lower three levels and the service level are designed as reinforced concrete flat slab construction. This design provides the maximum clearance in the area and also provides the weight required to overcome the uplift that might develop because of the high water table.

The upper three levels have many features requiring special structural design considerations, such as:

Long span construction over large open areas

Construction below the circular Securities Exchange Building

Construction of the fourth level mezzanines

Construction over the westerly side of South Street

Structural steel framing was selected for the three upper levels as being the most practical to meet the varying design conditions. Steel was also used for the design of the third floor roadway as it is suspended from the fifth level.

1. Lower Levels - Service Level, 1st Level and 2nd Level

The service and first level of the Concourse consists primarily of United States Customs Appraisers and examination areas and service-storage areas for the entire complex. All truck loading and unloading is concentrated on these two levels. The second level is the parking level.

a. Service Level

The central mechanical equipment area of the complex is located on this level and utilities are distributed throughout the length of the Concourse by means of a utility tunnel. All the main utility lines are thus easily accessible for installation and maintenance. The major bulk of the level is taken up by the United States Customs Appraisers examination area and facilities. This area is located in vertical relation to other Customs functions directly above and horizontally to the necessary truck loading areas.

It is apparent that the central equipment room is oversized. This intentional increase is to provide space for additional refrigeration equipment should future air conditioning loads increase. With the ability to provide this extra equipment, the primary distribution of chilled water lines has been sized to accommodate this future need. This approach of additional space for equipment and distribution size for future needs is also applicable for other utilities as required.

b. First Level

This level is the origination of traffic separation. All pedestrians enter the site at a variety of well placed entrances on the west side of the Concourse. The large majority of persons enter the complex by means of two bridges, reached by escalator, passing over Water Street and located at Wall Street and John Street. The Trade Center Gateway and the meeting areas of the site are entered directly on street level and each provided with auto "drop off" space.

There is, therefore, no pedestrian flow on the east side of the site where the truck movement is centered. Trucks enter the basement by means of ramps off South Street and serve the areas on street level at loading docks at Maiden Lane, Old Slip and South Street.. Passenger vehicles enter the site by ramp at Fulton and Water Streets up to parking and "auto drop off" on the main public level.

c. Second Level

The second level is almost exclusively used for parking. The level directly above it is the main public level of the Concourse and thus parking is well located for its ease of accessibility by elevator or stairway to the public level. Parking area is reached by the ramp up from Water Street and also by a ramp down from the Belt Road and auto "drop off" directly above.

Natural ventilation could not be exclusively considered for this area as the dimensions of the space and the number of vehicles utilizing the space made this easy solution to the problem impossible. As a result, an inexpensive yet practical solution has been found for this ventilation problem, by utilizing a unique system of fans, ventilation ducts and shafts.

A small portion of this level is used for a meeting area but that is completely outside the well defined parking area. The lower and enclosed part of the pedestrian bridges described earlier enter at this level from whence the level above is easily reached by stairways.

2. Third Level (World Trade Center Plaza)

The approach to the new pedestrian level above all the vehicle traffic is achieved via three two-level bridges over Water Street leading to the pedestrian colonnade running the complete length of the site and linking this building complex with the proposed developments to the north and south.

Major points of entrance to the platform building are at north and south extremes which lead to the World Trade Center Plaza. This Plaza is a magnificent enclosed space, two stories high, extending almost the entire length of the complex. This large pedestrian circulation area is flanked on either side by consumer services, fine restaurants, public banking facilities, etc., creating a prestige shopping "avenue".

Entrance by pedestrians to the lobbies of the Trade Mart, Securities Exchange, Commerce Exchange and hotel is from the World Trade Center Plaza. Entrance to these individual lobbies from vehicles is achieved at this same level along the eastern perimeter of the platform by means of a Belt Road. This Belt Road is reached by the ramp up from street level at street level and also by ramps to and from the elevated highway.

The design of the belt roadway provides a unique solution to the problem of reducing column spacing to permit free access to the loading areas below the roadway and providing a pedestrian walk adjacent to this elevated roadway. The interior columns for the roadway are suspended from the fifth level. These columns support half of the weight of the roadway and a proportionate share of the weight of the sidewalk.

At the south end of the platform, at the intersection of the World Trade Center Plaza and the main entrance from under the World Trade Center Gateway, is a major exhibition space adjacent to the Trade Mart lobby and Information Service. This is the "heart" of the complex.

