TOWN AND CITY INC

THE LOWER MANHATTAN PLAN

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CAPITAL PROJECT ES-1

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The Lower Manhattan Plan

NEW YORK CITY CAPITAL PROJECT ES-1

June 1, 1966

William F. R. Ballard
Chairman
City Planning Commission
2 Lafayette Street
New York, New York

Dear Chairman Ballard:

In fulfillment of the Contract with the City of New York, dated February 23, 1965, herewith is the Technical Report in 100 copies called for.

Our Report has addressed itself to the two major themes outlined in the original Contract: the land use and circulation problems raised by the massive renaissance in Lower Manhattan, and the new development opportunities, especially the proper reuse of the waterfront.

The purpose of the study was to develop a framework of policies "to enable the City to respond creatively to private initiative and to guide public activities so that this area reaches its great potential."

With your assistance, and the participation of your staff, we have, we believe, developed such a framework -- ambitious enough in scope to match the past achievements of Lower Manhattan, but practical enough to be translated into immediate realizable action.

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SUMMARY OF REPORT

This is a Plan for Lower Manhattan: for its business core, its transportation facilities, its waterfront and its land, for its place in the Manhattan Central Business District and in the metropolitan region as a whole.

It is thus not merely a project, or even a series of projects, but a system of development, on an area-wide scale, in which every phase of downtown life is related in an overall process of planning and change.

The Plan begins with an analysis of the inner city: historic downtown, the financial district, with its great canyons, its dense network of subway lines, its position in the national economy. Long-term goals are outlined for this Core, as well as for the surrounding areas. Areas of growth and change are demarked and formed into a coordinated pattern in which each improvement has a related and multiplying effect.

Proposals for the new waterfront are set within the context of this analysis: each link in the conceptual plan - pedestrian routes, waterfront plazas, the peripheral highway, the housing and office groupings - are all related to the Core, as well as to each other.

The result then is not simply another project, which can be accepted or rejected, depending on time and circumstance, but rather a general strategy for the redevelopment and growth of an area; an approach, a process and an organizing concept. Development can occur, within the framework of guiding principles, in a number of different ways, at different times in different places.

New York has not, in recent generations, developed such area-wide plans. But increasing positive achievement and hence competition from other urban areas, and the ever more turbulent needs of this City, make the establishment of higher goals and coordinated planning achievement mandatory.

Lower Manhattan was chosen for such a study because it is an area undergoing rapid change, and an area of unique strengths immediately adjacent to great opportunities. This Report confirms that judgement and points out a way of realization. The great strengths of the area make possible a plan that can be achieved largely without public assistance. The opportunities clearly point to an incomparable working and living environment.

THE PROBLEMS

Today Lower Manhattan is undergoing a series of massive changes which may alter many of its functions and revamp its patterns of circulation.

Sparked by such projects as the Chase Manhattan Bank, the Civic Center, the World Trade Center, downtown is in the midst of a significant enlargement of its office capacity. Two urban renewal projects -- Brooklyn Bridge Southwest and the Washington Street Renewal -- represent "beachheads" of new institutional and residential functions hitherto largely unknown in the area.

But in spite of these signs of strength, Lower Manhattan's position remains vulnerable in many respects, and its potential value to the City still not fully realized.

Its problems can be summarized in three categories: Problems of 1) function, 2) environment and 3) access and movement.

Problems of Function:

Although office expansion has been substantial in recent years, downtown's rate of growth has by no means matched midtown's. As a working environment, Lower Manhattan cannot today successfully compete with Midtown, with its rich diversity of facilities. Furthermore, in spite of the office expansion, downtown's employment seems to be declining -- from about 400,000 in 1960 to about 375,000 in 1965. As a business community composed of a handful of functions, it is exceedingly vulnerable to the decisions of a few powerful institutions and businesses.

Downtown's peripheral areas (mostly goods-handling in character) are in continued and sharp decline. Of the 51 piers on the two rivers, only 18 are in fairly regular use, and all but seven over 50 years old. Of downtown's three waterfront markets, one is moving out (fruit and vegetables) and another is scheduled for future relocation (fish). Other historic downtown functions (textiles, butter and eggs) are contracting, and the number of blue-collar jobs has declined by perhaps 35,000 in the last ten years.

Problems of Environment:

At the periphery, the remnants of once-thriving goods-handling industries, produce an uncongenial atmosphere: obsolete and often dilapidated piers, the blight of the elevated expressways, sprawling parking lots, heavy truck traffic. In the Core, an absence of noontime amenities, attractive open space, employee diversions: a reasonably good subway system made uncomfortable by grim, poorly organized stations and poor connections.

Problems of Access and Movement:

The complex of narrow canyon-streets (a natural pedestrian precinct) must also handle the servicing of a gigantic business activity, generating a serious conflict between the pedestrian and the vehicle. The intrusion of heavy volumes of traffic on and off the Brooklyn Bridge dominates traffic movement in the entire Civic Center area, posing serious problems, especially for the proposed new superblock.

The transit system is designed primarily to serve the older areas of the city, and operates poorly in relation to the areas to the north and east, where the growing professional and managerial class is increasingly concentrated.

SUMMARY OF GOALS

Lower Manhattan has a complex role to fulfill in the future. It has played a critical role in the history of both the City and the nation, but its past will not wholly predict its future. The City, and especially the region, have new needs and aspirations. To meet these needs, the following list of goals for Lower Manhattan was formulated.

(1) To strengthen the downtown business Core, with its important regional and national roles, by providing for prime office expansion, improving its working environment, diversifying its business life, reducing its vulnerability to the decisions of a single institution, improving internal transportation, and enhancing the City's economic and tax base.

(2) To provide a powerful new magnet for housing in the City's core area; to broaden its share of that part of the region's new housing market composed largely of younger households amenable to central city living; to contribute thereby to the reduction of the regional journey-to-work by providing walk-to-work housing, and by taking advantage of underutilized capacity in many existing subway lines.

(3) To broaden the regional choice of work opportunities by diversifying downtown's range of employment; and to broaden the regional choice of residence by introducing new housing in the vicinity of major existing employment centers.

(4) To take maximum advantage of the great beauty of downtown's waterfront and its striking physical plant -- thereby best serving the downtown business community, the new residential population, and providing regional recreation as well. To do this, the waterfront development must be designed as an integral part of the Plan for the future of the business Core.

(5) To rationalize downtown transportation through maximum feasible separation of pedestrian, arterial and service traffic. This will facilitate traffic moving through Lower Manhattan and minimize the severe conflicts between vehicles and pedestrians in an area of heavy pedestrian movement, the central business Core.

(6) To improve the working environment in Lower Manhattan by providing daily amenities, services and attractions found elsewhere in the City, and by improving the quality and character of public space and internal circulation: its pedestrian routes, subway access, intra-area mass transit.

(7) To protect existing blue collar jobs in the goods handling area by defensive actions where necessary, industrial rehabilitation where feasible.

(8) To assist in the incorporation of current major downtown projects (Civic Center, World Trade Center, Battery Park Site) into the existing and future fabric of Lower Manhattan, to minimize disruptions due to street closings, and to provide for connections to future adjacent developments.

(9) To improve Lower Manhattan's mass-transit access to those portions of the region -- particularly to the north and east -- where residential growth has been greatest and where the higher skilled workers now ingreatest demand are increasingly concentrated.

DESCRIPTION OF THE PROPOSALS

The Plan is conceived as a framework for decisions, an organizing concept to guide present and future growth. The physical expression of that framework is a newly rationalized circulation system, extending from the streets and subway stations of the inner city to the complex movement systems required by new developments proposed at the water's edge. The major deterrents to change are now the remnants of old movement systems, with their concomitant small irregular lots,and the elevated highways with their inhibiting influence.

The Movement System

Beginning in the old Core, the Plan designates and treats the old streets as either arterial, pedestrian or service.

Arterial vehicular streets are Church, Broadway and Water-Pearl (in a north-south direction) and Worth, Warren-Murray (or Chambers-Warren), Barclay-Vesey and Maiden Lane-Liberty (in an east-west direction).

Between these arterial vehicular streets will be the pedestrian streets, located to follow the major concentrations of downtown subway stations and the major lines of movement: Wall, Chambers, Broad, Fulton.

Out of the irregular old street pattern a rational and efficient system of movement thus can be organized, providing the basis for important links to future development at the Core's periphery.

Transit station improvements designed integrally with the pedestrian system will bring passengers out of stations to street level with great speed and less congestion at the stairways. At certain locations the streets above the station mezzanines can be opened to provide daylight, enhancing buth utility and appearance.

Intra-Bus

To serve the unique needs of Lower Manhattan, particularly as the Core expands and distances between major concentrations of workers and residents become greater, a small, low, moderate-speed vehicle is proposed for selected routes of the pedestrian system. This conveyance will provide frequent service for people moving distances too short for subway, too long for easy walking.

The new vehicle, called Intra-Bus, should be designed expressly for this purpose, with a low floor and relatively open sides so that it would be easily boarded, even in motion. Stopping time would thus be kept to a minimum.

Depressed Peripheral Expressways

To achieve direct pedestrian access from the Core to the waterfront, and a truly integrated waterfront development producing the highest land values, the Plan calls for the construction of depressed expressways, on new fill just outside of the existing bulkhead, and the eventual demolition of the existing elevated highways.

The cost of this new construction, including fill, bulkhead and highway, will be around $ 22 a square foot, and can be included in the price to developers of the newly-created land. It was found that, with City subsidy allocations already committed to more critical areas elsewhere, the entire development will be completely self-financing.

Altogether, the total investment in the waterfront development will be in the neighborhood of two billion dollars.

A Residential Community

The Plan calls for a downtown waterfront residential community of 80,000 to 100,000 people, to be constructed on some 450 acres of land at the periphery of the downtown business Core. Of this 450 acres some 190 will consist of new fill (replacing the largely unused and obsolete piers) and 260 will be inland area now available for redevelopment. In terms of phasing, this development could be carried out in 20 years.

The new residential community is to be composed of six interconnected development areas ("neighborhoods") of 10,000-15,000 people, each centering around waterfront plazas at the ends of the major downtown pedestrian streets and axes: Wall,

Broad, Chambers, Fulton, the World Trade Center.

These plazas will form "windows on the waterfront", broad openings into the very heart of the City. They will serve as the focal points of retail and community services for both the new residents and office workers.

Altogether some 40,000 dwelling units are planned -- ultimately serving a wide range of income and family types. A complete development of new retail and community services, including cinemas, schools and supermarkets, will be constructed to service the new community.

Each development district (or "neighborhood") will contain a mixture of housing at the water's edge and offices next to the existing business Core -- some structures will combine both offices and housing. The anticipated offshore expansion is designed to reinforce the cohesiveness of the Core, rather than to diffuse it.

Preliminary calculations indicate that the introduction of 40,000 new dwelling units in Lower Manhattan will not overload the existing transit network. By providing walk-to-work housing, it should in fact reduce the incoming subway volumes. Workers going to the midtown area will be using the excess capacity made available by the exodus of workers at downtown stations.

Waterfront Parks

The plazas will be connected together along the water's edge by a waterfront esplanade, providing public pedestrian access around the entire tip of the island and especially to the three major waterfront parks: Battery Park at the island's tip, and two new proposed parks, one between Catherine and Peck Slips on the East River (directly under the Brooklyn Bridge), and one between Canal and Hubert Streets on the Hudson.

Neighborhood Parks

Above the service cores will be located recreation facilities, for the joint use of residents and office workers in that district.

Servicing and Parking

Parking and service facilities are shown at the center of each development district, separated from pedestrian movement and linked to the new below-grade expressway.

The new highway will provide for both express by-pass traffic and local movement to service the new waterfront districts. Parallel service roads will connect to inland streets and to parking garages constructed over or adjacent to the depressed highway. As a matter of policy, new downtown parking facilities will be confined to this peripheral system -- within easy walking distance of the inner Core, out of the way of local service traffic. Some 20,000 new spaces will be required, 15,000 for the new residential population, and 5,000 to replace and to augment downtown's current supply.

Administration of Development

It is recommended that, after review by appropriate City and civic agencies, the implementation of these proposals be delegated by the City to an area development agency, with broad powers to carry out the major elements of the Plan, subject to periodic review by the City. Such an agency should be a joint enterprise between the City, its relevant agencies, and private interests.

This agency will determine the detailed development of the sequence of projects, establish basic form, function and economic controls, undertake the development of the substructure of landfill, highways and utilities, and lease out parcels to private developers who, under the guidance of the Plan, will actually build the vast majority of structures along Lower Manhattan's new waterfront.

Strengthening the Core

The working Core of Lower Manhattan has shown many signs of growth and strength in recent years, particularly in the field of banking, securities and government. But in spite of this impressive building program in the last decade, it would appear that Lower Manhattan's employed population (south of the Chambers-Worth line) has dropped since 1960.

As a working environment, downtown has few of the attractions

and conveniences which make midtown the preferred choice of many office workers. A major goal of the Plan is to alter this condition. Current estimates indicate a downtown employment of perhaps 435,000 by 1980 -- if no substantial change occurs in the structure of downtown life. On the other hand, if the major recommendations of the Plan are instituted, this figure could be as high as 500,000. The Plan shows a new ring of office buildings, concentric to the existing core, to contain this increased working population.

But perhaps more important than this quantitative expansion of office space will be the enhanced working environment, the improved transportation, economic diversification, a change in the whole quality of working in Lower Manhattan, a change which will result in a more intense and valuable business community. These changes point to the importance of close business participation in, and commitment to, the realization of these far-reaching proposals.

MAJOR RECOMMENDED IMMEDIATE ACTIONS

The Report contains a detailed list of immediate actions related to the movement system, the committed projects, and land use and renewal activities. The major recommendations are summarized here with the movement system considered first as the most immediate.

The Movement System

A. Adopt the street classification system (of arterial streets for major traffic, service streets for deliveries, and pedestrian streets, the latter to be closed part all of the day to all but necessary service traffic).

1. Arterial Streets

   North-South: Water (2-way), Broadway-Church, West (2-way), Park Row (2-way).

   East-West: Canal (2-way), Warth (2-way), Warren-Murray (or Chambers-Warren), Barclay-Vesey, Liberty-Maiden Lane (part 2-way).

   Through Traffic: The peripheral expressways.

2. Service Streets
   All other except pedestrian streets.

3. Pedestrian Streets

   North-South: Broad-Nassau(part), Broadway (combined).

   East-West: Chambers, Fulton-John-Dey (part), Wall. Improve Fulton Street for combined pedestrian and vehicular service.

B. Street Modifications

1. Tunnel from Brooklyn Bridge Approach under City Hall Park to connect the Bridge with the Warren-Murray (or Warren-Chambers) arterials.

2. Complete the widening of Warth Street.

3. Widen portions of Liberty Street and Maiden Lane.

4. Extend the widening of Water Street.

5. Provide short sections of new street at Baxter and Madison.

6. Complete Brooklyn Bridge approaches.

C. Transit System

1. Station Improvements
   Institute station improvements and entrance redesign at the Chambers, Fulton, Wall-Broad, Foley Square station complexes. Connect stations at Bowling Green.

2. Subway Facilities
   Proceed with modernization of existing subway facilities into the downtown area and improve transit access between Midtown and Downtown by means now being studied by the Queens-Long Island Mass Transportation Demonstration Program. The findings of the Water Street Subway study now underway by the Downtown-Lower Manhattan Association should be evaluated as part of this program.

3. Local Transit
   In cooperation with Transit Authority, begin development of a new transit vehicle for intra-bus service on the pedestrian streets.

D. Peripheral Highways
Undertake engineering studies of relocation of existing elevated highways in cooperation with relevant agencies.

CURRENT PROJECTS

World Trade Center

Analysis indicates that the long-term impact of the World Trade Center on Lower Manhattan will be a positive one, and that its traffic and transit impact will not produce undue disturbances. The Center should become the focus for a broad regenerative development on the west side of the island.

Efforts must be made, however, for closer coordination of the current design with downtown's existing fabric and future adjacent projects.

1. Re-examine role and relationships of central plaza and concourse level below, particularly as they relate to elevator entrances, retail shopping, and adjacent pedestrian levels.

2. Consider extension of the main pedestrian plaza to the east, along Dey Street, to Broadway, to provide a strong visual and functional connection to the heart of the island. Investigate possible use of an overpass at Church Street.

3. Plan for grade separated pedestrian crossings at Fulton Dey and Liberty.

4. Plan for extension of the plaza over West Street, anticipating the waterfront development.

5. Study alignment of underground ramps at Barclay Street for better relationship to surrounding street alignment.

Battery Park Site

A development of comparable size to the New York Stock Exchange has been assumed at the Battery Park Site. These recommendations are made for this site.

1. Broad Street at this point should remain physically open, although perhaps for pedestrian traffic only.

2. The Water Street widening should be extended to Whitehall Street.

3. Future pedestrian connections to the waterfront should be planned.

Brooklyn Bridge Southwest

This middle-income housing project will help establish the feasibility of residential family living in Lower Manhattan. Two recommendations are made for its detailed design.

1. As Fulton Street is improved, it should be designed in conformity with its recommended use as a pedestrian-service street.

2. A future pedestrian connection to waterfront housing in the Fulton Fish Market area.

Washington Street Market Urban Renewal Area

This project, whose land and buildings the City has already acquired, can have a major and positive long range effect on Lower Manhattan. Although it is hemmed in by blighting neighbors and economically difficult to develop for industrial purposes, it can serve as the nucleus for west side development.

Recommendations are:

1. If current Board of Higher Education Study proves the feasibility of this site for an educational complex -- as proposed in this Report -- it should be conceived as the first step in an integrated waterfront development.

2. Promote development of the northern end of the project for use by the graphic arts industry or for

research and development related to the educational use.

3. Reserve the southern portion of the project area for future intensive office use related to the World Trade Center. An interim use is off-street parking and as a construction material site.

4. Include a study of the preservation and development of the Duane Street Park as part of the Washington Street redevelopment.

The Civic Center

At this writing the Civic Center is under detailed study by the City Planning Commission. In this reexamination, the following principles should be considered:

1. If a Civic Center superblock is desired, the most direct and economical traffic solution would be an underpass through City Hall Park.

2. Even without the superblock, the underpass solution should be considered as a long-range solution of the heavy conflicts caused by the intrusion of Brooklyn Bridge traffic into a pedestrian area.

3. The preservation of as much as possible of the City Hall Park, as an open green area, should be a major goal.

4. Service functions for both federal and municipal complexes in the area of the present Duane Street should be consolidated in such a way that the heavy pedestrian movements generated by these complexes can easily move through this critical area.

5. In consideration of the designation of the Hall of Records as an historical building, consider the relocation of the planned Municipal Tower to the west, along Broadway.

6. As a principle, the bulk of proposed parking should be located to the east of the old Municipal Building, where it will be closer to highways and away from the congested core.

7. Examine carefully the feasibility and finances of the extensive retail facilities proposed for the underground concourse.

8. Two basic pedestrian routes should be considered as central design elements. First, Chambers Street, running across the Civic Center, through the Municipal Building, and then by overpass to the expanded site of the Police Headquarters. Second, an extension of the Broad-Nassau pedestrian route, across Park Row, and into the heart of the Civic Center, joining there with the pedestrian path of the Brooklyn Bridge.

WATERFRONT DEVELOPMENT

A. Organizational Procedure

Establish together with civic leaders and the business community, an appropriate quasi-public organization to prepare detailed plans for the proposed waterfront communities, to manage, promote and carry out the actual development, including the relocation of the peripheral highway, and to explore the various mechanisms of development including unassisted urban renewal.

B. First-Stage of Development

To undertake, as the first priority, the development of the area between Fulton and Wall Streets, from Water Street to the Pierhead Line; and, as second priority, the proposed waterfront development unit west of the World Trade Center.

C. Clear Unutilized Piers

In cooperation with the Department of Marine and Aviation, work out schedule for removal of piers, beginning with those presently unused, and relocating tenants of those in only partial or occasional use, and undertaking negotiations

with owners of several piers in private ownership.

D. Waterfront Park

Adapt the Braaklyn Bridge Park proposed for the offshore area between Catherine and Peck Slips as part of the public pork system, as the first step in the pork system proposed far the perimeter af the entire peninsulo.

When funds are available, fill the oreo ond develap it for general park and waterfrant use as well os far relacatian far the nearby residents.

Industriol Rehabilitatian

The area bounded by Canol Street, the Halland Tunnel approach, North Moare Street and West Street is considered suitable for its present industrial and warehousing use. Special study of its prcblems -- canflicts between thraugh and lacal troffic, need far off-street parking, same deteriarated and absalete structures -- be made in canjunctian with owners and occuponts af the area.

Residential Rehabilitatian

Urge local leadership in Chinatawn to undertake planning study, with City guidance, of means af alleviating prablems ossociated with age and condition af buildings, parking, etc. ta make passible maximum benefits ta region and Chinese cammunity itself. Principle of self-rehabilitatian should be fallawed throughout.

NEXT STEPS IN THE IMPLEMENTATION OF THE PLAN

Since the Plan is nat merely a set af specifications for a "project" ar a map with propased land use changes, but rather a guide for lang-range decisian-making, it is nat opprapriate ta canceive af its "adoption" os a single legislative ar administrative act.

Rather, an organizatian shauld be created capable af cantinuing the pracess of cansensus begun by this Repart. This agency (a development committee), presided over by civic, business and governmentol organizations, will be the focus far the mony refinements required before the plon can be tronsformed into legislotive reolity, new ordinonces, etc.

The refinement of methods af plan implementotion shauld be corried out with the ossistance of the relevont deportments of the City Government, os well as civic groups, porticularly those most concerned with Lower Monhotton.

This development committee cauld become the nucleous for the area development agency proposed in this report.

When the mojor elements of the Plon ore thus consolidoted, they will be presented ta the opprapriote ogencies and legislotive groups for implementation and odoption.

LOWER MANHATTAN PLAN

CHAPTER I

INTRODUCTION AND SUMMARY

Planning for one of the world's most important pieces of real estate, and for the heartland of a number of its most important activities, poses a unique challenge.

The problem here is not the usual one of fostering a renaissance in a dying and formless city, but rather of preserving and enlarging one of the boldest urban complexes ever built: a solid core of towers grafted onto a 17th century street pattern, framed by two great rivers, set on a strong spine (Broadway); a sharply defined mass of buildings and activity by which the very image of the modern city was fixed in the boom years of the 1920's.

IMMINENT CHANGES

Today Lower Manhattan is undergoing a series of massive changes which, in a short time, may drastically alter many of its activity and circulation patterns -- posing both problems and opportunities.

The first of these changes is already well underway. It is the revival in office construction sparked by such recent projects as the Chase Manhattan Building and others. Since 1955 some sixteen million square feet of office space have been added to downtown's stock. Another sixteen million are now projected.

On the west side of the island, a small "city within the city" is in formation -- the World Trade Center. This project, housing some 50,000 people in a great superblock, will establish new traffic patterns, recast the downtown skyline, introduce new business functions into the area, and eventually provide a new impetus to growth in a declining area.

To the north of City Hall, a new governmental Civic Center is under construction. This enlarged concentration of municipal and federal employees, centered on the biggest superblock in Manhattan, will form a strong new anchor of office activity. It also creates an altogether new pattern of pedestrian flow, contricts and rearganized vehicular traffic, and requires complex solutions and a high degree of planning coordination.

In the financial area to the south, the New York Stock Exchange has considered a move down Broad Street to the water's edge, a move which would influence the center of gravity of the financial district, enlarge the traditionally tight Core, and open up the waterfront for new growth.

In addition to these major new office concentrations, two urban renewal projects are planned: the Washington Market Redevelopment Area (31 acres) along the Hudson River, and Brooklyn Bridge Southwest (15 acres), introducing institutional and residential functions hitherto unknown in the area.

THE PROBLEMS AND OPPORTUNITIES

These projects call for widespread street closings and major traffic changes. In many cases, street widenings will have to precede the creation of the new superblocks. In others, new arteries must be pieced together to replace old ones that have been disrupted. The complex and awkward system by which heavy volumes of traffic converge on the Brooklyn Bridge must be completely revamped.

For downtown as a whole, an overall circulation plan is clearly needed, a plan classifying streets by predominant function and designing them accordingly.

In the financial Core itself -- a natural pedestrian island -- steps must be taken to separate people from trucks and autos, sidewalks from service area, to remove as many of the conflicts as possible. The expansion of the Core may also require the development of a new intra-area transit device.

To the north, where major east-west and north-south traffic is in constant conflict, a lower Manhattan expressway is looked to for relief of downtown congestion.

In spite of the broad scope of the projects outlined, they

only begin to tap Lower Manhattan's broad potential. Future growth possibilities, beyond these projects and generated in part by them, suggest even more drastic changes. These long-range changes will be concentrated in the areas surrounding the central office Core.

Although office expansion has been substantial in recent years, downtown's growth has by no means matched midtown's, where some 4 million square feet of office space are added annually (compared with a current downtown rate of around one million). As a working environment, Lower Manhattan cannot today successfully compete with Midtown, with its rich diversity of facilities.

In spite of physical office expansion, Lower Manhattan's employment seems to be declining -- from about 400,000 in 1960 to about 375,000 in 1965. Within Lower Manhattan's office stock, a wide range of condition prevails. In the financial district seventy-five per cent of the office area is postwar or modernized, but to the north the comparable figure is only forty per cent.

Although downtown's office Core is growing, the areas surrounding it (mostly goods-handling in character) are in general and sustained decline. Of the 51 piers on the two rivers, only 13 are in use and only 7 are of post-1916 construction and in good condition. Of downtown's three major waterfront food markets, one is in the process of moving out (fruit and vegetables) and another is scheduled for early relocation (fish).

In the last fifteen years some 4.5 million square feet of loft space has been demolished in the area; and another four million are scheduled to go in the next few year, to be replaced by renewal projects, office buildings or parking lots. Employment in goods-handling activities has declined from 75,000 to about 40,000 in this period. Roughly 20,000 of this drop was in the "northwest" portion of the area alone, where textiles, hardware, machinery, graphic arts, and warehousing are the predominant industries. Since this loss has been largely in critical unskilled and semi-skilled jobs, it is a matter of deep concern to the City.

To the south, along both waterfronts and adjacent to the office Core cargo-handling has been greatly reduced with no new major leases or construction in recent years. Little likelihood exists of a revival in maritime activity in this area, due to the inherent superiority of shipping facilities, upland conditions and transportation connections elsewhere in the region. This opens the opportunity for new uses to be considered here.

Altogether a 515 acre-area of land (and water), within a half mile of the Core will soon be available for new functions. Many parts of this land are already under development. Interest has been indicated by developers in much of the rest of it. A great opportunity down both riverfronts for further growth, new functions and new ideas is available.

For the City and the region, the challenge is to make available this underutilized regional resource: its dramatic waterfront, the imposing physical plant and employment center, with its key location and excellent transit facilities. This seems the ideal place to begin a program of maximum utilization of New York's waterfront as a means of increasing the attractiveness of the central city as a place to live and work.

Purpose of the Study

This summary of problems and opportunities is the background against which the Study was made. The purpose of the Study undertaken in February 1965 was two-fold.

(1) To assess the impact of the currently planned projects, both in land use and circulation and to recommend to the City those actions which were deemed appropriate and necessary to resolve problems raised, and to take advantage of opportunities created. Most of the projects were planned in relative isolation from one another. Coordinated decisions were generally beyond the scope or authority of the agencies involved in each individual effort.

(2) To prepare a long-range plan to be used as a guide for optimum future development of Lower Manhattan as a prt of Manhattan's Central Business District.

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† See New York City Planning Commission, The Port Of New York, Proposals for Development, September, 1964, p. 21. The report advocates that "Lower Manhattan Waterfront from Battery to Chambers Street should be redeveloped to complement the renewal of the Downtown Financial District."

Study Definition Area

The terms "Lower Manhattan" and "downtown", as used in this Report, are virtually synonymous in meaning, although each has a slightly different connotation.

In general usage, "downtown" refers to the office core centering around Wall Street. It includes City Hall and the government buildings to the north at Foley Square. Its effective boundary follows a line formed by Chambers and Warth Streets.

For the Study, this was the zone of special concentration. Much of the report's demographic work following this definition, both because it defines a coherent functional area (primarily office in character) and because it was consistent with data from earlier studies of the Downtown-Lower Manhattan Association.[1]

Lower Manhattan embraces a somewhat larger area north to Canal Street. It includes two adjacent zones: the goods-handling area to the east of the Civic Center, and Chinatown. These were included because many of downtown's problems and opportunities depend on the ultimate stability or redevelopment of these neighboring areas.

Lower Manhattan was accepted as the Study Area. It is bounded on the north by a line from the Hudson River along Canal Street to the termination of the Manhattan Bridge, south on the Bowery, and then southeast on Catherine Street, to the East River. It includes all the area south of this line to the Battery, from river to river.

The northern boundary slices a number of functional areas such as "Chinatown", and the warehousing area to the west. However, it defines an area large enough to provide an adequate planning setting for the major concentration of the Core to the South.

NATURE OF THE REPORT

This report summarizes the findings and proposals of the year-long Study of Lower Manhattan conducted by consultants for the City Planning Commission.

In Part I, the first four chapters of the Report describe Lower Manhattan, its problems, component parts, potential growth elements and current projects.

Chapter V sets forth a series of principles and goals for future development. Chapter VI outlines circulation and land use plans to fulfill these goals.

Chapter VII describes the mechanisms, staging sequence and costs of development of a case study area. Chapter VIII shows a long-term view of future alternatives, and the immediate steps to be taken.

Part 2 deals in more specific detail with Lower Manhattan's transportation system, summarizing field surveys, the computerized traffic network models, and detailed recommendations.

The Appendix is a series of papers dealing in depth with major land use and planning problems raised by the plan, and the investigation that led to it.

The plan and the process which produced it have occurred in a context of contribution and cooperation with the City Planning Commission and Department, its chairman and staff, as well as its technical resources.

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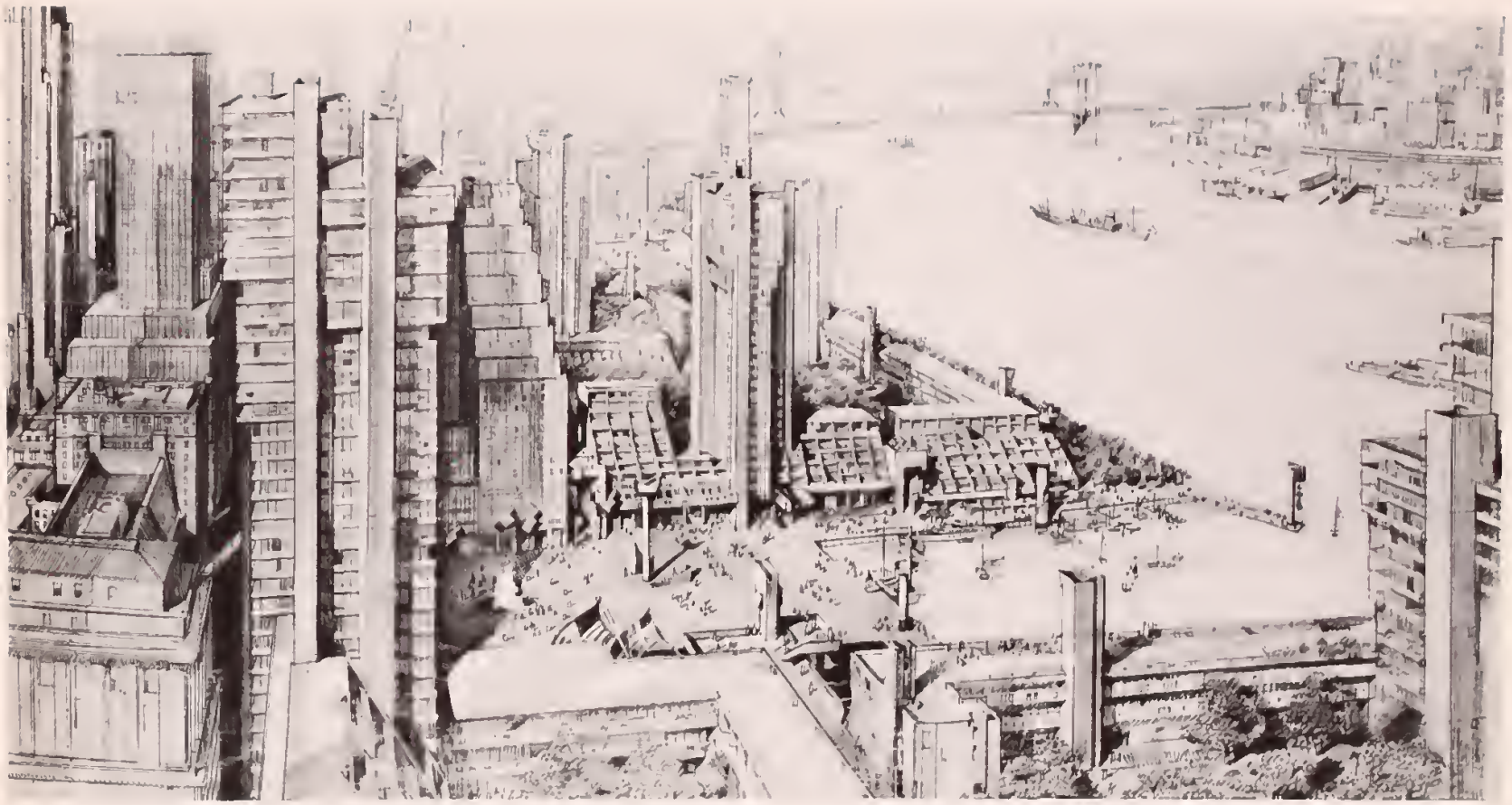
[1] Downtown Lower Manhattan Association - 1958, 1963.



PART I

Land Use

CHAPTER II

BACKGROUND AND SETTING

As o physicol unit, Lower Monhatton seems like o sepo-rate city. Its 375,000 employees ore clustered together in o tight moss and shore o speciol heritoge. Mony of its firms ore old, its ties to post tradition strong, and its sense of identity in striking contrast to the more amor-phous Midtown image.

This sense of partial isolotion from the rest of the City is to o degree justified. Lower Manhotton's greotest indus-try, finonce, is nat tied to o locol or regionol market, but to a notional one. The volume of business on the St-ock Exchange rises ond folls with the Gross National Product. It reflects the fortunes of notionol business octivity, ond sets the tone for much of downtown business life.

The relative purity of the functions of the orea is ot once its elegance and its weokness. No business orea of com-parable size is so specialized. Lower Manhottan hos mony choracteristics in common with o "one-industry" town. When prices ore good, the economy soars; when they slip, retrenchment is generally necessary.

In recent years, prices have been very good. The orea has experienced a substontiol boom in new constructian, led by the banking and securities industries. This reflected a national trend. Between 1945 ond 1965 financiol emplov-ment in the United States jumped from roughly one to three per cent of the working population.

Lower Manhotton's opporent self-sufficiency is neverthe-less not the whole story. The oreo is also o part of the lor-ger Monhatton Centrol Business District extending from the Battery to 60th Street, with nearly two million workers. Lower Manhotton is the lesser of the two poles of octivity -- the other being the East Midtown oreo which, with its 500,000 office workers, its greot shops ond showrooms, constitutes the current center of New York's business, cul-turol, ond social life.

In this lorger context, Lower Manhattan's boom is less im-perotive, its position less secure, its future more problem-oticol.

HISTORY OF CHANGE

The split in the Monhatton CBD dates from the middle of the 19th century. Little by little, the City's business cen-ter moved northword out of Lower Manhatton: first to Union Squore, then to 23rd Street and 34th Street, and finally todoy to the Eost Midtown area north of Grond Central Sto-tion. The shift in offices wos porolleled by a movement in foshionoble living, until olmost no residents ore left down-town.

This northword movement out of Lower Monhottan continues today. Within the lost decode several of the remaining corporote headquorters, olong with o few mojor bonks, hove relocated uptown. Some lorge low firms have also moved, or shifted substontiol segments of their operotions. Of the insuronce business, only marine ond casualty is left. The flow hos been olmost olways out, virtually never in.

The decline in downtown manufacturing and wholesaling hos been even more dramatic, reflecting o condition common to the entire CBD. The relocotion of the textile district re-presented a substantial loss -- leoving behind only a special-ized remnont in elegont cost-iron buildings north of Leonard Street that once housed the entire industry in New York.

In recent yeors coffee, diamonds and leather goods hove been displaced. The fruit and vegetable market is on its way to Hunt's Point in the Bronx and the City has a policy of the eventuol relocation of the Fultan Fish Market. The World Trade Center will cause the removal of an entire district of "electronics" wholesalers. Activity on the down-town piers hos declined so sharply that altogether new waterfront uses can seriously be considered.

As has been cited, in the "northwest" part of the Study Area -- north of Chambers Street and west of Broadway -- employment has dropped an estimated 20,000 in the last eight years, from 90,000 to 70,000. Further declines are anticipated, and some wholesaling groups will probably be phased out of the area altogether.

The decline of goods-handling is, of course, common to the entire Central Business District. And as in the rest of the CBD, it is office functions that have shown the greatest strength. New York's role as a national administrative center has been continuously growing.[1]

THE COMPONENT PARTS OF LOWER MANHATTAN

The Office Core

The downtown office Core is composed of four distinct elements: 1) financial community 2) insurance 3) corporate headquarters 4) shipping. Altogether, some 200,000 people are employed in these four groupings, tightly packed into an area from Beekman street south to Beaver Street, between Church and Water Streets. They occupy 35,000,000 square feet of office space.

The Financial Community: Of the four, the most dynamic by far is the financial community. At its heart are the ten thousand specialists who establish the day-to-day operating terms of the nation's money market. Some 100,000 workers are clustered around them for supporting activities.

This community is composed of two divisions: the securities market, involving about 50,000 people, and the banks, who employ some 60,000 people in this area.

The Securities Market includes the two exchanges (the New York and the American Stock Exchanges) handling 90% of the nation's trading, the commodity markets (Coffee and Sugar, Produce, Cocoa and Cotton), headquarters of the 400 odd brokerage houses that conduct 91% of the nation's securities business, and the market-related functions of the commercial banks. It is this grouping that has created the popular concept of "Wall Street," the place of interplay of ideas, men, and rumor that enters into maintaining the active market in financial instruments.

Here physical proximity is essential. No office is more than eight minutes' walking distance from another. Compactness is the key element. Fraternity is important too. The men of Wall Street and the money market know each other. They see each other often enough to have confidence and understanding about the deals they make.

Centrality is important. A vast national communications network focuses on the financial district. Orders, quotes, confirmations, queries, responses pour in and out by wire and mail. Wall Street serves a highly specialized central place function.

Address, name and reputation count very heavily in the tradition of Wall Street. These reinforce the sense of fraternity so critical to confidence in money dealing.

These ingredients are held together by paper work. The great mass of workers are not money specialists, but information processers: billing, accounting, quoting, confirming, clearing, counting, transferring, mailing. These are the activities around which today's computer revolution revolves. What the computer does to these activities spells much of the future of the financial district.

In the financial district are major central offices of five of the six largest banks in the United States.[2]

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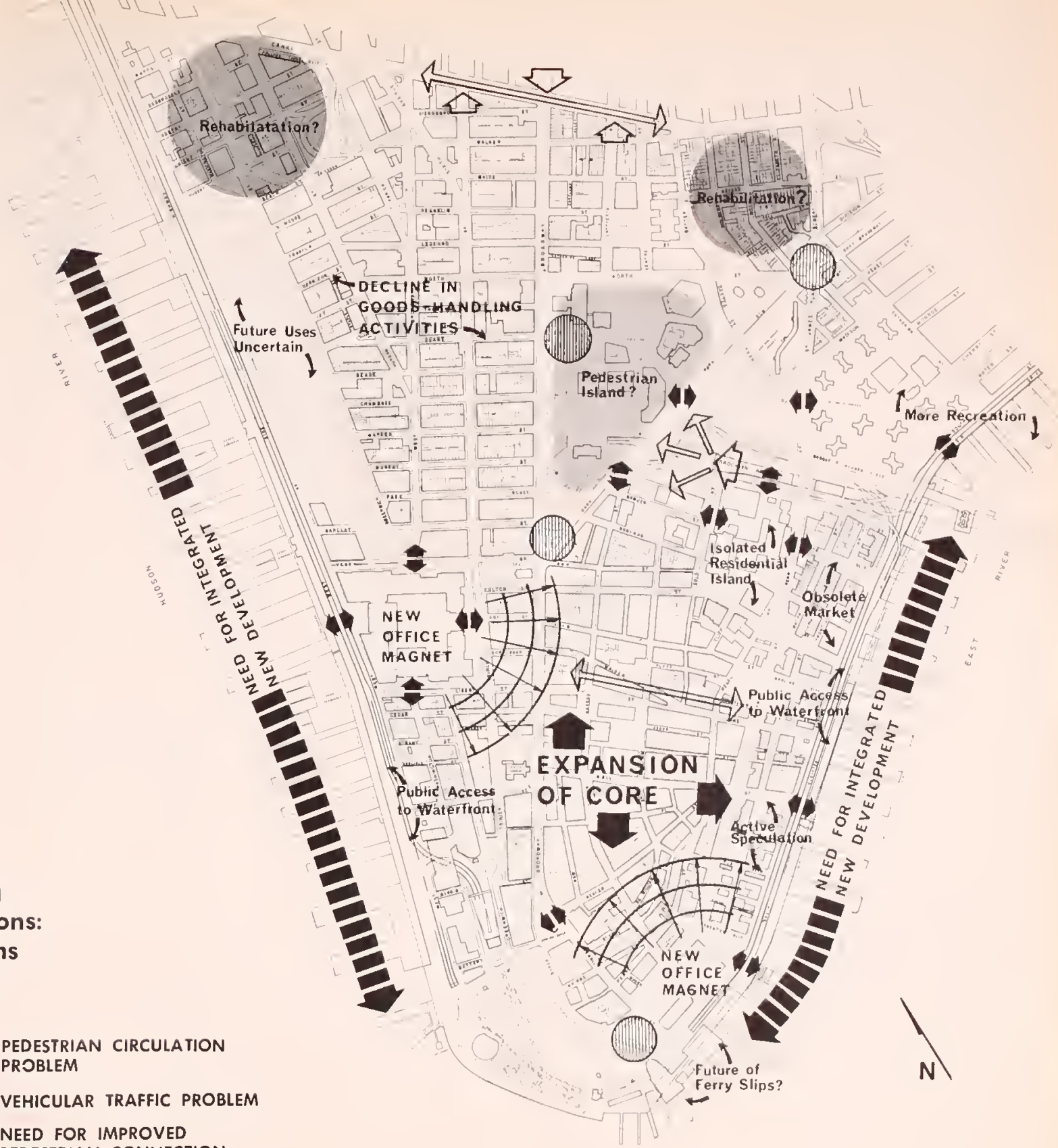
[1] The New York Metropolitan Region, with 11 per cent of the nation's employment, has 20 per cent of the nation's central office employment, including the headquarters of roughly one third of the nation's 500 top industrial firms. The Manhattan CBD itself contains the headquarters of one quarter to these 500 firms. (Regional Plan Association, Memorandum, "Forecast and Analysis of Past Trends," May 3, 1966.)

[2] SIX LARGEST COMMERCIAL BANKS (Dec. 31, 1964)

1. Bank of America (S.F.)	$15,498,892,000
2. The Chase Manhattan Bank (N.Y.)	13,018,151,000
3. First Nat'l City Bank (N.Y.)	12,452,369,000
4. Manufacturers Hanover Trust Co. (N.Y.)	6,970,520,000
5. Chem. Bank New York Trust Co. (N.Y.)	6,231,244,000
6. Morgan Guaranty Trust Co. (N.Y.)	6,109,015,000

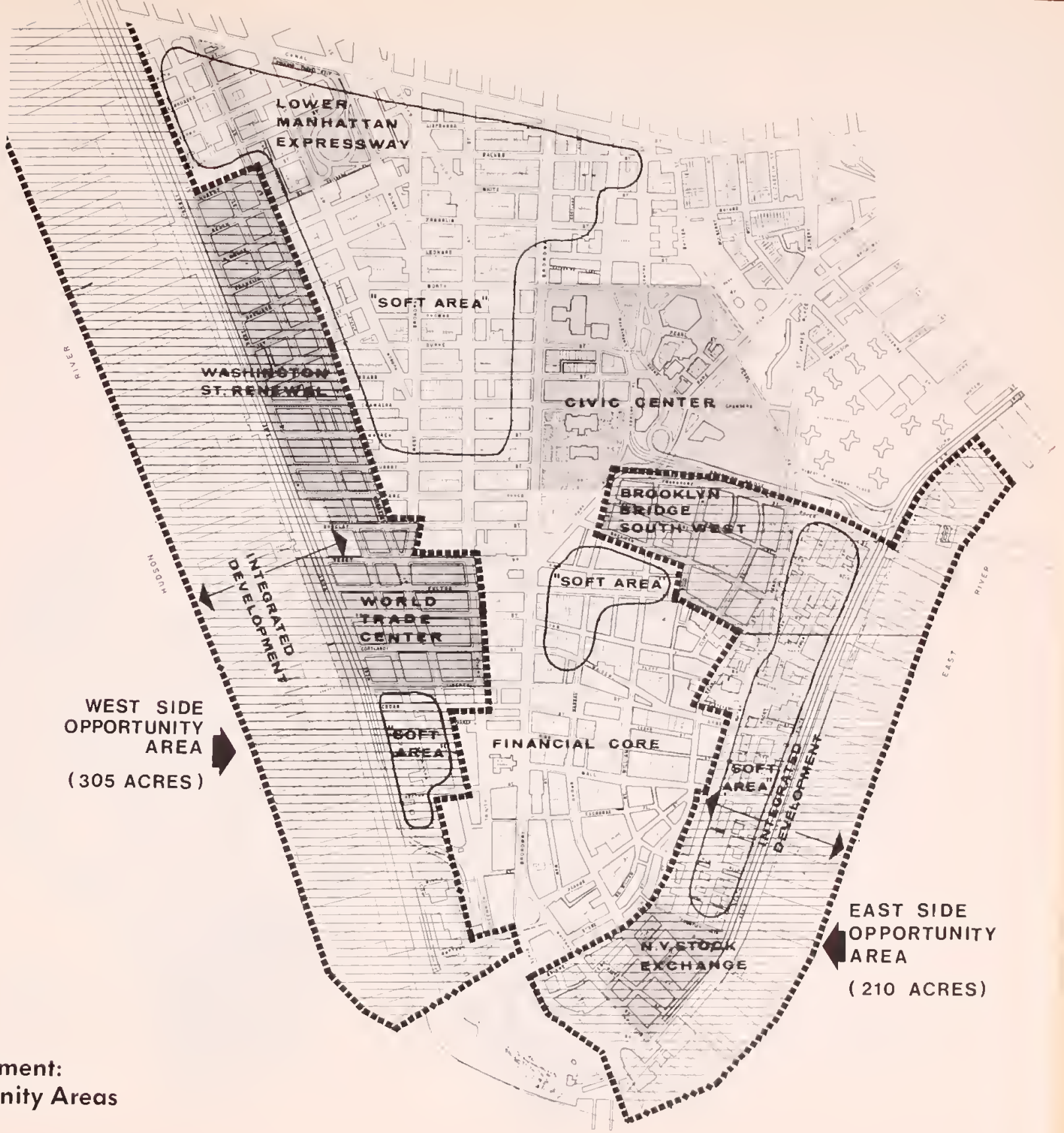


Existing Conditions: Problems

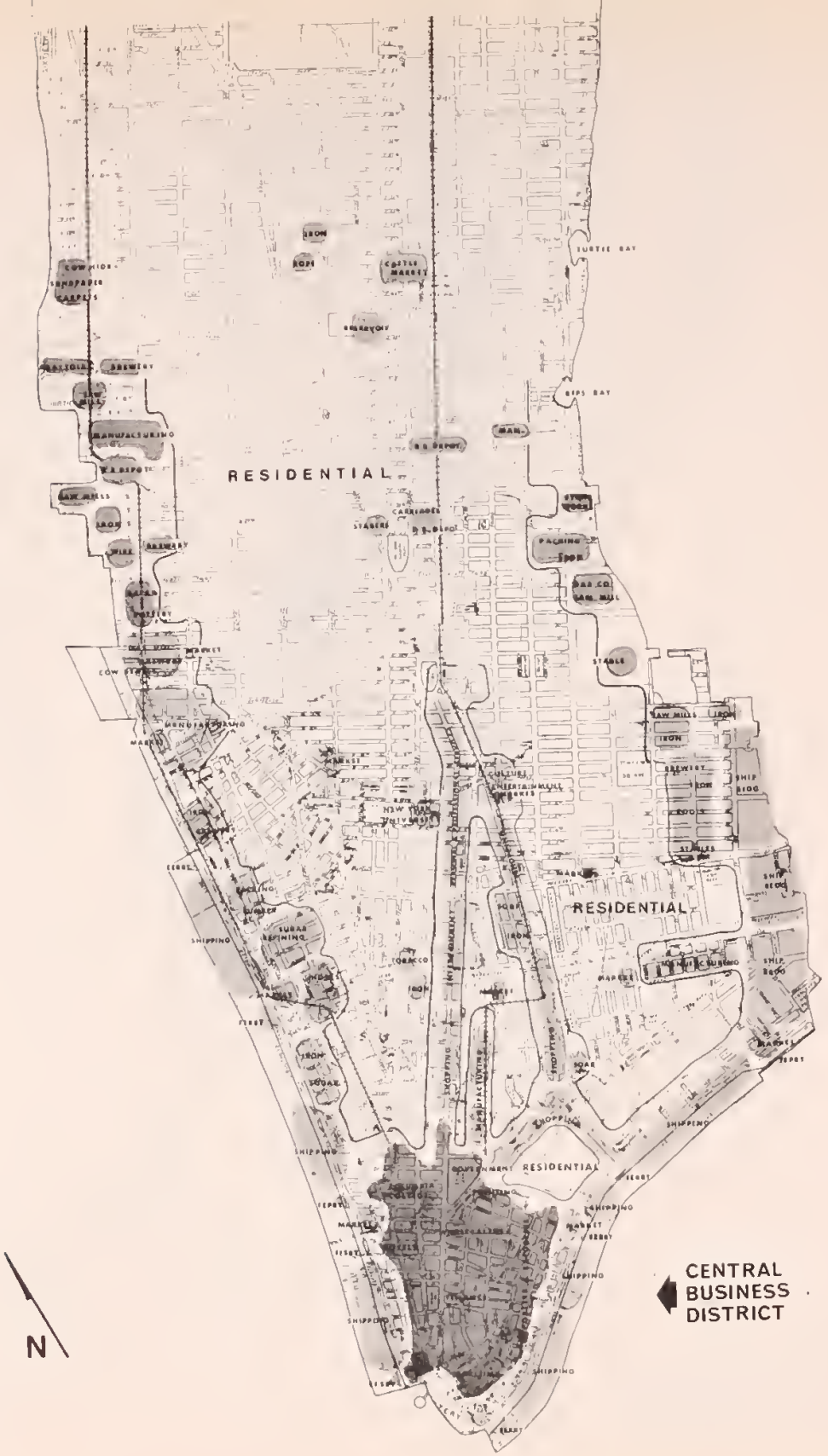
Legend:

- PEDESTRIAN CIRCULATION PROBLEM
- VEHICULAR TRAFFIC PROBLEM
- NEED FOR IMPROVED PEDESTRIAN CONNECTION

0' 500' 1000' 2000'



Future Development: Opportunity Areas



Manhattan CBD: Functional Areas—1850

Source:
LMP

0 ½ mi. 1 mi. 2 mi.

Manhattan CBD: Functional Areas — 1965

Source:
LMP FIELD SURVEYS

0 ½ mi. 1 mi. 2 mi

60,000 employees work in these downtown banks, administering hundreds of branches in New York State and around the world, and participating in investment decisions affecting long-term national and international interests. Also located downtown are the Federal Reserve Bank, the Check Clearing House, and other critical auxiliary institutions of the financial system.

Only a small portion of the banking business is directly related to the securities exchanges, and must therefore be physically located in the Wall Street area. Nevertheless, these remaining functions constitute an important and substantial activity. The stock transfer departments of the major banks operate a $100-million a year business that is considered "as essential to the search operation of the financial market place as the broker on the floor of the exchanges." [1] This function is bound to Stock Exchange not only by tradition but by law.

Other similar activities include dividend payments. The Morgan Guarantee Trust Company alone sends out some $1.8-billion a year as agent for corporations.

In recent years, several major banks have relocated their administrative components to the Midtown area, leaving only the market-related activities downtown. In one case, this has meant a relocation of about 80 per cent of its employees. In two others, it has meant the transfer of administrative headquarters. However, most of the others have kept the two components together downtown, while increasing branch services in the growing Midtown area.

Like insurance and shipping, (discussed later) banking has strong ties to the downtown area, quite aside from the linkages cited. Since it has become quite apparent that major banks can operate successfully from Midtown headquarters, the decision to remain downtown reflects the tenacity of these traditional ties.

Insurance: Adjacent to the financial district, sixteen out of twenty five of the nation's largest fire marine and casualty insurance companies are located in a cluster of buildings along Maiden Lane, Williams and John Streets along with the three remaining life insurance companies.

These companies are part of the financial district only in the special sense that they are involved in a financial business. In fact, they represent a wholly separate enclave of business activity whose relations to the money market and banking are of no more significance than any other New York business grouping.

Although they share certain common problems with the Wall Street community to the south, they lead a separate existence, with their own clubs, associations and linkages. The atmosphere is discernably different from Wall Street, lacking its obvious bustle.

This grouping of insurance firms is not the primary insurance center for the United States, or even for New York for that matter. There is probably more insurance employment in the remainder of the Manhattan CBD than in the downtown area. The casualty and fire firms are not consumer oriented and have historically found it advantageous to be together -- although the element of risk pooling which brought them together has lessened over the years.

Employment in insurance here has increased very little, if at all, and is stabilized around 45,000. Its rate of growth in behind the national average, true generally of insurance in New York. In 1947, the region held 38% of the nation's insurance employment; today, it is around 30%.

Corporate Headquarters: Along with banking, securities and insurance, headquarters of a number of major corporations make up a large part of the employment. These latter are in two distinct groups. Several major utilities, (AT&T, Western Electric, Western Union, N. Y. Telephone) are strung out in the northern part of the Study area. A small group of corporations, mostly in metals, is in the financial district itself.

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[1] H. Erich Heinemon, "Stock Transfer Business: Center of a Bottle," The New York Times, Thursday, March 31, 1966, p. 56.

Here,too, no special linkages ore involved, but rather historical factors with no current relevonce hold the corporations to downtown.

Altogether, some 30,000 employees are involved. The AT&T complex at Fulton and Broodway shows signs of o small expansion in the near future ond hos moved mony times in Lower Manhatton. The trend omong the other corporate groups is towards a further reduction in downtown facilities. No new corporote heodquarters have been established downtown in mony yeors; barring a major change in downtown's chorocter ond environment, none is expected.

Shipping: This category is composed of the headquorters of severol of the nation's lorgest shipping componies os well as a group of freight foreworders, agents, the Custom's House and supporting octivities.

Employment is stable, perhops declining slightly. The industry itself is not growing. It has no significont functionol connection to the day-to-doy money morket but still looks symbolically to the Narrows os the source of trode. The World Trode Center should be o stimulont, but this remains largely unquontifiable.

Along the East River, on Front ond Water Streets, ore the remnants of a once-thriving group of shipping service stores. This is where the greot port of New York begon. Today port activity hos moved elsewhere, ond the East River piers are lorgely inactive or obondoned. The Seoman's Church Institute, o remnont of busier doys, is moving from its present large building on Coenties Slip to a new,smoller location on State Street. One by one, the marine supply houses also are moving out.

Government

The second major component of Lower Monhatton is government. Lower Manhattan houses the region's great governmental center operoting ot municipol, state ond federal levels. Included are several mojor courts, City Holl, ond administrative headquarters for the City, state ond federal operations. Some 45,000 employees are now working in the areo involved.

Next to securities and banking, government is downtown's major growth industry. This expansion is simultoneously occuring ot all levels, ond o coordinated plon for o "Civic Center" to accommodate the growth hos been under discussion for some time.

The additions now plonned or in execution ore os follows: the Federal Building on Foley Squore; the Municipol Tower on Chambers Street; the Fomily Court on Lofoyette Street; the Police Heodquarters east of the Civic Center; ond thot portion of the World Trode Center to be occupied by the offices of New York State and the Port of New York Authority.

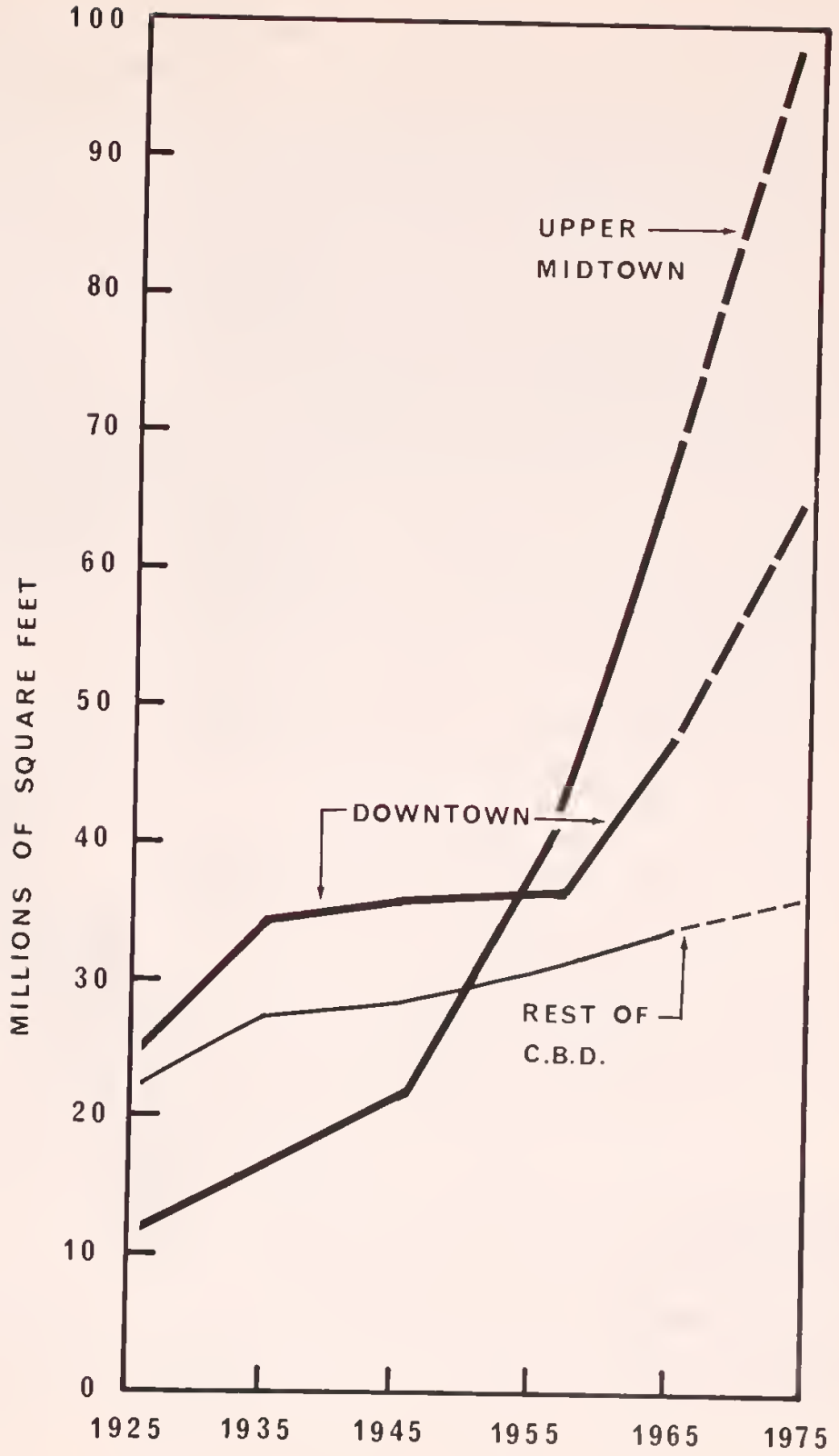
There ore no significont connections between the government center and the downtown office core described eorlier. It is even rare thot the two groups occupy spoce in the some buildings. However, in many instances they share the some business services thot occupy the older office space along Broodwoy, from Worth to Dey Street.

The Northeast Residential Areo

The third mojor component of Lower Monhatton is the residential areo north of the Brooklyn Bridge ond eost of the Civic Center. It consists of four distinct ports 1) "Chinatown", the historic core of Chinese-American population, and a popular tourist attraction; 2) the Governor Alfred E. Smith Houses, o low-income public housing development; 3) Chothom Green and Chothom Towers, middle-income housing developed under the Mitchell-Lomo program, and 4) the areo to the northeast below the Manhotton Bridge.

Chinatown: The Chinese-Americon populotion lives in on areo of mixed housing ond commercial uses, running from the Governor Alfred E. Smith Houses north across Conal Street to Hester Street at the edge of "Little Italy", ond eost from Chothom Squore to the Monhotton Bridge.

This historic nine blocks attracts some holf-million tourists onnuolly. It is the oreo originolly settled by Chinese in the 1850's (olong Mott Street) ond then in rapidly increasing

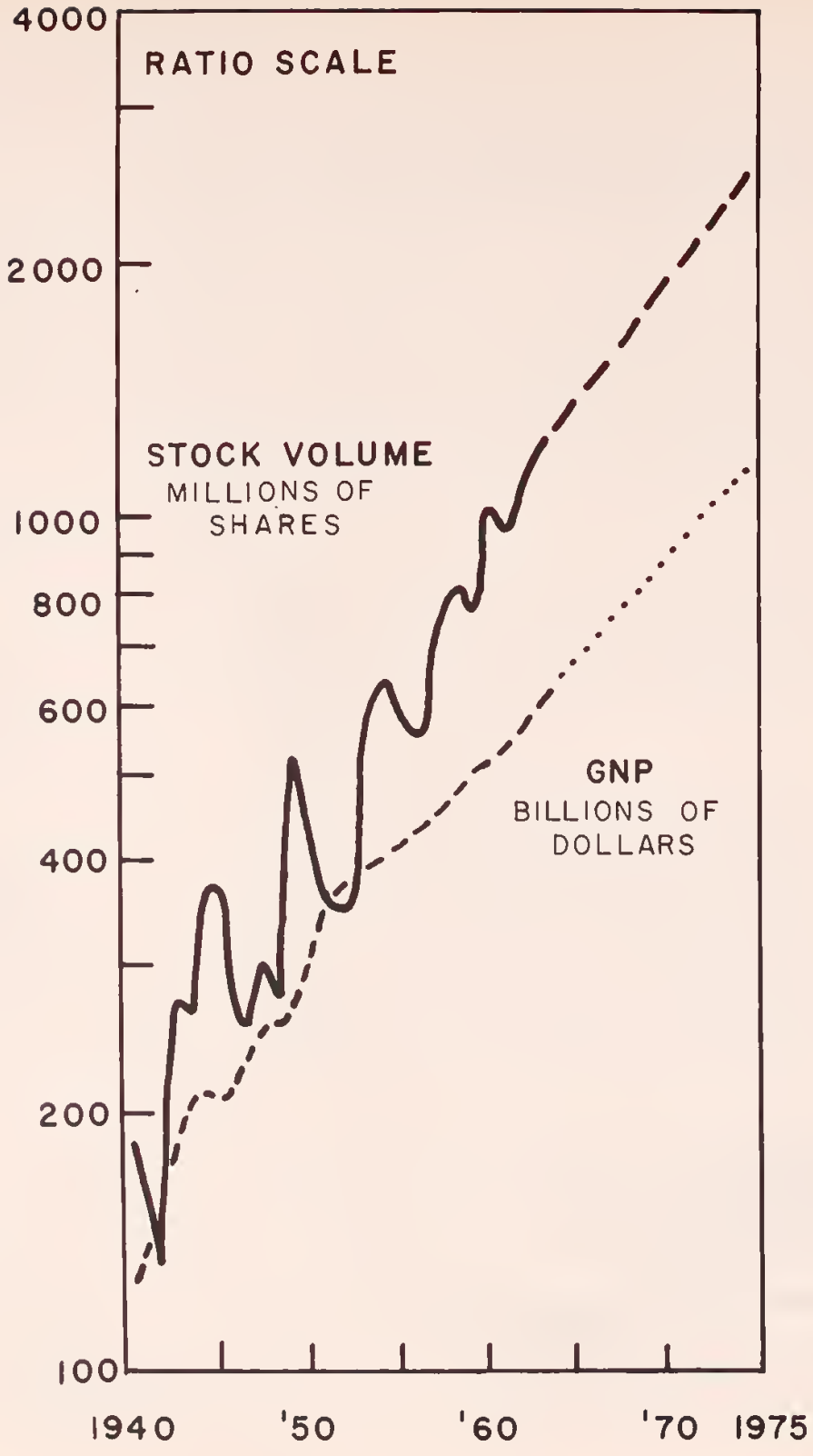


Growth of Office Space in Manhattan CBD

LOWER MANHATTAN: Battery Pk. to Chambers Street

UPPER MIDTOWN: 38th-60th Street

Source:
CPD, REAL ESTATE BOARD OF NEW YORK



Gross
National Product
and
N.Y. Stock Exchange
Volume
(Projected to 1975)

Source:
N.Y. STOCK EXCHANGE

numbers in the 1890's. It is the home of the greotest single concentrotion of Chinese-Americon populotion in the East. It is olso the center of Chinese-Americon educational institutions, fomily ossociotions, ond shops ond restourants for the opproximately 33,000 Chinese-Americans in the metropoliton region.

Estimates of the residentiol populotion of "Chinatown" vary ond are not considered relioble. The 1960 Census indicotes o non-white (predominontly Chinese) population of approximately 4,000 persons. Other estimotes range between seven ond ten thousand persons. About 1,000 Chinese-Americons live in the Gavernor Alfred E. Smith Houses.

The neighborhood is served by more thon 200 shops ond 60 restourants. There ore severol theatres feoturing live ond filmed productions in Chinese, five doily Chinese language newspopers ond over 65 fomily and trade ossociotians.

It is believed thot on increasing number of Chinese-Americons are moving from this oreo and thot it is functioning increosingly to provide services to the tourist population ond other Chinese-Americon residents of the region. Almost a third of its employed papulation work in locol eoting and drinking ploces.

The Chinotown papulation is predominantly low-income. Its housing is in poor condition and most dwellings ore old-low tenements. Only one new residential building has been constructed since 1939, though severol hove been remodeled.

A rehausing plan was put forth in 1952 by the New York Stote Housing Commissianer to demolish the existing buildings in the center and reploce them with a public housing project to be colled "China Village", with o fringe oreo devoted to shaps, restouronts ond o museum. The proposol wos successfully appased by the cammunity.

The area is notobly deficient in off-street porking spaces. During peak tourist hours, streets ore highly congested. This deficiency can anly worsen as the orea becomes still mpre taurist-ariented unless steps ore token to correct it.

The Governor Alfred E. Smith Houses: This New Yark City Housing Authority Project was completed in two stages in 1949 ond 1952. It pravides housing far opproximotely 7,600 people. They are locoted in 1,900 aportments in twelve 17-story buildings on an 18.5 ocre superblock.

Sixty percent af the residents ore Negro or Puerto Rican; onother fifteen percent are Chinese-American. The demographic chorocteristics af these residents ore typicol of a 15-yeor-old public housing project. There are a high percentoge of porents in the 35-45 yeor old age brocket who maved in when the praject was new. A large percentoge of residents are children between 6-16 years of oge.

Playground spoce is inadequate to serve these children. The site of P.S. 126 now under canstruction at one end of the praject areo was formerly used as o playground ond housed a gym. A porking lot for 95 cars occupies another potential ploygraund site. Heovy truck traffic to the Journol-Americon plant nearby on South Street makes access hozardaus to the Tahney Playground located across Catherine Street. No off-street parking spoces are avoilable for an estimoted 200-300 tenont-owned automobiles.

The Homilton-Madison Hause, a sociol wark center speciolizing in group wark, is located in the lower flaars of one building. There is o critical need to expand its focilities to toke care af its increasingly heovy worklood.

Chathom Green and Chathom Towers: These two middle-income, caaperative apartment developments were proposed by the New York City Housing and Redevelapment Boord as a reuse for land made available under Title I of the Federal Housing Act in the Pork Row Urban Renewal Area.

Chathom Green, lacated an o site east of Park Row, was completed in 1962. It was subsidized under a limited divided program by the City and spansored by the Association for Middle-Income Housing, Inc. Its 1,200 residents occupy 420 dwelling units. A playground and some cammercial space also occupy the site. It has been estimated that from 50 to 60 percent of the emplayed residents of Chothom

Green work south of Worth Street in Lower Manhattan.

Chatham Towers was completed in 1965 on a 2.6 acre site west of Park Row. It too was also sponsored by the Association for Middle-Income Housing, Inc. and is subsidized by the State under the limited-dividend program. When fully occupied, approximately 550 persons will live in 240 dwelling units. Below-grade parking will be provided for 125 cars. Playgrounds and plazas will occupy the 85 percent of the site not covered by buildings.

The apartments are cooperative and require an equity investment ranging from $ 3,980 for a studio to $ 8,930 for three bedrooms with a terrace. Monthly carrying charges range from $ 105 to $ 270.

Nearby Residential: Another major residential area adjoins the Lower East Side of Lower Manhattan to the north near the Manhattan Bridge. It is a vigorous neighborhood which historically has been the port of entry of new immigrants to New York City.

Most residents of this area are in service occupations. A substantial number of white collar workers has always lived in Knickerbocker Village, an early middle-income project immediately north of Catherine Street. The increasing number of cooperatives and subsidized housing in the area promises a gain in middle-class professional and white-collar workers.

The housing pattern nearby has been characterized in recent years by the growing blight in the remaining privately-owned housing, and by the growth of large public and middle-income housing units. The Two Bridges Neighborhood Council serves this area and is working to help meet the areas' housing and community needs.

The Fulton Fish Market

The Fulton Fish Market has been operating continuously at its present location on the East River at the foot of Fulton Street for over 140 years. The more than 90 wholesale dealers of fresh and frozen fish, processors and purveyors are housed in old, run-down buildings. Two City-owned market buildings on South Street are occupied by dealers in salt-water varieties of fish. Wholesalers handling fresh water species are concentrated on Peck Slip, a City-owned pier.

Truck transportation accounts far 93% of the annual total receipts of fresh and frozen fish. Nevertheless, water-borne delivery is still important to the Market. During some months, these landings represent 15% af the total volume in terms of receipts.

Annual receipts at the Market have been steadily declining. This decline is attributed to the increased consumption of packaged frozen fish shipped directly from points of production; to the awkward location of the Market which makes it difficult for buyers to come and go freely; and to the unattractiveness of the run-down, unkempt and functionally inadequate market buildings.

According to a recent survey of conditions at the Fulton Fish Market,[1] little if anything can be done to improve conditions at its present location. It was concluded to be in the best interests of the City and market users to relocate rather than attempt to rehabilitate.

Four potential new sites were recommended for the relocated market: Brunswick Inlet in Brooklyn; Hunts Point in the Bronx; Newtown-Creek, Brooklyn; Newtown Creek, Queens. They were selected on the basis of (1) accessibility, (2) location relative to receipts and shipments, (3) land area, (4) cost of land, (5) site development, (6) zoning requirements and (7) potential acceptability of site by Market users. Hunts Point is the most likely, and a move by 1970 is possible.

The Northwest Goods Handling Area

This area is part of the great "valley" of manufacturing-wholesaling that stretches from Lower Manhattan well up into Midtown. Here it is characterized by small businesses in older buildings, declining employment, and an increasingly

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[1] Edwards and Kelcey, Wholesale Fish Market for New York City, Department of Public Works, October 4, 1962.

Generalized Functional Areas: Present

Source:
CPD, LMP FIELD SURVEYS

0' 500' 1000' 2000'

RESIDENTIAL

WHOLESALE AND INDUSTRIAL

FINANCIAL MARKET

Functional Areas:

Source:
CPD, LMP FIELD SURVEYS

MARITIME

INSURANCE

MARKETS

GOVERNMENT

Financial Community

Legend:

MAJOR BANK :
4 ← NATIONAL RANKING (IN TOTAL ASSETS)

• BROKERAGE FIRM

▲ EXCHANGE

0' 500' 1000' 2000'

LOWER MANHATTAN PLAN

Functional Areas:
"Northwest" Goods Handling

N

Source:
CPD, LMP FIELD SURVEYS

0' 500' 1000'

TABLE I

NORTHWEST LOWER MANHATTAN

SUMMARY TABULATION OF ESTIMATED EMPLOYMENT BY FUNCTION

FUNCTIONAL AREA	GROSS ACRES	ESTIMATED TOTAL	EMPLOYMENT IN FUNCTION	IN OTHER ACTIVITIES
Butter-Cheese Eggs	14	3,000	2,000	1,000
Dry Groceries & Import Food	12	3,100	2,000	1,100
Worehousing & Export Pocking	11	900	800	100
Wholesole Shoes	7	1,500	500	1,000
Textiles	30	12,000	8,500	3,500
Grophic Arts & Poper	18	5,300	4,000	1,300
Hord Goods-Wholesole	18	4,500	2,500	2,000
Hord Goods Monufocture	4	1,700	1,500	200
Retoil	4	800	400	400
Generol Office	25	25,000	20,000	5,000
Government	4	5,100	4,500	600
Miscelloneous	23	9,300		9,300
NORTHWEST AREA TOTALS	170	72,000	46,700	25,500

ESTIMATED EMPLOYMENT BY ACTIVITY CHARACTERISTICS

GOODS HANDLING	30,000 - 35,000
TRANSACTIONS	30,000 - 35,000
RETAIL-SERVICE	10,000 - 12,000
GRAND TOTAL	70,000 - 82,000

Source: Field Survey checked ogainst estimotes derived from Bromley Mop meosurements of floor spoce ond ossumed employment per squore foot.

TABLE II

ESTIMATES OF EMPLOYMENT IN THE LOWER MANHATTAN FINANCIAL DISTRICT: 1965-1985

FINANCIAL EMPLOYMENT	1965[1]	1985 LOW[2]	1985 HIGH[3]	1985 LIKELY[4]
Banking	50,000	30,000	70,000	60,000
Securities	55,000	40,000	85,000	75,000
Insurance	45,000	30,000	50,000	50,000
	150,000	100,000	205,000	185,000
SERVICES	50,000	30,000	65,000	60,000
TOTAL	200,000	130,000	270,000	245,000
FLOOR SPACE	30,000,000	20,000,000[5]	45,000,000[6]	38,000,000[7]

Sources: [1] LMP
[2] Yavitz, op. cit.
[3] Vernon, ap. cit.
[4] LMP
[5] Assume 150 sq. ft./employee
[6] Assume 170 sq. ft./employee
[7] Assume 160 sq. ft./employee

unattractive environment.

Roughly 70,000 people are now employed here, whereas in 1958 the number of jobs was around 90,000. In the goods-handling sectors declines averaging 3 per cent yearly are not unusual. [1]

The typical building is a five-story loft seldom larger than 3,000 square feet per floor, and of non-fireproof construction dating from before 1915. Rents of well under a dollar a square foot are common; even the better lofts seldom rent for over $1.75. Some of this is cheap "incubator" space, but much of it represents space for inefficient or marginal activities which cannot afford higher rentals. Major rehabilitation, in such conditions, would not appear able to pay its way, and little renovation has occurred in a long time except a few isolated conversions to office space.

The area is occupied by eight functional groups as follows:

Butter-Cheese-Eggs Wholesale Market: Once the center of this trade for the region, the area now services primarily Manhattan restaurants, hotels, and independent groceries, leaving the major share of the general market to chain store distributors. Employment is probably no more than 2,000, down by half in the last 15 years. As much as half the space in the area is vacant or virtually unused. Many of its owners are near retirement.

Its future growth potential is not great; on the contrary, a continued decline is anticipated. In time the function may be phased out of the area altogether. There are no significant linkages to the locality now that truck traffic is almost the sole means of transportation.

Dry Groceries and Import Food: Some 2,000 people work in this subdistrict, dealing in specialized foods such as olive oil, paprika, and pistachio nuts. Rents are low, and the businesses are stable but not growing. No important local linkages are indicated. However, these businesses constitute a fairly significant portion of this activity in Manhattan.

Warehousing and Export Packing: These part-related assembly, storage and transfer functions remain here in very cheap space (as little as 30¢ a square foot) employing some 1200-1500 people. Their relationship is to the New York port as a whole, not to local piers. Therefore, this bustling function could be located almost anywhere in the City.

Wholesale Shoes: Perhaps 400 to 500 of Manhattan's 1,500 wholesale shoe employees work here in what appears to be mostly small specialty jobbers operating with unusual stocks. Rents are moderate and upper stories are utilized for storage. There are signs that some of the larger shoe jobbers are moving uptown along with the larger textile firms to a new and growing shoe center.

Textiles: Major textiles have moved uptown to sell directly to the garment industry. This area has increasingly became one of dealers in remnants and specialty cotton goods, accompanied by packers, refolders, import-export agents, and a few small garment makers. About 8,500 people are employed.

There are many signs of long-term vacancy, as well as underutilization of upper floor space. Some textile buildings have been taken over by other marginal uses, and still others have been torn down for parking lots. Continued contraction of the industry in and north of the Worth Street area is expected.

Graphic Arts: About 4,000 employees work in the graphic arts complexes. Rents are in the $1.75 per square foot bracket, for space with 250 lbs. (and up) floor load capacities.

This is a potential growth industry. It has market linkages to the nearby government and financial centers. Rehabilitation of older buildings for printing is in progress in several locations, but no new construction is anticipated. Rents in new buildings are generally higher than the industry can afford.

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[1] This material is based on a series of interviews with informed realtors and local merchants, conducted in June, 1965, and an analysis of the 1958 Census of business.

Hard Goods: Wholesalers of machinery, electrical goods and hardware employ perhaps another 4,000 people, some with stocks and some without. This total also includes an estimated 1,5000 people in hardware manufacture in substantial loft buildings along Lafayette Street.

Other Functional Specialties: Variety is characteristic of the area: casual employment agencies on Warren Street; clerical garb stores a few buildings west of Broadway on Warren, Murray and Park Row; bail bonds north of the Courts; retail shopping along Broadway and Chambers. Adding in services and retail outlets throughout the area, this miscellaneous grouping probably employs another 10,000 people.

THE MOVEMENT SYSTEM AND THE LOCATION OF ACTIVITIES

Why activities are where they are is largely a function of the movement system. This system is considered at length in Part 2, and is discussed here in summary only. Its performance characteristics explain as nothing else can the tremendously concentrated Core, and the relatively lightly developed frame at its edges.

Regional Position

In spite of certain weaknesses, Lower Manhattan enjoys a favorable position with repsect to the regional and local transportation system. The highly concentrated Core is the expression of the disciplines of movement, the focal point of Gottman's "economic hinge" [1] At a region-wide scale, it is the point of greatest accessibility.

Before 1900, downtown was served by elevated and surface trolleys. Within a 15 year period, the tunnels and 5 subway lines were connected to it.

As a result few urban centers are as dependent on mass transit. Some 95 per cent of its workers reach their jobs by public transportation, 75 per cent by the subway system. [2] Even for New York this is high. In the Manhattan Central Business District, taken as a whole, the corresponding figures are 70 and 60 per cent.

This dense network of subway lines (five abreast at one point) and stations (arranged roughly in four east-west zones or bands), corresponds to the physical configuration of the mass of buildings it serves. The northern band at Chambers Street serves the government center. The Fulton Street and the Wall Street complex of stations serve the Core, along with PATH that connects to Newark.

While this confluence of lines once represented the focal point of the City's transit system, the influence of the commuter lines, the rapid development of the Midtown office center, and growth in regional population to the north and east have shifted the focal point to the north.

Downtown's Capture Rate

The current configuration of journey-to-work movement into the two Manhattan office centers is shown in the accompanying maps. They demonstrate Midtown's higher "capture rate" of workers from Westchester and upper Manhattan. Anyone living in many of these areas must pass through Midtown before he reaches Lower Manhattan. These are exactly those northern parts of the metropolitan area where the growing class of skilled professionals are increasingly concentrated. Thus the Midtown area, whose subways are heavily overloaded, limits the capacity of a large part of the downtown system, and considerably reduces its effectiveness.

Lower Manhattan continues to rely heavily on older areas, with their higher proportion of unskilled workers, to which it has excellent transit connections. Most notable in this regard is Brooklyn. However, these older areas are not expected to grow, and in fact may decline in population.

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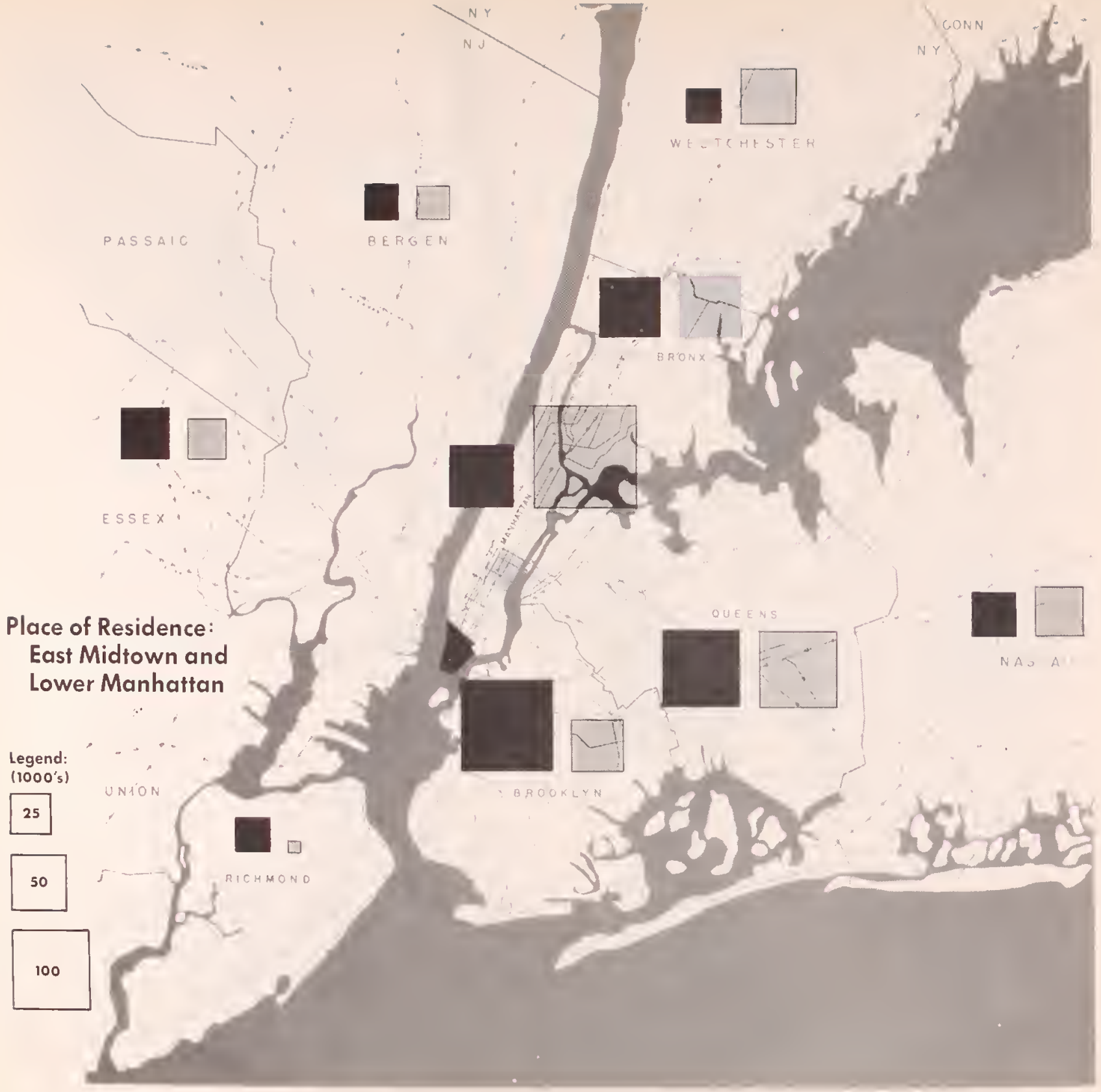
1 Jean Gottman, Megalopolis, M.I.T. Press, Cambridge, 1962.

2 Downtown Lower Manhattan Association, A Study Of Travel Patterns, 1961.

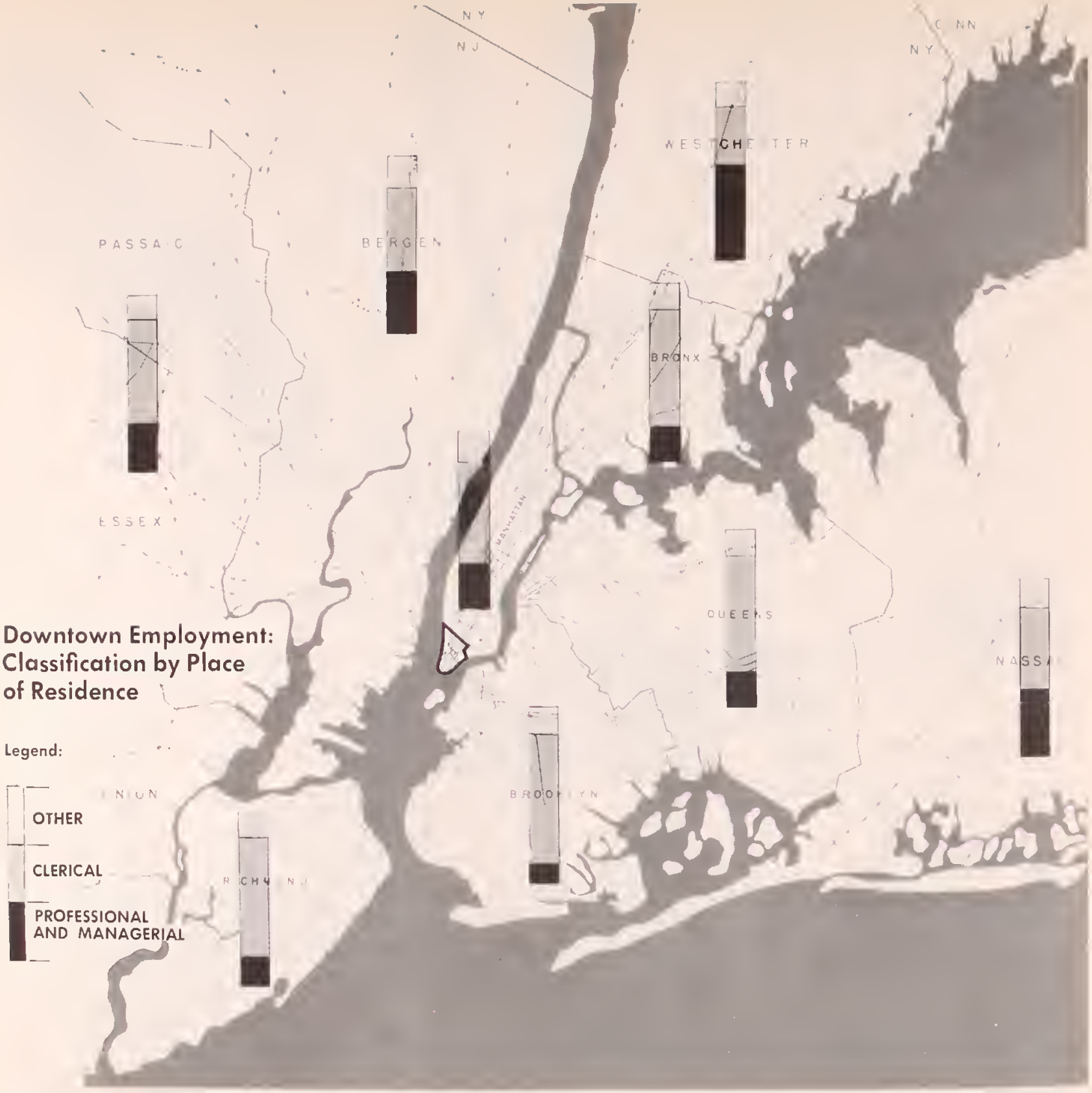
Source:
SEE TABLE III



Place of Residence: East Midtown and Lower Manhattan

Source:
SEE TABLE III

Source:
SEE TABLE IV



Downtown Employment: Classification by Place of Residence

Source:
DLMA

TABLE III

Percentoges of Persons Emplayed in Selected Areas of CBD by Residential Area

COUNTY	LOWER MANHATTAN (a)	EAST MIDTOWN (b)	REST OF C.B.D. (c)	TOTAL C.B.D. (d)
	(Total Number of Emplayees 1000s = 100%)			
	(408)	(400)	(1100)	(1908)
BRONX	11	12	17	15
BROOKLYN	27	9	13	19
MANHATTAN	13	34	30	27
QUEENS	19	19	17	18
STATEN ISLAND	4	-	1	1
N. Y. C.	77	74	83	80
NASSAU	6	7	5	6
SUFFOLK	1	1	1	1
L.I.	7	8	6	7
BERGEN	4	3.5	3	3
OTHER N.J.*	8	4.5	4.	5
TOTAL N.J.	12	8	7	8
REST OF REGION **	4	10	4	5
TOTAL REGION	100	100	100	100

* ESSEX, HUDSON, MERCER, MIDDLESEX, UNION.
** DUTCHESS, WESTCHESTER, FAIRFIELD

TABLE IV

Percentoges of Persons Living in Counties of Metropolitan Region Employed in Selected Areos of C B D.

(a) RESIDENTIAL AREA	(WORKING POPULATION in 1000s) = 100 %	(b) LOWER MANHATTAN	(c) EAST MIDTOWN	(d) REST OF C.B.D.	(e) C.B.D. (b) (c) (d)	(f) REST OF REGION	(g) TOTAL REGION (e) (f)
BRONX	(572)	3	8	32	48	52	100
BROOKLYN	(1026)	12	4	19	35	65	100
MANHATTAN	(781)	7	18	42	67	33	100
QUEENS	(773)	10	10	24	44	56	100
S. I.	(180)	20	2	10	32	68	100
N.Y.C.	(3232)	10	10	28	48	52	100
L. I.	(679)	4	5	10	19	81	100
BERGEN	(303)	5	5	10	20	80	100
OTHER N. J. *	(1623) (1926)	2	1	3	16	94	100
REST OF REGION **	(652)	2	6	7	15	85	100
REGIONAL	(6489)	6.5	6.5	17	30	70	100

* ESSEX, HUDSON, MERCER, MIDDLESEX, UNION
** DUTCHESS, WESTCHESTER, FAIRFIELD

With respect to the overall commuting situation, Lower Manhattan's position is relatively good for parts of New Jersey, Staten Island, but poor for Westchester and much of Long Island. The improvement of the PATH system since its acquisition by the Port of New York Authority will increase downtown's reach in New Jersey.

Intra-city bus service to Lower Manhattan is also poor. The major Manhattan terminals are all to the north.

Downtown's Area of Interest

Thus Lower Manhattan will benefit from any loosening of the transit situation in the midtown area, although to a lesser degree than midtown itself. These issues are discussed more thoroughly in Part II.

However, by the nature of things, Lower Manhattan will always be at some disadvantage, vis a vis midtown, in reaching potential employees in the northern part of the metropolitan region. By the same token, Lower Manhattan has a strong interest in the development of those parts of the region for which it serves as a natural focus. The growth of residential communities ringing the Harbor is thus of primary concern. Several recent proposals reinforce the belief that such an extended waterfront community is in process of formation -- particularly as obsolete waterside functions are phased out, leaving large tracts of new land for development. Among those areas are Jersey City and Weehauken, where new residential communities for 35,000 people are proposed, as well as a vast new park.[1] Growth is also anticipated along the Brooklyn and Staten Island waterfronts, and several specific proposals have been put forward. Ellis Island is also under construction for new uses more compatible with the Harbor's recreational future.

Capacity of Lower Manhattan's Movement System

Generally, the subway lines leading into Lower Manhattan are not being used to capacity. Overcrowding at peak hours occurs only on two lines, and then for only brief periods. Peak hour in Lower Manhattan, however, is really a peak 15 minutes when 200,000 subway riders arrive and depart from their jobs. Usage of the West Side lines in the downtown area is particularly low.

Whether this excess capacity can be effectively exploited by Lower Manhattan depends on City-wide decisions affecting the system at other critical points, particularly in the Midtown area.

However, this statistical "surplus" can be misleading, for in spite of actual excesses of capacity on the lines, the prevailing impression is one of crowding and discomfort. This is in part due to the design and conditions in most stations, which are old, with confined exits, creating an impression of visual confusion and congestion. Much can be done to improve this situation, as is evidenced where the Transit Authority has been able to remodel old or build new stations.

Special consideration is given in later chapters of this Report to the pedestrian movement system, relating the subway stations and their interconnections to the surface sidewalk system, and to destinations in buildings. This of course in the Core is a particularly important, even critical, part of the system.

Less than five per cent of Lower Manhattan's workers arrive at work by automobile. Lack of parking facilities, traffic hazards on an archaic street system, the availability of mass transit and its wide coverage of this compact area, account in large measure for such a low figure. Even so, less than five per cent of 375,000 people makes for a sizable absolute number, particularly when combined with regional thru-movement and visitors.