3. Fourth Level

The fourth level is basically a mezannine to the third level. Except for a consumer service area along the World Trade Center Plaza, the other areas are not as public in character and thus are reached via control points on the World Trade Center Plaza. These are the Commodity Exchange, World Trade Information Service and Hotel facilities.

The mezzanine concept as is here realized is extremely advantageous in providing additional clear height where needed and more control for non-public areas. Because of the great spaced needed to handle the working population and visitor circulation on the 3rd level, the need for higher ceiling heights is readily appreciated.

4. Fifth Level

The fifth level serves as a unifying element to the entire complex and the concourse specifically. Although it provides a wide variety of different type spaces, its function can be justified both on an architectural and functional basis. Architecturally it helps to tie the concourse together and functionally it provides an employee circulation level connecting all elements of the complex.

The spaces incorporated in the fifth level include, besides the trading floor of the Securities Exchange and office areas of the U.S.Customs, a wide variety of office spaces varying in bulk and in prestige factors such as use of garden open court areas and natural lighting. Because of the large bulk areas available on this level, all the auxiliary spaces required by the Securities Exchange can be located on the same level and within easy reach of the trading floor.

5. Sixth Level

The sixth level is the roof of the Concourse. On this level, but within the .ower forms of the World Trade Mart and World Commerce Exchange, are located three large dining areas. They are all easily reached via elevator from the World Trade Center Plaza and sixth level of the base as well as directly from each tower. The visitors gallery of the Securities Exchange is also on this level and is reached by elevator and stair directly from the Plaza.

B. TRADE CENTER GATEWAY

The proximity of the Trade Center Gateway to Wall Street and the financial district gives to it a "prestige" location. The structure is particularly suited to tenants who do not require the great bulk of space as is provided in the World Commerce Exchange and the World Trade Mart. The building serves as an entrance gateway to the entire Trade Center complex since the majority of people entering the project would use escalators located directly below the building at street level. Due to the building's location and size, banking and foreign bank branch offices, admiralty and custom law firms, insurance firms, management consultation firms and related offices would be located in it.

Structural, electronic, heating, ventilating and air conditioning considerations for this element are similar to the other structures in the complex and offer no unusual problems. The foundations for this building present no major problem since rock is encountered only a short distance down from the surface.

C. WORLD TRADE MART

The main function of the Trade Mart is to provide flexible space necessary for permanent exhibit area and related offices. Other functions included in the Mart are an observation level, a hotel of 350 rooms, a public dining room and a World Trade Information Service. The observation level and the hotel rooms are located at the top of the tower. The Trade Information Service, hotel lobby and public dining are located near the Concourse because of the need for accessibility.

The location of the Trade Mart at the southerly portion of the site allows its foundations to be carried economically by concrete piers down to sound rock which is close to the surface in this area. The dimensions of the structure are such that the width to height relationship does not exceed a factor of six. This relationship is structurally economical since the columns need not be increased in weight to take care of wind stresses. The framing of this high rise structure will be steel. The columns will be rolled H-sections with welded cover plates where required. Generally the floor framing including wind girders will be rolled sections. Field connects will be bolted, using high strength bolts for major connections. Certain lower portions of this building will require built up wind girders and welded box columns due to the two story arrangement of the space.

The structural framing is based on a column spacing of 26½ feet by 28½ feet. This bay spacing was determined to be the most reasonable balance between architectural requirement and economical structural design. The structure would be fireproofed in accordance with the requirement for a Class I Fireproof Building.

The floor system for the heavily loaded exhibit areas in this building would be structural steel (cellular type) sub floor topped with a light weight concrete fill. Concrete arch construction would be used in the core area of this building.

a. Display Areas and Related Offices

In the design of the Trade Mart, the question of a horizontal vs. a vertical structure was studied. As a result of this study, the vertical structure was found to be more successful in carrying out the prime function. The main advantages found in the vertical solution over the horizontal scheme were:

1). Less interior space and therefore more flexibility on a floor due to increase of the perimeter space

2). More efficient interbuilding communication and circulation by use of elevators for pedestrian traffic

3). Higher degree of security by requiring only one control point at elevator entrances

4). Larger portion of the space adaptable to multiple useage, i.e., office space and/or display space

5). More light, air, and view for building's occupants as well as for pedestrians at street level

Within the framework of a vertical scheme the nature of the display itself and the relationship between display and office areas presents an unique problem. The size and weight of objects displayed as well as the best viewing point of the displays are two important considerations in the design of flexible display space. This flexibility has been achieved in the Trade Mart tower by introducing into the structure double story increments instead of the conventional single story heights. Each of these double height floors is designed to receive twice the floor load of a single story. With this built-in feature, provision is available for (1) large displays requiring great height; (2) heavy displays requiring more than normal floor loading; and (3) average displays requiring conventional space and floor

loading. This double story concept also provides viewing of displays from above or below and is conducive to exciting and imaginative display techniques.

By placing the elevator core off-center of the floor area, a great deal of varying displays and office areas are available to individual tenants. Offices or small displays may be located on one side of the elevatore core, while larger areas are available on the other side with the remaining possibility of ringing the entire perimeter with offices.

b. Hotel

The 350 rooms of the hotel are located on the top eleven floors of the Trade Mart facing south thus giving to all rooms one of the most magnificent views in the Port of New York. The hotel lobby, lounge and main desk are located on the main entry level of the Concourse in close proximity to the taxi and auto loading area on this level. The Plaza level functions are directly connected to the hotel rooms by non-stop passenger elevators. One level above the hotel lobby and connected to it by an open stairway are various auxiliary functions of the hotel such as shops, barber and beauty shops, and hotel administration. The hotel service facilities, including laundry and housekeeping, are located on the service level and connected directly to the rooms by service elevators.

Although no specific hotel restaurant, as such, is provided it is felt that the public restaurant located in the Trade Mart tower on the sixth level of the base could be successfully used by the hotel guests as well as the public in general.

The design of the hotel is noteworthy in that it provides the ability to increase or decrease the number of rooms in the hotel as the market may demand.

D. WORLD COMMERCE EXCHANGE

The World Commerce Exchange has been designed for maximum office flexibility and a variety of tenants. The double elevator cores provide the possibility of four individual lobbies for large tenants, giving them individual identity and prestige. All areas of the Commerce Exchange are readily accessible to all functions in the Concourse and the Trade Mart by enclosed paths of horizontal circulation. Specifically, the structure provides a direct tie, via elevator, from the office area of the U.S. Customs function to the office and examination areas of the Appraisers' Stores, thereby uniting two closely related functions which are presently operating under the handicap of a 1½ mile separation.

Since depth of rock in the area of this structure varies from 50 feet to over 300 feet, it was found impractical to carry the building foundations to rock. A method was, therefore, devised to support this structure on a pile supported reinforced concrete mat. These piles would be driven into the firm sand layer above the rock.

Two other methods listed below were considered and would be given further study during the design of this building:

1. A continuous reinforced concrete mat foundation taken down to the sand layer which would require deep excavation but would result in additional basement space.

2. Supporting columns on high capacity piles or concrete caissons taken down to rock in the south and center portions of the building and to deep, dense boulder formations in the north portion of the building.

The framing of this building will be fireproofed structural steel, although preliminary studies indicate that reinforced concrete could be substituted for structural steel at no penalty in cost of construction. The advantage of either structural steel or reinforced concrete will be ultimately decided relative to the aesthetic considerations, functional needs, and finite economics resulting.

E. SECURITIES EXCHANGE

The Securities Exchange, due to its complex functions and expensive column-free space requirements, is treated as a major component in the development of the architectural solution for the World Trade Center. Its functional requirements occupying approximately 500,000 square feet could be broken down into three groups:

1. Operational
2. Supporting elements and circulation
3. Administrative

1. Operational Areas

Operation areas generally incude the trading floor, communications, stock clearing and ticker quotations.

Within an area approximately 240 feet in diameter, floor space is required to house the vast operations of the trading floor. In this connection, the upper level of the platform of expansive areas with no structure rising above, provides the ideal location to house the function without undue cost in structural design. Directly below, a major intricate communication area would be located to house all types of relative equipment.

Stock clearing, because of the nature of its activity, requires a location readily accessible for a large "in" and "out" flow of brokerage house messengers and other business personnel. This patternof circulation dictates a street level location. The other elements, although directly related, do not have exacting requirements.