Service movement, however, is extremely heavy, especially for the narrow, twisting streets which characterize much of this area. Off-street loading facilities exist only in relatively new buildings, resulting in a constant series of interruptions of normal pedestrian traffic, with vehicles awkwardly maneuvering through the maze of streets.

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[1] See The Changing Harborfront, Tri-State Transportation Commission, March 1966.

The peripheral highway system is designed primorily to bypass the orea -- for traffic bound for the Brooklyn-Battery Underposs, the Brooklyn Bridge, and the ferries. Since Lower Manhottan is a peninsula, its streets corry little through troffic -- that is, most of its troffic is of o locol choracter. The mojor exception to this condition is the intrusion of heovy volumes of troffic on ond off of the Brooklyn Bridge, much of which neither originates in, nor is destined for, Lower Monhatton. This intrusion dominates troffic movement in the northeostern portion of the Study Area, cousing major disruptions when combined with locol troffic ond local delivery and servicing. A solution to this problem represents one of the mojor objectives of the Study.

Summory of Problems of the Movement System

The principol problem of the movement system is getting pedestrians to subway connections ond bock which is deolt with in detoil loter in the Report.

The problem of surfoce congestion is the conflict of through and locol troffic, of locol ond service traffic, ond of vehiculor ond pedestrian traffic.

The new projects pose special problems of new troffic generators ond the impact these will have on the system.

The objective of o plon must be to sort out these movements into clearly articuloted and smoothly functioning sub-systems.

EXISTING OFFICE EMPLOYMENT AND SPACE

Analysis of functions and the movement system that serves them leods to a detoiled consideration of existing office employment ond spoce ond to estimates for the future. In ossessing Lower Manhottan's probable future growth, it is also essential to focus on forces which may modify trends in the future.

In office employment, two types of informotion ore sought: numbers of employees, and the amount of office space required to house these employees. As will be indicated, the exact relotionship between these two is not very clear. Indeed, there appeors to be o striking discrepancy between the two. Office space expansion far exceeds employee growth, not only in Lower Monhatton, but throughout the Monhottan Centrol Business District.

Thus the addition of 16 million squore feet of new space in Lower Monhottan in the next ten years, which would surely have o strong physical impoct on the areo, might at the same time reflect only a modest increase in employment. Also, the choracter of the employed population moy chonge significantly in that period.

Employment ond spoce were looked ot in three ways. The first wos o look at previous estimates of existing employment os o bosis for establishing a new estimate. The second was an analysis of these estimates based on various data developed in this study, noting discrepancies, and illustrating that the growth of office space far exceeds any opporent increase in office employment. Third, trends in eoch of the major economic sectors were studied. Finolly, a series of employment and space estimotes were prepared.

Estimotes of Existing Employment

The Downtown Lower Monhattan Associotion placed the 1961 employed populotion south of the Chambers-Worth S treet line at 425,000. [1] The Chambers-Worth Street line roughly defines the northern limit of office development. This agreed with figures issued by the Department of City Planning in 1957. The apparent stability of populotion wos surprising considering the substontiol new office spoce ploced on the morket in the intervening five years.

However, on unpublished door-to-door survey conducted in 1961 by the reolty firm of Broislin, Porter and Wheelock, Inc., indicoted an employment figure of 390,000, well below the 425,000 cited. These figures and the discreponcy underlined the foct thot no clearly distinguishable employment trend wos apparent.

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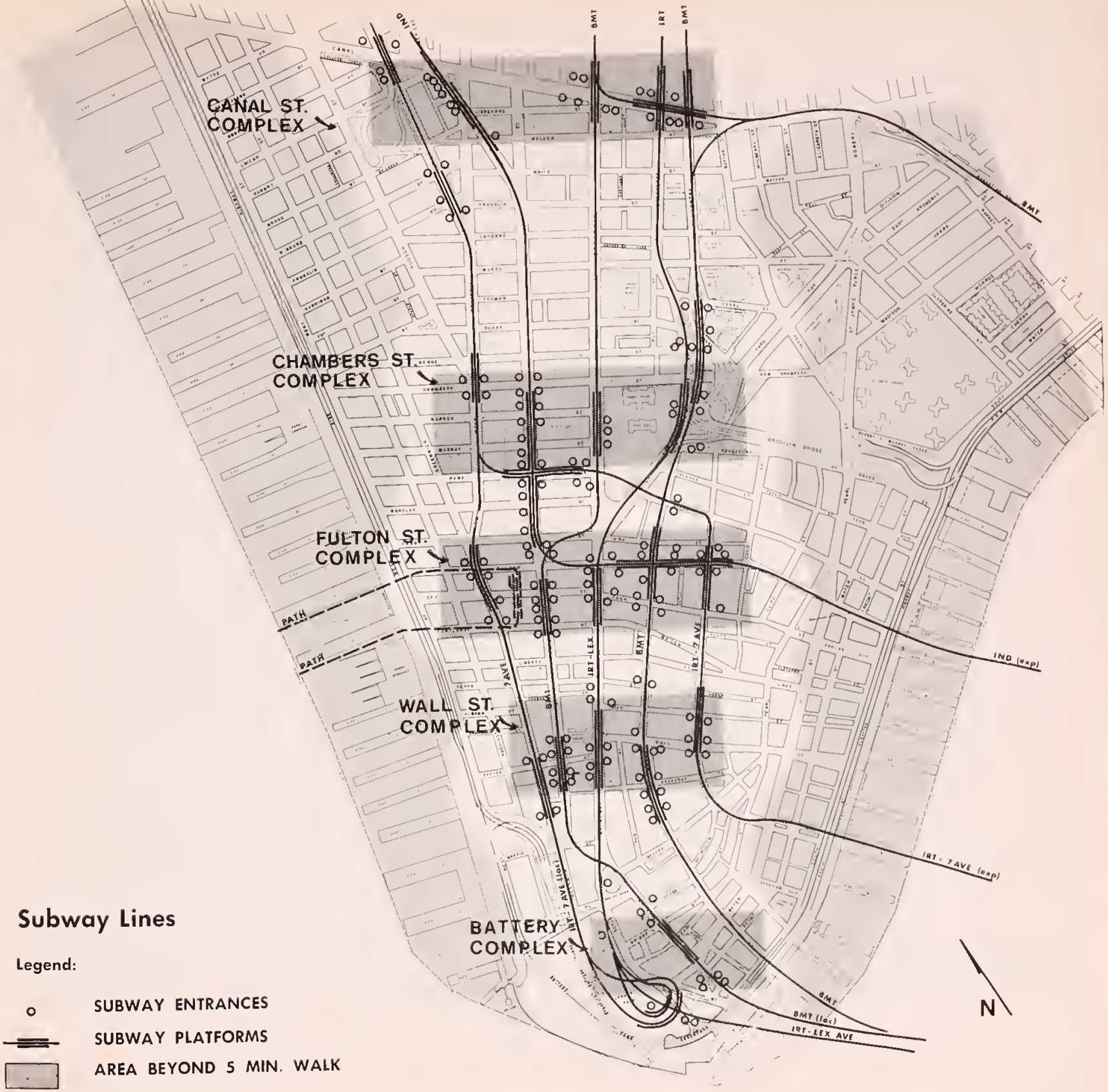
[1] Downtown Lower Manhottan Association, Mojor Improvements, Lond Use, Transportation, Traffic, November, 1963.



Subway Lines

Legend:

- SUBWAY ENTRANCES
- SUBWAY PLATFORMS
- AREA BEYOND 5 MIN. WALK

0' 500' 1000' 2000'

Unfortunotely, no business census hos been conducted in Lower Monhotton since 1961 (one is currently in progress but results were not ovoilable ot this writing). However, subwoy turnstile counts were onolyzed yeor-by-yeor between 1960 ond 1965. Since 75 per cent of Lower Monhotton's employees orrive by subwoy, ond 95 per cent by moss tronsit, o comporison of these figures should produce reosonoble figures.

These counts suggest thot 1960 employment wos oround 400,000, ond thot by 1965 it hod declined to somewhere in the neighborhood of 375,000.

For exomple, the peok hour (4 P.M. - 7 P.M.) counts for the subwoy stotions south of the Chombers-Worth line dropped from 213,955 in 1960 to 191,338 in 1965. Assuming thot everyone who leoves the downtown oreo between 7 P.M. ond 7 A.M. is on employee (on ossumption which is justified in downtown conditions) ond odding in these oddi-tionol hours, the following figures for 4 P.M. to 7 A.M. ore 262,255 in 1960, ond 247,302 in 1965, o decline of 14,953.

The 1961 Downtown Lower Monhotton report "A Study Of Trovel Potterns" stoted thot 4 per cent of downtown's employees leove between 8 A.M. ond 3:50 P.M. It is felt thot this report underestimoted non-peok trovel ond the time -period here considered is longer, so o figure of 7 per cent for the 7 A.M. to the 4 P.M. period is reosonoble. If the figures obove represent 93% of the doily subwoy totol, this totol would be 282,000 in 1960, ond 265,000 in 1965.

To this must be odded non-subwoy riders, which ore estimoted to be 75,000 ond 70,000 respectively for the two yeors, giving totols of 357,000 in 1960, ond 335,000 in 1965. Assuming thot 10 per cent of the employees do not report to work on ony given doy, the totol downtown employment would come to 396,000 in 1960, ond 372,000 in 1965.

In ossessing these figures, certoin complicoting foctors must be borne in mind. First, turnstile decline is not uniformly spreod throughout the study oreo. The Bowling Green, Whiteholl ond Brood Street Stotions hove shown o modest increose, while the Brooklyn Bridge ond Fulton Street Stotion complexes hove shown o morked drop, probobly reflecting the impoct of redevelopment.

Second, o portion of the decline hos cleorly non-office origins; the demolition since 1960 of loft buildings north of the Brooklyn Bridge, plus the evictions of loft tenonts olreody in progress to the south of the Bridge. This moy occount for perhops 5,000.

Third, there is o sizoble student populotion in the Study oreo -- well over 15,000. Mony of these students ore olso downtown employees (prdbobly o mojority). Nevertheless, those who ore not employees, ond who use the subwoys, should be subtrocted from the oreo totols.

Fourth, the peok-hour decline (22,600) exceeds the 4 P.M. - 7 P.M. decline (15,000), thus indicoting thot while peok-h our movement dropped off, off-peok-hour movement octuolly rose by 7,500. Recent observotion hos confirmed this trend, with such employees os Chose Monhotton working round the clock.

Thot there hos been o decline in totol downtown employment seems inescopoble. Whether there hos been o decline in downtown office employment is not oltogether certoin. However, it is probobly sofe to soy thot, controry to generol impressions, there hos been little increose. Thot is, office employment is opproximotely stotionory.

Whot mokes this conclusion extroordinory is thot in the some five yeors there wos o net increose in ovoiloble office spoce of some six million squore feet. Assuming 150 squore feet per office employee, thot represents spoce for 40,000 new employees.

The Spoce-Employment Rotio Problem

This conclusion confirms the Horvord study of the New York Metropoliton Region (NYMRS) [1] economy which noted

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[1] Edgor M. Hoover, ond Roymond Vernon, Anotomy of A Metropolis, Horvord University Press, Combridge, Moss. 1959

thot the growth af Manhattan's affice spoce in the postwor period was greater than the growth in the affice papulation. Taking the financiol community ond other office employment together, their crude estimotes suggested thot Manhottan employment grew by obout 10 per cent between 1947 and 1956, from 753,000 to 830,000 persons, a net goin of 77,000 persans. During the same periad, occording to present study estimates, affice spoce grew by 25,000,000 grass square feet. This wauld represent a net gain of 135,000 persons based an 150 squore feet per emplayee.

Similarly, NYMRS projections os revised on the basis of the 1960 Census, predicted that office employment will increose in the region by 1,273,000 jabs between 1956 ond 1985 in the fields of finonce, business and professionol service and government. In finance, Manhattan is projected ta increose from 211,000 jobs in 1956 ta 290,500 in 1985, a gain of 79,500; in business and professional services from 559,600 in 1956 to 650,200 in 1985, o gain of 11,000. This equols 189,500 new jobs. Gavernment is unpredictable. Assuming that all af this Manhatton grawth will accur in the Centrol Business District and thot it was exclusively office growth, this represents an increase in floor space (computed at 150 net squore feet per affice emplayees) omounting to 28,375,000 squore feet. However, between 1957 and todoy, 58,000,000 square feet of new office space have alreody been occupied or are in construction; by 1970 the tatal is expected to be 106,000,000 squore feet.

This discrepancy between forecast, foct, and emplayment is cammon to the entire New York Central Business District. During the same period onolyzed obave (1960-1965) same 17 million square feet of new office space were odded to the East Midtown orea, between 34th Street and 62nd Street, eost of Seventh Avenue. On the basis of 150 squore feet per persan, this wauld mean space far 115,000 new emplayees.

However, here turnstile caunts indicote an increose of only 46,000 peaple during the peak evening haur. If this represents 60% of Eost Midtown employees, the actual increase would then be in the order of 75,000, leaving same 40,000 people unaccaunted for, ond presumobly explainable only in terms of changing affice space standards. It oppeors quite clear thot there is a greot discreponcy between the opparent rote of growth of office spoce in the Monhattan Centrol Business District ond the rate of growth of office employment.

Severol explanotions for this discrepancy between office space ond employment growth are possible. First, there hos been a distinct upgroding in the spoce many kinds of enterprises have demonded. Solesrooms have switched from oging loft structures to more eloborote space in office buildings. Demand for future office spoce will occur because of increased need, as well os o desire to secure prestige office spoce in new buildings os o result of valuntory relocation (upgroding of spoce), ar invaluntory relacotion (renewol, etc.)

Such a redistribution is alwoys taking ploce. A more detailed survey of vacancy rotes moy be warronted to mare accurately gouge its extent. The next few years can be expected ta witness a greoter occeleration in the redistribution of office space. The World Trode Center conservatively estimates thot one-holf of its future employees ore olready in the orea. The new office develapment will undoubtedly move offices from the present Core and moy leod to a temporory softening of these oreas.

Another explonotian hos to da with the increasingly high standards of affice design. The NYMR Study estimoted thot on increase of 10 square feet per office worker in the Central Business District could hove obsorbed one holf of the post war grawth in office spoce to 1956. In foct when firms move, they take mare spoce than they immediately need, which can also occount for o consideroble temporory increose in space per employee.

Attempts by this Study to measure the change in office design standords, with o spot check of key buildings were inconclusive. The voriatians fram one building to another, from one profession ta another, ore so great as to require on areo-wide inventory. Although there is generol ogreement thot standords have chonged in the last twenty-five years, many observers feel thot the trend towords greoter spoce hos been reversed in the last five yeors. This left the questian unsettled.

Employment Inventory—1965 (With Selected Future Developments)

Legend:

- 200 EMPLOYEES

Source:
DLMA, CPD

0' 500' 1000' 2000'

Anather explanotian has to da with vaconcies in older buildings. Realty speciolists have lang predicted the growth af such vaconcies, although reliable infarmotian an this subject is held confidential. A good deal of unmodernized office spoce still exists in the dawntawn area with high vaconcies.

A finol explonation moy lie in the changing composition af the downtown office work force -- the decline in the propartian of unskilled "bock office" warkers who require little space, and the increosing proportion of troined people, with larger space allocotions. This trend was mentianed by every dawntawn executive who was interviewed. Whot seems to be invalved is o generol upgrading of the work force which, with the ossistonce of new office machinery, can occomplish for more work with fewer people than ever before, but tokes more spoce per employee.

In summary, future space projections must be made an same basis other than as a rotio of future expected office emplayment.

TRENDS IN EMPLOYMENT FOR LOWER MANHATTAN

Estimates of future employment in Lawer Manhattan must be based on reosonoble assumptians regarding trends in the following sectars of the Lower Monhatton econamy: the finoncial district (including the banking ond exchange cammunities) insuronce, government, maritime, world trade and gaods-handling, ond the ottroctian af activities nat now represented there.

The Financial District

What actually happens here will be the result of diverse and uncertoin trends: (1) The notional valume af transactions in banking, insurance and the securities markets; (2) New York's share af these octivities; (3) Lower Manhattan's share of New York's share, particulorly af banking octivities; ond (4) the impact af computer technolagy. Foced with this degree of uncertainty, only maximum and minimum figures may be suggested to set design scole extremes.

Three schaals af thaught chorocterize the differing views thot have been taken af the financial district's future. One sees a decline in Lawer Monhotton banking employment and a cansequent forty to fifty per cent reductian in banking space. [1] This moy be translotable inta o ten to twenty per cent decline in totol finoncial district floor spoce. The contentian is that computer technology, lawer rents in outlying areos, and the relotive moss transit inaccessability of Lawer Monhattan will combine to send infarmation processing operations to ploces like Lang Islond City. The Robbins-Vernon approoch of the Harvard Economic Study [2] sees New York as retaining an obsalutely vost, though relatively declining, volume of transactions, cantinuing ta be concentroted in Lawer Manhotton.

More aptimistic views on the Lower Monhottan scene assume that New York's share of oll kinds of financial district activity will remain high ond cancentrated in Lower Manhatton. The range of possibilities generoted by these views af the future are summorized in Toble II.

They represent little more thon arderly guesses abaut whot the varians views of the finonciol district mean in terms of emplayment and floor space. Law figures represent the lawest emplayment prospects. High figures represent aptamistic views of the future emplayment level in eoch sectar af the financial district.

The reol estote morket itself is also likely ta legislate against on absolute decline in financiol district office space. If the $ 9.00 per squore foot of Lawer Manhotton space which is being replaced by $ 3.00 space in Long Islond City is in fact vocated, then it won't long be $ 9.00 spoce. It will soon be $ 7.00 space which can be accupied withaut having to set up o separate cafeterio, o limousine shuttle, and a TV network ond became more competitive. Also mony New York banks, including the Chase Manhattan have a major stake

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[1] Boris Yovitz, Cammercial Bonk Operatians in Lower Manhatton -- The Impact of Automotion on Locotian ond Spoce Needs, A Repart to the New York Deportment of City Planning, August, 1965.

[2] Vernon et ol, op. cit.

in Lawer Manhattan's real estate market that they can't affard to leave.

The real question, then, is not downtown versus Long Island City, but downtown versus Midtown, ond New York versus the regionol exchanges.

Mony intangibles moy be at wark here; the "magic" of dawntown as against the inconveniences of working there, the copacity of downtown to generote (with City assistance but not subsidy) a new diversity ond an orderly development of its decaying peripherol oreos, downtawn's success in overcaming some af its transportation handicops and copitalizing an some of its potentiol cammuter odvontages (in the Harbar area in porticular). Also involved ore long-range econamic factors; regionol growth, the increasing independence af parts af the economy of the money market, the role of internationol finance (in which New York's dominonce is almast absalute) in Americo's econamic grawth. Considerations af banking ond the securities morkets follows.

On Banking In Lower Manhatton

Same writers hove assumed thot bonking monagement con, and therefore should, in its own interests, set up split operations to relocated outomoted data-processing operotions outside the Central Business District.

While there is a certoin abstroct logic in this argument, most bonkers interviewed hove stoted agoin the desirobility af hoving full control over their aperotions in o single locotion -- for ease of consultation, os an administrotive service center, ond sharpness of response. The executive vice president daesn't need ta see the key-puncher, but he does want doily contact with the manager af data processing who wants, in turn, ta see the supervisar af data input, wha does need ta see the key-puncher.

Although the decentralization orgument is based an analagaus situations in ather madern corporate business operations, it very passibly fails to take into occount the speciol charocteristics af a New York commercial bank. By condensing the space needs of data processing, the computer has enhonced the possibilities for further centrolizotion as much as for decentrolizotion. Banks, which once housed hundreds of clericol workers in cheop lower midtown warehauses (Wonomakers ot 9th Street, for example) hove recently been cansolidating. The First Notionol City Bonk which moved Midtown has spoken of o duol heodquorters, but in fact has tronsferred reol administrotive cantrol to its new Park Avenue offices. This Midtown choice is therefare irrelevont to the decentralizotion orgument.

The next generotion af computers may eliminate even more low-skilled personnel and further reduce the need for paper as o tronsfer medium. Opticol readers, tope ar core storoge of accounts plus direct debit-credit methods could enable the bonks to concentrote on ever greoter omaunt of wark in ever-smaller per-unit space.

Tadoy informed reoltors soy thot bonks in response to these chonges are looking for building sites for lorge floor area (30-50,000 sq. ft. per floar) clerical "foctory" aperotions in oreos at the fringe of the Core. They say they ore tied to downtown by security tronsfers, by the Federol Reserve Bank, ond by Check Clearing House, os well os the so-colled foce-to-face and decision moking functions.

A further foctor which moy modify the pessimism af some predictions is that programming the computer, necessorily linked to the computer operotor, is o function thot more ond more will become o monagement ond executive one. Like the budget director of the lost generotion, who aften went on to become o policy maker ond president of o corporotian, the pragrammer today is the "mogic mon" who will rise in importance as the importance of the mochine increoses. Since he can't be let out of sight of the policy makers, the reol choice is whether the whole operotion moves ta Long Islond or stays in Monhattan.

The current set of choices in plonning by the business community are criticol in "locking in" bonking as a permonent ond expanding octivity downtown.

On The Exchonge Cammunity

A shift ta o lawer Broad Street lacatian for the New Yark Stock Exchonge would tend to pull the exchange community south. While this chonge is ot the present writing in doubt, some mave is very likely. Possible sites are considered in the Chopter V. Regardless of where the Exchonge moves, computer technology hos alreody enobled the lorge brakerage hauses ta reduce their paper work and thus keep all operations efficiently centrolized in the financiol district without sacrificing the foce-to-foce compactness which is the area's life-blood. One mojor Wall Street building is already being remodelled for the margin operotions of o lorge brokeroge firm. Also few brokeroge houses are related in any criticol way to the Exchange floors in contrast ta the floor brakers who represent them. Centrolized accaunting service for small firms will soon be provided by the New York Stack Exchonge. Central certificote service to permit non-physical tronsferring af stocks could reduce the space and persannel requirements of this octivity. Although ot present it is prohibited by law plans ore afaat far such a change. If this low were changed it could loosen one af the ties which has kept bonks and the exchange community sa close ta eoch other.

Even though such legal changes ore possible, evidence indicates that the centrolized character af the New Yark exchange cammunity will not be fundomentally altered in the foreseeoble future. Although modern cammunicotion and computerization moke passible o decentralization af many functians, it seems clear under present influences that all af these aperotions connected with the day-ta-day aperatians af the money morket will cantinue ta be cancentroted in the downtown area.

Furthermore, the American Exchange, west af Church Street, has been grawing in volume of business and has became an impartant farce, such thot it has been canjectured that if the New York Stack Exchonge were ta leove New Yark, it might take over the "big baord" functians. The New York Stack Exchange would simply become the regianol exchange wherever it went.

Three distinct types of decentralizotion must be considered. The first is the separation out of mechonical processing functians into locations autside af the Central Business District (Long Island City, for exomple), where land is cheaper, and transpartation simpler. The secand is the decentrolizotion af the notional securities morket itself, which is naw so heavily cancentroted in New Yark. This would reinforce the role af regianal exchonges in Philadelphio, San Francisco, Chicago ond elsewhere. The third is the broadening of the base of financiol decisian making.

The very forces that make this decentralization possible -- technolagicol odvances -- seem to moke it less likely to happen. Downtown has shown an extraordinory ability ta incorporote into its existing structure the entire technologicol "factory" naw availoble in the business of pracessing poper; this has meant thot the pressures far geogrophicol exponsion of the downtown areo hove been under control. In fact, by condensing the spoce needed for aperotions, the computer hos enhanced the passibilities for centralizotion os much os for decentrolization.

Further reliable estimates ore that the exchange cammunity can dauble its business copocity withaut enlorging its geagraphicol coveroge very much. A combinotian of traditian ond monogerial judgement make this desiroble. In fact, the camputer con probably keep the space requirements of rapidly expanding valumes af infarmotion-processing close ta whot they ore taday.

With regord to the grawth of regional exchonges, ond the decentralization af the money market, the foct is thot New Yark's share of natianwide financiol emplayment has increased in the last two decades ond is likely to continue. Advontages the regional exchanges naw enjoy moy be negated by chonges in operotion af the New York Stack Exchonge, particularly in regord to brokers' fees, moking New York still more competitive.

On the other hand, it is undeniable that certoin traditional dawntown functions con and have been decentralized or relocated. The central odministration of commercial banks need not be located in the finoncial district itself. This is quite clear fram the experience af the First National City Bank which has successfully relocoted oll but its specifically

money market functions uptown (6,000 out of 7,000 employees). While the advantoges of a Midtown location hardly need to be enumerated, it is also reasonably clear that these administrative functions need not be relocated. The great commercial banks which have invested a quarter billion dollars in new downtown plant between 1955 and 1965 will probably further consolidate their investment rather than decentralize.

The other type of decentralization that has occurred has been the broadening of financial decision-making that was once concentrated in the money market's Core. Reference here is to the substantial influence now wielded by pension funds, university endowments, corporate giants, and insurance companies in the working of the money market. These groups are not located downtown, but they exercise authority through a wide variety of agents. The Federal presence is also felt in a hundred ways, and this, too, is a direct force in the money market, unknown a generation ago.

Following the NYMRS thesis concerning regional growth, it seems reasonable that national security transactions' volume will increase proportionately with Gross National Product. This is confirmed by recent projections made by the New York Stock Exchange. [1] Lower Manhattan's exchange community can probably be expected to keep 85% of that increase. While automation will enable the resultant 90% increase in New York market volume to be handled by perhaps a 40% increase in people, the space needs of these people may be much greater since it will be shared with data processing equipment. Thus, the exchange community might well double its floor area as the exchange function becomes more dominant in Lower Manhattan's compact, face-to-face financial district.

On International Trade and New Activities

The World Trade Center represents the first intrusion of new business activity downtown in a long time. Although it will draw a number of activities from the downtown Core -- beginning with the Custom House, and including many of the freight forwarders and shipping agents clustered around Bowling Green -- it is essentially a much broader operation, deriving its strength from the City and the World as a whole. One of its purposes is to strengthen the position of New York in foreign trade. As such, its benefits to downtown business will be indirect in the short-run, and its immediate relation to the money market of no greater significance than that of the insurance district.

However, its role in upgrading downtown should be direct and real, particularly in the presently disintegrated fringe of the Core. Some 100,000 new people, both workers and visitors, are estimated to be drawn into the downtown area every day, demanding a higher level of services and more service employees.

The immediate impact of the WTC on downtown real estate is a serious question. While some tenants will be drawn from the marine-occupied buildings around the Battery, the space they vacate may well be taken by businesses moving south, west, or north, to be near the new Stock Exchange; other older buildings may, in fact, drop out of the market. The major impact will probably be on the area around the Civic Center, as well as the financial center, among buildings presently occupied by New York State offices. These will suffer a short-term vacancy.

In the long run, the results will be to upgrade and modernize fairly good space, and to retire really obsolete space from the market. This sets the opportunity for private redevelopment of sites then made available.

On Maritime Activity

In view of the continuing decline of activity in American shipping, and the improved business techniques utilized in Lower Manhattan shipping offices, shipping is a kind of fixed, stable static element, neither growing, or contracting. Estimates are that downtown employment in this sector may

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[1] See Graphic 6
In the last year the expansion of Stock Exchange trading has exceeded the growth of Gross National Product, but whether or not this betokens a long-range trend is not yet clear.

TABLE V

WORKING POPULATION - ESTIMATES AND PROJECTIONS

(Chambers - Worth Line)

Year	Estimate	Source and Comments
1958	425,000 (510,000 south of Canal St.)	N. Y. Department of City Planning, "Employment Distribution in New York City and the Central Business District." Based on data provided by the New York Department of Labor.
1960	396,000	LMP 1966, based on turnstile counts, see pp. 14 - 15.
1961	390,000	Broislin, Porter and Wheelock, Inc., Survey of 1,600 buildings (for Downtown Lower Manhattan Association).
1963	425,000	Downtown Lower Manhattan Association report, "Lower Manhattan," 1963.
1963	415,000	Estimate of Dick Netzer (based on two abovementioned sources).
1965	372,000	Lower Manhattan Plan 1966, based on turnstile counts, see pp.
1975	435,000	Lower Manhattan Plan, based on committed and projected developments (100,000) minus assumed "redistribution" (40,000) on estimated 1965 base of 375,000.
1980	500,000	First National City Bank: committed and likely projects, on assumed 1965 base of 425,000.
1985	475,000	New York Metropolitan Region Study: as interpreted by Downtown-Lower Manhattan Association, 1963.
1985	435,000	Lower Manhattan Plan, 1966, based on individual unit projections (see Table V), assuming no residential community or other improvements.
1985	510,000	Lower Manhattan Plan, 1966, based on individual unit projections (see Table V), assuming realization of residential community and other improvements.

TABLE VI

POPULATION ESTIMATES BY FUNCTION

(South of Worth - Chombers Line)

(in 1000s)

	DLMA-NY STATE DEPARTMENT OF LABOR		LOWER MANHATTAN PLAN		ESTIMATES	
Function	1957[1]	1961[2]	1961[3]	1965[4]	1985[5]	1985[6]
Banking	45	58	55	56	69	75
Securities		55	52	55	74	75
Insurance	33	44	41	40	40	45
Law & Prof.	24	24	22	22	28	30
Business Service	19	19	18	18	23	25
Carporate	33	33	30	26	20	45
Shipping	50	48	45	35	25	30
Communications & Transpart	27	29	27	28	32	35
Real Estate	a	9	8	8	9	10
Government	a	42	40	45	60	65
Retail	a	20	19	14	10	25
World Trade	o				30	40
Monufacturing & Whalesale	a	40	38	23	10	5
Others	a	5	5	5	5	5
	425	426	400	375	435	510

[a] nat broken dawn in DLMA analysis

TABLE VII

FUTURE SPACE AND POPULATION ESTIMATES

Yeor	Workers	Office Workers	Sq.Ft. Worker [6]	Office Spoce (Sq. Ft.)	Residents	Residentiol Spoce (Sq.Ft.)
1965	375,000 [2]	350,000	142	50,000,000 [1]	15,000	4,500,000 [7]
1975	395,000	375,000	165	62,000,000	-------	---------
1985	435,000 [4]	400,000	180	72,000,000	-------	---------
1985	510,000 [5]	480,000	180	96,000,000	100,000	38,000,000

[1] LMP Estimote, See Graphic 5.

[2] See Toble V.

[3] Bosed on Current ond committed projects, minus office stock withdrown (by demolition).

[4] Low Estimate, bosed on current trends ond committed projects, see Table VI.

[5] High Estimote, bosed on odoption of Report Proposols, see Toble VI.

[6] Assume continuotion of current trends toword greoter space per worker.

[7] Alfred E. Smith Houses, Chothom Villoge, Chothom Towers, Chinotown.

TABLE VI (continued)

SOURCES

1 Dawntown -Lower Manhattan Association, Lower Manhattan, 1958.
2 Downtown-Lower Manhattan Association, Lower Manhattan, 1963.
3 LMP Estimates, revising DLMA figures in terms of turnstile caunts, 1960-65.
4 LMP Estimates, projecting 1961 DLMA figures in terms af turnstile counts, interviews and employment estimates for "northwest" and World Trade Center Area.
5 Unassisted growth estimate, based on NYMRS prajection of 29 per cent gain in downtown financial emplayment between 1965 and 1985 (Robbins and Terlecky, Maney Metropolis, p. 193, Table 36), from 128,600 to 165,200, representing a slight decline in proportion of CBD financial emplayment (from 48.6% ta 47.7%), and more significant decline in CBD's praportion of regianal financial employment. In the above Table this 29% was applied to Banking and Securities (taken in combinatian), Law and Professions and Business Services. Other activities estimated on the basis of current trends as revealed in interviews and field surveys by LMP staff: stabilization of insurance wark force, cantinuing decline in corporate employment, stabilization af shipping affice employment but sharp decline in goods-handling maritime activity; sharp increase in government fallowing cansolidation af federal, state and municipal administration; continuing decline in manufacturing and wholesale trade, at rate established in narthwest field survey.
6 The figures in this column assume an altered downtown compositian following the introductian of a residential community as propased in this paper. It is assumed that Lower Manhattan has regained a segment af the general affice market af the Manhattan CBD (as reflected in the carporate affice category) that other dawntown office components (warld trade, insurance) develop at faster rates than they wauld otherwise, that a substantial retail trade develaps ta serve the new residential community.

decrease by 20% from approximately maximum of 15,000 to 12,000. However, shipping firms have been diversifying, and this may tend to counteract the downward trend. The future, therefore, is problematical.

PRELIMINARY POPULATION ESTIMATES

The following tables summarize estimates of employment and space needs insofar as they can be determined:

Table V summarized these estimates on a gross area-wide scale. Table VI gives area-wide total, and breaks up the population into its components, and makes individual estimates for each component. Using the NYMRS basis for the financial components, certain regional and CBD "capture rate" trends are thereby implicitly assumed as possible. For the non-financial components, where local and industry-wide considerations are paramount, a series of assumptions were used (e.g. a virtual standstill in shipping, decline in manufacturing, sharp rise in residential-related retail and business services, etc.)

Table VII deals with office space, and its implications for both the number of workers employed and the floor-space ratios resulting.

No assumptions concerning transportation have been made. With the exception of world trade, no new activities have been assumed. The implications of the assumptions of office space goals are considered later. [1]

Conclusions Regarding Future Employment and Floor Space

In a situation of uncertainty with an indeterminate future, it would appear within the reach of the relatively few decision-makers that influence investment in Lower Manhattan to set the stage for either a long-range continuation of the building renaissance of the past 15 years, or to end it.

If the first decision gains as much consensus as would appear to be the case, then the current investment may well be minor compared to what is possible. If, on the other hand, civic leaders weaken, are unaided or are unencouraged by events and the Administration, (they need City support at least in policy terms), a kind of self-fulfilling prophecy of deterioration may set in.

It may seem to many that an apparently vital and growing complex such as Lower Manhattan is not as vulnerable as would be indicated by the above statement. A diagnosis of the present building pattern, however, shows the growth was triggered by perhaps no more than five key decisions, and has been continued by constant civic interest and stimulation. The climate that fostered downtown's comeback against Midtown's competition is more fragile than is popularly supposed. At the same time, the potential for growth and strength is there.

A major conclusion of this Study therefore, is that the continued strength and growth of the Core depends on diversifying its base and mix, what the business community and the Administration decide to do about the evident need for broadening downtown's economic base, enriching its mix of activities, and improving its environment.

This diversification is later seen possible if the residential potential of the area is realized to help support new housing-related business, and to create an environment in which other kinds of businesses now concentrated only in Midtown can be attracted.

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[1] The trends discussed previously were confirmed by the 1959-1961 study of the occupancy of Lower Manhattan buildings conducted by Skidmore, Owings and Merrill. The study showed the following increases in employment in selected economic sectors: security and commodity bankers and dealers, 23%; law and other professions, 10%; banking and credit, 5%; insurance 3% and government 5%. Employment in manufacturing and wholesale trade declined by 7% while there was a 3% decline in people employed in transportation and communications. While the 1959-61 period was one of unusual economic growth in the financial district, the figures confirm the independent estimate of trends in this Report derived through the studies, interviews, research and field work.

REHABILITATION

Although the major emphasis in planning Lower Manhattan is on the Core, certain "frame" areas and activities are important to single out for special consideration.

Industrial Rehabilitation

In previous discussion, it was observed that the average manufacturing and wholesaling firm in the Study area lacked the resources for major rehabilitation; indeed, that the special attractiveness of this area for them lay in its extremely low rentals in a central location suitable to the typical marginal industry still prevalent here.

The one possible exception to this rule may be in the triangle of land in the very northwest corner of the site -- bounded by West Broadway, Canal, North Moore and West Streets. It is an extension of the viable industrial area to its North. Here a program of industrial rehabilitation may yield fruitful results.

The area is suitable for rehabilitation for four reasons. First, it contains a considerable number of the loft structures in Lower Manhattan which may be readily rehabilitated to provide long-term space for industrial uses. These buildings are generally in sound condition, four or more stories in height, with gross floor areas in excess of 5,000 square feet, and with floor loadings in excess of 250 lbs/ square foot.

Second, the area has several locational advantages, particularly for goods-handling. It is adjacent to the concentration of trucking facilities north of Canal Street, the West Side highway, the Holland Tunnel and the planned Lower Manhattan Expressway.

Third, it also contains a number of smaller buildings many of which are both functionally and structurally obsolete. These could be demolished by encouraging private effort to provide vitally needed space for off-street parking, loading and storage areas for remaining buildings. Extensive demolition of such obsolete structures may provide good sites for any future industrial construction which may be warranted. Similarly, the northern end of the Washington Street Renewal Area has been included to provide immediately available sites for off-street parking, loading and storage or for new industrial construction.

Finally, the suitability of rehabilitation has been demonstrated here. Private interests have recently obtained several large loans for the express purpose of rehabilitating several properties in this area.

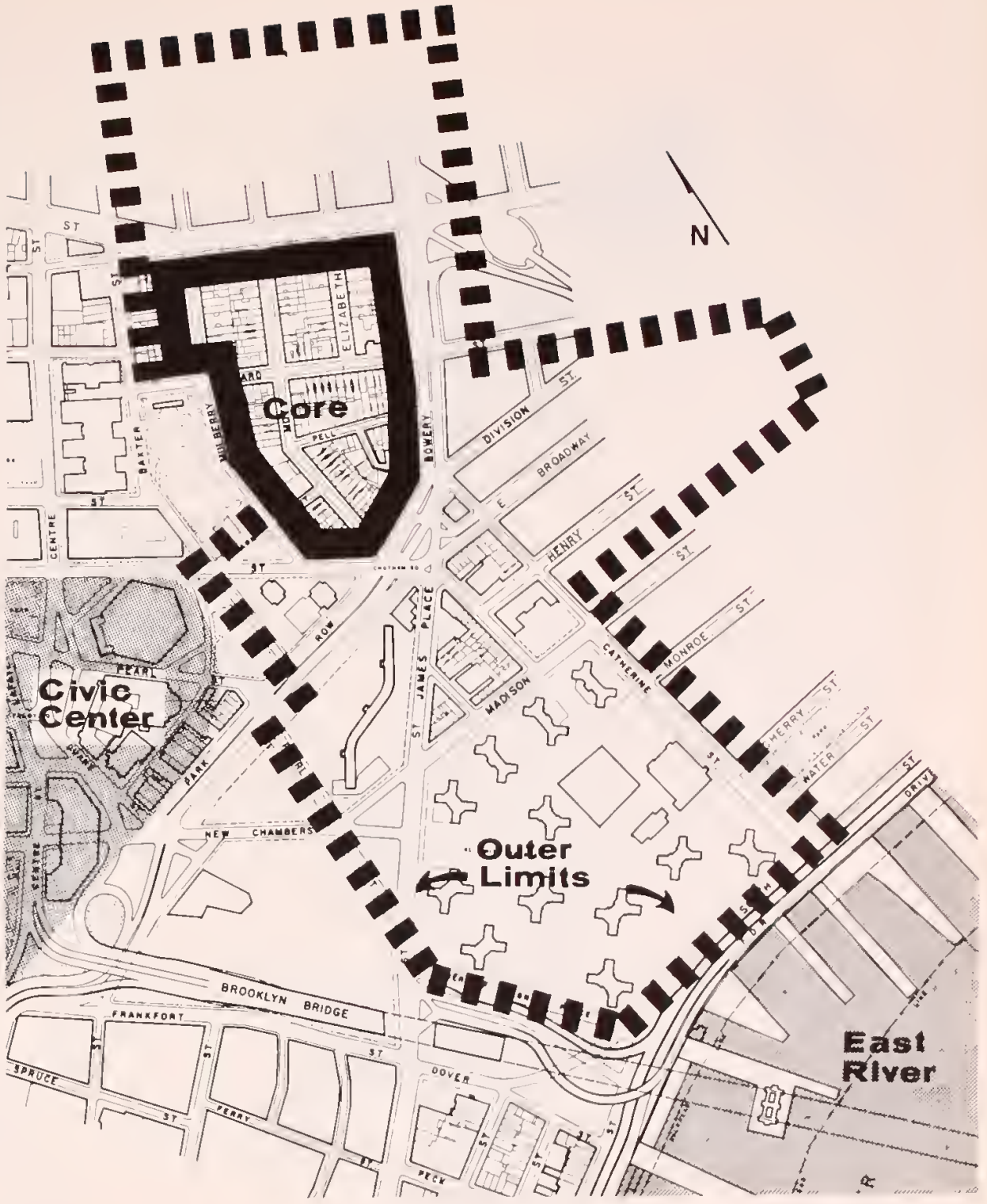
Residential Rehabilitation

With one or two exceptions, the entire housing stock of the Chinese- American area (" Chinatown ") is of pre World War vintage. Most of these structures are old-law tenements housing cold-water flats. A recent CRP report cites it as being one of the areas of the City requiring direct public action.

The problem here is to achieve a level of rehabilitation without destroying Chinatown's special character -- as much for the residents and merchants themselves, who have naturally resisted publicly-directed renewal, as for the area's annual half million tourists.

The renewal action should be self-generated with the initiative coming from the community,involving the community in planning for its own housing needs. The community is well-organized under lay leaders, and capable of employing its own advisers for the professional, architectural and planning assistance that may be necessary. The goal of "self-rehabilitation" would be to prevent a further decline of the building stock as a means of preserving its essential character. Indefinite delay might make major renewal necessary at some future date. Spot clearance should be encouraged where required. In addition, the possibility of converting some presently underutilized loft space on the Bowery, and Elizabeth and Canal Streets should be explored.

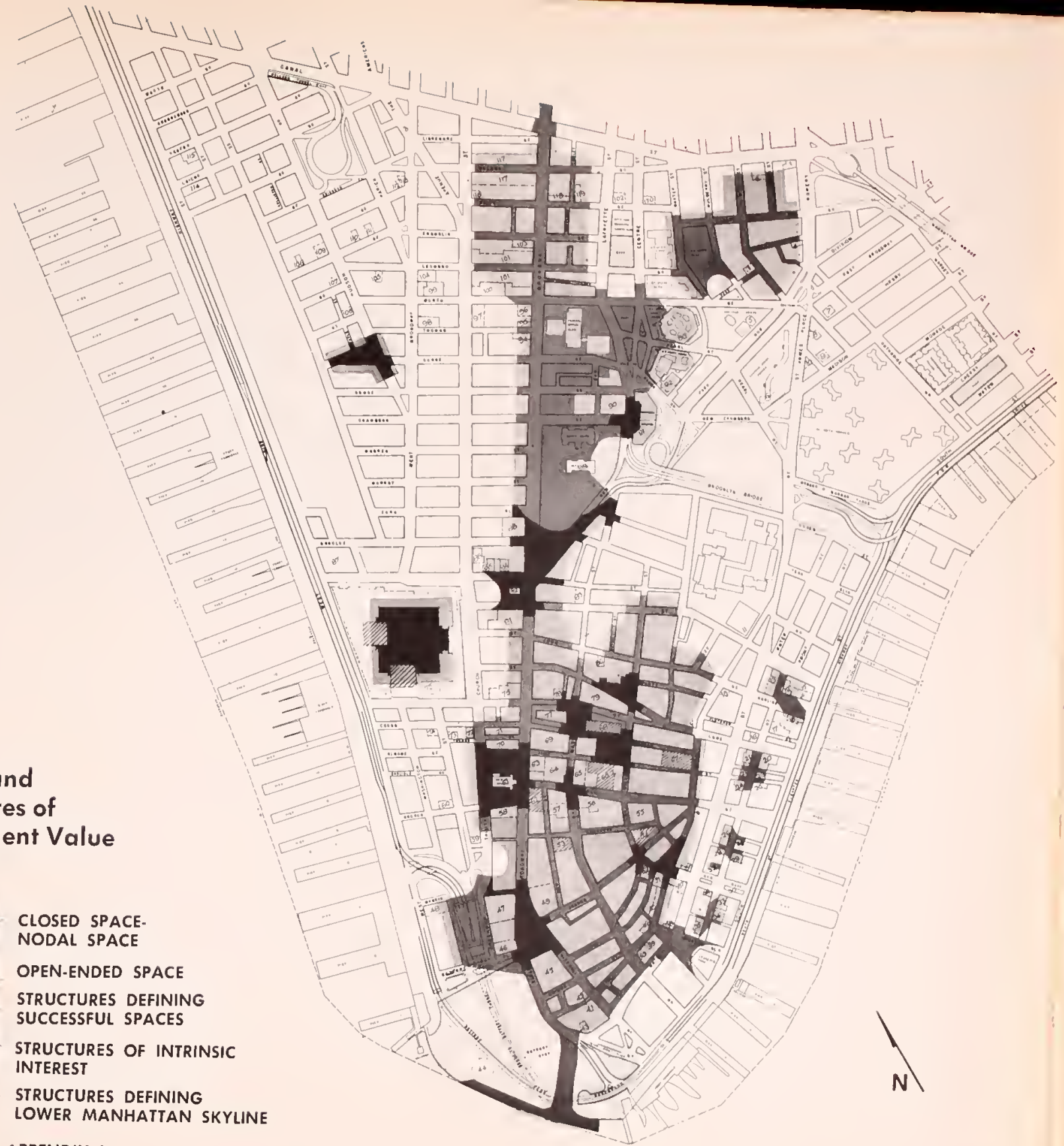
In the Governor Alfred E. Smith Houses next to Chinatown, the interior grounds should be redesigned to provide additional playground space. The Charles Evans Hughes



Functional Areas: Distribution of Chinese-American Population

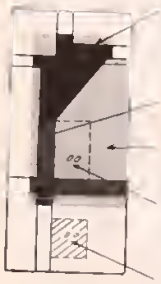
Source:
LMP FIELD SURVEY

0' 100' 200' 500'



Areas and Structures of Permanent Value

Legend:



CLOSED SPACE-
NODAL SPACE

OPEN-ENDED SPACE

STRUCTURES DEFINING
SUCCESSFUL SPACES

STRUCTURES OF INTRINSIC
INTEREST

STRUCTURES DEFINING
LOWER MANHATTAN SKYLINE

Source:

SEE APPENDIX I.

0' 500' 1000' 2000'

Vocotionol High School scheduled for demolitian in 1972 could be eliminoted ot on eorlier date ond replaced by additionol play spoce.

Self renewal here should be bosed on the fallawing principles: people shauld be involved in plonning far their awn housing needs, under local leoders; relocotion shauld be minimized. Where relocation is necessory, it should be lorgely within the present community; clearance of hausing should be deferred until new ar rehobilitoted housing is available; sub-stondord housing should be rehabilitoted, wherever econamically feosible, to decent, sofe ond sanitary standards; interference with ethnic and social integration throughout the community should be ovoided; canversion of non-residentiol to residentiol uses should be encauroged where the former ore not viable; existing institutions which serve the neighborhood should be upgroded in quolity ar reploced within the neighborhood. Focilities or institutions which are lacking should be provided; renewol pragrams should recognize the qualities of the orea which hove mode it o mojor tourist center and seek to reinforce them.

CHAPTER III

STRUCTURES AND BUILDING SITES

Growth and chonge, whether os estimated or not, is affected in terms of its location by many factars. Amang the mast importont is the avoilobility of sites that are appropriotely located ond odequote for the demonds for space. The previous chapter sow the demond for spoce as primarily reloted to growth of activities.

The purpose of this chapter is to tie growth to buildings and to approise the likelihood ond desirobility of new canstructian in ony particulor oreo bosed on the life expectancy of existing uses ond structures. Those thot hove o relatively permanent life will oct os "givens" oraund which new grawth will accur. Those thot ore less-permanent but ore well locoted will become the sites for new constructian. Those that ore less-permonent but poorly located will longuish in their present state, or decline groduolly, unless some public actian intervenes.

Mast importontly, site casts for constructian with few exceptions must be within the range of economic feasibility far the earning pawer of the new uses that con be put on them. In the normal market, "write-dawns" are rarely possible. [1]

STRUCTURE AND AREA CLASSIFICATION

The factars that are considered here are: age, condition, assessed valuatian, historic ar architectural volue, relotion to visually caherent spaces, omount ond character of employment, and size. While the study attempted a generolizotian of these foctors an a numerical scale by black or mojar structure, the end product is o judgementol evaluation of each factar in compasite.

If o building was built before 1915, was not firepraof, and had not been modernized (high speed elevotors and air conditioning) these factors are considered as militoting ogoinst its permonence. In additian, if it wos small (less than 12 stories), nat historically or orchitecturally important (nat an lists established by experts), cantained little employment (by block, less than 1000) and/ar employment af relative functianol unimportance ta the Core(ar in terms af City palicy) and was valued at less thon $5/square faot af land, it was considered very expendable (thot is, its owner wauld probobly welcome the passibility of another building an the site).

At the other extreme, if it had oll or any significant cambinatian af the abave characteristics, a building was considered to have o relotively permonent life expectancy. In between was a middle range of buildings with a combination of the above characteristics sufficient ta make it a short-range "given." Chapter V on land use discusses how these were used in the future land use assignment. The fixed areas are classed as "hard," the athers as "soft".

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[1] Except where a user makes a nan-market decisians, such os a corporatian that earns the site rent on o nationally-based octivity rather than what is octuolly conducted on the site.

These foctars olone, however, give o deceptive picture of where development might occur. Investor interest may be high in "hard" oreos ond non-existent in "soft" oreos depending on other cansiderotions. In order ta take this into account, informed real estote opinion, recent soles and speculative activity [1] were used to clorify oreos as very active, octive, ar inoctive. These were chorocterized os "hat" ar "cold". The results ore, of course, only guides ond probabilistic.

These two orea charocterizotions (hord-soft, hot-cold) were in turn combined to suggest three general kinds of oreas: those in which privote enterprise con operote effectively with oppropriote public plonning ond zoning regulotions; those in which o combinotion of public ond private coordinatian ond cooperotion is indicoted for optimum development; ond those in which public initiotive and action is necessory to set the stage for appropriote privote investment response.

The Frame of the Care

The basic configurotion resulting from these studies moy be summed up os follows:

Around the Core is o periphery af alder buildings, primorily laft in choracter, with relotively low ossessed voluotions. All were built before the turn of the century, very few remodelled, and only o hondful hove intrinsic architecturol or historical merit (including the first pre-fobricoted cost-iron building, built by the engineer Bogordus in the 1850's ot the corner af Woshington ond Murroy Streets).

They are generally accupied by older industries, mony of them phasing aut af the oreo os hos been seen. They frequently don't use the entire space, or use most of it for long-term storage.

Within this loft category is o wide ronge of building types and uses. Along Front Street, far exomple, there ore a number of interesting buildings built in the 1830's, with attractively simple facodes. Many af the five-story textile lofts narth of Leonard Street, with large plote-gloss windows handsomely fromed by iron columns, ore olso attroctive.

Severol modern multi-story loft buildings in the Study oreo -- mostly olong Canol Street -- dote roughly to the construction of the nearby Hollond Tunnel in the 1920s. These buildings ore port of a lorger group of modern loft ond worehouse buildings north of Canol Street, ond oppeor in good condition with heovy floor loodings.

A significont foctor in treating mony of these buildings os hoving a middle-ronge life expectancy is bosed on the fact that their blue-collor employment is importont to the City.

Office Buildings

The other mojor cotegary af structures in Lower Monhatton is affice buildings, whose oge, quolity ond chorocter vory widely.

In the financial ond insuronce districts, even old office buildings are generolly in good condition (either new or modernized), with high tox ossessments, high employment and high rentols. Many of these buildings hove a certoin architecturol distinction, forming both the downtown skyline ond the complex, irregular system of "conyon" spoces which give this orea its special choracter.

In the Core, roughly defined os east of Broodway ond south of Fulton Street, three-quorters of the rentoble office spoce is either af recent canstruction (thot is, postwor), or modernized; vocancy rates ore generolly belowfive per cent. Among the older, non-modernized buildings the voconcy rotes ore substontiolly higher.

Rentols ore between $4.00 ond $9.00 o square foot, depending primorily on the oge of the building ond an whether it is at the heart of the Core or at its fringe.

Outside the central Core, the office stock is not of such

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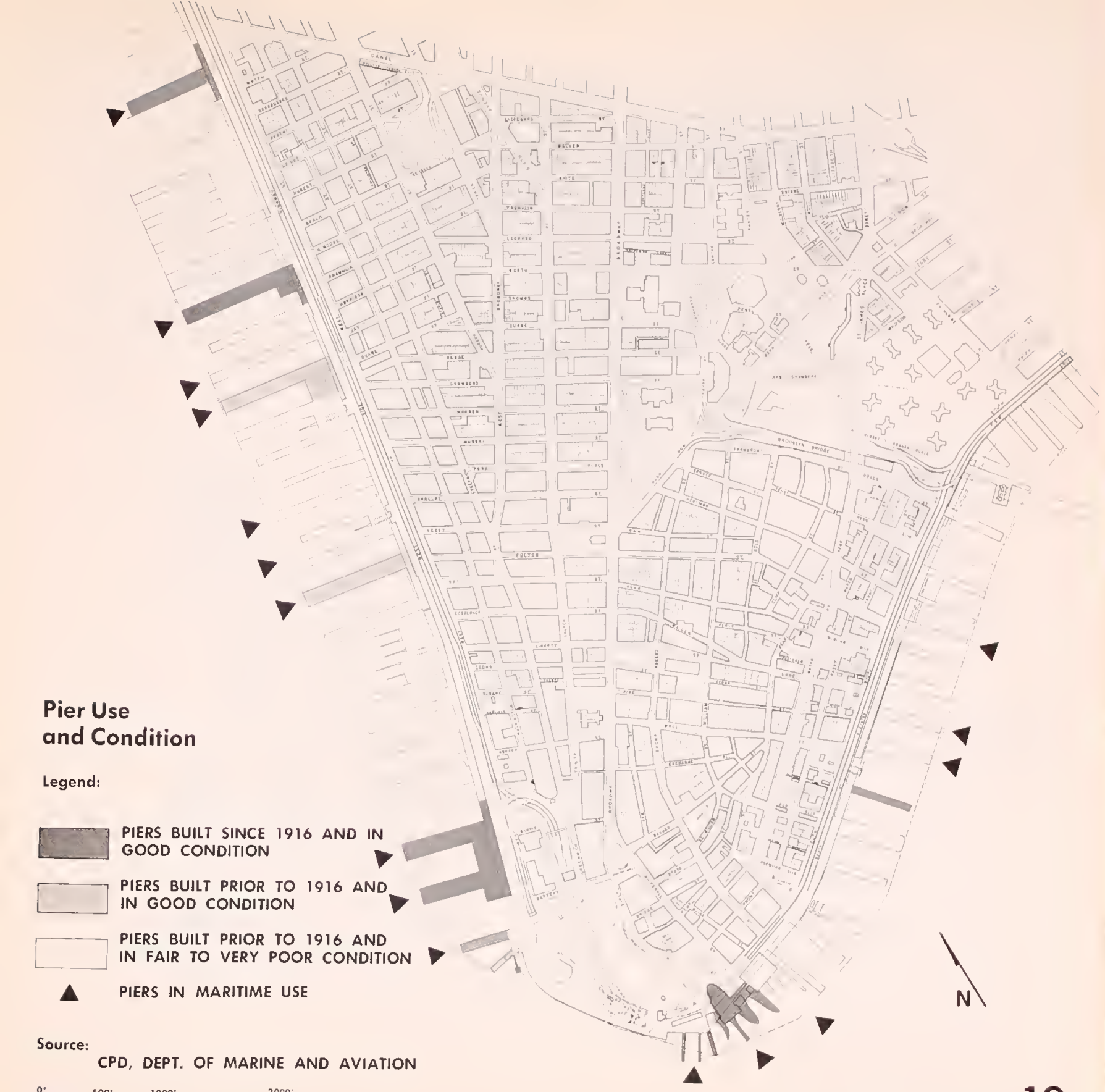
[1] Purchase for obvious resole ot a profit rother than use.



Pier Use and Condition

Legend:

- PIERS BUILT SINCE 1916 AND IN GOOD CONDITION
- PIERS BUILT PRIOR TO 1916 AND IN GOOD CONDITION
- PIERS BUILT PRIOR TO 1916 AND IN FAIR TO VERY POOR CONDITION
- ▲ PIERS IN MARITIME USE

Source:
CPD, DEPT. OF MARINE AND AVIATION

0' 500' 1000' 2000'

N

Building Age and Condition

Legend:

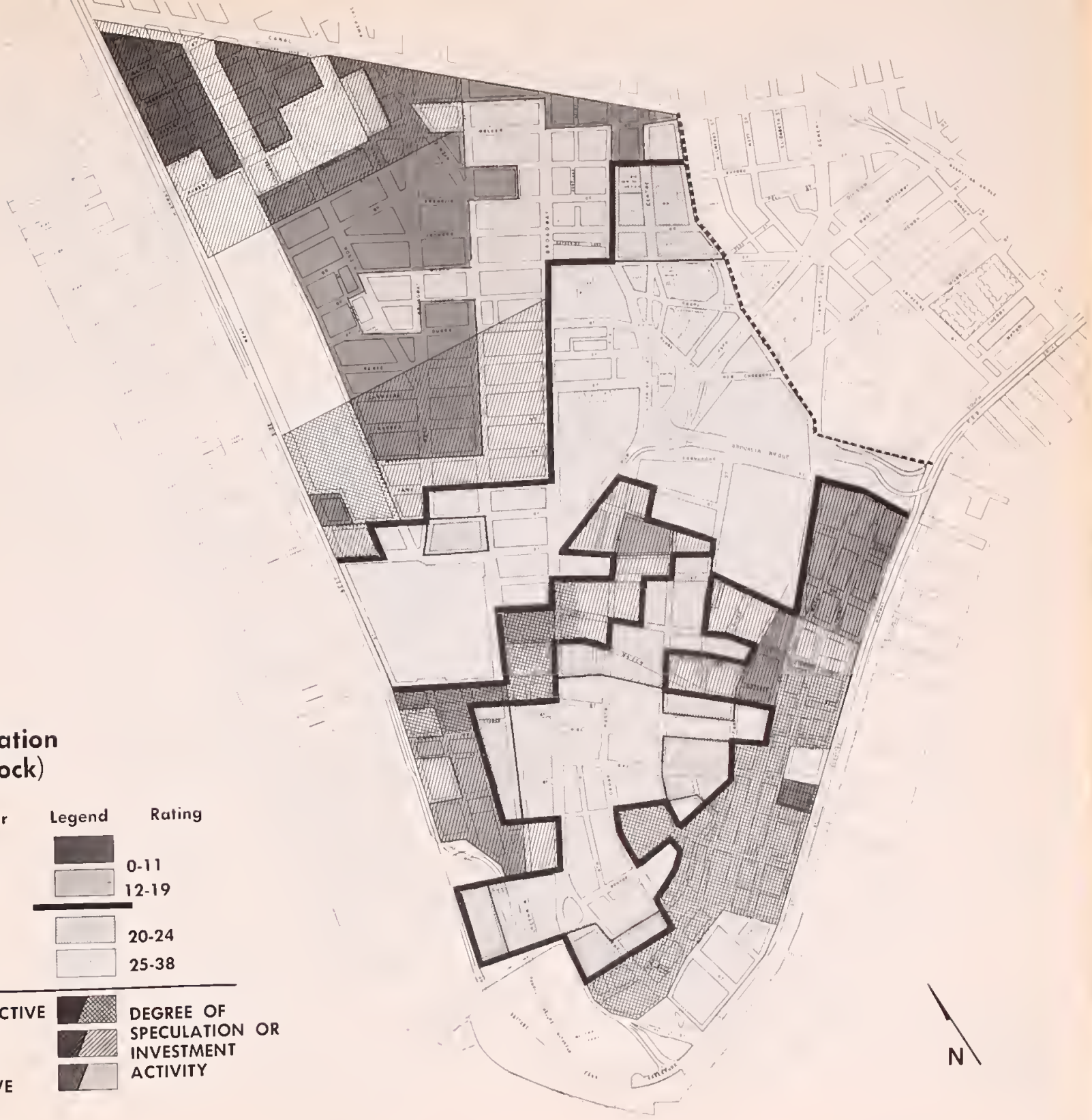
- BUILT PRIOR TO 1915, NOT FIREPROOF, NOT MODERNIZED
- BUILT PRIOR TO 1915, FIREPROOF, NOT MODERNIZED
- BUILT BETWEEN 1915-1945, NOT MODERNIZED
- ○ MODERNIZED SINCE 1945
- ▲ CONSTRUCTED SINCE 1945
- △ PARKING BUILT SINCE 1945
- OPEN OR VACANT LAND

Source:

DLMA
CPD
DEPT. OF MARINE & AVIATION
LMP FIELD SURVEY

0' 500' 1000' 2000'

N


Area
Evaluation
(by block)
Character
Legend
Rating
"SOFT"
0-11
12-19
"HARD"
20-24
25-38
VERY ACTIVE
ACTIVE
INACTIVE
DEGREE OF SPECULATION OR INVESTMENT ACTIVITY
Source:
SEE APPENDIX II
0'
500'
1000'
2000'
N

Building Life Expectancy

Legend:

SHORT-TERM

LONG-TERM

Source:
SEE APPENDIX II

0' 500' 1000' 2000'

Building Life Expectancy (Long Term)

Source:
SEE APPENDIX II

0' 500' 1000' 2000'

Construction and Modernization Since 1946

Legend:

- COMPLETED
- UNDER CONSTRUCTION
- ADVANCED PLANNING
- MODERNIZATION

Source:
CPD, DLMA

0' 500' 1000' 2000'

high paint alang Braadway. It was ta this same high paint an which City Hall is lacated that the line af the Braaklyn Bridge was aimed in the 1870's. Braad Street was built aver a canal which the Dutch had dug aut af a depressed swampland that turned narthwest fram the East River. Canal Street fallawed the caurse af the stream that emptied the small lake (knawn as "Callect Pand") just narth af what is naw the Civic Center.

The street pattern abruptly changes east af Pearl and West af Greenwich Streets, fram the tapagraphical pattern af the early Dutch system ta the rectangular grid adapted by the English far the new land filled beyand Pearl and Greenwich.

The divisian between the ariginal "care" (the ald Dutch City) and the newer filled land persists ta this day -- the divide between the high-prestige financial district (which accupies the ald Dutch city) and the varier cammercial activities that grew up araund it -- shipping, warehausing, impart and expart hauses, markets, ferry slips.

In cantrast ta the "hilly" care, the filled land is generally flat. The sail has paarer bearing qualities, and pases faundatian prablems where bedrack is nat near the surface. This,as well as the existing structures affects where and haw new canstructian will accur.

BUILDING PATTERNS

The carelatian af excellent space and high dallar value is ane expressian af the peculiar genius af dawntawn. Builders have adhered clasely ta the irregular street system, filling aut carefully ta the edge af each praperty line.

The Old City

The tenacious abservance af the ald street system has helped preserve the value, integrity and character af the area. Dawntawn grawth has been highly regenerative: alder buildings canstantly give way ta newer anes. The basic farm af the streets -- in terms af bulk, setbacks, and apenings -- has changed anly superficially in 75 years. Almast the entire Braad Street frantage an bath sides has been replaced unit-by-unit since 1900, but the basic street-farm is very much the same.

Yet a majar change has accurred in stages, as the skyscrapers develaped and the new zaning law af 1916 taak effect in the 1920's. The Equitable Building an Braadway triggered a reactian against filling entire sites and building ta any height at all with na cancern far light and air. The squat, cammercial buildings af the earlier era gave way ta the vertical bands af higher towers. In the space af a decade, the famaus dawntawn skyline was refarmed, ta the dismay af many far wham the 40-stary Equitable and Singer Buildings represented the ideal in vertical prapartians and use af site.

The past-Warld War II change was, hawever, even mare dramatic in character. Here, it was nat a questian af height ar verticality, but af basic spatial arganizatian. Far the first time, the ald street pattern was set aside. The free-standing tawer was intraduced, apening up huge new plazas, setting flat planes against vertical spires, and juxtapasing steel and glass against walls af stane. This trend taward mare spacious dawntawn siting was further reinfarced by the new zaning cade intraduced in 1962.

The prablem taday is haw ta retain a balance between these new apenings and the ald canyans. The indescriminate lacatian af adjaining plazas in the dawntawn area cauld lead ta a breakdawn af the traditianal spatial sense, transfarming Wall Street's canyan inta a diffuse pattern like that af Sixth Avenue in Midtawn.

The New Zaning Ordinance

140 Braadway and the Warld Trade Center are the exact expressian af building in this pattern ta the maximum, within the new flaar area ratia and (setback) incentive zaning adapted in 1962. This law encaurages large-site assembly. The larger the site, the mare passibility far setback, and thence the greater valume and height an any given site. Such buildings as 140 Braadway pravide large setbacks and get mare height in a market that wauld have paid a premium far larger flaars.

The form of future building potterns is going to be affected greatly by any zoning ordinance, os it hos in the post. The effect of the present ordinance will be to introduce a loosening of the "groin"[1] of buildings which, without coordination through a plan, moy in turn loosen the Core os well as destroy mony of the importont semi-enclosed spoces downtown, such as Woll Street, Nossau Street ond others.

BUILDING SITES OFFSHORE

Not the least of the potentiol building sites is the orea between the bulkheod ond pierheod lines. Offshore conditions at the tip of Manhotton ore exceptionolly favoroble for either lond fill or pile-supported structures. Since this oreo is no longer oppropriate for morine-related functions, it is important as on orea of potentiol use for the Core. In determining the possible extent ond location of new construction past the bulkhead line, on assessment of subsoil conditions was necessory.

A good deol of dato was alreody avoiloble in two reports commissioned by the Deportment of Morine and Aviation.[2] One report, issued in 1959, deolt with the Eost River, where the Deportment's consultonts proposed a series of marginal piers to reploce the obsolete ond underutilized piers now there. The second report, issued in 1962, proposed the complete redevelopment of the lond lying off the Hudson River from the Battery to 72nd Street. In the Lower Manhotton Study orea, the consultants proposed o combinotion of piers, apartment houses and office buildings. This wos the first serious study of the possibility of offshore housing downtown.

The following is o summary of the informotion presented in these two reports deoling with sub-surfoce conditions.[3]

General Conditions: Offshore conditions ot the tip of Monhattan Island ore exceptionally fovorable for either lond fill or pile-supported structures. Bedrock (chiefly Manhottan Schist) is capable of providing point beoring resistance to high load piles, piers or coissons, within several feet of its surfoce.

Soil Conditions: Typicolly, the strata of materiols above bedrock fall into two broad categories: o) those thot ore incopoble of supporting fill without excessive settlement (compressible moteriols, either fill or orgonic cloyey materials), ond b) those thot ore capoble of supporting fill and offering resistance to friction piles (coarse sonds or granulor moteriols). Strota A ond B (below) foll into the first category, Stratum C into the second.

a) Non-Lood Beoring: Strotum A: Miscellaneous Fill. Mixed Cloy, silt, sond ond grovel, cinders, occosional boulders, ond pockets of orgonic silt. Stratum B: Silt. Very soft to soft orgonic clayey silt, fine sond. Will settle under fill loods, must be penetrated to denser moteriols by piles.

b) Lood Beoring: Strotum C: Coarse Sonds. Medium compoct to very compoct, includes grovel, gronulor soils.

Fill Procedures: In order to provide beoring for fill, Stroto A ond B must be dredged, then reploced by coorse sands ond other materials capobl e of long term stabilization. In Zones II, III and IV, this process is feasible ond economical; an average of some 20 feet of silt must be dredged out. In Zone I, however, where soft compressible moteriol is found as deep os 80 to 120 feet, it is not recommended. In Zone II, for which preliminary colculotions were mode in the North River study, an overoge depth of 55 feet of new fill will be required to achieve o new surface of plus 12 o bove Mean Low Tide. Roughly five million cubic yords of fill ore involved.

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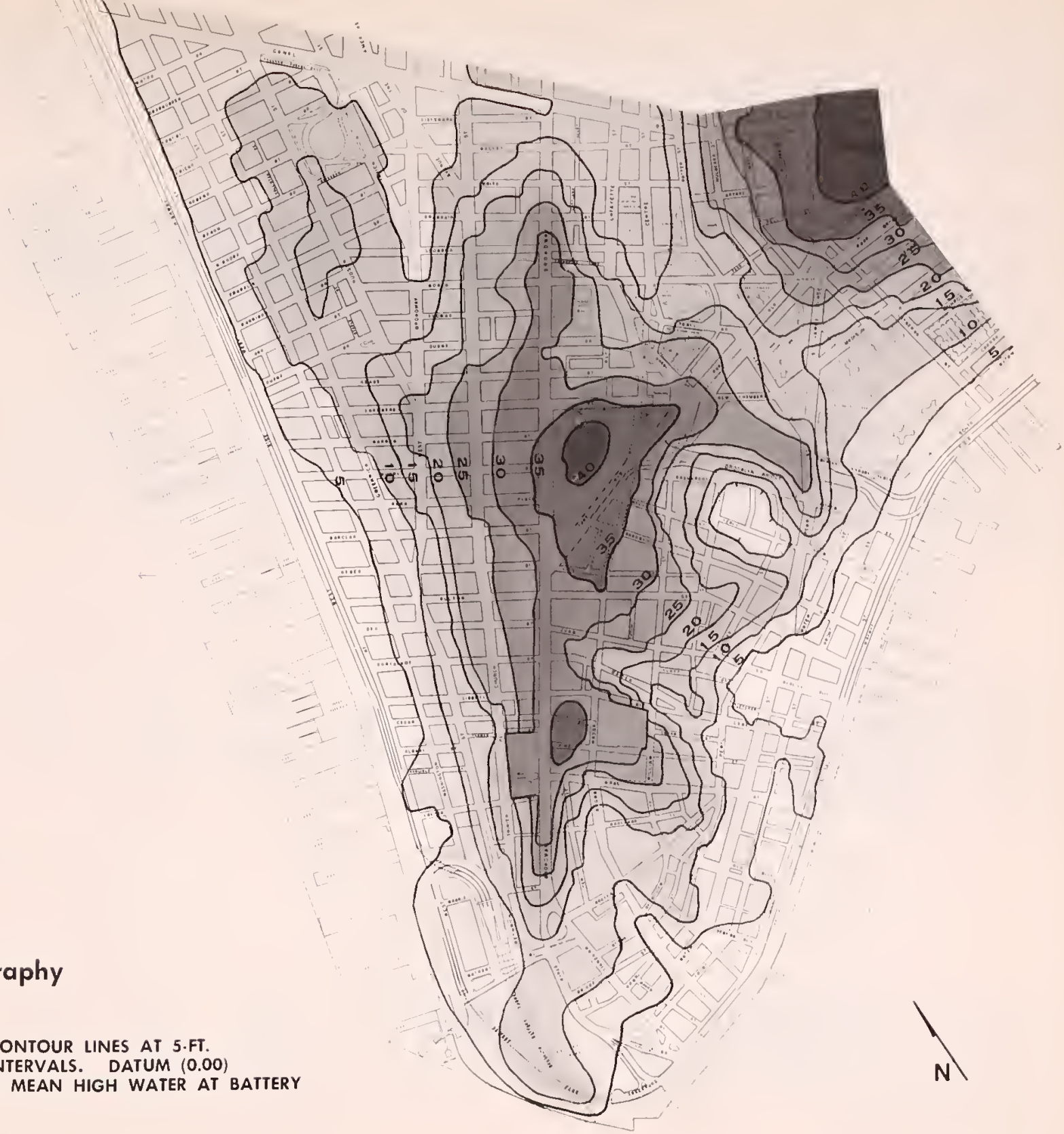
[1] Groin is defined os the texture of buildings ond voids.

[2] Department of Morine and Aviotion, Redevelopment of East River Piers, Lower Manhottan 1959. Consultonts: Tippetts-Abbett-McCarthy-Strotton, Engineers and Architects. Deportment of Marine and Aviotion, Monhotton North River Development Plon, 1962. Consultonts: Ebasco Services, Inc. (Monagement Consultonts), Eggers and Higgins (Architects) ond Moron, Proctor, Mueser & Rutledge (Engineers),

[3] An additional source of information wos Mr. John Wilson of the Port of New York Authority.



Topography

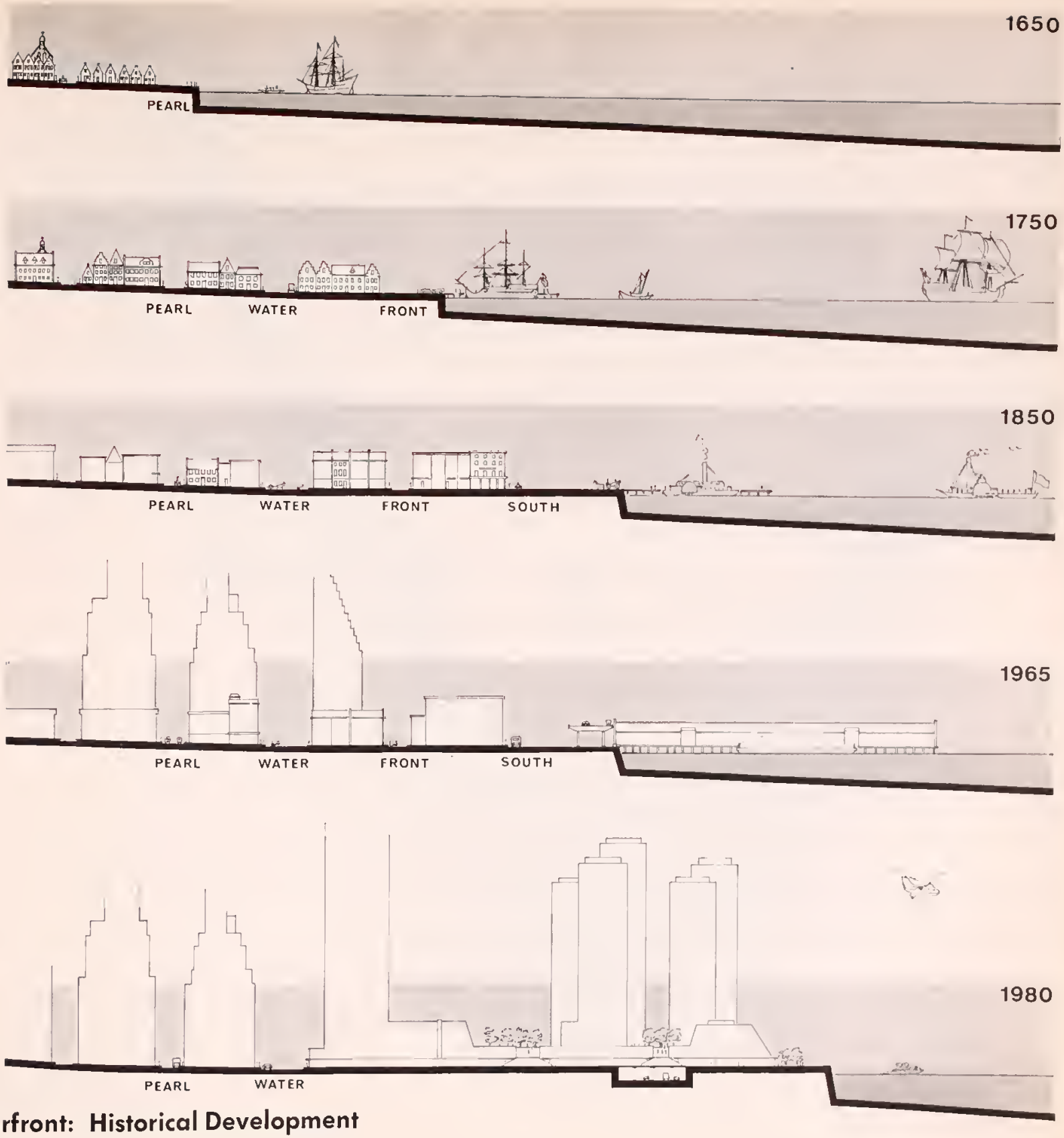
Legend:

CONTOUR LINES AT 5-FT.
INTERVALS. DATUM (0.00)
IS MEAN HIGH WATER AT BATTERY

Source:

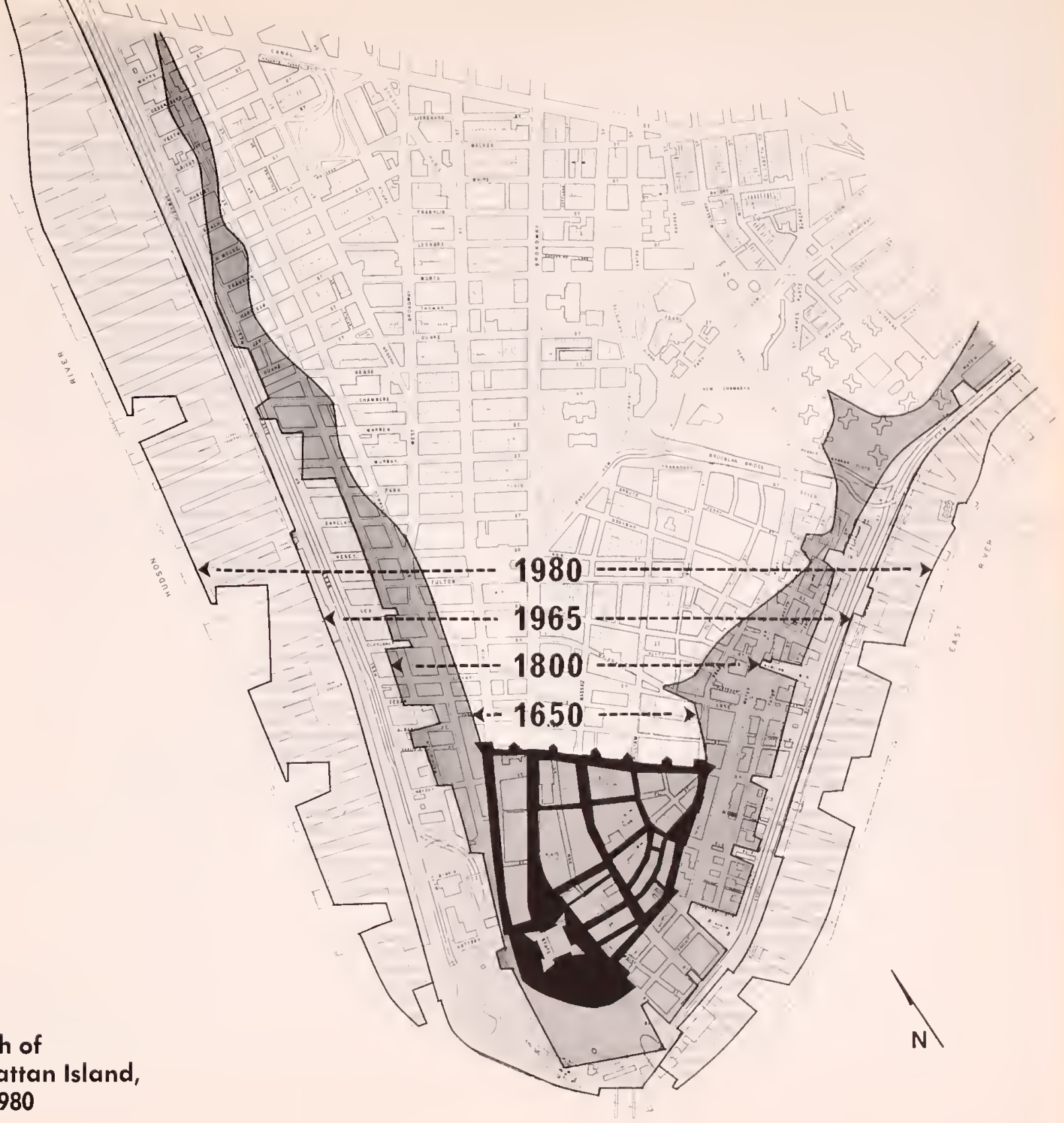
CPD

0' 500' 1000' 2000'

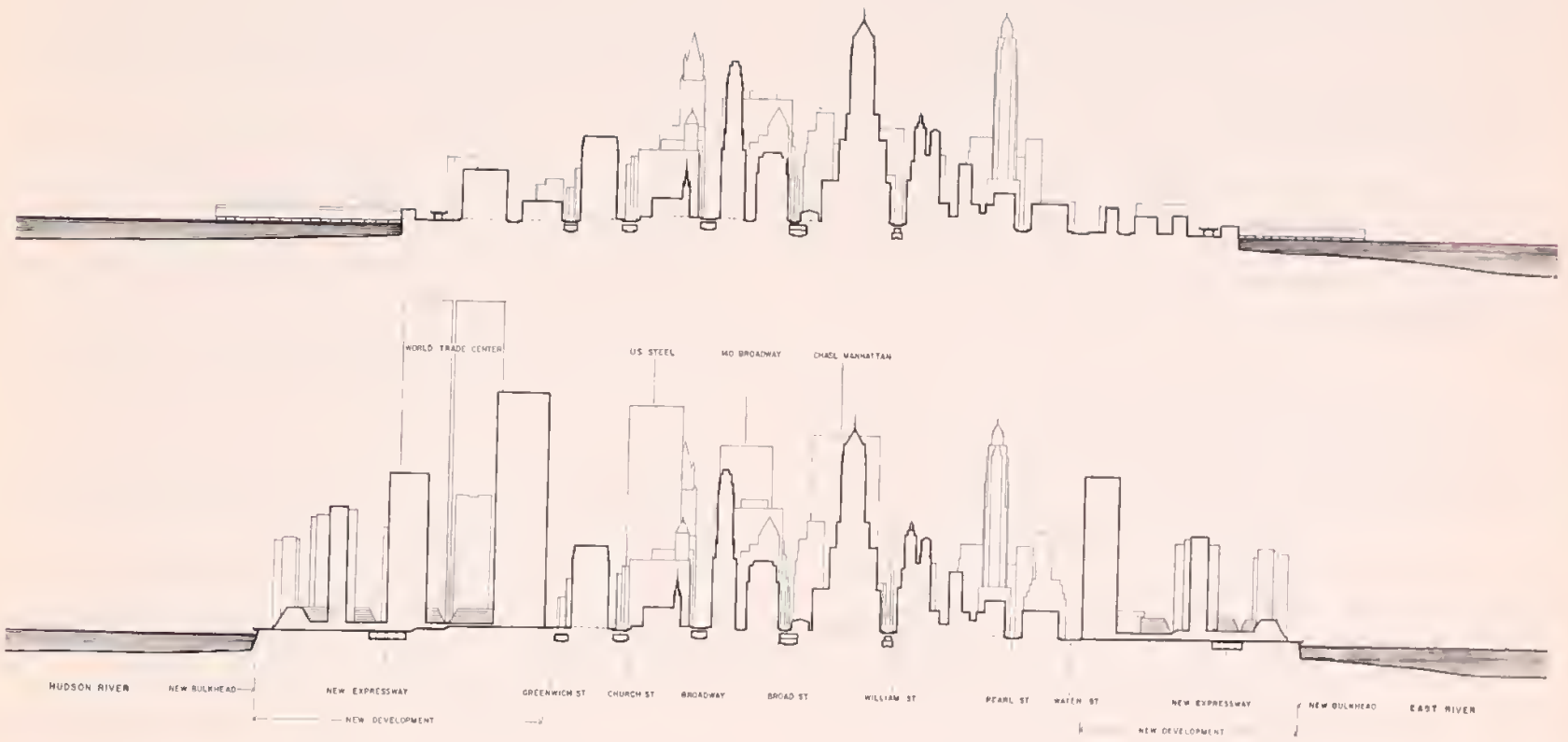


Waterfront: Historical Development 1650-1980

0' 100' 200' 500'



Growth of Manhattan Island, 1650-1980



Cross-Island Sections: Looking North at Wall Street

1950-1980

0' 500' 1000'

Estimoted Cost: Costs were estimoted ot $8.30 o squore foat, which included demolition of existing pier structures, dredging, fill, dikes and relieving platform. Retaining walls at the perimeter of the fill would cast roughly $ 1200 ta $ 1500 per linear foot. This obviously means that the larger the land fill, bath in breadth and length, the cheaper the unit cost af the new lond. Thus, for a fill 600 feet wide, and 1,000 feet lang, the retoining woll would cost oraund $4.30 per square foot of new lond, whereos if it is 2,000 feet lang, it would be $3.20 per square foat. On the other hand, if relieving platforms ore nat necessary and either ardinory platforms an piles or earth embankments will do, edge casts can be cut almast in half. Where structures are founded an fill (in Zane III, for example), deepened dredging shauld be considered ta cantral settlement. Under exceptionol circumstonces, fill con be placed over Strato B Silt, but this requires special cantrals ond an extended woit for sail cansalidatian.

River Flow ond Tides: a) East River: According to the U.S. Corps of Engineers, placement of fill must not reduce the cross-sectionol orea af the riverway by mare thon twa per cent. To achieve this, in the area sauth of Brooklyn Bridge, the outward line of fill must be kept back 80 feet fram the pierhead line. Between Brooklyn ond Manhotton Bridges, the comporable figure is 150 feet.

b) Hudson River: Na such limitotions seem ta exist for Hudson River fill Silting under existing piers is so greot that the effective river section is olready well under what the nominol width the river would ollaw. "For this reosan," stotes the North River report, "the proposed land fills create little additional abstructions to the narmol river flow."
The same would abviausly olso apply to pier supported structures. Silting along the morginol wharfs propased wauld be substantially reduced in comparisan to the slips between the finger they replace.

Pile Canstructian: Pile-tip elevotions are obviously highest in Zanes II ond III, where bedrack is between 20 ond 40 feet below meon seo level. No pile problem exists here and it might even be ecanamical to corry piles far light loods to rack. In Zones I and IV, estimated average pile-tip elevotions are abaut 80 feet below Mean Sea Level. Here various alternatives ore open. In Zone III, the soil can sustain frictian piles to suppart light ond medium loads. In Zane I, penetration ta bedrock will probably be necessary, unless o small settlement can be tolerated. A lot of variobles are involved in such colculotians, ond each configuration of foctors will dictote different salutians.

Piles Versus Fill: The situation con be summed up as follows:

a) Land fill has lower first cost than o pile-supported deck area, withaut considering the additianal casts of pile suppart far heavy structures in either case. The land fill orea hos practicolly unlimited life ond is neorly maintenance-free if potential settlements ore lorgely completed during canstructian.

b) Land fill eliminotes certain continuing prablems of pile-supported decks, such as long term pile-protectian, concentrotian af argonic gases and odors, and fire hazard beneath a deck extending over wide areos.

c) Fill areas provide canvenient working spoce during construction and are flexible for possible changes in lacotion ond type of structure.

d) With proper canstruction procedures, pavements, utilities, landscaped areas, storage yards or light structures may be ploced directly either on or in fill: pile support need not be pravided. Althaugh batter piles probably wauld be necessary for larger structures in decked areas, they cauld be eliminated for the same structures in filled areas.

Disadvontages of Lond Fill Schemes: Disadvantoges of land fill compared to pile-supported deck are as follows:

a) Land fill is economical where a relatively large orea is ovailable for filling ot ane time. Small areos with o lorge perimeter to orea rotia are not economical for fill because of special problems and added costs far the slope at the fill's periphery.

b) For those structures which must be pile-supparted, the faundation cast for piling is superimposed an costs for land fill in the building areo. Unless all the campressible silt is removed from beneath fill areas, the pile loads will be

significantly increased by drag forces.

c) In areas where fill if to be placed above organic silt, staged construction is required to insure the stability of fill slopes and to minimize settlement. This staged construction might require at least 3 years before structures could be commenced in the area and that time would be lost to revenue production.

Land Fill Construction Techniques and Costs:

In dredging and filling operations, the North River report anticipates the following conditions in Zone II:

Average Elevation of Bedrock Surface	47 feet
Average Elevation of Mudline	23 feet
Average Thickness of Sand Gravel Above Bedrock Surface	6 feet
Average Thickness of Strata to be Dredged	20 feet
Average Thickness of Fill to Elevation 12	55 feet

Note: Elevations plus and minus refer to Department of Marine and Aviation Datum, 0.0 = Mean Low Tide at the Battery.

Costs for Land Fill in Zone II (called Area I in the North River Study) were calculated as follows, on the basis of 1962 prices:

Demolition	4,650,000
Dredging	3,160,000
Demolition of top of bulkhead	380,000
Fill including compaction of top layer	8,225,000
Perimeter relieving platform including fenders	6,800,000
TOTAL	23,215,000

The area of fill involved is 2,8 million square feet; and this comes out to the aforementioned $ 8.30 per square foot.

If a rock dike is constructed in place of a relieving platform, the cost would be reduced by $ 3,700,000, bringing the cost of the new land to $ 6.95 per square foot.

If a regular bulkhead is constructed (at $ 1200 a linear foot) the cost would be a little less than the relieving platform ($ 6,250,000 against 6,800,000).

Comparison of costs between pile-supported and fill systems is complicated by the fact that one includes the cost of a finished deck, while the other does not. The North River study estimated the cost of pile-supported platforms in Zone I at around $11.50 per square foot. This included demolition, pier platform and fenders.

The conclusion of this analysis that land fill and new bulkheading, together with basic utilities, will cost around $14 to $15 per square foot of created land if the majority of the area from present bulkhead to pier head is filled. This, in New York terms, is a very modest cost for sites.

SITE ASSEMBLY COST AS A FACTOR IN GROWTH AND LAND USE

The above section demonstrates the very competitive possibilities of off-shore sites. This section continues the consideration of where development is likely to occur. First site assembly costs are considered. Then the utility of various possible uses within the zoning envelope is estimated to compare with costs of sites. Later in Chapter V, the two are put together as a device for determining a minimum, and maximum intensity, and the possible type of use that could be expected on any given site.

A contour map of downtown market values for land and improvements (combined) bears a distinct resemblance to the downtown topographical map. The Core and center have high values. Prices drop off progressively as one moves out towards the rivers. [1]

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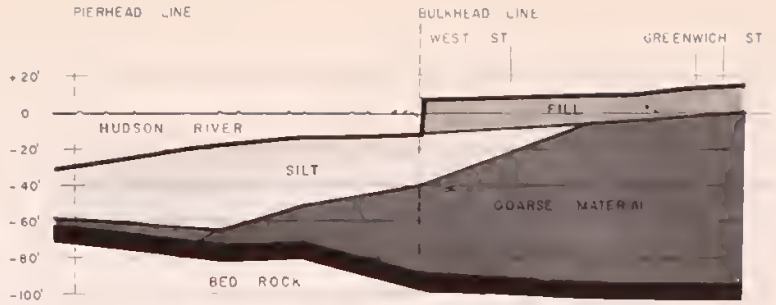
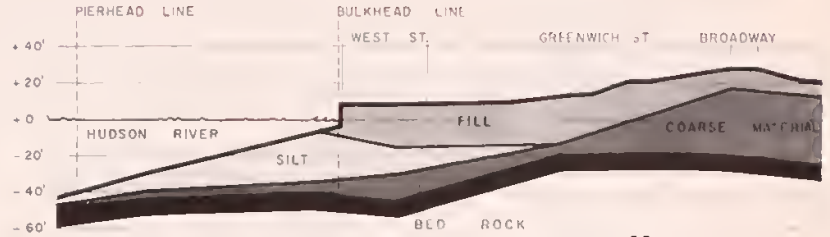
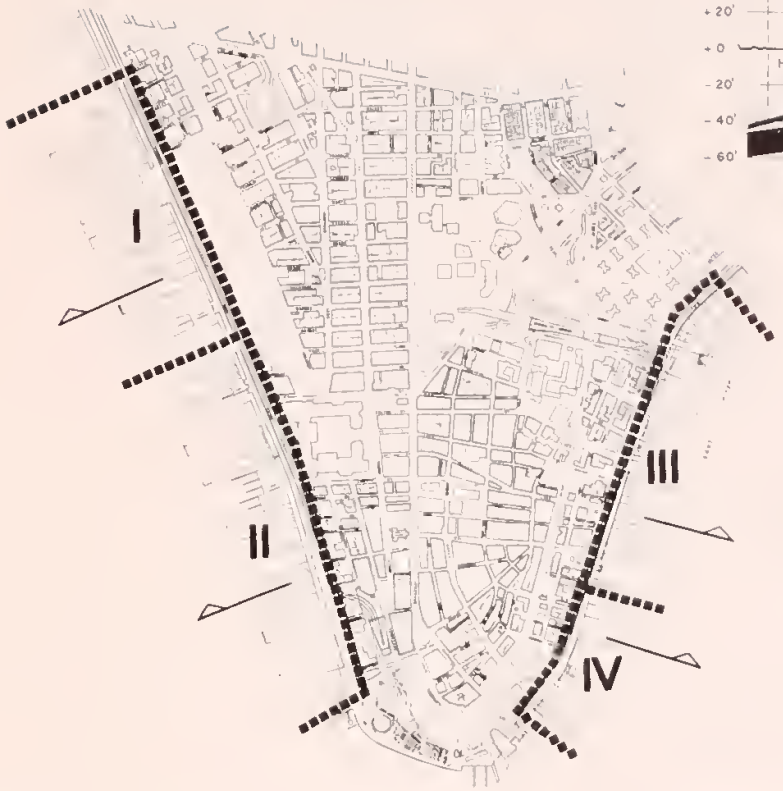
[1] The map itself is based on three sources of information: recent sales; informed opinion of local realtors and developers; and assessed valuations (adjusted to compensate for known discrepancies). It does not pretend to exact accuracy but is reliable as a general tool.