Considering the expansive column-free area requirements of the Trading Floor, the communications area directly below and the street level location for the Stock Clearing, a vertical housing of elements appears desirable. The platform concept offers a sound solution for this unique operation by making possible vertical

stacking of the elements with an ability to expand from the center of the "stack core". This system provides floor space for the complementing and supporting elements of "the Trading Floor".

2. Supporting & Circulation Elements

These elements generally include public lobby and exhibit areas; visitors gallery (to observe the activities on the trading floor); members, employees and visitors lounges; locker rooms and lavatories; members and employees entries; eating facilities and storage requirements.

The "stacking" of elements in the platform provides places for the public lobby and exhibit areas at the main pedestrian level. The visitors gallery also fitted into the design of the vertical stack at the plane where the housing for the trading floor rises above the platform.

In locating the remaining elements, the unique requirement of the Exchange operation to move several thousand personnel to the trading floor in a relatively short period of time is a major concern.

In order to accomplish this feat, a complex and costly system of elevators and escalators would be required. Here again, the platform concept supplies a feasible solution where a minimum vertical transportation installation is required. With the trading floor as the core, the platform provides for the location of member clubs and lounges, employees lounges, eating facilities and storage, all at the same level as the Exchange Trading Floor. Thus, the members and employees could, prior to the beginning of trading, quickly move to the Trading Floor level using normal lateral circulation and reach their posts with ease, in time for the opening of business.

3. Administrative Areas

In addition to those areas directly related to the activities on the "floor", a large area of administrative offices is required. These offices can be further from the "floor", but accessibility has to be maintained with walking distances to the Trading Floor kept to a minimum. The Commerce Exchange building, integrated as it is with the platform, provides the solution. The administrative offices can be readily accommodated in a building specifically designed for office space. The Commerce Exchange, tied to the levels of the platform by carefully located elevator banks, permits quick accessibility to the Trading Floor on the fifth level with only a short walking distance to the activities of the "floor".

The satisfaction of functional arrangement results in an architectural statement expressing the Exchange activities, complementing and lending subtle contrast to the straight lines of the platform and its integrated high rise towers.

4. General Considerations

The location of the Securities Exchange is such that economical foundations can be carried to rock.

The final architectural concept of this building will integrate the structural framing as a major feature of the design. The architectural consultants for the Securities Exchange have supplied us with utility requirements for this unit of space. These requirements have been incorporated in the basic utility plant and distribution systems. Because of the special nature of this area, the interior distribution of the utilities must appropriately be determined with the commencement of definitive plans. It is important to note that the flexibility of the primary distribution of utilities can permit an area of this magnitude almost complete autonomy in development.

F. U. S. CUSTOMS AND APPRAISER'S STORES

The present customs operation in the Port of New York is spread in about three main locations - Custom House located at Bowling Green, the Appraiser's Stores at 201 Varick Street, and the Record Storage and agents located at 647 Washington Street and 64 Stone Street. In the course of international trade, documents involved either in the import or export of goods, as well as in many cases the import itself, must physically move between the Custom House and the Appraiser's Stores or from the pier to both or either of these buildings.

To combine the functions essential to world trade in one building will, of necessity, reduce the time required for the processing of documents so necessary to this operation. The advantages of unified operations in a new building are self-evident in that it will obviate the need to replace the present aging structures which house these functions. There should be a substantial savings in the elimination of the pneumatic tube, a reduction in the number of units of mechanical equipment to move goods from the receiving and shipping level to the various appraisal floors; the elimination of elevator operators by the installation of the automatic equipment; the reduction in duplication of services such as personnel, stores, equipment, supply and other office materials; reduction in the security staff which could be accomplished by combining operations in one area. The functional layout as presented herein provides for the utmost flexibility and permits substantial changes among the various components involved in the entire customs operation in the New York area. By centralizing all examination in the service level of the Center, the utmost flexibility has been achieved to meet the ever changing composition of the imports coming into the United States so that changes can be readily accomplished between divisions without any undue expense. It is only by the use of the platform concept that a contiguous area of approximately 400,000 sq.ft. can be made available at the

service level. This examination area can readily be serviced by trucks approaching from South Street via ramps to the Service level, with separate access to a restricted receiving area, and by unrestricted general purpose truck circulation area.

Immediately above on the 1st level, are the offices of the Appraiser's Examiners who have the responsibility of making physical examinations. Adjacent to these offices is the Mail Examination area thus providing the examiners ready and easy access to this area. The Mail Examination area, being at grade, has ready truck access from South Street. Rising vertically above these two vast areas are the office functions connected with this customs operation in the Port of New York.

In the World Commerce Exchange are located the offices of the various divisions of the Collector of Customs, the U.S.Appraiser, the Controller, the Surveyor,as well as the Customs Laboratory and other related functions. Public access to these offices would be provided from the 3rd level completely segregated from the physical movement of vehicles and goods. Provision has also been made for restricted circulation through use of exclusive elevators and the study of a mechanical means for the movement of documents between the various divisions should be undertaken.

The physical arrangement of the government functions has received the wholehearted endorsement of the various Treasury and Commerce Department employees who are actively engaged in this operation. They feel that substantial savings in both time and effort will result from this physical arrangement for both themselves and the people involved in world trade with whom they have to do business.

V. RESUME OF PREVIOUS ARCHITECTURAL SCHEMES
WORLD TRADE CENTER
SCHEME A

Dated - May 9, 1960 - Drawing Nos. WTC 1010-1013

Site - (bounded by the following streets):

Water Street
Beekman Street
South Street
Gouverneur Lane

Site did not contain any land west of Water Street nor did it extend south far enought to include the U. S. Treasury Assay office. Scheme A included retention of 120 Wall Street within the World Trade Center development.

All east-west streets, except Wall and Fulton Streets, were to be terminated at Water Street. Wall and Fulton Streets extended through the site to South Street.

Major Structural Components - Total gross floor area 8,355,000 sq. ft.

A. Finance Office Building - 40 floors located near southern edge of site.

B. Government Office Building - 40 floors located just south of Maiden Lane.

C. Commercial Office Building - 40 floors located just north of Fulton Street.

D. World Trade Mart - 65 floors located adjacent to the F.D.R. Drive approximately opposite John Street.

E. Base structure - five full levels with partial development of a sixth level in various locations.

Functional Components located in the Base structure

1. Basement level - mechanical equipment and storage area, Appraiser's area, basement of 120 Wall Street

2. First and Second levels - parking, post office, Appraiser's area

3. Third level - parking

4. Fourth level - commercial areas, public corridors

5. Fifth level - Commodity exchanges, open courts, commercial area and Introduction and Information.

6. Sixth level - (partial development) - Plaza, bank, shops

7. Seventh level - developed only in the area below the World Trade Mart. The Trade Club was to be located here.

WORLD TRADE CENTER
SCHEME I

Dated - August 16, 1960 - Drawing Nos. WTC 1121-1129

Site - (bounded by the following streets):

South Street
Fulton Street
Water Street
Old Slip

Site also included Block 31 located between Old Slip, Pearl, Wall and Water Streets and Blocks 70 and 75 located between Fulton, Pearl, Fletcher and Water Streets

Major Structural Components - Total gross floor area about 8.8 million sq. ft.

A. Stock Exchange - large circular building located at southwest corner of site partially over block 31, Water Street, and a portion of the site proper.

B. World Office Building - 24 floor structure located along the F.D.R. Drive at south end of site

C. World Trade Mart - 60 floor structure located in the north portion of the site opposite John Street. This structure was to contain 50 floors of office and exhibit area with provision for two story high exhibit area as required.

A 50 room Hotel occupied seven floors around outer face of this structure. A Health Club and a Trade Club were also included in the upper floors.

D. Base structure

Functional Components located in the Base structure

1. Basement level - Mart and Hotel storage, mechanical equipment area, shop storage, customs sales and storage, Appraiser's examination area, truck ramps and circulation area, customs parking

2. First floor - northern portion contained parking, southern portion included telephone area, mail examination, Appraiser's offices and storage

3. Second level - commercial area, shops, hotel lobby and dining facilities, fountains and pool, stock exchange communication area

4. Fourth level - shops, commodity exchanges, stock exchange, trading floor, high rise elevator pits

5. Fifth level - Trade Mart lobby and exhibition area, auditorium ballroom, Introduction and Information, restaurants, Office Building lobby, escalators from storage level. This level, +47, was extended over the top of the U. S. Assay Office.

WORLD TRADE CENTER
SCHEME II

Dated - August 29, 1960 - Drawing Nos. WTC 1130-1139

Site - (bounded by the following streets):

South Street, Fulton Street, Water Street and Old Slip

Major Structural Components - Total gross floor area 8,879,000 sq. ft.