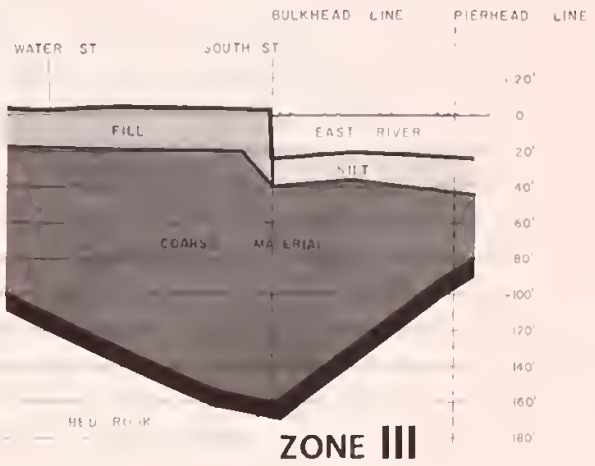


ZONE I



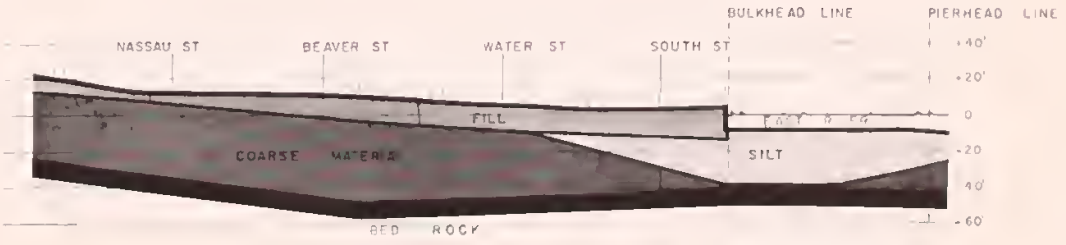
ZONE II





ZONE III

Offshore Subsurface Conditions



ZONE IV

Source:
CPD, DEPT. OF MARINE AND AVIATION

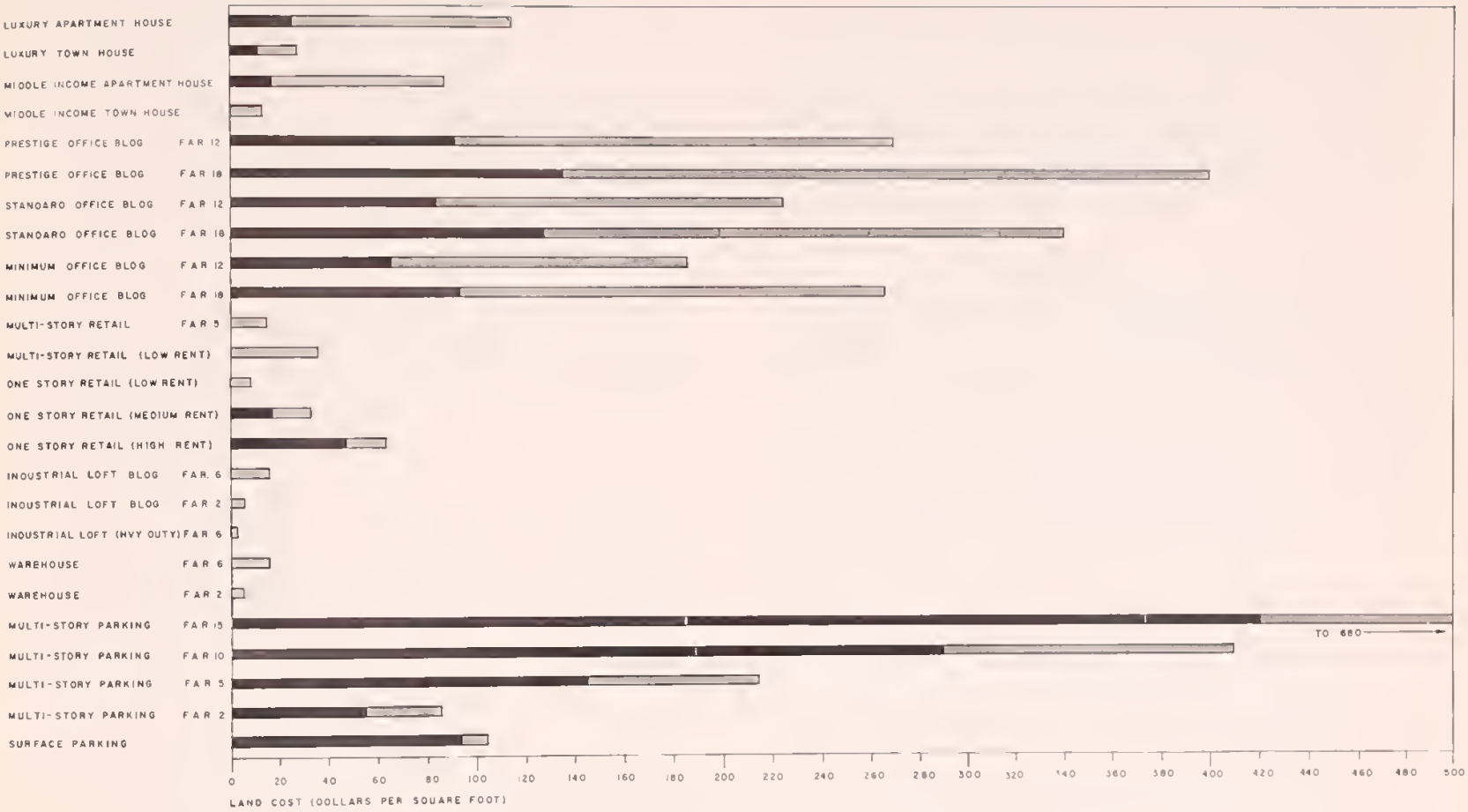
0' 250' 500' 1000' HORIZONTAL SCALE

Generalized Land Acquisition Costs

(Dollars per Square Foot for Land and Buildings)

Source:
RECENT SALES, ADJUSTED ASSESSED VALUATIONS

0' 500' 1000' 2000'



Maximum Land Cost Allowable for Specified Rates of Return for Selected Building Types

Legend:

8% PLUS

5-8%

The wide ronge of morket volues of lond ond improvements in the Study oreo reflects mony of the some conditions onolyzed eorlier in this section: the extremely voluoble Core ond the declining periphery.

However, it should be noted thot olthough the ronge is wide, much of the peripherol lond is by no meons cheop. This is porticulorly true of lond odjocent to the Core. On the Eost Side where speculotion is greot, sites ore now selling ot between $ 75 ond $ 100 o squore foot, with some os high os $125 depending on locotion ond ossembly. Ten yeors ogo this lond could be purchosed for perhops o third os much.

This rise in volue reflects the spreoding out of Core octivity which hos occurred in recent yeors ond the effect of the widening of Woter Street. Speculotive octivity to the south ond eost of the Core hos been porticulorly vigorous. A number of porcels hove been ossembled, ond plons hove been filed for severol new buildings.

Even on the lower West Side, where little new construction is onticipoted soon, lond volues ore relotively high. This is due in port to the World Trode Center, ond in port to recognition thot the entire downtown oreo is o potentiol site for prime office construction.

The Ability of Uses to Poy Site Costs

To determine the economicolly possible uses in the downtown oreo, the moximum lond costs for o voriety of proboble downtown building types wos colculoted, bosed on o series of ossumptions concerning occeptoble rotes of return, toxes, rents, ond expenses.[1]

The colculotions were bosed on the relotionship expressed in the reol estote formulo:

$$\text{Rote of Return} = \frac{\text{(Rents minus expenses) minus Property Toxes}}{\text{Investment}}$$

This rote of return is sometimes colled cosh flow. It is essentiolly net income return to full investment ofter operoting expenses ond reolty toxes. It is meosured before considerotions of mortgoge finoncing olternotives ond income tox situotions.

For ony combinotion of building, site, income streom, certointy, ond investor, there is o minimum cosh flow rote-of-return below which "thot" investor won't venture into "thot" situotion. This minimum rote represents combined returns for the investment itself, monogement of the investment, onticipotions obout its future net income streom, ond the degree of risk involved. This combinotion con then be set ogoinst olternotive investment returns, mortgoging prospects or limits, ond income tox considerotions. A choice obout complex relotionships con be mode on o one-foctor bosis.

Very simply, if the rote of return equols or exceeds the minimum occeptoble rote for o specific investor, thot investor could reosonobly be expected to build thot building on thot site. If the rote of return is less thon the minimum rote, then the suggested privote morket investment is unlikely os specified, without public subsidy in one or onother form, such os lond cost write-down, reolty tox obotement, mortgoge finoncing ossistonce, or rent subsidy. Alternotively, privote "subsidy" in the form of o different privote investor with o lower minimum rote limit -- due to concern, or tox position, or both -- is o possible woy to moke on otherwise unlikely investment more likely.

By working bockword from the generol relotionship, os expressed in the rote of return formulo, it wos possible to exomine eoch of the voriobles which offect these generol volues.[2] The colculotions of this investment onolysis kept the volues of eoch of these foctors constont for eoch building type. In effect, the results of the onolysis show how the octuol rote of return will chonge os lond cost chonges if oll other voriobles

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[1] These colculotions do not opply to non-competitive corporote buildings where site costs ore often much more thon the eorning power of the building.

[2] The nomes ond relotions of the voriobles were those used in the FORTRAN computer progrom written to corry out the investment onolysis.

remain canstont for that building type. [1]

Ten building types were anolyzed. They represent those mojor building types which most reosonably con be expected as majar uses in the Study oreo. A summotion of results fram the investment onolysis gives the maximum lond cost thot could be poid while still giving an investor on 8 per cent or o 5 per cent return on the total investment. Such o return represents as much as o 15-to-20 per cent return on the develaper's equity investment, depending on the proportion his investment beors to the total. These calculations refer, of course, ta an average "rationol" investor, ond moke no allowance for the many special situatians gaverning individuol coses, where tax ond depreciatian situations moy dictote widely varying demonds ond needs.

In summary these colculations confirm mony widely held ossumptians regarding investment apportunities.

For example, unsubsidized industriol ond warehouse lofts cannat pravide a sufficient return ta pay far constructian costs, let alone land costs at prevoiling rents ond land costs.

Conventianally-finonced residentiol buildings (except in special luxury situotions) cannat be built on lond costing much over $50 a square foot. This maximum pertains ta the upper-middle and to upper-incame housing typical af much recent Monhattan canstruction.

Far other categaries even this figure is far in excess af the possible.

Sauth af the Worth-Chambers line no such land is ovailable. Thus it is clear thot, without substantial subsidy, hausing in the Core area connot poy current site costs. In fact, only in the water frant fill oreo can lond be made ovoilable far housing ot an econamic cost.

---

[1] A change in building cast, rent, etc., was considered ta establish anather building type. The actual volues for each af the voriables was assembled from two major saurces: New Yark City departments ond ogencies especially the Department af City Planning ond the Real Property Assessment Department, and infarmed opinion from real estate and architecturol firms familiar with the costs of constructing, finoncing, renting and operating each of the building types analyzed.

CHAPTER IV

CURRENT AND COMMITTED PROJECTS

One of the principal objectives of the Study was to determine what the impact will be of the projects which are either in planning or currently underway. This impact will set in motion massive changes, most for the better, in Lower Manhattan. These changes (particularly regarding the movement system) were evaluated to determine what ought to be the response of the City to proposed street closures and realignments, and what is likely to be the reaction of the private sector of the market. The movement response is considered in detail in Part 2. Here the focus is on land use and functions.

The projects considered are: the World Trade Center, the New York Stock Exchange, Brooklyn Bridge Southwest Urban Renewal Project, the Washington Market Area Urban Renewal Project, and the Civic Center. A number of other important private projects were also evaluated, but collectively as net additions to space rather than individually.

It should be noted that two of the current projects--the World Trade Center and the Civic Center -- have also been the subjects of special reports by the Department of City Planning to Mayor John Lindsay, and for that reason are dealt with only generally here.

THE WORLD TRADE CENTER [1]

The prime stated objective of the World Trade Center is to simplify and expand international trade by centralizing and consolidating within the Center essential world trade services and activities. It is anticipated that members of the world trade community will be able to function more efficiently by rapid interchange of information, prompt processing of trade documents and rapid consummation of exchange and other transactions. The Center's expected range of world trade services and facilities will constitute a new and unique headquarters for international trade.

Description of the Project

The Center will contain principally government agencies and private firms which play a part in international marketing and in the administrative processing of world trade. The United States Bureau of the Customs, offices of the Department of Commerce, Port Authority administrative offices, foreign consulates and commercial attaches, foreign government purchasing missions, Custom House brokers, international trade associations, exporters, importers, freight forwarders, international banks, marine insurance firms and other agencies and businesses related to foreign trade will be among the occupants. In addition, the State of New York plans to consolidate most of its principal offices in Manhattan in the Center. These offices now account for approximately 1,500,000 square feet of rentable space at both owned and leased locations. Only those State offices which are essentially neighborhood service facilities

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[1] For a more detailed discussion of the World Trade Center see Department of City Planning, City of New York, The World Trade Center: An Evaluation, The Department, March, 1966.

will remain where they are.

The fallowing, with the indicated major occupants and functions are scheduled in the World Trade Center and the distribution of net floar space:

OCCUPANTS, FUNCTIONS AND SPACE IN THE WORLD TRADE CENTER [1]

User	Net Square Feet
State of New York	1,900,000
U.S. Bureau of the Customs	800,000
N.Y. Port of Authority	800,000
Other Gavernment (Foreign and State Functions Related to World Trade)	450,000
Trade Service (customs brokers, freight farwarders, international banks, etc.)	1,700,000
Expart-Impart Firms	2,300,000
Auxiliary Services(consumer services)	750,000
Exhibit Space	185,000
Informatian & Education Center	80,000
Hotel (550 Raoms)	200,000
Parking (subsurface) (2,000 cars)	800,000
Storage (subsurface)	200,000
TOTAL	10,165,000

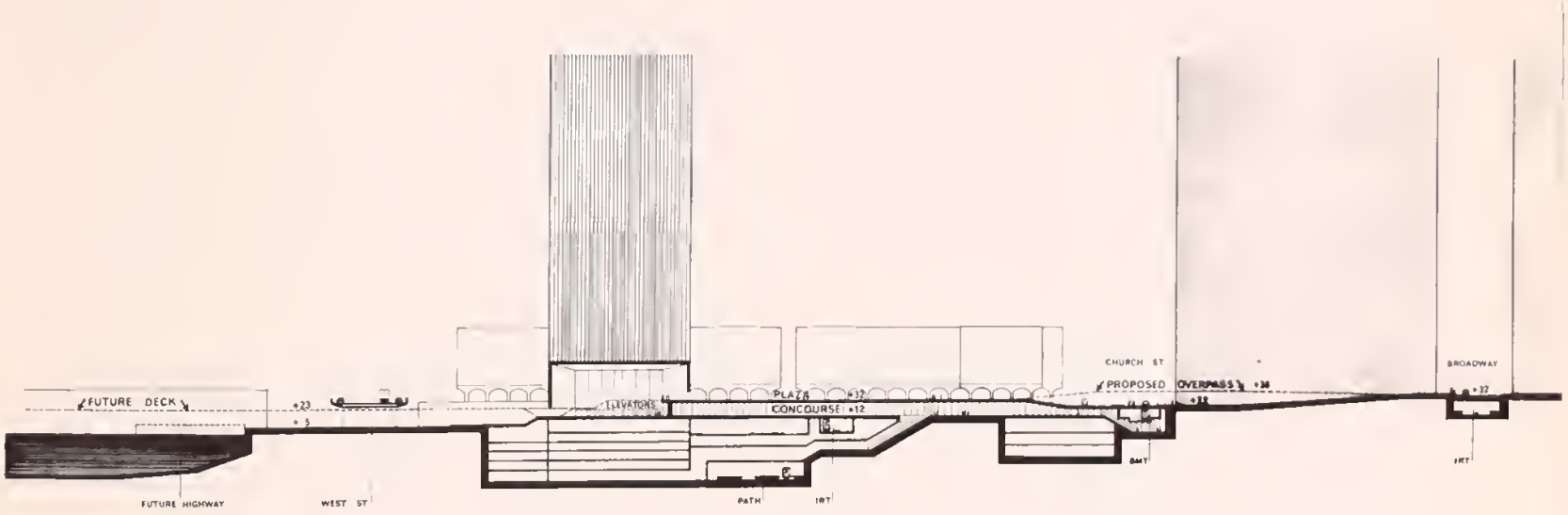
The praposed World Trade Center will be located on the largest commercial superblock in Manhattan, to be created by closing oll internal streets: its length and width about equal to the midtown blocks between Fifth and Park Avenue. The 16-acre site in Lower Manhattan is bounded by Vesey Street on the north, Liberty on the south with West and Church Streets, respectively, the western and eastern boundaries.

Transit access will be provided by three subway lines with direct cannections by underground passageways to a covered cancourse level directly underneath the plaza. The new PATH station, to be relocated under the present Greenwich Street (six levels below grade), will also connect directly into the concourse, which will contain shops, restaurants and ather consumer services, as well as direct access to all of the elevators serving the buildings abave. The Center's designers have assumed that a great majority of the Center's 100,000 visitors and 50,000 employees will pass through the Concourse. To facilitate access to the Concourse level from the west, a new underpass will be constructed under Church Street, supplementing the two underpasses (two levels below grade) now in operation.

The paved five-ocre pedestrian plaza above the concourse is conceived of primarily for exhibitions and noon-time strolls, rather than as a part of the primary pedestrian circulation system. From the west it can be reached only by crossing Church Street itself, which is over 100 feet wide; and from the mojor office units it can be reached only by rising by escalator from the central pedestrian circulation level, the Concourse. The Plaza itself will be about ten feet abave the level of Church Street, and (since the ground slopes off to the west) about 28 feet above West Street, approximately at the level af the elevated Miller Highway.

Once within the Warld Trade Center sites vehicles and pedestrians will be completely separated. The plaza and the concaurse levels will be exclusively for pedestrians. Under these levels will be parking for 2,000 cars, building service and storage, and Customs examination areas. These

[1] Source: Part of New Yark Autharity, February, 1966



Section Through World Trade Center: Looking North

0' 100' 200' 500'

areas will be entered from vehicular tunnels from West Broadway, Liberty ond West Streets.

Taxis and other Center-generoted traffic will be provided for in separate drop-off lanes, out of the main flow of traffic. Traffic not destined for the Center will circulate around the superblock on the peripheral streets which, except for West Street, will be doubled in width.

Existing Land Use ond Structures

This area is now occupied by a polyglot of old delapidated loft structures, with retoil office, manufacturing, automotive, and some small amount of residential use.

Many of the small retail stores are in older loft buildings, using the basements or upper floors for storage. A large proportion of the upper floors of these buildings have been vacant for many years. There are a small number of transient hotels. Two fire houses, and auto service and parking lots make up the rest.

The most substantial structures in the area are the office buildings along Church, Liberty and Vesey Streets. Some 61 per cent of the structures in the areo were built before 1858; 22 percent were built between 1358 ond 1914; 15 percent between 1915 and 1929; and only 2 percent after 1930. Most are in poor condition.

A spine af retail business runs along Greenwich Street, extending on most of the cross-streets to the east and west. With few exceptions the distribution of light industrial and warehousing uses follows the same pattern.

The site of 15 acres presently consists of 14 small unevenly shaped blocks. The streets themselves, many of them awkwardly aligned, occupy almost half of the site.

Current Employment

Of the total number of 17,200 persons employed on the site in 1958 [1], the largest single number, 5,850 were engoged in services. This cotegory covered o wide variety of professionol, business and personol services from borbering and management consultotion to telephone-answering and legal. The second largest group of workers, 3,150, were employed in light monufacturing.

Retail stores employed 2,550 persons. These stores had given this area its distinctive quality: home electronic goods, food specialties, vegetables and fruits, coffee ond tea, discount ond hardware applionces, florists, pet shops, bargain clothing apparel.

Other employment included 1,750 workers in wholesaling, mostly with stock, and 1,700 workers in financial, real estate and insurance. Transportation, communication and public utilities employed 1,200 construction industries 700, and government offices 200.

It is now estimated that the total employment in the site as of mid-February 1966 is between 4,000 and 5,000, including workers employed by PATH. This represents a 75 per cent decrease in jobs over the 1958 employment.

Analysis Of Effect On Lower Manhattan

Reol Estate And Future Growth: Of course, it is not passible to precisely guoge the impact of the World Trade Center on the overall morket for new office space and the occupancy of existing space. However, it is possible to make generalized observations.

There is little evidence to suggest to date that anticipation of the World Trade Center is having any serious negative

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1 Department of City Planning, study of wage and salary employment in Manhattan CBD, 1958.

effect on the rate of new building construction downtown. In the long-run it is likely that the World Trade Center's 8,000,000 square feet of competitive space will be absorbed by a currently exponding market for office space in the Manhattan CBD. The introduction of this new function into Lower Manhattan -- international trade -- and the Port Authority's investment of over $500,000,000 together with the improvement of PATH, will very likely have a generative "throw-off" on future office growth in Lower Manhattan. Already there is evidence of land speculation in the area to the north. In addition a successful Center can enhance New York's growing role as the center of international finance. Over time a functional connection to the financial community is expected to develop. This could manifest itself in the expansion of banking east of Broadway and north of Liberty Street, its traditional boundaries until now. In addition to the supporting service that will be provided within the Center other ancillary activities are anticipated near or adjacent to the Center. These areas will ultimately assume greater value as prime office sites than they now enjoy.

The immediate impact, however, may be very significant on the market for existing office space in older buildings downtown. As has been seen, about three-quarters of the office floor space, or about 40 million square feet, is pre-World War II. Half, or 20 million square feet, is still unmodernized. In 1963, vacancy rates in non-modernized office buildings south of Chambers Street averaged about 13 per cent. Almost all of the tenants of the Customs House, 45 and 346 Broadway, 80 Centre Street and 270 Broadway are already scheduled to move to the Center. Customs brokers, freight forwarders, State offices in rented space, Marine Insurance firms and international banks will be attracted to the Center leaving office space behind. The Port Authority has said that one half of its 50,000 Center employment is already in Lower Manhattan.

The response of the market to this will be as it has been elsewhere. Vacancies in buildings that have good locations and can be modernized will stimulate competitive remodelling. Where structures are not so well located, rents will drop. Owners of older buildings will face the choice of remodelling, dropping rents, or considering alternative uses. As elsewhere, it is expected that the result, in the long-run, will be to upgrade the office stock, improve the environment, and increase taxes to the City.

Transit: The World Trade Center with its 150,000 daily visitors and employees is advantageously situated in relation to the subway system. Passing through the site is the Seventh Avenue IRT. On the east is the BMT Broadway Line and just to the northeast the entrance to the IND. A short block away is the Fulton Street-Broadway complex of stations which provide access to two additional lines. Platform lengthening resulting in increased capacities has already occurred on the Seventh Avenue IRT. Studies of train capacities of all the lines in Lower Manhattan indicate considerable additional available capacity in the lines on the West Side. It is anticipated that the Center will not overload the subway system.

Pedestrion Circulation: Port Authority planners estimate that a little under one half of its workers and visitors will arrive by the three subway lines (and PATH) directly connected to the below-grade Concourse level; the remainder will arrive from subway stations to the west, crossing Church, Liberty and Vesey Streets to reach the Site.

The pedestrian routes from the east therefore are of critical importance. Question may be raised concerning the adequacy of this access, particularly with regard to the Church Street crossing, which involves a complex two-level drop on one side, and a one level rise to the Concourse on the other. It is difficult to believe that, except in bad weather, this underground route will be extensively used. The easier, more natural route will be to cross Church Street on-grade, and to continue on-grade into the center, across the great open plaza, and from there directly into the office buildings.

This route is not only easier, but it has the virtue of making maximum use of the huge plaza, with its handsome paving, its attractive displays.

The problem with this route, however, is Church Street itself. Heavy pedestrian crossing will pose difficulties for both pedestrians and the anticipated large volumes of vehicular traffic, each slowing the other up considerably. This would become further exacerbated if the World Trade Center

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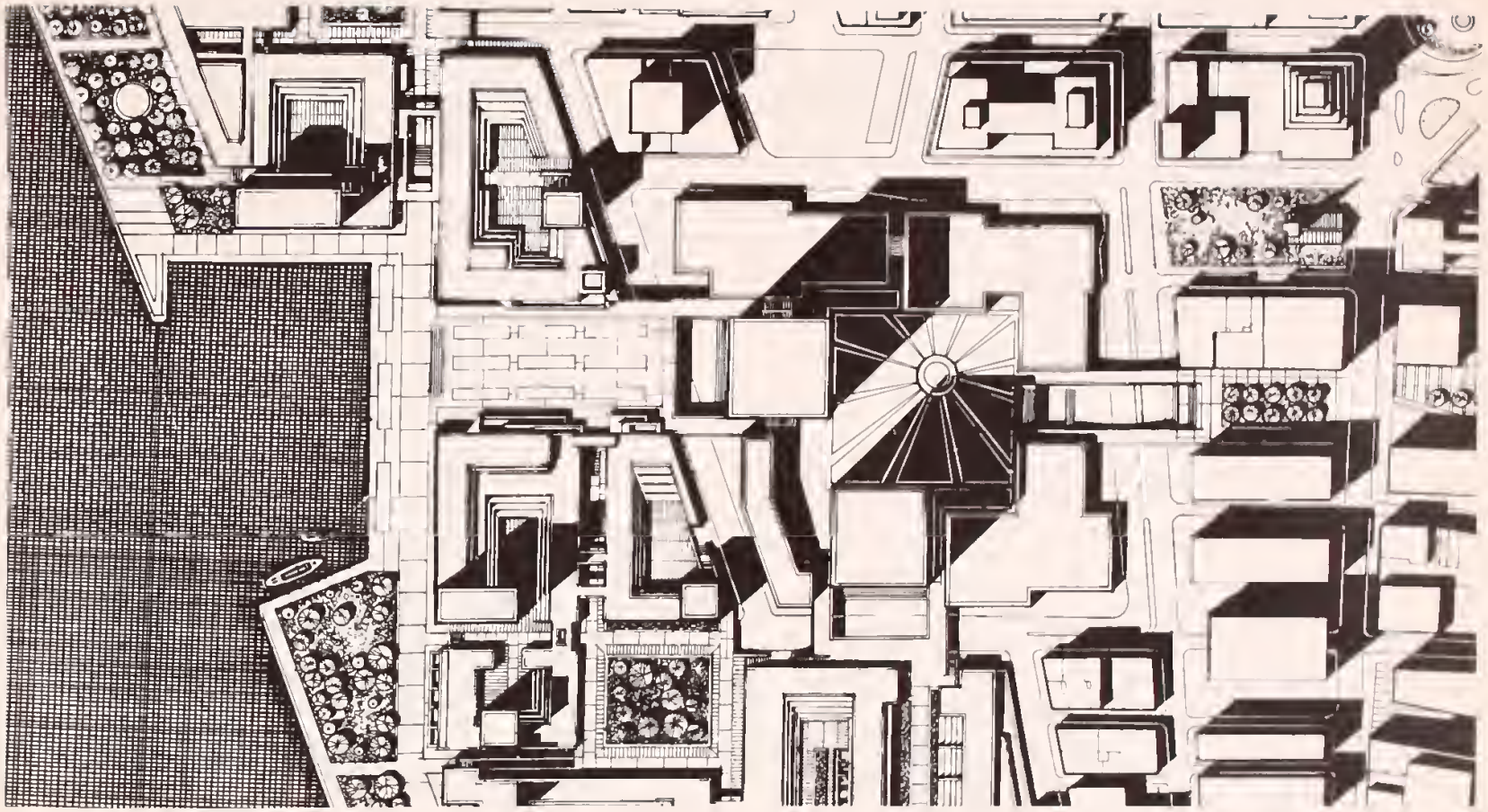
1 Similar massive changes on a smaller scale have been observed in Pittsburgh, Chicago, Baltimore, Philadelphia and many other cities.



Waterfront Development: World Trade Center

0' 200' 1000'

plozo should become port of o pedestrion route from the interior of the island to the woterfront develapment oreo.

For these reasons on overpass ot Church Street, described in more detail among recommendotions should be considered.

Vehicular Circulation: The Center, o significont vehiculor generotor itself, will be odjacent to four major troffic routes: Barclay and Vesey Streets to the north and Liberty Street to the south provide eost-west movement. Church ond West Streets on the eost ond west provide north-south movement.

Mony currently important streets such os Fulton ond Greenwich will be closed to create this lorge commerciol superblock. To compensote for this, peripheral streets ore being doubled in width. The proposed traffic pottern -- o modified traffic-circle -- while not providing the highest quolity of service, oppeors to satisfy adequotely troffic circulation requirements. Off-street parking for 2,000 cors ond 75 to 100 truck berths will help solve the servicing ond parking problems. The Center will be o significont generotor of trucks porticularly to the Customs exomination oreos. Curb cuts ond turnorounds will odequotely provide for buses, cobs ond other temporarily stopped vehicles.

Urban Design: The World Trode Center estoblishes o new scole, both horizontol ond vertical, in the skyline ond streetscope of Lower Monhottan. Its portiol symmetry, lorge poved open plozo, and the horizontol line of its low buildings ogoinst oluminum-clod 110-story towers controst strongly with the older downtown community. The five-ocre ploza will provide o major urbon open spoce ond the lower five-story flonking buildings olmost completely enclosing the plozo will help provide o sense of humon scole ot the pedestrion level.

At first glonce the 110-story towers seem to overpower the skyline, ond architecturol reoctions hove been voiced strongly. Historic exominotion of chonge reveols, however, that this is the old ideo only bigger ond bolder. The Lower Monhotton skyline wos creoted to some extent by corporote egos of the post. These new towers con be considered no more out of scole thon were the Woolworth Building ond Empire Stote Building in their doy.

Perhops the most startling controst is between the squored-off towers ond the spires of most of the older buildings. Buildings of o similor kind ond close to the Center in height ore needed to form o tronsition between it ond the old scole.

Recommendotions

1. Integrotion.

If the World Trode Center is to function os on integrol port of the downtown community, the design of its mony peripheral pedestrian connections should be given further considerotion.

Recent modifications of the relotionship between the towers ond the low-rise units have facilitoted connections to future roised pedestrion levels to the west ond south, the proboble elevotion of these future pedestrion levels hos been estoblished in the optimum site plon (ot +24) ond this elevotion should be token into occount in the further design of the connecting elements.

To the east, however, the problem is more complex, ond more immediote, and here on overposs should be planned as port of the current design.

2. Overposs.

The proposed overpass would require o minimum of vertical movement. Following the line of Dey Street, it would ultimately form o connection between Broodwoy ond the World Trode Center Plaza, which ore roughly ot the some elevotion. In troversing Church Street itself, the overpass would hove to rise some six feet (for cleoronce).

The construction of this overposs would hove severol importont by-products. By moking it eosy for pedestrions to move ocross the plozo, it could enhonce usoge of whot should be on exciting, useful ond busy spoce. The relocotion on the Plozo of o portion of the consumer services now planned exclusively for the below-grade Concourse might

thus also be considered.

This, in turn, may raise the question of whether it is desirable for the Center's elevators to load and unload at the Concourse level. The decision to place the elevator entrances at the Concourse level was based on the assumption that some 80 per cent of the Center's employees and visitors would arrive through the underground Concourse, and only 20 per cent across the plaza.

3. Concourse and Plaza

This assumption, if correct, will mean a virtually empty plaza during the very periods of the day when it should have the most intensive use.

Closer investigation indicates that, with close to 50 per cent of the Center's employees walking on-grade from the east, the 80 per cent figure for the Concourse is probably very high -- even if no direct overpass is constructed at Church Street. With an overpass, however, the distribution might well be nearer 50-50, and this may suggest some rethinking of the relationship of the two major pedestrian levels and the elevators, along with a broader conception of the role of the great plaza itself.

Or it may suggest that, if the Concourse is to be the major pedestrian level of the Center, handling some 130,000 people daily, it should be treated as such: perhaps as a monumental covered space, fifty or sixty feet high, or even higher, in which the functions of the Concourse and the Plaza are combined.

4 Intra-Bus

A further consideration, along these lines, concerns the routing of the low-speed Intra-Bus. The most desirable route would be one which passes directly across the plaza, depositing its passengers at the entrances to the Towers. In the future, it would continue past the Center and onto the waterfront deck beyond. The proposed Church Street overpass (running along Dey Street from Broadway) would facilitate such a route.

A less preferable alternative would be to route the Intra-Bus around the Center, on Vesey and/or Liberty Streets. This would detract from the usefulness of the plaza, and also reinforce the Center's physical "isolation" from the city's fabric.

THE NEW YORK STOCK EXCHANGE SITE

At the present writing the proposal to impose an additional stock transfer tax has upset the plans of the Stock Exchange to locate at the foot of Broad Street. Although alternative choices are available to the Exchange[1], the original plans to which the Exchange may return are analysed here, as they will more or less obtain on many alternate sites.

The Exchange is making a significant expansion move for the third time in its history. The need for more room on its trading floor and the need to introduce more automated equipment require a site area of considerable size for the Exchange to accommodate its growing volumes of business. Its strong physical links to banks and brokerage houses require a site within walking distance of the financial core.

Description of Project

The Exchange proposed to build a trading floor, with office space and adjacent meeting rooms. It would accommodate a projected employment of 3,700, up from its present employment of 2,400. Added to this daily total will be 2,500 tourists, 500 traders and 2,000 business visitors. The adjacent office building to have been built by the Atlas-McGraw Co. would undoubtedly house predominantly member firms of the Exchange, would contain about 5,000 employees in about 1,200,000 square feet of space. Parking for 200 cars and retail facilities are to be provided in a below-grade concourse and garage. The Exchange's investment would be about $ 50,000,000, while the adjacent office building would cost $ 27,000,000.

The proposed Exchange site (of 100,000 square feet) is located about 1,200 feet southeast of its present location in the center of the financial district. The private office building

[1] 20 Broad Street was designed to permit removal of thru floors for expansion of the Exchange.

would occupy a site of 110,000 square feet, just to its south across Broad Street. Four historically significant buildings are to be moved from the sites to the Fraunces Tavern block where they will be restored and, in combination with a rebuilt replica of Stadt Huys, will be the downtown Museum of the City of New York. Together with the tourist attraction of the Exchange, this will be a highly popular place and strengthen the Battery area as a tourist attraction.

Previous Land Use

The site originally contained 3 residential buildings with 9 families and 91 commercial buildings with 250 tenants. These buildings were used for office, manufacturing and warehousing. Marine supplies with other maritime functions predominated. At present the majority of the area is being used temporarily for parking. Historically it has been related to the commerce of the adjacent waterfront.

Analysis and Effect on Lower Manhattan

Real Estate and Future Growth: The decision of the Exchange to move has precipitated a wave of real estate speculator activity in areas heretofore considered "out of the office core". This area, particularly from Whitehall to Maiden Lane between Pearl and South Streets, is being assembled by a few investors, because of the Exchange's move, the sale of City-owned land, the widening of Water Street and expansion needs of the financial district. On the west side, the World Trade Center has not appeared as yet to have precipitated any spectacular activity similar in scope to the Exchange, probably because it is a new concept without the institutionalized linkages of the Exchange to the financial community.

The immediate effect of this move would be to almost double the perimeter of the financial community. However, although its historic compactness will be loosened, it will not be destroyed by this enlarged core. Over time, a gravitation of member firms and other related activity to the now underdeveloped areas around the Exchange, can be anticipated.

Pedestrian Circulation: The Exchange combined with the City Museum will be a significant generator of pedestrian movement. In addition to 3,700 employees, the Exchange expects over 5,000 daily visitors.

To reach existing adjacent subways such as the IRT involves circuitous movement through an area of vehicular-pedestrian conflict because of the vehicular approaches to the Staten Island Ferry. Also there is an absence of pedestrian connections to the Ferry Terminal and the proposed new developments on the waterfront. A solution to this problem must ultimately involve a separation of pedestrian and vehicular movement around the western and southern perimeter of the site.

Probably the most significant pedestrian impact of the relocation of the Exchange will be on Broad Street, which will act with Wall Street as the central pedestrian arteries of the financial community.

Transit: The Exchange is served by the IRT Lexington and Seventh Avenue Lines and the BMT Broadway. These lines make the Exchange relatively well-served by rapid transit. In contrast, however, its former site on Broad and Wall Streets was served by five different lines within a four-minute walk. However the Exchange's employment and new future office development at this site would not present any problem as far as transit riders are concerned.

Traffic: The Exchange and the adjacent office building are following the current downtown pattern of the street closing, development of superblocks and the widening of peripheral streets. Local traffic circulation in the area is complicated by the access streets to the elevated F.D.R. Drive. The completion of the widening of Water Street should considerably improve circulation. In addition, South Street and Coenties Slip will be widened to increase street capacity in the immediate area. Because of the alignment of the F.D.R. Drive, Broad Street is the major entrance to the financial district from the north, while Coenties Slip provides access to the Battery Park Underpass.

Local traffic circulation in the area will be improved by these changes and will be adequate for the Exchange development. However, the access to the F.D.R. Drive will continue to be a problem, because of the awkward alignment,

and increasing traffic volumes will further complicate access to the Drive and perhaps overall circulation in the area. Further consideration of this is given in Part 2 of the Report.

Urban Design: The Exchange's location adjacent to the waterfront and the Bay will afford it a significant place in the downtown foreground. Its proposed massing in the latest scheme is an appropriate symbol of its importance.

Immediate Recommendations

1. The Water Street widening should be completed, extending to Whitehall Street.

2. Future pedestrian connections to the waterfront should be planned for by extension of the proposed plazas across South Street.

3. Broad Street should be considered (for the future) as a pedestrian street to facilitate movement to the Exchange. The long-range proposal to relocate and redesign F.D.R. Drive below-grade will release this street for exclusive pedestrian movement.

4. Pedestrian connections to the Staten Island Ferry area and subways should be improved. The proposed raised plaza along Whitehall Street suggests the possibility of a pedestrian overpass or an underpass from its below-grade concourse level.

5. If the New York Stock Exchange does not locate on this site consideration should be given to including it, along with its waterfront, as part of the East Side Urban Renewal Area.

BROOKLYN BRIDGE SOUTHWEST

This federally-assisted 27 acre urban renewal project administered by the Housing and Redevelopment Board will provide for the expansion of two important institutions - Pace College and Beekman-Downtown Hospital. In addition it will introduce a middle-income residential population into Lower Manhattan south of the Brooklyn Bridge providing housing within walking distance of the Core , the Civic Center, and the World Trade Center.

Description of the Project

The apartment development will contain 1,650 units (5 percent three bedroom, 33 percent two bedroom, 50 percent one bedroom and 12 percent efficiency apartments). A parking garage for 600 cars will permit 40 per cent of the tenants the possibility of parking their cars. Commercial buildings will provide about 200,000 square feet of retail shopping space while an additional office building is planned for 400,000 square feet of space. The apartments will occupy seven acres while commercial uses occupy four acres.

Pace College will build a new campus to provide for 10,000 students (a doubling of its enrollment) a new graduate school with 1,500 students, a library, a 600 seat theater, a gymnasium with 2,200 seats, computer and communications centers, a dormitory for 600 students, 60 new classrooms and a cafeteria and administrative space.

Beekman Downtown Hospital will expand from 200 to 300 beds with the possibility of adding 200 beds at a later date including facilities for 300 ambulatory patients per day. One third of its patients are from downtown (mostly emergency cases with many from Chinatown). Twenty five percent are welfare cases. A longer-range plan includes a separate building for long-term care. Together all these uses occupy four acres.

The four 30-story residential towers with connecting six and seven story lower units are interconnected by an elevated plaza. Underneath this plaza are two levels of parking. The open areas, some of them planted, provide the necessary recreational and community facilities in a relatively quiet and isolated area two levels above the street. The long six to seven story buildings provide an intermediate scale between the towers and the low rental structures.

Pace College is developing its long narrow site into a multi-level college and campus. The first three to five stories of this sharply sloping site (three stories at Park Row and five at Gold Street) will be developed into academic facilities with the "campus" on the roof, while a 23 story tower near Gold Street will accommodate administrative and faculty offices

with the student dormitory.

Beekman Haspital will expand its existing buildings by adding a wing to the east, extending each flaar af the existing building.

Existing Land Use

The site naw contains 11 blocks on which are 171 cammercial and industrial buildings. 143 are deteriorating. Over 700 businesses are being relacated including 15 individuals (mostly artists) living in warehouses in the area. The area cantained a mixture of uses including affices on Park Row, the "swamp" (an historic leather wholesaling area) printers and other manufacturing including some automotive uses. Thus the trend toward the decline of gaads-handling activity fram below Chambers Street is being accelerated by this project. It alsa was the place of arigin of "pop" art in America.

Total public investment in land acquisition, administration and relocation is expected to be $22 million. Total resale value of the site averages about $25 per square foot. The City contribution, after land writedown and sale, will be abaut $ 3 millian. The sponsors will pay $ 5.5 million for land. The residential developer, Pace College and Beekman Haspital will invest about $50,000,000 on the site.

Analysis and Effect on Lower Manhattan

Real Estate and Future Growth: Brooklyn Bridge Sauthwest is in a polyglat neighbarhood unusual far a housing praject. Ta the south, across a half black of non-descript commercial structures, it faces the insurance district. Ta the east across a widened Water Street is the Fulton Fish Market, and to the west is Pace College and Beekman Haspital. To the narth af the Braaklyn Bridge are public and middle income hausing projects.

While the lacation is not naw prepossessing, it is a dynamic one quite different fram the hamogeneaus residential surraundings af other housing. Because of the solid wall af the Braaklyn Bridge, the project stands somewhat isolated in the midst of a dense business and industrial area. It will have to provide many af its awn supporting retail and recreational facilities. Its expected papulatian of 4 ta 5,000 persons and high proportion af dawntawn workers and few children. Here will be the first bridgehead af housing in Lawer Manhattan and it will provide a test far the concept of housing-affice intermixture. It will serve as the starting paint of additional middle-incame hausing in Lawer Manhattan.

Pace College's ambitiaus $16,000,000 expansian will pravide more cultural and educational appartunities to the downtawn business community through its educational programs and new theatre-library-auditorium facilities. The diversification of Lower Manhattan's predominant use -- business -- will be furthered by this develapment. The area to the Sauth af the new campus along Nassau Street toward the "soft" area around Fulton Street can be cansidered an "expansian" area for this prime growth industry, educatian. The College realizes that it may outgraw its projected facilities in a few years and will have to purchase buildings to its sauth. The school has been able to fill classrooms as fast as they can be made available.

Beekman Haspital will expand its services for the residential community and its City clientele south of Canal Street was well as the business area to the south. About 75 percent of its cases come from this area.

Transit: The institutianal and residential sites are well served by subway. Within a five minute walk are all the subway lines in the City located in the Fultan Street complex. Any additianal laad on the transit system should be predaminantly in the reverse direction fram the daily heavy incoming movement.

At present buses run an Water Street and Park Raw. The possibility has been discussed of extending an existing line down Madison Street, under the Bridge to Gold and Fulton. This could pravide an additional connection to the residential areas ta the North.

Pedestrian Circulatian: If the experience from Chatham Green Hauses holds true here, over 50 percent of BBSW residents who wark will be emplayed in Lower Manhattan. An even higher percentage of walk-to-work employees can reasonably be expected here because it is much closer to the financial Core. The experience of people who actually

walk-to-wark and the distances invalved will provide a real clue ta the effectiveness of such a policy.

Pedestrion access ta the south will be simplest, while access to the Narth is impeded by the Bridge and its access ramps. Access to the Civic Center, in spite of an existing underpass and a proposed averpass (at Park Raw), will be difficult. The site slapes 20 feet fram Park Row to Water and it would have been passible ta provide continuous level pedestrian access within the site.

Fulton Street to the sauth af the residential block is to become an important pedestrian street with service access in the over-oll circulotion system develaped for Lower Manhattan. Both Pace College and the housing have been developed as "islands" and their pedestrian areas will be above and separated from street level.

Traffic Circulation: Peripheral streets, including Gold, Frankfort, and Fultan will have their rights-of-way widened. Traffic circulation in the area should be impraved and off-street parking and laading will improve the curbside situation. The continuation of Madison Street -- Gold Street into this area will provide an additional entrance to the financial district and serve principolly as a cannector street with the residential areas ta the Narth.

Immediate Recammendations

1. The widened right-af-way of Fulton Street should be designed in conformity with the recommended use of Fulton Street as a pedestrion-service street.

2. A future pedestrian connection to the area ta the east (future housing) should be designed so that these hausing areas can be cannected by a walkway system. This may be an at-grade solutian, or if it proves feasible an overpass over Water Street.

WASHINGTON STREET URBAN RENEWAL AREA

The history of this project goes back seven years, involves a large number of groups, interests and changing market conditions, and reflects all the complexities and problems of New York's industrial development.

Description

The gross land of the renewal area is 38 acres, the net land 23 acres. It is now owned by the City, and its present users -- the produce market -- are in the process of leaving for the new Hunt's Point Market in the Bronx. In six years of effort the city has not yet found a suitable sponsor for the site's redevelopment, and the prospect looms for the site to become a stretch of deserted land along West Street for some years to come. It would thus join the Flatlands Industrial Park in Brooklyn, a similar development area taken over by the City for which no suitable use has yet been found.

The total cost of acquisition, demolition, management, and site preparation, will come to around $ 44 million. The City will pay a third and the Federal Government two thirds of this $ 44 million less whatever the eventual resale value of the land is. This comes to a little under $ 44 a square foot cost of the land available for redevelopment.

The original plan called for a combination of offices in the southern half of the site and warehouse-loft space in the northern half. However, the first sponsor had difficulty obtaining rentals which would cover his costs, and he withdrew in 1962. Subsequently, the land-use designation was changed to exclude office space.

In the next few years the potential for industrial loft and warehousing in the area was investigated by several developers who after exhaustive surveys decided against going ahead. Few industries in Manhattan were able to afford the high costs of new space and they were expanding very little. Other industries were either contracting, or uninterested in high land costs. Furthermore, a good deal of modern loft space, renting well below the probable rentals of this project, was vacant elsewhere. This made the prospects of successful development here even more discouraging.

In 1965 several new proposals were made, all of a different character from the previous. One developer sought to use the area for a one and two-story warehousing-distribution center. But this low-density coverage meant a high tax write-down to which the City was legally unable to commit itself. The City was very reluctant to go ahead with a development which would bring so little return to the City -- in jobs and taxes -- after such a heavy investment on its part.

Two other developers proposed residential usage -- one in combination with commercial on the first few floors, the other without any commercial. According to the official designation of the site, the Housing and Redevelopment Board could not actually consider either of these proposals without further policy decisions by the City.

Immediate Policy

In these circumstances, the initial response of the Study has been to caution against hasty action -- particularly with regard to the low-density warehousing proposal. The area is changing rapidly, and within a year or two several major projects will substantially alter the complexion of the neighborhood. Among these are the World Trade Center, the Civic Center, the development of an acceptable plan for the Lower Manhattan Expressway, and the adoption by the City of a plan for redevelopment of the downtown Hudson waterfront.

Most of these plans are, of course, individually known to the general public. However, their cumulative impact may not be easily apparent today, since many of them are still on the drawing boards or clouded by uncertainty. As definitive decisions are reached, new possibilities will open up. Clearly in the long run the City will gain more in three or four years than the minimal return possible today.

Long-Range Policy

Nevertheless, the question still remains: is there now, or is there likely to be in the future, a demand for loft space in Manhattan renting for $ 3 or $ 5 a square foot? The answer seems to be no.

There may, however, be other possibilities and it is desirable to rethink the basic assumptions of the project. In the first place, the area need not be thought of in terms of a single use. It falls into one piece only because it was originally laid out to serve the piers that supplied the fruit and vegetable markets directly across West Street. However in terms of current linkages, it breaks up into three areas, each related to neighboring predominant uses: the World Trade Center (office) at the south end, warehousing or printing at the north end and butter-eggs-cheese in the middle. It is in this middle area on either side of Chambers Street that may prove to be the key to the entire development.

Secondly, it may be useful to remove any preconception concerning usage, abandon the original industrial-commercial assumption altogether, and start over.

The City has on its hands 31 acres of land, near the waterfront, within walking distance of three subway lines, the Civic Center, the World Trade Center, and ten minutes from the heart of the financial district.

What function might take maximum advantage of such a site, with a high priority in the City's overall scheme of things? The concept would be to use a public function, if appropriate, as a part of a strategy to set the stage for waterfront development and ultimate renewal of the northwest itself.

Probably no single topic of recent municipal policy has occupied as much attention as education -- both because of the new importance of educational institutions in an increasing technical-professional society, and because of the particular significance of education in providing full opportunities for the city's disadvantaged minorities.

The use of this excellent site for educational purposes therefore deserves serious consideration. [1]

Educational institutions throughout the country are expanding at a very fast rate and are a "growth industry"; indeed, the general trend is for colleges and universities to outpace their own expansion plans. This is true in New York as well, where the City universities, public and private, have been expanding into a host of old buildings at various distances from any central campus.

Overall City policy may indicate that current investment should be put elsewhere -- in Harlem perhaps as a device for improving the environment in investment possibilities there. Without taking a position on such a policy, it should be noted that Lower Manhattan represents a great opportunity to have integration in both schools and housing because the area has no residents now, and requires no relocation to create sites.

The proposal is to set aside the central portion of the Washington Market site as an educational reserve -- for institutions now seeking space, for joint facilities of several institutions, or for an entire campus if that seems possible.

The area involved is some 25 acres; three times as much space can become available when waterfront development occurs. The opportunities for expansion are clearly very good. The area calls for a user with strong growth tendencies; education obviously falls into this category. The idea need not be limited to, or even be essentially higher education. It could also be a site for university-related private research organizations, and data processing centers.

Education could provide that focus for residential development in the area which all current proposals lack, a focus essential in an area as isolated as this one is now. The nearest existing residential development is nearly a half mile away. It seems doubtful that an isolated stand of new housing, in the midst of a goods-handling neighborhood, could be successful, nor would it be good policy to try it. There are other locations downtown which are far preferable for housing now -- particularly on the East Side, adjacent to Brooklyn Bridge Southwest or on new filled land past South Street.

A proposal for residential development in this site should be part of a larger plan for the West Side -- including offshore development. An educational park would appear to be an appropriate part of such a plan.

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[1] At this writing, the Board of Education is proposing a study of such a possibility.

Development of Duone Street Pork

While not port of the Woshington Morket Renewol Areo, one of the few fine urbon spoces in the northern port of the Study oreo is Duone Street Pork. It is o smoll triongle formed ot the intersection of Duone ond Hudson Streets, bounded by o smoll office building ond 4-5 story loft buildings housing butter-cheese-eggs merchonts. Further study of the morket could include it os on odjocent oreo.

With the development neorby of institutionol uses in the Woshington Street Morket Urbon Renewol Areo, ond with the eventuol phosing out of the butter-cheese-eggs businesses, this Pork might become the nucleous of o smoll residentiol-student-foculty enclove. Some of the neighboring buildings might be rehobilitoted ond converted to new uses: for restouronts, studios, clubs, smoll oportments. The triongulor spoce itself will relote ot the western side to o woterfront plozo, ond connect to the educotionol use proposed for the centrol portion of the Woshington Street Morket Urbon Renewol Areo.

Lond costs in the oreo ore now probobly too high to justify extensive low-density redevelopment. However, if educotionol functions develop to the west, the expectotion is thot o high-density residentiol growth moy in time be expected to follow here. This high-density development moy thus, in effect, moke possible the development of the Duone Street Pork os o project, whose volue lies in the preservotion of the scole ond chorocter of the old, low-density structures which now surround it.

By odding to the volue of the neighboring development, giving distinction to the oreo for which it serves os the nucleous, the preservotion of Duone Street Pork could eosily be justified os o speciol rehobilitotion project.

Immediote Recommendotions

1. Concur in ond urge the corrying out of the study of the Centrol portion of the Woshington Street Morket Urbon Renewol Areo os on educotionol complex. Conceive of it os reloted to the woterfront residentiol development.

2. Promote development of the northern end of the project for use by the grophic orts industry or for reseorch ond development reloted to the educotionol use.

3. Reserve the southern portion of the project oreo for future intensive office use reloted to the World Trode Center. An interior use is of course porking ond os o construction moteriol site.

4. Include o study of the preservotion ond development of the Duone Street Pork os on extension of the renewol project.

THE CIVIC CENTER

The purpose of the Civic Center Project is to consolidote City ond Federol ogencies now in scottered locotions principolly in Lower Monhotton. The result is expected to increose the efficiency ond operotion of these sectors of government ond to provide o more suitoble ond functionol working environment thon they now hove. The Center will olso be o tongible symbol of the City's pre eminence os o greot world metropolis. An important considerotion is the money now expended onnuolly on rentols for City ogencies in privote buildings. At this writing the City odministrotion is reviewing oll the progrom ond physicol plonning of this Project.

The principol elements of the proposed Civic Center ore:

The Federol Office Building ond Customs Court: (including o proposed extension) 1,750,000 squore feet of office spoce contoining 11,000 employees, ond o 300 cor goroge;

The Municipol Office Tower: 900,000 squore feet of office spoce contoining 8-9,000 employees, 150,000 squore feet of retoil spoce ond o 500 cor goroge;

Police Heodquorters: 670,000 squore feet contoining 2,500 employees, ond o 200 cor goroge;

Family Court Building: 270,000 square feet of space containing 920 employees.

Description of the Project

The City area of the Civic Center was designated in preliminary drawings by Edward Durell Stone and Eggers and Higgins, Associated Architects. This plan, a further refinement of a former diagram called the ABC plan, combined the Executive Office Building and the Municipal Building into a single 54 story tower on axis with City Hall between Chambers and Duane Streets. A paved pedestrian plaza from the rear of City Hall to Duane Street was proposed. This would have removed all the trees in historic City Hall Park and changed its character from an earth park to pavement. At Duane Street because of topography the plaza would be 13' above grade, while at Chambers Street it would be at present grade.

The square tower 160 feet on a side would be set on a plaza 450 by 650 feet. The tower was moved south from an earlier location away from the Federal Office Building (FOB) and was placed close to the Hall of Records. It was then recommended that this latter building (recently designated as a landmark by the Historic Buildings Commissian) be demolished, along with 2 Lafayette Street (an office building) and that the plaza and parking be extended east to Centre Street. Underneath this plaza was to be located a concourse which would contain City offices serving the public, 150,000 square feet of retail space and 200,000 square feet of circulation area. This concourse would also serve as indoor connection to the three subways that immediately serve the area as well as City Hall.

A rectangular reflecting pool would occupy a good part of the depressed area and provide an attractive setting for restaurants, etc. At Duane Street the concourse would be at street level while at about Chambers Street it would be completely below grade. Beneath this pedestrian concourse was to be a parking garage for 500 City-owned cars, and loading space for 12 trucks for the retail and office space.

The plaza itself would be planted with trees (in boxes) and paving and would become one of the largest urban open spaces in the City. It would be a monumental setting for the Civic Building.

The Federal Office Building and Customs Court (under construction) between Duane and Worth Streets creates its own plaza level a few feet above Duane Street but almost a full level below the plaza af the Civic Center. Entrance to the FOB and the Civic Centers' underground parking and service was planned to be off Duane Street and is the most satisfactory location for service if thru-traffic is eliminated.

Because of serious mid-block pedestrian conflict at Duane and Chambers Streets, a carefully designed loop road and ramp system was developed as part of this Study with the architects for both building complexes and the Department of Public Works. This consisted of a set of ramps in the middle of Duane Street peeling off left and right to underground areas. Around these ramps is to be a loop raad at grade for drop-offs and taxis. This loap stapped short of the location of the mid-block pedestrian movement. The present FOB ramp on Duane Street (already built) is designed so it can be depressed to meet the new grade of the access ramp in Duane Street.

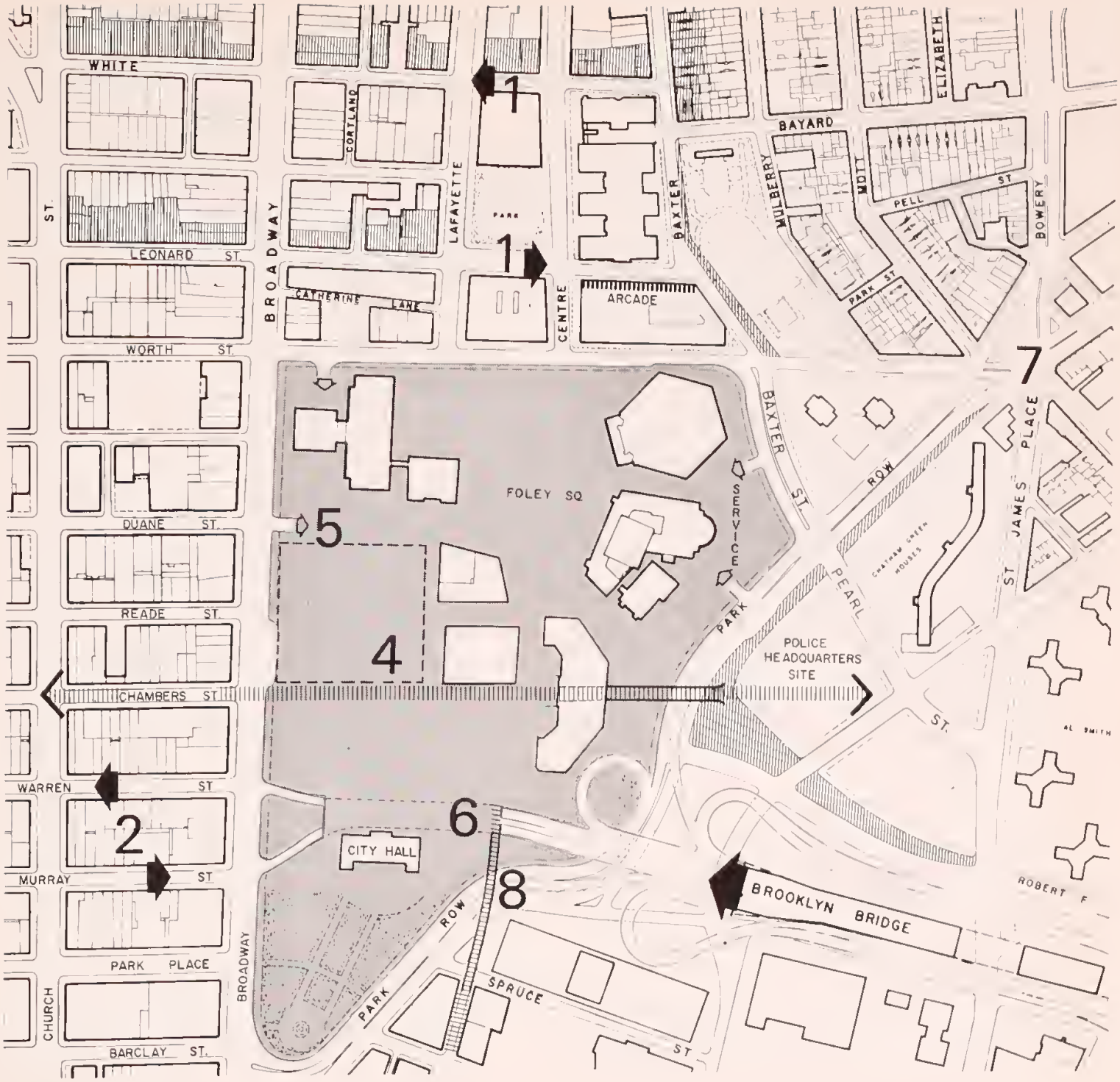
Previous Land Use

The Federal site contained a mixture of affice buildings along Broadway with some manufacturing and loft buildings on Centre and Thomas Streets. These contained about 180,000 square feet gross of office and 640,000 of loft type space.

The Civic Center site, still occupied, contains a similar mixture, with office functions predominating. Businesses in the area consist of law and other service functions, retail shops, printing firms, manufacturing wholesalers and business sales and service.

Analysis and Effect on Lower Manhattan

Real Estate Activity and Growth: These are already indications of a resurge of real estate activity in the immediate vicinity of the Civic Center particularly along Broadway. Some buildings have been renovated. A previously high



Civic Center: Problems and Proposals

0' 100' 500' 1000'

1. WHITE-LEONARD COUPLE
2. WARREN-MURRAY COUPLE
3. POLICE HEADQUARTERS SITE
4. MUNICIPAL TOWER SITE
5. DUANE ST. SERVICE COMPLEX
6. CITY HALL UNDERPASS
7. CHATHAM SQUARE ALTERATIONS
8. NASSAU ST. OVERPASS

vacancy rate showed signs of dropping by 1965. This was undoubtedly due in part to relocated occupants of the Federal and City building site areas. Concentration of approximately 15,000 additional employees on these sites will also have a positive effect on adjacent business and personnel services. The related private activities that service and receive business from government will concentrate and expand to the west across Broadway and toward the World Trade Center as the area to the north is preempted by Courts, and by the textile center. Thus the natural functional expansion area of office related activities to the Civic Center will be to the west while the courts are expanding to the north.

Substantial increases in government employment and related services has occurred over the past five years and is, together with finance, the major growth sector of the Lower Manhattan economy.

Transit: The Civic Center is directly served by the BMT, Jamaica, IRT Lexington Avenue and the BMT Broadway subway systems. Located further west on the Chambers Street axis of subway stations are the IND and IRT 7th Avenue, about a five minute walk. Additional employment in the area, (actually a redistribution within Lower Manhattan) should be adequately accommodated by this major concentration of subways, along with bus routes that also serve it, particularly from the Lower East Side.

Pedestrian Traffic: One of the important concepts adopted from the ABC plan for the Civic Center was a traffic-free pedestrian "superblock". This would stretch from Worth to Barclay Streets and Broadway to Park Row in a triangle with a base of 1,300 feet and a north-south dimension of 1,800 feet, certainly the largest "superblock" in the City. Within this area separate City buildings would be more effectively related if vehicular traffic were excluded. An additional 7 acres of open plaza and park land would be added to the present.

However this "superblock" did not encompass the area to the north of Worth Street where a substantial number of government employees work. In fact it proposed to re-route traffic from the area to Leonard and White Streets to the north. Detailed analysis of existing peak hour pedestrian movement showed the importance of Duane and Chambers Streets through the area as not only traffic but major pedestrian routes to the subway stations. In addition Centre Street carries pedestrians to the subway entrances in Foley Square across a very complicated traffic pattern.

Projections of these pedestrian movements were made to show conditions after the Civic Center and Federal Office Building are in place. They demonstrated the importance of a mid-block, north-south crossing of Duane Street especially between the FOB and the Civic Center concourse with its retail shops and connections to the subway. It was decided that an effective connection should and could be worked out between the pedestrian levels of the FOB and the Civic Center at Duane Street.

Vehicular Traffic: Initial examination of the vehicular traffic problem in the Civic Center area indicated a far higher traffic volume than had been anticipated in 1962 by the ABC plan. In particular, question was raised concerning the routing of traffic around the northern end of the new pedestrian island, both from operational and land use points of view. It had been assumed that a widened Worth Street, plus one additional street to the north (probably Leonard) could handle the increased volumes caused by the closing of Chambers, Reade, Duane, Lafayette and Centre Streets ; closer examination showed that this solution would require the widening not only of Worth Street, but of both Leonard and White Streets to the north, entailing substantial demolition and relocation of existing functions and displacement of important blue-collar jobs in the textile area.

Alternative solutions were therefore sought out. In the process five alternative plans were developed and evaluated. Criteria for judgement included directness and speed of traffic movement, service access to Civic Center buildings, ease and freedom of pedestrian movement, cost to the City, and impact on neighboring properties.

An electronic computer network was used, which is described in detail in Part 2 of this Report. This technique made it possible to quickly test each of many alternatives, assigning different traffic volumes to the street system (as they would occur during various construction stages), including traffic

Generated by new developments. The Lower Manhattan Expressway wos assumed in, under construction, or not in, as three alternate conditions. The volumes ond turning movements resulting from the initiol assignments were carefully checked against octuol traffic counts to ensure moximum accuracy. Certain minor errors in assumptions were thereby corrected. The period for which the network was built was the morning peak hour, 8:00 to 9:00 AM.

The network onolysis indicated thot traffic volumes moving around the northern end of the Civic Center pedestrian superblock will require 7 to 8 moving lanes, assuming thot the Lower Manhotton Expressway was completed by the time the streets are closed. These lanes could clearly not be occommodated on Worth Street, even ofter widening. Therefore, four alternative solutions were explored.

Alternative I: A Leonard-Worth Couple plus White Street.

This proposal, a variation of the original ABC plan, called for the widening of the following streets: Worth, Leonard, White and Baxter (including the toking of a slice from Columbus Park).

The widening of Leonord ond White Streets would require the acquisition and demolition of buildings now housing about 400 firms and close to 2,000 employees. It would cost about $ 12,000,000 (exclusive of relocation costs).

This routing would solve the bosic east-west traffic problems created by the new pedestrian island, but its long, circuitous path makes it an awkward and inflexible solution. The heavy volumes of traffic on all sides of the Civic Center superblock make internal servicing off these streets very difficult. Pedestrian movement would be quite hozordous.

The required demolitions and relocations along Leonard and White Streets, cutting through the heart of the textile district, would leave a wide scor of excess property taking, unsightly rears of buildings exposed to view, ond dislocate many businesses in an already shaky area.

Alternative II: A Duane-Worth Couple.

This proposal is a modified version of a plan worked out by the Department of Traffic.

But instead of a two-way system, it is only west bound, thereby making possible a sotisfactory pedestrion solution between the FOB and the Municipal Tower.

The Duane-Worth Couple would reduce pressure on Leonard Street, but not eliminate the need for its widening, with the necessary demolition, relocotions, etc. However, it would make unnecessary the widening of White Street.

It would result in a portial interruption (at the south end of Foley Squore) of the pedestrian island and on extremely cumbersome design of the intersection of Broodway and Duane Street, where the olready-complex service-toxi ramps and the new high-speed underpass must be brought together. As previous investigotions emphosized, this areo lying between two buildings with roughly 20,000 workers, is an extremely criticol one where intensity of pedestrian movement is expected to be (in fact already is) far greater than onywhere else in the Civic Center.

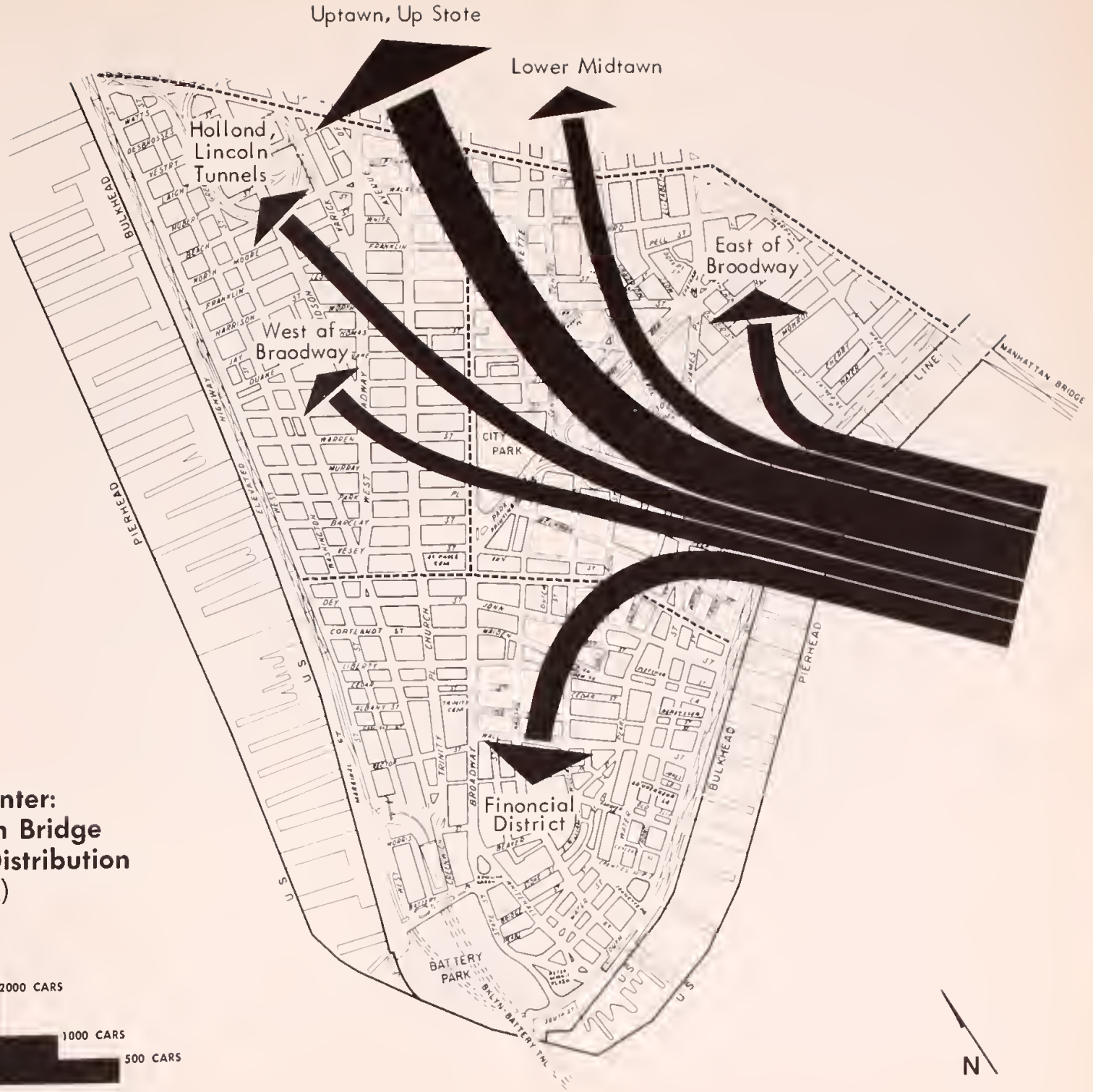
Traffic service for Alternotive II is slightly better than for Alternative I, but the advantage of the direct connection to Broodway is offset in port by the complexity ond tightness of the resulting design. Redevelopment of o traffic-free Foley Square is mode extremely difficult if Duane is a through street.

The high romp coming off the Brooklyn Bridge, clearing Pork Row, makes virtually impossible a direct pedestrian connection from the Municipal Building to the new Police Headquorters. This connection would therefore have to cross Park Row at the rear of the Federal Court House, a less desirable solution.

Costs for this alternotive were estimated at $ 8,000,000.

Alternative III: A Chambers-Worth Couple

This proposal is similar, in many respects, to the Duane-Worth alternative described above: it requires the widening of Leonard and Baxter Streets but not White Street, and it breaks sharply through the pedestrian islond, this time at the Municipal Building itself.



Civic Center: Brooklyn Bridge Traffic Distribution (8-9 AM)

Legend:

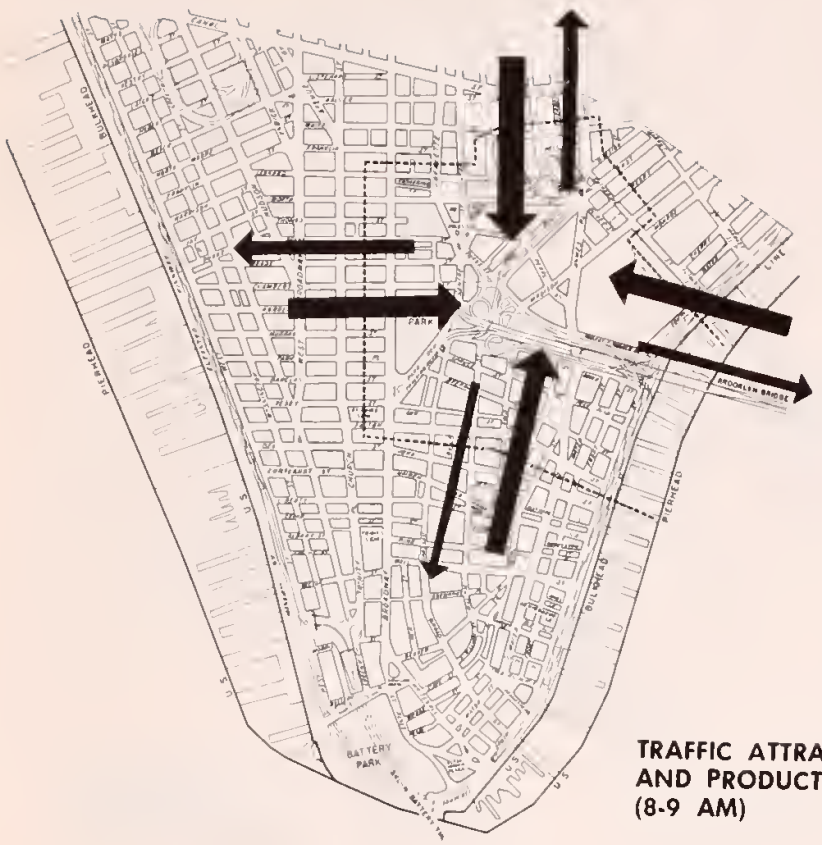
2000 CARS

1000 CARS

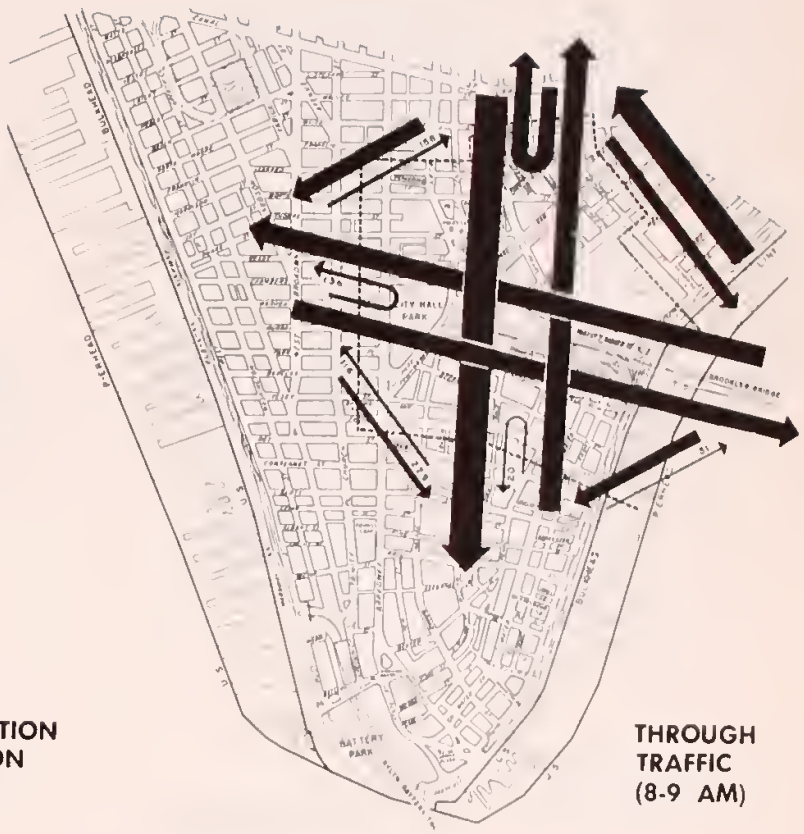
500 CARS

Source:

AMV TRAFFIC COUNTS
DEPT. OF TRAFFIC



TRAFFIC ATTRACTION
AND PRODUCTION
(8-9 AM)



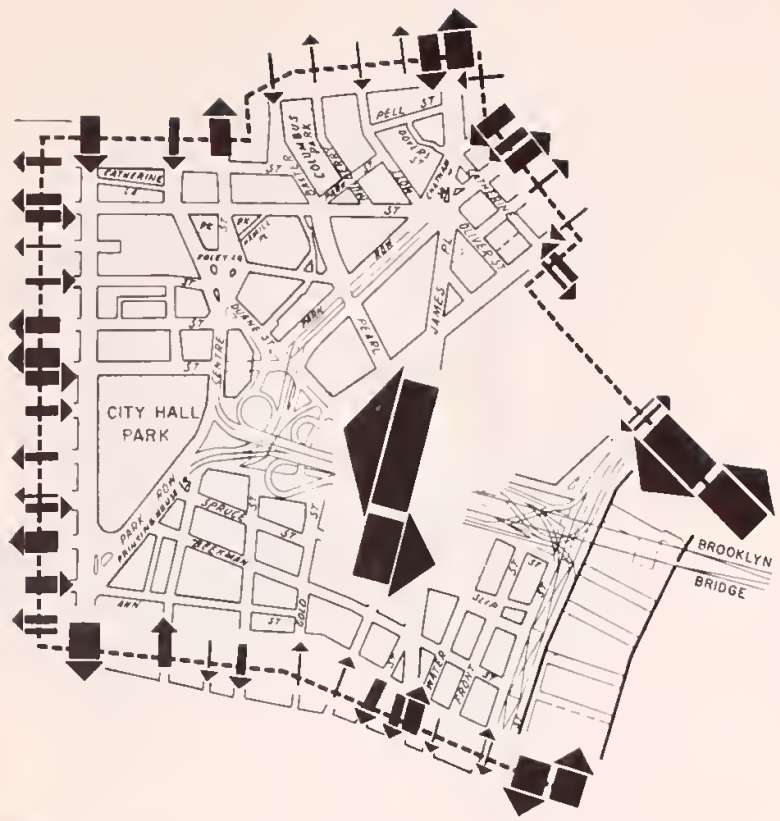
THROUGH
TRAFFIC
(8-9 AM)

Civic Center:
(Network Area)

Legend:

Source:

AMV TRAFFIC COUNTS
DEPT. OF TRAFFIC



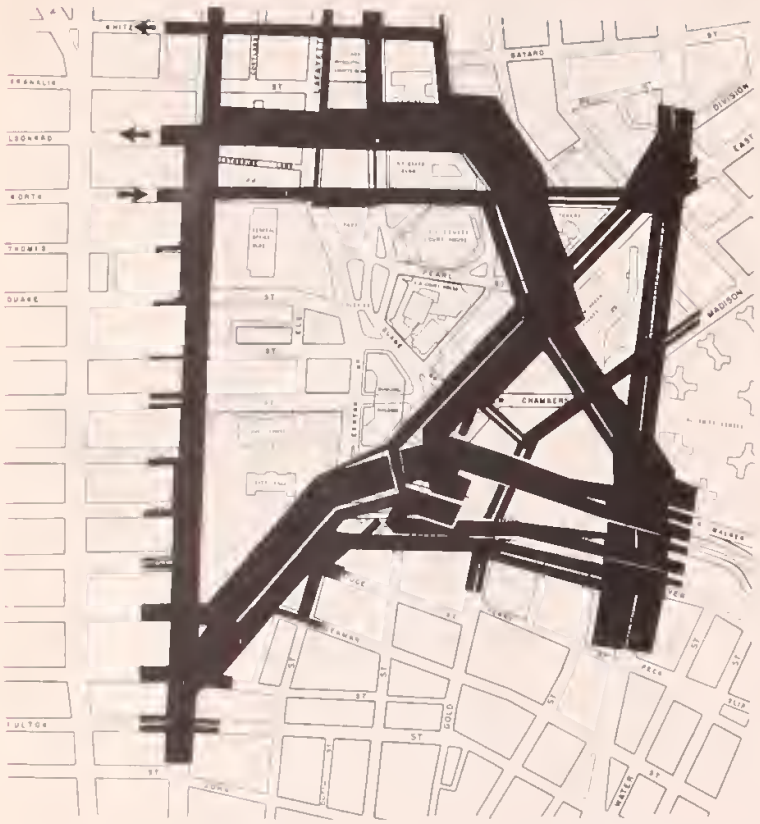
CORDON COUNTS
(8-9 AM)

PRESENT TRAFFIC
VOLUME ASSIGNMENTS
(8-9 AM)

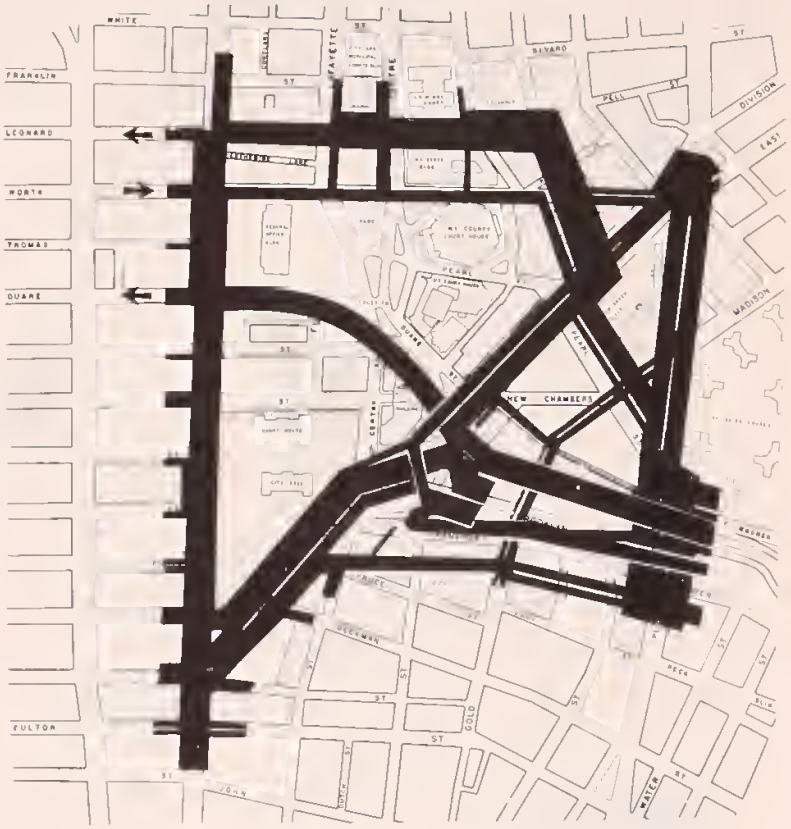
Civic Center:
(Network Area)

Source:

AMV TRAFFIC COUNTS
DEPT. OF TRAFFIC



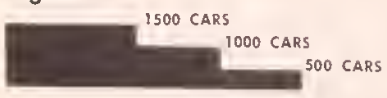
WORTH-LEONARD-WHITE



WORTH-DUANE-LEONARD

Civic Center: Traffic Volume Assignments (8-9 AM)

Legend:



Source:

COMPUTER NETWORK ANALYSIS

WORTH-CHAMBERS-LEONARD

CHAMBERS-WARREN

Redevelopment of the forecourt af the Municipol Building, o potentially valuable space, would not be possible, but Foley Squore would be left free for redesign.

This scheme had one advantage over the Duone-Warth salution: it seporated Brooklyn Bridge traffic fram lacol service ta the new federal-municipol complex at Duone Street. Like Alternative IV below, it required a reconsideratian af the design af the concaurse level of the Municipol Tawer.

Its cast was estimated at abaut $ 8,500,000.

Alternotive IV: A Chombers-Worren Underposs.

This solution, an undergraund connection directly across City Holl Pork, provides the highest level af averall service, disperses traffic effectively, retains the pedestrian islond, and eliminates altogether the need far lond ocquisition and relocotion north of the Civic Center island. Chombers and Warren Streets align directly with the existing ramp entrances ta the West Side Highwoy, and would provide relief ta the Barclay-Vesey-Broodway intersection, os well as better access to the Warld Trade Center area. A significant land use advantage is that it allaws a substantial enlargement af the Police Heodquorters site. In on oreo where land is volued at least ot $30 per square feet this is no small saving. Vehicular access ta these sites will olsa be impraved.

A direct pedestrian an-grade cannection fram the City Hall Park to the Broaklyn Bridge walkwoy can eosily be constructed. A pedestrian route thraugh the center af the Municipal Building at Chombers Street ta the new Police Headquarters can be developed in place af a mare remote ane suggested acrass Pork Raw further narth. This pedestrian averpass design wauld be coardinated with the design of the Park Raw aff-ramp fram the Braaklyn Bridge. If passible pedestrions should be kept at ar near grade. If an abave-grade salution is necessary, majar pedestrion entrance ta Palice Headquarters should be that level.

Worth Street would be widened, as planned, ond serve as a twa-way street for east-west traffic narth of the Center. Since volumes on Warth are now such that it can operate as a two-way street, there would be na need ta widen Leonard or White Streets, ar cut o strip from heavily-utilized Calumbus Park. The resulting lower valumes an Warth Street, Pork Raw, and Baxter Street will eose service access from these streets to Civic Center buildings, including the new Police Headquarters (a major traffic generatar itself).

This solution, and Alternative V, ore the anly anes which adequately solve the vehicular traffic prablem creoted by the pedestrian superblock.

Preliminary study of the Worren underpass indicates that it can be so aligned os ta preserve same of the larger trees in the rear and ta the west of City Hall. The descent fram the Bridge will require modificotians af the City Holl IRT Stotion, relocating one entrance and one (no longer needed) crosswalk, but in no way interfering with the headroom of the trains or the station platforms.

This salutian has two defects. In common with alternative V below, it requires twa exits ot Broadwoy, acting as borriers ta free flow af pedestrions.

The secand defect is thot Chambers Street is olready o mojar pedestrion raute from the subway entrances ta the Civic Center. Its use as o mojor orteriol wauld be in conflict with pedestrian flaws. While the passibility exists of treating Reade Street to its north os the pedestrion raute, Chambers will undaubtedly remoin the major pedestrian thorafore.

The estimated cost af this Alternative is $ 5,000,000.

Alternative V: A Warren-Murray Cauple.

This salution is similar ta the Chambers-Warren Couple, except that the Chambers underpass is shifted ane black to the south ta Murray Street. It hos several advontages and disadvantages in relation ta the Chambers-Warren solution.

One advantage is thot it is slightly cheoper ta construct, since for o large partion of the raute, only one trench ond one set af retaining walls need ta be dug. Furthermore, it cancentrotes the damoge ta City Hall Pork within ane oreo,

thereby reducing the scope of refurnishing and planting necessary.

Its major advantage is that it leaves the Chambers Street axis free for future pedestrian development -- both within the Civic Center itself and later on along the line of Chambers Street to the West. This axis ties together a number of important elements in the long-range plan for the area: starting from the west, the proposed Chambers Street waterfront plaza, the line of subway stations along Chambers, the old Municipal Building, and finally, the new Police Headquarters.

By eliminating the open cut of the Chambers underpass, this solution also solves a serious siting problem in locating the new Municipal Tower, allowing for a wider range of solutions, and permitting easy access to the Tower along Broadway, should the tower be located at Broadway.

Its disadvantages may be summarized as follows: Taken by itself, it is not quite as direct a vehicular route as the Chambers-Warren Route. It must make a turn on the west side of City Hall, coming close to City Hall itself. To conceal the open cut to the west will require careful planting. This solution also means that few of the fine stand of trees behind City Hall can be preserved, while the Chambers-Warren solution might have permitted the saving of some of them.

Recommendation

Taking these factors all together, the Consultants recommend the Warren-Murray solution. The development of the Chambers Street pedestrian axis is so important to the long-range plan for the entire area, from the new Hudson shoreline all the way to the Gov. Alfred E. Smith Houses, that it should take precedence over the minor (and solubl e) problem created at the Murray Street open cut west of City Hall. No street other than Chambers -- with its many shops, bars and restaurants, its subway stations, and its visual climax in the arch of the old Municipal Building-- is capable of serving this function.

Suggestions for Consideration

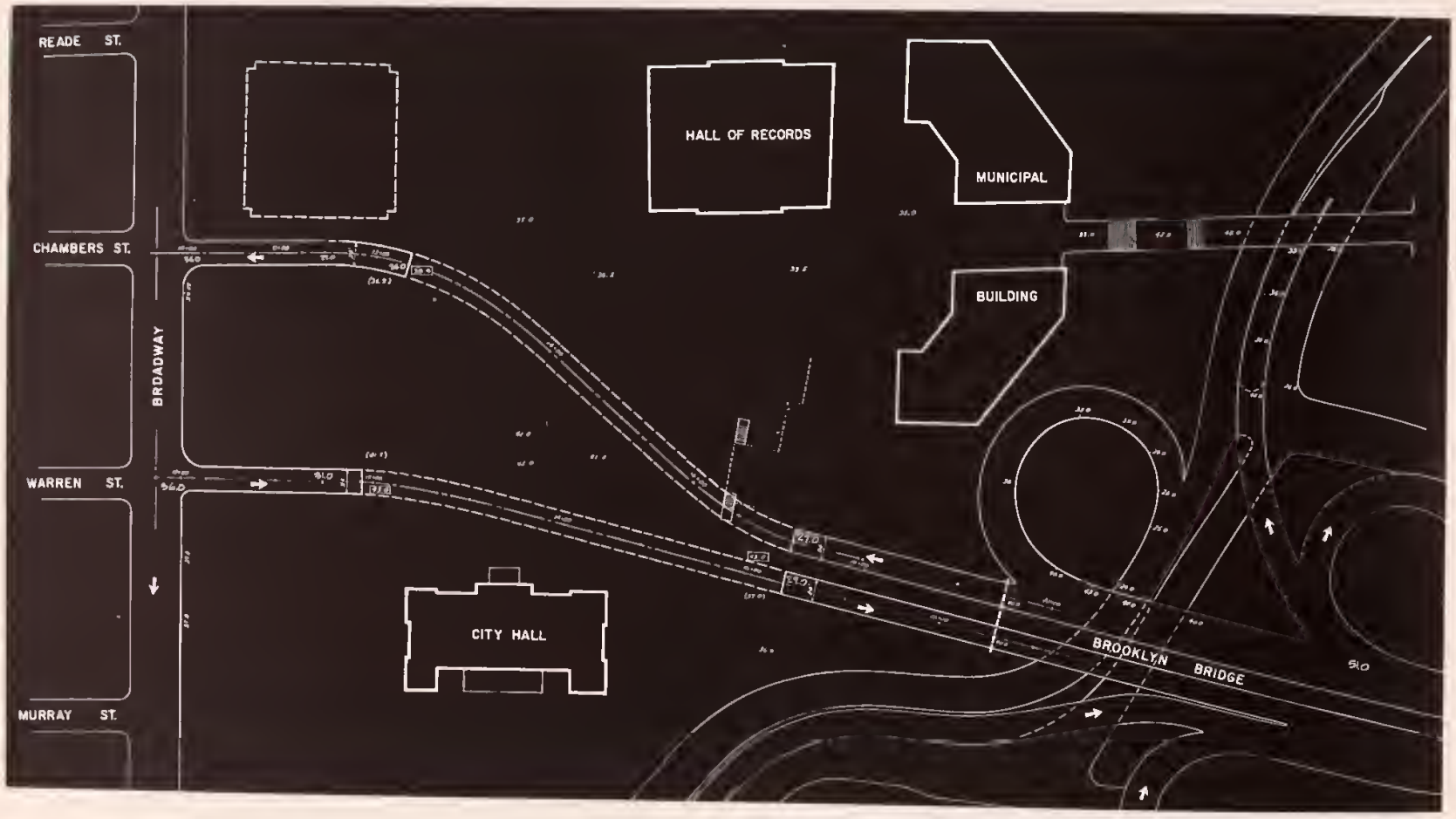
Both the retail facilities and those City agenices requiring easy public access might well be placed on the new Municipal plaza, rather than under it. Such a change could intensify usage of what could otherwise become a lifeless expanse of open space. Since a grand pedestrian plaza is being created at grade, the advisability of putting most of the public activity in 400,000 square feet of space under that plaza, with over half of it devoted to circulation alone is questioned. The vast bulk of subway-bound movement, destined for the IRT-BMT complex to the east (the Broadway BMT is a minor station), can be handled by a more modest underground system, if such direct connections are deemed necessary.

The need for new parking facilities in the overall area is beyond dispute. Closer study may show, however, that only a portion of it (say 200 cars) must be located directly in the Municipal complex; space for the other 400 cars might be added to the parking garage tentatively set for the block adjacent to the new Police Headquarters (which can be enlarged substantially beyond its mapped size to accommodate larger capacities). Such a plan would have the virtue of keeping traffic out of the heavily congested Broadway area, and near the major arteries to the east.

Another point to be noted in the reappraisal would be the possibility of preserving City Hall Park in its entirety. If the underground concourse must now be terminated at Chambers Street there would be no reason to carry the paved Plaza across the northern half of the Park to the rear steps of City Hall. This park, the second oldest in the City, with its fine old large trees is the traditional setting and symbol of municipal government in New York. Its partial demolition in favor of a formal paved plaza deserves serious reconsideration.

The location of the Municipal Tower itself is also deserving of some further thought. The present plan, placing the building squarely in the center of a great open plaza, clearly calls for the ultimate demolition of the Hall of Records. Yet this architecturally interesting building has been designated by the Landmarks Preservation Commission as a permanent landmark.