A. World Office Building:

26 floors located at the southern end of the site along the F.D.R. Drive. Midpoint of the major axis of the structure was located opposite Wall Street.

B. World Trade Mart:

68 floors, 58 floors of office and display, upper 10 floors devoted to Hotel, Health Club, Trade Club and Observation Deck

C. Securities Exchange:

Large rectangular structure located over Block 31, Water Street and southwest corner of site proper.

D. Base Structure:

5 levels plus basement.

Functional Components located in the Base structure

1. Basement level - essentially the same as Scheme I except maintenance and equipment storage area was provided below grade on Blocks 70 and 75.

2. First level - similar to Scheme I, New York Stock Exchange, clearing area relocated from Block 31 to southern portion of the site proper.

3. Second level - parking

4. Third level - Wall Street Plaza, Stock Exchange exhibit and members lounge area, Commodity Exchange, World Trade Mart lobby, Hotel lobby, ballroom, auditorium and other hotel functions.

5. Fourth level - Commodity exchange offices, Introduction and Information, commercial mezzanine, public and restricted corridors, hotel employee lockers and dining facilities plaza.

6. Fifth level - (partial development) restaurants and roof area.

WORLD TRADE CENTER STUDY
SCHEME III

Dated - November 30, 1960 - Drawing Nos. WTC 1231-1241

Site - Total area approximately 16 acres. The main site is about 1,700 ft. long, 600 ft. wide at the southern and northern ends and 400 ft. wide at the center. The site is bounded by the following streets: South Street, Fulton Street, Water Street and Old Slip.

The World Trade Center site also includes Block 31 located between Old Slip, Pearl, Wall and Water Streets and Block 75 located between Fulton, Pearl, John and Water Streets.

The only through east-west street passing through the site is Maiden Lane.

Major Structural Components - Total gross floor area 11,227,000 sq. ft.

A. World Commerce Exchange:

Width - 140 ft. Length - 655.5 ft. Height - 368 ft. above Concourse and 435 ft. above Water Street Total stories - 30 above Concourse
Office area - 2,438,000 sq. ft. Mechanical, toilets, circulation 878,000 sq.ft.
Total gross area - 3,316,000 sq. ft. Elevators - 68

B. World Trade Mart:

Width - 171 ft. Length - 336 ft. Height - 851 ft. above Concourse; 918 above Water Street Total stories - 72 above Concourse Display area - 1,662,000 sq. ft.
Office Area - 1,415,000 sq. ft. Hotel area - 150,000 sq. ft. (352 rooms)
Total gross area - 4,344,000 sq. ft. Elevators - 70

C. Trade Center Gateway:

Width - 84 ft. Length - 484.5 ft. Height - 280 ft. above Water Street
Total stories - 20 above colonnade Office Area - 634,400 sq. ft.
Total gross area - 818,700 sq. ft. Elevators - 18

D. Securities Exchange

Diameter - 210 ft. at base, 155 ft. at top; Height - 80 ft. above Concourse
Total gross area - 60,171 sq. ft. Elevators - 6

E. Concourse

Width - varies but is approximately 400 ft. Length - 1,600 ft. Height - 67 ft.
Office area - 148,000 sq. ft. Special use - 875,000 sq. ft.
Parking - 559,000 sq. ft. (1,600 cars)
Total gross area - 2,684,000 sq. ft. Elevators - 14 Motor stairs - 10

Functional Components contained in Concourse (Base) structure

1. Service level - Appraiser's examination area, truck circulation, customs sales and storage, special government storage areas, pistol range, World Trade Mart storage, hotel housekeeping facilities, maintenance equipment and personnel areas.

2. First level - Customs Information area, mail examination area, Appraiser's Offices, special customs examination area, telephone exchange, Securities Exchange ticker and quotation area, securities clearing area, security and firefighting areas, hotel service and storage area.

3. Second level - parking, unassigned area and meeting room kitchen

4. Third level - World Trade Center Plaza, consumer service area, U. S. Customs lobby, World Commerce Exchange lobbies, Securities Exchange exhibits, Trade Mart and hotel lobbies, meeting rooms, pedestrian bridges.

5. Fourth level - Commodity exchanges, trading floors and meeting and administrative areas, consumer services, Securities Exchange communications.

6. Fifth level - Office area, customs office area, Securities Exchange members facilities and exchange trading floor, cafeterias and kitchen.

7. Sixth floor - indoor and outdoor dining areas, Securities Exchange employee cafeterias, kitchen facilities.

SCHEME III REVISED
(Final Revision)

Dated - January 12, 1961 - Drawing Nos. WTC 1264-1270

Scheme III revised is essentiall a refinement of Scheme III. The site boundaires and the major structural components are the same as those of Scheme III.

The major changes contained in Scheme III Revised are as follows:

1. The Concourse Structure was realigned along the major axis of the Concourse and normal to the long axis of the World Trade Mart. In Scheme III this structure was offset to the east of the major axis of the Concourse.

2. Bay spacing throughout the project was changed from 28' 6" x 28' 6" to 28' 0" x 28' 6".

3. The Securities Exchange structure was realigned along the major axis of the Concourse and normal to the long axis of the World Trade Mart. In Scheme III this structure was offset to the east of the major axis of the Concourse.

4. The Securities Exchange roof design was changed from a compression and tension ring with cables configuration to a truss system.

Scheme III Revised - continued

5. The meeting room area was changed from a round to a square design and relocated. Layout of the meeting room area was also revised.

6. The mechanical equipment area in the Service Level was relocated and realigned.

7. The Trade Center Gateway building was reduced from 20 floors to 18 floors. Each dimension of this structure, however, was increased by 9 ft. This change increased the available office space from 634,400 sq. ft. to 690,000 sq. ft. while increasing the gross floor area of the structure only 4,300 sq. ft. to a total of 823,000 sq. ft.

   The double elevator core design of this building was also changed to a single core configuration. The number of elevators provided was changed from 18 to 16.

VI. BIBLIOGRAPHY OF WORLD TRADE CENTER STUDY SOURCE MATERIAL

The following is a listing by category of technical material developed in connection with the World Trade Center Study. This material is available in the general files of the Port Development Department and/or in World Trade Center files.

Trade Research

Balance of Payments and the World Trade Center
Banking at the World Trade Center
Benefits of World Trade Center to American Exhibitors
Capital Exports from the United States
Commodity Exchanges in the United States - New York (number, categories, tonnages, volumes traded, practices, and their importance to New York)
The Cost of Doing Foreign Business
Distribution of Exports by Type
Electronics Industry in World Markets
Evaluation of Industry Conferences with the Government on Export Expansion
Export Agents - Export Managers; Their Geographical Location, Type of Representation, and Function
Export Firms in the United States and New York City
Export Trade Act - Webb Pomerene - Description and Evaluation
Foreign Freight Forwarders - A Costing Study: Impact of Innovation on the Industry; "Production" and "Custom" Types of Organization
How Foreign Trade Influenced the Port District
Importance of Foreign Trade to the World, the United States and the Port of N. Y.
Industrial Exhibit Themes
Industrial Trade Show Exhibition Practices
Iron & Steel Industry and the World Trade Center
Markets in New York - Timing of Displays
Motivational Research Study of Foreign Businessmen at New York International Airport
New York's Share of Foreign Trade
Problems of Management in Developing Countries
Projection of United States Merchandise Exports & Imports (1965-1975)
Purchasing Agents Survey - Description of their Behavior and Needs
Relationship of New York's Transaction and Transportation Functions
Sale of Exposure at Proposed World Trade Center
Size of United States Export Market
Transportation Survey - Industries Dependent Upon Foreign Trade, Extent
United States Exhibits at Overseas Trade Fairs
World Export of Manufactures - Port of New York and Export Prices

Physical Studies

Zoning
Operations and Maintenance
Vertical Transportation
Enviromental Studies

Transportation Studies:

- Journey-to-work Survey
- Pedestrian Access
- Subway Adequacy
- Bus Transportation
- Port Authority - Downtown Heliport
- Vehicular Access
- Parking

Engineering Department Report

Real Estate Department Activities

Real Estate Investigation
World Trade Hotel
Occupancy and Construction Report - Office buildings - Manhattan
General (selected memorandums from R. Curtiss)

Other

Report on other World Trade Centers
Primer on Import and Export Activities
J. McAvey Report on World Trade Center Economics
Report on World Trade Information Service
Memorandums on T. J. Davies' contacts
Memorandums on C. J. Barfoed's contacts
Alexander O. Stanley Report on - "A Proposed Blueprint of Operation for the New York World Trade Center"