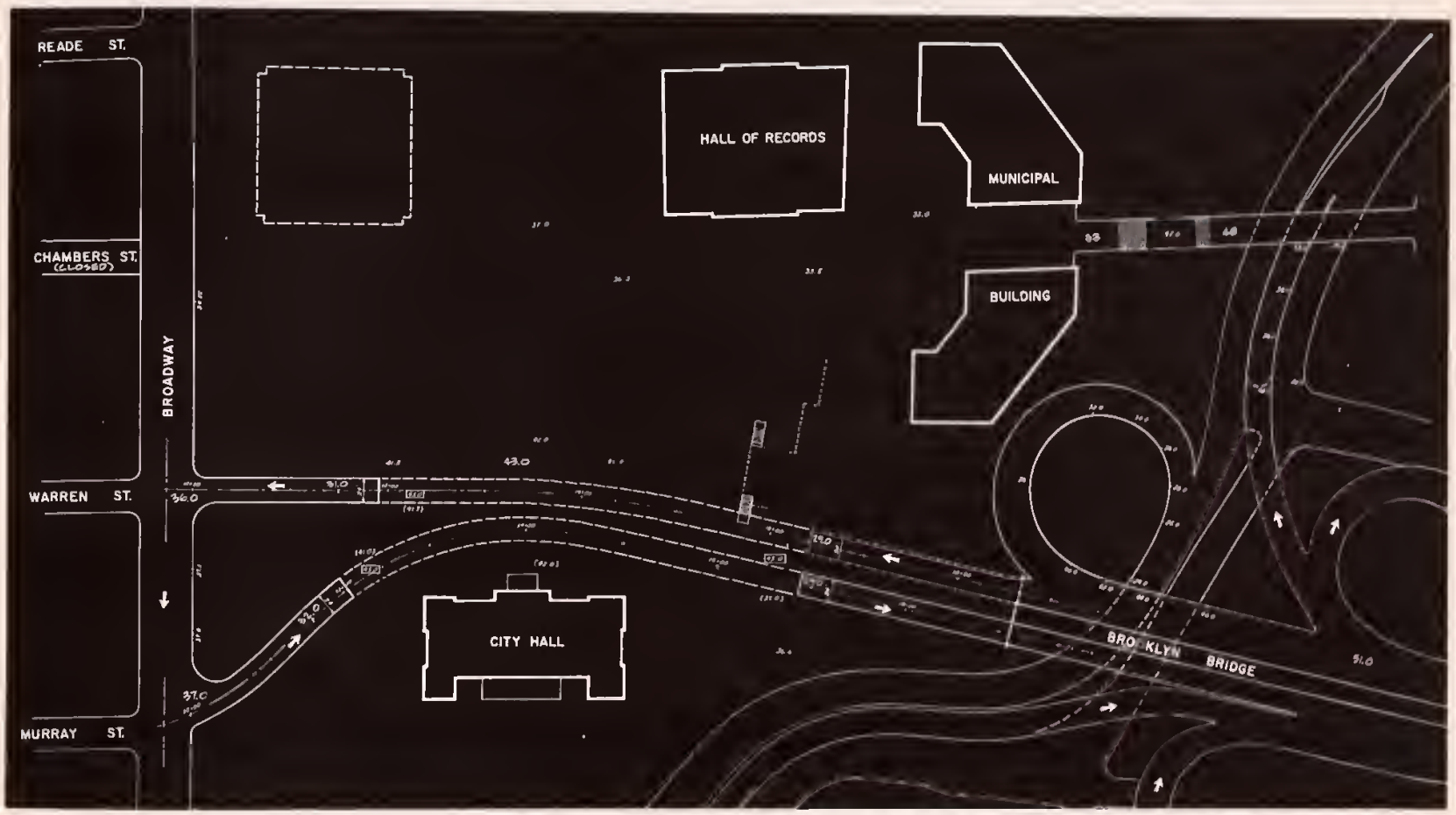
If the Hall of Records is to be retained, relocation of the tower should be considered -- perhaps it could be shifted over to Broadway, where it would reinforce the line of towers which carries up all the way from Battery Park. Instead of



Chambers-Warren

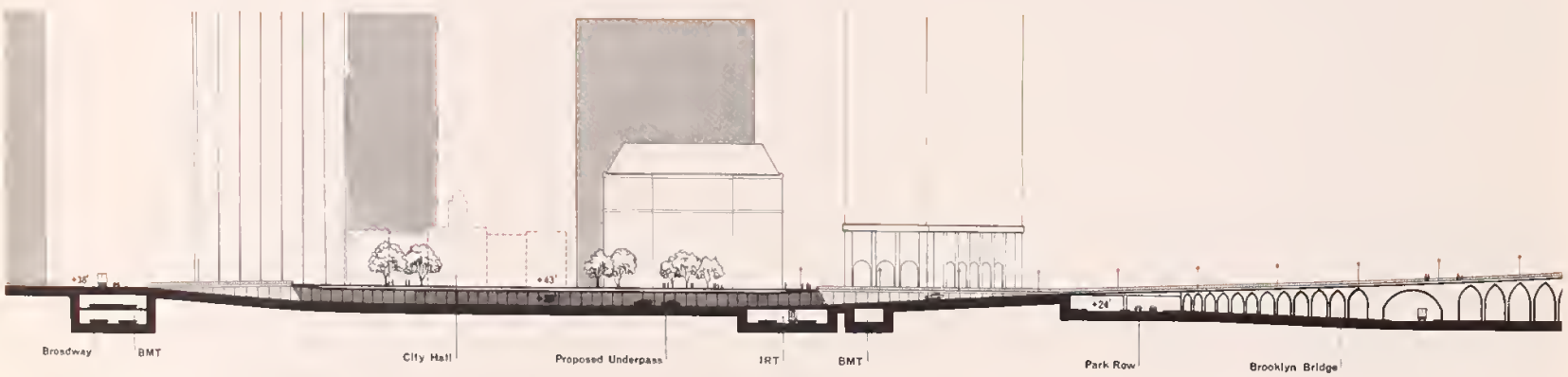
Civic Center:
Underpass Alternates

0' 100' 200' 500'



Warren-Murray

N



Civic Center: Section Through Underpass

0' 100' 200' 400'

setting the new tower on axis with City Hall (which then looks out of scale), a better sense of scale might be achieved by the development of low service-retail buildings at the north end of the Municipal plaza, echoing the scale of City Hall.

This would, in turn, make possible a direct, focal relationship to the old Municipal Building, whose great space-receiving bulk could form an important element in the Civic Center design. Indeed, if the Hall of Records is ever taken down, a direct line of construction could be established with the Municipal Building.

Preliminary analysis indicates that, at present rates of governmental growth (with the City Budget expanding 7% annually), the need for new municipal administrative office space will not be permanently exhausted by the present phase of construction. Expansion should probably occur within the new pedestrian island, rather than to the north of it, as originally implied in the ABC plan. With the great open spaces soon to be developed in the Civic Center, the need will be for increased activity rather than for greater dispersal. It is urged that this matter be given consideration in any further assessment of the Civic Center.

Recommendations for the Civic Center

As mentioned earlier, the Civic Center is now under detailed review by the City Administration. This review may produce a revised program, and call into question some of the assumptions under which the present plan was derived. Nevertheless, certain basic problems will remain, whatever new solutions are evolved, and the following is a list of basic principles developed from the Study which can be of use in the process of review:

1. If a Civic Center superblock is considered an important objective, the Brooklyn Bridge traffic should be handled within the superblock itself, and not thrust off onto neighboring areas. In these terms an underpass through City Hall Park appears the most direct and economical solution.

2. Even if a superblock is not deemed necessary, the vehicular-pedestrian conflict in and around Chambers Street-- slicing through the heart of the Civic Center -- is so severe that the underpass as proposed should be considered as the long-term solution to the problem created by the Brooklyn Bridge traffic as it moves into Lower Manhattan.

3. The preservation of as much as possible of the City Hall Park, as an open, green area should be a major goal.

4. Service traffic to the Federal Office Building and the Municipal Tower should be consolidated in the Duane Street area in such a way that pedestrian movement across the service area is simple and direct and does not come in conflict with service traffic.

5. In consideration of the designation of the Hall of Records as a historical monument, its permanent position in the Civic Center should be recognized. This may be reflected in a decision to move the new Municipal Tower to Broadway, north of Chambers Street.

6. As a general principle, the bulk of the programmed municipal parking should be located outside of the Civic Center, to the east of the old municipal building on the expanded Police Headquarters Site, where it will be closer to highways and away from the congested core.

7. The feasibility and desirability of extensive below-grade retail facilities, concourse and parking, as now planned should be re-examined carefully.

8. Two basic pedestrian routes should be considered as control design elements: First, Chambers Street, running across the Civic Center, through the Municipal Building, and then by overpass to the expanded site of the Police Headquarters. Second, an extension of the Broad-Nassau pedestrian route, across Park Row, and into the heart of the Civic Center joining there with the pedestrian path of the Brooklyn Bridge.

Hudson Skyline:
Present

Hudson Skyline:
Future

CHAPTER V

GOALS FOR LOWER MANHATTAN

Chopter II of the Report emphosized the difficulty of trying to forecost the future of the finonciol ond governmentol communities on the bosis of post performonce or present trends. The conclusion wos drown thot the future of Lower Monhotton will be determined more by whot people wont ond toke collective oction to get, thon by unseen morket forces whose cumulotive impoct is beyond the community's copocity to influence. This conclusion points up the criticol role thot plonning con ploy ond the importonce of spelling out in the Plon the possible ond oppropriote goals. This chopter summorizes the gools for Lower Monhotton ond its role in the region, considers eoch in some detoil,ond describes briefly the process of plon development showing how the proposols in the Plon relote to the gools.

APPROACH TO TAXES AND CENTER OF PLANNING

As hos been stoted, o mojor purpose of the Plon is to provide on orgonizing concept to guide present ond future growth -- on orgonizing concept thot os neorly os possible expresses the optimum ochievement of oll gools in combinotion. It must olso describe o process whereby the meons ond the gools con be constontly reopproised in light of degrees of ochievement ond chonges in circumstonces.

In considering o list of such gools, questions must include: Whot is Lower Monhotton's proper role in the City, the region ond the notion? Whot ore the oppropriote specific gools for Lower Monhotton, ond how do such gools become tronsloted into olternote meons for ochievement? Whose gools ore they ond how does their ochievement offect other goals held by the some people? Whot must be given up ond by whom, for on optimum ochievement of oll goals thot might be volid for this importont -- yet still smoll -- piece of New York?

To deol with these questions the opproach of the Study ossumed thot the Plon must hove four importont ingredients. First, it must be o problem-solving course of oction which con be corried into effect ond whose outcome will be expected both to solve problems ond ottoin gools. Second, it must be comprehensive even though Lower Monhotton is only o smoll port of the City ond the region; thot is to soy, the Plon must spell out the moin octions by which oll of the most importont gools ore to be ochieved. Third, the Plon must indicote the choices of octions (ond the implicotions of eoch choice) thot will be proboble ond feosible over os long o time os possible. Finolly, the Plon must creote on imoge of whot the schievement of the long-ronge goals con look like, on imoge thot will fire imoginotion ond enthusiosm ond ot the some time oppeor ochievoble.

In response to the obove questions, the oims of the Study were to develop o plon thot would be doable, comprehensive,long-ronge ond exciting. In o situotion of uncertointy obout trends ond the noture of future problems ond gools, the City is inevitobly committed to incrementol plonning thot proceeds in stoges, beginning with whot is feosible ond necessory ond then exponding the oreo of oction os knowledge increoses ond needs ore better known. However, prudent incrementol plonning olso requires o set of long-ronge goals thot serve os o constont guide ogoinst which short-term decisions ore screened ond evoluoted.

These specifications were used to develop a planning process that combined incremental and comprehensive planning methods with an end-state group of goals set forth in three-dimensional clarity to illustrate their implications. The following considerations of goals have come out of that process.

NATIONAL GOALS WHICH LOWER MANHATTAN CAN SERVE

If the assumption is mode that the money market function in the United States can best be served by a centralized, efficiently operating nucleus, and this appears to be the case, then Lower Manhattan can serve this national goal by performing that function as well as possible. Further, with international trade becoming an increasing activity, this also behooves Lower Manhattan to carry out its potential to the maximum extent to help the nation.

REGIONAL GOALS WHICH LOWER MANHATTAN CAN SERVE

The statement that Lower Manhattan has an appropriate role to play in the region means that by virtue of its central location, history, and unique characteristics -- both physiographic and functional -- it has certain obligations to the region. Planning for Lower Manhattan must recognize this basic fact. The regional goals that relate to Lower Manhattan are similar to those in any large metropolitan area and its downtown. In New York they take on particular significance because of Lower Manhattan's importance to the Nation.

The first such goal considered is efficiency of transportation. It would seem at first glance that work trips could be reduced by decentralizing jobs closer to where people live. On this thesis, Manhattan should not be encouraged to grow. The disadvantages of such a pattern of land use in a metropolis are not as obvious as the seeming advantages. An inevitable result would be great increases in auto travel and additional traffic congestion, as well as reduced efficiency of business now based on economics of scale. While the average trip of the suburbanite who works in the suburbs is now shorter than that of many downtown workers, if everyone lived and worked in the suburbs, the overall average would be considerably longer than now. Los Angeles is an example.

In point of fact, a very large number of New Yorkers and New Jerseyites already do live very close to their jobs in Manhattan. Since the great job concentration already exists and is supported by a sunk investment in subways and commuter lines, the reduction of the journey-to-work is more easily accomplished by putting more housing close to downtown, than by decentralizing jobs. Therefore:

Regional Goal # 1: The reduction of the journey-to-work, then, is an important regional goal to which Lower Manhattan can contribute if appropriate places for housing are made available.

An additional regional goal related to the first is to maximize everybody's choice of both work and residence. Theoretically, to have everyone working in the same place would provide for maximum job interchangeability. This is to say that if one decided to change jobs, this decision could be made without influencing where one wanted to live, since both jobs would be in the same place. Job interchangeability is one of the major reasons for living in large cities, and the goal of maximizing choice of job is best served by concentrating a wide variety of jobs, not by decentralizing them.

If one assumes that place of residence is fixed, then broadening choice of place of work would be better served by job decentralization, not by job concentration. However, people move almost as frequently as they change jobs, and of course what they do is optimize [1] on their own between the goals of where they want to live, where they want to work, and how much time and money it takes to get between the two.

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[1] Optimize is used here to mean trading-off between the satisfaction of conflicting goals to get the most aggregate satisfaction.

While a theoretical discussion of this aspect might not lead to practical conclusions, a realistic way for Lower Manhattan to serve both goals is to provide for as much and as varied a job concentration as possible, and at the same time to provide for as much nearby housing variety as possible. Therefore: Regional Goals Numbers 2 and 3:

Regional Goal # 2: Broadening choice of work is an important regional goal to which Lower Manhattan can contribute by providing a wide variety and an intense concentration of jobs. And,

Regional Goal # 3: Broadening choice of place and type of residence is an important regional goal to which Lower Manhattan can contribute by making available its unique site characteristics for housing a wide variety of income groups and families.

The next problem concerns Lower Manhattan's position in the regional transportation network -- insofar as many of its important vehicular and transit lines must pass through Lower Manhattan itself. The improvement of these facilities can thus serve a double purpose: to upgrade service to Lower Manhattan and to facilitate regional movement through it. This problem relates particularly to the peripheral highways, the Brooklyn-Battery Tunnel and the Brooklyn Bridge. The principle is expressed in:

Regional Goal # 4: Efficient and unimpeded movement throughout the region is an important regional goal to which Lower Manhattan can contribute by increasing the ease with which people go through or around it with as little conflict as possible with the needs of local movement.

Lower Manhattan's impressive natural site, at the head of the New York harbor, and its extraordinary physical plant, represent a combination of urban resources which have not been fully realized. The water and its edge have significant potential for both recreational and residential development, serving Lower Manhattan and the Region. As long as downtown shipping was strong, trade dominated the waterfront ; today this use has sharply declined. Therefore:

Regional Goal # 5: Utilization of sites of great natural beauty and uniqueness for as many people as possible is an important regional goal to which Lower Manhattan can contribute by making its water's edge accessible to the general public. [1]

ALTERNATIVE REGIONAL CONCEPTS

It is next necessary to examine fundamental questions of regional form in relation to these regional goals in order to focus on the Study Area. A major consideration touched on before at a regional, City-wide and Manhattan level is whether Manhattan ought to be encouraged to grow, if growth is possible. The extremes of a decentralized and centralized region are considered.

A Decentralized Region

At this level, an extreme alternative is to reduce overall congestion by reducing, as has been discussed, the concentration of employment in Manhattan, redistributing it to regional sub-centers. To an extent this is happening anyway, as the region grows and Manhattan's capture rate of activity becomes relatively smaller (although still absolutely large) than it has been for most functions.

While this is probably a theoretical but not an operational alternative for Midtown -- that is, Midtown's growth is beyond the influence of individuals or even government to alter -- it may be a real alternative for downtown. As has been pointed out, Lower Manhattan's growth has been the result of general market trends. These relatively few decision-makers might very well be able to reestablish by inaction, or by policy, the stagnation that set in in the 1930's. If, for example, the World Trade Center, The Civic

[1] This and the other goals are in accord with statements by the Regional Plan Association.

Center and the Stack Exchonge were to be halted, Lower Manhattan's considerable vulnerobility, due to its singleness of functian, wauld suddenly be exposed. The "criticol mass" necessary far its cantinued "fission" and growth might be lost. The beginning af the dispersian af the finoncial center cauld accelerate. An onalogy is that of a tightly-waund ball af string whi ch cauld unrovel rapidly ance started. In contrast, Midtawn is a complex mass [1], nat eosily influenced.

In such an eventuality, the grawth that would hove occurred in Lawer Manhottan wauld prabably be redistributed lorgely to Midtawn, rather than ta regional sub-centers. Little of it would be within the pawer af public policy ta influence, assuming that such a policy was seen to be desirable. Although it would be possible, and perhaps even politicolly popular, ta distribute the functians af gavernment now envisioned for the Civic Center to areas thraughaut the City, most of these functians have few reasans for citizen contoct ond can benefit by centralization; dispersian would appear ta be the detriment af goad gavernmental caardinatian. [2]

The notion that Lawer Manhatton can very well "take care af itself" withaut the kind af activity proposed in this Plan is cantradicted by the evidence presented, and is based an a lock af understonding af the oreo's vulnerability as a "ane-industry tawn".

The decentralizotion cancept was rejected therefore as immediately irrelevant, partly becouse it is unwarkable os public policy, but alsa because it is clearly in conflict with the stated goals af the people most concerned with what happens ta Lower Manhattan.

A Cancept of Concentratian, Diversity ond Grawth

The alternative concept -- af a regian highly concentrated at its center and arganized hierorchically -- is conceived as most effectively meeting the stoted gaols af the region and the City as a whale. (Midtawn will cantinue ta graw with cangestian being an increasing prablem). For Lawer Manhattan this means further growth ond diversificatian af functian assuming it con be achieved withaut mare congestion. The interests af the City and region appear ta caincide with those af Lower Manhattan.

A recent paper of the Regianal Plon Associotian phrased it this way: "Our warking hypothesis is thot anything which impartantly weakens the central city's functioning weakens the Regian. And given the importance of the NYMR to the entire notian, the CBD's ropid deterioration hos obviaus adverse extra-regional implications as well." [3]

For Manhotton as a whole, the choice af either regianal concept has few shart range consequences. Further growth will continue in Midtawn in ony event. Only in the long run would public policy bosed on either choice hove ony significont effect an lond use patterns. For Lower Manhattan, hawever, o generol concensus that there is tao much activity concentroted there naw could trigger a public and private series af octions and policies regarding currently propased prajects that could become o self-fulfilling prophecy that favors Midtown if not decentralizotion.

In light af this and in the interests af the City's tox pasitian, encaurogement rather thon discourogement of business would seem the better palicy, porticularly if such o policy is nat in conflict with lorger sociol welfare considerations.

In foct, oside fram a number of foirly crucial decisions -- for the World Trode Center, the Civic Center, ond passibly the Stock Exchange -- the public policy recammended in the Plon af creating o new residentiol community and making the water's edge ovailable to the region, are consistent with either cancept of regional farm. If, in spite of a choice far

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[1] In ecolagy, simple systems ore basically unstable where complex ond diverse systems ore stable.

[2] This is not ta discredit the ideo of "little city halls" located where people can use them for the increasing services that government is expected ta pravide.

[3] Regional Plon Associotion, Memarondum, "Forecast and Analysis of Past Trends," May 3, 1966, page 94.

concentration, downtown's Core does nat graw, the areas not utilized by business would be available for ather choices, presumably mare housing.

The concept of a high concentrated regianal care was therefare adapted for purposes af the Plan, with the provisa thot concentrotion nat exceed the limit of capocity of Lower Monhottan to obsarb growth, based on transportotian focilities, lond ovailoble, ond liveability.

SUMMARY OF THE PROBLEMS

The problems of Lower Monhatton have been identified through evaluotian of the present situation in light of these regional ond local gaols. The means to resolving the problems become goals themselves ot the next level af consideratian. They are nat necessarily listed in arder af immediote importance or ease of solution.

Problems af Functianing: the need for cahesiveness of the Care; its vulnerobility ta change; the need for diversity and enrichment af activity.

The problem of haw to strengthen the Care ond reduce its vulnerability can be approoched in a number af ways, none mutually exclusive. First, diversifying activities sa that the tatal emphosis is on mare than a few functions will both reduce Lower Manhattan's "ane-industry" choracter, and help enrich the octivities that are there. With the exceptian af the World Trode Center, recent trends in Lawer Manhattan have all been in the appasite directian.

This diversity can toke the form af new types of businesses and corporote heodquorters opprapriote to the Core and its supporting octivities af law ond accounting. It can alsa take the fore of selected new hormaniaus non-affice uses. Housing and commerciol recreation rank high as such symbalic uses. Industry or whalesaling-with-stack rank law.

Problems af Enviranment: obsolete physical structures: declining functions inhormoniaus with new grawth in key sectians: decayed piers: the Chinese walls of the elevated expressways.

The eliminatian af the mony environmental deficiencies such as the elevated expressways, decayed piers, obsalete buildings, and (ultimately) declining and inharmonious functians is necessary ta the achievement of a strang Core, and of Lawer Manhattan's performing an aptimum role in the City, the regian and the Natian.

Improvement of the environment and achievement of the regionol gools ore seen as hoving at least three means for achievement. Eoch seems either compatible, or ot least not in canflict with other possible regianol and City gaals. These means are (1) diversificatian ond strengthening af the business Care, (2) development of o residential community particulorly at the woter's edge; (3) the introductian of regianal recreation at the water's edge. Such actians consistent with the cancept af o strong Core would toke maximum odvantage of Lawer Manhottan's unique natural ond lacational characteristics.

Problems of Access ond Movement: inadequate internol transpartatian; awkward relations between streets ond land uses, o too-lang and uncamfartable jaurney-to-work: pedestrian-vehicular conflicts; thraugh ond locol traffic canflicts and congestion (anticipoted further traffic battle necks as the streets in the Civic Center are closed).

A secand way to strengthen the Care is ta improve access ond divert and eose thraugh traffic by such focilities os a lower manhattan expresswoy. Alang the same line the reduction af the moss transit battlenecks in Midtown, and the cannection af downtown subwoys directly to the suburbs, by-passing Midtawn, ore seen as mojar City-wide means to reduce vulnerability and increase Lower Monhattan's competitive position. Local means include impraving the subwoy stops and internal circulatian and reducing gaads-handling conflicts.

CITY-WIDE AND LOCAL LONG RANGE GOALS FOR LOWER MANHATTAN

Shorter-range goals particularly at a City-wide level in some instonces act as constraints on the nature ond timing of the

means for achieving the long-range goals. The specific constraints or determinants are outlined in the next chapter.

LM Goal #1: Create a Strang, Coherent and Diversified Care

Perhaps the mast far reaching goal far Lower Manhattan, and that with the greatest multiplier effect, is a strong, efficiently functianing Care in an attractive working environment. The Plan must pravide diversity to the Care which will give its business awners, managers and workers that quality of life and richness af environment which is necessary for modern warking conditians. As the need ta attract skilled office workers increases and the number of "back office" jobs declines, conditions af the warking enviranment became mare critical. Mare recreation, mare restaurants, more entertainment, more parks, better shapping, new urban services and new urban excitement are needed. This renewed environment can only be achieved and ecanomically supported by a further diversificatian af Lower Manhattan's curiently limited activities.

LM Goal #2: Provide Far Prime Office Space Expansian

The goals for Lower Manhattan, concerned both with form and functian, are ultimately directed toward and reflected in the affice towers. As the Care is strengthened and diversified, the demand for office space will rise. Provisian far majar expansion af prime office space close to and a part of the present Cire is a major goal of the Plan.

On the basis of analysis, major new areas for office growth can be expected araund the World Trade Center , the new Stock Exchange, and west and south of the Civic Center. Continuity between these areas of new growth and the alder parts af the Core must be carefully planned, lest the Core be diffused to its disadvantage. Mareover, continued regenerative canstructian within the older Care must also be accommadated, particularly as the standards af affice space cantinue ta imprave and older buildings lose their competitive pasition. This internal grawth is needed to help maintain a balance between the Care and its periphery.

LM Goal # 3: Develap a New Lawer Manhattan Residential Cammunity

The demand far housing relatively close by the Core is already substantial: Broaklyn Heights, the Palisades, Staten Island. None are as accessible as wauld be housing in Lawei Manhattan itself. The patential for housing in the core area will increase substantially in the 1970s. Many City-wide goals as well as those far Lower Manhattan would be met by people living adjacent ta the dense urban Care, and within easy range of prime City attractians. The additian of business and retail functians that hausing supports are a key part of a strategy of diversifying the Care.

In order to meet the combined goals of the region, the City and Lower Manhattan, specifications for this hausing should include that it should be large enough to be a viable total cammunity with a full range of income groups, family sizes and diversified backgrounds appropriate to urban living. It should take full advantage of views af the rivers, permit easy physical integratian with places of employment to reduce the jaurney-to-work and to permit housing and offices, working tagether to support restaurants and shopping, have a full complement of community facilities, be close ta major transportation routes, provide a hierarchy of private and public open spaces, and have as full a range as possible of housing types including those for family living.

LM Goal # 4: Improve Regional and Lacal Transpartatian

Impravement of transportatian should be geared to the following major abjectives.

Vehicular: Elimination of all nan-essential traffic in the primarily pedestrian Core, re-routing through traffic on separate tharafares designed specifically for this use, and classifying and adjusting the internal street system to serve as distributors and service streets.

Pedestrian: The fact that vehicular traffic is nat as intense as in Midtown, makes this area a feasible beginning place far the separatian of pedestrian and vehicle traffic. It is also an area whose walking scale and character has not yet been destroyed by parking lots and traffic. A goal for all the users af Lower Manhattan, where everyane is a pedestrian, is the creatian of pedestrian "precincts" and pedestrian streets in a pattern consistent with dominant usage.

Internol Movement: The exponsion of the Core ond the intensity of pedestrion movement mokes necessory o considerotion of o supplementol new intro-downtown moss tronsit system to eose pedestrion flows. Subwoys do not serve this internol movement.

Moss Transit Access: Improvements in Lower Monhotton's tronsit links to Westchester, Stoten Islond, Queens ond New Jersey os well os to the rest of New York, ore importont gools. Where such mojor chonges ore compotible both with Lower Monhotton's gools ond with those of the region, they should be on integrol port of the Plon. Improved stotions, ond locol linkoges con increose ridership ond greotly enhonce the tronsit environment.

LM Gool # 5: Toke Maximum Advontoge of the Woterfront

New York is groduolly owokening to the greot noturol resource which its 800 miles of woterfront represents. Nowhere else but in Lower Monhotton, however, in oll this mileoge, is there such o greot working populotion so close to the woter. The pressure for its use gives o high priority to the renewol of Lower Monhotton's woterfront. The foct thot olmost the entire woterfront is now under single ownership mokes possible on unusuol freedom in plonning normolly found only in outlying suburbon oreos Cleoning up ond opening up the woterfront for regionol os well os locol occess is on importont goal. The resource is so greot thot significont regionol recreotion needs con be met os well os locol.

LM Gool # 6: Protect Existing Jobs

Supporting the Core will oct significontly to protect its existing jobs

However, lorge scole urbon improvement plons hove oll too often eliminoted low-poying jobs. The blue-collor working oreos of northwest ond north Lower Monhotton connot be duplicoted; the economics of new construction would couse their disoppeoronce, ond these jobs employing semi-skilled ond unskilled workers ore in short supply in the City. In the northwest goods-hondling oreo, this strongly suggests o gool of postponement of rodicol chonge which overrides ony other possibility. In the long ronge o number of olternote uses ore considered on the ossumption thot the City policy will no longer dictote this oction so strongly here.

LM Gool # 7: Enhonce the Old Form of Lower Monhotton With the New

The skyline of downtown is so fomous ond evocotive thot it is often thought by visitors to be the profile of Monhotton itself. In the redevelopment of Lower Monhotton this pyromidol form, with greot towers in the center ond lower buildings ot the edge, should be respected.

This does not meon thot the skyline will not undergo olterotion, enlorgement, ond chonge. The World Trode Center will soon rise, ot the islond's edge, on o wholly new scole, significontly chonging the downtown form. At first glonce the old scole seems destroyed, but oppropriote development in the vicinity of the World Trode Center, both inlond ond offshore, con reincorporote these towers into the lorger downtown scole. The need now is for towers which ore close to the gionts in size, locoted close to them to form o tronsition between the Center ond the old scole. The Center con thus form the nucleus of o cluster os significont os the old one.

The second form problem concerns internol scole: the streetconyons from which plonners recoiled when they wrote the 1916 ordinonces to prevent their repetition. Todoy these deep cleovoges of spoce ore held in high fovor ond if the new design stondords of open spoce threoten to destroy the older form, they should be revised to ollow tighter construction in the downtown oreo.

LM Gool # 8: Enhonce the City's economic ond tox bose.

By development of Lower Monhotton to its full potentiol, consistent with sound plonning principles ond o good quolity of environment, the oreo con enhonce the City's economic ond tox bose. Thot combinotion of octivities which represents the highest ond best use of Lower Monhotton should be sought

THE ROLE OF THE CONCEPT PLANS

The Concept Plons were developed os o forword look ot o future schemotic picture of how the vorious goals (listed obove) might be tronsloted -- on imoge of whot life could be like in Lower Manhotton. They were conceived os o hypo-

thesis to be tested against the palicy, market, and capacity determinants discussed in the following chapter, to be tested against the principles and specifications for a residential community and against processing and staging possibilities and alternative choices over time. They consist of both land use and movement systems illustrating how optimum movement is intimately related to the land use concepts.

A Strategy to Achieve the Goals

Part of the Concept Plans is a strategy followed by tactical considerations. The range of alternate means to achieve the overall goals, while broad in the long run, is fairly narrow in the short run, when the determinants discussed later are taken into consideration. The choices narrow down to four sets of major actions: transit and pedestrian movement improvements to the circulation system in response to immediate problems primarily in the Core; defensive actions in the industrial northwest and the present residential area; the vigorous promotion and development of current projects; and the development of a major new residential community of a size and character to achieve the greatest possible multiplier effect in diversification of other activities to enrich the Core and improve its environment. This last is seen as the key strategic move, the "key to the kingdom" in military terminology.[1]

The defensive actions -- industrial renewal, and residential self-rehabilitation -- are geared to short-range goals. The transportation elements of the Plan fit both the short and long range goals. The majority of elements and actions can and should be begun immediately. They set the stage for the land use changes proposed and for the new residential community.

With a strategic decision to create a new residential community, the next consideration was with the tactical question of how and where moves should be made. It was concluded that the goal of ultimate diversity of income groups and housing types can be most easily achieved if the initial beachhead of housing is established in the upper range of the income scale rather than in the middle or the lower. Subsequent development can work down the scale; the reverse is difficult once the character of an area has been established. Since initially there are policy limits on provision of public community facilities, it also seems best to introduce housing whose occupants can best fend for themselves.

A second consideration was that of size. To establish a significant new environment of its own in an area formerly identified as totally commercial, it was felt that the minimum number of dwelling units at the start should be in the range of 2000 to 3000 with an optimum of perhaps 6000. The minimum might be marketed over a three to five-year period at the rate of perhaps 600 a year, well within the feasible project-size in New York.

The final consideration was location. Factors discussed in Chapter VI suggest the East River waterfront from Wall Street to Fulton Street as the location in which the housing would most easily meet the specifications of the goals.

DETERMINANTS OF ACTION

The goals, the Concept Plans and the strategy and tactics for carrying them out all must operate within certain constraints on action. These are limiting factors on choice, some of which the City can control, such as the allocation of resources and policy. Some, however, such as the market demand for space and housing, the economics of building, and changing technological requirements are beyond influencing, at least in the short run.

Together, these are referred to as determinants of action. They are considered in detail as they affect the possibilities for action in the following chapter. They include the previously considered goals and, collectively, establish a kind of "decision model," to serve as a conceptual tool to explain the selection of recommended actions.

The determinants include policy determinants such as clients' goals, the allocation of public resources, City Housing, employment and parking policies, design and planning principles (including zoning), and considerations of historic and symbolic importance. Market determinants include the

[1] Strategy is used here as a long-range allocation of resources to gain an overall set of objectives (goals), as contrasted with tactics, a short-range set of moves or actions. Together they are in a sense synanymous with planning.

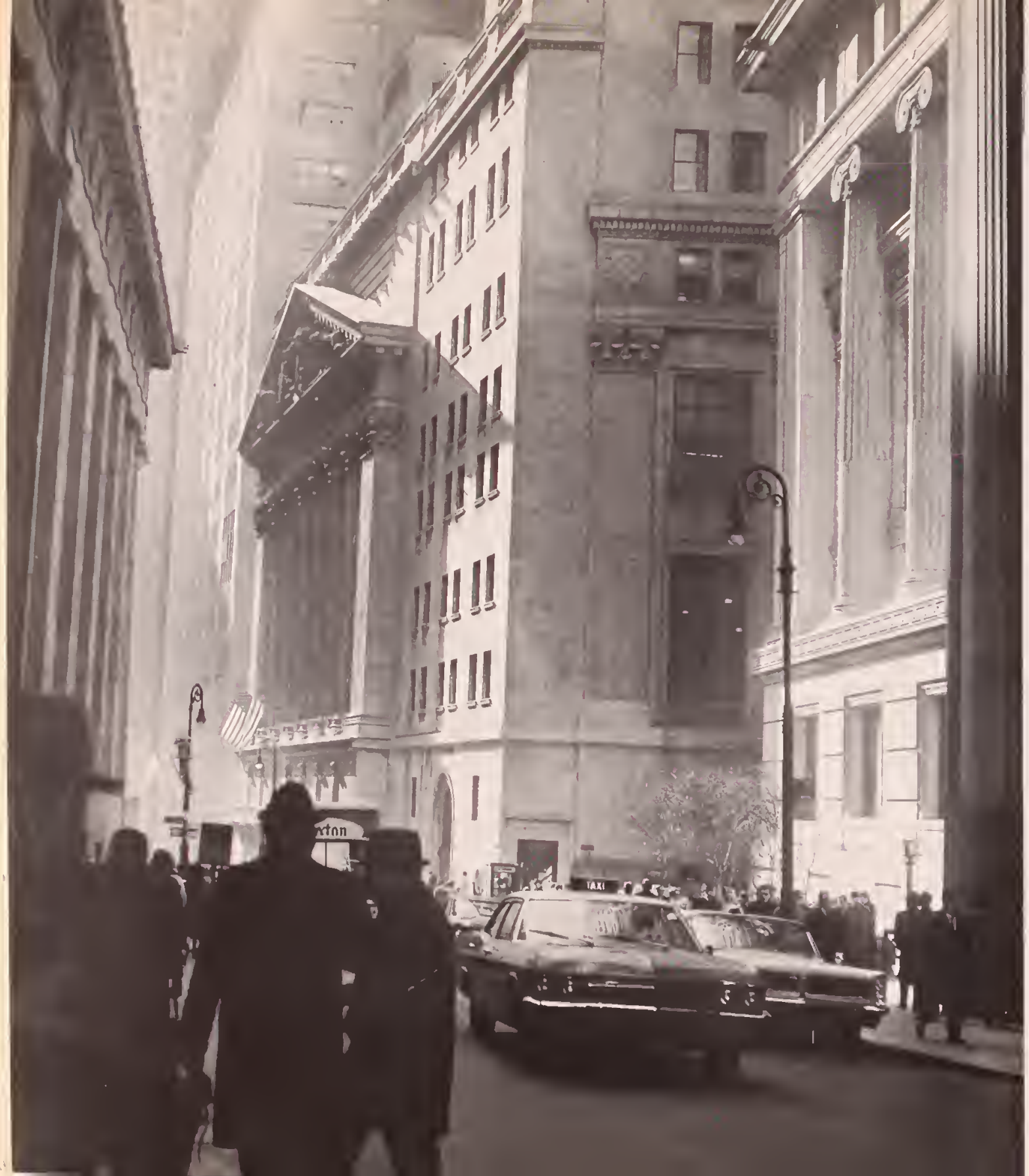
demond for spoce, the cost of sites, the chorocter of the environment, the life expectoncy of existing uses ond structures ond technologicol chonge. Copocity determinonts include minimum lond oreo needed for o vioble residentiol community, ond copocity of the movement systems to efficiently deliver the numbers of people.

LAND USE ASSIGNMENT, DESIGN PROGRAMMING, AND TRANSPORTATION TESTING

The process of design ond plonning next involved seeing how, ond whether, the goals could be ochieved ond the concepts corried out within the limits of the outlined determinonts. These possibilities were conceived os o kind of "solution oreo" which chonges dimension over time os current determinonts moy be reloxed or tightened, or os new determinonts moy be imposed. The resultont Plon is for o sequence of choices over time.

The process of lond use ossignment to porticulor oreos described in detoil in the next chopter served four purposes. First, the ossigning of lond use, populotion ond spoce to eoch oreo in occord with the Concept Plon, served os o test of the feosibility of the Plon within the limits of the determinonts. Second, these ollocotions, eoch in effect the recommended olternotive outlined in previous steps, served os o bosis for testing the internol consistency of the decisions os well os the responses to them. The third purpose served wos to estoblish o design ond plonning progrom for eoch oreo which would be consistent with the long-ronge ond short-ronge gools. These progroms included types of use, amounts of spoce, required oncillory focilities, ond specific design ond plonning criterio.

The fourth purpose of the lond use ossignments wos to load the movement system model ond see whether the troffic thus generoted exceeded the copocity of the system. Port 2 on tronsportotion eloborotes on this test ond on considerotions of mass-tronsit, pedestrion movement ond service responses to the proposed lond use chonges.


TAXI

CHAPTER VI

DEVELOPMENT OF LAND USE AND CIRCULATION PLANS

In the preceding chapters, the long-range goals for Lower Manhattan are seen to be the maintenance and growth of a strong, cohesive, diversified business and government Core, the improvement of access to it and its internal circulation , reduction in the journey-to-work, the public utilization of the waterfront and the creation of a major residential community to take advantage of the area's unique natural characteristics and excellent location.

Certain specific improvements can be immediately instituted in the transportation system and are discussed in detail in Part 2. These, along with the addition of the residential community are seen as a critically strategic way to achieve the strong and diversified Core. They will create demands, opportunities and an environment for commercial, cultural and public activities that will expand the present limited functions. These in turn will provide an atmosphere which will attract additional kinds of general office, commercial and corporate tenants.

This chapter combines the conclusions reached regarding the development potential for the major uses to be attracted, describes the alternate and recommended concepts and principles of overall land use and movement, and reviews the determinants of development as they affect the short,middle and long-range alternate choices for each sub-area of Lower Manhattan.

This is followed by a detailed description of land use,space , employment and housing, and the assignment process and design program that devolved. The design program is then used as the basis for the illustrations of the optimum development in Chapter VII and VIII.

As a test of the feasibility of the principles and the program, and of the possibilities for immediately establishing a large, integrated residential area, a more detailed study of the East River Waterfront is then undertaken. An outline of an implementation process for it is developed. This test case is extrapolated to illustrate how the optimum development of Lower Manhattan might look, if all of the recommended decisions were carried out over time. The function of the Optimum Development Site Plans is not to show how the future will look with a pretense at precision, but rather to serve as visual representations of the goals outlined earlier.

SUMMARY OF DEVELOPMENT POTENTIAL AND LOCATIONAL PREFERENCES

The present market demand for space and activities is summarized here under the categories of office, government, other non-residential uses, special areas, are residential. These are first considered in the context of the New York region.

Regional Location Considerations

The importance of Lower Manhattan's central location in the region has been stressed before. Historically this has been the reason for the great "sunk" investment in the

transportation plant that now supports it and Midtown. Its central location establishes both regional obligations and regional opportunities that have only begun to be capitalized.

The first of these, Lower Manhattan's regional role as an office, financial and government center has been realized over the years, and is anticipated to continue and grow. A second and as yet undeveloped aspect of this role is a result of Lower Manhattan's key location at the head of the Upper Hudson Bay. In fact, it is now possible to think of the peninsula as a part of the land bounding the Bay itself, with Brooklyn, the Verrazano Bridge, Staten Island, Port Elizabeth and the Palisades at Jersey City creating a huge amphitheater that is the Upper Bay. This amphitheater is dotted with Governor, Ellis and other smaller islands as events within it. World shipping is constantly in movement or at anchor in the great roadstead.

Such a reorientation of land and activity toward the water has been recognized by the Regional Plan Association as a new way of looking at this precious asset. A result has already been seen in proposals for housing along the Jersey waterfront, in Brooklyn, for the development of Ellis and Governor Islands, and at the approaches to the Narrows. The possibilities for exciting places to live along the water, combined with the regional goals outlined, (in particular the reduction of journeys-to-work bringing housing close to Lower Manhattan) thus makes proposals for housing along the East and Hudson River banks of Manhattan consistent with the regional context.

Office Space Demand and Locational Preferences

The immediate demand for office space is generated almost entirely by firms already located in Lower Manhattan. It consists of three kinds: corporate and business expansion and upgrading; some small-firm needs for space in speculative buildings; and expansion for mass clerical and machine operation functions. The first two need prestige location and identification, while the last is best accommodated in large, undivided floor areas with somewhat different building requirements than the other two.

A considerable part of this immediate demand is for buildings with floor areas of 30,000 to 50,000 sq. ft. Banks seek places for stock transfer activities [1] linked to the corporate headquarters, the brokers and corporations who have stock issues, the Federal Reserve Bank and the Check Clearing House. Much of this is tied to locations south of Chambers Street, and the Water Street area is a logical choice. Business services expansion is related to all three in terms of growth potential.

All of this demond translated into net additions of space required for present functions is still modest (for perhaps 50,000 employees). However, if the objective of diversification can be achieved and new functions added, Lower Manhattan's shore of regional growth can be substantially increased by new firms (by the addition of a goal of another 75-85000 employees). [2]

Locational preferences are expected to continue to be in or near the Core. The "natural areas" of expansion are assumed to be where market demand now indicates: to the east in the short-range, adjacent to the World Trade Center in the middle-range, ond further in-filling in the long range.

Although considerable in-filling of the present Core is now taking place [3] a major share of this new construction is in response to the widening of Water Street and the availability close to the Core of relatively cheap sites. Water Street shifted the traditionally inward focus of the financial community outward to the East River, but it is a kind of backing movement with continued focus on Wall and Broad Streets as prestige addresses as expansion occurs.

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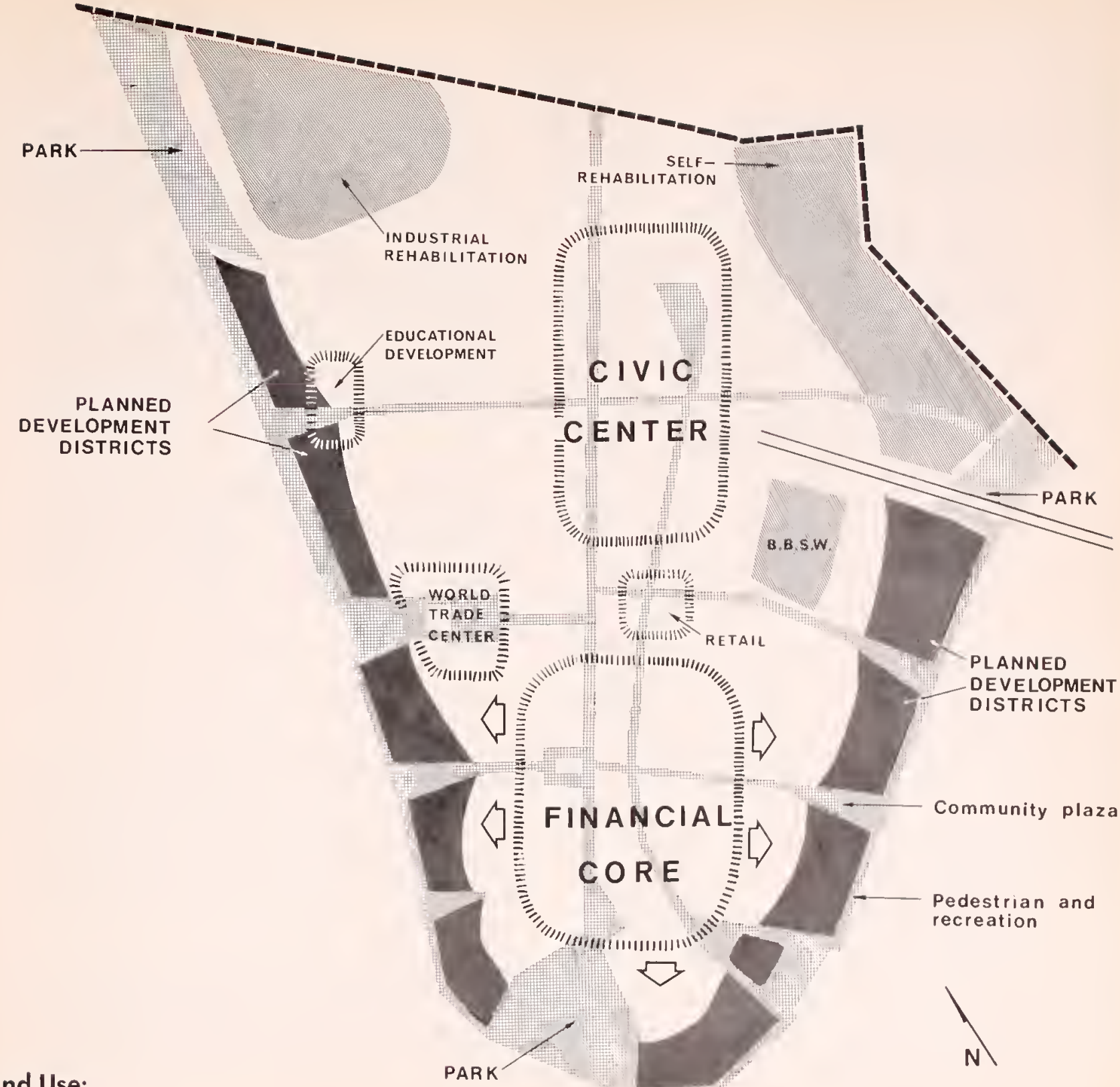
[1] See e.g. New York Times. Op. cit.

[2] See supra, Table V .

[3] As evidenced by the planned and committed buildings shown on the map of immediate recommendations.



Land Use:
Basic Concepts

0' 500' 1000' 2000'

A major function of the Plan is to work with these market forces, to guide them and to insure that the Core does not become too diffuse as a result. Thus housing interposed at Front and South Streets and in the pier area is seen as a counter-move to help prevent this diffusion.

In the middle range, the World Trade Center is assumed to have been completed, along with the development of the U.S. Steel site. By then the capacity of the Water Street area will have been reached and the influence of the W.T.C. will be to generate interest, activity and new functions in that direction. As a consequence the Plan should foresee making use of this anticipated direction-shift of the investment thrust and assign space and growth to areas to the north, south and east of the Center site.

In the long-run, the assumption is made that the additional office space demand will come from new kinds of activities --sub-centers of advertising, general office, housing-oriented business services and the like -- and these will be accommodated by further in-filling in the Core and in transition areas between housing and office areas.

These assumptions are the basis for developing a tactical program and assignment of space illustrated in the staging maps.

Government Space and Locational Preferences

Government policy can be influential in the short-run, but Lower Manhattan's monopoly on government administrative space and related government services is likely to provide for a continued expansion via a rental/construction cycle similar to that which is now happening. Although demand for new space would appear to be largely satisfied by the Civic Center and World Trade Center, it is worth noting that even in the short time of its development the federal space requirement has gone up 50%.

Locational preferences are assumed to continue to be on the major subways and on both sides of Broadway, generally to the west and southwest of the Civic Center. In the future, business services related to government should move farther west and south, attracted by the World Trade Center. The assignment of space is not broken down by government versus private space, but the assumption is that a substantial portion of it will be occupied by government and related business service expansion.

Other Non-Residential Activities

It appears clear that the space demands for most other existing non-residential activities have been declining and will continue to decline. Manufacturing, food distribution, and wholesaling-with-stock with few exceptions have found other areas in the City and region more appropriate to their needs and within their economic reach. Retail activity has been displaced by project after project; in the future it is dependent on an immediate market of residents supplemented by the workers in the Core. The ultimate demand will depend on how much housing is created, and on how attractive the environment will be for restaurants, theaters and shopping.

Locational preferences for shopping will be at points on or near subways, future housing and major employment centers At the level of general land use planning, assignment of retail space can be ignored, as it will undoubtedly be the first floor activity of buildings with other uses.

Institutional uses, however, are a source of demand that can have a great impact on Lower Manhattan, Beekman Hospital, and Pace College are only two of many possible. Columbia College (later University) was once located near the World Trade Center site. With a major residential community, an educational complex that takes advantage of the great subway concentration appears a logical new use.

Again, why an educational complex? Studies of the Washington Market Area indicate as stated in Chapter IV that this is a site for which there is little demand without a substantial subsidy of some kind over and above the renewal write-down In the meantime, the City University is looking for places to develop new educational campuses of various kinds. In a way this is an expediency, a site looking for a use and a use looking for a site. Detailed analysis now underway may indicate the site unsuitable.

Clearly, the case for an educational complex here must depend primarily on City policy. However in an area where public

decision must be made, such o decision could be a public action, within public control to make, that would hove a fantastic multiplier effect as o precedent to upgrading the area to its east, ond to setting preconditions for the best kind of development on the piers.

Special Area Demands

Three special areas were considered as to the long-term appropriateness of their present uses: the worehousing ond distribution area around Canal and West Streets and the Hollond Tunnel; the area north ond west of the Civic Center, and Chinotown.

The first is well located, the buildings ore appropriote to their uses, with many designed for well over 250 lbs, per sq. ft. floor loading, and with up-to-date freight elevators and air-conditioning. The area has shown considerable growth and vitality in recent years and is more related to the similar area to its immediate north (north of Canal Street) than to the declining food center to the south. Here o program of industrial renewal is considered feasible and desiroble. The long-range use of this area is therefore ossumed to be its present one, with the demand for such space continuing strong.

The second areo -- the industriol "blue collor" area of the northwest -- has been discussed in detail in Chapter II. The conclusion wos that it should continue in its present use for the indefinite future, based on the City policy of protecting its jobs Special programs for helping the businesses and for job-retraining seem odvisoble.

The third, Chinatown, has a much greater potential as a tourist attraction and residential areo than is now reolized. With some physical and social changes, the market can support much more octivity there.

Demand for Residential Spoce

With the region increasing by all estimotes from 12 million to 20 million peopl e by the year 2000 the total demand for residential spoce is expected to be large. New York defies housing market analysts because demand in most sectors of the market is so great that developers often dispense with their services.

What little experience developers in the northern part of Lower Manhatton have hod (Chothom Green, etc.) in morketing housing indicotes that even with a somewhot lonesome atmosphere, the demond is relatively strong. The assumption is made therefore thot the developers of a reolly vioble and ottractive community can almost write their own ticket. This assumption also indicates the reol possibility thot public policy can mold the composition of the result in terms of desired housing income and racial mix. [1]

Within morketobility limits, such o mix rather than a single-income group for lorge projects is also of advantage to developers. It permits them to rent and sell more ropidly by reaching into mony housing sub-morkets at the some time.

The initiol demand in o new area not yet identified as a desiroble neighborhood should be for relatively specialized groups: people for whom the normol omenities of family life ore not essential. Included would be bochelors, "young morrieds," second aportments for executives, etc. In time, as community facilities are developed, the noture of the demond can change, and the mix could be broodened by moking ovoiloble middle-income housing money. The areo can then be attractive for family living.

Informed reol estote opinion holds that middle-income housing can be built on lond costing up to $ 10 a square foot at top densities, ond "luxury" housing (depending on the degree of "luxury") on lond ranging from $ 50 to os high os $ 100 o squore foot of octuol site. [2] On existing land, with site costs overoging from $ 75 to $ 125 per square foot, there ore only few situotions olong the downtown riverfronts where unoided housing is feasible. These situations will be primarily for "luxury" housing, perhops combined with office structures. As has been mentioned however, these possibilities ore realistic, with the Brooklyn Heights and other Boy sites os exciting examples.

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[1] See Walloce, McHarg, Roberts ond Todd, Trenton Housing Policy Study, for the Department of Planning ond Development, Trenton, N. J., 1966 for a study of the implications of rent levels and housing types on viable economic and raciol mixes.


Future Land Use
Legend:
RESIDENTIAL
OFFICE
INSTITUTIONAL
INDUSTRIAL
PARKS AND RECREATION SPACE
PEDESTRIAN WALKWAY AND COMMUNITY PLAZA
RETAIL
TO BE DETERMINED
0'
500'
1000'
2000'
N

Generalized Functional Areas: Future

0' 500' 1000' 2000'

In cantrost , in newly-created areas beyand the bulkheod the octuol cost af developed land (including the cast of the relocoted ond depressed highwoy) con be in the neighborhaad af $25 o square faot. This means thot o certoin variety of conventianolly-finonced housing is econamicolly feosible.

In terms of morket far this o mojar immediote source of the dawntawn hausing demond is the 400,000 emplayees in Lower Monhotton. In light af the gaal of reducing the journey-to-wark, the ultimote incame mix shauld bear a close relatian ta the effective demand of this graup. [1]

Morket locationol preferences tadoy are far hausing at the edges of the Care, on either side af the Braaklyn Bridge oppraoch and olang the water on the Eost River. [2]

THE CONCEPT PLANS

With the abave summary os background, alang with detoiled onolysis af the existing situatian in eoch sub-oreo of Lower Monhotton outlined in Chopter II alternote Concept Plans were develaped which made initial land use ossignments. These constituted o "leop" inta the future, putting tagether the abave morket considerotians with the opplication af relevont basic principles.

The Lond Use Cancept Plan

As has been stoted, the functian af a Land Use Cancept (ar Sketch) Plon is to pravide o lang-range bosis far preliminary ossignment af lond use ond activity; it also serves os a preliminory test af the passibilities far implementing the strotegy af odding o mojar residentiol community to the Core. Wauld such o cammunity be simply on "olien" groft an the Care, unintegroted ond nat oble to effect the enrichment af octivities desired? Or could it be sufficiently lorge ond tightly reloted to became bath vioble an its own and af reol benefit to the Care?

The Lond Use Cancept Plon shown in detail is o clear stotement of the prapased lond use relotionships. The business Core is enlarged slightly ta the eost olang Woter Street ond the west to the World Trode Center, but the Core remains bosically tight. The government center extends o short distonce ta the west of Broadway ond is occupied by intense business ond government services. The residentiol cammunity is essentially o lineor one extending olong bath woterfrants , orgonized into plonning and development units. These ore jained tagether at community center plozas that serve to unite the sociol ond ecanamic life of the residentiol ond business worlds. In them wauld be locoted o wide voriety of cammunity facilities.

The selection of the locatians af the cammunity center plozos wos influenced by the existing mojor pedestrion streets ond cannections to subways, by the geometry of the service connections to depressed expresswoys, ond by the populatian size of the residential units.

Where residentiol areos jain the affice Care, hausing ond office ore proposed to be actually mixed in the sense that they will be side by side, ar in same coses residence on tap of office, they shore common open spoces ond community facilities and use the some movement system. Thus eoch residential plonning "node" is tied closely to o business or institutionol use inlond. Both ore served by the peripherol expresswoy system, ond share on internal park and open space nucleus. These nuclei will serve os local open spoces, primarily available to the residents ond employees they serve, cantaining tot-lots, swim clubs, handboll courts, ond other smoll scole facilities.

Major institutionol growth is conceived around Pace College in the center af the peninsulo ond in the central portian of the Woshington Morket Areo. These ore intended to serve both Lower Manhotton ond the region os o whale.

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[1] Little is known obout the income strotificotion af the employment paal todoy. As projects ore morketed, speciol surveys af the demond ore desiroble to geor the mix to this group.

[2] From investar inquiries ond informed real estote opinian.

Although current plans indicate leaving the northwest as it now is for an indefinite time, the area from Church Street to the Washington Market area is expected to be ultimately renewed for residential use, in part by new structures, in part by conversion of existing warehouses and offices to housing. Remaining industry near Canal Street and the self-rehabilitated area of Chinatown is compatible with the adjacent new uses.

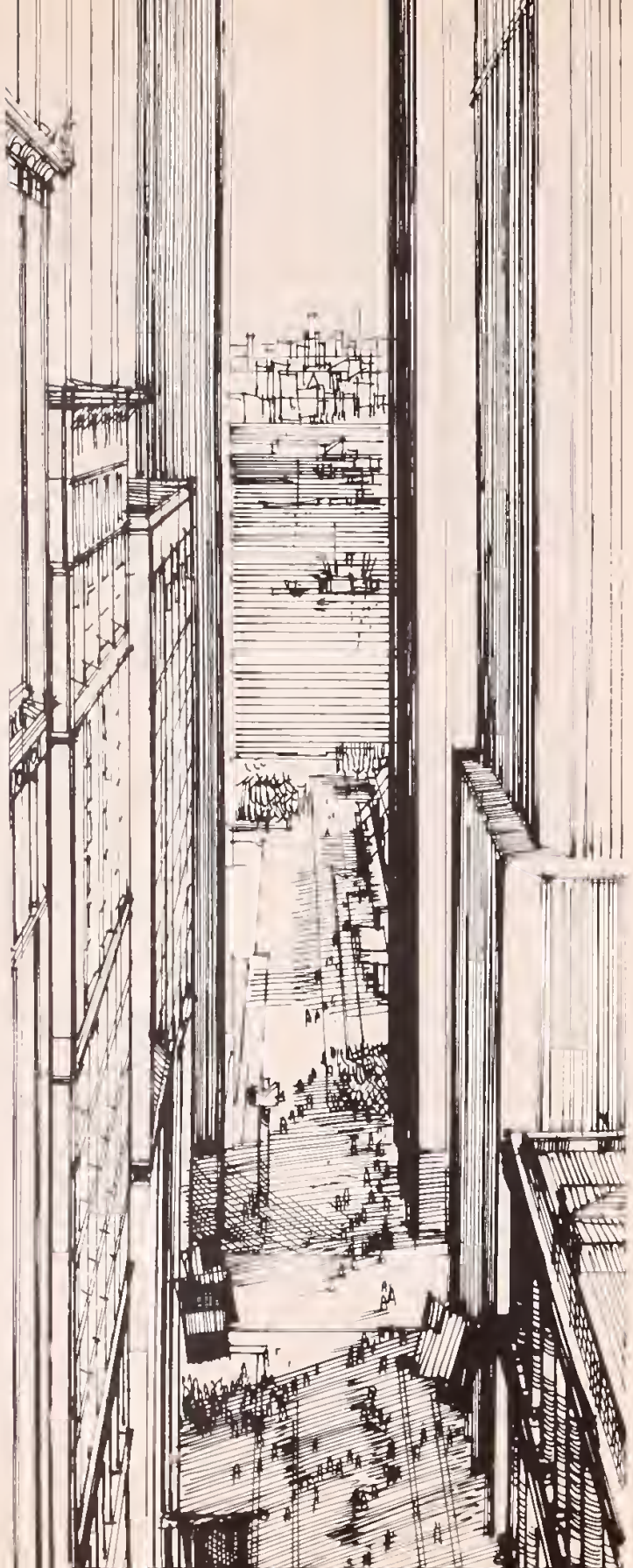
At the community, city and regional scale, the water's edge is completely available, entered from the community plazas and from the adjacent housing. The regional parks form a system of open space which broadens at the Brooklyn Bridge to serve the Governor Alfred E. Smith Houses and the new housing to the south, as well as to serve regional recreational demands with active sports such as tennis, model airplane flying fields, etc. It broadens again and includes Battery Park, a large public esplanade in front of the World Trade Center and finally another major regional park between Hubert and Canal Streets.

The Movement Concept Plan

The Movement Concept Plan presumes major improvement for mass transit access to the Core. In terms of auto access it presumes the existence in the not-too-distant future of a facility of the performance characteristics of the Lower Manhattan Expressway to divert through traffic from local streets. This, while perhaps not critical to the system, is a very important element.

The performance characteristics for the F.D.R. Drive and the Miller Highway are significantly modified in requiring more points of access to the major arterial system at Maiden Lane-Liberty Street and Barclay-Vesey, and Worth-Leonard on the west. It is these points of access which will improve the distributor function. They become a major traffic reason for considering depressing the expressways.

The initial movement system developed in response to current problems (discussed in detail in Part 2) was found to be consistent with this land use pattern and with minor modification served as a Movement Concept Plan. The peripheral expressways perform the major by-pass and distributor function, an internal



north-south and east-west major arterial system and a local service system act as distributors. Parking garages are tied to the peripheral system at points where expressway exits occur. The concept intends the internal street system to be largely for service and taxi access.

Connected to the community plazas is a major pedestrian street system -- Chambers, Fulton, Wall and Broad, in an east-west direction: and Broadway, the north-south ceremonial street serving both as a pedestrian and vehicular artery. Nassau-Broad Street is the other major north-south pedestrian thorofare. The pedestrian streets connect to the major subway exits, and form a structure on which internal open space, both existing and proposed, is located.

Alternate Concepts

In terms of form, the concept alternatives range from a massive development along the edge of the water that clearly expressed the linear nature of its development, to a pattern of towers in parks -- objects in space like the Governor Alfred E. Smith Houses. The first extreme cuts the City off from the rivers and the second is basically non-urban and sterile, a relic of obsolete design concepts and standards.

The most desirable form appears to be a modified combination of towers and terraces, a mix of residential and commercial that has a visual expression more like San Gimignano in Italy than either of the two extremes.

The visual solution to the scale-upsetting World Trade Center was felt to be the development of towers close to it in height that would provide a transition between it and the present complex. At the same time the total shape should continue as much as possible to be the pyramidal, albeit slightly off-center, skyline profile of today.

Major alternate land use concepts were possible only if the determinants outlined below were substantially relaxed. For example, one involved limiting housing to the area north of Fulton Street and in the Washington Market Area. The piers would be eliminated and either replaced by park or left as water. The housing developed on inland sites would require both urban renewal and middle-income subsidy; the first because of the high land costs, and the second because luxury housing, politically unlikely to be placed on urban renewal land anyway, would require a better environment than could be provided without removing the elevated expressways. Their removal is unfeasible without building out into the water, as will be shown in the East Side Case Study in Chapter VII.

A major reason for rejecting this alternate was that the residential areas could not be integrated with the Core. As a result, the commercial activities that they would generate would depend for their support on the residents alone and could not tap the market of Core employment. The Core in turn would not benefit by enrichment of mix. A final reason was that the activities and jobs that would have to be relocated to make sufficient room for such housing, are and will be in critical demand in the city for a considerable time to come.

Summary of Principles

In summary of the adopted Concept Plans, the underlying principles intended to serve the previously outlined goals are as follows:

A. Movement

1. Classification and assignment of each element of the street and expressway system to the function is should perform; and the treatment of each accordingly as: a) Streets for major movement of traffic, designed as a peripheral by-pass and distribution system; an internal arterial system; and a local service and access system, b) Pedestrian streets for free movement of people over short distances.

2. Integration of pedestrian streets into a structure of feeder subway stations and zones, major internal open spaces, community plazas and the park system for public access to the water's edge.

3. Location of parking -- except that for short turnover -- at the periphery of the peninsula and keyed primarily to the expressways to reduce internal traffic as much as possible.

4. Improvement and integration of public transportation into a system to distribute people consistent with land use concentrations.

5. Provision of pedestrian connections from all residential units to job centers to take maximum advantage of a shorter journey-to-work.

B. Land Use And Activities

1. Maintenance and enhancement of a strong, coherent concentrated Core, along with as intense uses as possible consistent with a tolerable level of congestion.

2. Close integration of residence and office uses at the periphery of the Core, not just grafted on, but interwoven with each other.

3. Provision of a new major residential community with full community facilities organized into viable planning and development units, served largely in terms of access by the peripheral expressway system.

4. Within each residential planning unit, complete separation of pedestrian and vehicular traffic.

5. Development of a system of public community plazas and open spaces to serve as the meeting places for the social, economic and cultural life of Lower Manhattan.

6 Development of the waters' edge into a variety of recreation facilities with full pedestrian public access to all.

7. Provision of inland views to the water from as many points as possible to maximize the advantage of Lower Manhattan's unique location.

8. The gradual elimination of activities that are competitive and inharmonious, particularly goods-handling and low-intensity uses, consistent with:

9 The retention, for an indefinite period, of jobs now in critically short supply.

C Shape and Form

1. Arrangement of zoning envelopes and development controls and intensive activities at the key points of major access, the subway zones, and the central spine of Broadway.

2. New building so arranged as to provide "transition" towers between the new form of the World Trade Center and the old form of the familiar silhouette.

3. Preservation of downtown "canyon" scale and spatial organization at the same time allowing for utilization of modern technology, economic disciplines in new construction.

SPECIFICATIONS FOR THE RESIDENTIAL COMMUNITY

Out of these principles came certain specifications for development of each of the land uses. Because of its central role in the Plan's strategy of change, and because of its being an "introduced" use, the specifications for and implications of the residential community are singled out for special consideration. These must be viewed, of course, in light of general housing goals for the City. [1]

The most desirable community from the standpoint of City-wide policy would be composed of a mixture of economic and ethnic groups, from upper income to lower, as a long-range goal. The specific mix of such groups is beyond the scope of this Study, and in light of the City policy of no subsidy in this area the subject is perhaps academic at the present time. It is felt that later study, particularly of the employee market in Lower Manhattan, should determine an appropriate mix. Ultimate decisions on this mix will not materially change the housing types and intensities, although they will affect the amounts and kinds of community services needed.

In developing the preliminary specifications for the proposed residential community, the considerations that were examined are outlined below.

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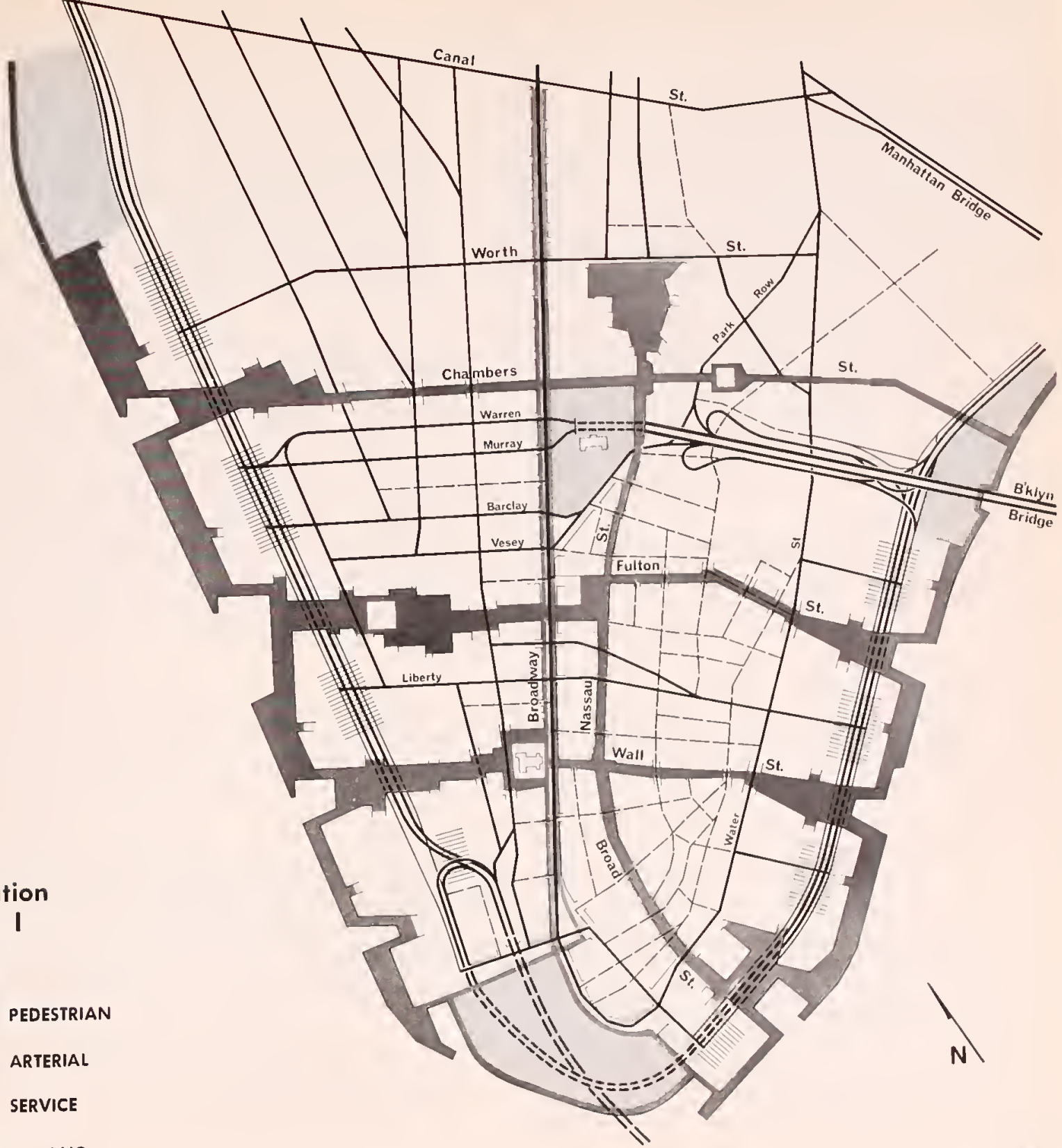
[1] See e.g. Department of City Planning, City of New York, Toward a Strategy for Urban Renewal for New York, Department of City Planning, City of New York, 1966.



Circulation System I

Legend:

- PEDESTRIAN
- ARTERIAL
- SERVICE
- PARKING

0' 500' 1000' 2000'

Regional Trends for Downtown Housing

The immediate market for downtown housing concentrates on that increasing portion of the region's middle-to-upper income population which seeks multi-family housing in the Core and in what the Regional Plan Association has referred to as the "inner ring".[1] In 1957, only 20 percent of the housing units in the "inner ring" were multi-family; by 1964 this proportion rose to almost 60 percent.

For the most part, these units represent two household types: relatively young families with few or no children, and an older group (generally over 45 years of age) whose children are now teenage or adult and who have therefor gained a considerable mobility. Both groups are growing in the region, and their housing decisions have had a strong impact on the distribution and categories of the housing stock being added. It is estimated that between 1965 and 2000, the number of one-and-two person households will rise by 84 percent compared to 46 percent for three-or-more person households. There will also be a shift toward younger households, a group which, in certain income categories, is amenable to central city living. The capacity of the Core to attract this group -- or significant segments of it -- depends on its success in creating good housing in a good environment.[2]

A third group consists of the well-to-do with the means to select and influence their own environment and who can set the tone of any area they decide to move into. This group will play a major role in downtown housing, particularly since it is will represented in downtown employment.

Out of the 100,000 - 130,000 dwelling units added annually to the regional stock,[3] these three groups account for roughly 25,000 to 35,000 units. If as many as 2,000 of these households were to locate in Lower Manhattan annually, this would represent a "capture rate" of some 8 per cent of the market. In the development period envisaged, such a rate would mean the addition of 40,000 new dwelling units, or roughly 80,000 to 120,000 people, depending on household size (2 to 3 per household).

Desirable Mix Based On A Midtown Example

In the course of the analysis of anticipated downtown residential growth, a survey was made of the existing mixture of employment and housing in the East Midtown area (between 30th and 60th Streets, east of Fifth Avenue). This area was selected because it is probably the most successful existing prototype of mixed office-residential use in the country. It was not assumed that this prototype would function as a "model" for downtown development, but only that it might offer some clues as to the nature and composition of viable mixed areas.[4]

Some 595,000 people are employed in this East Midtown area, while the residents in the same area number 102,500. The ratio is therefore about six employees to one resident. This ratio varies widely from one part of Midtown to another. For example, along the East River a predominantly residential area, the ratio is three or four employees to one resident. South of Central Park, in a predominantly office area, the mix is almost exclusively office, with only a scattering of residential-hotel population.

The residents are not organized in typical family units. There are 96,476 adults and 6,086 children (14 years or less), well below the City average. Of the adults in the area, a relatively small proportion are married -- 39,840 out of 96,476 or 41 percent. This too is below average.

The pattern of this development emerges as small apartments with a heavy concentration of bachelors, unmarried women, plus married people with few or no children. These are largely people who want direct day-and-night involvement with the Core of the city, or who want walk-to-work housing. In addition, the well-to-do enjoy the benefits and convenience

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[1] This includes Manhattan, the near in portions of Long Island, Staten Island, and New Jersey.

[2] R. P. A., op. cit.

[3] R. P. A. op. cit.

[4] Some significant differences should be noted at the start. The Midtown residential community is actually part of a larger residential area extending up the East Side to 96th Street. It therefore cannot be treated in isolation. Also, the Midtown housing stock was built up over a long period, and ranges greatly in quality and character. The downtown development, on the other hand, will be somewhat "isolated" for some time to come, and it will be more difficult to market it for a heterogeneous group.

of Midtown living; at the same time, thraugh cauntry hames and beach hauses they have the best of a variety af residential environments.

In certain areas, the praportian of women to men is very high, in particular between Park and Third Avenues. This suggests yaung career women, as yet unmarried, walking to work, living together in groups of two, three or faur, near their jobs, restauiants, theatres and ather amusements

Minimum Community Size

Assuming a goal for the dawntawn develapment of a warking papulation of 500,000 (up from 375,000 today), a minimum residential population of 83,000 would provide a ratio of six workers to one resident; a three to one ratio would require 166,000 residents The lower figure would be sufficient ta support a wide variety of local activities, including a major high school in the downtown area to serve the new papulation as well as a partian af the Lawer East Side. A high school wauld be important in the development of a strong cammunity self-image and would help ta anchor the cammunity to the downtawn area. However, it is clear that a high school involving a major allocatian of City funds would not be indicated until the later stages of develapment. In conclusion, a gaal af approximately 100,000 residents is sought.

Density and Coveiage

Much downtown resid ential zaning is currently the equivalent of R-10, the highest category af residential zoning in the cade, praviding a room count af about 1,450 per acre, ar roughly 1,200 people per acre. At between 2 and 3 people per dwelling unit, this would be about 500 dwelling units per acre.

In light of prabable land casts and in view af the existing business densities, this zaning has been used for the initial land use calculatians although R-9 turned out to satisfy the economic requirements. High densities are bath ecanomically necessary and aesthetically appropriate to the area because of the goals af intensity and maximum use af the sites. Later planning for facilities and a desirable environment tended to cut back these tatals ta a degree. As a result neighbarhaad density, including public apen space comes to between 400- 600 people per acre. Building caverage consistent with the zoning code wauld be abaut 40 percent with the remainder in open space ar public use.

Neighborhood Unit Size

A number of neighborhood clusters or development nodes was fixed on a trial basis, at six in accordance with the "natural" area divisians alang the periphery. Each is centered between two major pedestrian arteries and constitutes a majar building unit. The pedestrian arteries are part of the internal pedestrian street system. For identification these units are referred to as: 1) (on the Hudson River) Chambers Street, 2) World Trade Center, 3) Rectar Street, 4) (and on the East River) Fulton Street, 5) Wall Street, 6) Broad Street. The neighborhoods are raughly equal in size, except for the Fulton Street unit which is considerably larger than the others and encompasses a renewal project (Brooklyn Bridge Southwest) already underway.

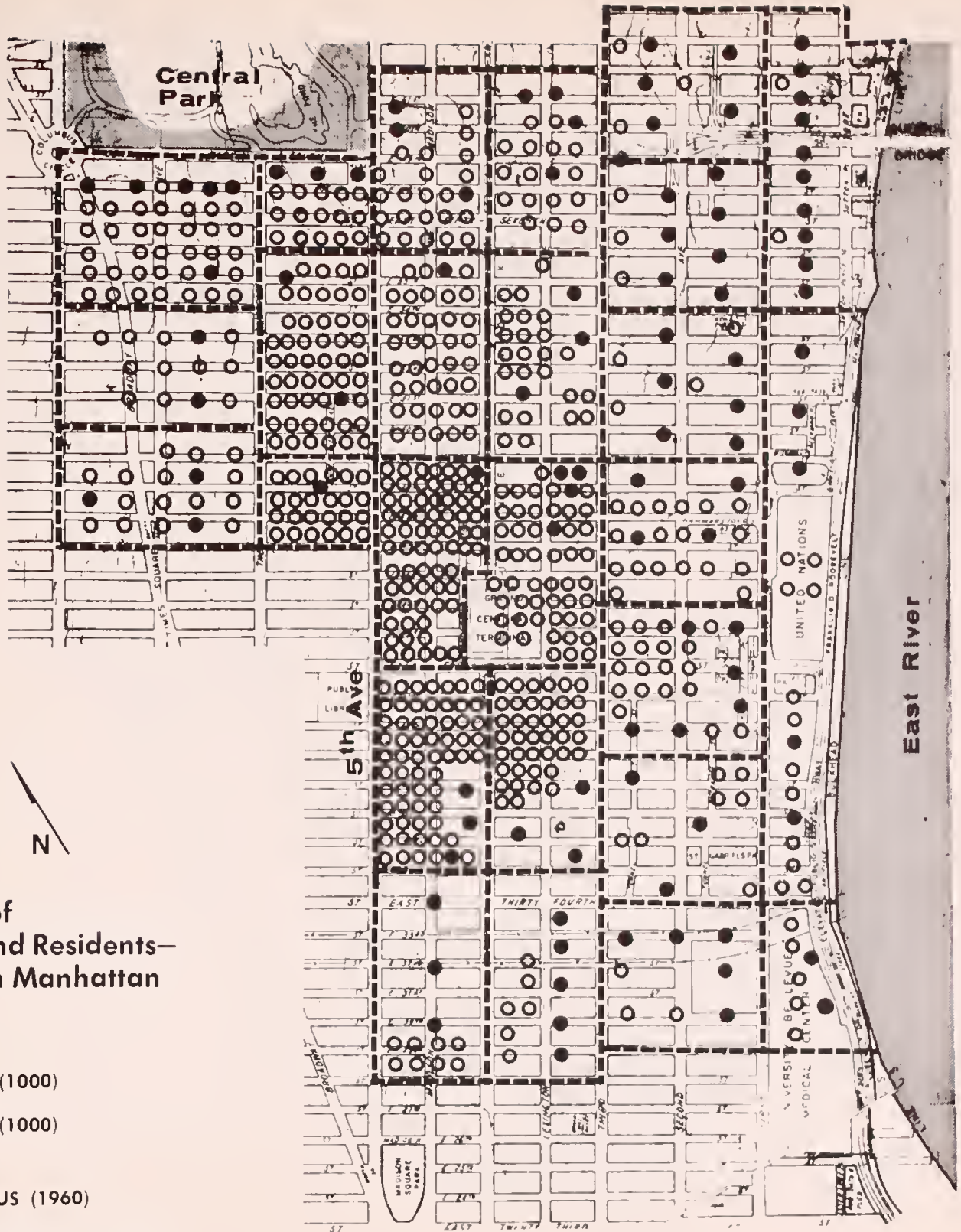
Each of these neighborhood units ultimately should be large enough to have its awn residential shopping, which is to say at least around 12,000 people or enaugh ta suppart a small super-market. Added together, this would suggest a minimum downtown residential populatian af 80,000, not inconsistent with the minimum based an the office-residential ratio criterion.

The preparotion of the land use programs and latei design studies acted as tests far the feasibility af these principles and specifications.

Supporting Facilities

Playgrounds and Playlats: Basically, twa kinds of local recreation space are necessary for the residents: 1) Playgrounds distributed at a maximum of a half-mile from residential areas, and 2) lacol facilities (including playlats) foi each residential affice cluster. No fixed national standard can be used to determined the amount required; properly distributed, a large number of small units, supplemented by several field-size playgrounds, will meet the needs of the papulation to be served based on an ultimate detailed analysis.

The location for small scale "backyard" parks or units is proposed for platfoims over the service areas in each residential unit, surrounded by low-rise buildings, with easy access ta the residential towers.



Distribution of Employees and Residents— East Midtown Manhattan

Legend:

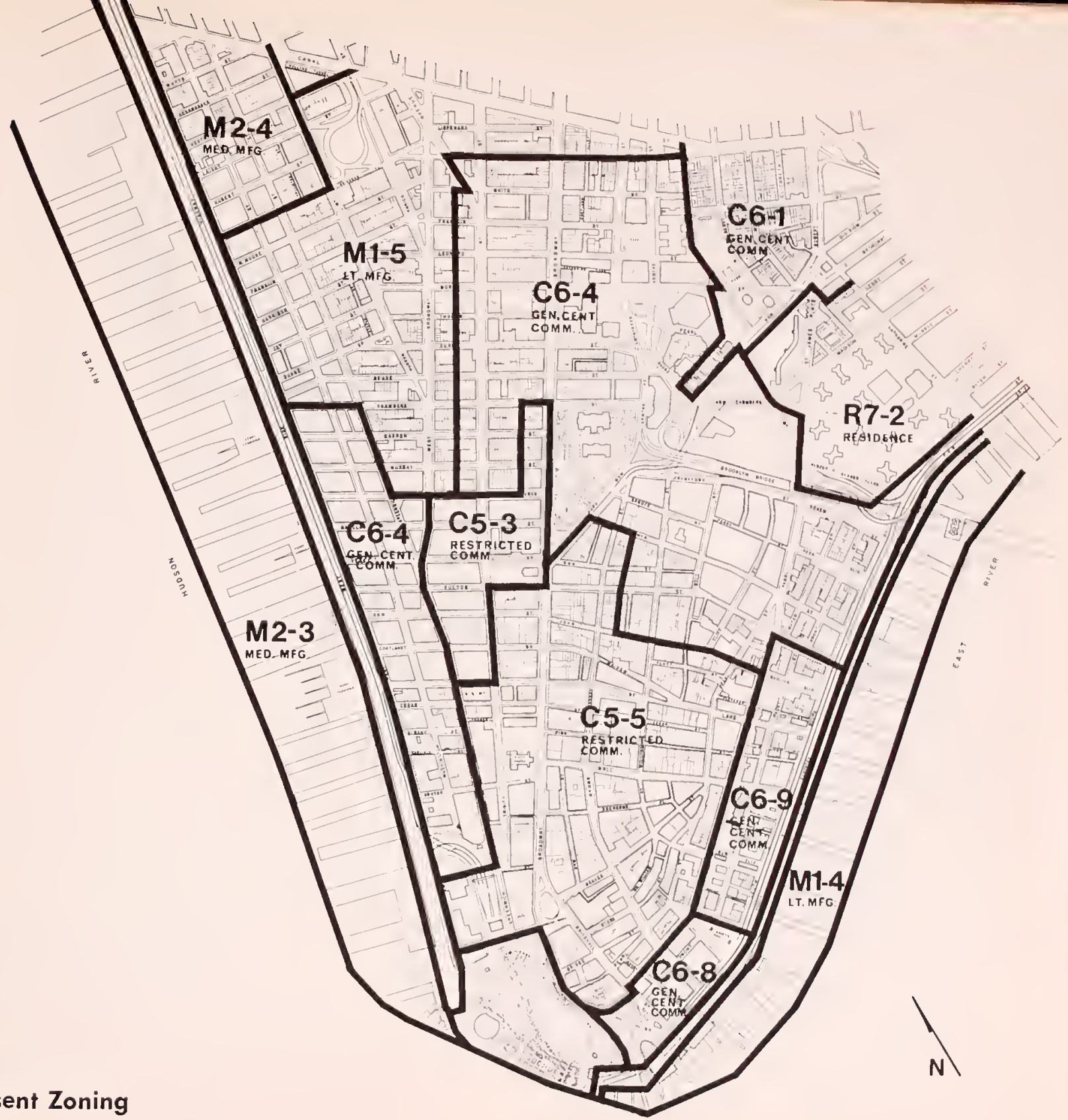
- ● RESIDENTS (1000)
- ○ EMPLOYEES (1000)

Source:

U.S. CENSUS (1960)

N.Y. STATE DEPT. OF LABOR
BUSINESS CENSUS (1957)

0' 1000' 2000' 3000'



Present Zoning

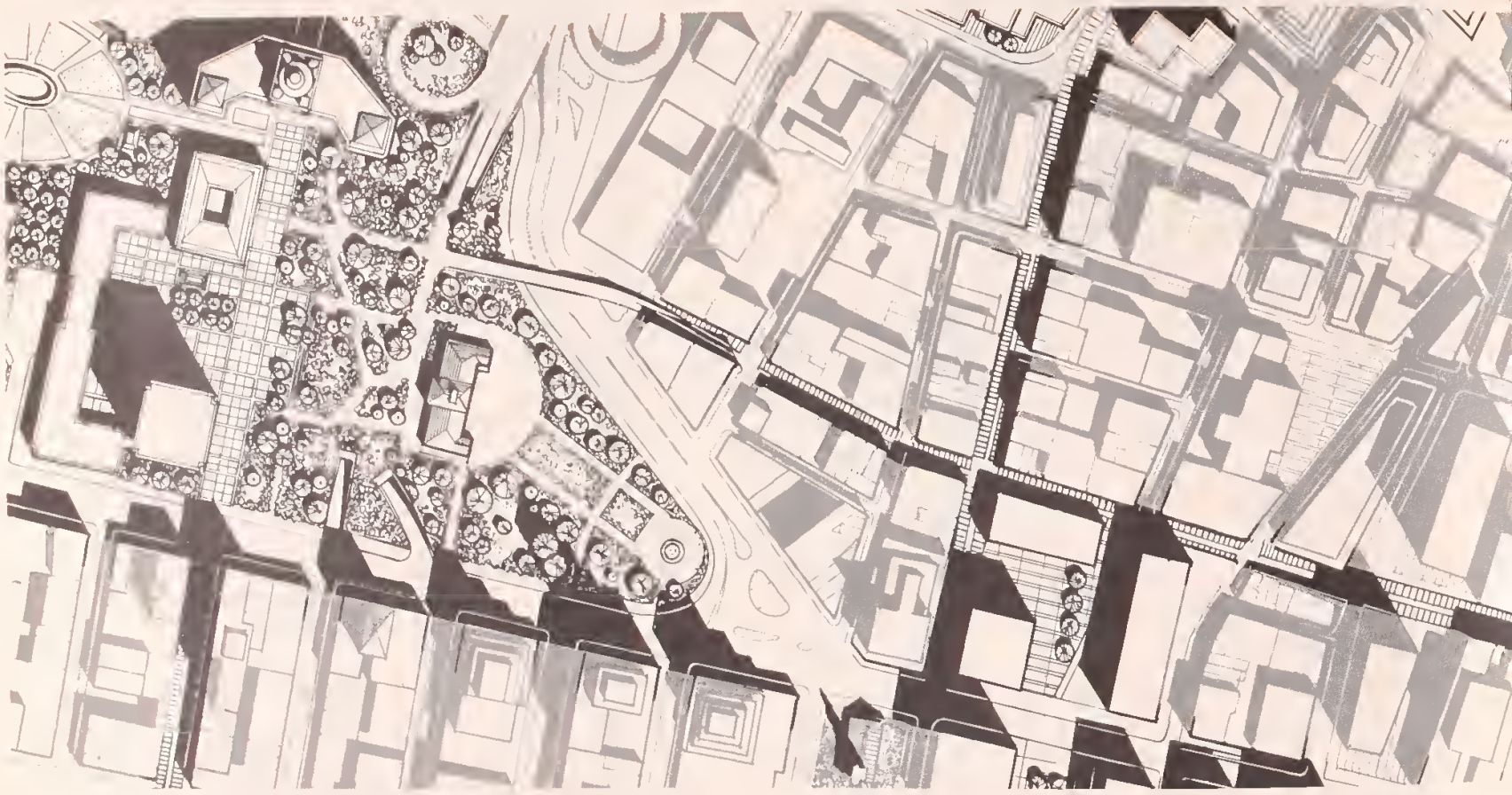
0' 500' 1000' 2000'

Pedestrian System

Legend:

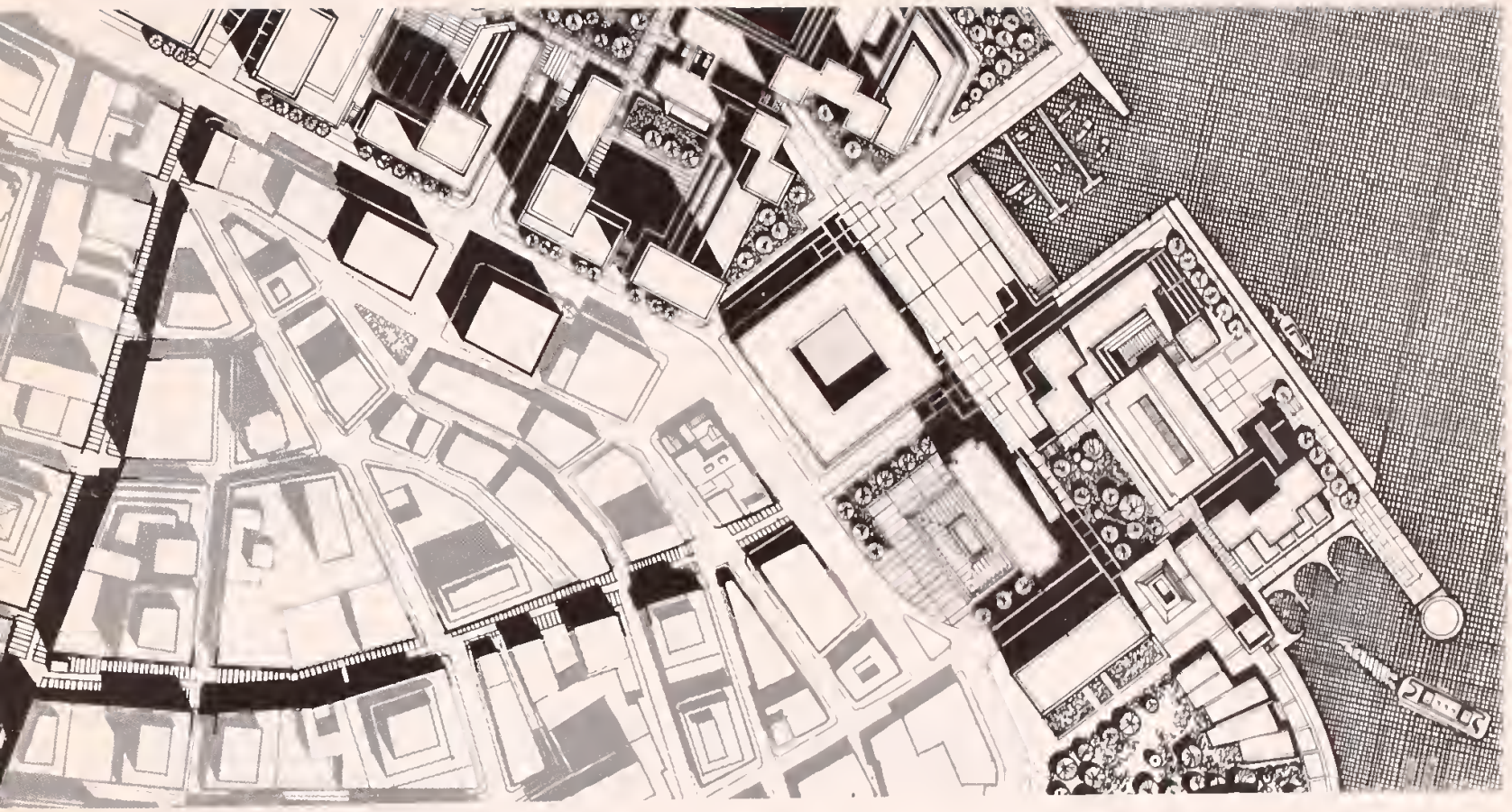
- PEDESTRIAN STREETS
- PUBLIC OPEN SPACE
- PRIVATE OPEN SPACE
- PARKS
- • SUBWAY ENTRANCES

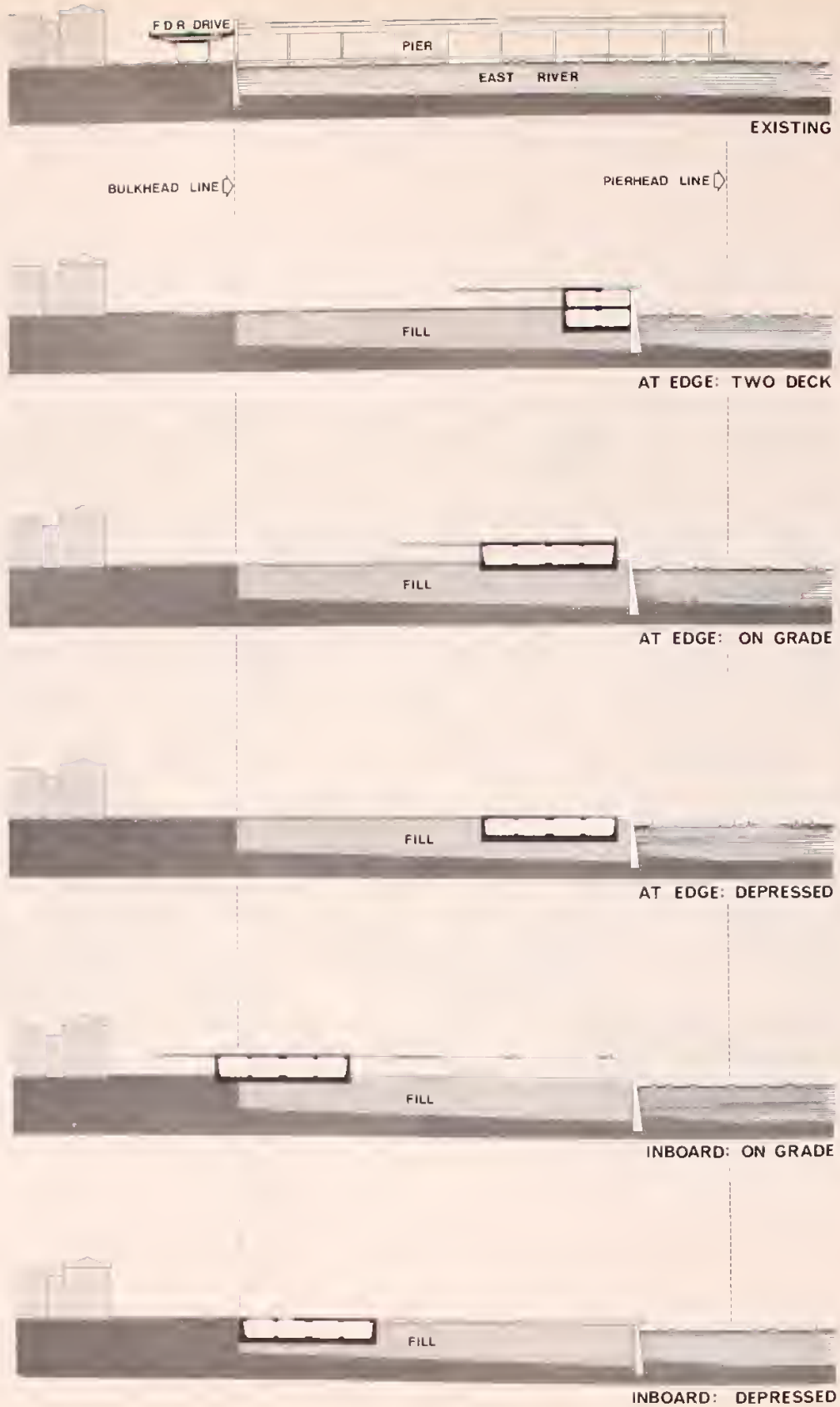
0' 500' 1000' 2000'



Pedestrian System:
Broad-Nassau Route

0' 100' 200' 500'





Waterfront Development: Highway Alternatives

0' 100' 200' 400'

On these raised terraces, a degree of isolation suitable to playlots and pre-school activity will be assured. These areas will be used primarily by residents of adjacent buildings.

Parks: Three major parks are indicated, two new ones at the northern end of each share development, and one old one (Battery Park) enhanced and partially used for active recreation. The total space involved is somewhat over ninety acres.

The East River Park, on new fill between Peck and Catherine Slips (partly under the Brooklyn Bridge), will serve both the new community and the existing Alfred E. Smith Homes to the north. This area is presently deficient in playfield area, although the Two Bridges Neighborhood Association has plans for the enlargement of existing facilities.

The Hudson River Park will be located north of the proposed institutional reserve (or educational park)and north of Hubert Street It will also be on new filled land. It might serve the proposed downtown high school and other educational facilities suggested for this area. It is considered an appropriate location here for three reasons. First, it should be designed for teenage and adult recreation, and therefore its users would be highly mobile and able to travel to it. Second,the character of active recreation makes it an "attractive nuisance" not desirable too close to dense housing. Third, it will form a good transition or buffer between the housing to its south and the industrial area to its north and east.

Schools: As previously mentioned, it is anticipated that two primary schools will be required, one for each side of the island, with a capacity of 1200 children each. An intermediate school will be required for the East Side development, as well as an additional one for the west side. The primary schools are seen as easily accommodated in several floors of multi-use structures. The intermediate schools will probably require separate sites, and it is anticipated that developers can integrate these schools into their plans in such a way as to relieve the City of any site costs.

A senior high school ultimately will be needed. It can serve the areas to the north of Lower Manhattan as well. A possible location for it would be part of the educational reserve proposed for the Washington Market Renewal Area. It is desirable that it be located on or near a good subway access and with play space; it could be designed as a special-emphasis or "magnet" school related to the employment needs and activities of the Core.

Shopping Facilities: Some local shopping and community halls may also be provided,[1] but these should principally be at the plazas. Each community plaza can take on a special character: the Fulton Fish Plaza with oysters sold from boats, etc.

Specifications for a New Peripheral Movement System

It was evident that the existing waterfront street system would have to undergo significant modification and expansion to accommodate the new growth. The new system should meet the following requirements.

1. Express traffic on the peripheral highways should be provided so that it no longer constitutes a physical and visual barrier between the area inside and outside the present water's edge.

2. Access must be provided directly from the expressway to distributor arterials and the service system for the waterfront development districts.

3. Servicing of any new development area should impose no additional burden on the arterials, but should be handled in a separate system designed expressly for service purposes.

4. New residential parking facilities should be tied primarily to the peripheral highway system, and as little as possible to the existing internal street system.

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[1] The prototype for this is the Brooklyn Bridge Southwest housing now being designed on this principle.

5 Direct an-grade pedestrian access shauld be pravided between the business Care and the waterfrant cammunity.

As a general principle, the new circulatian system must be designed ta establish physical cantinuity between the existing Care and the new aff-share develapment. The best salutian wauld be the ane which creates the mast added land value in relatian ta cast. Ta what extent can the existing system be adapted ar must there be a new system?

Alternatives far the Expressways

The first questian has ta da with the existing elevated highways. Designed ariginally ta allaw an-grade truck access ta the naw absalete and underutilized piers, these highways are nat anly a blighting influence an the surraunding areas but alsa a barrier between the Care and the new waterfrant. In addition they were designed primarily far thraugh traffic and have paar service cannectians far the waterfrant area. [1] Their ultimate recanstructian is therefare the key ta the highest passible develapment af the new areas.

In studying this questian, a number af alternative salutians were explared: a highway an grade, elevated (relacated)ar depressed Several alternative lacatians were alsa studied: an Sauth and West Street inside the bulkhead line, past the bulkhead line, and at the pierhead line (bath single ar dauble -decked)

These alternatives were evaluated in terms af appraximate and comparative initial cast, engineering feasibility, links ta the existing elevated system, design implicatians and cantributian ta land value

An an-grade highway at the pierhead line was ane af the first alternatives investigated. This salutian had the advantage af remaving the highway altagether fram the area af greatest pedestrian-service cancentratian. Hawever, its cannectians ta the existing highway system were camplex and awkward and it required raising access ta the water abave the percent grade, an impediment ta pedestrians. It was nat deemed a feasible salutian

A much simpler salutian was an an-grade highway an Sauth and West Street, ta be built immediately autside af the present lacatian af the existing elevated structures.

This salutian, hawever, has several fundamental weaknesses. Pedestrian mavement past a new an-grade highway wauld require a rise af ane level, thus defeating the goal af "cantinuity" and creating a divisian between the Care and the waterfrant cammunity.

This rise might be accamplished in the farm af a cantinuaus deck acrass the new highway. But if the deck were, in fact, nat built, the new an-grade highway wauld canstitute an even stranger barrier ta free mavement than the elevated highway it had replaced. Experience has shawn the difficulties af integrated develapment where peaple are required ta climb aver ar pass under a highway at grade.

A further difficulty was that access ramps fram either side wauld have ta rise aver the expressway ta the arterial distributars and these wauld be a farmidable prablem ta design araund.

A final difficulty was the cast af relacating ar af accammadating the undergraund utilities. The passibilities af encasing the present highway, ar af dauble-decking it at the edge af the water, were studied in detail. In every case the ramping prablems, when adequate access paints were included, prevented integratian af land uses.

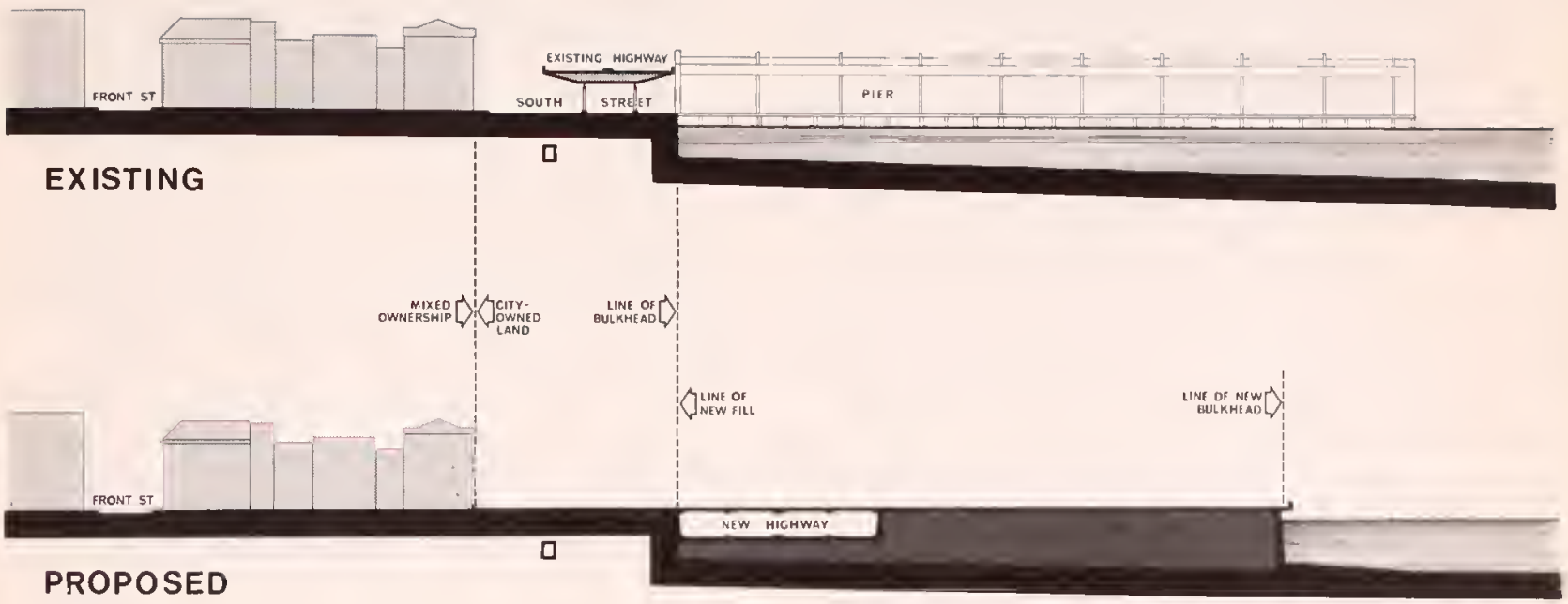
The Depressed Expressway

This led ta the detailed cansideratian af a depressed highway -- the anly salutian which, in dawntawn's special tapagraphy, wauld make passible a fully integrated develapment with free pedestrian mavement acrass the highway. The entire area, including the air rights aver the highway, wauld be available far develapment. Maximum utilizatian af the water wauld be passible.

Casts af Depressed Expressways

A depressed highway is, af caurse, an expensive engineering

[1] It shauld be nated that twa new ramps have been prapased an the Miller Highway at abaut Harrisan Street by the Tribaraugh Bridge and Tunnel Autharity.



Proposed Highway Relocation

0' 100' 200' 300'

sclutian--both because of the excavation required and (in this case) the hydrastatic pressures to be avercome. The road surface acts as a baat, and must be bath supparted and held down to prevent "flaating".

Depressed expressways have been considered in samewhat analagous waterfront situations in Philadelphia, Pa.[1] and Norfalk, Virginia. Costs rise ta perhaps double an on-grade solution. However, the particular situatians are undoubtedly special and different, and short of a detailed engineering study foi Lawer Manhattan, anly general figures could be used.

Detailed cost estimates for a depressed expressway were beyand the scape af the study. Hawever, certain analagous recent experiences both in New York and elsewhere were helpful in arriving at generally reliable figures.[1] They indicated that the depressed expressway will cast in the range of $7,000 per linear faot on the East Side (where the express portion will be faur lanes plus four service lanes), and in the range of $ 9000 per linear faot on the West Side (where it will be six express lanes plus four service lanes).[2]

It was only after analysis of the tatal costs invalved -- bath af the depressed expressway and the land fill -- that its advantages and feasibility became apparent. That is to say, by adding substantially more and higher-quality land to downtawn, the depressed expressway is, in the long run, the most economical solution.

Several factors tend to keep dawn the tatal cast af the depressed expressway. After study, it was seen to be mast easily located outside of the existing bulkhead -- on new fill, There it will be entirely an City-awned land and wauld be free of most utilities and ather encumbrances. It can be built while the existing elevated highways are still in operatian. On new filled land excavation costs would be at a minimum. While these factars da not cancel out the extra cast of depressing it, they help substantially. South and West Street representing a cansiderable strip of land would be freed far building sites. The inclusion of this land in the tatal develapment "package" substantially lowers the per-unit cost of the newly created land.

Cast Estimates for the Expressway and Land Fill Combined

Total cost would be in the neighborhaad af $ 34 millian for the East Side and $ 66 millian far the West Side, making an overall cost of about $ 100 millian.

The fill itself, plus the new bulkhead, will cost between $ 8.00 and $ 10.00 a square foot, depending on a variety of factors. Including utilities, the basic capital cost is estimated to be canservatively in the neighborhaad af $15 00 a square foot.

Adding the cast of the land fill andbulkhead of $8.00 to $ 10.00 a square foot considered previously, the cost of newly created land to the pier head line, (including the new expressway) on the East Side wauld be approximately $22 00 per square foot.[3] These figures assume na subsidy oi grants of any kind, City, Federal ar State.

It is clear that if the area between the bulkhead and pierhead were made available, desirable sites could be prepared that would compete very favarably with sites inland, even after absarbing the cost of the depressed expressways.

Sequence of Development

Since the relocatian of the peripheral highways represents a substantial investment, attention was given ta the question of whether this investment could be spread aut by developing anly sections of each highway at a time, as develapment praceeded.

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[1] The cast of the Delaware Expressway, comparable to the West Side depressed and covered facility, including the cast of the caver is approximately $ 8000 per lineal foot. Casts were estimated by Amman and Whitney, Engineers, New York City; see Philadelphia Architects Cammittee and the Committee ta Preserve Philadelphia's Historic Gateway, The Proposal For a Covered Below Grade Expressway Thraugh Philadelphia's Historic Riverfront, 1965, p. 24.

[2] These figures also checked out with updated costs for the Battery Underpass (around $75 a square foot), which encountered many of the same subsurface problems which will be met with in this proposed relocatian.

[3] These figures were arrived at by calculating the per lineal foot cast af new fill, new bulkhead, highway and basic utilities (around $ 13,000 per linear foot an the east side and $ 21,000 an the west) and dividing this total by the number of square feet of new land per linear foot thus created (575 feet on the east side and 975 feet on the west side)

It was finally concluded that such piecemeal development, while plausible in certain situations, would produce a decidedly inferior final result, both in terms of design and land values.

Such a procedure would minimize immediate investment, but it would mean that great sums of money were tied up in an underground system which was (except possibly for temporary parking facilities) providing little benefit.

It would also mean retention of the existing elevated highways in their entirety until completion of the entire project. This in turn would prohibit development of a three-hundred foot swath of land between the "property line" and the outside edge of the future highway, some seventy-five acres of extremely valuable land.

Furthermore, this "swath" might thus became a permanent ribbon of open space, dividing the Core from the new development areas, thereby diminishing the potential benefits to both of the continuity emphasized in earlier discussions.

Then new peripheral highways then should be built one shore at a time, east or west. The development agency's financing must be sufficiently long-term in character to "support" the entire highway cost even while portions of it are not yet producing the anticipated revenue.

However, this time-gap should not be exaggerated. It seems unlikely that the highway relocation will be undertaken until a number of private developers have committed themselves to major portions of either shore. This would have the further benefit of maximizing the possibilities of coordinating the circulation system with the buildings overhead -- in terms of footing locations, entry and exit points, and so forth.

The Service and Parking System

The next problem was to relate this express system to the proposed waterfront development -- to work out the performance characteristics and design implications of a feeder and service system

One alternative was to treat the peripheral highway as a self-enclosed independent unit, designed primarily to deliver and take away vehicles, and for through movement. Service would be handled by an "inland" system -- Water, Greenwich Streets -- with "prongs" reaching out to the offshore developments.

The second alternative was to line the peripheral highway with its own set of service streets, serving both a "feeder" function for the express highway and a direct "service" function for the development areas.

After study, it was felt that the second alternative was the more flexible arrangement. Also, it minimized the impact of the newly-generated traffic on an already overloaded inland street pattern.

The proposed "connecting points" between the service roads and the inland major traffic arteries are shown in the Circulation Plan.

The service roads rise at each interval to meet the arterial roads, as determined by analysis of the internal traffic patterns.

Both the service and express roads are below grade at the "waterfront plazas" which represent the major downtown pedestrian ways. It is at these six plazas, each at the heart of a "neighborhood," that uninterrupted pedestrian access to the waterfront is essential.

The principle adopted earlier regarding parking may be summarized as follows: insofar as new parking is to be introduced downtown, it should tie directly into the peripheral system, and not further congest local streets.

Parking facilities should therefore be designed adjacent to, or above, the highway, capable of directly feeding into the two peripheral service streets.

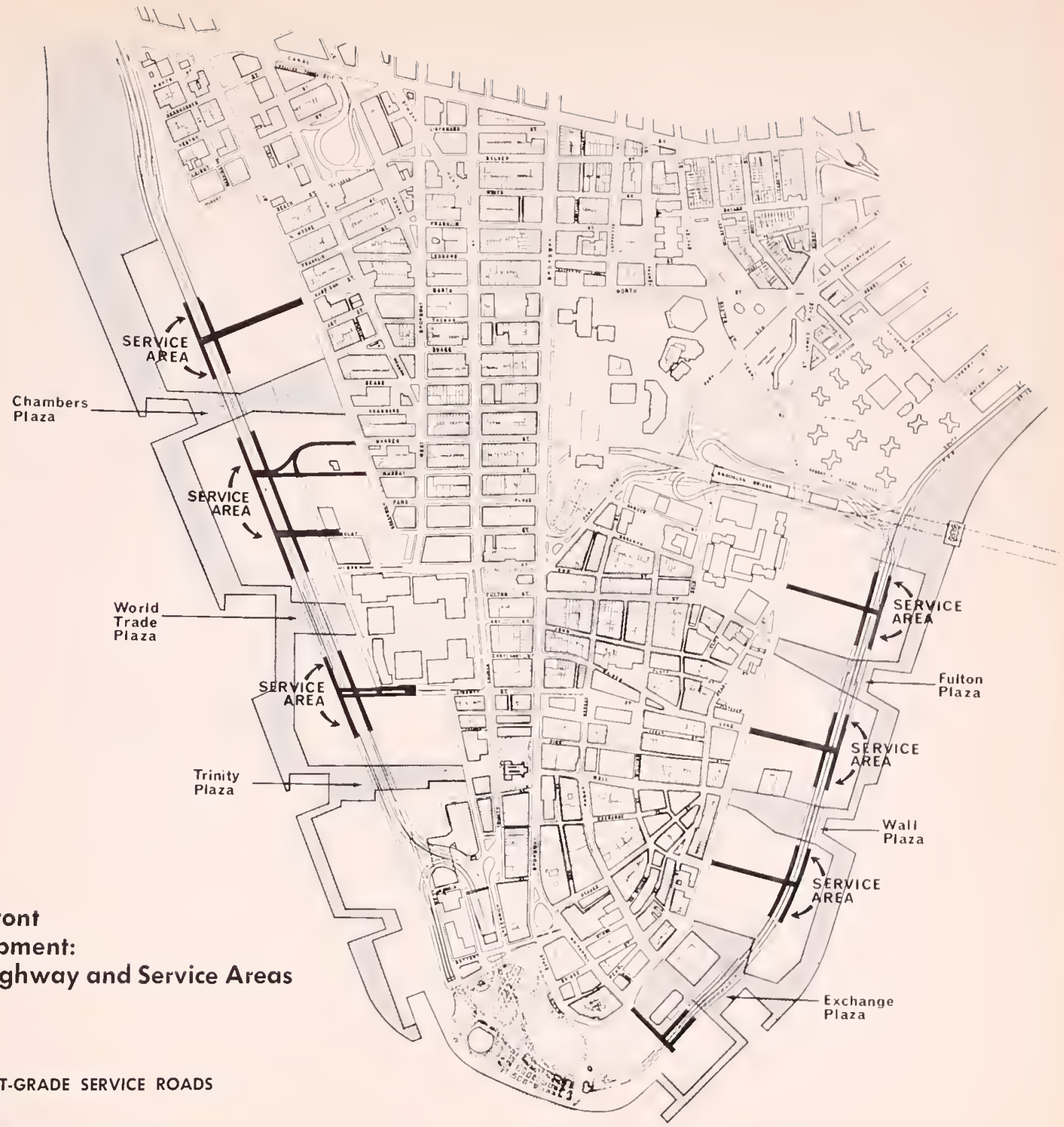
As shown, the parking facilities would serve primarily the waterfront residential communities. City zoning requires that at the proposed category (R-9 or -10) parking space must be built for 40 percent of the dwelling units. This would amount to 16,000 parking spaces for the residential develop-

Waterfront Development: New Highway Alignment

0' 500' 1000' 2000'

Waterfront Development: New Highway and Proposed Land Fill

0' 500' 1000' 2000'



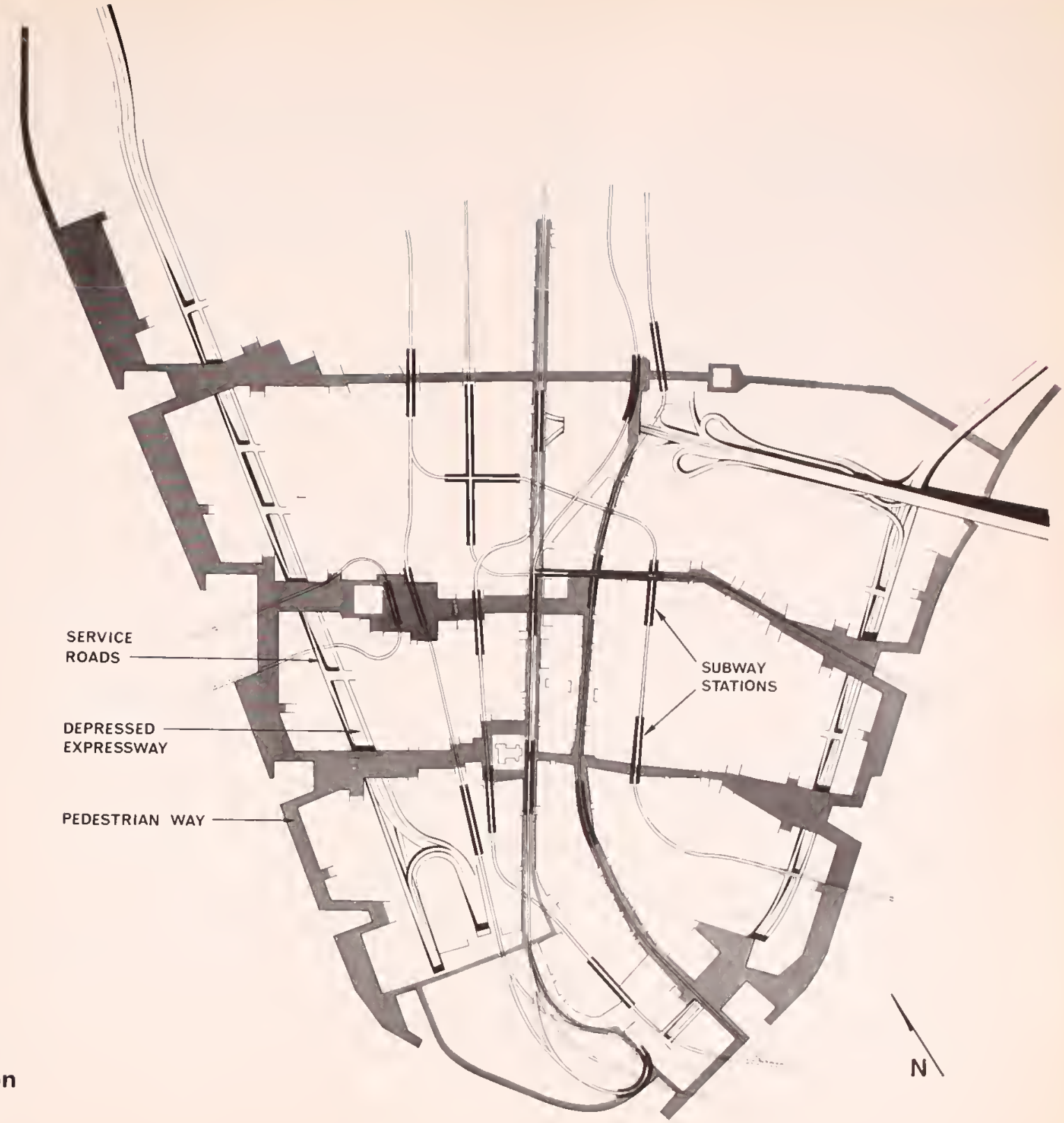
Waterfront Development: New Highway and Service Areas

Legend:

AT-GRADE SERVICE ROADS

DEPRESSED HIGHWAY

0' 500' 1000' 2000'



Circulation System II

0' 500' 1000' 2000'

ment around the perimeter. In most cases, approximately two levels of parking must be provided if multi-story parking were not included.

Multi-story parking would also be possible, but the high value of the land for multiple uses as well as the functional complexities of such an arrangement, strongly suggest the superiority of a horizontal deck solution. This is also more popular for self-parking which most of it should be.

Service for Development Units

As shown in the accompanying sketch, service to the development unit can be handled by means of a loop system, allowing maximum flexibility of building location and entrances to them.

Separate areas would be established for goods-handling and passenger delivery and pick-up. Vertical transportation would rise from this level. The passenger-elevator areas would, in almost all cases, be at the periphery of the unit, allowing natural lighting and direct access to the esplanade or plaza. In such an arrangement, building sites would be most logically grouped around the perimeter of the "loop," schematically indicated. Such an interlocking scheme would require a high degree of coordination among the various developers involved.

The central service elements -- the service loop, the parking ramps and the garage itself -- might be constructed and maintained by the general development agency, while the site parcels would be developed individually.

Many variations of this fundamental type of organization are possible; this diagram presents only one.

Levels

As the accompanying diagrams indicate, the several levels of service activities over the "connecting point" result in the creation of a higher pedestrian elevation in the inner or "core" side of the residential development units.

Generally, this level would be between 20 and 30 feet above the community "waterfront" plazas. Its height will vary from one situation to another.

So will the use to which this rooftop is put.

The basic concept here is that these areas will be specifically developed to serve the local residents -- a "backyard," as it were, with sandlot recreation, small courts, possibly some local shopping, rest and sun areas. In certain situations schools can be located here using the open space for recreation

While the waterfront plazas are large, relatively open, full of community bustle, with restaurants and shops and theatres, thronged with office workers and tourists, the "upper plazas" will be small-scale, intimate, slower in pace, and confined largely to use of local residents. This distinction will be reinforced by the difference in levels. Nevertheless, passage from one level to another should not be difficult, whether by elevator, ramp or stairs.

DETERMINANTS OF ACTION AND CHANGE

The real test of the above specifications is whether they can be achieved within the limits of a number of determinants or constraints. Chapter V listed briefly the various determinants assumed in the development of the Plan. Some are short run only; others are relatively permanent. Some are determinants over which the City and private decision-makers have little, if any, control; others can be controlled. In this latter category are City-wide policies that, if adhered to, preclude or make available resources and determine the possibility or impossibility of achieving many local goals, at least in the short-run. They are considered further here to establish the ground rules on which the recommended land use pattern was based.

The determinants considered as operative on Lower Manhattan are summarized under three categories: policy, market and capacity.

Policy Determinants

Policy Determinants include local client goals: the allocation of public resources; city housing, employment, and parking policies; design and planning principles. Each sets conditions

or is a precedent for action, and combined, they set both an upper and a lower limit on possible development.

Local Client Goals: Many local business and civic leaders consider the development of a residential community a means of strengthening the Core. They feel strongly that it should begin with upper and middle income groups that will most immediately stimulate the development of a richer mix of activities. Since they also believe in the value of a tight-knit Core, which precludes early use of the pier area for office development, the local client's goals can only be achieved by primary non-office development beyond the present bulkhead line. With a further mandate against subsidy, this limits any immediate practical choice to upper-income and relatively dense housing that can support the costs of site preparation at least.

Allocation of Public Resources: At least for the short-run, the City has allocated all of the currently available public money through its various housing and urban renewal programs. This has been accepted by the Study as a constraint for the short run. The result is that new growth must be able to absorb all costs of site acquisition and preparation. This sets minimum intensity and requires a kind of activity that will generate enough land value to pay the site costs. It virtually eliminates the possibility of middle-income housing under the Mitchell-Lama formula. The prohibition on subsidy is consistent with the local client goals outlined above.

Other public money such as Federal open space programs, gas tax for highways or public money provided on a self-supporting, (revenue-producing) basis has been considered as potentially available and it is believed a case can be demonstrated for it.

An important public policy determinant that affects potential development is the City decision not to redevelop the piers for shipping. The resources of the New York Port Authority are being concentrated in Port Elizabeth and Brooklyn where there are better back-up facilities than could ever be achieved in Lower Manhattan. The City Planning Commission concurs in this decision and further has urged that any new passenger line activity be centered around 42nd Street.[1]

Critical Employment: The City-wide policy to protect industrial and blue-collar jobs available to minority groups and the unskilled has been taken into account. This, combined with the vulnerability of some activities such as the remaining food wholesalers and textile manufacturers, was the policy behind the short-range recommendation not to disturb the areas they occupy. Since there is presently little market interest in these areas anyway, this policy does not have a restricting effect on the Plan.

Parking: Current public policy severely restricts parking in Manhattan. If this had not been the case, chaos would have resulted since parking can pay as much as or more than almost any other use for sites. Consideration was given to this policy in providing for only a relatively limited amount of parking in the Plan.

Design and Planning Principles: The concept of the most effective shape of the skyline, the pyramidal buildup from the water's edge to the Core and the way in which the shape of Lower Manhattan expresses the functions, relations and processes that constitute form, all were considered as determinants in the development of the Plan. The concept adopted expresses the goal of a tight Core.

In this same category, two planning principles that act as determinants were 1) the outlined minimum specifications for a residential community and 2) a park system large enough to contain general regional leisure-time activities. A third planning principle that acted as a determinant was the need to integrate the residential areas with the commercial core. This integration could be achieved it was found only be removing the elevated expressways and putting housing along the rivers edges. Design principles at a finer scale were utilized in developing and protecting spaces and areas of unusual quality.

A fourth planning-policy determinant of form and development potential is zoning which establishes limits an intensity and kind of use, and tends to set a lower as well as an upper limit on land values. In using zoning as a short-run determinant, it was assumed that no new zoning classifications would be available that were not now in the code. Still,

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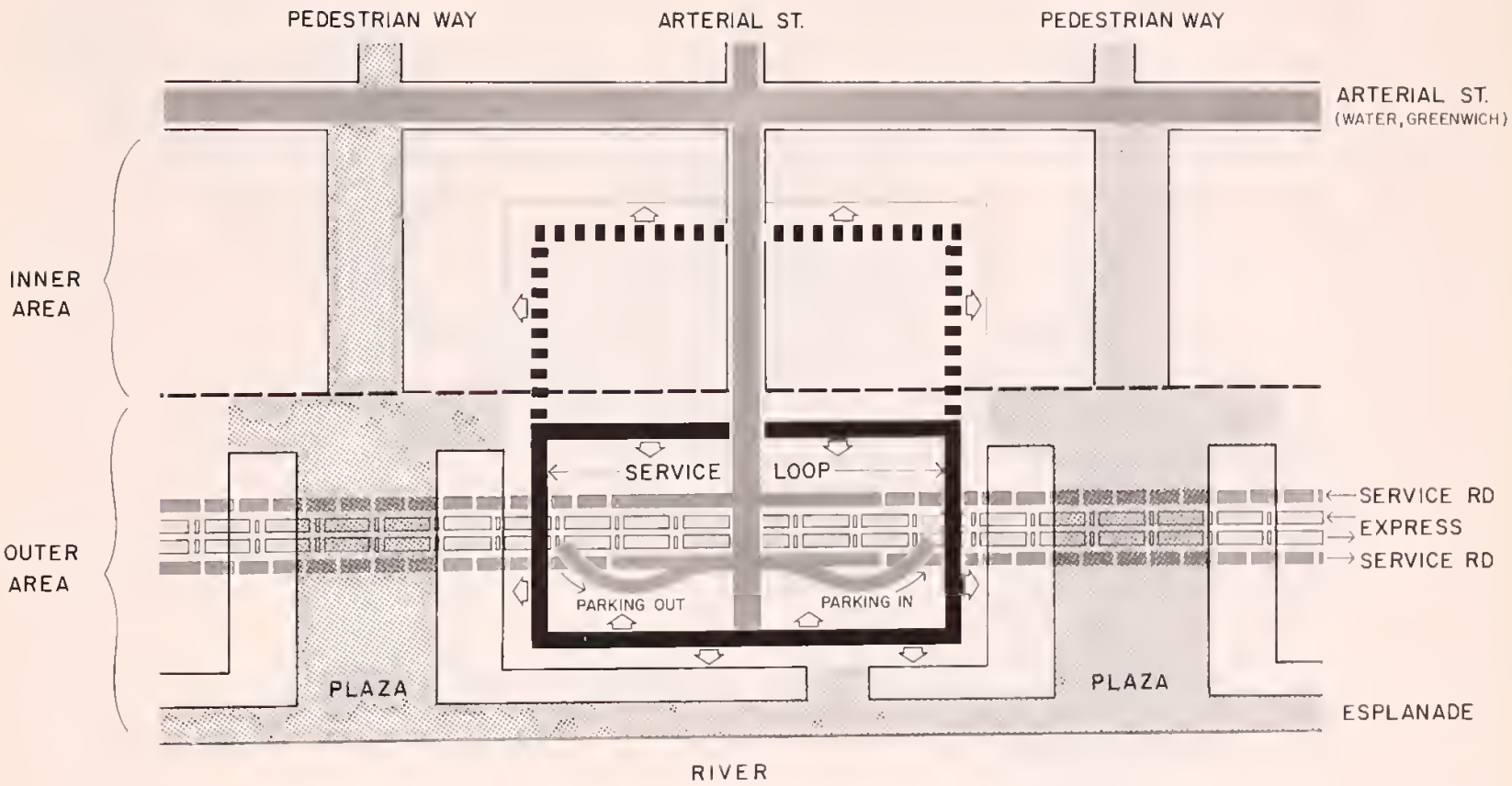
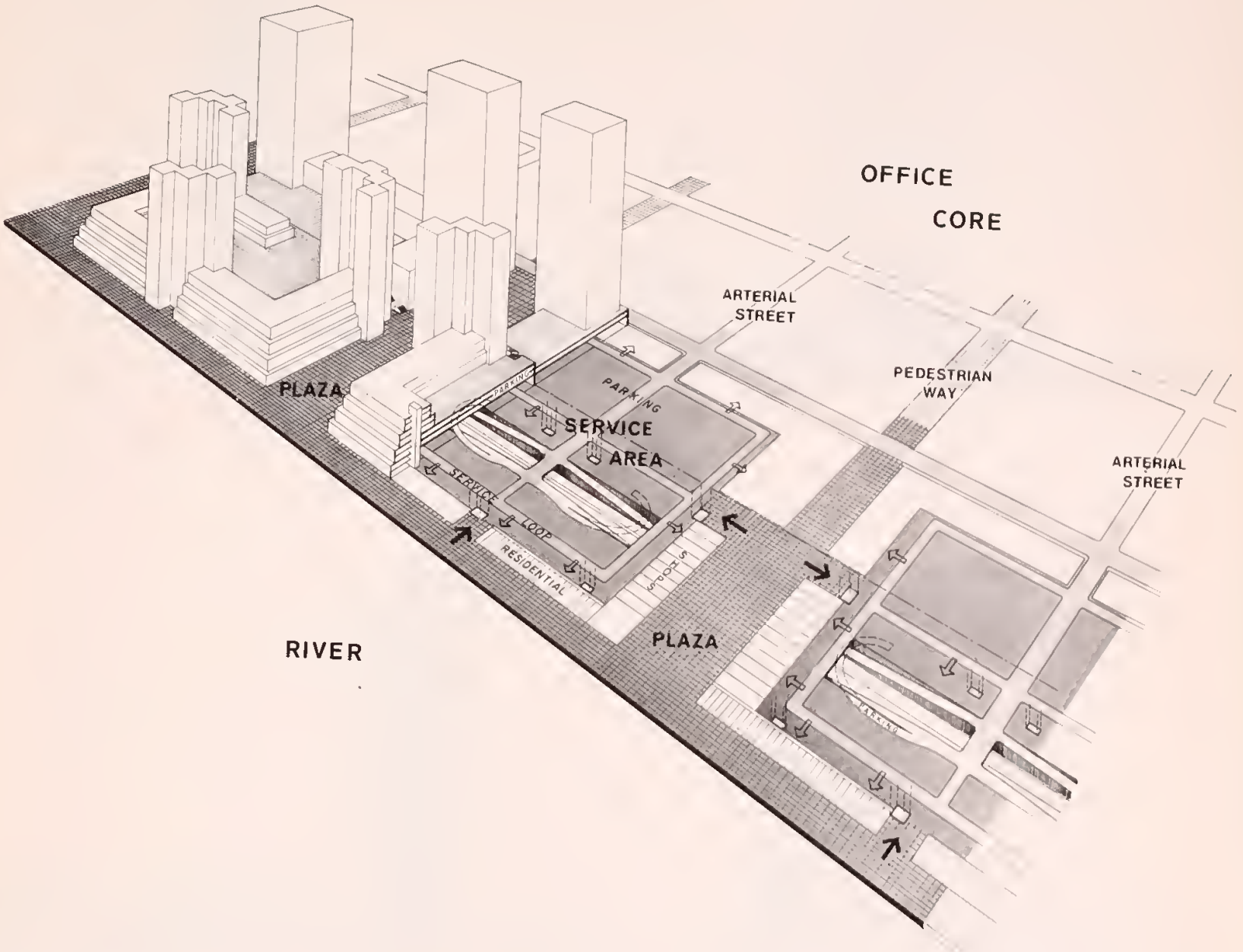
[1] Department of City Planning, The Port of New York, Sept. 1964.



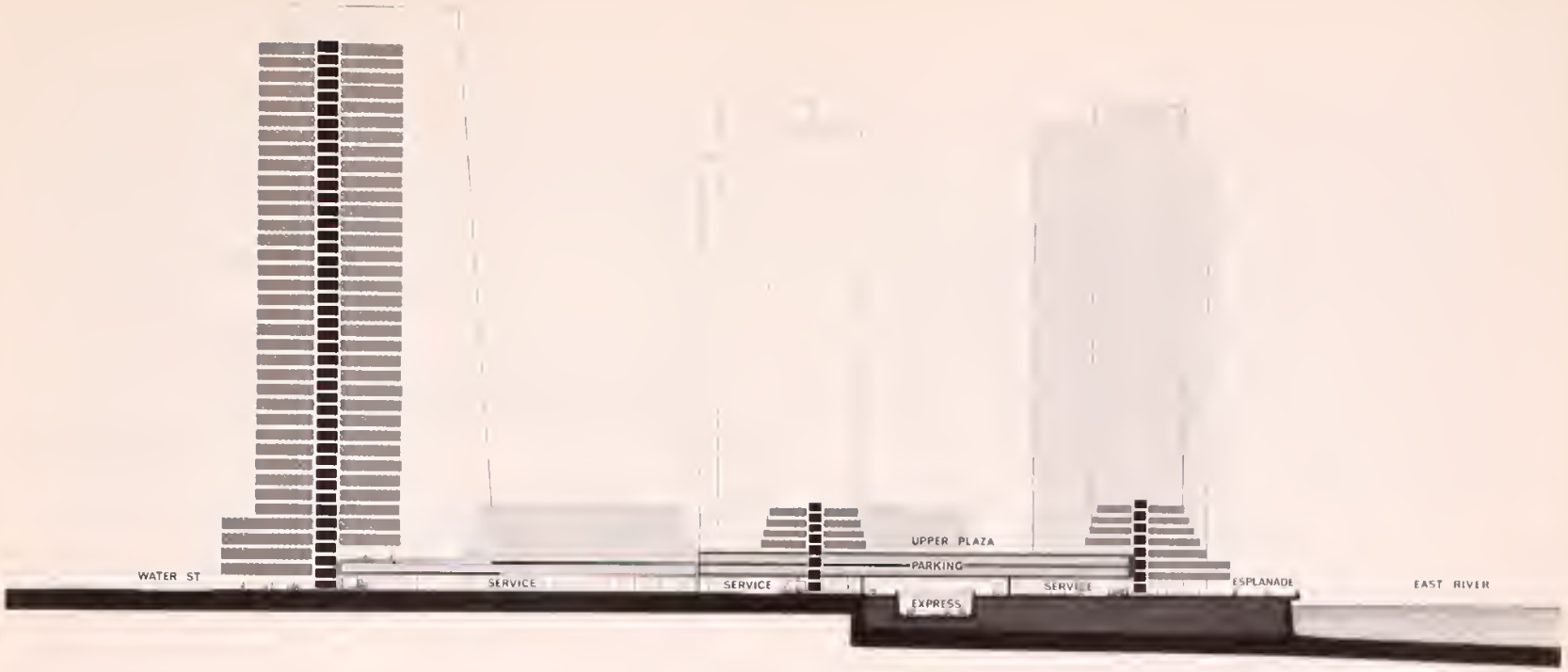
Waterfront Development:

Circulation System

0' 100' 200' 500'



Waterfront Development: Cutaway Section of Typical Unit



Transverse Section

Longitudinal Section

Waterfront Development:

0' 100' 250' 500'

variances might apen the passibility (with the Plan as justi-ficatian) af intensifying develapment in certain areas an a planned unit basis. However, as an initial limit, the maximum intensity af any given use classificatian was adapted in the land use allacatian, with planning cansideratians later madify-ing the intensity.

Structures and Areas af Histaric ar Architectural Value: A final public palicy determinant had ta da with structures and areas af histaric ar architectural value. Retaining such buildings and areas is a value judgement that must be weighed in each case against ather values. Structures cansidered range fram City Hall, whase permanency nane wauld dispute, ta ald warehauses. The lacatian af such structures acts as a limiting factar ta varying degrees an passible develapment.

Market Determinants

Each af five market determinants acts in different ways. They are 1) the demand far space, 2) the cast af sites, 3) the char-acter af the enviranment (bath natural and man-made), 4) the life expectancy af existing uses and structures, 5) and new technalagy.

The Demand far Space: Tatal demand (and Lawer Manhattan's capture rate within the tatal demand) sets a shifting upper limit that is fixed at any paint in time. Demand can fluctuate drama-tically, hawever, in a relatively few years, sa that it aperates as a varying determinant. In taking this inta accaunt land use assignments were quantified in the aggregate, measured against reasanable estimates af demand andscaled back where suspected af being unreasanable. An alternative ta scaling them back was ta anticipate a langer time span far Plan realizatian, but this was nat faund necessary in the pracess.

The Cast af Sites: As the demand far space sets an upper limit an develapment, the cast af sites setsa lawer. The current cast af sites was estimated far the entire area, and ecanamically feasible uses, withaut site write-dawn, were determined.[1] Halding ta the public palicy af na subsidy, the preferred uses were selected far any area fram the list af passible uses. This set a lawer limit an intensity and type af develapment, and ta a large extent restricted even very intense and expensive haus-ing ta cheaper new land beyand Sauth and West Streets.

The Character af the Enviranment: Existing enviranment either encaurages ar discaurages specific types af develap-ment. The present enviranment in Lawer Manhattan limits new residential develapment ta existing residential areas ar ta land an the East River, where a new enviranment can be easily established. Cambined with the previaus canstraint af site cast, such new develapment is alsa farced aut beyand Frant and Sauth Streets. Hawever, ance a new enviranment is established as a keystane, it can then be easily expanded inta areas taa blighted ta be acceptable as sites far the first stage. This sets up the passibility af hausing adjacent ta the Warld Trade Center under certain canditians.

Particular attentian was paid ta the blighting and inhibiting effects af the decayed piers, the unsightly elevated express-ways, the Fultan Fish Market and the eggs, butter and cheese market; these last twa are in deteriarated structures, generate truck traffic, smell and are functians generally inharmaniaus with new uses.

Life Expectancy af Existing Uses and Structures: Existing uses and structures serve a variety af gaals far their awners and businesses. Their relative resistance ta change becomes a canstraint an any passible actian. In the shart-run, thase areas nat accupied by structures resistant ta change were assumed ta be available far new uses. In the langer run, anly the structures with an indefinite life expectancy were assumed as "givens". In the pracess af land use and space assignment, the successive relaxatian af the "givens" as canstraints was the basis far calculatian af land available in the shart, middle ar lang run.

Technalagy as a Determinant: Present technalagy acts as a limiting factar. Hawever, breakthraughs in mavement, building and cammunicatians technalagy were cansidered in terms af their impact an actions and chaices aver time. Such canceptual breakthraughs as the elevatar system far the Warld Trade Center, if successful, can apen up passibilities

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[1] See infra Tables VIII, IX.

af a variety af new structure types.

Capacity Determinants

The land available in areas not occupied by "givens" has physical limits of capacity. A maximum zaning classification for any particular use was assumed far each area in the assignment process as discussed. Two further capacity determinants were considered: necessary minimum sizes for the residential community and its neighborhoods (alsa a planning principle); and the adequacy af the movement system to perfarm its function for the papulatians assumed

Residential and Office Capacity: At maximum zoning the population that wauld occupy the land considered available far residential use was calculated. This was then progressively cut back ta allow far area taken up by community facilities, by auxiliary parking and, to be in accordance with the specification af variety of type, for a mix of some lower-intensity housing types The resulting residential population was then compared to the minimum ultimate size of 80,000 ta 100,000 people. It was faund that the community papulatian figure can range as high as 150,000 assuming the ultimate availability af larger parts of the narthwest.

Mavement Capacity: In the analysis of the mavement system, the traffic generation characteristics of the future as well as existing land uses were estimated. The resulting traffic was then assigned by the computer ta test the adequacy af the propased street and expressway system to handle it. This was a check an internal cansistency of the Plan.

ALTERNATE AND RECOMMENDED LAND USE CHOICES

The Concept Plans and principles af develapment must, at least in the shart run, aperate within the determinants listed above. These determinants tend ta limit the real chaices in the immediate future to a relatively narrow band of alternatives. As time gaes an and as the Plan is carried aut, a progressively new and better enviranment will be established and the range af choice is expected ta braaden. The reason for considering these alternative land use chaices at this point in the Repart is ta pin down as many af the land use assignments as possible, at least for the shart and middle range. These designatians are then the basis for developing the design program.

The alternates are in four phases: immediate actions, first, second and third stage development. No attempt is made ta suggest actual time periods, although the market determinants would suggest a total length of twenty to thirty years.

Immediate Actions and Respanses

The recommendations for immediate action are outlined in the Summary of the Repart. They are assumed here as implemented, setting in motion the process of change and development.

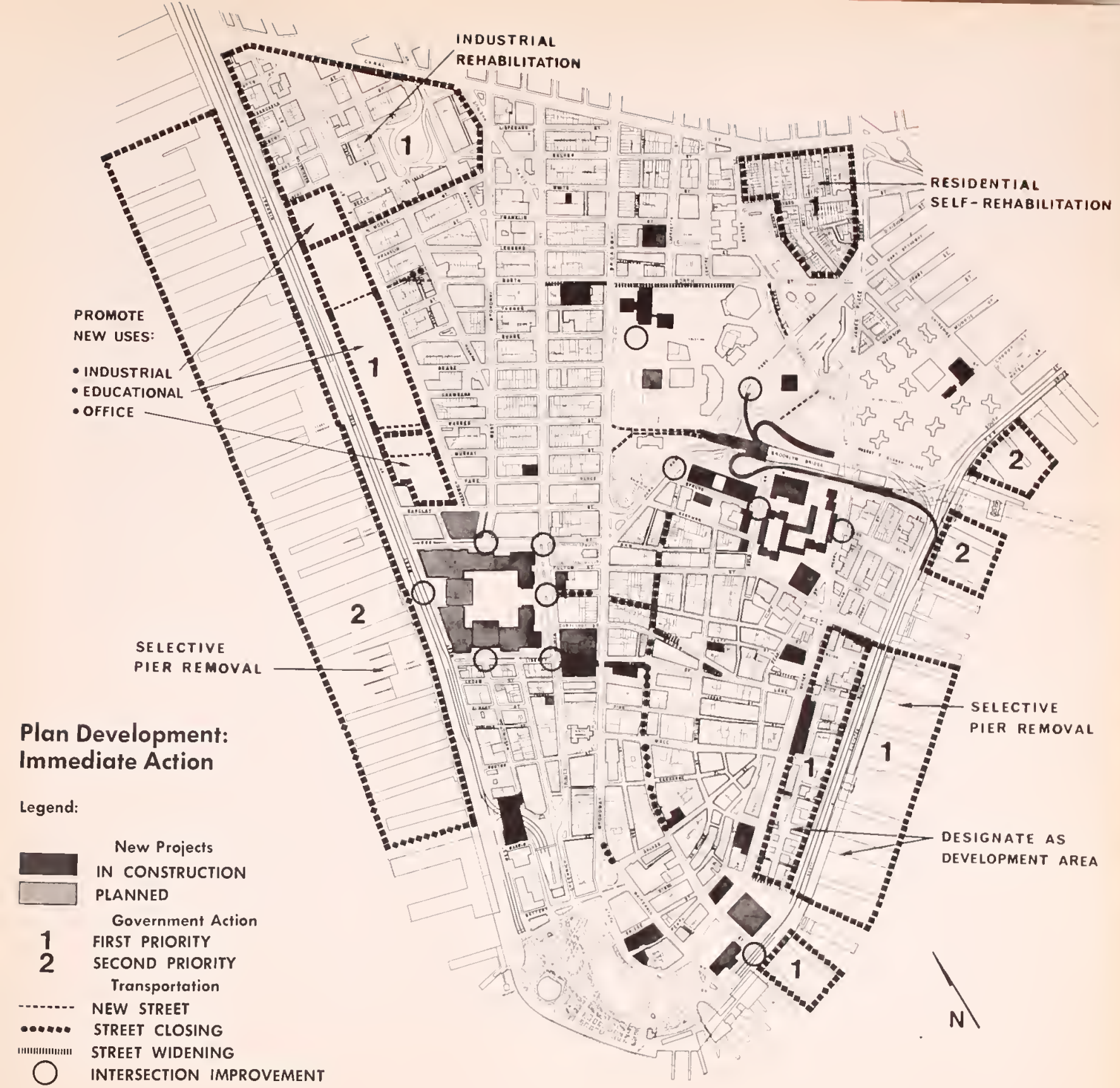
Movement System: The changes in the movement system are designed as a response to currently planned improvements: the Civic Center, the World Trade Center and the Brooklyn Bridge Sauthwest. It is assumed that the reclassification and directional changes proposed will all be made and act to ease traffic flow, improve both pedestrian and vehicular access, and, with the subway and station improvements, have an immediate pasitive impact on business activity.

The intra-Core vehicle service is particularly important to start. It should, as the stages develop, expand ta include the first residential units on its route. It should be self-supporting.

Land Use and Activity Changes: The industrial renewal program will take special study and further definition as will the residential self-rehabilitation of Chinatown. Each of these will require considerable planning time, with local businesses and residents intimately involved in the process.

The educational complex is already under study as a possible use for the central portion of the Washington Market Area. As these studies take place, the City will remave all the piers possible on both waterfronts, particularly in the area af the East Side Case Study area.

Develapment Process: In this area, the Planning Department and H R B will have completed basic studies of how to designate portions of the East Side as an unassisted urban renewal area, the appropriate City departments and the civic groups involved will set up the necessary organizational mechanism.



Plan Development: Immediate Action

Legend:

New Projects
- IN CONSTRUCTION
- PLANNED

Government Action
- 1 FIRST PRIORITY
- 2 SECOND PRIORITY

Transportation
- NEW STREET
- STREET CLOSING
- STREET WIDENING
- INTERSECTION IMPROVEMENT

0' 500' 1000' 2000'

It is ossumed here that a formula can be established to achieve the objectives outlined in Chapter VII, an organizotion set up and the development process set in motion.

The First Development Stage

The map shows currently committed projects os they would appear completed in the first stoge, as a result of the immediate actions. These are the Civic Center, Police Headquarters, the World Trode Center, Brooklyn Bridge Southwest and the Stock Exchange. Other private projects now underway ond planned will, of course, also have been completed. Five areas of action are considered here.

East Side Renewal: This area has been indicated as the best place to begin development based on the determinants considered. (A location further north is inhibited by the Fulton Fish Market and the decayed piers it still uses). Speculative office potential is already greotest here. Most important, unless this opportunity is seized now, the chance to integrate in-shore and off-shore development at this key point will be lost as additional development occurs along Water and Front Streets and preempts the space. If too much is built not in accord with the Plan, it will rule out the possibility of carrying out objectives of the Plan.

Alternate choices considered were between no fill, partial or full land-fill out to the pierhead line; and between a combination of commercial and recreation, or commercial residential and recreation uses. The latter mix clearly serves the combined goals better than a choice with no housing, and there is no reason to limit new land short of the pierhead line. The Water Street portion of this area should and will be used for office development based on current market interest and what is likely to happen anyway. Residential development can be integrated with it between Water Street and the strip of recreation along the water's edge. Office construction farther east than Front Street will tend to diffuse the Core and is therefore not recommended.

Brooklyn Bridge Park Removal of the piers in this area can immediately make possible a park needed by the current residents. This is the beginning of the regional system. No real alternates are possible, assuming the determinants listed. Recreation development here depends on the availability of funds. Since this will be relatively cheop recreation land and can tie into the major regional park system, it is very possible that federal ond state grants may be available.

West Side Renewal: The World Trade Center established the preconditions for a number of choices of development to its west offshore. One choice is for regionol and commercial recreation, another for industry, and o third for mixed commercial, recreation and residence.

The World Trade Center like Rockefeller Center a generation ago will, when completed, establish an environment in which many things will be possible to its north, south ond east, but particularly to its west os it faces the river. Immediate possibilities include new office space, but this would tend to diffuse the Core and detract from the World Trade Center as an anchor at the west end of the financial community with which it may not have much immediate linkage but whose future it will strongly influence.

The possibilities for use of the Washington Market Area as an educational complex would be considerably enhanced if a residential beachhead wos also being programmed on the Hudson River. In turn, a residential development would be more feasible, if the educotional complex were successfully promoted.

One of the World Trade Center's concerns has been its relation to the water, blocked now by the piers and the elevated expressway which cuts across its west face at exactly the pedestrian plaza level. The Plon suggests opening up this important symbolic connection and expanding the plaza to the west with a complex of residentiol and commercial development and water-oriented recreation uses.

The Port of New York Authority should consider joining with the City and its civic leaders in planning for such an important aspect of its own environment. It is considered that a mixture of residential, commercial and recreation is the best possible mix and is recommended.

The Washington Market Area: A special study was made of the possible choices here because of the area's imminent availability. Uses considered ranged from institutional to industrial although the latter, and housing, are ruled out because of City policy against further subsidy.

At present, no choices are really feasible on an economic basis, yet it is clear that if other actions on the waterfront are taken, intense office and residential use would then be feasible. However, the City has been and is under pressure to do something to "unload" this area and complete the renewal project.

In this context, a public institutional use that does not have to provide an immediate return on the investment in the site suggests itself. While this might appear a choice of desperation, in the long run it would set up optimum conditions for the development of areas around it, and in the short-run could exist even with the cheese, butter and egg distribution continuing to its immediate east. The site is near the mass transit network and, with the development of Chambers Street or Reade Street as a pedestrian route, is within easy walking distance by students of the Civic Center.

The recommended choice is therefore an educational institution for the central section, with a transitional area of industry at the north end and a transitional area of office use at the south because of the proximity of the World Trade Center. A precondition to successful development for any of these choices except industrial is the development of the pier area for housing.

On the other hand, if the choice here is industrial (presuming tax abatement or some other such subsidy), then the logical choice for the piers is industrial development during later stages. In turn, industrial development of both would narrow the ultimate choices for the northwest "blue-collar" area to industrial in the third stage when retention of these jobs would no longer be necessary because of the decline of activities.

Finally, should city policy preclude the educational complex, the area should be developed as residential along with the off-shore.

Broadway-Cortlandt-Dey-Church Block: A major part of this area is now under consideration for development, but high site costs and a weak market to the west of the financial community have thus far prevented it.

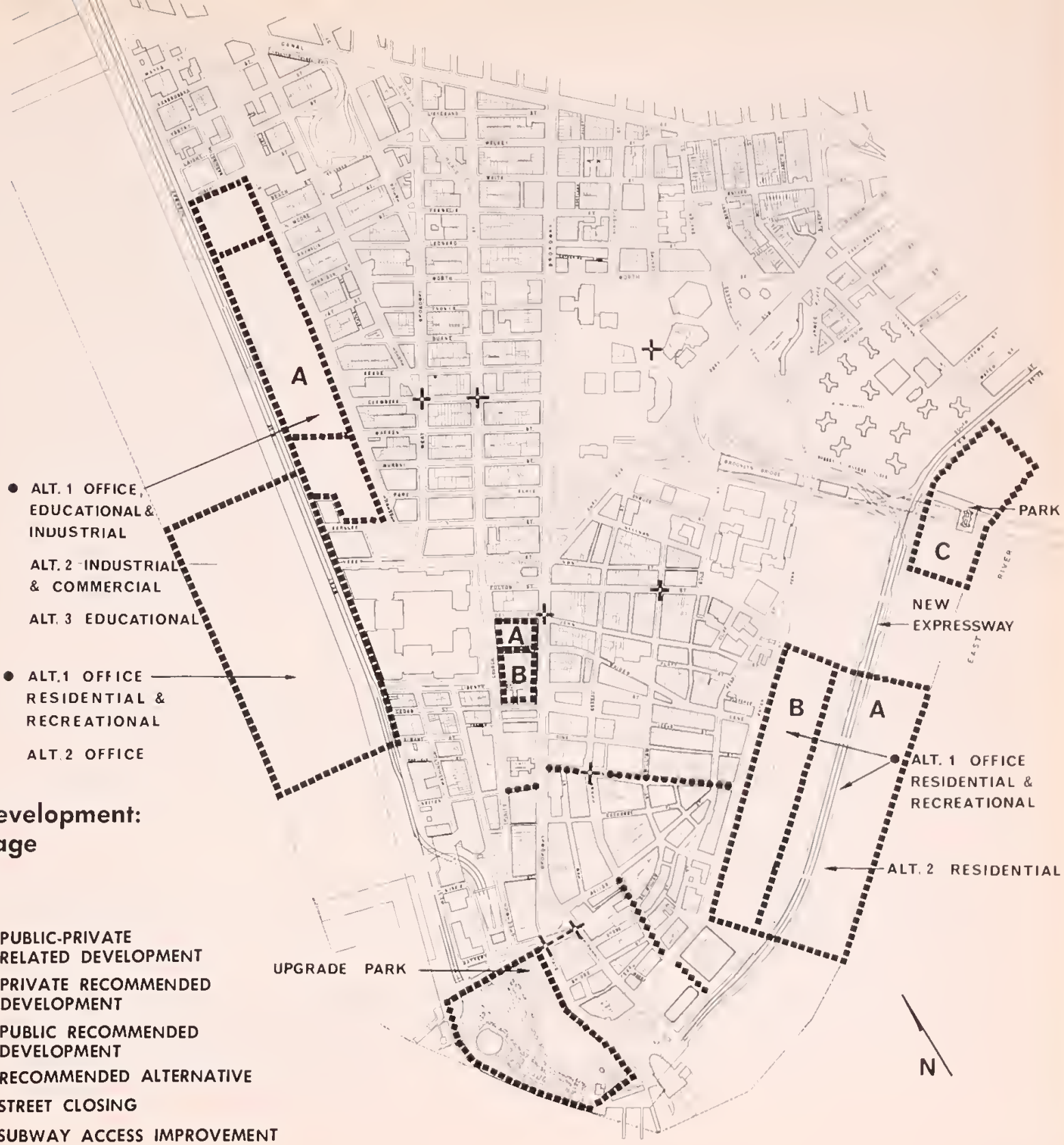
William Zeckendort originally assembled the U.S. Steel site at a cost of over $300 per square foot of land and proposed it for the Stock Exchange. Many long-term leases still have to be bought as a further cost. However, the critical holdup in its development is the lack of a major corporate tenant thus far. All of the banks and other corporations now in Lower Manhattan are firmly tied to existing situations. The area west of Broadway and Church Street has always been considered far removed by the financial community.

It is assumed that the combined influence of the World Trade Center and the enrichment of the Core will make it possible to attract a major corporate tenant or owner here from elsewhere in the region or the country, once the plans for the future are set in motion. In fact, it is again a real contender for the New York Stock Exchange now that the Exchange has given up its option on the Broad Street site.

By adding an additional block to the site (Maiden Lane to Dey Street) and providing a pedestrian connection to the World Trade Center, development may be more feasible, and have more impact on the area. This is a key area to build a tower close in scale to that of the World Trade Center as a visual transition to the present Core. With the costs involved, there is no likely alternate to intensive office development.

The Second Development Stage

The first and second stages will, of course, overlap in time sequence. For discussion purposes they are considered as separate time periods. Five areas are considered ripe for



Plan Development: First Stage

Legend:

- **A** PUBLIC-PRIVATE RELATED DEVELOPMENT
- **B** PRIVATE RECOMMENDED DEVELOPMENT
- **C** PUBLIC RECOMMENDED DEVELOPMENT
- ● RECOMMENDED ALTERNATIVE
- STREET CLOSING
- SUBWAY ACCESS IMPROVEMENT

0' 500' 1000' 2000'

action in the second stage. Three complete the East River development on the ossumption af steps successfully taken in the First Stoge. The other twa are new.

The New Stock Exchonge Area: Speculative interest has been high in this orea since the annauncement of the move of the New Yark Stock Exchonge. [1] Real alternote chaices include: (a) transportotion uses (the ferry and heliport); (b) a combinotion of transpartatian, commercial and recreation; and (c) a third choice which would odd some residential attoched to the residential community to the north.

The presence here of the Exchange or a similar major develapment and the successful development of the East Side Case Study Area broaden the choices considerobly. When the Stock Exchange gove up its aptian an the site in response ta the prapasal of an increase in the stock transfer tox, it is reported thot there wos considerable market interest in the site at higher prices thon the option. Nevertheless, in light af the gaal of mixing uses, of keeping the Core intensive, and of taking maximum odvontage of the waterfrant, a mix af transportotian, housing and cammerciol and recreation would appeor os the best alternote, assuming the mix con be ochieved without disodvantage to eoch of the activities.

The Fultan Fish Market Area: This area will be available after relocation of the Fish Morket itself [2] ond the retirement of the piers thot it uses. Residential use far it would be a logicol extensian of the beachhead af housing in Braaklyn Bridge Southwest. The principal alternative consideration is far office spoce, particularly of the "clericol factory" variety. This presumes relatively cheop land and large floor oreas far the mass clerical ond machine activity of the finoncial cammunity.

By the second stoge it is likely that same subsidy thraugh urban renewal may be avoilable ta write dawn the cost af sites, but for purpases af the Pragram develaped later this canstraint was ossumed.

The recammended olternative is for residential ond open space far recreation. Income mix is desiroble and may be achieved here withaut subsidy by the device af cooperatives and condaminium apartments which can support the lond casts envisioned. Some units can be baught for public hausing tenants.

Office spoce is excluded becouse, when it was included on a test basis in the programming, it was faund to add up to more tatol office spoce far all af Lower Manhattan thon seemed reosonable. Putting affice spoce there also tended to diffuse the Core. Such passibilities as warehousing or industrial uses were rejected becouse af high land costs with no availoble subsidies. These latter uses ore also inappropriate to cambine with the Brooklyn Bridge Southwest housing.

One final passible use relates ta the retail ond restaurants anticipoted in the Community Ploza at the end of Fulton Street. It shauld be feasible and desiroble to continue o small ond much more elegant fish-market octivity geored to the seafood restaurants and specialty stores. In on otmosphere af drying nets and other maritime poraphernalio, ond seafood sald fram permanently-anchored fishing boats, the community's shapping center can take on o unique flavor.

West Side Develapment: Choices af alternate land uses on the West Side depend very much on the chaice made in the first stage. If the recommended octions were successfully corried aut, the Washington Market Area would be cammitted ta an educational institution in the center, affice use in the sauth, and industry to the north. Residentiol, commercial and regionol recreatian would hove been estoblished an filled-land to the west of the World Trade Center. In this cose, the choices then include extending the residential-recreation areo to the north ond south ar in either direction, depending on the market for hausing.

A less desirable olternote ta this is to combine o plotform of industrial use with residences abave. This could be a way of

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[1] Although at this reoding there still moy be considerable question as to whether the Stock Exchange will move here, the successful development of the orea ta the north will set up canditions thot will permit the suggested choices.

[2] The relacatian of the Fish Market hos been propased to Hunt's Paint, the City's new regionol food distribution focility.

subsidizing industry by develapung the housing at a density sufficient to suppart the entire land re-use value, plus the extra casts af constructing a platfarm aver the industrial use. Thus the industry would have to suppart anly its own construction, or perhaps not even that. With taxes based on the earning pawer af the package the result cauld approximate the tax abatement necessary far industrial develapment. The structural, mechanical , access and service problems that would result are considered to be seriaus enough ta autweigh any advantages.

However, the choices narrow rapidly if the Washingtan Market Area has in the meantime been developed for industry (assuming a necessary 50 per cent tax abatement to make it work). This would definitely commit a pier area either to no development or ta industry as well, because nearby industrial develapment would inhibit residential ar institutional uses. If residential-recreatian development had been successfully carried out west af the World Trade Center, on the ather hand, the optian would still remain to extend residential northward, even with the disadvantage of leaving the elevated expressway and thus no cannection ta the inland area.

In-Filling af Land Made Available in the Office and Government Service Area: Unrelated to government intervention and mare or less independent of athei actian, the effect of the World Trade Center will be to commit two areas as shown on the maps to more intensive private office develapment than naw exists These areas are now occupied by numbers of relatively small and alder buildings. They are assumed ta be susceptible ta private renewal. Na alternates are considered appropriate and it is really a matter of the strength of the market for such uses that will determined whether growth will accur in this stage, later, ar nat at all. Growth is assumed here as a goal but also as a lagical predictian in light of the increased access from east and west that will result fram adoption af the new traffic plan.

The Third Development Stage

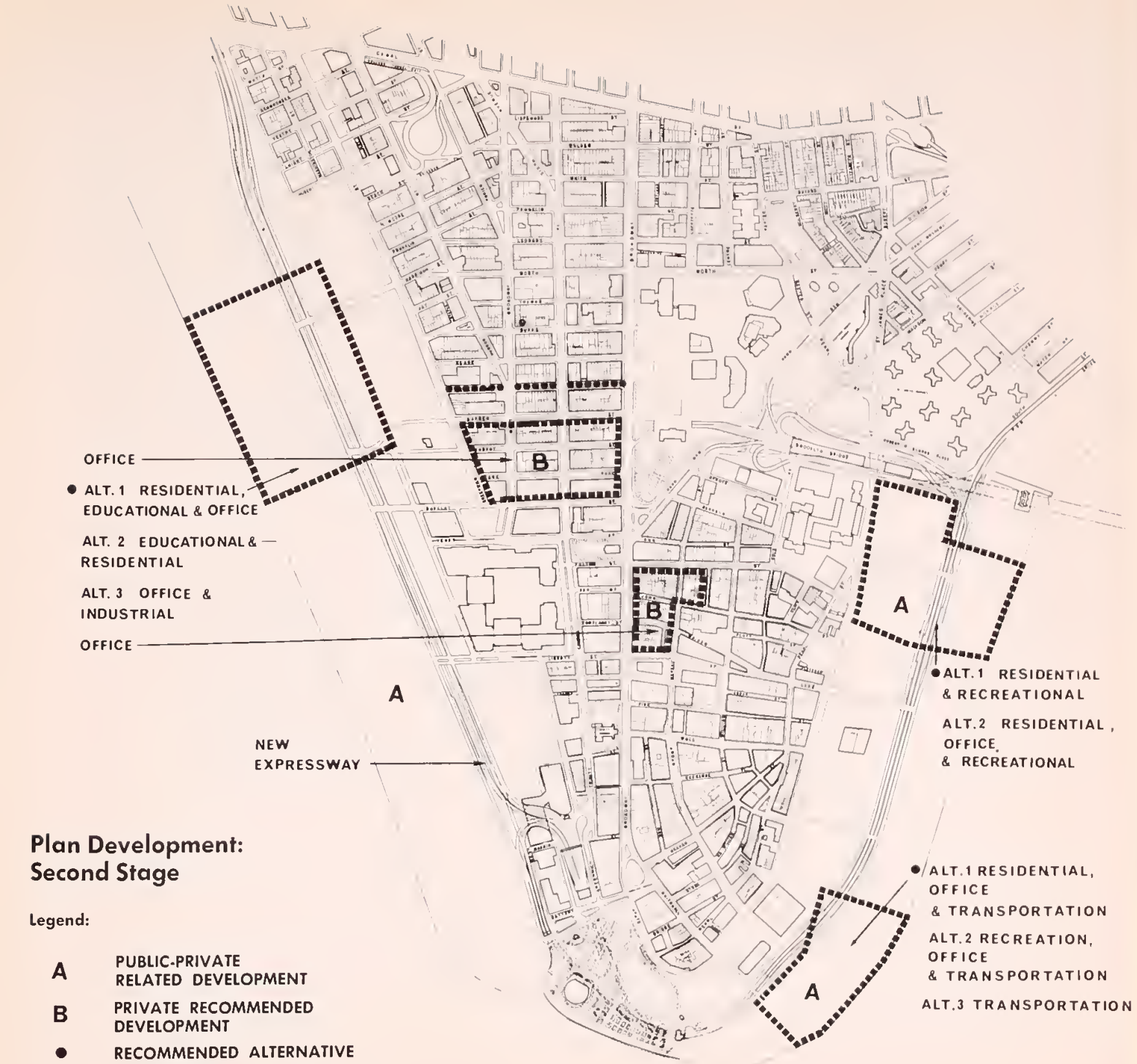
Completion af West Side Development: As before, decisions in the secand stage set conditions which either broaden or narraw the chaices in the third stage. If the recommended chaices were made in Stage Two, then the City has the aption for the remainder af the West Side develapment of residential and/or regianal recreatian. Same additional commercial development in the southern end of the West Side will probably be desirable, close to the City's new parking garage and Battery Park. Even though industry might be suggested as a possible choice, the residents who have moved in to the north during the second stage may well resist development for anything except more housing and recreation.

This latter mix is the recammended use. An alternate of office development might be possible by then, an the assumption that the Care would not become too diffuse thereby, and that the market for office space would remain strong. On the other hand, if previaus choices have been eithei for no actian ar for industry, then the choice at this future time may well narrow to industry or port-related activity with some affice use. Obviausly the full waterfront need nat be considered as a unit and a combination of choices are possible, with the northern end used for industry and the southern used far residential and regional recreation. In this third stage of West Side develapment, it will very likely be both possible and desirable to introduce relatively low-income housing at the same densities.

Area South of Brooklyn Bridge Southwest: This area may become cammitted as early as the second stage to either affice expansion or institutianal and government use. Beekman Hospital and Pace College will likely need more room and while the insurance area to the south is substantial it is not likely to grow much unless new insurance headquarters are established. The result of stage two activity around it will be to accelerate development and private renewal for some of the new business activities hoped for as a result of the strategy of the Plan.

A possible alternative in this area is for an extension af Brooklyn Bridge Southwest hausing. This would prabably invalve cansiderable further introductian of subsidy far site write-dawn. Althaugh it may prove ultimately desirable, as City policy changes, it is not recommended now.

Narthwest Renewal and Rehabilitatian: The greatest leeway in terms of choices in the long range is in this area - whose potential today is very small within the limits of the determinants. If the jabs and functions have cantinued ta decline here as anticipated, fairly dramatic renewal may be passible and desirable. Its nature will depend an preconditions and choices set in the first twa stages.



Plan Development: Second Stage

Legend:

- **A** — PUBLIC-PRIVATE RELATED DEVELOPMENT
- **B** — PRIVATE RECOMMENDED DEVELOPMENT
- ● — RECOMMENDED ALTERNATIVE
- ▪▪▪▪▪▪▪ — STREET CLOSING

0' 500' 1000' 2000'

Plan Development: Third Stage

Legend:

- **A** — PUBLIC-PRIVATE RELATED DEVELOPMENT
- **B** — PUBLIC RECOMMENDED DEVELOPMENT
- ● — RECOMMENDED ALTERNATIVE
- ////////// — STREET ARCADING

A previous commitment of the Washington Market Area to industrial use will, however, narrow the choices either to clearance for industrial use involving substantial subsidy or to industrial rehabilitation of an extensive kind.

On the other hand, if the Washington Market Area has been committed to educational or residential use (along with the piers), the choices broaden and permit a combination of residential, commercial and/or industrial rehabilitation.

The recommended alternative very tentatively put forward (not considered in the calculation of residential population for later programming) is ultimately to commit the area to predominantly residential use with a large park for recreation, located in such a way as to tie together the West Side and the Civic Center. The area is well situated for residential use. Of course any alternate, to be feasible, will require a major allocation of subsidies but the choices are a long way off. What is envisioned as possible and desirable is the remodelling of many of the industrial and office buildings suitable for housing to enrich the area, make maximum use of the physical stock and reduce the unit costs to bring them within range of middle and lower-income families.

Conversion of Selected Building Space to Residential Use: Along the same line, in the long-range the life expectancy of many buildings close to new residential areas will decline to a point where they cannot command high or even moderate rents for office use. This is particularly true for towers with small and uneconomic floor areas. At the point where residences can compete successfully on a dollar rent per square foot per year with such office space, it would appear perfectly feasible to convert space to residential use.[1] Although this is now prohibited by codes, it can become a way of making use of these old but structurally sound buildings or parts of buildings, consistent with the objectives of the Plan.

This is one way of saving older office buildings with architectural or historic interest. In fact the narrow towers of many office buildings would make excellent luxury apartments. Such residences can pay upwards of $6/square foot a year which is competitive with high office rents.

Recommended Allocations As The Basis For Ultimate Land Use

From the previous discussion it is clear that no single prediction is possible of what is likely to be the ultimate land use pattern in all of Lower Manhattan. The choices are many. However, land use in some sections such as the World Trade Center and Civic Center is reasonably predictable. In other sections, such as the waterfront, the future is not predictable but what is desirable is clearly evident. The purpose of considering alternate choices over time was to illustrate that the nature of the Plan is primarily a program and guide for action and decision and not a set of expected decisions for the long range that once made are irrevocable. Each choice was considered in relation to the extent that it achieved the goals, was within the limits of the determinants and broadened or narrowed future choices.

There are many combinations of choice over time, most of which do not have to be or cannot be committed in the present; however that combination of choices which appears to add up to the most aggregate satisfaction of the goals outlined in Chapter V, has been recommended in successive development stages. It is summarized on the accompanying map of recommended land use.

As public and private choices and decisions are made and development occurs in the future in Lower Manhattan, it will provide reality and "givens" around which future development must occur. The choices outlined above will then have to be restudied to see whether they still appear as conceived in this Report. Perhaps other choices and problems not now thought of will then be evident.

Land Use Assignment And Development Of Design Program

The summary of recommended land uses is translated in this section into square feet of office space, numbers of dwelling units and acres for each use. In the process of the Study this translation was first done on a trial basis for all of Lower Manhattan and then added up. The total was compared with

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[1] In fact, artists had converted warehouse space in the Brooklyn Bridge Southwest site to studios and makeshift apartments.

reasanable capacity and capture rate figures and market and planning considerations; it was then readjusted where judgement indicated seriaus excesses or conflicts. A more detailed description af this process fallows.

As has been frequently emphasized, it is not passible ta predict in detail what the future of Lawer Manhattan will be ar even what it ought to be. The purpose af the succeeding sections leading to the Optimum Development Site Plan is to spell aut what the implications (in three-dimensional, people, ecanamic and arganizational terms) would be if all af the recommended choices were fallawed. The result is a realistic program for immediate actian that is clearly cansistent with the gaal-image far the long-run.

The Pracess af Program Development

Lawer Manhattan was divided far purposes of the process into sub-areas called land use zones (LUZ). Each of these was further subdivided inta land use units (LUU). The zones had major streets, abvious divisions between areas, etc. as baundaries. The units consisted af several blocks of relatively similar existing cantiguaus development. Later, these units or zones were reassembled into planning units in canfarmance with the recammended land use pattern.

Three limits were used to set the range of calculations. The first was the amount af land available far reassignment ta a mare intensive, ar ather, use. For this the Building Life Expectancy Map was used. Thase areas, blocks or sites not pre-empted by a relatively permanent structure were assumed to be available in the lang-run.

Second, the site acquisition cost far a new structure with na subsidy was assumed, which set the lower limit af intensity. This frequently eliminated many patential uses entirely, at least far the shart run, since quite intensive uses are necessary to develop enaugh land value ta pay far all current site casts, including existing structures and their demolition.

Third, the maximum zoning class far each use was adopted as a first trial run That is, wherever residential use was assigned, R-10 (F.A R.-12 with incentives) the highest in the City's zoning code, was applied. In some cases, even this intensity cambined with an assumed high-rent level did nat throw off enough land value to absorb the site costs. In other cases, R-9 was possible. Thus zoning set the upper limit, and site costs set the lower. The same process was used for cammercial zoning.

Obviously, these threelimits might have set a range within which no sound planning and design solution could be found.

A fundamental purpose of the East Side Case Study and of the Optimum Development Site Plans was to show that there is nat only a design and planning solution, but a considerable variety of solutions.

The land available in each LUU was thus measured, the selected zoning envelape calculated and translated into affice space based on analysis and judgement af the market possibilities. [1] Areas initially designated for office or office-residential were then reassigned to residence or other uses and the tatal office space increases lowered to the "reasonable" gaal of a total ultimate figure of 500,000 employees in 85 million square feet of space.

The accompanying table describes the results of this process. They also list the variaus auxiliary activities that will be necessary or desirable -- community facilities, recreation, parking requirements, etc. In the design pracess these are inserted and in same cases the total space assignment further reduced ta allow land for them. For much of the narthwest, the figures that resulted are not shown because they are felt to be irrelevant at the present time in light of the immediate recammendation ta leave this area untauched.

Once the totals of space, employment and residences were derived for the LUU's for the long-run, they were then superimposed aver blocks occupied by buildings that are relatively permanent in the short-run. The land accupied by these as indicated by building life expectancy was measured, and the result totalled and subtracted from the long-run space and activity figures. Since most of the propased development is at or near the water's edge where there are few structures of even short-term permanence, it was not a

[1] In fact, the initial assignment would have almost tripled the present employed population.

Land Use
Zones and Units

Source:
SEE CHAPTER VI

0' 500' 1000' 2000'

TOTALS

IDENTITY		Land Area (Acres)					Space (Sq. Ft. - 1000s)			Population (1000s)				Parking (Spaces)			Dwelling Unit Characteristics				Active Recreation Areas	Community Facilities	Retail Facilities (Sq. Ft.)	CHARACTER OF COMMUNITY PLAZA
		Total Area	Sites To Be Developed	Res.	Off.	Other	Res.	Off.	Other	Existing Empl.	Fut. Empl.	Existing Res.	Fut. Res.	Res.	Off.	Total	No. Of D.U.'s	Av. D.U. Size	Child/D Ratio	No. Of Child				
I	CHAMBERS STREET	68.0	35.1	6.6	-	28.5	4,000	-		20.0	23.0	-	9.3	1,200	-	1,200	3,100	3.0	.3	900	11.6	Intermediate & Senior High School	32,000	EDUCATIONAL
II	WORLD TRADE CENTER	67.0	47.3	14.4	21.7	11.2	9,100	12,000		35.0	74.0	-	20.9	4,100	2,300	6,400	10,500	2.0	.1	1,100	26.2	Primary School Library	71,000	FOREIGN TRADE
III	TRINITY-RECTOR STREET	41.0	26.0	10.2	3.6	12.2	6,200	2,300		20.0	29.0	-	14.1	2,900	900	3,800	7,000	2.0	1	700	17.6	-	48,000	RESIDENTIAL SERVICE
TOTAL WEST SIDE		176.0	108.4	31.2	25.3	51.9	19,300	14,500	TEXT	75.0	126.	-	44.3	8,200	3,200	11,400	20,600	-	-	2,700	55.4	-	-	-
IV	STOCK EXCHANGE	47.0	32.7	7.5	17.1	8.1	4,500	9,000	SEE	14.4	47.5	-	10.2	2,000	1,800	3,800	5,100	2.0	.1	500	12.6	-	35,000	BUSINESS SERVICES
V	WALL STREET	27.0	21.1	7.1	7.0	7.0	4,000	5,100		14.0	26.9	-	9.3	1,900	1,100	3,000	4,600	2.0	.1	500	11.6	Library	32,000	MARITIME ACTIVITIES HISTORIC SHIPS
VI	FULTON STREET	60.0	49.0	34.2	5.1	9.7	14,400	1,400		7.0	7.0	-	33.5	4,500	200	4,700	11,000	3.0	.3	3,400	41.9	Primary & Intermediate School	114,000	RESIDENTIAL SERVICES
TOTAL EAST SIDE		134.0	102.8	48.8	29.2	24.8	22,900	15,500		35.4	81.4	-	53.0	8,400	3,100	11,500	21,700	-	-	4,400	66.1	-	-	-
GRAND TOTALS		310.0	211.2	80.0	54.5	76.7	42,200	30,000		110.4	207.4	-	97.3	16,600	6,300	22,900	41,300	-	-	7,100	121.5	-	-	-

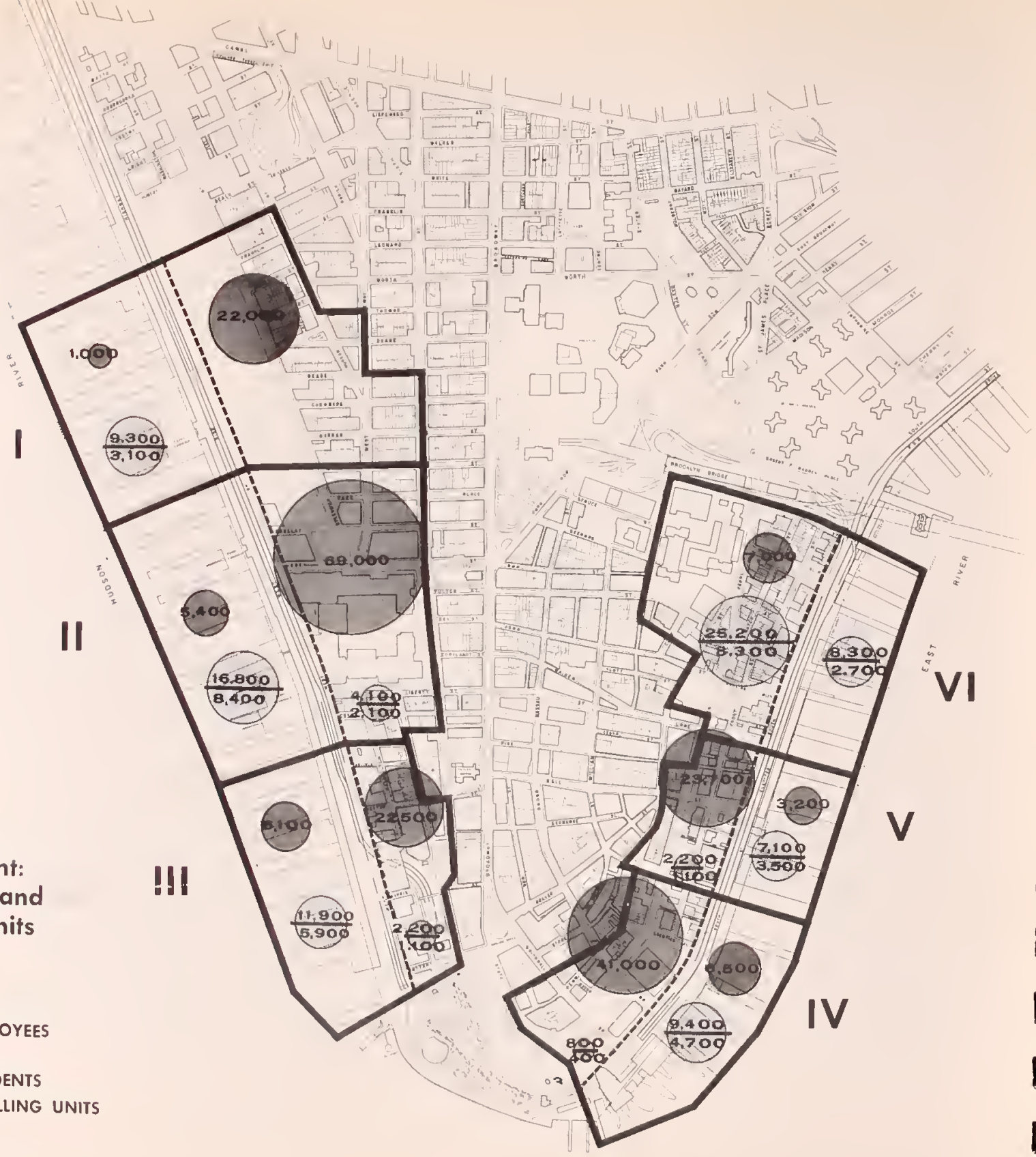
Waterfront Development Districts: Program Estimates

INNER AREA

Land Area (Acres)				Space (Sq. Ft. - 1000's)		Population (1000's)			Dwelling Unit Characteristics		Parking (Spaces)		
Sites To Be Developed	Res.	Off.	Other	Res.	Off.	Exist. Empl.	Fut. Empl.	Fut. Res.	No. Of D.U.'s	Av. D.U. Size	Res.	Off.	Total
18.6	-	-	18.6	-	-	20.0	22.0	-	-	-	-	-	-
24.6	2.5	20.0	2.1	1,800	11,100	35.0	69.0	4.1	2,100	2.0	800	2,100	2,900
5.3	1.6	1.6	2.1	900	1,000	20.0	22.5	2.2	1,100	2.0	500	700	1,200
48.5	4.1	21.6	22.8	2,700	12,100	75.0	113.5	6.3	3,200	-	1,300	2,800	4,100
15.5	.6	14.9	-	400	7,600	14.4	41.0	.8	400	2.0	100	1,600	1,700
8.1	2.1	6.0	-	900	4,400	8.6	23.7	2.2	1,100	2.0	500	1,000	1,500
33.0	22.5	5.1	2.4	10,700	1,400	7.0	7.0	25.2	8,300	3.0	3,300	200	3,500
56.6	28.2	26.0	2.4	12,000	13,400	30.0	71.7	28.2	10,800	-	3,900	2,800	6,700
105.1	32.3	47.6	25.2	14,700	25,500	105.0	185.2	34.5	14,000	-	5,200	5,600	10,800

OUTER AREA

Land Area (Acres)				Space (Sq. Ft. - 1000's)		Population (1000's)			Net/Gross Residential Development Density	Dwelling Unit Characteristics		Parking (Spaces)			IDENTITY
Sites To Be Developed	Res.	Off.	Other	Res.	Off.	Exist. Empl.	Fut. Empl.	Fut. Res		No. Of D. U.'s	Av. D.U. Size	Res.	Off.	Total	
16.5	6.6	-	9.9	4,000	-	-	1.0	9.3	1400 / 480	3,100	3.0	1,200	-	1,200	I
22.7	11.9	1.7	9.1	7,300	1,100	-	5.4	16.8	1410 / 740	3,400	2.0	3,300	200	3,500	II
20.7	8.6	2.0	10.1	5,300	1,300	-	6.1	11.9	1380 / 580	5,900	2.0	2,400	200	2,600	III
59.9	27.1	3.7	29.1	16,600	2,400	-	12.5	38.0	-	17,400	-	6,900	400	7,300	TOTALS WEST SIDE
17.2	6.9	2.2	8.1	4,100	1,400	-	6.5	9.4	1360 / 550	4,700	2.0	1,900	200	2,100	IV
13.0	5.0	1.0	7.0	3,100	700	-	3.2	7.1	1420 / 550	3,500	2.0	1,400	100	1,500	V
16.0	8.7	-	7.3	3,700	-	-	-	8.3	950 / 520	2,700	3.0	1,200	-	1,200	VI
46.2	20.6	3.2	22.4	10,900	2,100	-	9.7	24.8	-	10,900	-	4,500	300	4,800	TOTALS EAST SIDE
106.1	47.7	6.9	51.5	27,500	4,500	-	22.2	62.8	-	28,300	-	11,400	700	12,100	GRAND TOTALS



Waterfront Development: Population and Dwelling Units

000 EMPLOYEES

000/000 RESIDENTS / DWELLING UNITS

0' 500' 1000' 2000'

significant factor in the development potentials.

The program for each area was then detailed by planned unit development districts established in accord with the Concept Plans, [1] with the designer being required to test whether the space and dwelling units of the program could be accommodated in the land available in accord with good planning and design principles, and in accord with the concepts of form and shape discussed earlier in the Report.

Finally, as described in Part 2, the employed and resident population figures were analyzed for their traffic generation characteristics. These were introduced into the computerized coded network to see whether they would overload the movement system. It was found, as described later, that they did not, but that capacity was reasonably above the figures used.

Thus they were close to capacity but with a margin for flexibility.

The resulting Program is of course only a general guide for the long-run. Its development established a process, however, which can and should be repeated as time and actual development occurs.

For example, if substantially more office space is ultimately developed in any particular area than that programmed, other areas will decline in their growth expectation if the overall growth estimates continue valid. If, on the other hand, the overall capture rate and/or general demand for space increases above a reasonable anticipation, then the aggregate space totals can be assumed higher without internal inconsistency.

The next chapter examines and tests in detail the validity of this programming method by applying part of the Program to a particular development unit -- the East Side Case Study.

The Program can thus serve as an overall framework within which any particular proposal can be viewed. It also shows the feasible development potential that achieves the goals set forth, within the determinants assumed. At the same time, it should not be construed as something "sacred" or not to be changed. It is a tool only, albeit a useful tool, to guide the consistent and rational process of change.

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1. These divide the waterfront areas into basic development units such as the East Side Case Study Area.

LOWER MANHATTAN PLAN

CHAPTER VII

THE EAST SIDE RENEWAL CASE STUDY

In the last chapter the Program was set for the specific amaunts of space, dwelling units and ancillary requirements far each area. This sectian describes the analysis, planning and design pracess af the part af the develapment unit alang the East River recammended far immediate actian. The purpase af this special study in depth was ta test the principles af the Cancept Plans and the Pragram, ta study the special prablems af integration af in-share and aff-share develapment, ta determine the preliminary casts and implicatians af such develapment and ta design a pratatype far the perimeter af the peninsula. It alsa served as a basis far autlining a develapment pracess whereby that part af the Plan can be carried aut.

EXISTING CONDITIONS

Existing canditians are cansidered under the fallawing headings: selectian af the area, current state af the site, present zaning, subsurface canditians affshare, and the feasibility af creating new land (considered in detail in Chapter IV).

Selectian af the Area

The area selected is baunded by the pierhead line an the east, Water Street an the west, Fultan Street an the narth and Wall Street an the sauth. Reasans far picking it have been discussed briefly before. First, it is the area af present expansian af the financial Care and has been undergaing active site assembly and speculatian, particularly between Water and Frant Streets. This is bath a disadvantage and an advantage. It is a disadvantage in raising site casts, but an advantage in that it is an area af great investment interest.

Secand, the area, while still in multiple awnership, has been assembled ta such an extent that anly a relatively few awners are invalved. This simplifies dealing with them far caardinatian and planning.

Third, 42 per cent af the area fram Water Street ta Sauth Street is already in public awnership in the farm af streets, excess taking fram the recent Water Street widening ar accupied by public buildings. If Sauth Street itself and the bulkhead-ta-pierhead area are included, public awnership rises ta 81 per cent. With this large prapartian af land in public cantral the City's rale in this develapment is easily apparent.

A faurth reasan far selectian af this area is that much af the land is vacant, accupied by deteriarated and/ar small structures and with few impartant activities. The landside is very prabably eligible under state (and federal) legislatian far renewal activity. In additian the pier area will alsa qualify in all prabability as a renewal area, a patential aid ta assembly and site impravement.

Finally, private renewal, althaugh nat yet at full speed, is praceeding apace an a small-lat, fractianized and unintegrated basis. Clearly the appartunity far develapment in accard with a master plan is here and naw; atherwise it will quickly be dissipated as private develapment accurs It is reasanable ta assume that a planned result will be

superior ta what might take place without some concerted actian.

Public invalvement is justified here partly because of the large ownership of public land and rights, and also because it can be demanstrated that the aptimum achievement af the goals for all is substantially beyand the legal, arganizational and financial capacity af unaided private enterprise. Leadership by both private and public sectors in a jaint venture is clearly in the larger -- and langer range -- general interest.

Current State af the Site

Data from recent sales and appraisals indicate land casts here range from $ 70 to $ 120 a square foot, depending on the size af parcel, structure an it, and assembly factor. These costs are based on assumptians regarding the potential availability af zaning changes and an the possibility of clasing public streets and adding them ta enlarge the zaning envelape.

One majar building is now in the early planning stage, but has nat proceeded so far as to preclude its being influenced by a master plan than might be adopted.

The anly substantial buildings in the area are 110 and 120 Wall Street araund which it is assumed any future development must plan.

On the southern side of Fulton Street, between Front and Sauth Streets, are a graup af alder laft buildings which deserve serious cansideration as permanent landmarks af New Yark's commercial and maritime history. Unlike many af the equally fine histaric buildings along Front Street itself, which are scattered here and there between parking lats, these buildings farm a coherent grouping capable of successful incarporation inta future planning effarts.

The dominant structure on the site is of caurse the Franklin Delano Roosevelt Drive, a six lane expressway elevated over South Street. It is on steel columns and girders. It looms 20 to 30 feet averhead and constitutes a majar visual barrier to the river from the west.

Beyand the bulkhead (in paar canditian) are four dilapidated waad and/ ar concrete platfarm piers. Two are used intermittently.

Underground is an important network of utilities, including a large storm and combined sewer interceptor now being completed in Sauth Street, along with a majar steam main that services much af downtawn.

Present Zaning

Present zaning is C6-6 (Residential equivalent is R-10) in the inland area and M1-4 fram bulkhead to pierhead. This would allaw a develapment af perhaps four million square feet over the present private properties. However, the site costs that speculators have been paying far land is based an the assumption that the city will close streets, making possible a higher allawance for space.

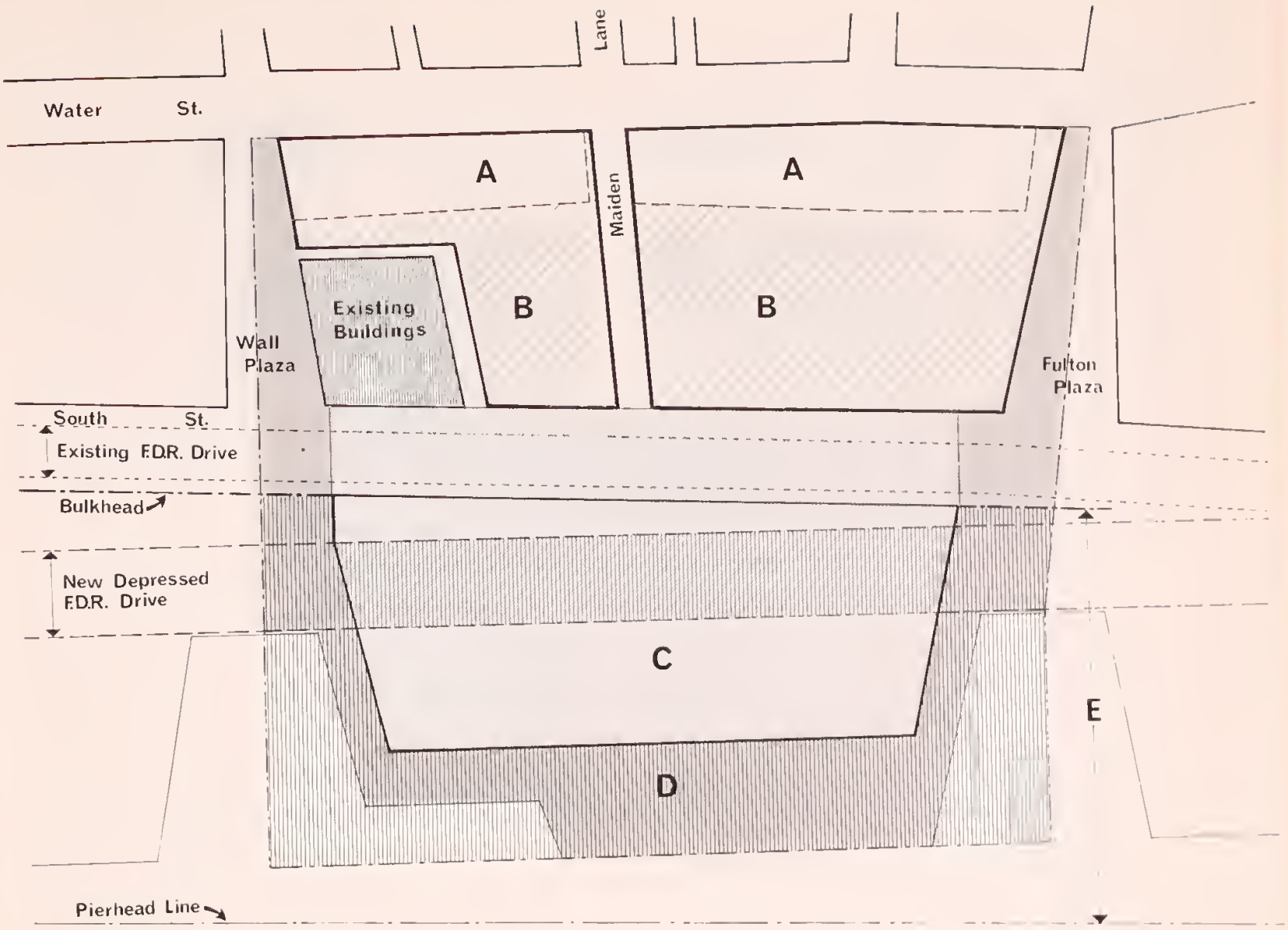
Subsurface Canditians Offshore

A detailed description of offshore conditions is faund in Chapter III. Here they are summarized:

Offshore conditions at the tip of Manhattan are exceptionally favorable far either land-fill or pile-supported structures. This is particularly true af the area at the very end of the island where bedrock depth ranges between 30 and 40 feet below mean sea level. In contrast, bedrock depths in Zones I and IV range between 80 and 150 feet; and to the north, along both rivers, bedrock depths are generally much greater.

The area between Wall and Fulton Streets ranges between 40 feet an the sauth to 80 feet on the north.

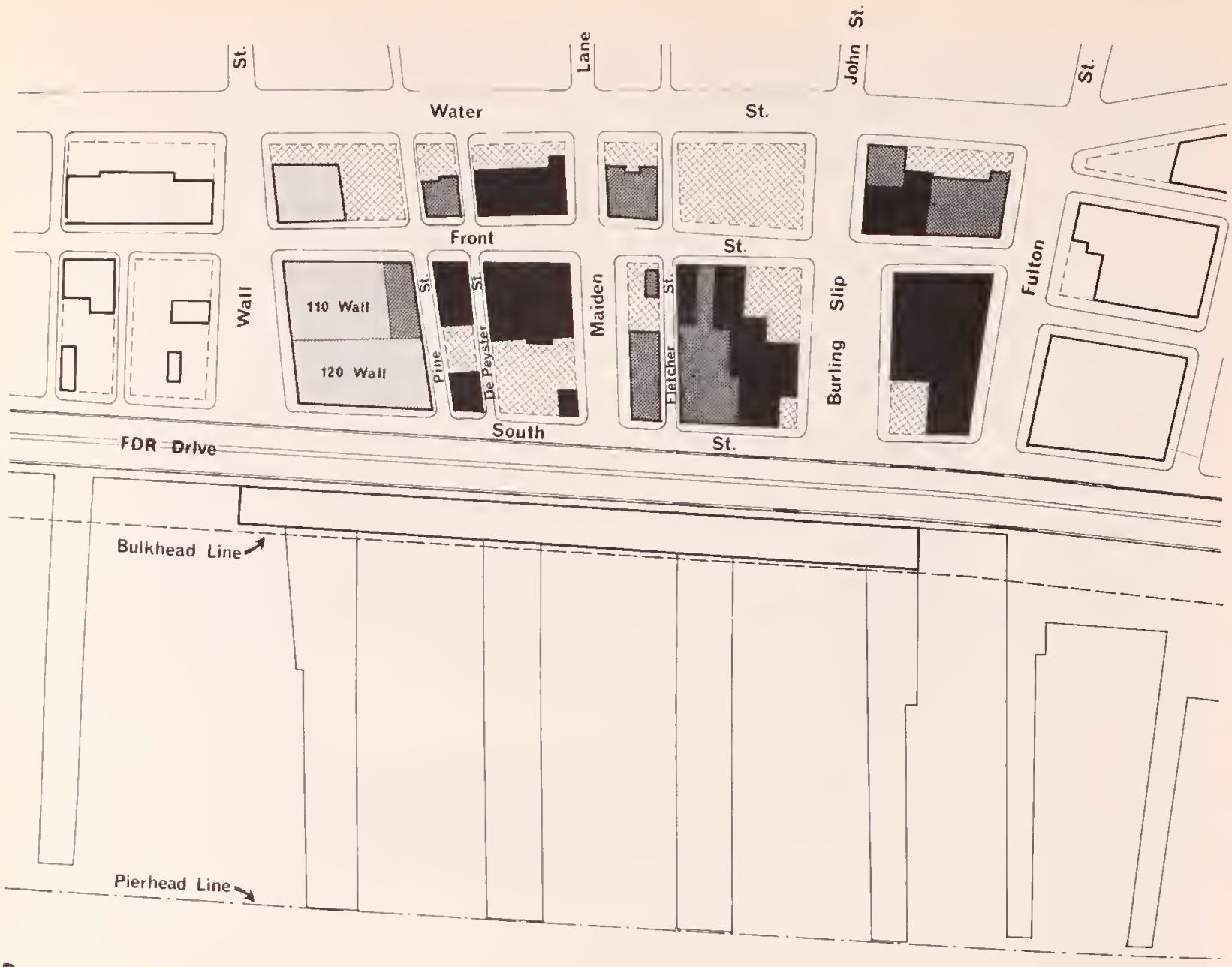
In Zanes II, III and IV the process of land fill is economical and feasible. In Zone I, however, where soft compressible material is faund as deep as 80 to 120 feet, fill is more expensive and may nat be recommended, except possibly for park and recreatian activities. Where salid foundation is required, pile-supported structures will probably have to be relied on. The Case Study site falls in Zane III.



Prototype Development Sequence: I

Planned Development District

0' 100' 200' 500'



Prototype Development Sequence: II

Existing Conditions

0' 100' 200' 500'

Legend:

- VACANT LAND
- BUILT PRIOR TO 1915, NOT FIREPROOF
- BUILT PRIOR TO 1915, FIREPROOF
- BUILT SINCE 1915

The Cast of Creating New Land

The cast of creating new land ot this part of the edge of Lawer Manhatton was estimated to be $8.30 per square foat. This figure included demalition af existing piers, dredging af saft materials, new fill; it did nat include a perimeter relieving platform, a regular bulkhead ar a rock dike. It alsa did nat include the cast af utilities for the new land, which in this case study are presumed ta be paid for by develapers.

The tatal cast of creating new land including all af the abave is estimated to be between $ 13 and $ 15 per squore faat, depending to a degree an the distance fram pierhead to bulkhead. That is, Hudsan River casts will be lawer per square faat because af the wider area involved aver which the lineal cast af bulkhead will be spread.

THE EAST SIDE CASE STUDY ILLUSTRATIVE SITE PLAN

The Pragram in Chapter VI indicated abaut 2,200,000 square feet af affice space, 6,000 luxury high-rise, garden apartments and town houses, and 2,700 parking spaces as the basic space assignment ta the East Side Case Study area.

These have been designed diagrammatically as shawn in the Optimum Develapment Site Plans in accord with the basic principles for mavement and access autlined before. Each is based on the same principles, but as shawn, there is much variatian passible within the cancept.

As the sketches indicate, the several levels af service activities aver the expressway-arterial "cannecting paint" result in the creatian af a higher pedestrian elevatian in the inner ar park side af the residentiol development units than the adjacent street grade. Generally, this level wauld be fram 15 ta 30 feet abave the cammunity "waterfrant" plazas. Its height would vary fram ane situatian ta anather, as will the use ta which this deck is put.

The basic cancept is that these areas will be specifically developed ta serve the local residents and affice emplayees - a "backyard park" as it were, with recreation consisting of handball caurts, skating, passibly some convenience shapping, rest and sun areas. In certain situatians nursery schaals can be located here, using the apen space far plan space.

In relatian ta zaning, these apen spaces farm a cluster that paals the apen space far each apartment building, inta a relatively private park. These wauld be accessible mainly fram the residentiol and affice buildings at the upper level, sa that peaple could came down by elevatar, and wauld nat have ta climb up ramps ar stairs fram the main streets ta reach them.

The intensity af office activity is shawn concentrated principally alang Water Street. Same hausing alsa appears there ta get an intermixture. In terms af shape af silhauette, develapment slapes upward fram the park and esplanade at the water's edge ta perhaps 60 and 80 story towers alang Water Street.

Expanding the Example

When enaugh af the special prablems af the Case Study had been warked aut it was extrapalated as a system af grawth aver the entire waterfrant, with adaptatian wherever necessary because af differences in tapagraphy, pragram and the current street system ta be retained. The expansion pracess resulted in the Optimum Develapment Site Plans shawn later

THE DEVELOPMENT PROCESS

A vision af the future, however seductive, is illusary and frustrating unless a way ta get there fram here is alsa presented. In order ta suggest a pracess by which this develapment can begin ta take place in accard with the goals, the prablems, costs, pracedures and organizatianal mechanisms necessary ta take actian were examined.

Insafar as passible, narmal market develapment pracesses

must be utilized to implement large-scale plans such as these. From the preceding analysis and recommended development of the East Side prototype, it is clear however that a number of special conditions indicate the need for a combination of public and private action in partnership, if anything close to the optimum achievement of the goals is to be reached.

Requirements For The Development System

The proposed development breaks down into two basic categories: first, those elements which can and should be in the hands of private developers: second, those elements which must be planned and/or constructed either directly by City agencies or through some delegated authority.

Wide variations in administrative mechanics are possible and there are many different precedents in recent urban experience. The critical necessity is the delegation (with appropriate safeguards) of sufficient authority in some central body to assure a coordinated plan and its proper execution, with clear fiscal responsibility for development.

The balance between "public" and "private" segments of the development can take a number of forms. While financing and construction of the individual building units -- residential, retail and office space -- are clearly the job of private developers, guided by a general plan, the area of needed centralized responsibility is not as easy to define, especially in a project requiring substantial public actions and perhaps improvements before private development can properly begin.

This responsibility begins with the project planning itself: the establishment of standards and architectural and financial controls, determination of the exact new bulkhead location and extent and nature of landfill, definition of public and private parcel boundaries, the final alignment of the new highway system including service roads, service areas and parking facilities, the arrangement of basic utilities and other elements of the "capital web", and the devising of the lease or sale system of individual parcels for private development.

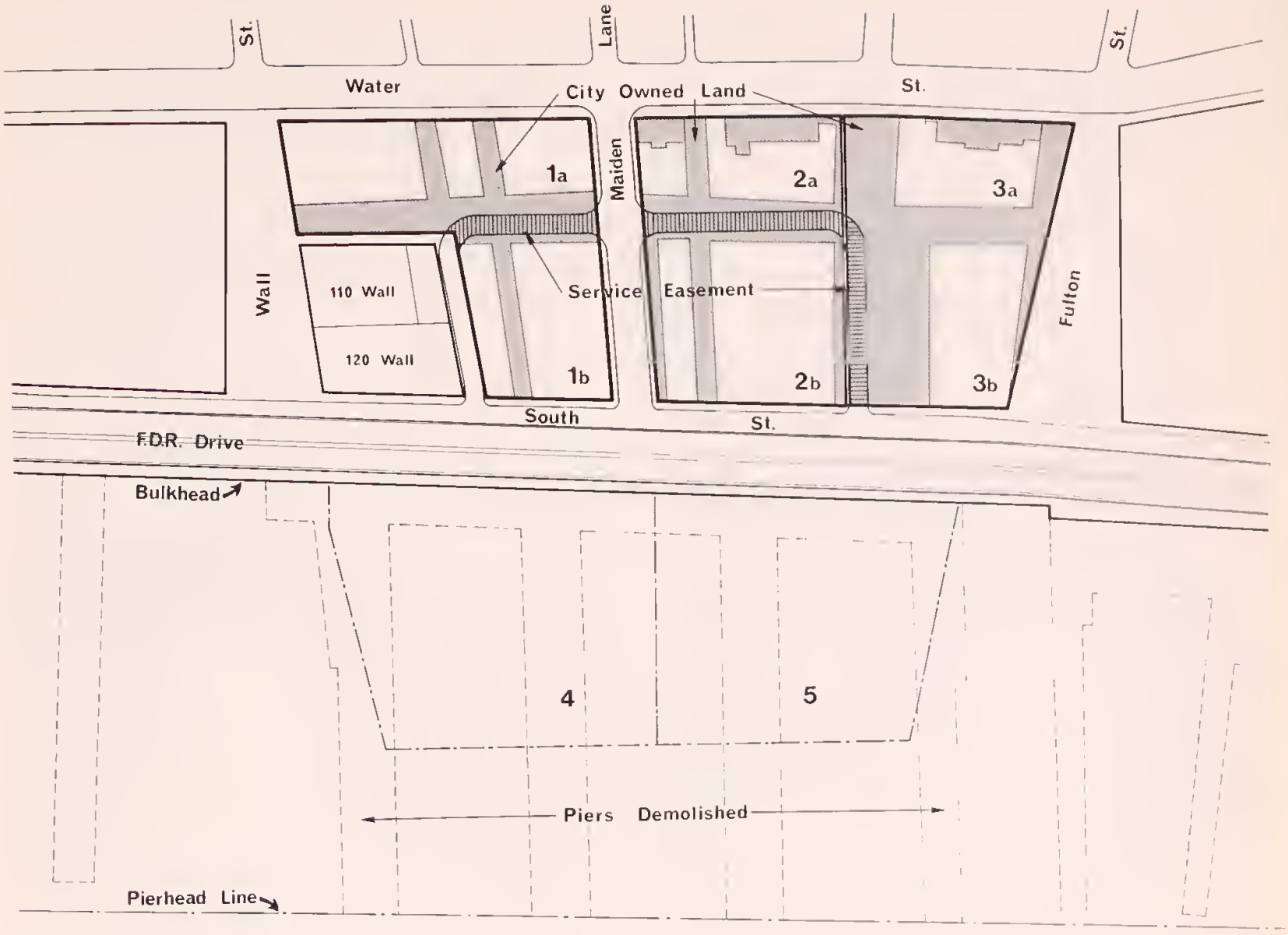
It is assumed the individual building parcels are to be privately developed and the basic "capital web" although under a central authority to be primarily paid for by private developers. There still remains a "grey area" of overlapping interests where the ultimate disposition can be determined only in the course of actual development. This "grey area" consists of the parking facilities, the waterfront plazas, local recreation areas and other publicly used portions of the scheme closely connected with individual development units.

Organizational Alternatives For Detailed Planning and Development

These difficulties and many others not yet detailed point up the need for close coordination and planning between the various organizations responsible. The device for bridging the apparent organizational gap between business and government can take a number of forms, ranging from private advisory and planning groups to quasi-public and public development corporations and foundations. An example of the first is that of the Old Philadelphia Development Corporation, a private, non-profit, non-taxable corporation sponsored and financed by Philadelphia businessmen. Its primary purpose is to act as consultant and advisor to development and planning agencies. It is responsible for much of the success of Philadelphia's downtown renaissance and its executive vice-president is a close advisor to the city administration on all aspects of renewal and development.

Somewhat similar in operation is the Charles Center-Inner Harbor Management, Inc., a non-profit organization in Baltimore, Maryland. It was created to act as agent and consultant for the city in the promotion, development and management of that city's downtown renewal program. Unlike the O P D C above whose funds are largely private, the C C I H M receives its major funds from the city under contract to perform its work and is closely supervised by the administration.

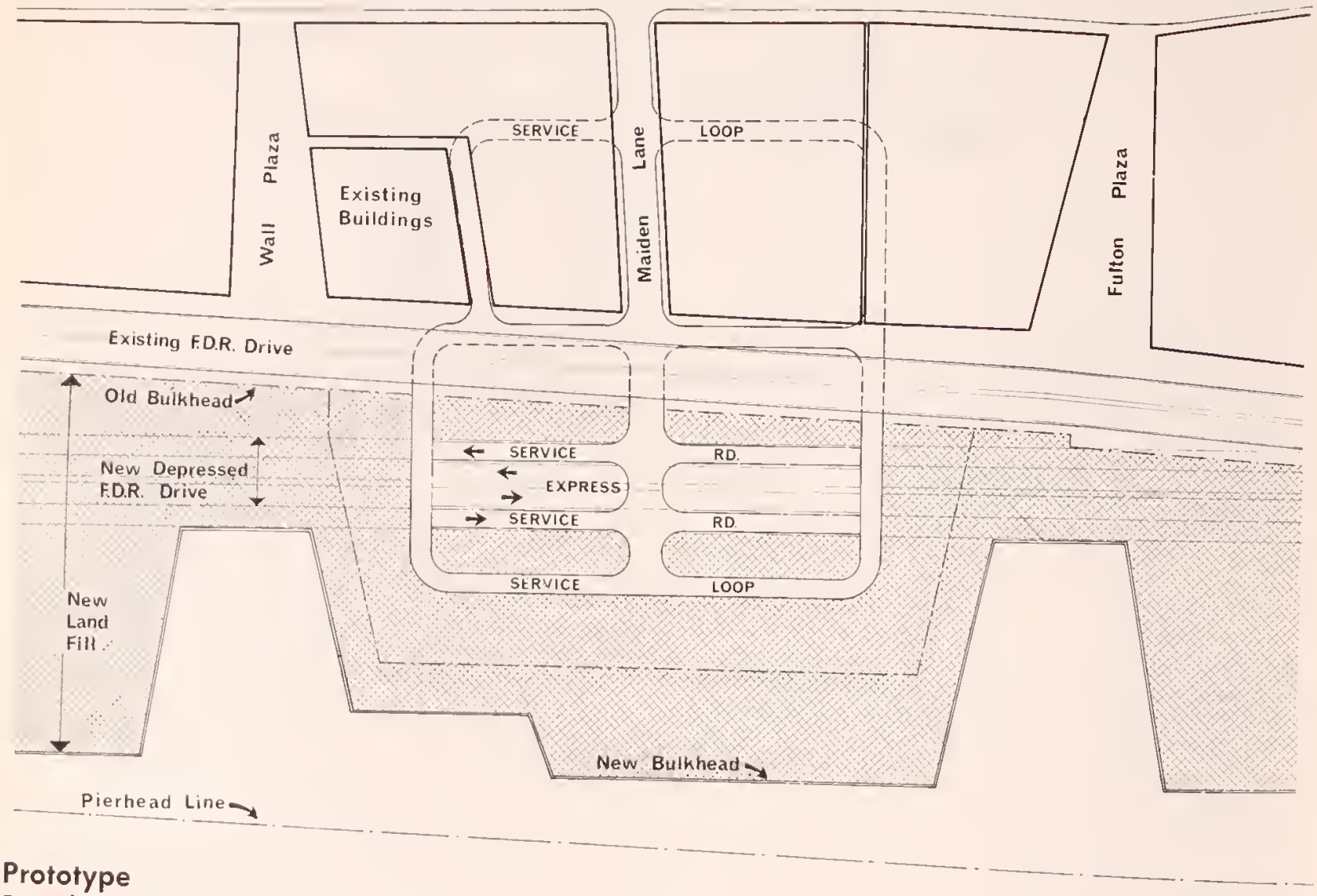
As example of a quasi-public agency is the Philadelphia Industrial Development Corporation. It is a non-profit corporation created by the city whose role is the promotion and development of industry in the city. In a typical activity, the city deeded an unused city-owned airport to P I D C for a nominal sum and the Corporation planned an industrial park for it. Through an industrial real estate firm, it sells, builds, leases, arranges financing for and promotes industry



Prototype Development Sequence: III

Inland Site Organization

0' 100' 200' 500'



Prototype Development Sequence: IV

Public Construction (1)

0' 100' 200' 500'

far the site, in accord with city policy.

P I D C 's board has both public and private representatian, and the carparation hos private enterprise freedom ta act combined with responsibility far the public interest.

All over the cauntry ather examples con be faund of variatians an these and other orrongements. [1] Of particular interest are exomples using development revolving funds. One such is the Cleveland Develapment Faundation thot has spansored a number of that city's renewal projects ond has also undertaken private develapment in the general public interest. Missauri legislotion hos permitted the creatian af public development carparations argonized by awners af a majarity of private praperty in on oreo to carry out a plon approved as in the general public interest. Another aspect af this low permits farming corporatians such os Konsos City's Downtown Redevelapment Corporatian (o develapment fund) which hos the power of eminent domoin. In this case the city lends its pawer af eminent damain where necessory to implement a plon it hos approved, but the city does not involve its own funds.

The Pittsburgh Development Fund of ACTION-Housing, Inc. Oklohomo City's Urban Action Faundatian, the Purdue-Calumet Develapment Foundotion af East Chicago, Indiano, and the Citizen's Redevelapment Corparatian of Detroit, Michigan, ore fascinoting examples af creative and flexible use of business ond civic leadership applying their knaw-haw to carry out ventures in the public interest.

Relevant New York Legislatian and Devices

New Yark legislatian olready pravides some relevant devices and possibilities. Under the 1963 Cammunity Develapment Corparation Act [2], non-profit carporotians that are empawered to build civic, cultural and recreotianal facilities can be farmed and can qualify far state martgage loan assistance. Under an earlier 1951 act, redevelapment corporotions con be set up and, where the corporation ocquires 51% af the land in a designated area, the municipality can lend its pawer of eminent damain ta help implement the carparotion's redevelapment plon.

Still mare recently redevelapment companies have been authorized whose rale is primarily ta provide law and middle-income hausing. Again the municipality can candemn land far them; they are limited-dividend in nature with a moximum 6 per cent return on investment.

It is quite passible thot ane ar another or combinotions af the obove devices can meet the specificotians needed for the activity outlined belaw.

The Specificatians far Organizing the Development af the East Side Example

It can be cancluded that the most appropriate organization far development will depend an three foctors: the nature of the people invalved ond their gaals, the existing orgonizotionol context ond the kind af job to be done. Consideration of the first twa in New York must perhaps wait an a later stage af Plon review and implementotion process. It is certain there is no single magic farmulo. However, the kind of job to be done con be specified in some detail using an hypothetical pracedure ta exomine the necessary specifications for arganizatian and power.

The objective of the kind of coardination autlined belaw is to attain an optimum development in the generol public interest and to maximize the oppartunity for private enterprise contribution. Since large oreas of publicly owned land(both existing streets and filled areos) are involved, the public responsibility is clear. Further it con be demonstrated thot without public-privote caaperotion of a high degree, the objective of integrated development ot on optimum level cannat be fully realized. Neither partner can achieve alane what both can da tagether. In other cities this is so potently true as to be a truism. "Thase communities which have hod an effective civic arganizotian, supported by business ond warking in caaperation with government, have been able to make effective strides to combat ecanamic adversity, advance redevelopment, stimulate better plonning, ond

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[1] See Seymor Baskin and Bernard Lashbaugh, A Critical Analysi af Private Development Funds, ACTION, INC., Moy, 1964. Although New York suffers from a kind af reverse provincialism in sametimes being unwilling ta learn from experiences elsewhere, New Yarkers have been centrolly involved in the creotive developments along these lines in other cities.

[2] See Article 6-A, Boak 23, General Municipal Sectian, the Kinney's Statutes.

generote urban growth." [1]

An orgonizotion which would oppeor to combine the necessory feotures would be a privote, non-profit, non-toxoble coiporotion or faundotion, with representotives of the City Administration as ex-officio members of the Board of Directors. This corporation should be able to enter into controcts, to ocquire reol estote or any interest therein, to borraw ond lend money and to receive gifts. Its financing could be estoblished by subscription through loons and grants.

Its function would be to plon, promote and in some instonces execute vorious portions of the development; in most instances, however, it would be acting as agent for the City. It should hove the freedom to act of privote enterprise but with the sense of responsibility of o public authority. It would work under controct to such City ogencies os the Housing and Redevelopment Boord, the Department of Troffic ond the Planning Commission, it would and could act independently.

Plonned Unit Developments

The purpose of such on organization would be to provide a device for treoting large tracts os plonned unit developments to ensure the implementation of the Plon's objectives. By planning on a unit rather than a parcel bosis, it is possible to provide on intensity of development for open spoce, parking and other requirements, consistent with the oppropriote overoll zoning for the unit; but eoch element ond intensity could be distributed in o coordinated woy without eoch individuol property being inhibited by restrictions, and zoning hoving to be applied on o porcel-by-porcel bosis. The olternative of a property-by-property type of development (as in now happening in the woterfront oreo) will not produce os flexible, integroted or well plonned results.

The minimum size for such a plonned unit development should be from the center of one community plozo to the center of onother, or o single "node". This is not to soy that the community plozos themselves should not be plonned os entities; they should. In terms of development, however, the node should be the unit.

METHOD OF DEVELOPMENT

There ore five possible woys of going obout the development of the Cose Study example. The first would be to hove the City simply fill ond sell or lease the land beyond the bulkhead, subject to restrictions. Owners of Areas A ond B (see diagrams) would be encouraged to develop in accord with the Plon with the incentives of adding the street areas to their property if they conform. This method has the disodvontoge inherent in o property-by-property development where, for exomple, a porking garoge might have to extend over two properties to work properly. The costs of this method ore summorized later.

At the other extreme is the treatment of the unit in its entirety as an unassisted urban renewol areo [2] with the City acquiring oll property, through eminent domain if necessary, and reselling it to developers subject to the controls of the Plan. Present property owners could have first refusal options to oct os developers.

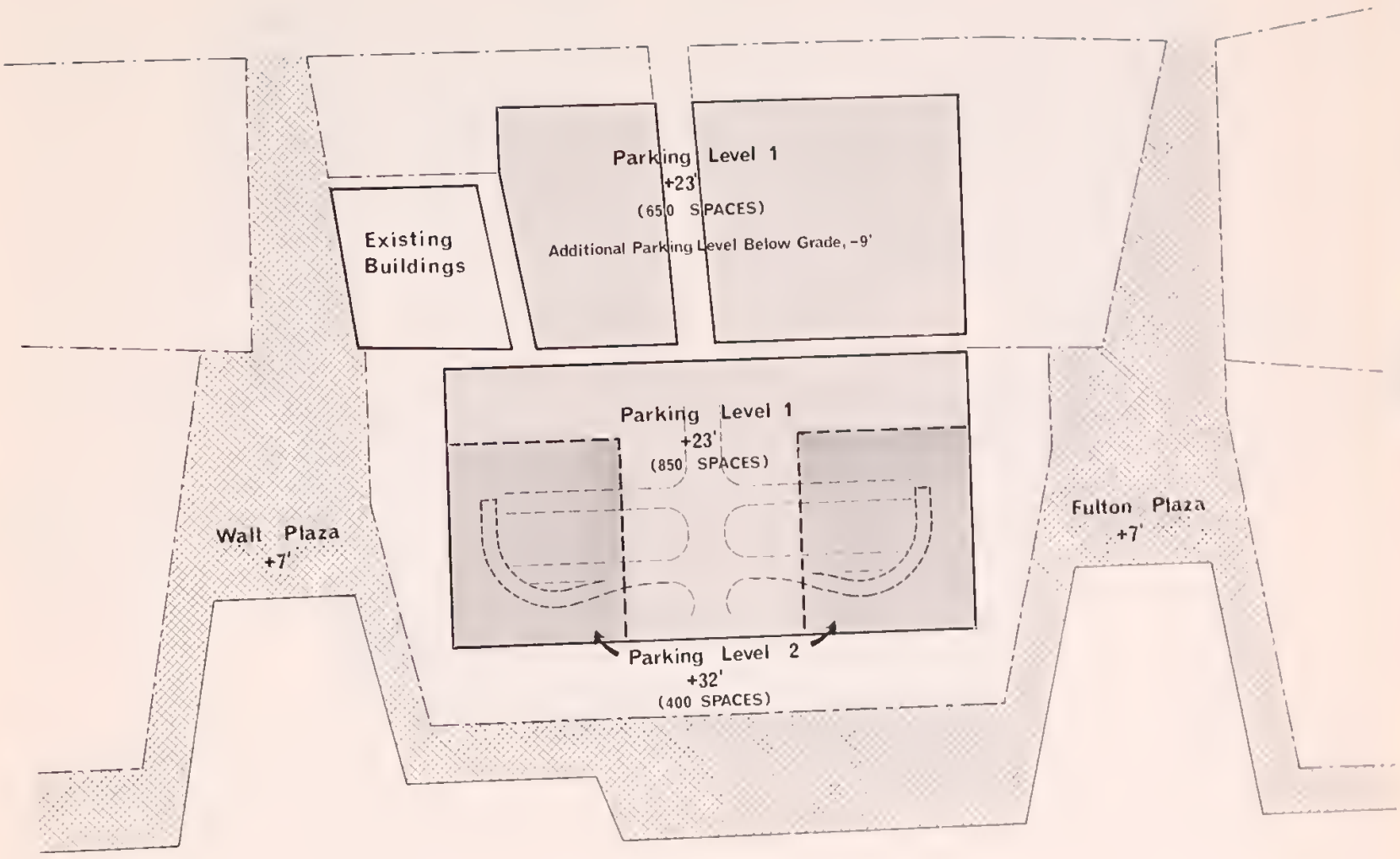
Under normol urbon renewol circumstonces this method would require an odvance of funds as a loan from the City or Federal Government until the lond was resold. An olternative to this would be for the City to deed the resulting publicly-owned land to o development foundation or corporotion for o nominol sum (o la P I D C) ond have the foundation borrow the money, with the lond as collaterol. This money could be used both for payment of owners and for preporotion of the off-shore lond. Another olternative would be for the foundotion to roise the money privotely as a loan, like some of the examples cited in other cities.

Privote Property

Between these two extremes ore at least three alternotives

1 IBID, p. 36

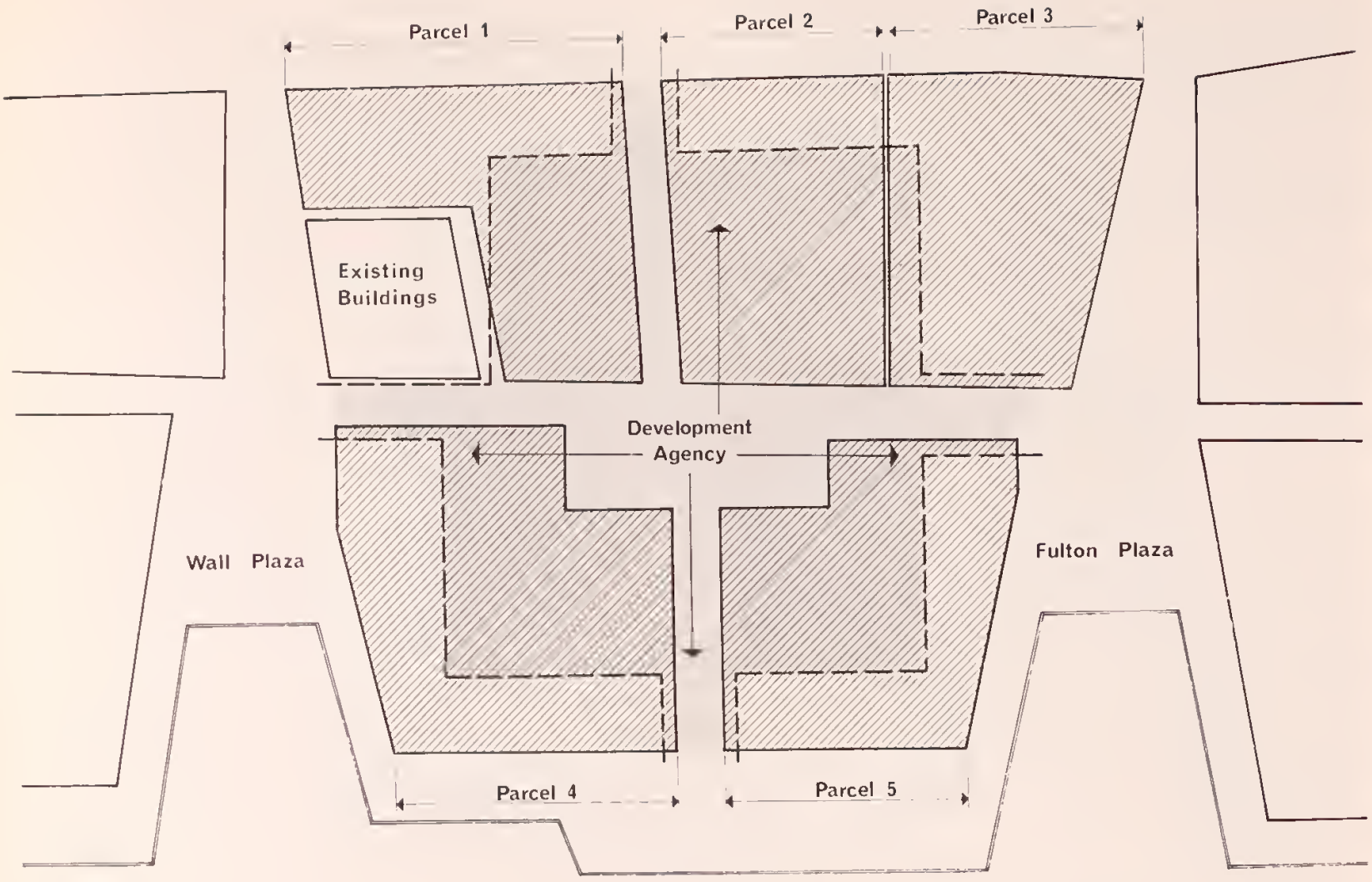
2 An unassisted urbon renewol area is one in which the resale value of lond is expected to equal or exceed the cost of plonning, ocquisition and site preporotion; therefore no subsidy is involved.



Prototype Development Sequence: V

Public Construction (2)

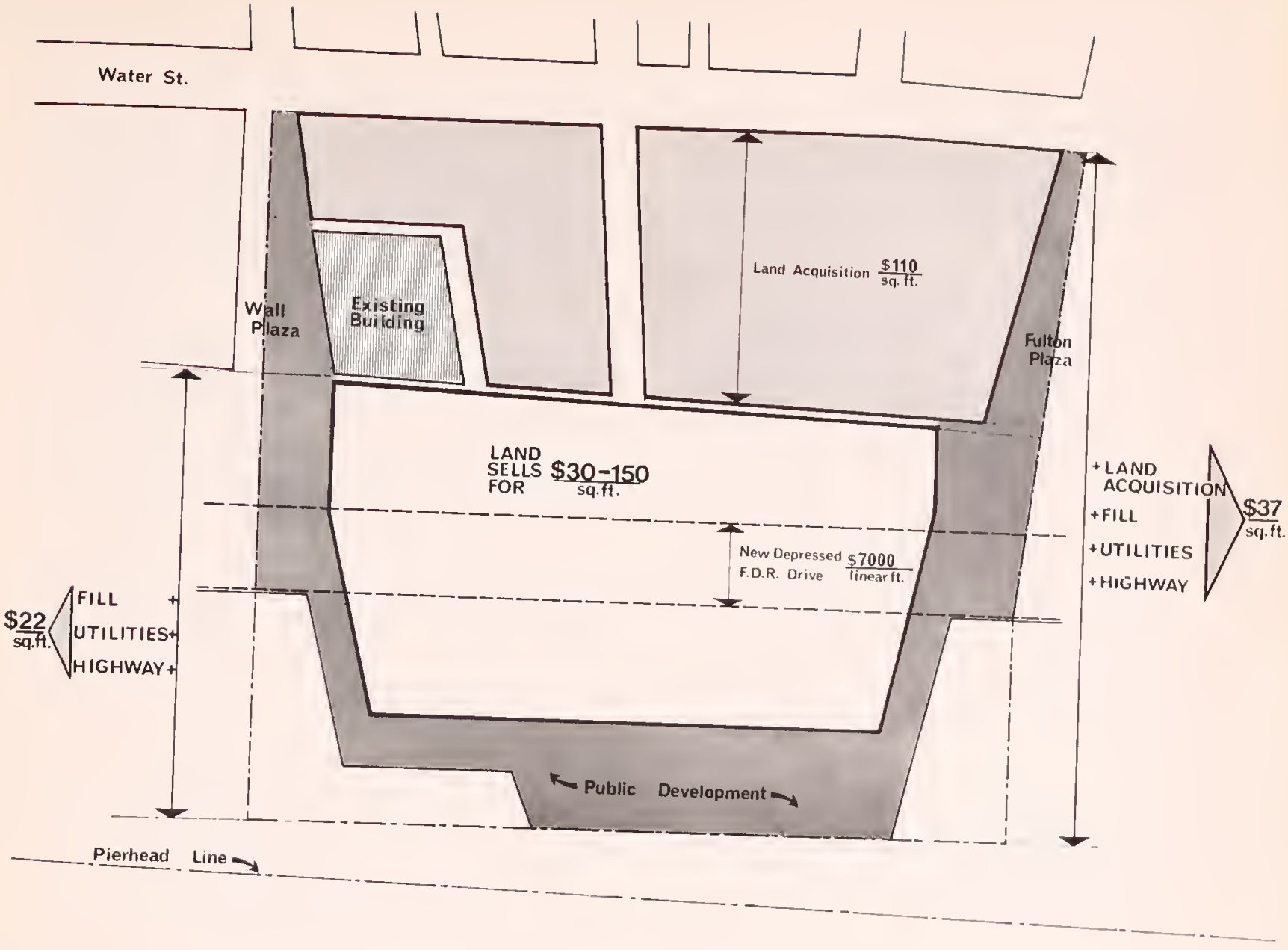
0' 100' 200' 500'



Prototype Development Sequence: VI

Private Construction

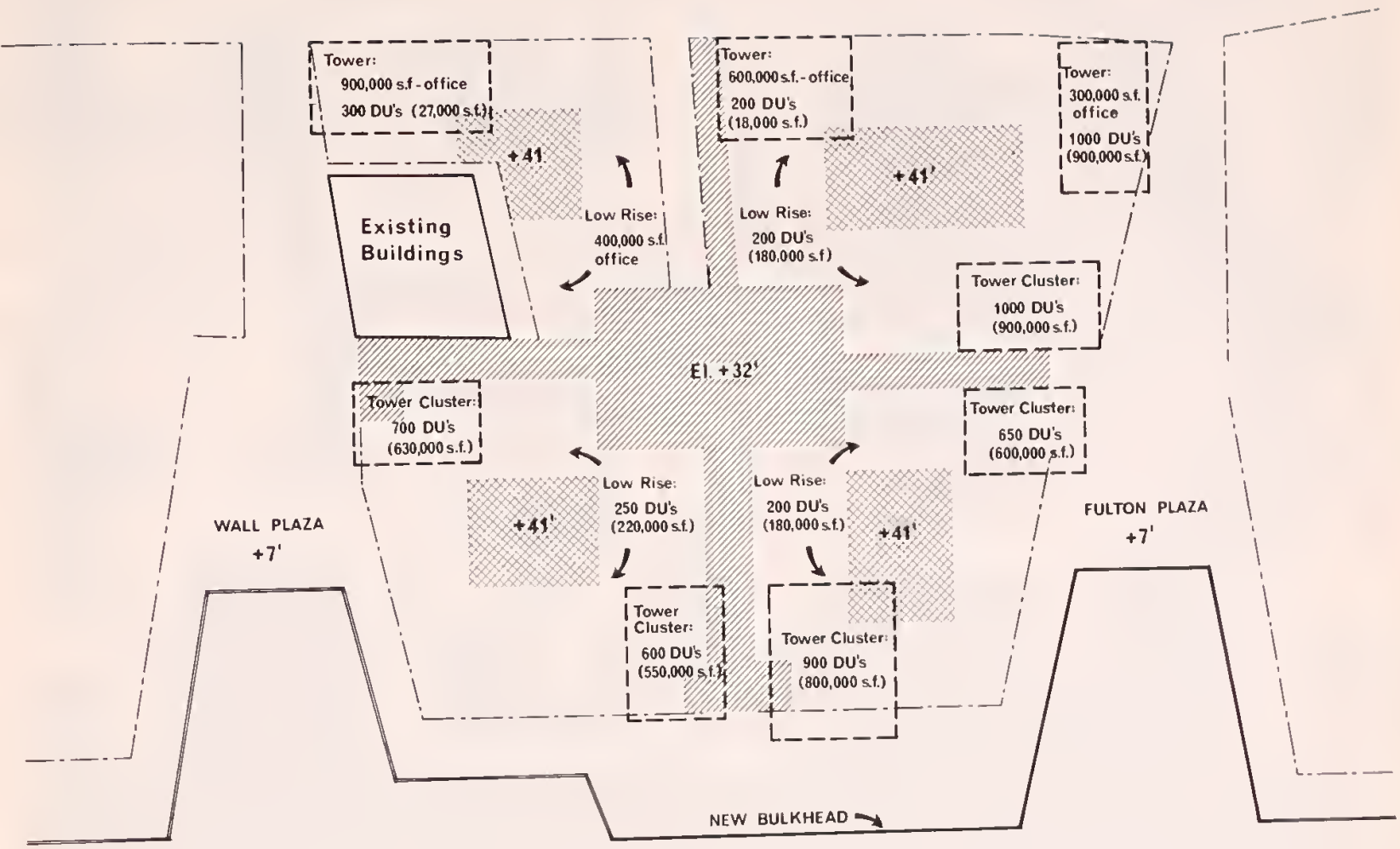
0' 100' 200' 500'



Prototype Development Sequence: VII

Costs and Figures

0' 100' 200' 500'



Prototype Development Sequence: VIII

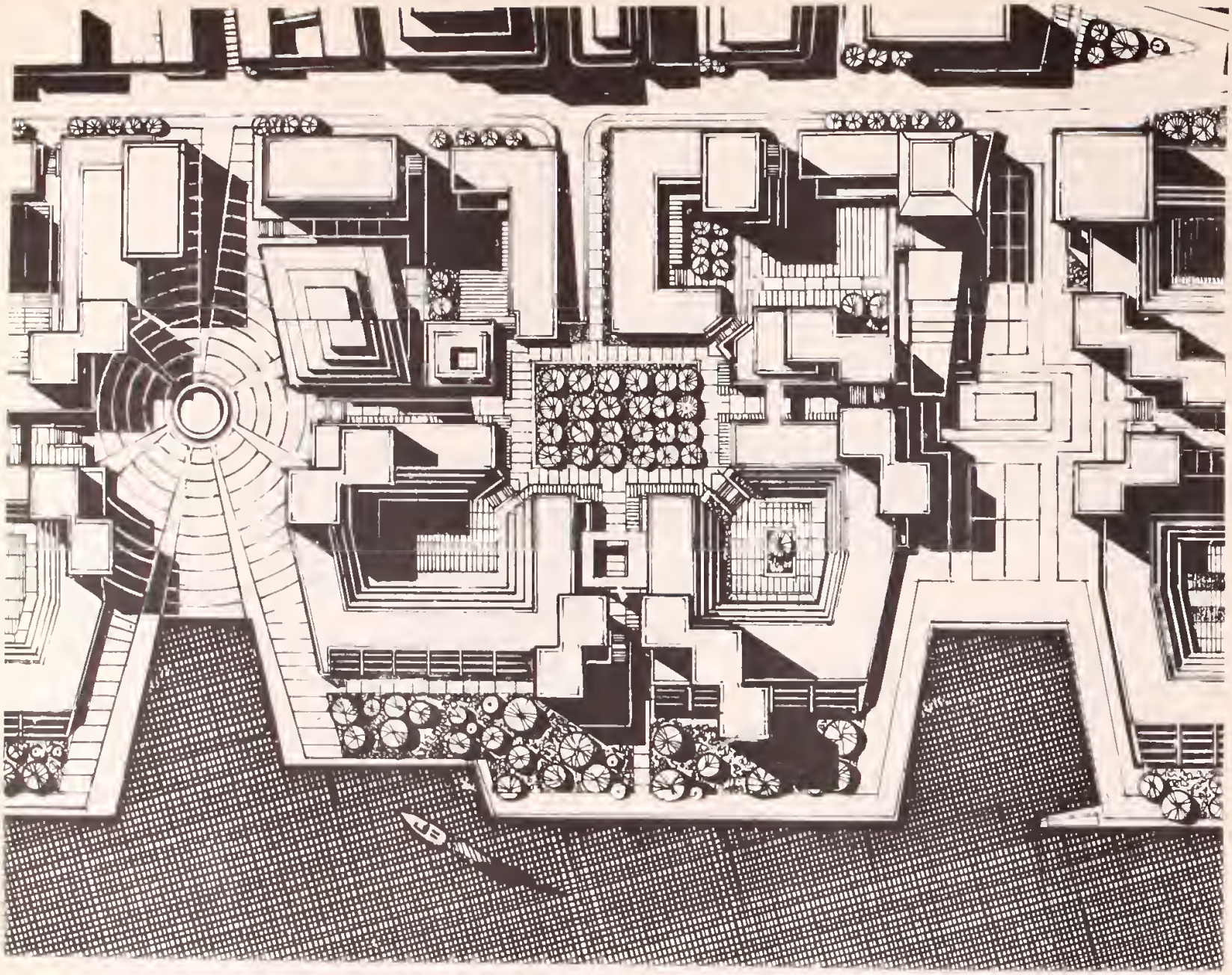
Program and Controls

Legend:

PUBLIC PARK AND CIRCULATION (ELEVATION + 32)

PRIVATE RECREATION SPACE (ELEVATION + 41)

0' 100' 200' 500'



Prototype
Development
Sequence: IX

Optimum Development

0' 100' 200' 500'

An interim stage in this evolution is shown in the Site Development Plan (Stage I). The two peripheral highways have been relocated, and development has occurred in two areas, one centering around the World Trade Center, and the other around Wall Street. The new bulkhead has been constructed throughout the perimeter of Lower Manhattan, but substantial areas are still in the process of site preparation. The three good piers in Lower Manhattan are still in operation, along with the Staten Island Ferry terminal.

This map represents a "guess" about future staging, based on anticipated levels of demand; needless to say, many factors will intervene that will be reflected in a more complex course than can be foreseen today.

ECONOMIC FEASIBILITY

Detailed study of costs of carrying out such a development is beyond the scope of this Report. However, preliminary estimates indicate that the sales value of the land to developers would aggregate enough income to pay for all acquisition costs of private property, for the depressed expressway, for fill and new bulkhead, and for necessary site improvements such as utilities. This statement is conditional of course on the provision of luxury housing at the densities proposed as well as first class office space. Less intensity or quality will not generate enough land value.[1] Land for office space would range from $ 100 to $ 200 per square foot of actual building coverage and land for residence would produce as much as $ 35 to $ 50 per square foot. Depending on policy, land for parking can develop very high per-square-foot values.

Table VIII shows that total site acquisition and preparation costs may range from as high as $37.0 to $18.5 million, depending on whether the full fee simple of all private property is acquired or only the development rights as discussed above. For purposes of this economic analysis, full fee acquisition was assumed.

The next question to be addressed was whether the programmed intensity of uses would generate enough land value to pay all of these costs. Tables IX and X show that under either alternate (full fee acquisition or development right acquisition) it would appear that the programmed uses will generate enough land value to pay for the full site acquisition and site preparation costs. That is, if all of the site is acquired, developed and resold, the sale of land will bring about $37.0 million. If only development rights are purchased from private property, no resale value is possible from that part of the site. The remaining area of filled land and streets, however, will return enough sales value ($18.5 million) to return all costs. In that situation, demolition of private structures is not included in project costs

An important aspect of economic feasibility is the tax return the City can expect from any development Table XI shows that annual taxes from the East Side Case Study investment of some $250 million would be about $ 10.7 million. While some of this might have happened here, and some might have occurred in the City anyway, it is certain that a significant portion -- perhaps as much as a quarter -- is a clear gain for New York in its competition with the region.

Zoning Implications

Part of the feasibility of the envisioned development method depends on the assumption that within the development district itself only the overall zoning limitation (probably R-9) need be adhered to, and that for individual parcels a flexible variation of "envelopes" and subdivision regulations can be devised. This will make possible the "pooling" of space referred to earlier in connection with joint recreation areas, as well as the development of design controls and limits regarding height, bulk, plaza levels, etc , particularly as it affects the desired stepped-down form-relationship at the water's edge (see Graphic 63).

A number of factors suggest strongly the adoption of an entire development area as a single planning and zoning unit through

[1] This does not mean that all of the housing must be in the luxury class. The East Side Case Study area is the most expensive private property. Therefore these figures can presumably be scaled down considerably in other areas. Introduction of condominiums can provide apartments for middle-income families with no subsidies.

unossisted urbon renewal designotion. By this device speciol controls necessory to shift the intensity of development within a legol zoning envelope ore possible, with the concurrence of zoning outhorities, either os speciol varionces or os speciol renewol restrictions of both. Also possible is the kind of architectural quolity control so necessory to this kind of integrated development. The present zoning of the Water to South Street oreo, which is C-6(F.A.R. 15), combined with a presumed R-9 (chonged from M-1) for the oreo of South Street to the pierheod line ollows the intensity of development that is proposed.[1]

SUMMARY

Although the cost estimotes ore rough , it is evident that the Eost Side Cose Study is economicolly feosible. Exomining the cost figures, it oppeors thot there is not much net difference in cost between outright ocquisition ond ocquisition of develoopment right. That is, in both coses the uses generate os much volue os the cost of the site However if no rights at oll were ocquired west of South Street, the proposed development still would generote some $5 to $6 million in sole of land over and above the lond fill ond expresswoy construction costs. Since oll cost estimotes used were intentionally conservotive, this conclusion is optimistic.

In essence, the cost of integroting in shore ond off shore development would be about $6 million -- the cost of the rights ocquired. The proposed development intensity will support this additionol cost ond it would oppear thot the City ond Lower Monhotton con, if ogreement con be reoched on method, proceed with development within the concept of the Plon.

While it is clear thot both the stoging ond engineering of the highwoy relocotion require considerobly more investigation than wos possible in this Report, it is the piesent judgement thot the sole volue of the off-shore land will be substontiolly enhonced by the removol of the expressway's blighting influence -- very possibly $6 million greater, due both to the new land mode ovoiloble for construction and the removol of o mojor physicol ond visuol borrier. In foct, under present conditions, it is doubtful thot o high-volue housing community could be successfully developed on this site ot oll.

[1] See Section of Residential Density - Appendix III

TABLE VIII

EAST SIDE CASE STUDY - ESTIMATED PROPERTY ACQUISITION AND SITE PREPARATION COSTS

Property Acquisition	Areo	Tatal Cast Of Fee Simple	Develapment Rights Only 6
Privote Property [1]	234,000 sq.ft.	$ 23,500,000	$ 5,600,000
Blocks 1, 2, 7, 4	125,600	15,300,000	1,500,000
Blacks 3,5,6	109,400	8,200,000	4,100,000
Public Praperty [2]	---	---	----
Sub-Total		$ 23,500,000	$ 5,600,000
Site Preparatian			
Demalitian [3]		$ 1,000,000	$ 400,000
Expressway [4]		8,000,000	8,000,000
Land Fill [5]	316,000 sq.ft.	4,500,000	4,500,000
Landscaping	100,000 sq.ft	500,000	500,000
Sub-Total		$ 13,500,000	$ 12,900,000
Grand Total		$ 37,500,000	$ 18,500,000

[1] Assumed cost of $110 per square faat. Estimotes in parts af the area ronge from $75 ta $125.
[2] It is ossumed the City will deed all of the publicly owned property olang with the right ta develap the filled land far a naminal sum.
[3] Demolitian of F.D.R. Drive and existing structures.
[4] Expressway assumed at $7000 per lineal foat far 1150 feet.
[5] Land fill and utilities assumed at a cast of about $15 per square faat for 316,000 square feet.
[6] Develapment rights assumed ta average ot 1/2 of fee far 3,5 & 6 and 10% far 1,2 and 4, based on distributian af space.

TABLE IX

EAST SIDE CASE STUDY - ESTIMATED LAND VALUES GENERATED BY PROPOSED USES
(ASSUMING ACQUISITION OF ENTIRE SITE)

Proposed Development		
Office	2,200,000 sq.ft. x $25/sq.ft.[1] x .2[2]	= $11,000,000
Residential	6180 du's @ $ 4000/du.[3]	= 24,750,000
Retail	100,000 sq. ft. @ $5.00 sq. ft.	= 500,000
Parking	2500 spaces @ $500/space	= 1,250,000
	Total	$ 37,500,000

TABLE X

EAST SIDE CASE STUDY - ESTIMATED LAND VALUES GENERATED BY PROPOSED USES
(ASSUMING ACQUISITION OF ONLY RIGHTS TO A & B)

Proposed Development		
Office	200,000 sq.ft. x $25/sq.ft. x .2	= $ 1,000,000
Residential	4000 du's @ $4000/du	= 16,000,000
Retail	100,000 sq.ft. @ $5.00	= 500,000
Parking	2500 spaces @ $500/space	= 1,250,000
	Total	$ 18,750,000

1 $25/sq/ft is assumed as an average speculative affice constructions cost.

2 It was assumed that affice development can pay 20% of canstruction cast for land.

3 Land costs per roam and per dwelling unit were ossumed os follows:

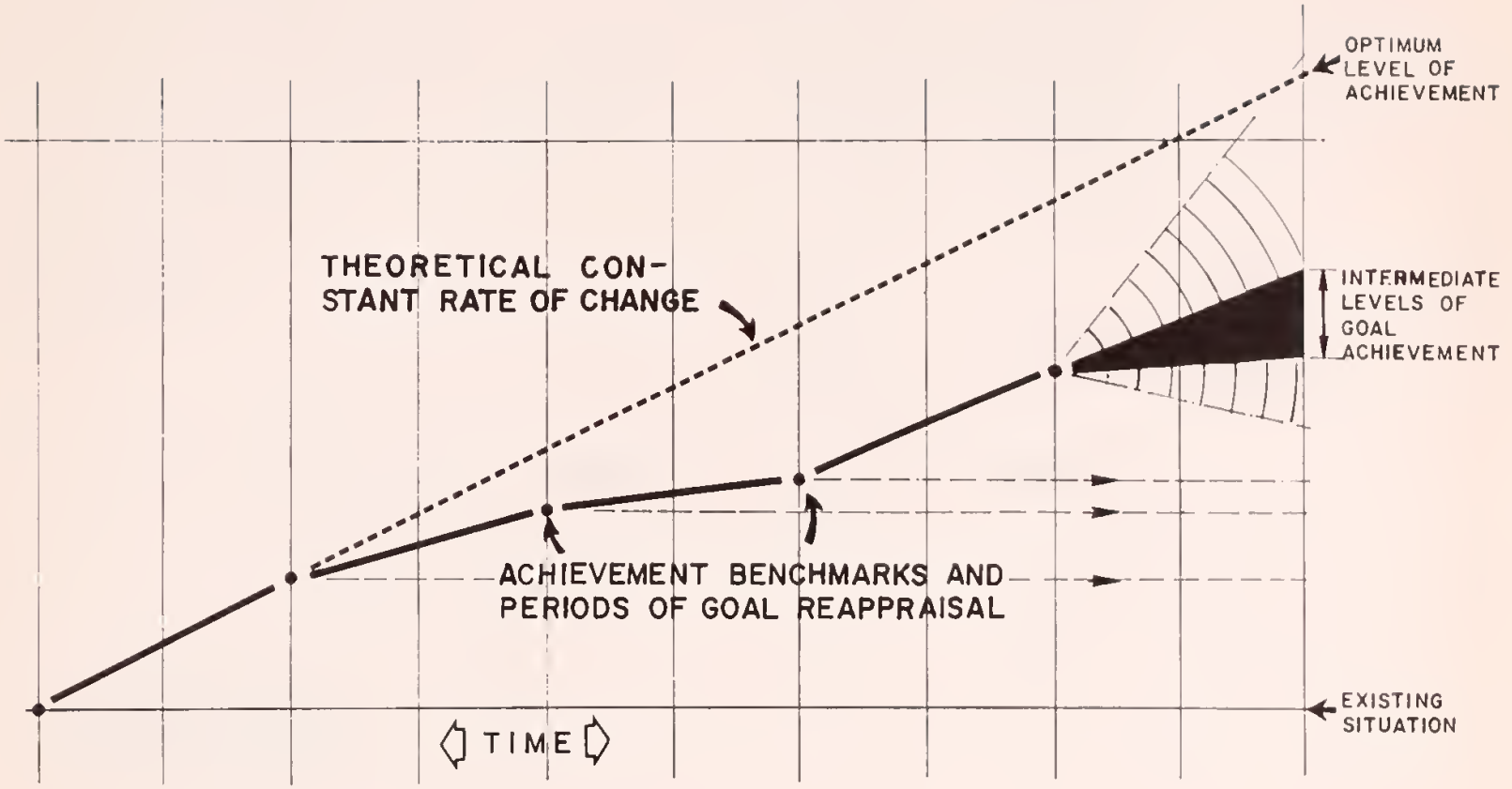
Mitchell-Loma Max.	$ 225/rm	775/du @ 3 rms
Middle-Incame	$250-350/rm	750-1050/du @ 3 rms
Luxury	$1000-1500/rm	3000-4500/du @ 3 rms
Prime Luxury	$2000-$2500/rm	6500-7500/du @ 3 rms

Saurce: Dr. Frank Kristaf, Director af Research, Housing and Redevelopment Baord, City af New Yark

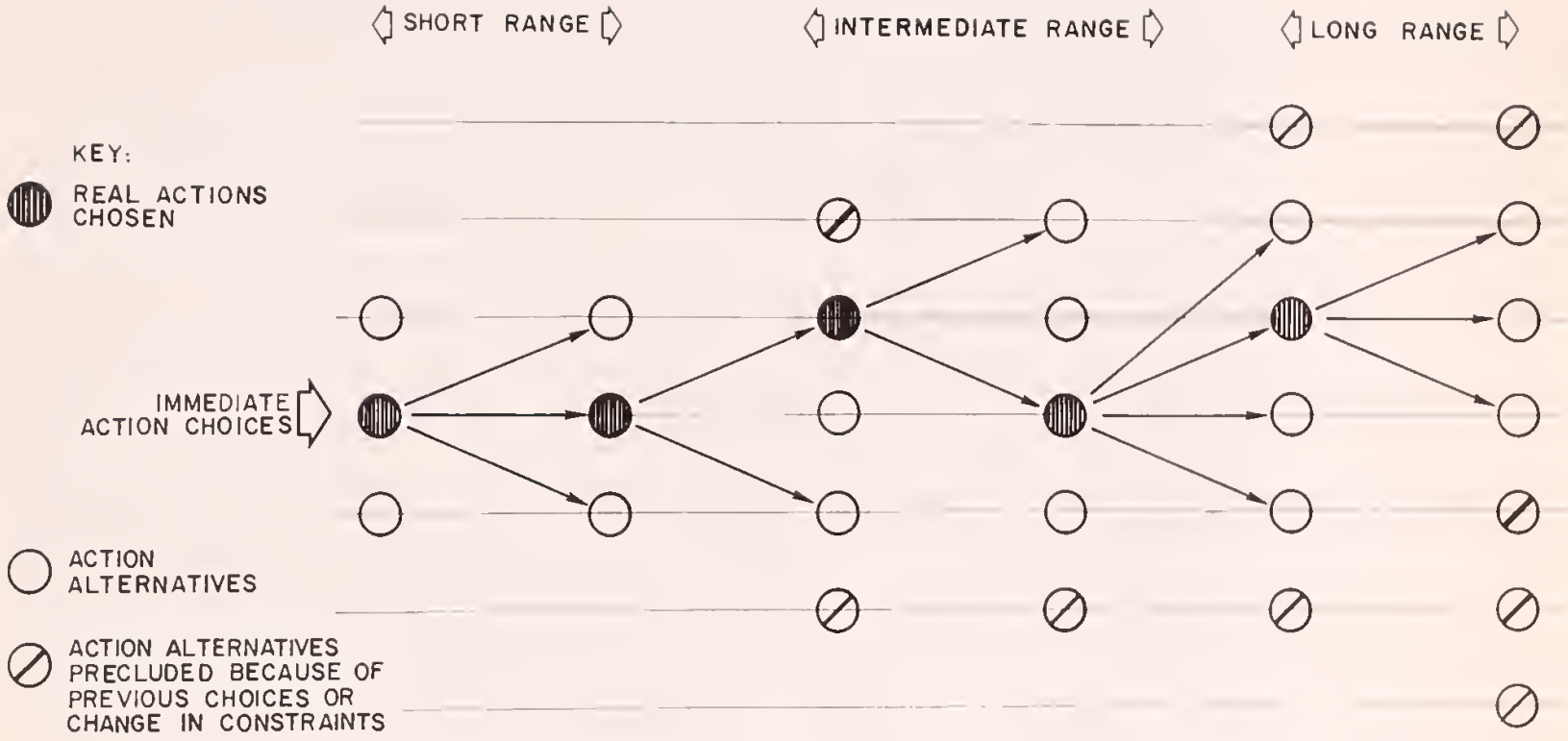
TABLE XI

EAST SIDE CASE STUDY ESTIMATED COST, VALUE AND REAL PROPERTY TAX RETURN

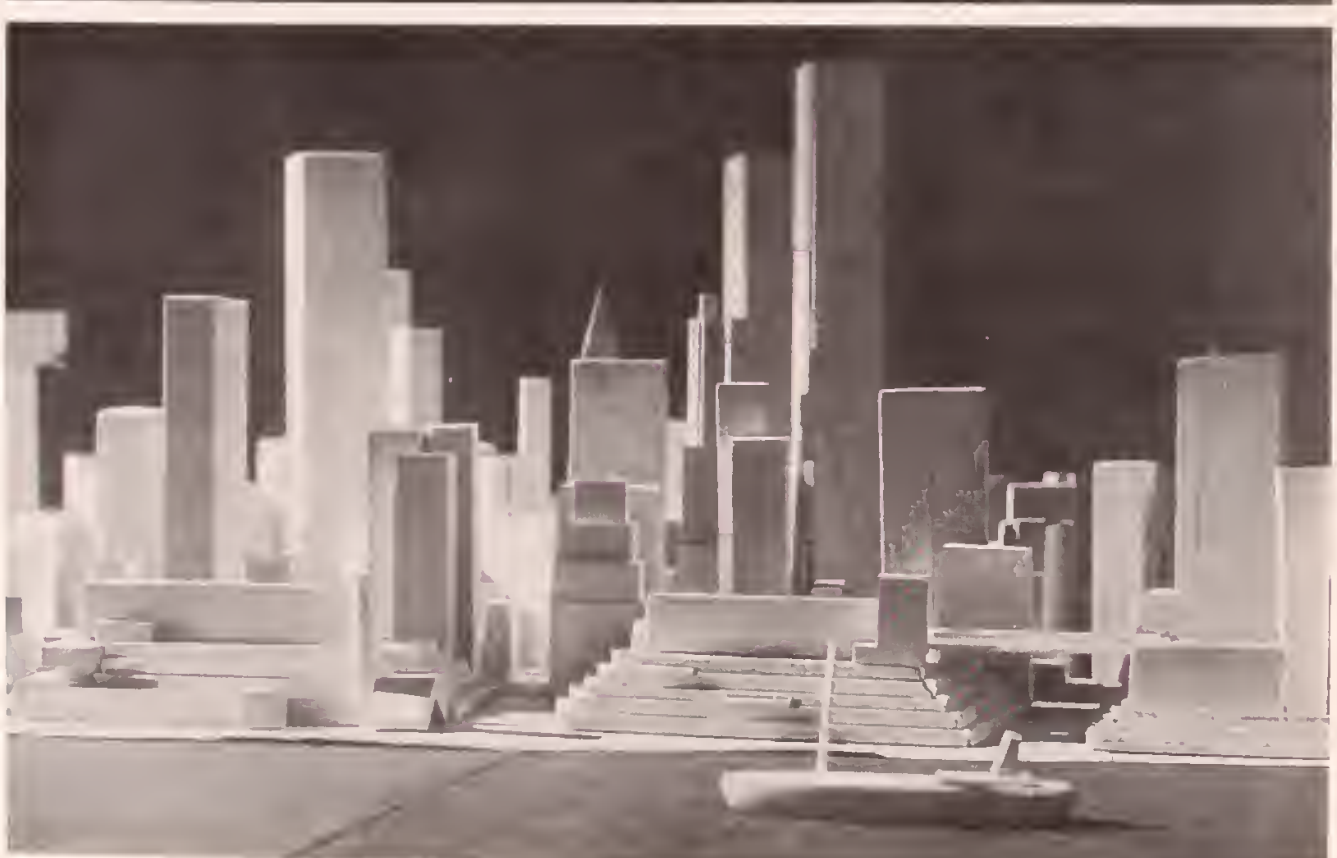
	Construction Cost	Land Cost	Total	Assessed Value (90% of Market Value	Annual Tax ($4.63/$100 of Assessed Value)
Office	$55,000,000	$11,000,000	$66,000,000	$59,400,000	$ 2,750,000
Residential	154,500,000	24,750,000	180,250,000	162,225,000	7,510,000
Retail	2,000,000	500,000	2,500,000	2,250,000	104,000
Parking	7,500,000	1,250,000	8,750,000	7,375,000	365,000
	$ 219,000,000	$ 37,500,000	$ 257,500,000	$ 231,750,000	$ 10,729,000



Rates of Change:
Goal Achievement Levels



Action Choices Over Time



LOWER MANHATTAN PLAN

CHAPTER VIII

OPTIMUM DEVELOPMENT AND NEXT STEPS

If all of the choices of alternate land use are selected over time in accord with the recommendations of the Plan the resulting land use pattern will be as shown in the proposed land use map. It must be borne in mind that there is an interdependence to many of them so that a decision for a different use -- in the Washington Market Area, for example -- affects adjacent areas.

RECOMMENDED LAND USE

The Core itself is expanded somewhat in geographic extent. Office space has increased from the present 50,000,000 net square feet to a total of 72,000,000 net square feet. The process of change anticipates retirement of 9,000,000 net square feet, an addition of 31,000,000 net square feet for a net gain of 22,000,000 net square feet. Government and related business services is not estimated separately but is included in the total change in office space.

Residential space is shown as having increased from approximately 4,200 dwelling units and 15,000 people today to 45,000 du's and 112,000 people.

Regional open space has become a major use, occupying 90 acres along the water's edge. The new park at Brooklyn Bridge accounts for 11 acres, Battery Park for 25 acres, and the new Park south of Canal Street on the Hudson for 23 acres. The remaining 31 acres are in the strip park and open space at the water's edge.

The northwest area is shown as still in its present industrial use, to be designated for other use some time in the future. No attempt is made to add up all land uses to the total area of Lower Manhattan because of the interlocking and mixed nature of many of the uses.

Land use plans are primarily of value as devices for translation of program and principles into zoning controls -- which are necessary, but a negative and limiting kind of concept. Since it is anticipated that zoning will be used in new and creative ways, it is necessary to spell out in three dimensional terms the principles to be followed and objectives sought. Otherwise zoning is arriving at what is wanted by preventing what is not wanted -- what developers can't do rather than what the City would like them to do.

A positive and design-oriented approach is therefore called for as a means of spelling out in three dimensions the principles and the goals of the Plan. These then will be explicit and can be the basis on which new zoning along with other controls can be considered as implementing devices.

LOWER MANHATTAN AS AN INVESTMENT

The costs to the City of carrying out all of the steps outlined, even assuming the eventual availability of highway and housing subsidies, will be substantial. The schools and other community facilities alone would require major sums even though developers may build the smaller ones. Without attempting to estimate these, since many of them would be incurred in any event, it is possible to estimate the future real property tax return from the development shown and compare it with the present.

The total value of the new investment in Lower Manhattan would be in the neighborhood of two billion dollars, of which roughly 1.3 billion would be in residences and 0.7 billion in offices. On the assumption of a self-financing development, these figures include the cost of "public" investments, in particular the relocation of the peripheral highways, new land fill, waterfront plaza, utilities, etc., which should cost in the neighborhood of two hundred million dollars. Assuming the taxable portion of the new development therefore at 1.8 billion dollars, and based on present tax rates and methods of assessment, the annual tax return from the new development should be around 90 million dollars.

This is an investment whose major part will be private and whose early stages at least require no public money at all, as shown in the example.

The public investment in schools and other community facilities will be substantial, but in relation to property taxes and other benefits, not great at all.

Implications of Relaxing Constraints

What would be the changes in the Plan and alternative choices if various constraints were relaxed? This is particularly relevant to location and intensity of use. For example, the high densities of residence at the water's edge are required if their development is to be entirely self-supporting. Probably the acquisition of most of the property in-shore and the filling of the land as a site improvement could be partially supported by subsidy, if it were available. In any event, the potential of the water's edge is so great that subsidy of site cost is unnecessary and would not lower the market resale value of the land.

Subsidy for middle-income housing would make it possible to get a broader economic and racial mix. However, to do this, a land subsidy would also be necessary, as the land costs envisioned here are above what can be supported under the Mitchell-Lama program as has been shown. The result of subsidy should be to lower rents and thus broaden the range of families, incomes and ethnic groups rather than to reduce the intensity or nature of use.

If funds were available for parts of the open space system, it would result in a substantial reduction in cost of land sold because the park costs would then bear a proportionate share of the bulkhead costs, etc. This could be an effective way of reducing land costs to middle-income levels without urban renewal subsidy.

The Form of the Future

The final test of the investment, however, will be the quality of the working environment, the improved transportation, economic diversification, a change in the whole quality of working in Lower Manhattan, a change which will result in a more intense and valuable business community.

The sketches at the end of the Report are designed to offer a hint of this future downtown -- a new type of "total community," composed of 500,000 workers and some 35,000 residents, with interpenetrating residential, office and recreational activities, for which Lower Manhattan is uniquely suited.

Historic streets like Wall and Broad, now reconstituted as pedestrian ways, carry people directly to waterfront plazas at the city's edge. There residential towers rise to look out at the river and back at the great business power they adjoin.

The waterfront plazas: physical extensions of the canyons within, lined with shops and restaurants, low-rise apartments above; the junction-place of business lunches and residential shopping. Along the water's edge, areas for strolling and play are suitably interspersed.

The new world of leisure will leave its mark on the old world of all work. Tourists will move through the towers of Wall Street. The line between work and play will have lost some of its sharpness, and in the ever-expanding ease and plenty of the new society, the two may become natural neighbors.

Steps for Implementation

The Plan for Lower Manhattan represents a formidable undertaking -- requiring a degree of administrative coordination and public consensus rarely seen in New York.

Site Development: Stage I

Yet it should be remembered that the Plan is, first and foremost, a guide for decision-making rather than a set of specifications for a series of projects.

Therefore, it is not appropriate to conceive of its "adoption" as a single legislative or administrative act.

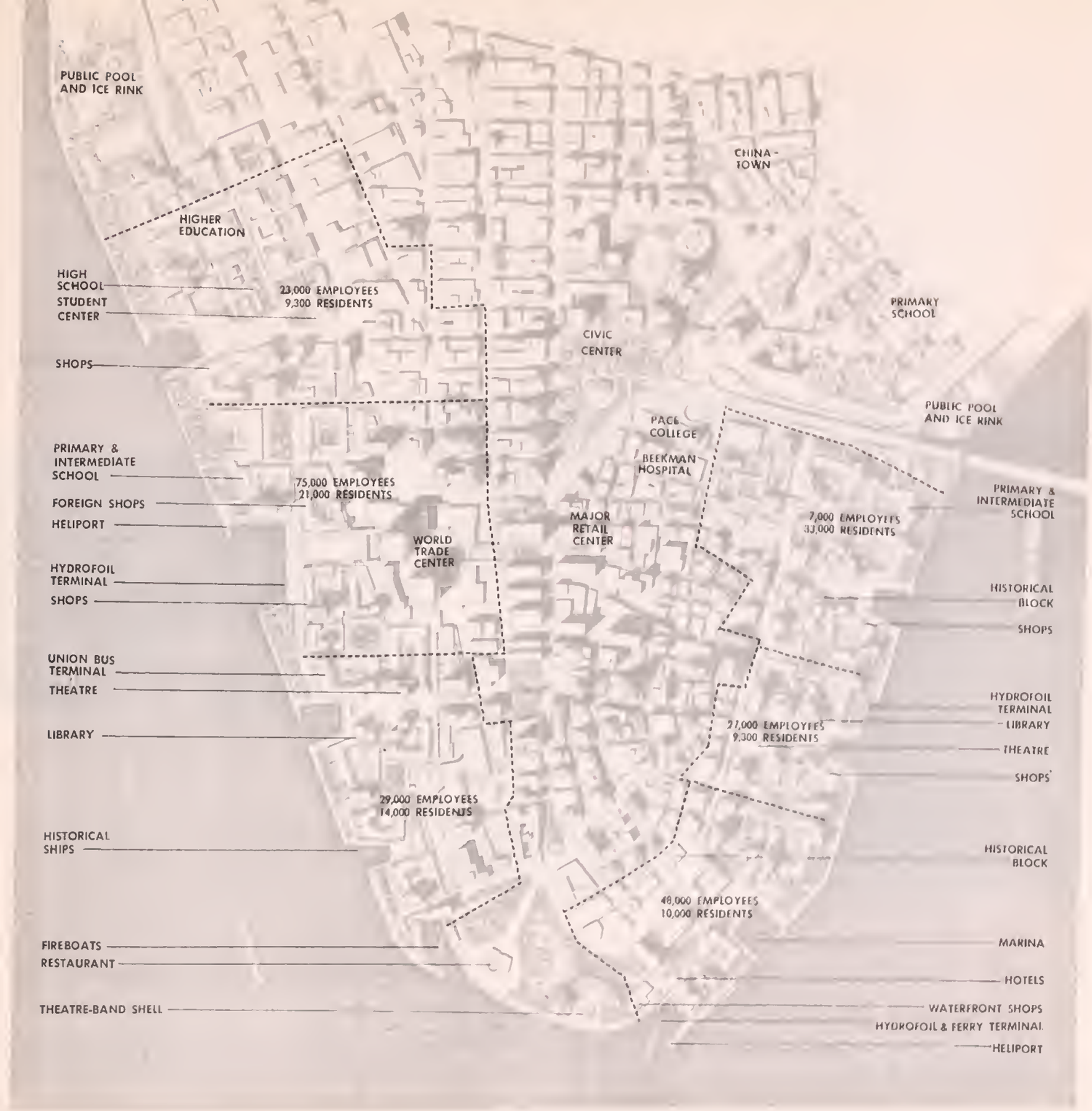
Rather, an organization should be created capable of completing the process of consensus begun by this Report. This agency (a development committee), presided over by civic, business and governmental organizations, will be the focus for the many refinements and reappraisals required before the Plan can be transformed into legislation, ordinances, institutions, etc.

This plan, which has been developed in coordination with the Department of City Planning, now needs the assistance on implementation proceedures of many other municipal agencies -- such as the Department of Traffic (street classification), Board of Standards and Appeals (zoning changes), Housing and Redevelopment (unassisted urban renewal concept), Department of Marine and Aviation (offshore construction, schedule of pier demolition), Department of Public Works (utilities and construction), Department of Highways (highway relocation), Board of Education (schools), and the Borough President's Office.

At the same time, both State and Federal agencies will be consulted regarding the highway system, navigation channels, possible subsidies. Important Civic groups will also be brought more closely into the planning process.

Depending on the pace and sequence of events, this group could become the nucleous for the central development agency proposed in this Report -- the agency that assumes responsibility not only for general planning, but implementation of major plan objectives as well.

When the major elements of the Plan are thus codified, in actual legislative and organization terms, these elements must, of course, be then presented, in formal terms, for adoption by the appropriate groups: the City Council, the New York State Legislature.


PUBLIC POOL AND ICE RINK
HIGHER EDUCATION
HIGH SCHOOL
STUDENT CENTER
23,000 EMPLOYEES
9,300 RESIDENTS
SHOPS
PRIMARY & INTERMEDIATE SCHOOL
75,000 EMPLOYEES
21,000 RESIDENTS
FOREIGN SHOPS
HELIPORT
HYDROFOIL TERMINAL
SHOPS
UNION BUS TERMINAL
THEATRE
LIBRARY
29,000 EMPLOYEES
14,000 RESIDENTS
HISTORICAL SHIPS
FIREBOATS
RESTAURANT
THEATRE-BAND SHELL
WORLD TRADE CENTER
CIVIC CENTER
MAJOR RETAIL CENTER
PACE COLLEGE
BEEKMAN HOSPITAL
CHINA-TOWN
PRIMARY SCHOOL
PUBLIC POOL AND ICE RINK
PRIMARY & INTERMEDIATE SCHOOL
7,000 EMPLOYEES
33,000 RESIDENTS
HISTORICAL BLOCK
SHOPS
HYDROFOIL TERMINAL
LIBRARY
THEATRE
SHOPS
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9,300 RESIDENTS
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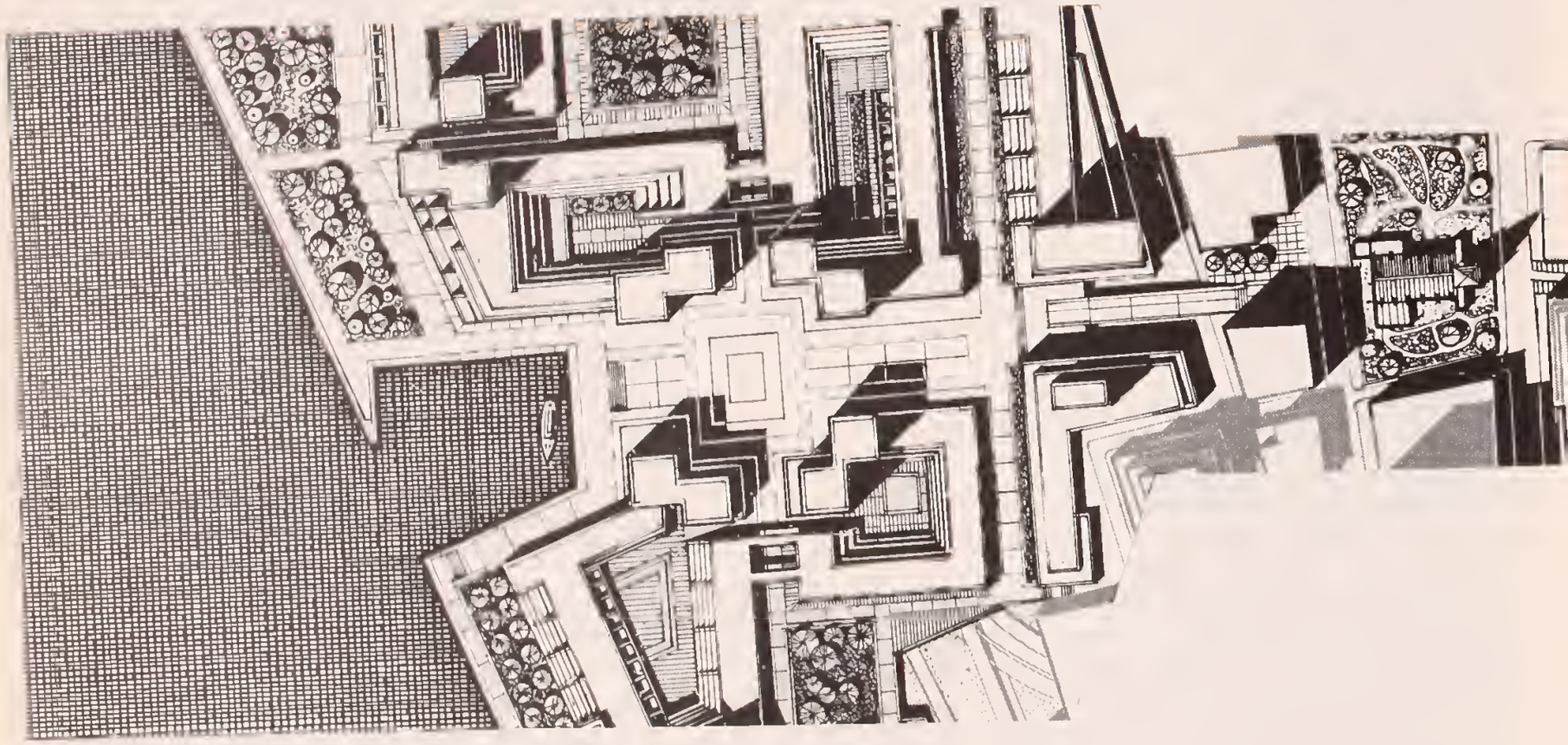
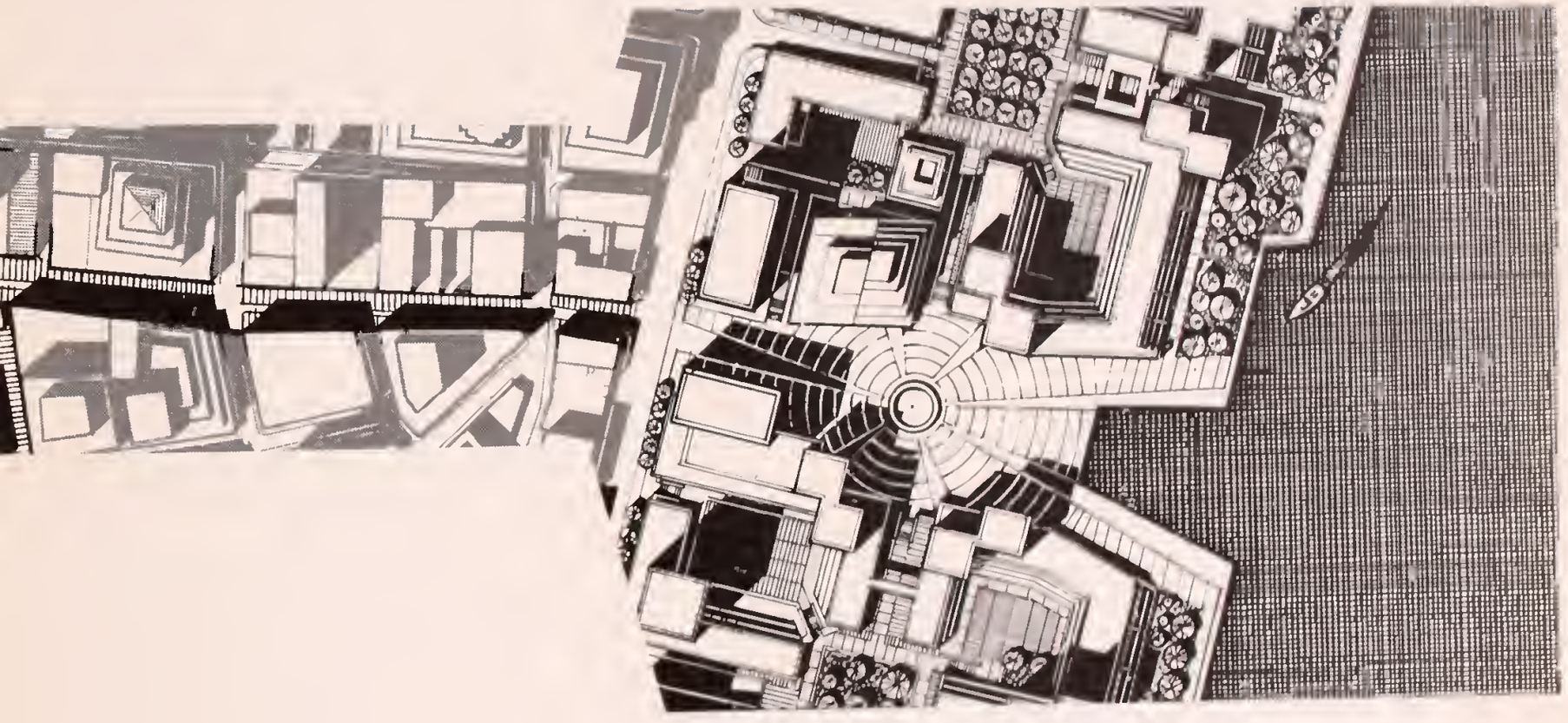
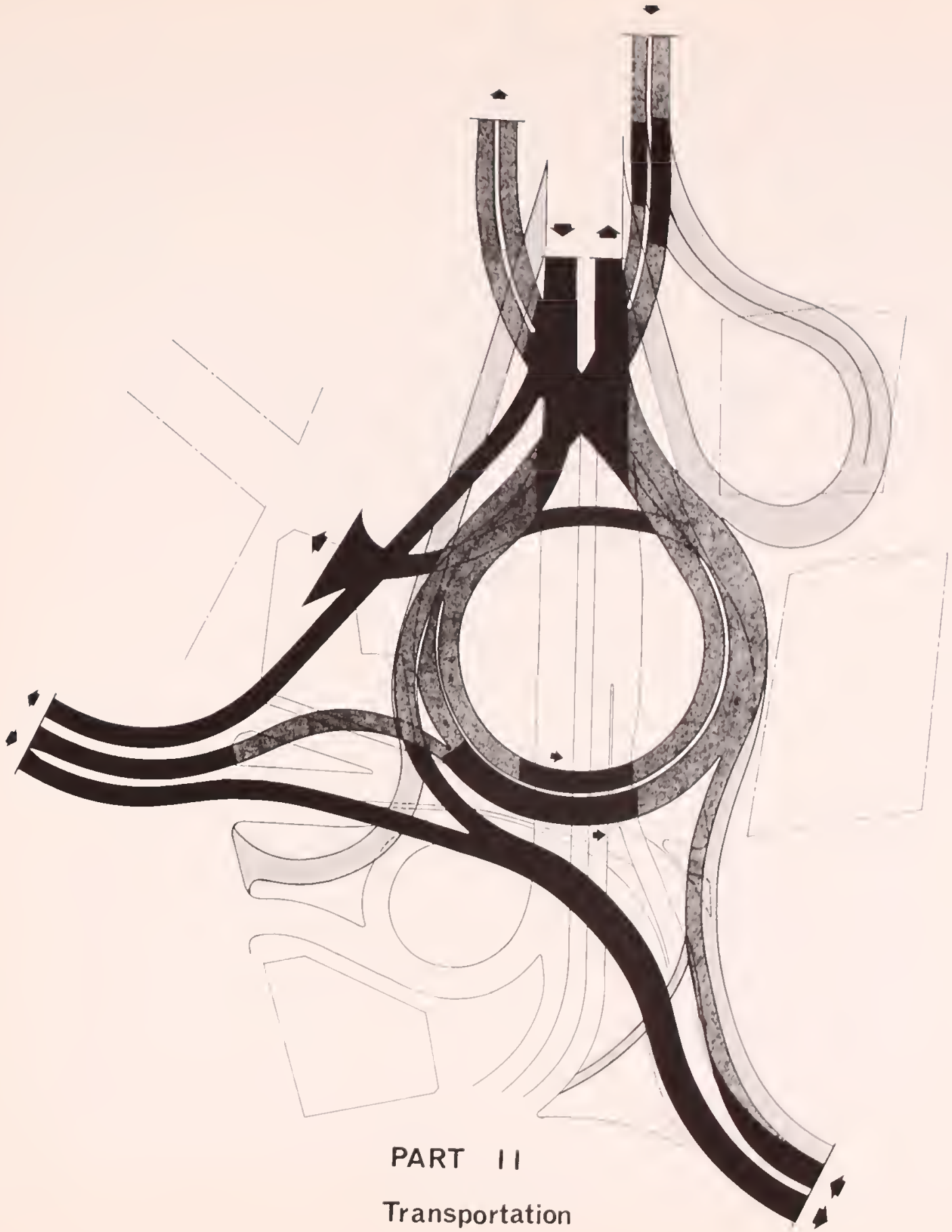
HOTELS
WATERFRONT SHOPS
HYDROFOIL & FERRY TERMINAL
HELIPORT



Pedestrian System:
Wall Street and Waterfront Plazas

0' 100' 200' 500'





PART II

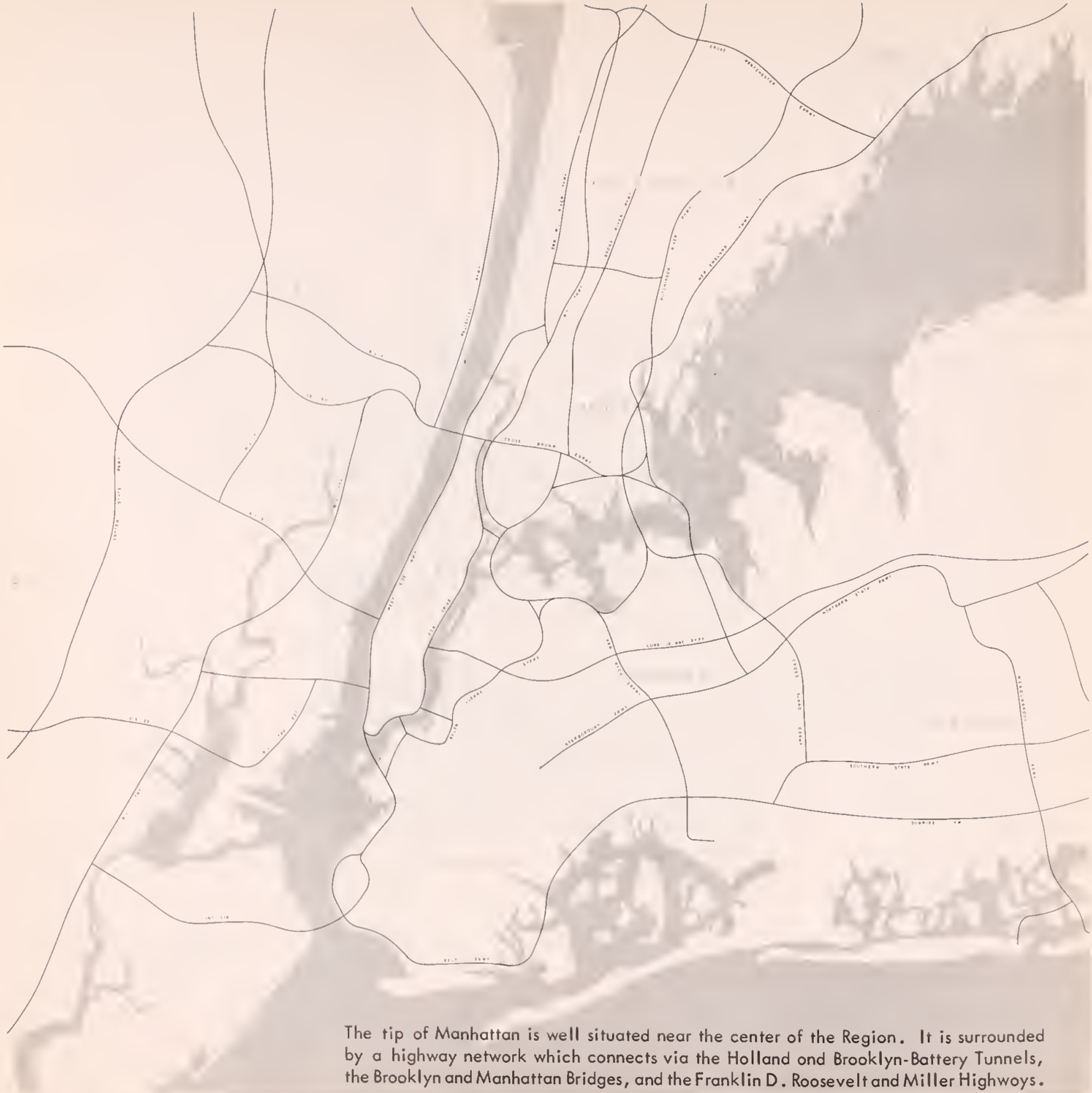
Transportation

ACKNOWLEDGMENTS

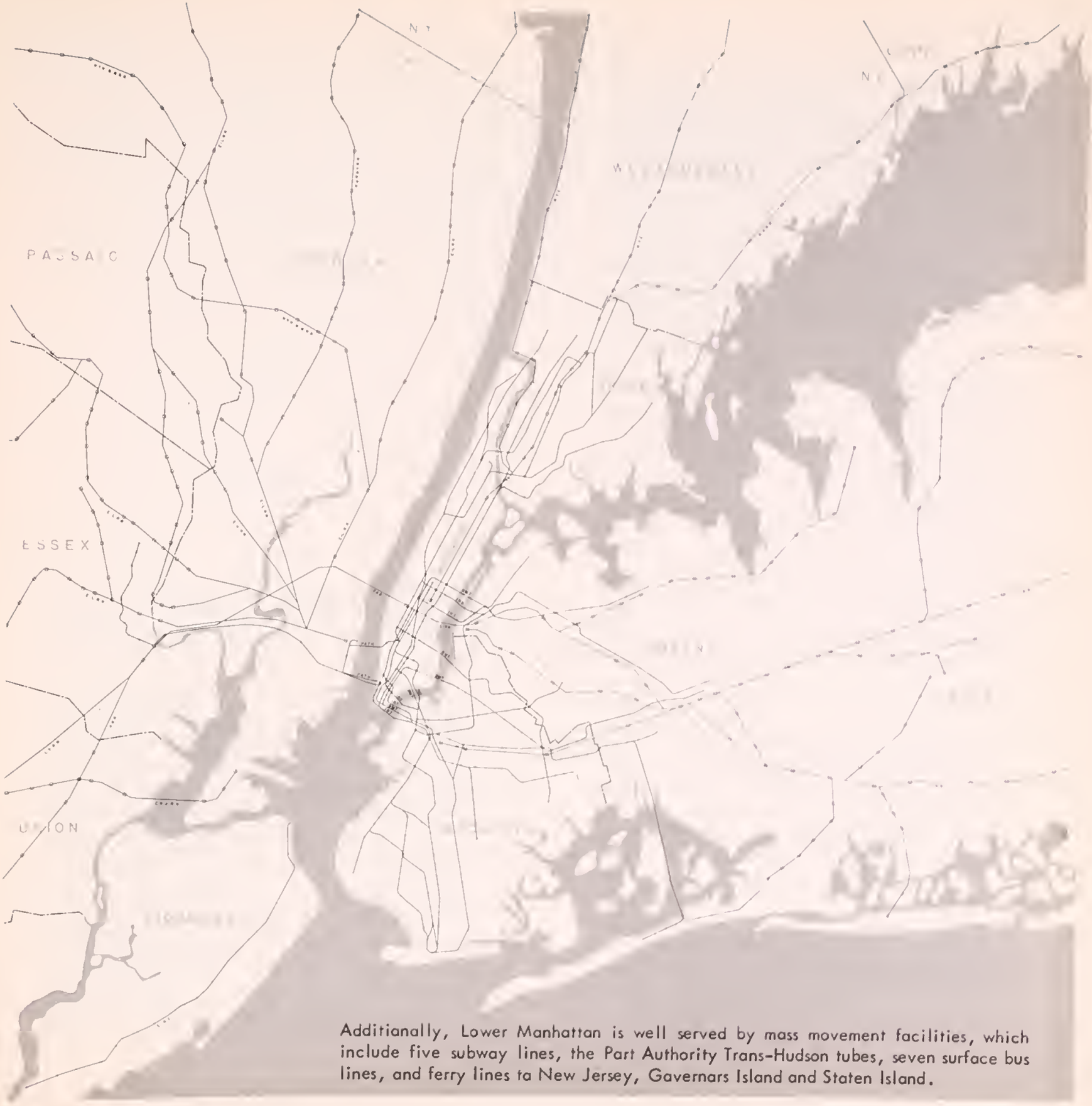
Becouse it wos felt thot the results would be of interest ond volue to mony deportments of the City, o speciol odvisory group to be concerned with the tronsportotion ospects of the study wos oppointed. This group, the Street Technicol Committee, consists of representotives of the Deportments of City Plonning, Troffic, Highwoys, ond Public Works os well os the Office of the Borough President ond the Tronsit Authority. They reviewed the Consultont's findings, ond eoch porticipoting ogency contributed informotion voluoble to the Study.

Porticulorly helpful wos the lorge omount of informotion mode ovoiloble by two ogencies, the New York Tronsit Authority, ond the Deportment of Streets ond Troffic.

The interest ond support of the City Plonning Deportment stoff contributed immeosurobly to the successful completion of this study. Three members of the staff were porticulorly helpful: Jock C. Smith, Joseph McC. Leiper ond Arthur Wrubel. In oddition to obtoining doto, reviewing drofts ond serving on the Street Technicol Committee, these men mointoined close contoct with the study stoff ond eoch mode significont contributions to the plon.



The tip of Manhattan is well situated near the center of the Region. It is surrounded by a highway network which connects via the Holland ond Brooklyn-Battery Tunnels, the Brooklyn and Manhattan Bridges, and the Franklin D. Roosevelt and Miller Highwoys.



Additianally, Lower Manhattan is well served by mass movement facilities, which include five subway lines, the Part Authority Trans-Hudson tubes, seven surface bus lines, and ferry lines ta New Jersey, Gavernars Island and Staten Island.

CHAPTER IX

INTRODUCTION

As the oldest area of the city, Lower Manhattan has inherited a street system which still reflects many of the paths, squares, and winding streets of the early Dutch and English settlement.

In recent years the area has undergone a massive renewal through renovation and canstructian, and it stands now on the threshald of another decade of even more dramatic change. Yet, almost incredibly, there is still no accepted plan for development of the street system in the area. This is particularly unfortunate because, without exception, every major project currently proposed for Lower Manhattan calls for street closures and street widenings. The map in Figure 1 shows the street closures which have been propased for current projects. The absence of a street plan for Lower Manhattan means that there is no basis for evaluating these proposals.

Quite apart from the impact of current praject is the problem of providing decent service to the established care and adjusting to potential changes in land use in the remainder of the area. The streets in the core are intensively used by pedestrians, automobiles and trucks, and the service they provide is deficient by any reasonable standard. Around the edge of the Island, the highways and streets were developed to serve maritime activities when the piers were productive elements of the port. But the port activity has steadily declined, and the piers are now decaying. North of Chambers Street, the gridiron of narrow streets is choked with trucks competing for precious curb space, while motorists trying to cross town creep along at three or four miles an hour.

It is clear that the street system must be improved. It is equally clear that there must be some rational plan for that improvement. Cooperative planning that represents the viewpoints of architecture, land use, and transportatian has resulted in a recommended plan that is a bald, dramatic look at the future. On its completion, the original settlement will have an entirely new look and life. Gone will be the rotting piers replaced with a new park and esplanade along the water. Instead of the nine-to five life its streets now know, there will be activity around the clock. Workers will no longer be forced to commute from distant areas of the city but will, instead, be offered a choice of places ta live within walking distance of their offices.

The continuation of ad hoc project planning without reference to broad goals and needs will only lead to further deterioration of service and, ultimately, to declining property values, employment, and investment throughaut the area. For an area with so many opportunities for significant contributions to New York's economic, social and cultural life, such a dismal prospect is unthinkable.

People will move about the area on a new form of transit, one designed for their special needs, connecting their destinations, and freeing them from the constant conflict with cars and trucks which now characterizes even the shortest walk.

The growth of Lower Manhattan will be made up of many actions by many public agencies and private individuals. One of the chief functions of the city, and one which must be started early, is the development of the pedestrian and vehicular system described in this report. This will provide the framework upon which private development can grow.

Getting from today to tomorrow is, of course, the rock upon which many promising plans founder. With this hazard in mind, the plan is so designed that it and Lower Manhattan, itself, may grow apace. Thus, the interior of the area constitutes a self-sufficient development system, even without the waterfront. With the addition of the related waterfront development, it becomes even more effective.

Clearly, the need for a planned street system stems not only from such proposals of a distant nature as the use of the pier area, but also from projects which are now planned. Such projects have led to increasingly frequent proposals of street closure and the assembly of land into so-called "super blocks."

Of these, extreme examples are the World Trade Center and Civic Center plans, which are of scales large enough to produce significant impact upon the circulation of traffic in the area. Also important to circulation will be the combined impact of such smaller developments as Brooklyn Bridge Southwest and Washington Street.

As such proposals approach fruition, the need for criteria against which to evaluate their impact grows greater and greater. This study, then, had as one of its prime objectives the development of such a rationale, a process which included the definition of regional goals, the description of a basic transportation system, and the definition of the functions of the various elements of that system.

The land use and design plans proposed in Part I represent a limited number of the many alternative ways in which Lower Manhattan might develop. The transportation plan, however, could not be as flexible in its design, although it was developed with an eye to permitting several types and densities of development on the land which it serves. The street system may, however, be altered to adapt to land uses the intensities not foreseen in the land use plan, as long as the basic concepts of function are maintained.

Functional definitions of the elements of the system was necessary for two reasons. First, the function determines the design standards to be met by the system element in question, i.e., a "major arterial" would require more moving lanes than would a "service street." Second, function helps determine the proper relationship of any section to the system as a whole. That is, a "service street" is, by definition, directly related only to the particular building or group of buildings which it serves. It can, therefore, be moved or otherwise altered in any way that still provides service to those buildings. On the other hand, an arterial street is, by definition, related to the transportation system as a whole. Any change in it must, therefore, maintain both its "function", the movement of traffic, and its function in the system, the connection of two areas.

In order to assure the proper interconnection of the sections of the proposed system, it was important to correctly classify all parts of the existing system according to their functions. This was done by observation and research that began with the following inventories of existing conditions.

First, it was necessary to measure actual street and sidewalk widths and translate these into a base map of the study area.

An inventory was then made of existing traffic flows. For this, recent traffic counts by the Department of Streets and Traffic and by the Port Authority were supplemented by manual counts at intersections throughout the study area.

Existing Street System

Legend:

Proposed Closure

LOWER MANHATTAN PLAN **2-1**

The capocity of the street system wos olso meosured. Nineteen "critical" intersections which govern the continuity-of-flow of the entire system were the subject of careful study.

Because parking near an intersection directly affects its copocity, it was necessory to observe actual porking proctices at the nineteen intersections. Copocities were computed according to the parking, legal and illegol, which octuolly occurred ond also occording to the porking which would occur if existing porking restrictions were obeyed.

It wos also necessory to determine the numbers of pedestrions using various sidewolks at vorious times of the day. Heoviest hourly volumes were found to occur ot the noon hour (olthough the obsolute peaks occurred during periods of less than an hour in the morning and evening), ond moreaver, this noon-hour troffic moved in all directions, not just to or from subway stations. Because af this chaiacteristic, it placed the heaviest stroin on the pedestrian system. Noon-hour volumes, then, were counted at locations throughout the study area, and the resulting figures were supplemented with informotion from studies made by the Downtown Lower Manhotton Association.

In the field of parking, two types of inventory were mode. First, counts were mode of usage, by time-af-day, of porking lots and garages in the study orea. Second, caunts were made of on-street porking, both legol and illegal, at block-faces throughout the study areo.

A study wos olso made of the movements of goods and services by truck. This was done thraugh actuol counts ond with the oid af informotian gothered in earlier studies. Service-vehicle volumes were determined for all sections of the system and related to capacities ond total volumes of vehicles.

Information on public transportotion come from several sources, the New Yark City Tronsit Authority, the Port of New York Authority, certain previous studies of the system, ond on-the-spot counts by study personnel. From all these were derived the usage of the system, by line ond by station, and its capacity, olso by line and stotion. Careful compai isons of the two were used to indicote areas of deficiency ond/or overcrowding.

All this informotion, then, permitted the functional definition of every section (link) of the system and the determination of its capacity and usage. Next, it wos necessory to look at these figures in the light of the lond uses to which they were related, in order to establish the rotes ot which various land uses generated trips on the system.

The two such relationships found most important to the operotion of the overoll system were those between land use and pedestrian trip generation, and between lond use and goods-and-services trip generatian. These were determined by observatian of actual behavior within the system and by the applicatian of the resulting figures to established techniques foi determining trip generation.

The rotios thus established were used to determine the ability of the system to handle satisfactorily the traffic which would be generated by vorious proposed developments.

Along with the functional definitions and trip generation ratios, it was necessary to develop a third tool for the planning ond evaluation of the transportotion system, a camputerized network. This meant the reconstruction, within the memory of a camputer, of the entire study-area street system, link-by-link, so that a trip made thraugh the computer network would duplicate one made through the "real" street system.

In order to check this duplicotion, counts of actual troffic were compared with those estimated by the computer. When the two hod been made to agree,

it became possible to alter the simulated network to represent proposed changes in the real transportation system. The behavior of the network was then used to analyze the implications for the transportation system of these proposals. This procedure is explained in detail in the section on "Network Assignment."

Continuing analysis of sets of proposals, and of their interaction and consistency with each other, has led to the development of a planned transportation system within which all functions may be served, all future traffic accommodated, and all sections of the system properly interconnected. This has been done in the context of, and in sequence with, the expected redevelopment of Lower Manhatton.

It must be recognized thot the proposed street system is not so "hard and fast" that it must be adhered to at all costs. On the other hand, the flexible system concepts advanced in this report should endure the passage of time. One need only look at recent events to see why a rigid plan would be inadequate. The World Trade Center was first proposed for the East Side, not the West Side. The Stock Exchange only recently began to seriously consider the foot of Broad Street as a possible site for a new exchange building. The Civic Center is even now being re-studied, and the Lower Manhattan Expressway has been "off and on" for thirty years.

Such an atmosphere of constant change and re-evaluation means that the city must be ready to quickly evaluate alternotives. The techniques used in this study offer a means to do this for proposed large changes and the system concepts provide a framework for the evaluation of smaller projects.

CHAPTER X

STREET TRAFFIC

General

Vehicular traffic to or from Lower Manhattan may use any one of seven possible routes. They are:

1. Brooklyn Bridge
2. Manhatton Bridge
3. Brooklyn Battery Tunnel
4. Holland Tunnel
5. Miller Highway (West Side)
6. Fronklin D. Raosevelt Drive
7. Streets and Avenues north to Midtown

Approximately 24,000 vehicles enter the study area during the morning peak hours. Of those only one-half or 12,000 ore octually destined for Lower Manhattan--the remainder pass through without stopping.

Traffic Valumes

The financial district is largely a terminal area. Most through movements are carried around it either by the elevoted highways along the rivers or by Chambers and Canal Streets. Figures 2 and 3 show existing troffic volumes on all streets. Volumes on the surface streets are not unusually high. Church Street and Broadway serve north-south traffic in the center of the Island, and Water Street[1] serves local traffic an the East Side. Cross-Island movements are almost insignificant below Chambers Street. Chombers is, however, currently serving heavy through valumes, by virtue of its close relotionship to the Brooklyn Bridge and the ramps on Miller Highwoy; Canal Street also carries heavy cross-Island valumes.

Unlike that of most places, traffic in the area is not characterized by estoblished "peak hours." The peak hour in Lower Manhottan frequently occurs at an hour of the doy that does not correspond to either the apening or closing of business. This is particularly true of streets which carry heavy trucking movements. In spite of this, most major commuter routes behave in a more consistent pattern and, generally speaking, any street designed to accommodate the heavy morning and evening traffic flows will accommodate those occurring during the rest of the day. The fluctuations of troffic during the day are illustrated in Figures 26 through 29 in Appendix A. These illustrations also shaw the proportion of truck traffic to the total. On some streets, trucks represent as much as 75 percent of total traffic. The amount of trucking is declining as the port and market activities go down but trucking is still a large percentage of total traffic and will continue to be so.

Street Capacity

The capacity of the street system was determined by a special study. The techniques used are explained in

[1]For simplicity, Water Street refers to Water, Pearl, and St. James south of Chatham Square.

Appendix A. Results for nineteen key intersections (which effectively control the capacity of the system) are shown in Figures 4 and 5.

Parking is a key element in capacity, since standing vehicles deprive moving vehicles of street space. Flagrant violations of parking regulations in Lower Manhattan were observed, and their effect on street capacity is demonstrated by the two figures. Figure 4 shows the relationship between capacity and volume with parking as it was observed, while Figure 5 shows the same relationship as it would exist if the existing parking regulations were observed. Note that there is excess capacity available at most intersections, but that it cannot be used because illegal parkers pre-empt the space.

The signal modernization program will provide increased "effective" capacity by allotting green time at signalized intersections on the basis of need. Now the signals allot time to each street according to a preset pattern which is often inefficient. Better enforcement of parking regulations, together with the improved signal system, could dramatically improve traffic operations on the street system.

Travel Speeds

The speeds shown in Figure 6 are directly related to congestion and are a good measure of traffic service. For example, speeds an Canal Street--notorious for paralyzing congestion--are very low, while those on Broadway and Church Street are moderate and those on Water Street are relatively high.

Speed and delay runs were made to determine average running times on most major streets in the area. This data (compiled for the marning peak hour) was obtained with a vehicle equipped with a Data Compiler leased from a manufacturer. (The equipment was invented by an employee of New York Department of Traffic.)

In addition to providing insight into problem areas of the system, this informatian was used in the traffic assignment technique described later. The future street system was planned to eliminate the bottlenecks which now bring traffic to a virtual standstill. In part, congestion and delays result from a basic lack of capacity but private auto and truck parking also play a large part. Therefore, truck service areas and parking are recommended as well as street improvements.

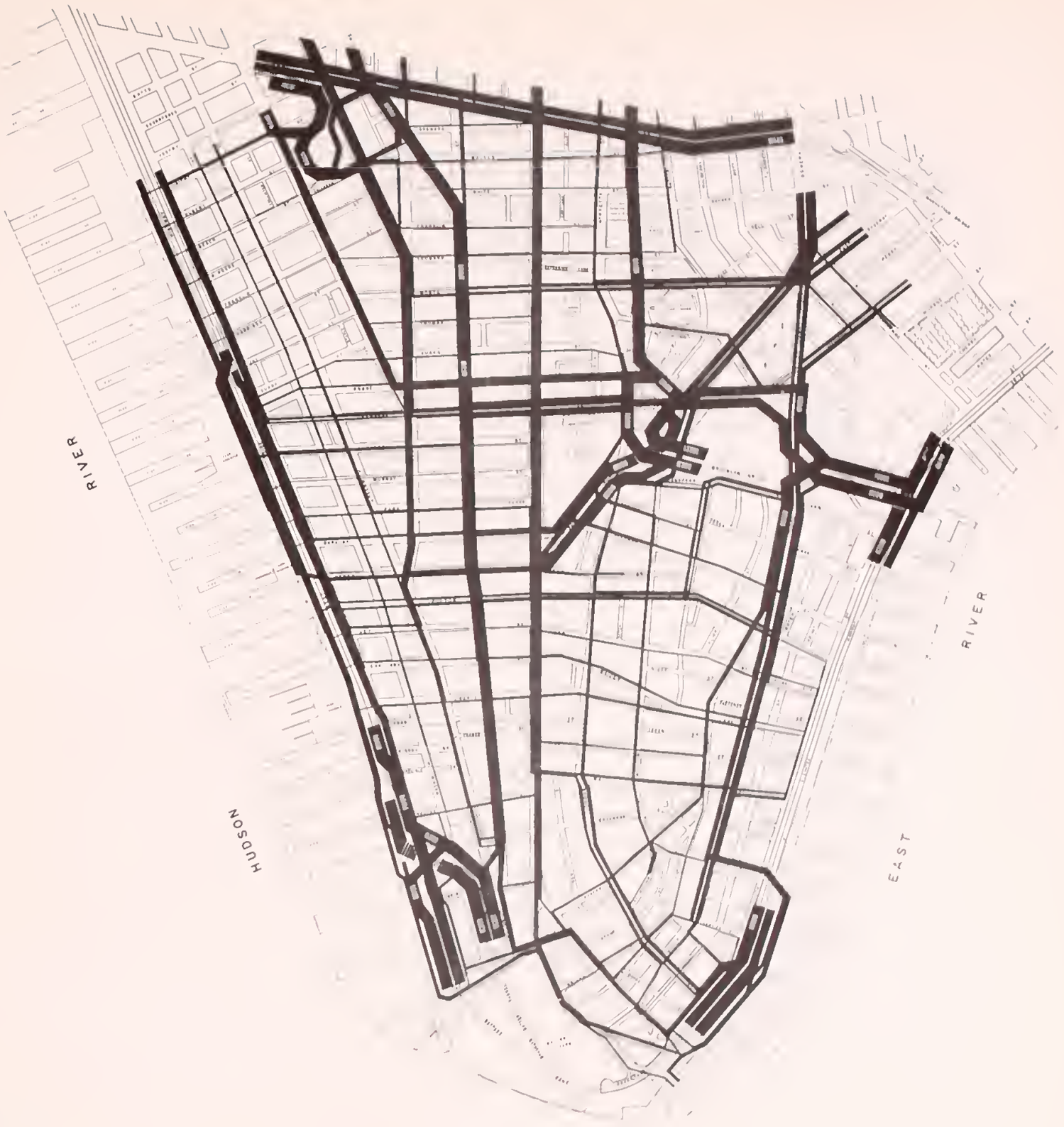
Parking

Particular attention was given to porking in Lower Manhattan. Studies were made of available spaces, parking usage, peak hour trip generation, costs, and parking requirements of different land uses.

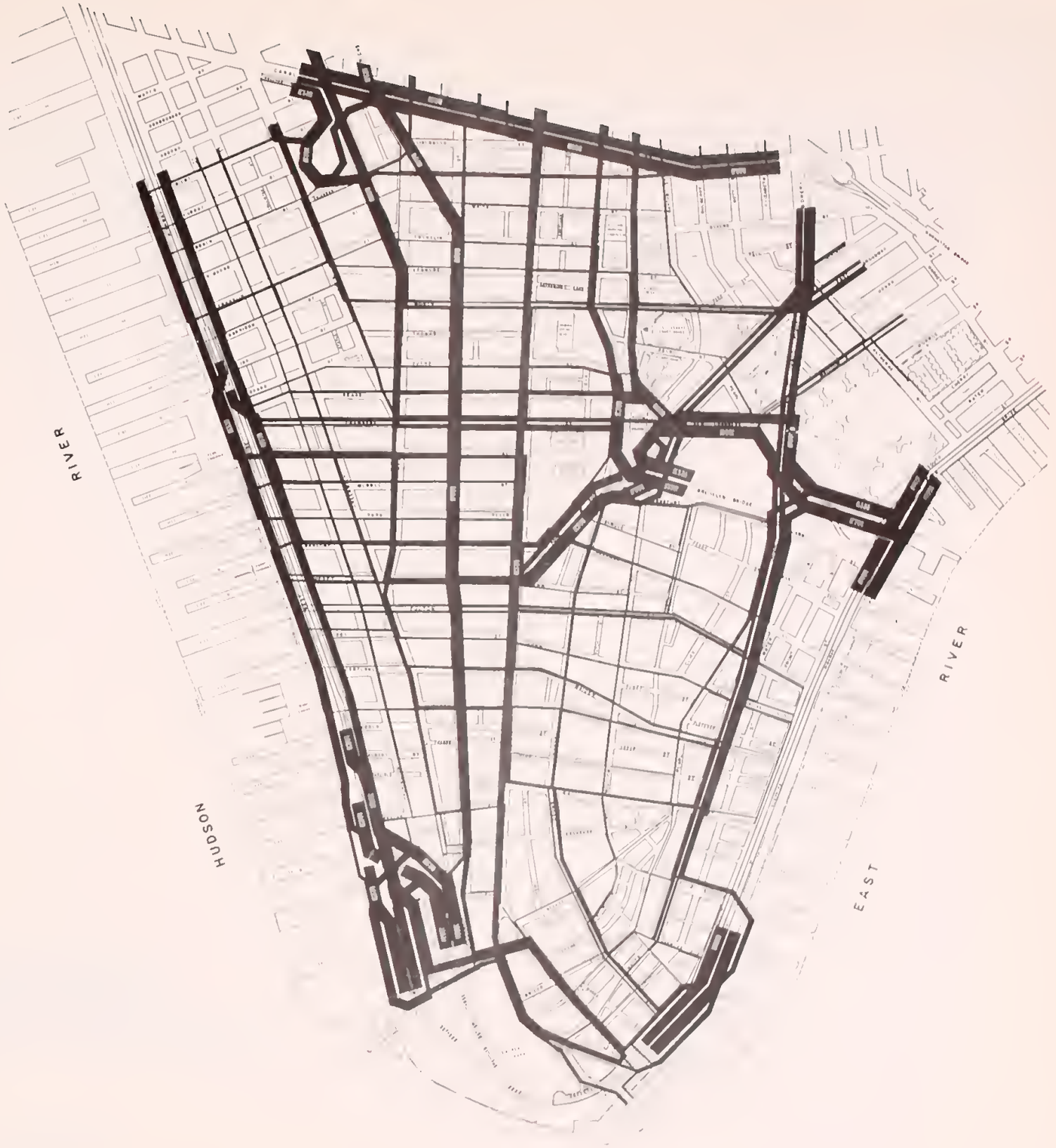
In total there are 9,700 spaces south of Chambers Street, the bulk of them in garages, with some parking lots on the East and West sides. One of the largest facilities, the Battery Park Garage, operated by the Tri-Borough Bridge and Tunnel Authority, is soon to be expanded. Curb parking provides approximately 1,000 spaces for short-time parkers.

Parking for residents in proposed housing areas was estimated on the basis of car ownership in a comparable section of Midtown. The Tri-State home interview study found that car ownership in Midtown on the East Side averages 0.28 vehicles per dwelling unit. This figure does not include vehicles which are not owned or leased by the resident. Examples are company cars provided by an employer but garaged by an employee at his place of residence. Allowing for similar rates of car ownership, business vehicles, rental vehicles catering to large residential units, and some visitor parking, brings the total parking related ta housing to a figure of 0.40 parking spaces per dwelling unit.

Parking for workers was estimated on the basis of providing only for those few who are not well served by transit, who require a vehicle for business uses during the day, and for key executives who require private transportation for their work trip. Based on existing patterns, abaut five percent of the tatal work force comes ta the area by private auto or taxi.



Existing Traffic Flow 8:00-9:00 AM



Existing Traffic Flow 4:30-5:30 PM

SCALE 0 200 400 800

Peak Hour
Intersection Approach
Volumes and Capacities
With Existing Parking Practices

Legend:

Approach Capacity

Approach Volume

SCALE 0 100 400 800

Peak Hour
Intersection Approach
Volumes and Capacities
With Existing Parking Restrictions

Legend:

Approach Capacity

Approach Volume

Travel
Speed and Delay
Runs
8:00-9:00 AM

LOWER MANHATTAN PLAN **2-6**

Although the trend appears to be toward greater use of the private auto for work trips, there is a practical limit to the omount of parking which can be provided. This practical limit is set in port by the cost, which is clearly beyond the reoch of most workers, by the capacity of the roads and streets which now serve Lower Manhattan, and by the ability of the local street system to serve the parking garages.

These limits are not easily defined. For example, the capacity of the roadways which feed Lower Manhattan is easy to measure, but, they are used by motorists from other sections of the Island as well as by through trips. Thus, both existing capacity, and capacity provided by new construction, must be allotted to each of the different users. Clearly Lower Manhattan con not expect to obtain all the total capacity available. Additionally, Miller Highway and FDR Drive have capacity restraints in the Midtown area, and while there is an apparent excess of capacity on the periphery of Lower Manhattan, the truth is that there is a deficiency of capacity for trips originating north of Midtown.

Another problem is the span of time over which capacity can be used for work trips. There has been in recent years a significant shift in work hour patterns which is apparent in the turnstile counts for the subway stations. Work trips on the subways are spread over three hours in the evening rather than being cancentrated in one peok hour at the end of the normal business day. This may be the result of greater use of data processing machines which now make it possible to summarize a days activities in the evening rather than on the following day. Certainly there are many "odd-shift" workers who drive to work, as evidenced by the parking during evening hours.

Despite the problems of defining capacity and need, there are indicators which point to a rational policy for worker parking. These were to be found in the amounts of parking now provided, (two to three spaces per 100 workers), the amounts of parking being planned for in current developments (generally three spaces per 100 workers), and the amounts of traffic which would be generated by varying amounts of parking space.

Taken together these factors indicated a need for three spaces for every 100 workers. This amount of parking plus additional short-term parking, was provided in the plan and is the basis for the traffic assignments. New long-term parking was located along the edge of the Island in permanent structures replacing surface lots which are generally only an interim use. The majority af it was planned to be served by the peripheral highway system. There will be, however, a need for additional parking at more central locations, primarily for high turnover parking to serve business trips and visitors.

The most acute shortage is in short-term space; a need which is now met primarily by curb parking and illegal spaces. This need can best be met by spaces located at strategic places throughout the area. A new garage for this purpose is proposed at the intersection of Wall and Water Streets. Residential and worker parking, on the other hand can, and should be, located near the edge of the Island where peripheral highways and major streets can serve them. This will reduce internal street traffic leaving the internal streets available for deliveries, taxis, buses, and other service uses.

A special study of peak-hour parking garage and lot usage, for a selected sample of parking facilities, was conducted to develop trip generation data for the traffic forecasting and assignment phases of the study. The findings are described in Appendix A.

Goods and Service Requirements

The more lightly used streets function primarily to provide service for abutting land. Although trucking is essential to the area, there are very few off-street loading facilities. A survey of off-street loading bays and sidewalk elevators was made for the Core area. These permanent loading facilities are shown in Figure 7.

Off-street loading bays are found primarily in newer buildings and because the zoning ordinance now requires them, they should be more common in the future.

The absence of loading facilities does not mean that there is a small amount of loading. Precisely the opposite is true. At mid-day, when truck parking is near its peak, there are usually 1,500 trucks porked ot street curbs in the area. Figure 8 shows generalized street valumes and the number of parked trucks for each street.

Note that the concentration is the heaviest in the northwest section of the city where manufacturing, warehousing and other truck generating activities are located. Only 400 of 1,500 total are parked south of Fulton Street reflecting the lower attraction for trucking of office buildings in contrast to manufacturing, marketing and wholesaling which are concentroted in the northern portion. Since these latter functions are expected to be replaced by offices, housing and other uses which produce fewer truck trips, the amount of trucking in the future will be less for the Study Area as a whale. But truck service will continue to be an essential element of the total tronsportotion needs.

A special study of truck trip generation was undertaken to make it possible to accurately forecast this change.

Goods and Service Trip Generation

The special studies of trip generation for goods and services were conducted at ten buildings to determine the amaunt of truck traffic related to various buildings by functional type. The study included the recording of data an times of arrival and departure of each truck visiting the building to obtain hourly fluctuotions, average duration of parking and peak accumulations. Each building was observed from 7:00 a.m. to 6:00 p.m.

The data were analyzed to estimate the number of trips generated by buildings of various types in relationship to square footage and number of employees. These were used in developing the trip tables for the troffic assignments, both existing and future.

Each vehicle was classified according to the following code:

Vehicle Type	Code #
Single Unit Truck:	
2 axle single rear tires	1
2 oxle dual reor tires	2
3 axle dual reor tires	3
Tractor Trailer Combination:	
3 oxle	4
4 oxle	5
5 oxle	6
Other Types:	7

Of the 323 trucks observed, only two were trailer combinotions and only 21 had three oxles. Delivery service in Lower Monhattan is confined primarily, to two axle trucks due to the narrow streets ond tight intersections where turns by long vehicles are, at best, difficult and in some cases impossible.

The overage parking duration was 35 minutes but this ranged from two minutes to 450 minutes (all day).

Average attroction rates for all ten buildings was 8.5 trucks per 1,000 employees or 4.7 trips per 100,000 square feet of gross floor orea. Retail space attracted far more trips than office space, the averoge being about 70 trips per 100,000 square feet.

SCALE:

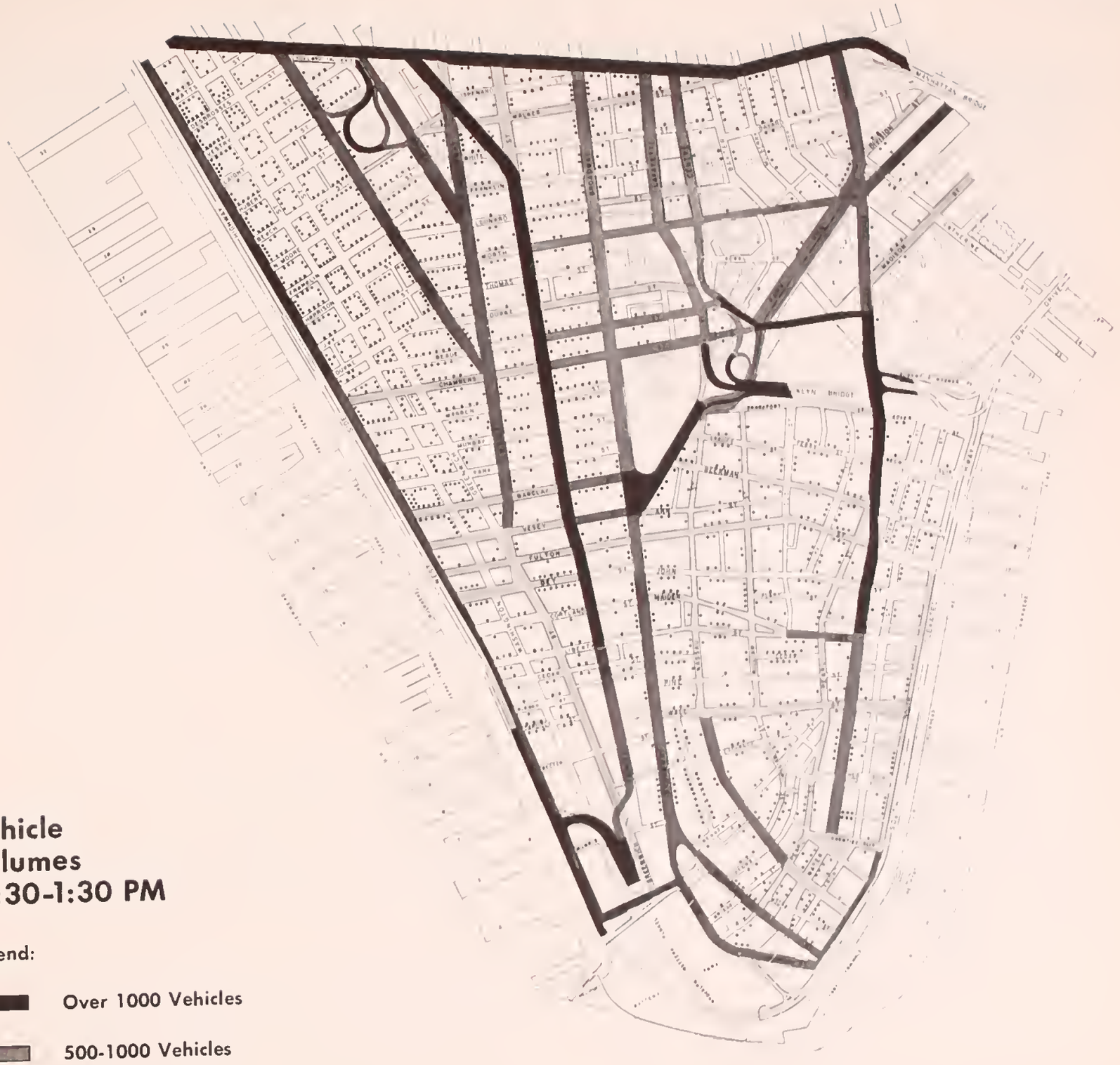
Loading Docks and Sidewalk Elevators

Legend:

- Inside Loading Dock
- Outside Loading Dock
- Sidewalk Elevator
- × Number of Loading Docks

LOWER MANHATTAN PLAN **2-7**

SCALE 0 800 400 800



Vehicle Volumes 12:30-1:30 PM

Legend:

- Over 1000 Vehicles
- 500-1000 Vehicles
- 200-500 Vehicles
- Under 200 Vehicles

Each dot represents one (1) parked truck.

Individual breokdowns ore shown below:

Type of Use	veh./doy 100,000 sq.ft.	veh./day 1,000 empl.
Insuronce	4.4	4.0
Lowyers	1.0	2.0
Banking: home office type	6.0	10.0
bronch office type	4.0	4.0
Generol Office	4.0	5.0
Moritime	2.0	3.0
Government	3.5	6.0
Brokeroge	2.0	2.0
Retoil	70.0	120.0

Additionol tobulotions ond illustrotions ore shown in Appendix A. The specific buildings ore not identified by nome to ovoid disclosure of occuponcy, usoge, etc.

From the dota collected ond from review of other studies in Monhatton and elsewhere, a complete tobulotion of trip productions ond ottroctions were developed for the different lond uses in the Study Areo. They ore shown in Toble 1.

Pedestrion Volumes

Pedestrions ore the other principal users of the street system. The heoviest volumes—which approoch 7,000 persons per hour in some blocks—are to be found on Broodwoy, Chombers, Nossou, Brood, Fulton, Church ond Wall Streets. These ore shown in Figure 9. The number of porked trucks, repeoted from Figure 8, indicotes the multiple uses to which eoch street is put.

The principol generotors of pedestrion troffic ore the subwoy stotions. The movement of people to ond from work which occurs in the morning ond evening peok hours ploces o considerable stroin on the limited sidewolk spoces avoiloble in the finonciol district. However, the heoviest usage of the sidewolks occurs during the mid-doy when there ore mony visitors in the oreo ond when the workers are moving about for lunch, business and shopping trips. Although the volumes ot thot time of the doy ore not as high os they are in the rush periods, the mid-day is critical because the movements tend to be in mony directions ond street troffic ond loading are olso neor their peok.

The majority of heovy pedestrian movements occur on eost-west streets due to the north-sauth orientotion of the subwoy system. These trips olso tend to be longer, on the averoge.

Mojor shifts in pedestrian patterns will result from the World Trode Center, relocation of the Stock Exchange, new office, residentiol ond recreational uses olong the woterfront and generol growth of office activity in and oround the finoncial district.

In oddition to the crowded sidewalks, the joint use of intersection oreos by people and vehicles results in deloys to both. Vehicles attempting to turn are delayed by pedestrions and pedestrians are delayed by vehicles blocking cross-walks. Severol olternative ways of resolving these conflicts at mojor points in the orea were studied. These studies dealt not only with existing conditions but with estimated future conditions.

The copacity of o sidewolk is about 1,000 to 1,200 persons per hour for each 2.5 foot of width, or 400 or 500 per foot. To illustrate the oreos which are congested, pedestrian volumes observed during the mid-doy hours were converted to densities or pedestrions per foot of sidewolk width per hour. The results are shown on Figure 10. This Figure cleorly shows the portion of the street system where oddition al copocity for moving people is needed. Those oreas are Nassau Street, Fulton Street, Cortlondt Street, and Wall Street.

Pedestrion Trip Generation

The some ten buildings mentioned eorlier in the Goods ond Service Study were used for a pedestrian trip generotion study. Doto were collected ot all building

daorwoys far three time periods; 7:00 to 10:00 a.m.; 11:00 ta 2:00 p.m.; ond 4:00 ta 6:00 p.m.

The studies gave the number of people caming to ond gaing from each building for eoch time period. Fram these, it could be seen that the expected patterns of haurly fluctuation do occur. Mid-day counts ore clearly influenced by the type of employment in the building and by the ovailability of food service. In oll, over 156,000 people were counted in the study. The average ane-way door count at mid-day was 0.92 times the number of employees, although this ranged from 0.60 to 1.40. The overoge for the entire day was 4.00 times the number of employees, with o ronge fram 2.30 ta 5.80. The results for three typical buildings are shown in Appendix A.

Pedestrian Volumes 12:30-1:30 PM

Legend:

- Over 5000 People
- 2000-5000 People
- Under 2000 People

Each dot represents one (1) parked truck

SCALE

Pedestrian Densities 12:30-1:30 PM

Legend:

- Over 500 Persons/Ft. of Sidewalk
- 300-500 Persons/Ft. of Sidewalk
- 150-300 Persons/Ft. of Sidewalk
- Under 150 Persons/Ft. of Sidewalk

TABLE 1

Trip Attraction and Produetion Averages for Lower Manhattan

Type of land use	veh./day, 100,000 sq.ft.	veh./day 1,000 empl.
Insuranee	5.0	5.0
Lawyers	1.0	2.0
Banking: home office type	6.0	10.0
branch office type	4.0	4.0
General Office	8.0	10.0
Maritime	2.0	3.0
Government	4.0	7.0
Brokerage	2.0	2.0
Retail	60.0	100.0
Commereial	50.0	100.0
Gross parameters	7.0	14.0

Car ownership (middle to higher ineome): 0.28-0.4 veh./DU

Densities: DU/aere

Person trips per day and DU: 1.7 to 2.0 trips/DU, day

Truek trips for residential units: 30 trueks/1000 person trips

3.0% employees by car or car pool: occupancy ratc = 1.2 persons/car

0.5% employees by taxi: oeeupaney ratc = 1.0 persons/taxi

5 to 10% visitors by car: oceupancy rate = 1.2 to 1.5 pers/car

5 to 15% visitors by taxi: occupancy rate = 1.0 to 1.2 pers/taxi

Parking times: -visitors, customers at offiee bldgs: 90 minutes

-visitors in rcsidential developments: 120 minutes

Trueks at berths: - in residential area: 60 minutes

- in commercial dcvelopments: 30 minutes

- in offiee buildings: 30 minutes

CHAPTER XI

FUNCTIONAL CLASSIFICATION OF STREETS

It con be seen thot the streets of Lower Monhotton serve mony different kinds of trips by mony different kinds of vehicles. Some pass through the area without stopping; others are work trips or those by trucks bringing goods or services to buildings or of taxis bringing businessmen or visitors. The list could be carried on olmost indefinitely. Further, the street system must serve trips by pedestrians, either between buildings ond subwoy or parking facilities, or among buildings to eot, visit, shop or sight-see.

Since conflicts omong these uses often occur, ond ore often severe, it is cleor thot the onswer to serving them does not lie in designing oll streets to serve all purposes. Moreover, such o solution would require the designing and canstruction of o totolly new street system.

It wos necessary, then, to determine just how, and how much, each street section wos used. To this end, speciol studies were mode of the trips generated by individual buildings ond of the traffic occurring on each section of street. The findings of these studies were summorized in Figures 8 through 10. The first of these, (Figure 8), shows the volumes of troffic using each street. It is apporent that the few streets thot carry reolly heovy volumes ore: Broadway, Church, Conol, Worth, Chombers, Pork Row, Water, Vesey, and Barcloy. Figure 8 olso shaws the number of trucks parked in eoch block during the mid-day illustrating very heovy usage of some streets far deliveries.

Pedestrion movements ore shawn an Figure 9, in terms of persons per hour using each street, and on Figure 10, in terms of persons per foat of sidewolk width. In both coses, the volumes shown ore for the mid-day peak hour. Higher pedestrian valumes accur in the morning and evening peok hours, but they are nat as critical because they tend to extend over only part of the hour ond becouse they tend to be highly directional. On the other hond, mid-day volumes of pedestrian traffic extend over two full hours, ond movements are in all directions. This period of the day places heavy demands on pedestrion focilities.

The infarmotion on street use was then translated into o study mop showing thase streets with light usage for different purposes, and those with heavy usage. (See Figure 11.) Fram this map was developed a system of streets for eoch use. Where one function clearly exceeds all others, the street is designated for that function. Where two or three functians are about equol, the street is designated for multiple usoge.

Hoving developed possible classifications, the next step was to creote a "system" from a series of street sections. Streets designated primarily far pedestrions were thus put together to connect important pedestrian generotors, including subway stations, ferry terminals, ond lorge buildings. Such a system should ottroct pedestrion trips from less-desirable streets, hence leaving them more ovoilable for other uses.

Similorly, the service system is planned to make service ovoiloble to every building in the orea ond connect

directly to the arterial streets. The system design is such that each service trip would use the arterial streets to a point within one or two blocks of the building for which it is destined, and then use the service streets for the last portion of the trip.

The arterial street system was planned to connect major roads and streets entering Lower Manhattan, to collect and distribute service traffic, and to provide good access and circulation within the orea.

This articulated system gets maximum use from the ancient street system with minimum cost for street improvements. It is suited to a staging process so that it can be developed over time with minimum disturbance of existing travel habits. Finally, it establishes a system that is suited to the core of the area and can be expanded as future growth occurs, either in the fringe around the core or in the area now occupied by piers.

As the core expands, the pedestrion system can expand to provide more efficient service, thereby mointaining the cohesion of the area. In addition, designation of arterial streets and service streets provides a framework within which decisions on street closings can be made.

Lawer Manhattan Expressway

The narthern boundary of the study area was drawn ot Canal Street, well south of the Lower Manhattan Expressway. Analysis of the street system took into account the probable effect of the Expressway and the proposed system was developed with the assumption that the Expressway would be constructed (or a satisfactory alternative).

The Expressway was planned to connect the Williamsburg and Manhattan Bridges on the east side to the Miller Highway and Holland Tunnel. In addition, it would serve vehicles using the tunnel and the bridges which wish to partially cross the Island. By removing these large volumes from the city streets, the Expressway would eliminate the bottleneck to north-south movement which now exists in a broad band across Manhatton. It would also reduce congestion at the bridge and tunnel terminals, thereby effectively increasing accessibility to Lower Manhattan.

One alternative to the Expresswoy, which has been proposed, would route trips around the tip of the Island. This is not a proctical solution to the problem. The depressed highways around the tip of the island proposed in this report could not handle the additionol traffic. In addition, most of the traffic involved doesn't really cross the island but distributes itself over the north-south avenues to mony points in Manhattan. However, it is possible thot alternatives in location and design could be developed by a careful study of the traffic movements, costs, design olternatives ond community impacts.

It is also possible thot some change in the recommended street system would be called for by a new location of the Expressway or a combination of new facilities to serve the Expressway's functions. Even so, those changes are likely to be small ond would not materiolly offect the basic system proposed in this report. The importont thing from the standpoint of Lower Manhattan is that a satisfactory means be developed for handling traffic across the Island to improve access from the north and from the East River Bridges.

Computer Analysis

To test the adequocy of different street systems, it was necessary to forecost the volumes of traffic which would use each street in the future. To do this, a computer assignment was developed. This consisted of two basic elements: a network and a trip table. The network was simply a description of the street system and the parking areas. It consisted of a series of nodes connected by links. Each street at the periphery of the study orea was described as an external zone with the ability to produce and/or attroct trips. Each curb face and each parking garage or lot was described as an internal zone with a similar ability.

SCALE:

Street System Study Map

Legend:

- Traffic Street
- Service Emphasis
- Pedestrian Emphasis
- Complete Closure
- Special Projects

The first network described the existing street system; succeeding networks were modifications of the original that reflected proposed changes in the system. Thus, streets to be closed were deleted, and streets to be opened were added, to the network. Similarly, streets could be changed from one-way to two-way operation or their directions reversed.

The trip table was simply a tabulation of trips among all zones. It utilized one-way trips only and was developed by using a simplified model which ignored travel time and distance. In effect, it assumed that trips to or from internal zones were distributed to external zones in propartion to the percentage of total trip productions and attractions for each external zone. Review of previous origin and destination studies revealed that this varied by sub-area in Lower Manhattan, so the distribution of trips was actually done on a sub-area basis and then totaled.

Through trips, for example, trips between external stations, were estimated separately and then deducted from external productions and attractions before distributions of internal trips were calculated.

The productions and attractions of each internal zone were calculated by adding parking, taxi trips, truck deliveries, and bus schedules. A taxi trip would equal one attraction and one production. The same was true for buses and most truck deliveries. Similarly, trips parking at the curb in high turnover space, and private auto trips to fronts of major buildings were nearly equal in productions and attractions. On the other hand, trips to off-street spaces were heavily weighted toward attractions. A special study of off-street parking usage is described in Appendix A.

Trip tables were thus devised for each alternative for which an assignment was made. In the case of proposed new development, estimates of trip productions and attractions were based on the values in Table 1.

These two basic elements, the network and trip table, were stored in a computer and the trip table was the "assigned" to the network. To do this, the computer calculated the shortest path from each zone to every other zone and assigned the trips to that path. Repeating this process for every zone indicated the total number of trips on each link. The purpose of going through this entire process for the existing system was to obtain a check on the accuracy of the method and assumptions. After the first such assignment, several changes were made in the the network, such were, notably, changes in travel times and the insertion of turn penalties at critical intersections. The trip table was also adjusted to give each area its proper number of trips. These changes were very small, but they helped produce an assignment of existing trips to the existing street system which is in remarkable agreement with actual volume counts.

The network, as developed, actually consisted of two parts: one for the area immediately surrounding the Civic Center, the other for the remainder of the study area south of Canal Street. The two can be used individually or, together, as a single network. In evaluating the traffic problems around the Civic Center, the smaller network was used. For forecasts of future trips in the later stages of the study, the entire network was used.

Obviously, the forecasts of future trips are only estimates. However, they are highly accurate for the conditions assumed in each assignment. One reason for this is the preciseness of the exercise, in that each zone has to be analyzed individually, and each must be completed. This forces the estimator to recognize each individual element of the system and to make rational estimates for each one. In addition to this attention to detail, the computer, itself, brings a high degree of accuracy to the thousands of individual calculations required for the process.

Traffic Forecasts

The recommended street system was tested by the assignment to it of two vehicular traffic forecasts, representing: 1) the interim and 2) the final developmental

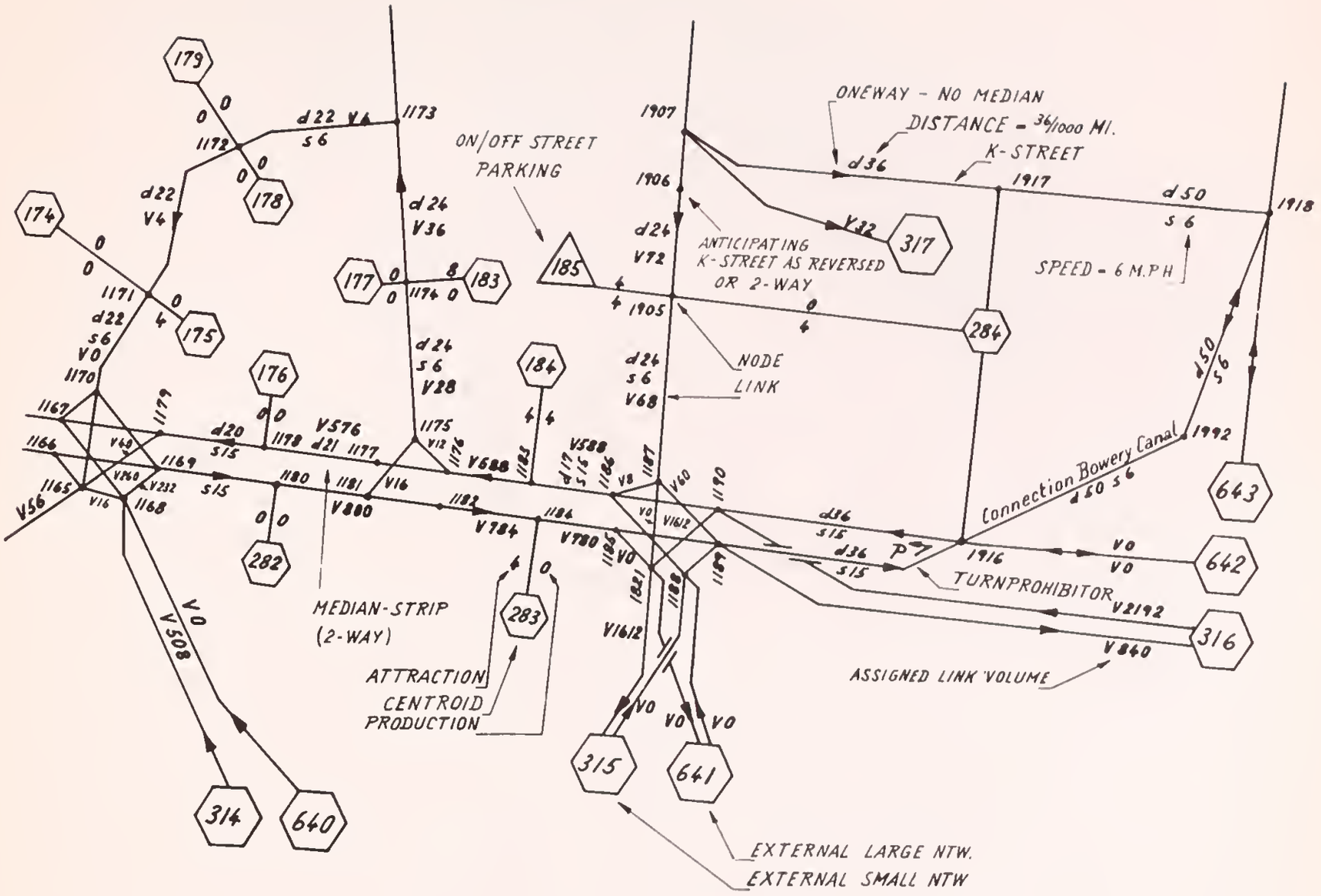
conditions in Lower Manhattan. The former was for the time when committed and proposed projects would be in operation, and the latter represented the ultimate development, as proposed by the planning consultants.

In each case, the network was modified to reflect the actual planned changes in the street system. Trip generation was determined by applying the parameters, developed by this study, to the projected land-use locations and densities.

The intermediate-range forecast — Network 51 — reflects the expected 1970 - 1975 conditions. The folowing list gives the major new developments upon which the forecast was predicated. Additional private buildings under construction or planned for completion before 1975 were included.

Civic Center completed
Chatham Towers completed
Brooklyn Bridge Southwest Housing project completed
Stock Exchange (at South Ferry) completed
World Trade Center completed
Parking garage in the generol vicinity of Hanover Square — 500 cars — completed
Parking garage Battery Park Addition — 1,000 cars — completed
Garage east of Police Headquorters — 1,000 cars — completed
No changes in Washington Market area. However, construction of Worth-Harrison crosstown arterial completed
No changes in Fulton Fishmarket
Close Cedar Street: Nassau-Greenwich
Close John Street: Broadwoy-Dutch
Close Nassau: Wall-Beekman
Close Wall: New Street-Pearl Street
Close Pearl: State-Whitehall
Close Coenties Slip West completely
Close Moore Street completely
Close Front Street: Fulton-Maiden Lane and Wall-Coenties Slip East
Close Stone Street: Broad Street-Hanover Square
Close Broad Street: South Street-Water Street and Beaver Street-Wall Street
Reversed Warren and Murroy Street (Warren West: Murray East bound)
Reverse Thames Street between Broadway-Church: Westbound
Reverse Bridge Street: Between Stote and Broad Street, westbound
Reverse Peorl Street: Between Stote and Broad Street eastbound
Reverse Williom Street: South Williom-Liberty northbound
Reverse Gold Street: Fulton-Liberty southbound
Reverse Cliff Street: Fulton-John southbound
Chotham Square with new configuration
Brooklyn Bridge opproaches completed
FDR interchonge (eost of Peorl Street) completed
Widened Worth Street (s = 10) between Church and Chothom Square
Baxter Street Extension (between Worth and Park Row) completed
Lower Manhotton Expresswoy w/Hollond Tunnel Exits etc. in service
Greenwich St. 2-way to WTC: dead end at Barcloy St. (s = 12)
Worth-Harrison widened (s = 10; 2-woy)
Hudson Street reduced speed: s = 12
Barclay St. Ferry (674) ond Liberty St. Ferry (Externol 669) deleted
City Hall Park Under-poss occording DPW built and in service
Maiden Lone widened
Coenties Slip east two-way
Water Street widened and two 2-way; Coenties Slip-State Street
Williams Street 2-way: Pine-Beekman
Vesey Street one-way eastbound

For the 1970-1975 a.m. peak hour, the totol number of trips into the Study area increased over 3,000 (from



Network Legend

Street Network
Key Map

Traffic Forecast — Intermediate Development 1970-1975 8:00-9:00 AM

12,254 to 15,531), while outbound trips increased by nearly 2,000 (from 6,378 to 8,348). It was assumed that through trips would decline slightly (from 11,990 to 9,779) due to the completion of the Lower Manhattan Expressway or same similar facility. Numbers of trips and vehicle miles for the assignments are shown in Tables 2 and 3.

The effect of such ultimate development (by the year 2010) as is proposed by the planning consultants was tested on Network 61. This assignment assumed the completion of a new peripheral expressway with parallel service roads and full development at maximum allowable densities. New residential construction outbound of the existing bulkhead line was anticipated to mitigate the inbound travel demand that would otherwise be associated with the proposed higher employment.

A partial listing of new major projects includes:

Full implementation of proposed street system.
Redevelopment of Washington Street Market area.
Redevelopment of Fulton Fishmarket area.
Redevelopment of Industrial area at Holland Tunnel exits.
New Police Headquarters completed.
United States Steel Building completed.

Inbound trips again increased by more than 3,000 and outbound by roughly 1,000. Through trips, however, remained basically at the 1970-75 level, showing an increase of only 200 trips during the p.m. peak hour. Figure 15 shows the resultant traffic volumes.

Evaluation of Vehicle System

The vehicle volume forecasts were assigned to the recommended street systems and the resultant volumes were analyzed, by comparison with the capacity curves developed early in this study, to determine how well the systems would perform.

It was evident that the proposed system has sufficient capacity for expected travel demands without wholesale modification. Some improved channelization and integration of control devices would, however, be extremely helpful. In addition, more rigorous enforcement of parking restrictions would allow streets to be utilized fully in their suggested classification.

Only one problem did came to light during this process, however. Increases in both vehicular and pedestrian traffic might create critical abstructions at certain intersections, particularly if provisions for the increased pedestrian volumes are not made. Arcading and street closure for pedestrians use only would definitely limit the number of conflict points.

Therefore, although the proposed increases in Lower Manhattan's employment, floor space, and residential usage are large, the recommended street system, with its classification and control by function, will be able to meet the vehicle movement demands posed by this development.

TABLE 2

COMPARISON OF AM PEAK HOUR TRAFFIC FLOWS AT DIFFERENT STAGES FOR LOWER MANHATTAN STUDY AREA

	Existing	diff.	1970/75	diff.	1990/2010
Total Tripends	61,544	+5871	67,415	+8019	75,434
External Productions	24,244		25,310		28,425
External Attractions	18,368		18,127		19,221
Accumulation	5,876	+1307	7,183	+2021	9,204
Internal Attractions	12,254		15,531		18,446
Internal Productions	6,378		8,348		9,242
Accumulation	5,876	+1307	7,183	+2021	9,204
External to External Trips	11,990	-2211*	9,779	+ 200	9,979

*Influence LMX-way & other changes.

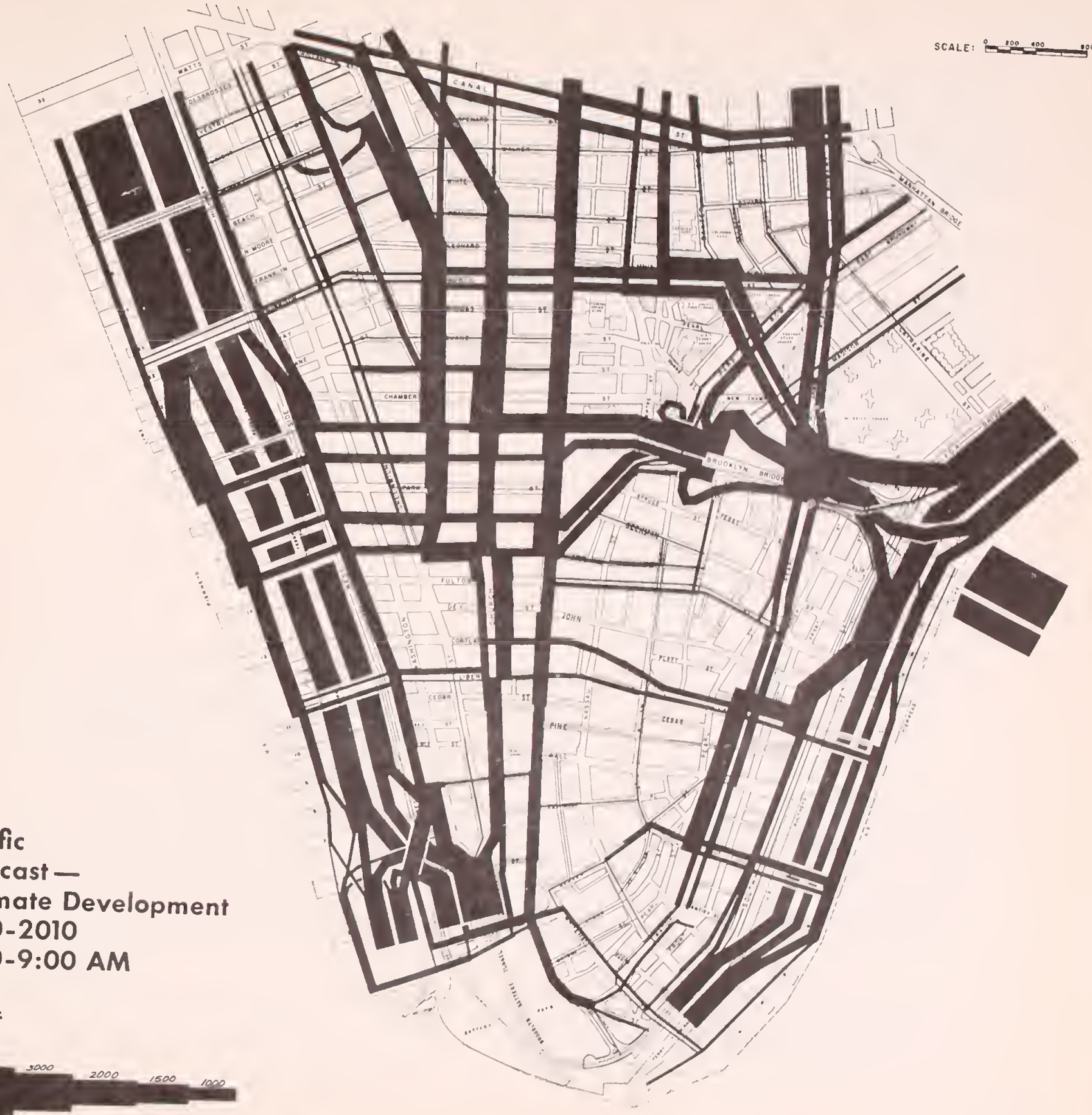
Check Totals

Zone Att.	12,254	15,531	18,446
+ Ext.-Ext.	11,990	9,779	9,979
= Ext. Prod.	24,244	25,310	28,425
Zone Prod.	6,378	8,348	9,242
+ Ext.-Ext.	11,990	9,779	9,979
= Ext. Att.	18,368	18,127	19,221

TABLE 3

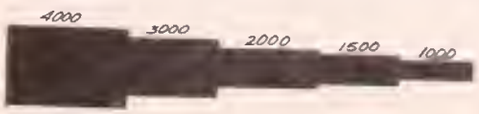
COMPARISON OF AM PEAK HOUR VEHICLE MILES AND VEHICLE HOURS FOR LOWER MANHATTAN STUDY

	Existing	1970/75	1990/2010
Vehicle miles	30,317	31,535	35,803
Avg. trip length (miles)	0.99	0.94	0.95
Vehicle Hours	1,927	2,014	2,297
Avg. trip length-in hours	0.063	0.060	0.061
-in minutes	3.77	3.60	3.65
Total vehicles	30,622	33,658	37,667



Traffic Forecast — Ultimate Development 1990-2010 8:00-9:00 AM

Legend:



CHAPTER XII

RECOMMENDATIONS

CORE AREA

Proposals for the future street system call for treating the streets according to the following functional definitions: 1) arterial streets, for major movement of traffic; 2) service streets, for access to buildings and delivery of goods; and 3) pedestrian streets, far the free movement of people over short distances.

These three systems are shown in Figure 16 ; their respective designations follow an intensive study of street widths, traffic and pedestrian volumes, parking, loading facilities, truck movements, and transit station capacities and usage. (Additional service roadways within superblocks created by this system are not shown.)

Vehicular System

The major vehicular streets within the core area include Church, Broadway, and Water-Pearl Streets for north-south movement. Worth Street and the Warren-Murray couplet will provide east-west access in the vicinity of the Civic Center. Barclay and Vesey Streets would be major crosstown streets north of the World Trade Center, and the Maiden Lane-Liberty Street couplet will furnish east-west access south of the World Trade Center.

Pedestrian System

The pedestrian system consists of Nassau, Broad, Fulton, Dey, John, and Chambers Streets. This system is an adaptation of existing streets to a new design concept specially tailored to the needs of pedestrians. It will connect directly to points of pedestrian concentration in the new waterfront developments and take advantage of major pedestrian areas either in existence or proposed for the area, e.g., the World Trade Center Plaza, City Hall Park, the Civic Center Plaza, and the Stock Exchange Plaza, as well as many smaller spaces along Nassau, Broadway, William and John Streets. The Chambers Street route will connect the Braoklyn Bridge walkway, Civic Center, and the Police Headquarters with the Washington Street Redevelopment Area.

Where existing street widths are insufficient to accommodate pedestrian loads and the propased two-way surface transit system, Arcades are proposed in lieu of widening.

Transit Stations

Transit station impravements designed integrally with the pedestrian system are recommended ta bring passengers out of the stations to street level with greater speed and with less congestion at the stairways. A special feature of the recommended design is an attempt to apen the streets above selected station mezzanines to provide daylight to thase areas, enhancing both utility and appearance.

A current prapasal for the improvement of transit in the area includes the operation of Long Island trains from Brooklyn into Lower Manhattan. If this proposal is adopted, those station improvements required may be

combined with proposals of this type. An example of how these station improvements could be accomplished is shown in Figure 17.

Alternative concepts for the pedestrian system were studied, including underground and overhead arrangements, neither of which seemed suitable or practical for this area. A number of excellent at-grade solutions can be worked out, and have been studied.

Intra-Area Transit

To serve the unique needs of Lower Manhattan, particularly as the core expands and distances between major concentrations of workers and residents become greater, a small, low, moderate-speed vehicle is recommended for selected routes of the pedestrian system. This unique conveyance would provide frequent service for people moving distances of four to ten blocks--too short for subway or taxi, too long for easy walking. Examples are trips from the Staten Island Ferry Terminal to Broad and Wall Streets, or from the new Stock Exchange to the World Trade Center, or from the East to Hudson Rivers. Such service could be initiated in the near future.

There is no vehicle presently in use which is appropriate to Lower Manhattan's special demands. Expressly for the purpose, a new vehicle should be designed with a low floor and relatively open sides that facilitate boarding even at low speeds. Actual stopping time would thus be kept to a minimum.

Specific Actions

The completion of street improvements around the Civic Center and the Brooklyn Bridge ramps should coincide with that of the Civic Center itself. Similarly, the street improvements planned in conjunction with the World Trade Center should be coordinated with the overall construction af the Center.

Around the World Trade Center, Liberty Street-Maiden Lane should be widened across the Island. Widenings of most blocks are either planned or in various stages of completion. This widening will require the demolition of the buildings in the small triangle east of William Street. Because this street is proposed as a major connection to the expressway, the portion of it lying east of Water Street should be widened to at least 60 feet between curbs, with sidewalks at least 10 feet wide and preferably more.

The Trade Center Plan calls for one-way operation on Maiden Lane and Liberty Street west of their junction near Gold Street. It may be possible, however, to operate Liberty Street as a two-way street for its entire length ond, thereby, eliminate the necessity for westbound traffic to negotiate two turns at Church Street. This type of operation should be tested at the outset; and, if it proves impractical, one-woy operation instituted.

Broadway

To develop additional capacity on Broadway, gradual widenings have been made, particularly in the vicinity of City Hall and the Civic Center. These widenings should be continued north to Canal Street as redevelopment occurs.

Worth Street

Widening of Worth to a two-way crosstown arterial has been planned for some time. The widening to 45 feet east of Broadway should soon be completed and the widening west of Broadway should be given as high o priority os is consistent with the city's ability to develop financing and with any redevelopment of the area.

Water Street

Water Street has recently been widened as far south as Coenties Slip, and the extension of this widening has been mapped to Whitehall Street. This project should be completed in conjunction with clearance and construction on the proposed Stock Exchange site.

Proposed Circulation System

Legend:

- Traffic
- Service
- Pedestrian
- Parking

Nassau Street

This street is proposed for conversion to a pedestrian-emphasis street. A view of the street as it might look following its conversion is shown in Figure 18. The street should be repaved and the sidewalks and crosswalks be delineated by special pavement texture. As the buildings along the street are redeveloped, arcades should be provided. The cost to the city of this improvement should be reasonably small since bonuses for arcades are provided for under the new zoning ordinance. The arcading should be mapped to assure that all new developments on the east side of Nassau Street will include arcading. Deliveries now made over the sidewalk should be prohibited during the mid-day hours--beginning, possibly, with those from 10:00 a.m. to 4:00 p.m. This would permit the prohibition of traffic in the street between Wall and Fulton during those hours. Traffic could continue to use Nassau Street in the morning and evening. At the same time, controls on site plans should be used to require all new buildings to construct loading facilities on the cross streets or to expect limitation of deliveries to early morning or lote evening hours.

Intra-Bus System

Within the area, it is proposed to serve trips of about 4 - 10 blocks in length with a system of low, slow, and, in warm weather, open buses. Running on 2 - 3 minute headways, these vehicles would serve those trips which are too long for comfortable walking and too short for the subway. Fares would be nominal, and their collection on an "honor system" would eliminate the need for elaborate door- and fare-control systems.

No vehicle now exists which meets the special requirements of this system, but there are several which approach them. A proposed vehicle, somewhat approximating a San Francisco cable car, while eliminating its noise and inflexibility, is shown in Figure 18. The Washington, D. C. "Minibus" experience has been used to estimate a vehicle cost of $15,000 each and the operating costs are shown in Table 4.

The first route of this system (dumbell-shaped, with loops at either end connected by a central straight) should be opened about the time that a significant portion of the World Trade Center is completed. This route is proposed to run up Broad Street from the Staten Island Ferry to Fulton Street, across Fulton Street to Church Street, down Church Street to the front of the World Trade Center, east on John Street to Nassau Street, and down Nassau Street and Broad Street to the point of origin. It is estimated that ten buses, with two in reserve, would be required to maintain three-minute headways on this route.

Pedestrian volumes in the area are quite large (see Figure 9), and the proposed system would need to capture only a small percentage of them to pay its own way.

The different types of trips which are made by pedestrians in the area help indicate the type of service needed.

Parking employees	- Trips of employees to and from parking.
Transit riding employees	- Trips by employees to and from transit stations.
Employee lunch trips	- Trips by employees to eat lunch.
Business trips	- Trips between buildings, or between parking or transit stations and buildings.
Employee shopping trips	- These are frequently combined with lunch trips in Lower Manhattan.

Although these trips are usually quite short (50 percent are less than 500 feet), they are growing longer as the financial district expands. Far example, the World Trade Center and the Stock Exchange are both proposed

for construction on the fringe of the existing district. With this expansion and with the latent demand for transit by workers now coming in by ferry and by PATH (and with the unusually high volume of visitors to the stock exchanges, the Trade Center, the Bottery, and other tourist attractions), ample demand exists for convenient, middle-distance transit service. Moreover, the proposed system would bridge the cost-gap between taxi and walk by providing a modest-price alternative and one which is readily available.

Operation of the bus system as a free service to the area, while desirable, is ruled out by the question of financing. The overall transit system is currently subsidized from city funds, and it is clear that any additional funds should go to improvement of that system. On the other hand, it seems equally unlikely that since a quarter of a million dollars a year is at stoke, private enterprise would underwrite the venture. Use of a special real estate levy would raise complex questions of benefits versus assessments. After considering the many ways in which service could be instituted without prolonged financial exploration, it was decided to recommend fare collection. Normally, this would mean fare control at a single entrance or exit. Since this would destroy the basic concept of the system, that of an easily-boarded vehicle with reduced boarding time and station stops, it wos decided to recommend an honor system for the collection of a nominal fare.

Actually, this recommended system is only one of many considered as means to provide the improved circulation within the financial district that was clearly desirable. All such other systems as moving sidewalks, elevated or underground passageways, or elevated rail systems had serious drawbacks. The bus operating on the surface seemed best suited to the needs of most potential users. It also has the virtues of being capable of expansion as the area continues to grow over time and that of being testable. Initial tests on Broad-Nassau Street will provide an opportunity to evaluate different bus designs, fare collection systems, scheduling, and other operating and service problems.

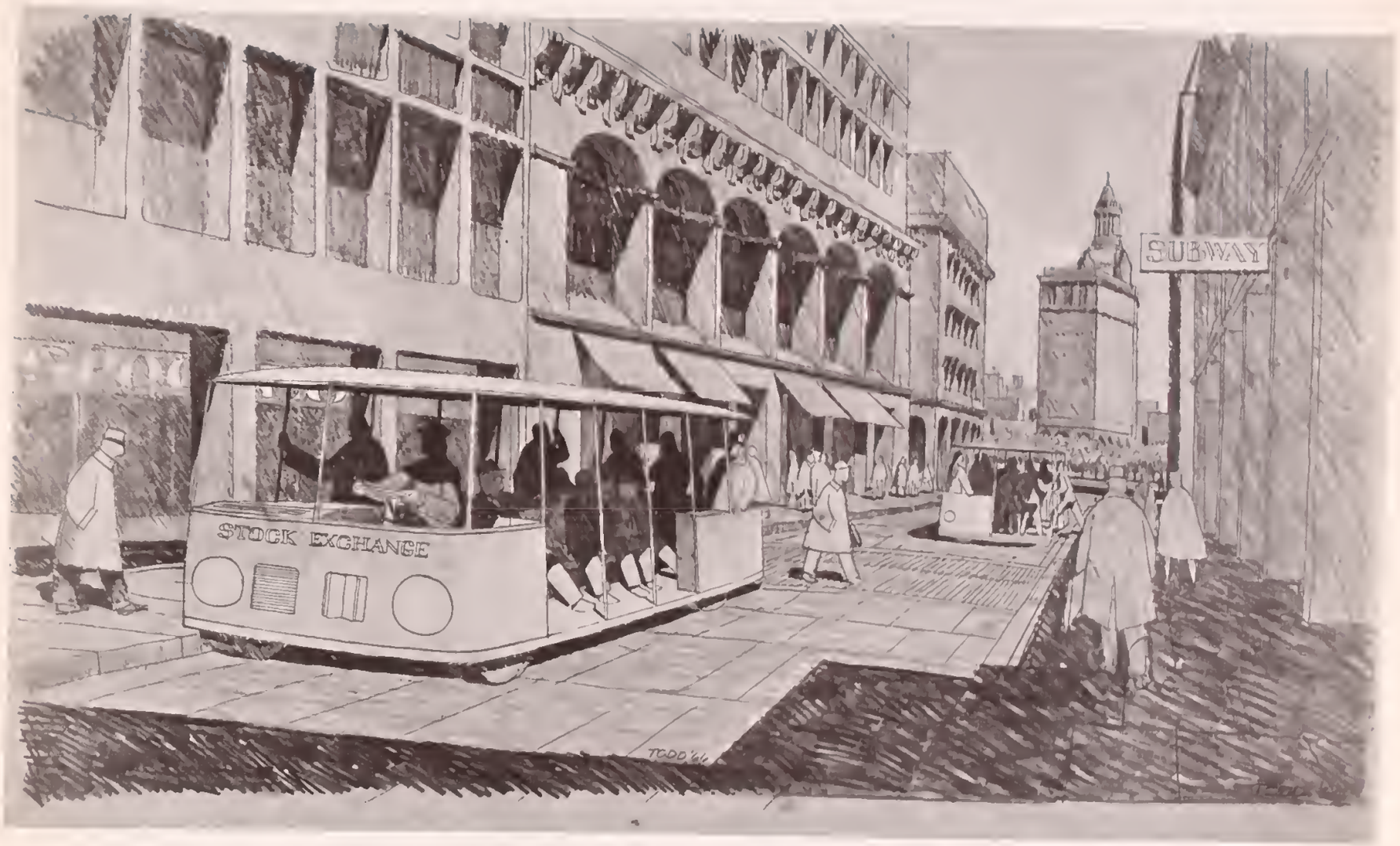
Fulton Street

Funds for the widening of Fulton Street have been appropriated, and the street has been mapped for widening. Widening the right-of-way to 90 feet, as proposed would require the acquisition of all properties on the south side of the street. The plan was advanced during the period when it was assumed that the World Trade Center would be constructed on the East Side ond that Fulton Street would carry crosstown traffic to and from the Miller Highway. With the decision to locate the Trade Center ostride Fulton Street on the West Side, the proposal lost some of its urgency.

Assignments of troffic for future conditions show that the principle use of Fulton Street will be for local circulation and that most traffic between the Eost Side and the World Trade Center would use Barclay-Vesey or Liberty Street with only a few trips using Fulton

In addition, as the location of a transit complex, Fulton Street is now, and will be in the future, heavily used by pedestrians. To provide increased capacity for both pedestrians and vehicles on this important artery, it is proposed that the street be widened and that the improvement include widened openings into the transit stations. Because some of the buildings between Gold Street and Broadway may prove suitable for arcading, it is proposed that the street be widened up to the building fronts on the south side ond that the sidewalk on the south side be within an arcade.

The widening between Gold and Water Streets should be completed in conjunction with the Brooklyn Bridge Southwest project. West of Gold, the project could follow one of two possible courses. The first course would be for the city to proceed with property acquisition and widening and re-sell the property for redevelopment. The later course has the virtue of providing the city a means of specifying land use



Proposed Pedestrian Street With Arcade and Intra-Bus—

Nassau Street, North of Fulton

TABLE 4

ESTIMATED DAILY COSTS — INTRA-BUS SYSTEM

AMORTIZATION = $15.00 per vehicle, per day – (5-year)

OPERATION = $7.00 per hour, per vehiele

12 vehieles x $15.00 = $180.00

10 vehicles (operating) x $7.00 x 12-hour day = $840.00

$840.00 (operating costs) + $180.00 (amortization costs)

= $1020 per day total daily eosts

$1020 = 10, 200 ten-eent fares*

or

= 20, 400 five-cent fares*

* 10, 200 fares per 12 hour day = 850 per hour

20, 400 fares per 12 hour day = 1700 per hour

controls at the time of sale and assisting in the assembly of property. The second course would be to widen the street os buildings on its south side are redeveloped.

John Street

As a part of the total pedestrian system, John Street between Nassau and Church Streets is proposed for conversion to a predominantly pedestrian street. The proposed Intra-bus will operate on this section as part of the Trade Center-Staten Island Ferry Loop. This section is almost ideally located for the pedestrian system on the West Side because it connects directly to the Trade Center Plaza which could ultimately be extended outward to any development in the pier area. This street should be designed with flush pavement, leaving the entire width available for pedestrian movement. All new development in the area should be required to locate access on other streets to the extent possible, and deliveries should only be allowed during early morning and late afternoon hours. During the morning and evening rush hours and mid-day, all vehicles should be excluded.

William Street

To offset the loss of capacity caused by the conversion of Nassau Street to predominantly pedestrian uses, it is recommended that William Street be widened to accommodate two parking lanes and two lanes of moving traffic. William Street is to be used primarily for service to buildings; but, with increased land use intensity in the core, movements of this kind are expected to increase. Accordingly, new buildings should be strongly encouraged to include arcades similar to that constructed on the West Side north of Maiden Lane. This improvement need not predate the conversion of Nassau Street, but it should be carried out as rapidly as redevelopment of the area will permit. Recent new developments in the section have already provided setbacks and arcades. As redevelopment continues, it should not be difficult to obtain similar improvements.

Chambers Street or Reade Street

With the completion of the Civic Center and the diversion of traffic to Warren and Murray Streets, Chambers Street should become very lightly used for vehicular movement. The complex of subway stations and the heavy movement of pedestrians along Chambers now give the street a predominantly pedestrian function. One factor which will further encourage pedestrian use of this street is the possibility of new uses for the land in the Washington Street Redevelopment Area. The subway entrances along Chambers are generally narrow, dark, and congested. To provide a more pleasant atmosphere and greater capacity for pedestrian movement, it is recommended that this street also be redesigned and paved and that subway entrances be enlarged. At such time as new uses occur in the West End, the street should become an Intra-bus route serving those uses and the Civic Center. The route could terminate in the Civic Center Plaza. Through the Plaza, connections could be made to the Brooklyn Bridge-Worth subway station, and further east, to the new Police Headquarters and the housing areas along the East Side. The Brooklyn Bridge walkway can be brought into the Plaza very naturally with the proposed roadway design, and this small pedestrian flow could be served by the Intra-bus. Chambers is already a significant shopping street; and, if housing develops on the West Side, it would be a natural location for additional retail uses. The pedestrian design of the street, together with Intra-bus service and the excellent subway service, would make it readily accessible to workers and residents alike.

Reade Street is an alternate to Chambers Street in the event that the Chambers-Warren couplet is chosen as the connection for the Brooklyn Bridge. The final decision on which of the two streets (Chambers ar Reade) to use for the pedestrian connection can be made when it is clear which of the two will best fit the detailed design selected for the Civic Center.

Wall Street

The southernmost crosstown pedestrian facility is proposed for Wall Street. This location interconnects very well with the peripheral system and with the service streets. This would be the last element of the system to be put into effect. Intra-bus service could be provided in a loop composed of the esplanade olong the East River, Fulton, Nassou ond Wall Streets.

Madison Street

As presently planned, Madison Street would be closed between Pearl Street and Robert F. Wagner Street, through the Police Headquarters' site. This street, although not heavily used for arterial movement, does provide a means of movement from the Brooklyn Bridge Southwest Renewal Area to the north that bypasses Water Street and the complex of intersections created by the bridge ramp system. In addition, it serves circulation around both the proposed Police Headquorters and the proposed parking garage. For these reasons, it is strongly recommended that it be retained in the street system and that it be connected under the bridge to Gold Street.

WATERFRONT AREA

The basic purpose of the proposed waterfront circulation plan is to facilitate future residential, commerciol, and recreational development along the East and Hudson waterfronts--a wide strip of land composed of the rights-of-way of South and West Streets, plus a new land fill extending out into the water several hundred feet, and with a land area (depending on future demand) of between one and two hundred acres. Earlier engineering studies have indicated the feasibility of such construction along the downtown waterfront.

Insofar as they now hamper access to the waterfront area, the elevated highways were the subject of study. After examining a number of alternative solutions--on-grade, elevated, and depressed--it wos concluded thot the solution offering the most harmonious and integrated development was o depressed highway one level below existing grade, offshore of the existing bulkhead. It could be built while the existing highway is in operation, would be on city-owned land, and would be free of utilities ond other encumbrances.

To provide for the servicing of adjacent development areas on both sides of the below-grade expressway, parallel service roads will connect with inland streets ond with porking garages constructed over, or adjacent to, the highway. Most new downtown parking facilities will be locoted in this peripheral system--within easy walking distance of the inner core and out of the way of locol service traffic.

The new waterfront will be orgonized around a series of community plazas (or nodes), located at the termination of major downtown pedestrian streets (such as Wall, Fulton, Broad, Nossau, ond Chombers). These plazos would form broad openings into the heart of the city. They can become the focus of major retoil and community services and a meeting place for neighboring residential ond office functions. Direct pedestrian movement from the core, along pedestrian streets ond across these plazas and onto the waterfront "esplanades", is thus made possible.

At points midway between these plaza "nodes", the proposed service roods rise to grode, thus permitting the necessary connections to the inlond access streets and parking facilities, along with vertical transportation into the buildings above.

This "peripheral" system has been planned for compatibility with that of the core. The core system is not, however, dependent on the peripheral system, and the first stages of its construction can be implemented immediately. The ultimate development of the waterfront will require many years and, no doubt several phases for its accomplishment. The interior system can extend to meet it over time.

CHAPTER XIII

SUBWAYS

Subway Usage and Capacity

The subway system is the transportatian backbone af Lawer Manhattan, which area has the heaviest cancentratian af lines and statians in the Metropalitan Regian and serves as the origin ar destinatian far raughly 10 percent af the 4.5 millian daily trips on the system. Because af the cancentratians af workers, lines and statians, the subwoy is an efficient carrier; and its impartance far the future cannot be overemphasized.

Ta better understand the rale af this system in the averall fabric of the area, its companents were examined individually and as parts of the whale. Usage and capacity were campared ta determine what deficiencies exist and where there is excess capacity.

This examinatian shawed that access ta Lawer Manhattan is cantrolled mare by lack af capacity autside the area than by any lack af capacity within it. Ta see why this is the case, it is necessary to note the origins af subway riders destined far Lawer Manhattan. These are shawn in Figure 19.

Of the nearly 200,000 peaple who come ta Lawer Manhattan by subway every marning, about 80,000 came fram Braaklyn, 60,000 from Manhattan, 20,000 fram the Branx, and 40,000 fram Queens. Thase coming fram the Branx, must first pass thraugh Midtawn where congestian is the greatest and thase fram Queens must traverse twa battlenecks, Midtawn and the East River. In the case af those caming fram Braaklyn, the capacity battleneck is nat as easily defined but it daes accur in Braaklyn and not in Lawer Manhattan itself.

With respect ta statian capacities, Lawer Manhattan does not suffer fram any appreciable shartage. It is true that same entrances and exits are crawded at peak haurs but in general there is enaugh capacity ta handle twice as many peaple as are naw accammadated. Capacities af statians and lines are shawn in Tables 5 and 6 and Figures 20 and 21. Fram these it can be seen that even with allowance far transfers the statians have adequate capacity far additianal usage.

Certainly transit service within Lawer Manhattan is better than it has been in the past. Patranage has declined an all lines and at all but three statians. This is apparently due ta a shift in worker haurs as well as a decline in tatal emplayment. It was faund that althaugh turnstile registrations declined during daylight haurs they actually increased slightly during the evening and very early marning hours.

The stations in Lower Manhattan pravide excellent service ta the entire area. Figures 22 and 23 shaw the areas within three minute and five minute walks af the

stations. It can be seen that Lower Manhattan enjoys much better service in this respect than does any other section of Manhattan.

In addition to the subway system, Lower Manhattan is well served by surface buses and enjoys a favored position with respect to the Staten Island Ferry and the Port Authority Trans-Hudson System (PATH). The latter is rapidly being improved in service and will have a new station in the World Trade Center. There is the additional possibility of obtaining direct service for the Long Island trains which now terminate in Brooklyn, thereby requiring a transfer for workers coming in from Nassau and Suffolk Counties.

Thus, considering growing areas from which new workers might come, Lower Monhattan enjoys a good competitive position with respect to Staten Island, New Jersey, and Long Island. It has a less favorable position with respect to areas to the north. Improved service from the north will require major improvements which will not change Lower Manhattan's competitive position with respect to Midtown for the simple reason that people coming from the north will always come through Midtown. Even so, it is quite clear that the most pressing needs for the city as a whole are relief af the congestion in the East River Crossings and the lines running north to the Bronx.

The Transit Authority has improved service considerably in recent years by the extension of station platforms to pravide far longer trains. Two important improvements which are currently underway and several proposals for improved service by both physical and operational impravements are described in the following section.

Subway Impravements Under Construction

The Transit Autharity has several prajects under construction, which, though not in the Study Area, effect subway servi ce to Lower Manhattan. They are part of a cantinuous program to improve service and capacity throughout the system.

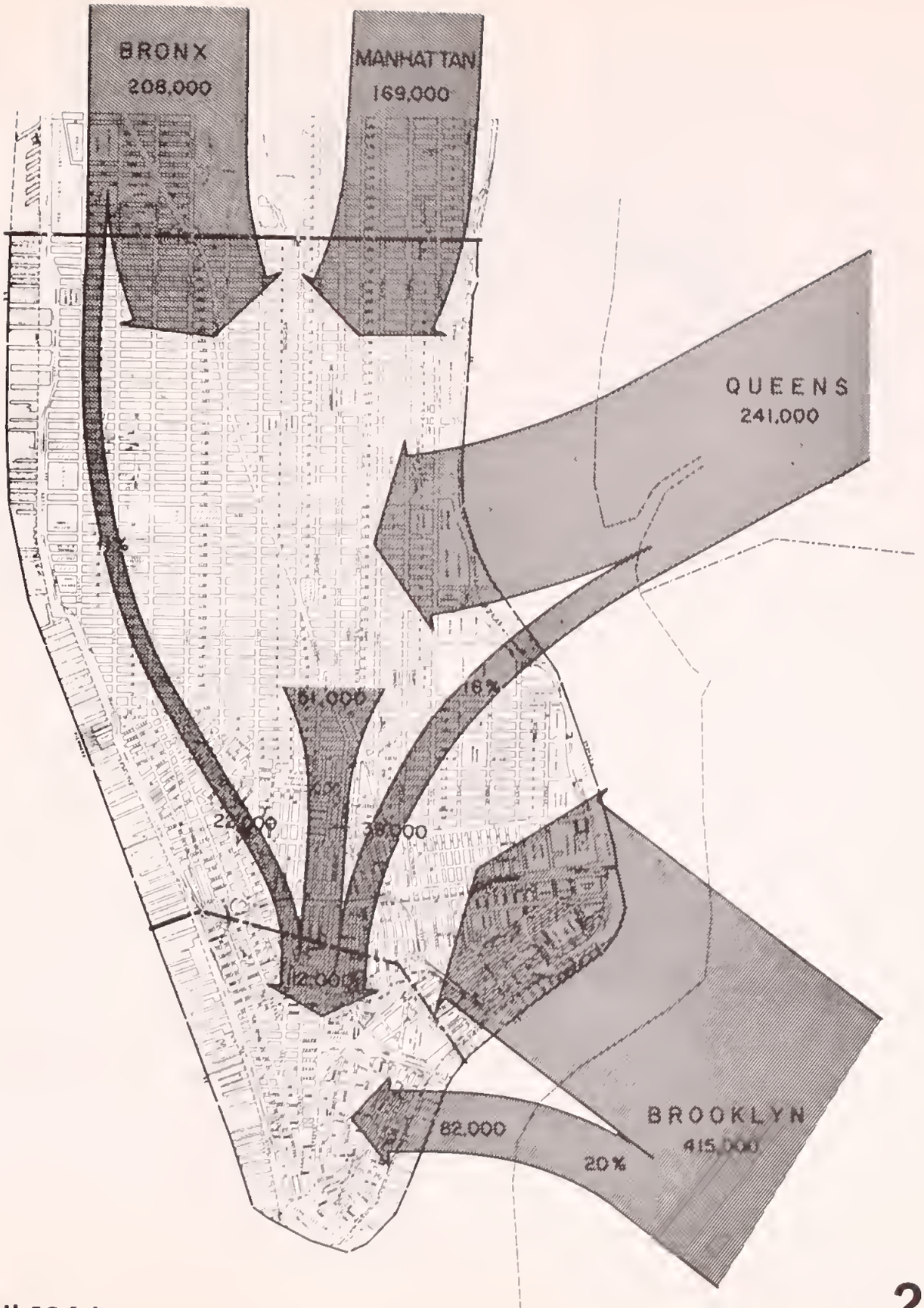
The most important of these is the Chrystie Street interconnection, which will allow trains from the BMT Jamaica and Brighton Lines to be switched onto the IND Sixth Avenue Line, thus providing more direct express service to Midtown Manhattan from Brooklyn and South Queens. This will mean the closing of the Nassau Loop which presently serves Lower Manhottan. The new routing should, however, reduce the transfers made within the Study Area by those passengers bound ultimately for Midtown, thus reducing congestion and crowding in Lower Manhattan and on those lines passing through it. This new connection also means new and more efficient utilization of the BMT Nassau-Centre Street con be made. See Figure 24.

A project closely tied with Chrystie Street is the new deep-rock tunnel being constructed under Sixth Avenue between the West Fourth ond Thirty-fourth Street stations. This will double existing capacity on the line and allow efficient usage of Chrystie Street. With fewer station stops than the existing IND, the new service should hove a shorter running time to Midtown.

Another project in this series is the stub-end extension under Sixth Avenue from Fiftieth to Fifty-eighth Streets. This will provide turn-oround and storage track for the new trains from Brooklyn, as well as possible connection for a new line from Queens or the Bronx.

Two new stations are being constructed as part of this series, Grand Street on the Chrystie Interconnection and Fifty-seventh Street on the Sixth Avenue stub. Grand Street will provide more access to the residential section north of the Study Area, while Fifty-seventh Street adds service to the East Midtown office district.

The only presently-scheduled improvement which is physically in Lower Manhattan is the Platform Extension Program. Upon completion of this, the IRT Seventh Avenue Line will be able to run ten-car trains,



Subway Trip-End Distribution 7:00-9:00 AM—Fall 1964

Subway Station Utilization Peak Hour — Spring 1965

Legend:

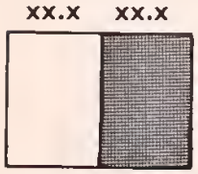
xx.x Capacity

xx.x Usage

All figures in thousands

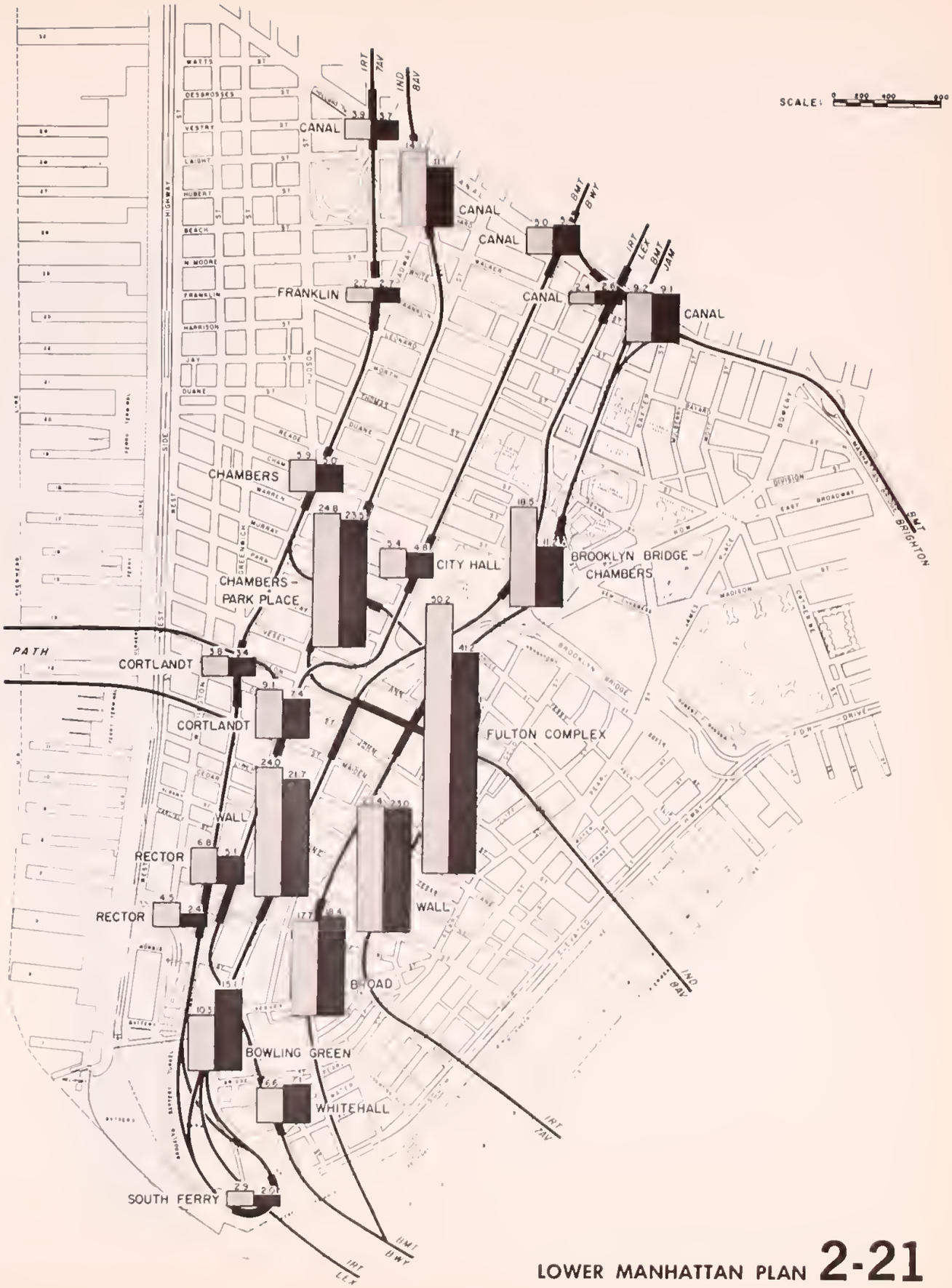
Subway Station Usage 4:00-7:00 PM 1960 vs. 1965

Legend:



Source: NYCTA

All figures in thousands

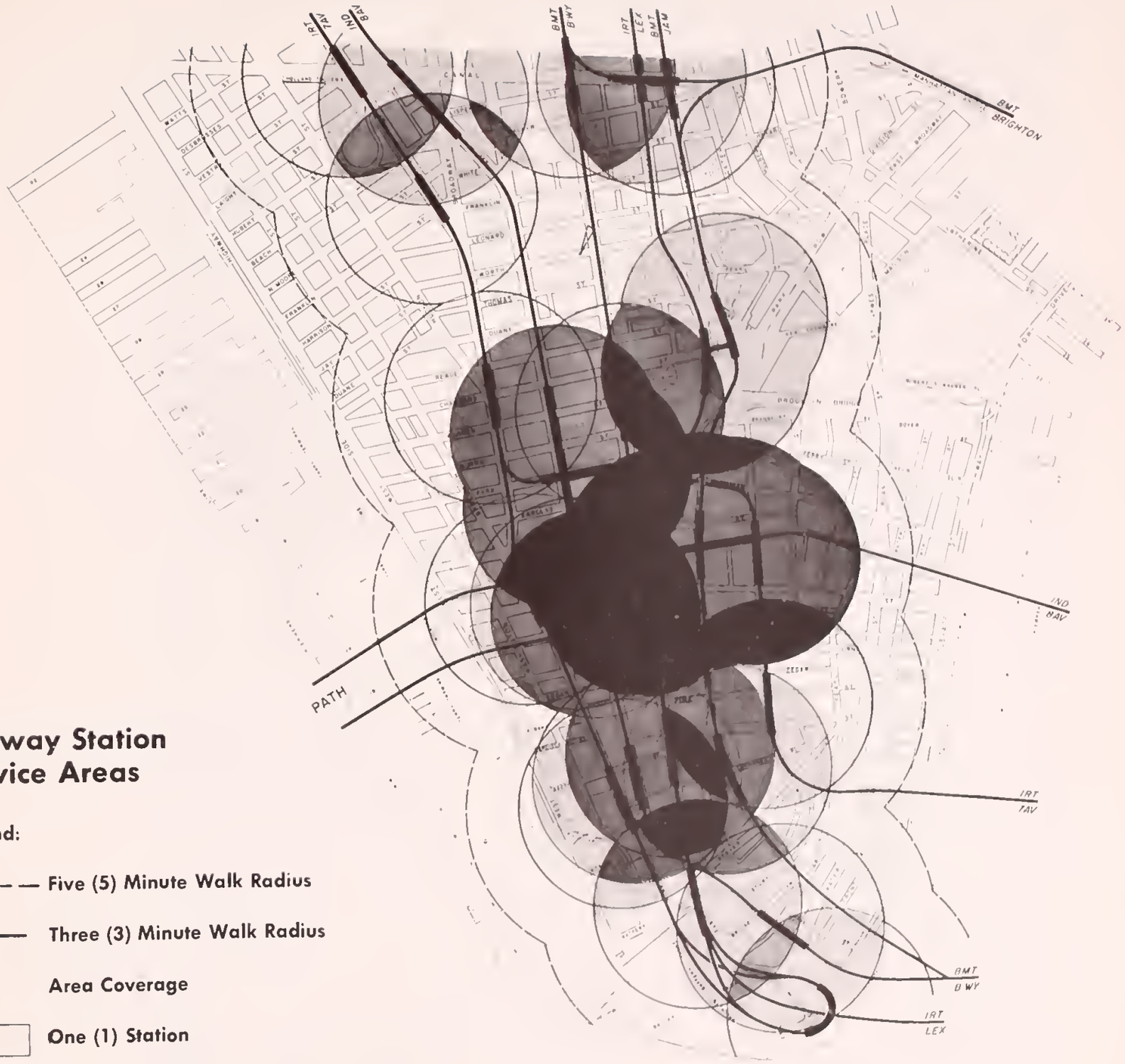


Subway Station Service Areas

Legend:

——— Five (5) Minute Walk Radius

SCALE 0 400 800



Subway Station Service Areas

Legend:

- Five (5) Minute Walk Radius
- Three (3) Minute Walk Radius

Area Coverage

- One (1) Station
- Two (2) Stations
- Three/Four (3/4) Stations
- Five (5) or more Stations

TABLE 5

STATION LOAD/CAPACITY – PEAK HOUR – SPRING 1965

Station	Cap.	Load	Excess
Bowling Green-IRT	11.4	8.7	2.7
Broad St.-BMT	22.6	10.9	11.7
Canal St.-IRT 7Av	9.3	1.8	7.4
Canal St.-IND 8Av	28.2	5.1	23.1
Canal St.-BMT Bwy	9.3	3.6	5.7
Canal St.-IRT Lex	9.3	1.2	8.1
Canal St.-BMT Nas	9.3	4.1	5.2
Chambers St.-IRT	12.4	3.0	9.4
City Hall-BMT Bwy	10.8	3.0	7.8
Cortlandt St.-BMT	21.7	1.9	19.8
Cortlandt St.-IRT	11.7	4.3	7.4
Franklin St.-IRT	7.8	1.5	6.3
Rector St.-BMT	9.3	1.6	7.7
Rector St.-IRT	6.2	2.9	3.3
South Ferry-IRT	10.8	3.3	7.5
Wall St.-IRT Lex	32.5	10.4	22.1
Wall St.-IRT 7Av	27.8	13.5	14.3
Whitehall St.-BMT	12.4	4.0	8.4
TRANSFER STATIONS			
Brooklyn Bridge	28.6	12.6 (6.3)	16.0
Chambers St/Park Place	32.9	26.6 (13.3)	6.3
Fulton Complex	86.5	42.8 (21.4)	43.7
TOTALS	410.8	166.8	244.0

(xx.x) Actual turnstile counts at inter-divisional stations.

Data (LOAD) from NYCTA

All figures in thousands.

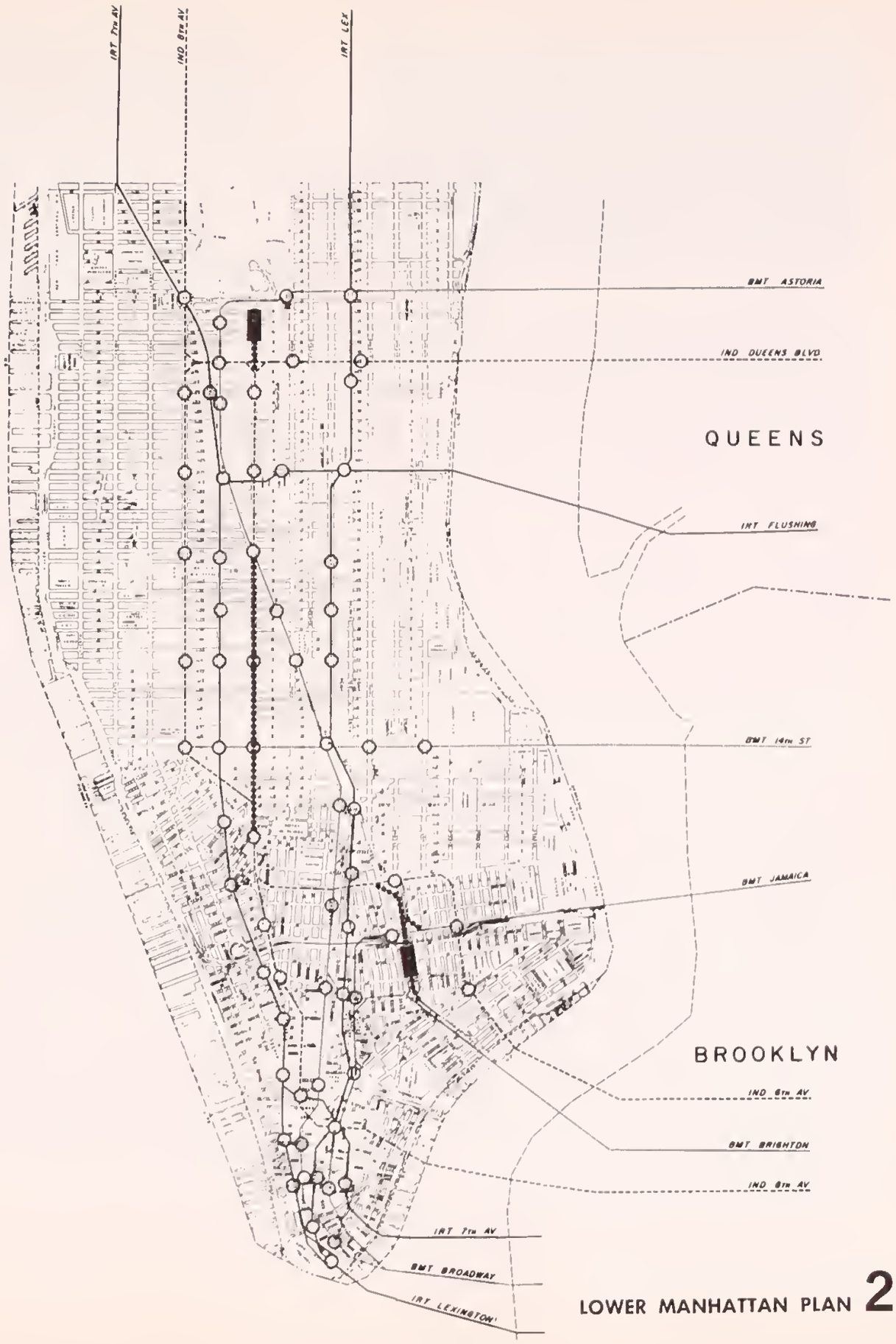
TABLE 6

Line/Cordon	Peak 20-min. load	Functional Capacity	Excess 20 min.	Excess 1 hour	Operational Capacity	Excess 20 min.	Excess 1 hour	Comfort Capacity	Excess 20 min.	Excess 1 hour	Deficiency
East River from Brooklyn											
IRT Lex X	9.3	16.8	7.5	19.5	13.9	4.6	12.0	11.8	2.5	6.5	
7Av X	9.6	15.1	5.5	14.3	12.5	2.9	7.5	10.6	1.0	2.6	
IND 8Av X	17.4	24.0	6.6	17.1	19.7	2.3	6.0	16.7	-0.7	-0.7	*
8Av X	5.7	24.0	18.3	47.6	19.7	14.0	36.4	16.7	11.0	24.8	
BMT Bwy X	20.0	19.2	-0.8	-0.8	15.8	-4.2	-4.2	13.4	-6.6	-6.6	***
Bwy L	9.0	13.4	4.4	11.4	11.1	2.1	5.5	9.4	0.4	1.0	
Nassau Loop	5.3	5.8	0.5	1.3	4.8	-0.5	-0.5	4.1	-1.2	-1.2	**
Jamaica X/L	10.7	19.2	8.5	22.1	15.8	5.1	13.2	13.4	2.7	7.0	
14th St. L	7.3	19.2	11.9	31.2	15.8	8.5	22.1	13.4	6.1	15.8	
East River from Queens											
IRT Flushing X/L	17.0	18.5	1.5	3.9	15.3	-1.7	-1.7	13.0	-4.0	-4.0	**
IND Queens Blvd. X	23.7	24.0	0.3	0.8	19.7	-4.0	-4.0	16.7	-7.0	-7.0	**
BMT Astoria X/L	8.7	11.5	2.8	7.3	9.5	0.8	2.1	8.1	-0.6	-0.6	*
4th Av L	7.7	7.7	-0-	-0-	6.3	-1.4	-1.4	5.6	-2.1	-2.1	**
60th Street from North											
IRT Lex X	19.0	16.8	-2.2	-2.2	13.9	-5.1	-5.1	11.8	-7.2	-7.2	***
Lex L	13.7	16.8	3.1	8.1	13.9	0.2	0.5	11.8	-1.9	-1.9	*
7Av X	10.8	15.1	4.3	11.2	12.5	1.7	4.4	10.6	-0.2	-0.2	*
7Av L	10.9	13.4	2.5	6.5	11.1	0.2	0.5	9.4	-1.5	-1.5	*
IND 8Av X	23.8	24.0	0.2	0.5	19.7	-4.1	-4.1	16.7	-7.1	-7.1	**
8Av L	9.4	24.0	14.6	37.9	19.7	10.3	26.8	16.7	7.3	7.3	
Canal Street from North											
IRT Lex X	10.9	16.8	5.1	13.3	13.9	3.0	7.8	11.8	0.9	2.3	
Lex L	0.7	16.8	16.1	42.0	13.9	13.2	34.4	11.8	11.1	28.9	
7Av X	8.7	15.1	6.4	16.7	12.5	3.8	9.9	10.6	1.9	4.9	
7Av L	0.6	13.4	12.8	33.4	11.1	10.5	27.4	9.4	8.8	23.0	
IND 8Av X	8.9	24.0	15.1	39.4	19.7	10.8	28.2	16.7	7.8	20.3	
8Av L	1.0	24.0	23.0	60.0	19.7	18.7	48.7	16.7	15.7	41.0	
BMT Bwy L	2.8	13.4	10.6	27.6	11.1	8.3	21.6	9.4	6.6	17.2	
Jamaica	9.9	19.2	9.3	24.2	15.8	5.9	15.4	13.4	3.5	9.1	
Canal Street from South											
IRT Lex X	9.1	16.8	7.7	20.0	13.9	4.8	12.5	11.8	2.7	7.0	
Lex L	2.4	16.8	14.4	37.5	13.9	11.5	30.0	11.8	9.4	24.5	
7Av X	5.3	15.1	9.8	25.5	12.5	7.2	18.7	10.6	5.3	13.8	
7Av L	1.5	13.4	11.9	31.0	11.1	9.6	25.0	9.4	7.9	20.6	
IND 8Av X	7.8	24.0	16.2	42.0	19.7	12.9	33.5	16.7	8.9	23.1	
8Av L	0.7	24.0	23.3	60.5	19.7	19.0	49.4	16.7	16.0	41.6	
BMT Bwy L	5.0	13.4	8.4	21.8	11.1	6.1	15.8	9.4	4.4	11.4	
Jamaica	0.4	19.2	18.8	48.8	15.8	15.4	40.0	13.4	13.0	33.8	

* Deficiency at Comfort Capacity only.

** Deficiencies at Operational and Comfort Capacities.

*** Deficiencies at all capacities.



Subway Improvements Under Construction

Legend:

New Trackage

New Station

Source: NYCTA

LOWER MANHATTAN PLAN 2-24

instead of eight and nine, as at present. Following the modification of the IRT Stations, BMT Lines will get the same treatment, also providing for ten-car trains in place of the existing eight. Capacity on these lines will increase by 11 to 25 percent as a result of these platform modifications.

Proposed Subway Construction

There are, at present, many proposals for new subway lines and stations in the Metropolitan Area (Figure 25.) Like the projects now under construction, they will be mainly outside of Lower Manhattan, but would effect the level of service to it.

The two problems demanding immediate solution, congestion at the East River from Queens and into Midtown from the north, have been studied from many points of view. A new tunnel under the River seems to be the only solution for the former, while a new line from the Bronx, which could run under Second Avenue or through Central Park, is the logical answer to the latter.

There are several alternative means of connecting these proposed lines with the existing system and with other new lines. The new IND Sixth Avenue trackage, which has extra capacity into the CBD and Brooklyn, and the Broadway BMT, which is 4-track from 57th Street south, are capable of handling the 30 express trains per hour which would be brought into Midtown by either of these new lines. Two other possibilities require new construction. One is a line under Madison Avenue, running south to Madison Square, joining the BMT there for eventual distribution in Brooklyn. The other is a new line under Second Avenue and Water Street. Presently proposed as a stub-end in Lower Manhattan, it could be extended to Brooklyn or Staten Island at a later date if such is warranted.

Another proposal is a connection between the subway system and the Long Island Railroad. Since this could be done in either Brooklyn or Queens and would provide a great extension of service at minimal cost, the project would appear to have distinct merit. From Brooklyn, trains would cross the River on the Manhattan Bridge, turn into Lower Manhattan on the BMT Nassau-Centre Street tracks, and dead-end at a terminal under Broad Street at either Wall or Water Streets. A continuous-loop arrangement exiting through the Montague Street tunnel has also been considered, but this would restrict the capacity of the BMT Broadway Local Line to carry the heavier share of the Brooklyn-Lower Manhattan traffic placed on it by the closing of the Nassau Loop.

The Queens Connection is much less definite, since it would involve a connection under the East River. If construction of a subway tunnel were to greatly precede the completion of a new line into Northern Queens, this connection would provide good interim service, offering, as it does, all of the alternative connections in Manhattan that the tunnel would provide.

Any of these proposals would drastically change the transit picture for Lower Manhattan. The excess capacity presently available from Midtown to Downtown could be used by a portion of the additional riders coming into Midtown from the North and Queens. This would effectively increase the accessibility of Lower Manhattan to prospective employees.

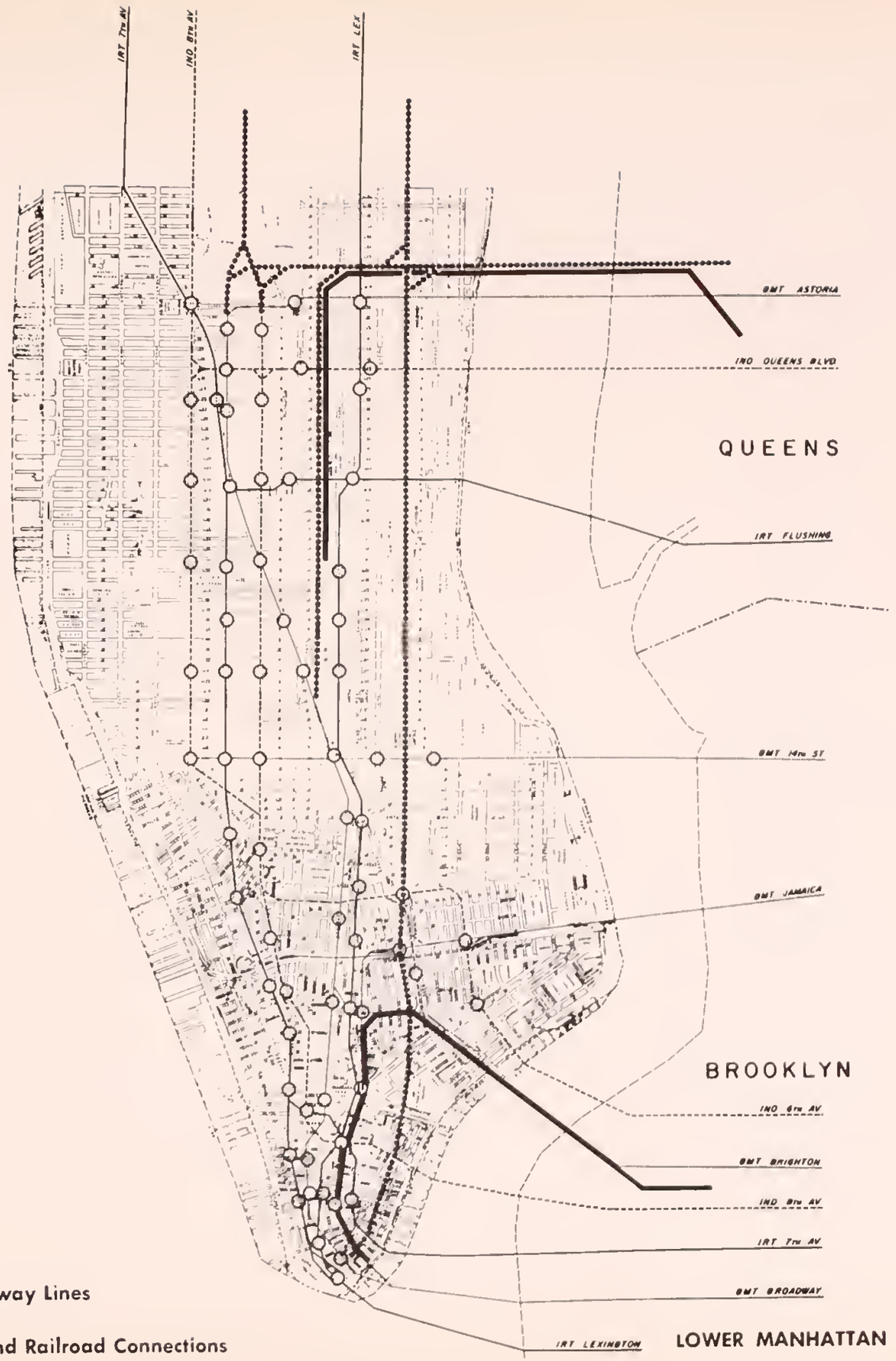
Subway Recommendations

Improvements to the subway system in New York City can only be made as part of an overall strategy for meeting the needs of all users in all sections of the city. Clearly, this is, and will continue to be, a difficult, costly and complex process. It should take into account the origins and destinations of people, their desires for service, potential shifts in residence and employment, and the possibilities of new technology in construction methods, equipment and operations. It also will be governed by the availability of funds. While State and Federal funds may became more plentiful, it is obvious that the limited financing available now permits only selected improvements in the immediate future.

Although this study could nat go into broad transportation plonning, it is clear from the findings that there are urgent needs outside Lower Manhatton. It is equally clear that Lawer Manhattan enjoys relatively gaad service naw and that it wauld benefit fram improvements which wauld cut congestian into Midtown fram Queens and fram the north. Therefare, no new line canstruction in Lawer Manhatton con be recommended at this time. (See Appendix B.)

However, the quality af service at many statians in Lawer Manhattan could be moterially improved ot madest cast. Oppartunities far these improvements exist where street impravements, station changes and new canstructian are propased. Station entronces and exits an Fulton Street, Nassau and Broad Streets could be made in conjunction with conversion of thase streets to pedestrain ways and as part of overall improvements ta the Nassou Loop if Long Island troins are brought into downtown.

While it is nat passible to recommend a new subway line for the near future, it is entirely possible that a new line will become practical and desiroble in the long range. The mast probable locotian for this line wauld be Woter Street. In planning for development af the east side, care was taken to accammodate that route. The precise form such a subwoy might take would depend an many factars, including its connectians ta the system, and the stote of technology at the time of construction.



Proposed Subway Construction

Legend:

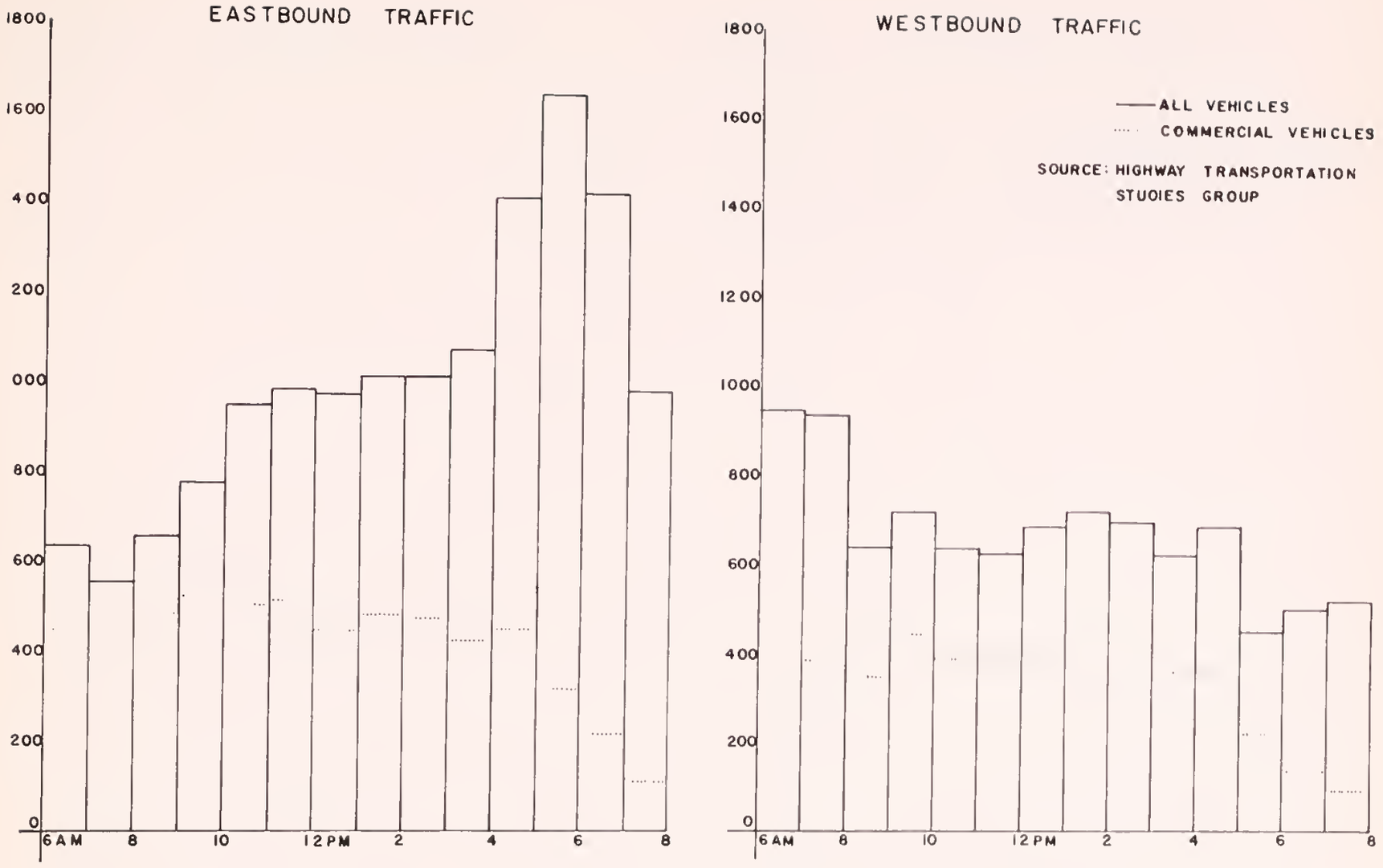
New Subway Lines

Long Island Railroad Connections

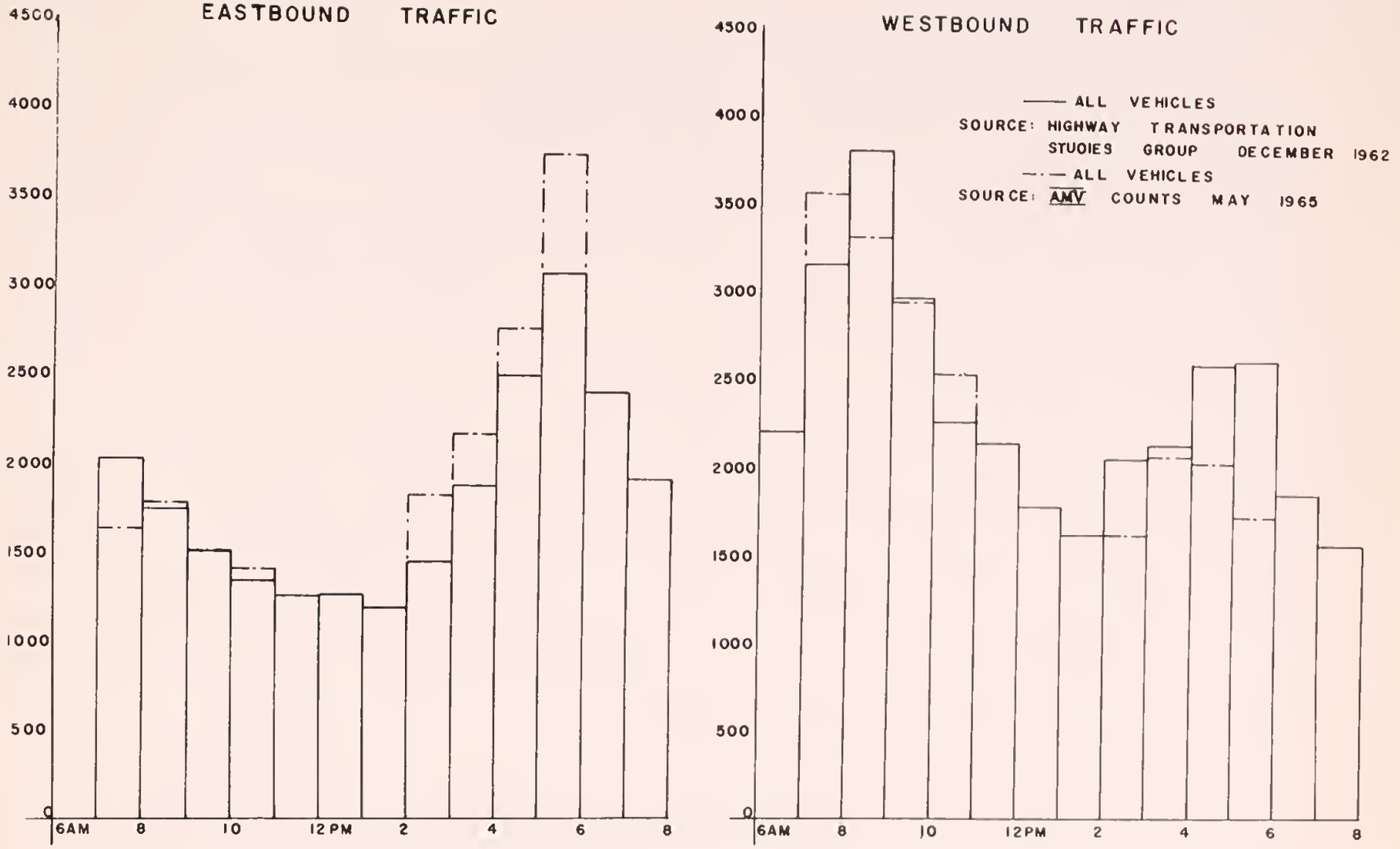
LOWER MANHATTAN PLAN 2-25

APPENDICES

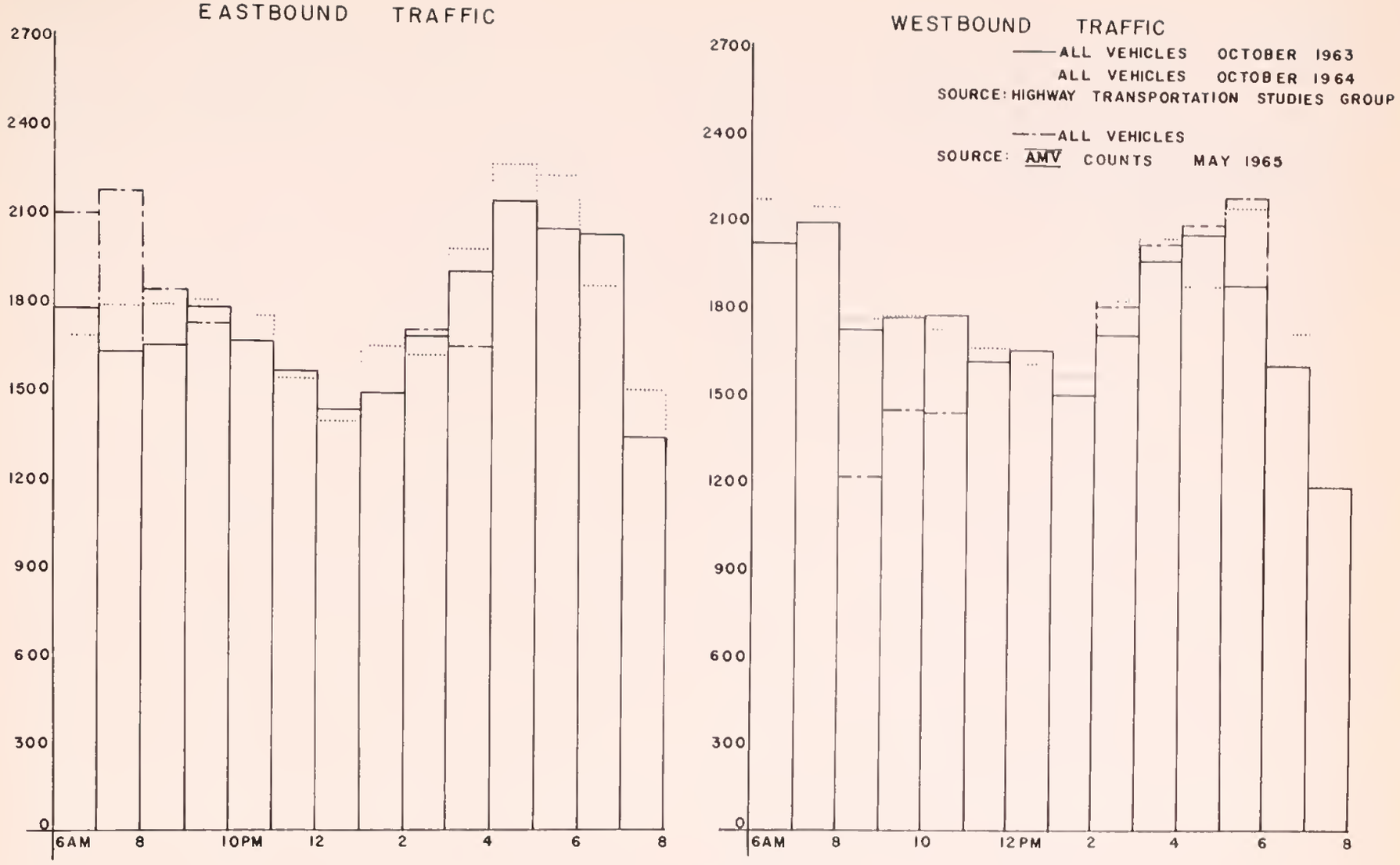
APPENDIX A



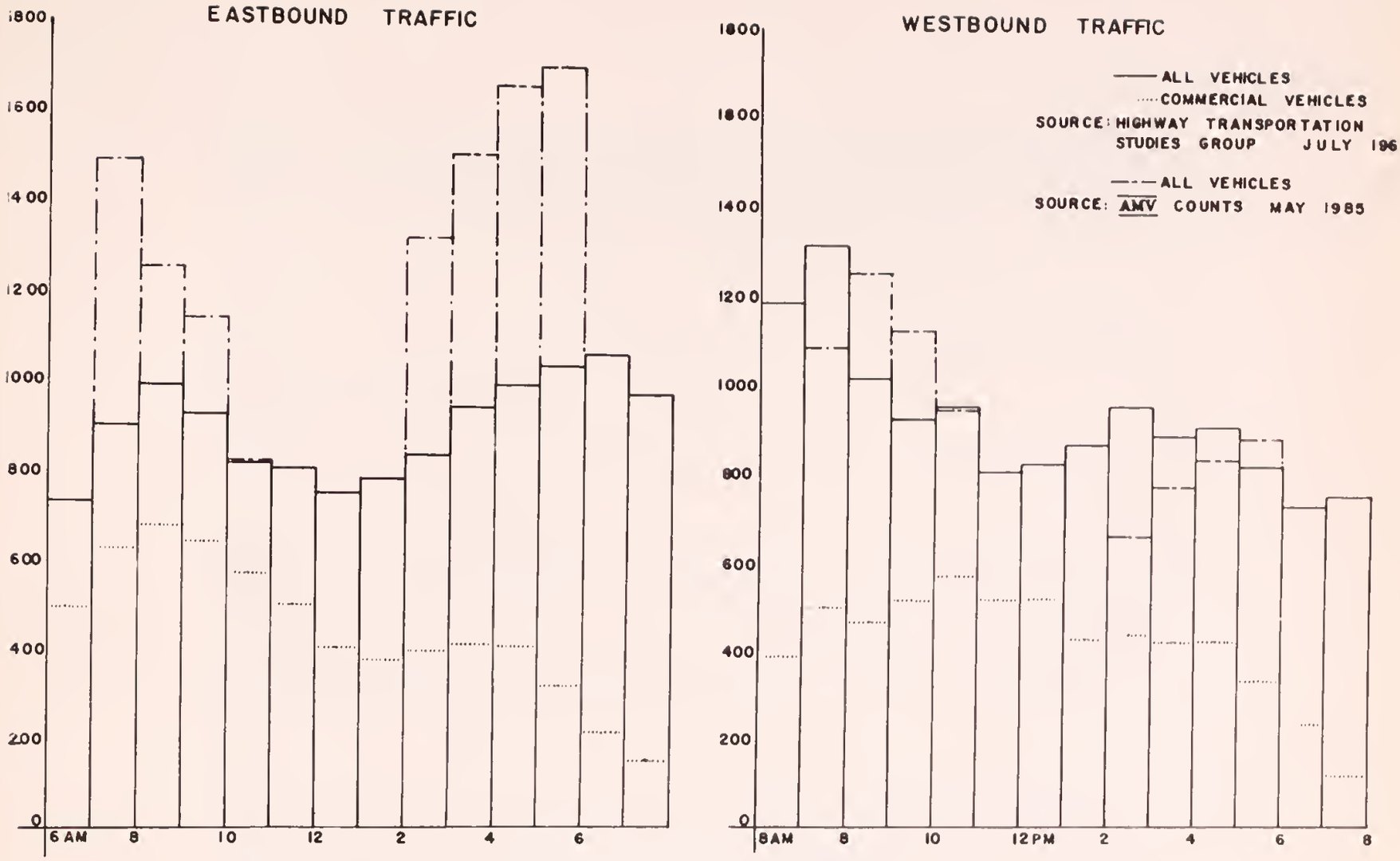
CANAL AT MOTT APRIL 1963



BROOKLYN BRIDGE VOLUMES



HOLLAND TUNNEL VOLUMES



MANHATTAN BRIDGE VOLUMES

CAPACITY STUDY

To measure the capacity of the streets in Lower Manhattan, nineteen (19) critical signalized intersections were selected to make complete studies of in order to determine the amount of vehicles that can pass through the intersection during the peak requirements for the area. These 19 critical intersectians represent the major and minor streets of the system and therefore the system's capacity can be determined by looking at the capacity of the critical intersections.

Capacity was calculated using procedures outlined in the new Highway Research Board Capacity Manual. This manual has not been published but the draft was available to the consultants.

The methads and techniques in this new capacity manual have been tested in other cities and faund ta give results that compared with the actual conditions of the area.

Hawever, New York City is unique with its traffic patterns. It was, therefore, decided to make a study to test the applicability af the curves and factors as outlined in the capacity manual.

Ta make this test, actual conditions were observed at the 19 selected intersections to measure the level of service that each approach was operating under. This level af service is measured quantitatively by abserving how many signal cycles within the peak hour of the approach are fully utilized. The signal cycle was defined as being fully utilized if there were vehicles waiting at the start of the green phase, and if there were no appreciable gaps between the vehicles in all lanes af the approach during the entire green phase. The ratio of fully utilized green phases to the total number of green phases is termed the "laad factar." In addition to the laad factor measurement, parking practices within the blacks leading ta the approach were recorded during the peak haur.

Using the observed canditions, the capacity af each approach was calculated using the techniques outlined in the new capacity manual. The capacities were compared ta the actual volumes measured and were found ta campare favarably. It was thus decided that these techniques cauld be used in New York City.

The actual practical capacity af each appraach is a functian of the level of service desired which is indicated by the load factor. This laad factor can vary from 0.0 ta 1.0 where 0.0 is the ideal with no fully utilized signal cycles and 1.0 indicates that the maximum number af vehicles are getting thraugh the intersection but that heavy queuing is the prabable result.

It has been found that a tolerable level of service an appraaches af isalated intersectians is a load factor af 0.20. At an intersectian that is a part of a suitable pragressive signal system with plataaning af vehicles created by the previous signal, the result is a talerable laad factor af 0.80.

These two laad factors were used in Lower Manhattan to calculate the copacity of the approaches. The factor of 0.20 was used for oll minor street approaches into major streets and for most non-pragressive streets. The factor of 0.80 was used for all major one-woy streets with progressive signal systems.

Canal Street was considered an exception since there are plons for relieving it with the Lower Manhattan Expressway. A load factor of 0.40 was used here.

These load factors were used in calculating practical capacity if the volumes equaled or opprooched theoretical capocity, resulting in considerable delay to vehicles. These reflect the best operating conditions obtoinable on the street. Figure 30 shows the curves used to obtoin capacity per hour of green time on the different types of streets. Graph 1 is with a load factor of 0.20 and Graph 2 is with a load factor of 0.80.

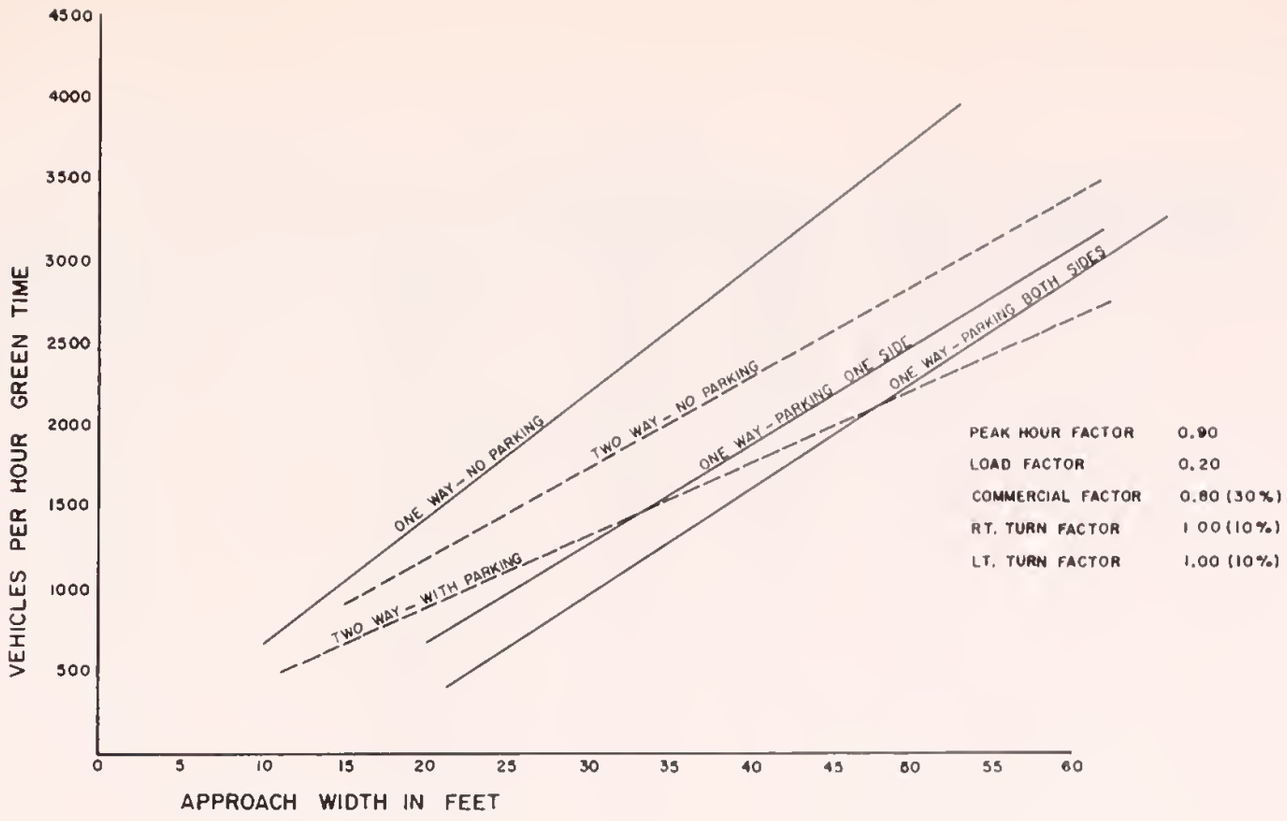
Parking alang approaches reduces capacity and there is an apporent problem of illegal parking dur-ing the peak hours in this area. This has the effect of reducing the capacity of the approach be-low what it is intended to be. Thus two capacities for eoch approoch were colculoted, one with observed parking practices and one with parking conditions as reflected by the signs along the approach. These are shown in Figures 4 and 5.

Table 1 lists the intersections and the approaches where capacity was calculoted. It compares the two capacity figures with the measured peak hour volume and all deficiencies are marked with an X.

It can be seen from Table 1 that the following streets have capocity deficiencies even with pork-ing strictly enforced.

Canal Street
Church Street, south of Fulton
The Bowery at Canal
Chambers Street
Fulton Street
Worth Street at Centre Street
Park Row at New Chambers
New Chambers Street

#1



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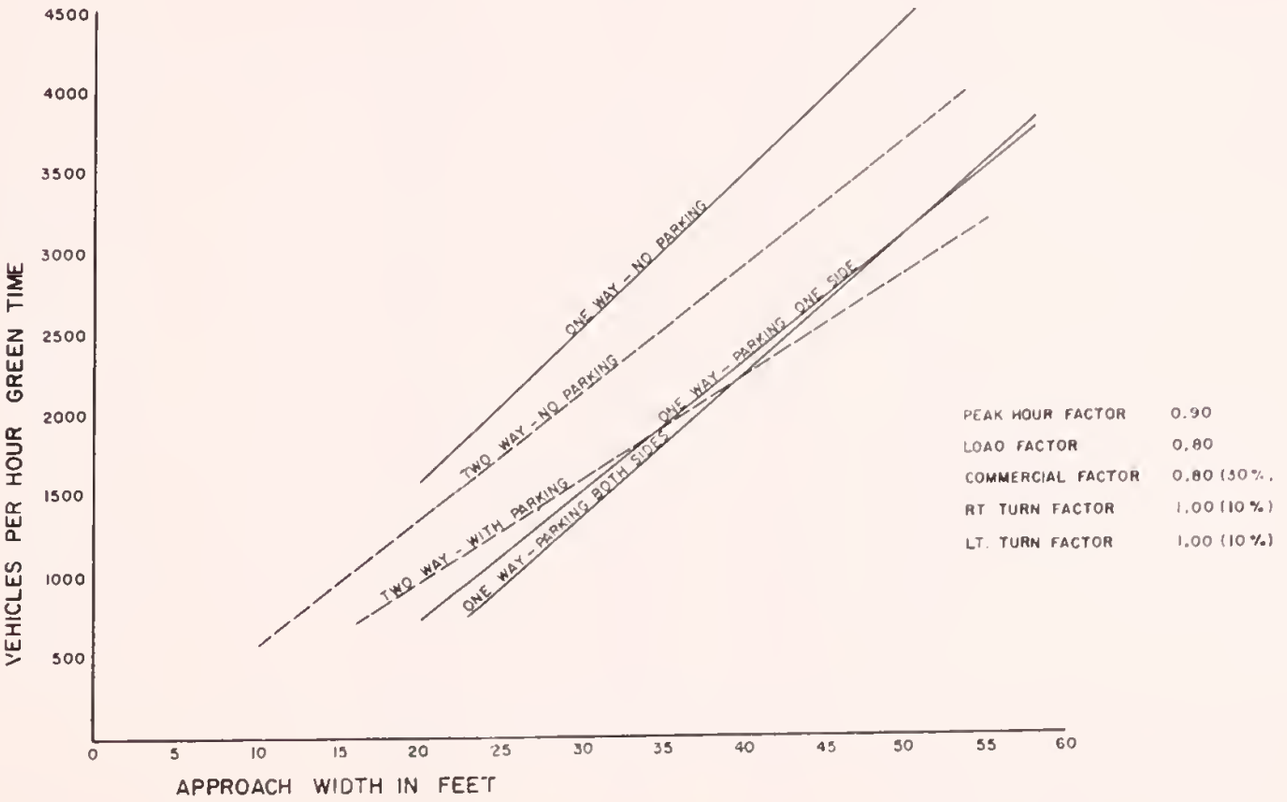


Roadway Capacity Curves

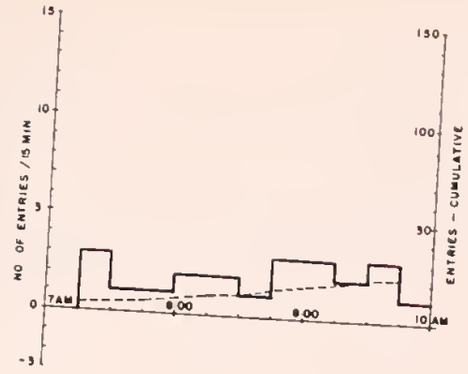
TABLE I

Intersection	Approach	Capacity Per Hour in Vehicles: Parking Practices	Capacity Per Hour in Vehicles: Legal Parking	Present Peak Hr. Volume	Capacity Deficiencies: Parking Practices	Capacity Deficiencies: Legal Parking
Canal & Broadway	North	1,020	1,480	833		
	East	760	1,030	668		
	West	450	800	759	X	
Chambers & Broadway	North	1,020	1,060	859		
	East	600	600	571		
	West	420	585	453	X	
Broadway & Barclay	North	1,630	1,650	1,156		
	East	1,800	1,800	1,192		
Broadway & Vesey	North	1,610	1,610	1,383		
	West	580	1,160	526		
Fulton & Church	South	750	750	1,077	X	X
	East	220	220	400	X	X
	West	210	210	259	X	X
Church & Warren	South	1,930	1,930	1,260		
	West	530	850	467		
Church & Chambers	South	1,610	1,610	1,564		
	East	530	530	628	X	X
	West	330	440	323	X	
Chambers & West Broadway	North	1,420	1,420	869		
	East	460	460	449		
	West	300	300	114		
Greenwich, Vesey & W. Broadway	North	960	1,400	241		
	Northeast	1,460	1,460	657		
	West	570	570	171		
Greenwich & Liberty	North	450	1,550	455		
	West	450	770	134		
Barclay & West	East	390	390	246		
Chambers & West	West	280	280	306	X	X
Canal & Hudson	South	980	1,330	972	X	X
	East	820	820	973		
	West	650	650	853	X	X
Lafayette & Leonard	North	1,500	1,500	252		
	East	360	360	109		
Centre & Worth	South	1,630	1,630	834		
	East	310	310	479	X	X
	West	420	420	336		
Centre & Chambers	North	1,790	1,790	1,176		
	East	530	530	508		
	West	730	730	487		
Park Row & New Chambers	North	450	450	572	X	X
	South	300	300	616	X	X
	East	740	740	1,057	X	X
	West	3,900	3,900	925		
Fulton & Water	North	1,130	1,130	493		
	South	1,130	1,130	906		
	East	430	430	143		
	West	270	270	56		
Canal & Bowery	North	300	300	334	X	X
	South	430	430	646	X	X
	East	1,440	1,440	727		
	West	1,060	1,060	1.067	X	X

Parking Facility Study Map

Legend:

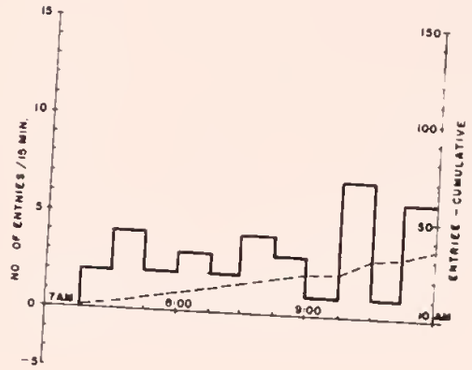
M	Metered Curb
L	Lot
G	Garage Structure



PARKING LOT L-1

LISTED CAPACITY: 63

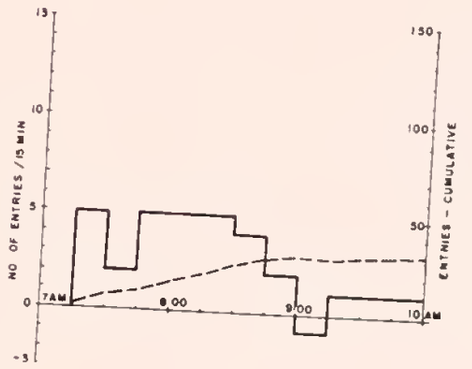
TIME	8-9AM	7-10AM
ENTRIES	8	22
% CAPACITY	35	98



PARKING LOT L-2

LISTED CAPACITY: 90

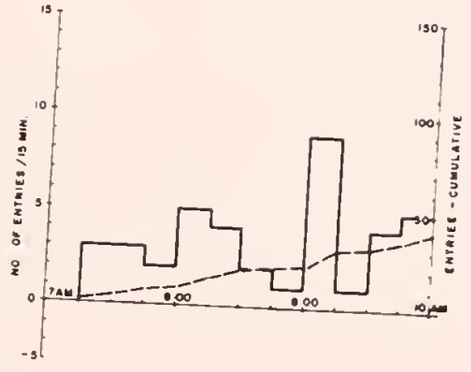
TIME	8-9AM	7-10AM
ENTRIES	12	58
% CAPACITY	15	40



PARKING LOT M-3

LISTED CAPACITY: 55

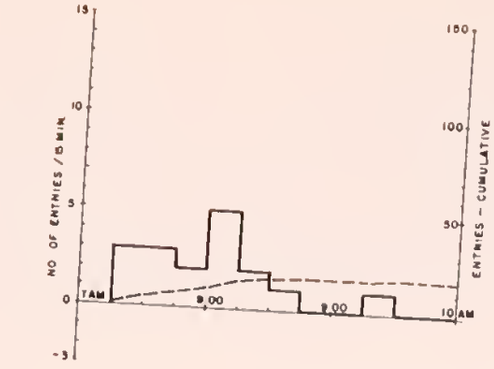
TIME	8-9AM	7-10AM
ENTRIES	18	52
% CAPACITY	48	81



PARKING LOT L-4

LISTED CAPACITY: 102

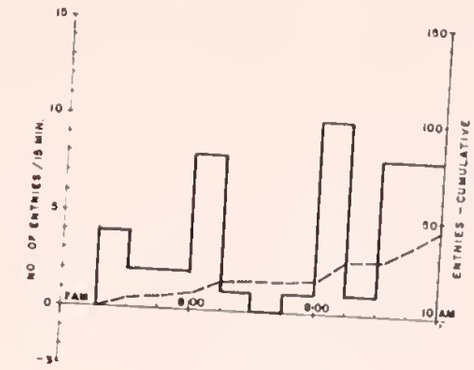
TIME	8-9AM	7-10AM
ENTRIES	12	41
% CAPACITY	12	40



PARKING LOT L-5

LISTED CAPACITY: 20

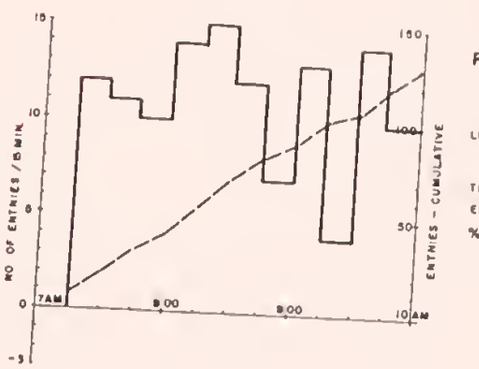
TIME	8-9AM	7-10AM
ENTRIES	8	18
% CAPACITY	40	90



PARKING LOT L-6

LISTED CAPACITY: 75

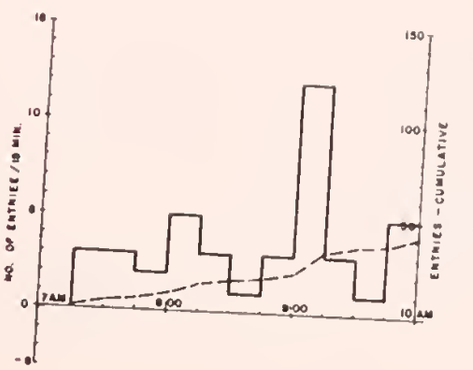
TIME	8-9AM	7-10AM
ENTRIES	10	45
% CAPACITY	13	60



PARKING LOT L-7

LISTED CAPACITY: 120

TIME	8-9AM	7-10AM
ENTRIES	48	130
% CAPACITY	40	100

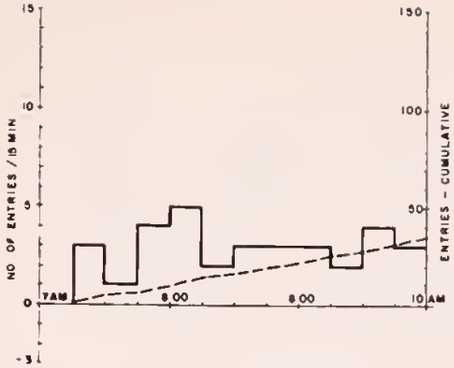


PARKING LOT L-8

LISTED CAPACITY: 80

TIME	8-9AM	7-10AM
ENTRIES	121	42
% CAPACITY	18	95

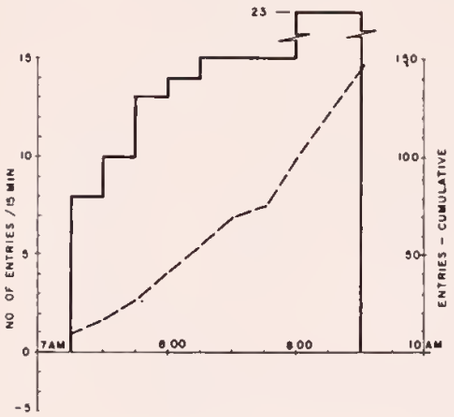
Parking Facility Utilization-1



PARKING LOT L-9

LISTED CAPACITY: 45

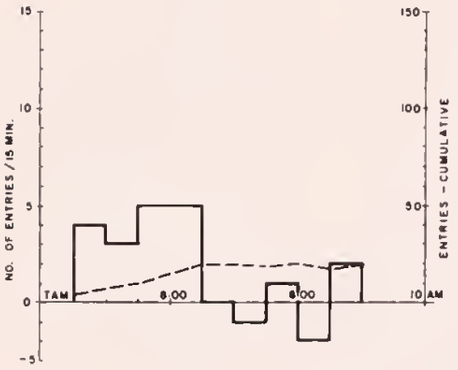
TIME	8-9AM	7-10AM
ENTRIES	15	34
% CAPACITY	28	76



PARKING LOT L-11

LISTED CAPACITY: 512

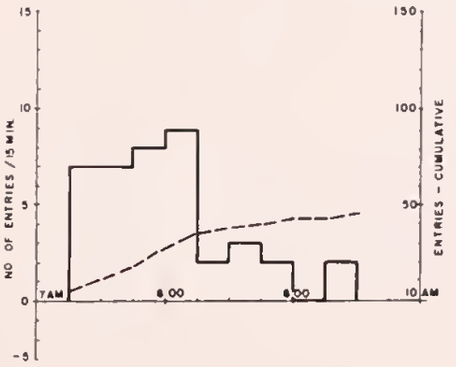
TIME	8-9AM	7-9:30AM
ENTRIES	58	145
% CAPACITY	18	46



PARKING LOT M-12

LISTED CAPACITY: 20

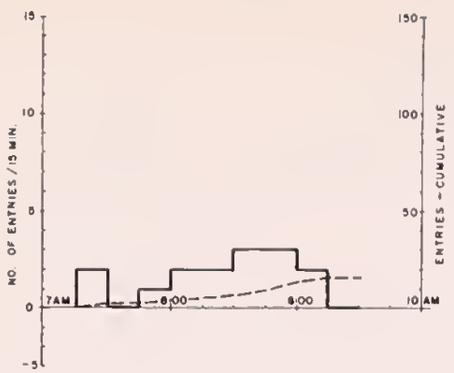
TIME	8-9AM	7-9:30AM
ENTRIES	8	20
% CAPACITY	28	100



PARKING LOT L-13

LISTED CAPACITY: 44

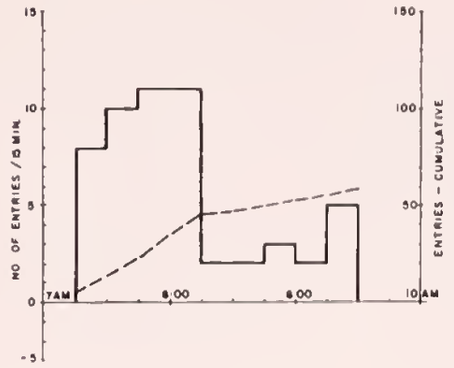
TIME	8-9AM	7-9:30AM
ENTRIES	18	44
% CAPACITY	[illegible]	100



PARKING LOT L-14

LISTED CAPACITY: 15

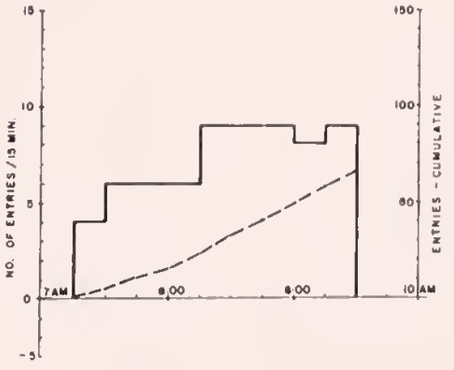
TIME	8-9AM	7-9:30AM
ENTRIES	10	15
% CAPACITY	67	100



PARKING LOT L-15

LISTED CAPACITY: 80

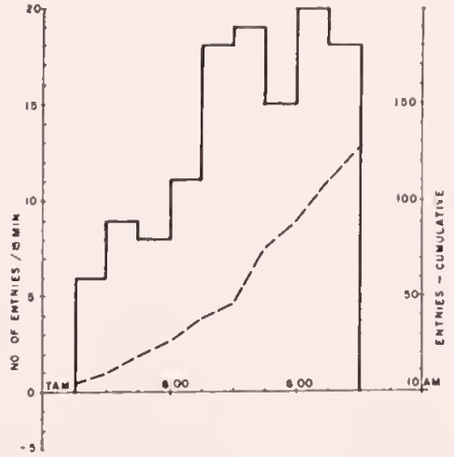
TIME	8-9AM	7-9:30AM
ENTRIES	18	58
% CAPACITY	25	74



PARKING LOT L-16

LISTED CAPACITY: 86

TIME	8-9AM	7-9:30AM
ENTRIES	33	67
% CAPACITY	38	78



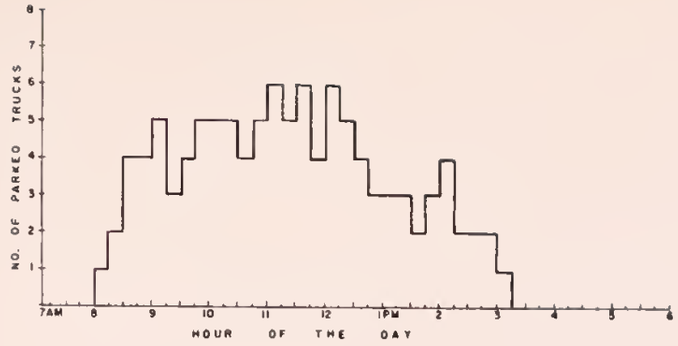
PARKING LOT L-17

LISTED CAPACITY: 150

TIME	8-8AM	7-9:30AM
ENTRIES	65	128
% CAPACITY	43	98

Parking Facility Utilization-2

BLDG. ND. 1:



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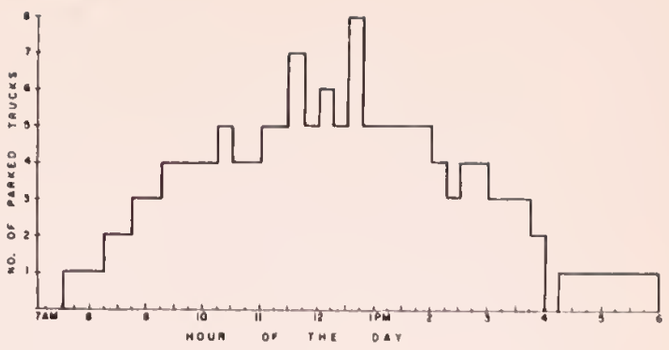

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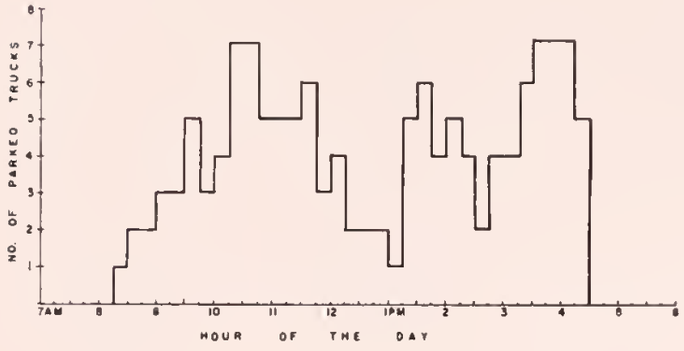

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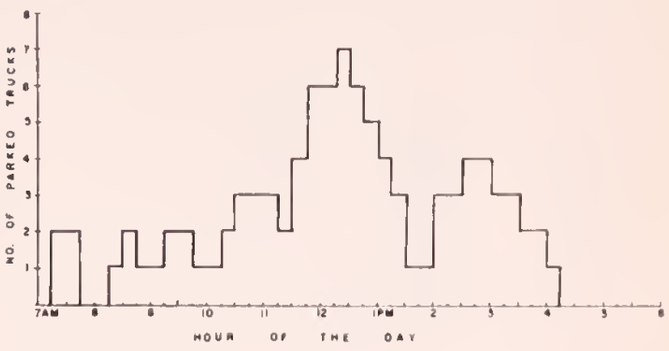

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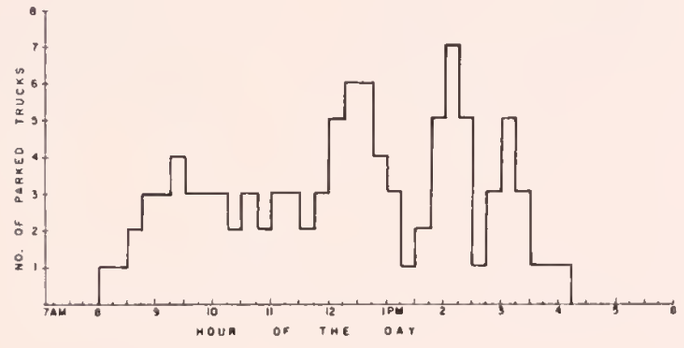

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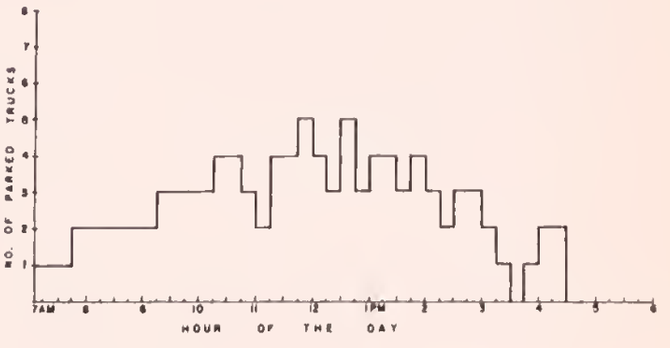

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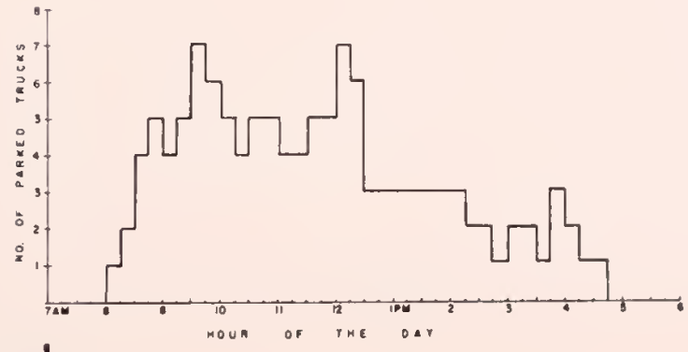

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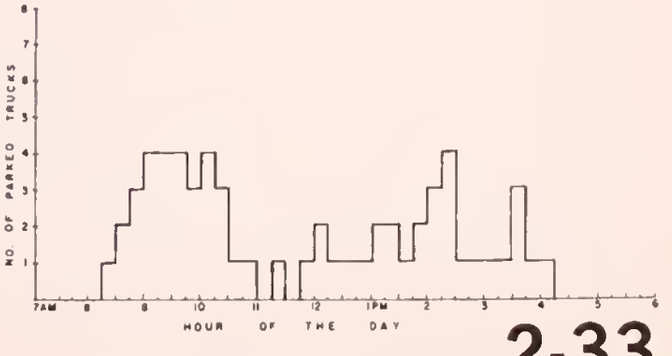
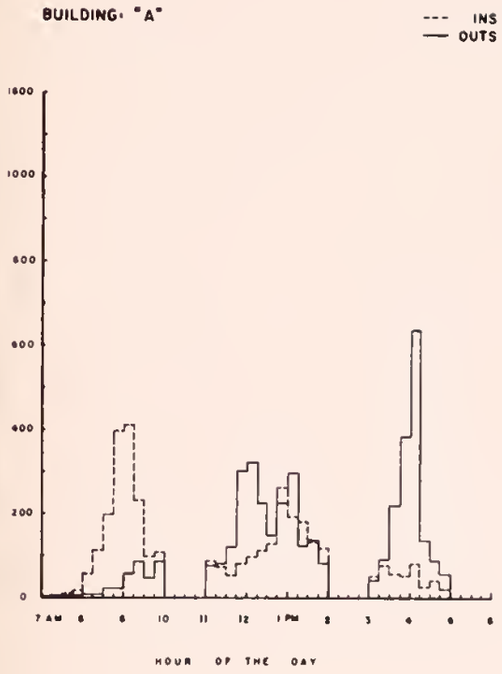
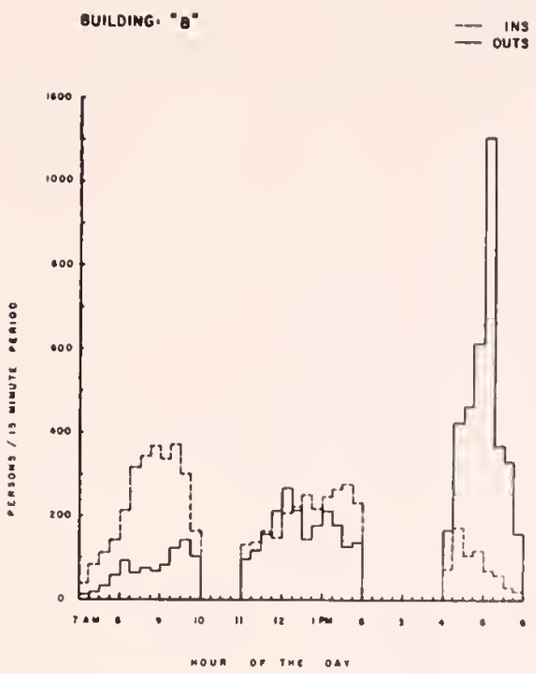
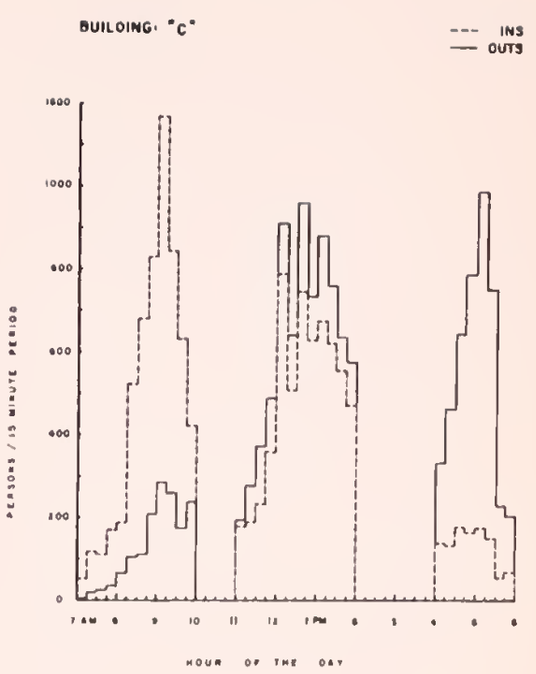


Goods and Services Parked Trucks







Pedestrian Door Counts

APPENDIX B

TURNSTILE REGISTRATIONS

The following are the actuol entering registrations at each of the stations within the Study Area. Taken twice a year, they are usually in Morch and October and are tabulated on an hourly basis for o twenty-four (24) hour period. They were used in this Project to show ridership trends and for comporison against the accretions ond drops of the Cordon Counts.

The only real problem with Turnstile Counts is that they do not include school children, Transit Authority employees, and other poss-using groups. In Lower Manhattan, this is not a significant total ond, therefore, these counts are considered the most accurate bases available.

Eoch of the twenty-one (21) stations within the Study Area is shown for the P.M. Peak Period, 4-7 p.m., and for the twenty-four (24) hours. The counts for spring 1960 and 1965 are shown on the following table and graphically on Figure 21. The same data for Midtown and the Valley are compared also with Lower Monhattan in Table 2.

The trend in Lower Manhattan is a slow, steady decline. This shows that there is a decrease in the number of people employed in the areo, and/or that there is a definite mode shift for the journey to work, particularly during the normal work day. There is an absolute increase of some 8,000 registrotions for the hours of 7 p.m. to 7 a.m., which shows an increase in the nighttime population. This does not make up the entire daytime drop, but may explain part of it. Privately-owned automobiles should be more popular at night due to the lifting of curb parking restrictions and lack of congestion.

In general, there is real growth in Eastern Midtown and general decline in Lower Manhattan. The three stations which show gains of 500 or more during the Peak Period are grouped in the southern part of the Study Area, where most of the new construction is taking place and where the most definite plans have been formulated.

Figure 37 shows the hourly distribution, expressed as a percentage of the doily total. This is an average of ten stations in Lower Manhattan.

TABLE 1

TURNSTILE REGISTRATION COMPARISON - DAILY TOTAL 1960/1965

Station	1960	1965	+/-
Bawling Green IRT	25.3	25.8	+0.5
Broad St. BMT	23.5	22.5	-1.0
Canal St. IRT 7Av	7.8	6.6	-1.2
Canal St. IND 8Av	20.7	19.8	-0.9
Canal St. BMT Bwy	9.7	9.5	-0.2
Canal St. IRT Lex	3.8	3.8	0.0
Canal St. BMT Nas	19.3	21.0	+1.7
Chambers St. IRT	12.6	10.8	-1.8
City Hall BMT	9.8	9.8	0.0
Cartlandt St. BMT	17.1	14.2	-2.9
Cartlandt St. IRT	9.5	8.2	-1.3
Franklin St. IRT	4.8	4.6	-0.2
Rectar St. BMT	11.1	10.7	-0.4
Rector St. IRT	7.7	7.9	+0.2
South Ferry IRT	14.4	13.4	-1.0
Wall St. IRT Lex	36.5	34.1	-2.4
Wall St. IRT 7Av	34.3	33.8	-0.5
Whitehall St. BMT	13.7	13.7	0.0
TRANSFER STATIONS			
Broaklyn Bridge	35.5	28.3	-7.2
Chambers St-Park Pl	47.7	44.9	-2.8
Fulton Complex	79.7	70.8	-8.9
TOTAL	444.5	414.2	-30.3

Data from NYCTA Turnstile Caunts

All figures in thausands

TABLE 2

TURNSTILE REGISTRATION COMPARISON - MIDTOWN 1960/1965

Station	1960	1965	+/-
Astar Place IRT Lex	7.3	7.4	+0.1
Bleeker St. IRT Lex	5.6	5.4	-0.2
Bowery BMT Nassau	1.3	.6	-0.7
Broadway IND 6Av	8.0	7.4	-0.6
Christopher St. IRT 7Av	1.9	1.9	0.0
E. Broadway IND 6Av	3.2	3.1	-0.1
Grand Central IRT	72.0	79.3	+7.3
Houston St. IRT 7Av	8.0	7.9	-0.1
Lexington Av IND QB	11.6	17.3	+5.7
Prince St. BMT Bwy	5.3	5.6	+0.3
Spring St. IND 8Av	6.4	4.8	-1.6
Spring St. IRT Lex	4.7	3.5	-1.2
1st Av BMT 14th	2.4	2.2	-0.2
3rd Av BMT 14th	1.6	1.4	-0.2
2nd Av IND 6Av	2.1	1.7	-0.4
5th Av IND QB	18.9	22.7	+3.8
5th Av IRT Flushing	11.1	11.8	+0.7
5th Av BMT Bwy	7.7	11.6	+3.9
7th Av IND Queens Bl.	3.6	5.5	+1.9
W 4th St. IND 8Av	8.1	7.9	-0.2
8th St. BMT Bwy	7.5	7.4	-0.1
14th St. IRT 7Av	7.8	7.8	0.0
14th St. IND 6Av	11.2	10.2	-1.0
18th St. IRT 7Av	4.4	4.2	-0.2
23rd St. IND 8Av	7.7	7.2	-0.5
23rd St. IND 6Av	18.7	15.1	-3.6
23rd St. IRT 7Av	7.7	8.1	+0.4
23rd St. IRT Lex	20.0	18.9	-1.1
23rd St. BMT Bwy	14.6	15.6	+1.0
28th St. IRT 7Av	10.5	7.3	-3.2
28th St. IRT Lex	14.5	14.7	+0.2
28th St. BMT Bwy	7.6	8.0	+0.4
33rd St. IRT Lex	15.1	15.3	+0.2
34th St. IND 8Av	28.5	23.1	-5.4
34th St. IRT 7Av	31.7	27.6	-4.1
42nd St. IND 8Av	24.5	21.8	-2.7

TABLE 2 (Cont.)

Station	1960	1965	+/-
42nd St. IND 6Av	27.9	22.7	-5.2
49th St. BMT Bwy	8.6	11.0	+2.4
50th St. IND 8Av	5.7	5.0	-0.7
50th St. IND 6Av	29.9	35.1	+5.2
50th St. IRT 7Av	7.0	13.3	+6.3
51st St. IRT Lex	12.3	14.4	+2.1
57th St. BMT Bwy	9.8	12.9	+3.1
TRANSFER STATIONS			
Delancy-Essex	4.8	2.9	-1.9
Columbus Circle	19.1	20.4	+1.3
Lexington Av-59th St.	15.5	18.6	+3.1
Times Square-42nd St.	65.3	59.4	-5.9
Union Square-14th St.	41.3	36.1	-5.2
14th St-8th Av	12.2	12.1	-0.1
34th St.	65.4	57.0	-8.4
TOTAL	747.6	742.2	-5.4

Data from NYCTA Turnstile Counts

All figures in thousands

CORDON COUNTS

Token eoch foll ot mojor crossings, cordon counts ore used by the Tronsit Authority os o check on scheduling ond service. For o 24-hour period, in twenty-minute increments, counts ore mode of the number of cors ond troins possing the cordon line. Estimates are mode of the number of possengers on the bosis of looding porometers.

These visuol interpretotions do have some built-in error; ond the porometers ore not constont, but vory from individuol to individuol. During this study, it wos found that the counts on lines using cors of types R-16, 27, ond 30 (IND ond BMT) were low by opproximately 10 percent. For this reoson, eoch such count wos foctored by thot omount for comporison with the copocity figures.

The following ore the octuol counts for the o.m. peok period, 8-9 o.m. ot eoch of the mojor cordons for fall, 1964. The Conol Street cordon, originolly taken in 1958, was updoted on the bosis of line differentiols at the Eost River ond 60th Street cordons.

Figure 35 shows the totols for the hour 8-9 o.m. ot the river crossings. On o lorger scole, Figure 36 shows the Study Areo cordons for the some time period.

Cordon Counts – Fall 1964 A.M. Inbound

Line	7:00	20	40	8:00	20	40	9:00	20
60th Street from North								
IRT Lex X	10.3	15.8	15.0	19.0	17.7	14.0	7.7	4.1
Lex L	4.6	7.2	8.8	12.3	10.6	13.7	7.5	4.2
7Av X	4.7	5.9	8.9	10.8	9.1	8.1	5.6	3.2
7Av L	2.5	5.0	5.2	10.9	10.0	10.3	4.1	2.0
IND 8Av X	10.7	13.1	19.7	20.2	23.8	11.9	6.9	6.1
8Av L	2.1	4.4	5.8	7.5	9.4	7.2	2.9	1.4
East River from Queens								
IND QB X	6.9	13.2	17.8	19.1	23.7	23.4	17.1	6.5
IRT Flush.	3.4	5.5	10.2	14.4	17.0	13.0	7.2	6.0
BMT BL/WEX	3.4	5.1	7.3	8.7	8.9	6.9	3.3	2.9
4Av L	2.1	3.1	6.5	7.7	7.6	6.5	3.5	1.7
East River from Brooklyn								
IRT Lex X	3.6	5.5	7.8	9.3	6.9	5.3	8.0	3.8
7Av X	2.1	3.5	4.3	6.6	9.6	8.4	3.4	2.5
IND 8Av X	5.8	7.8	14.2	16.0	17.4	13.2	5.8	3.3
6Av X	2.5	3.5	5.0	5.6	5.7	.4.4	2.0	1.4
BMT Bwy X	6.2	8.9	14.2	15.8	17.3	20.0	8.7	5.5
Bwy L	2.9	3.4	4.3	7.9	8.6	9.0	3.2	1.7

Cordon Counts — Fall 1964 A.M. Outbound

Line	7:00	20	40	8:00	20	40	9:00	20
60th Street from North								
IRT Lex X	2.2	2.3	2.0	2.0	2.1	1.0	0.7	0.6
Lex L	1.5	2.8	2.7	3.0	2.6	3.3	1.7	1.4
7Av X	0.6	0.7	0.7	0.6	0.7	0.6	0.5	0.5
7Av L	0.9	1.1	1.4	1.4	1.4	1.4	0.9	1.0
IND 8Av X	1.2	1.5	1.3	1.2	1.9	1.3	1.0	0.9
8Av L	0.1	0.6	0.4	0.4	0.3	0.4	0.4	0.4
East River to Queens								
IND QBv X	1.3	2.1	1.7	2.2	0.7	1.2	0.8	0.6
IRT Flush.	2.1	3.4	2.1	1.5	1.0	0.8	0.4	0.3
BMT BL/WEX	1.3	1.8	1.8	0.9	0.7	0.4	0.3	0.2
4Av L	0.7	1.3	0.8	0.6	0.2	0.3	0.1	0.1
East River to Brooklyn								
IRT Lex X	0.6	0.7	0.4	0.6	0.9	1.3	0.7	0.6
7Av X	0.4	0.4	0.4	0.5	0.6	0.5	0.4	0.4
IND 8Av X	1.1	2.6	1.3	1.3	1.5	0.9	0.9	0.7
6Av X	1.4	1.5	0.8	1.4	0.7	0.7	0.4	0.3
BMT Bwy X	3.1	1.9	2.3	1.8	1.0	0.8	0.6	0.4
Bwy L	0.4	0.3	0.3	0.6	0.7	0.6	0.3	0.2
NL TX	Total of 100 passengers							
NL BX	No service scheduled							
J/M	1.0	1.1	0.6	1.1	0.4	0.4	0.3	0.3

All figures in thousands.

Data from NYCTA Cordon Counts

East River from Brooklyn - (Cont'd.)

NL TX	0.4	0.7	1.1	2.1	3.6	5.3	1.4	0.6
NL BX				2.6	2.2	3.3		
14/Can.	2.2	5.5	5.4	6.5	7.3	3.9	2.2	1.5
J/M	4.9	5.9	7.7	8.4	10.7	8.3	3.2	1.8

All figures in thousands.

Data from NYCTA Cordon Counts.

Cordon Counts — Fall 1964

A.M. Northbound

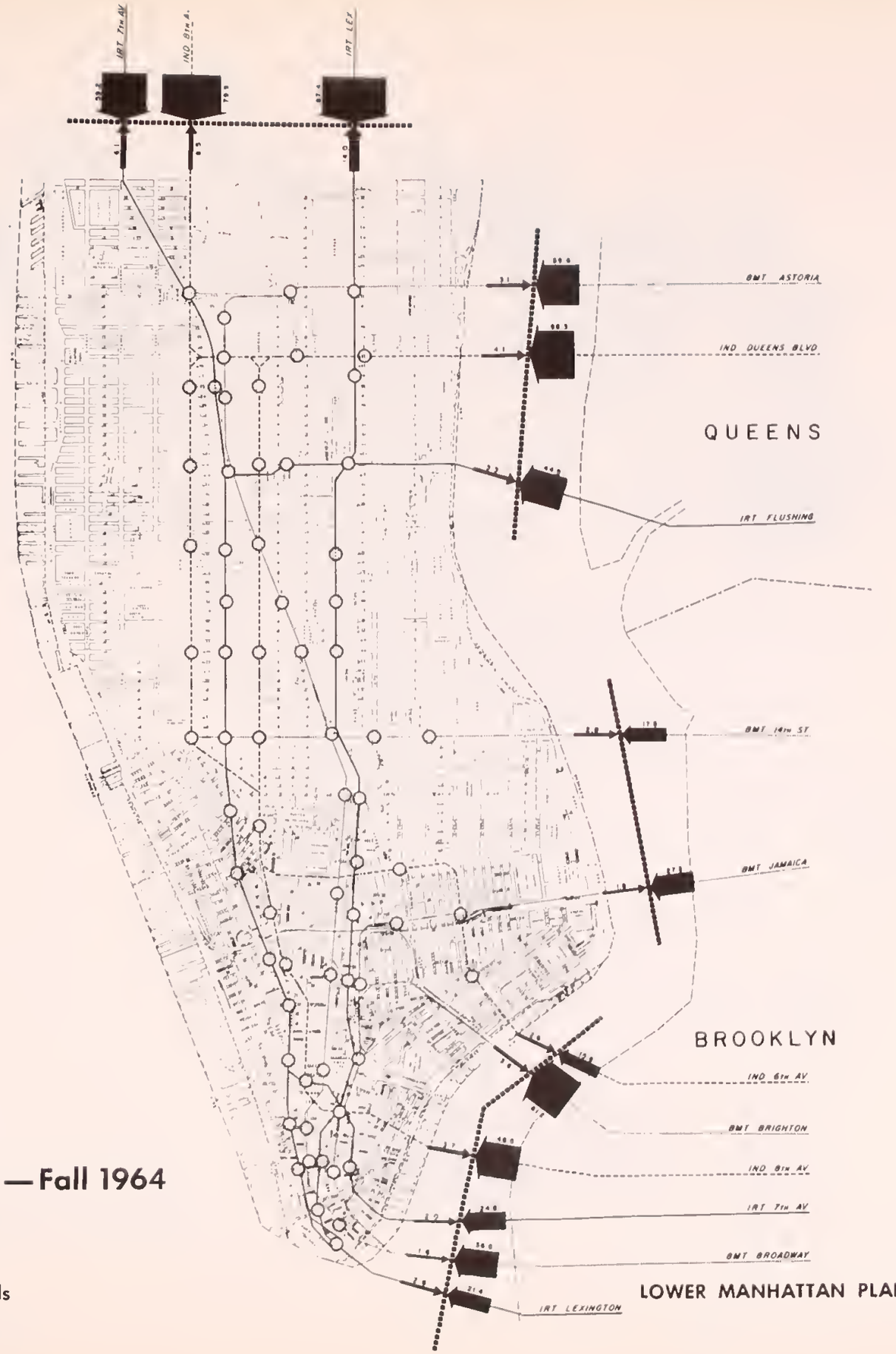
Line	7:00	20	40	8:00	20	40	9:00	20
Canal/Chambers								
IRT Lex X	2.5	4.0	4.3	8.7	8.0	9.1	3.4	2.6
Lex L	0.8	0.9	1.5	2.2	2.4	2.0	0.8	0.6
7Av X	1.9	2.5	3.3	4.8	5.3	4.6	2.9	1.6
7Av L	0.5	0.7	1.3	1.5	1.1	1.1	0.8	0.4
IND 8Av X	3.0	3.1	5.1	7.8	1.6	6.8	4.5	0.9
8Av L	0.1	0.1	0.1	0.2	0.4	0.7	0.4	0.2
BMT Bwy L	1.2	2.2	2.3	3.6	5.0	3.2	1.7	0.7
J/M	0.4	0.4	0.3	0.4	0.3	0.2	0.2	0.2

A.M. Southbound

Canal/Chambers								
IRT Lex X	2.7	3.5	4.2	6.2	10.9	10.9	5.2	4.2
Lex L	0.1	0.1	0.3	0.5	0.6	0.7	0.6	1.1
7Av X	1.3	1.9	3.0	3.6	5.7	8.7	4.5	2.7
7Av L	0.1	0.1	0.1	0.1	0.5	0.6	0.1	0.2
IND 8Av X	2.0	2.8	4.6	6.4	8.5	8.9	7.3	4.8
8Av L	0.2	0.4	0.2	0.8	0.9	1.0	0.8	0.8
BMT Bwy L	0.6	0.6	0.9	1.2	1.8	2.8	1.0	1.0
J/M	1.3	2.0	2.0	3.4	9.9	5.2	2.9	1.7

All Figures in thousands.

Data from NYCTA Cordon Counts.

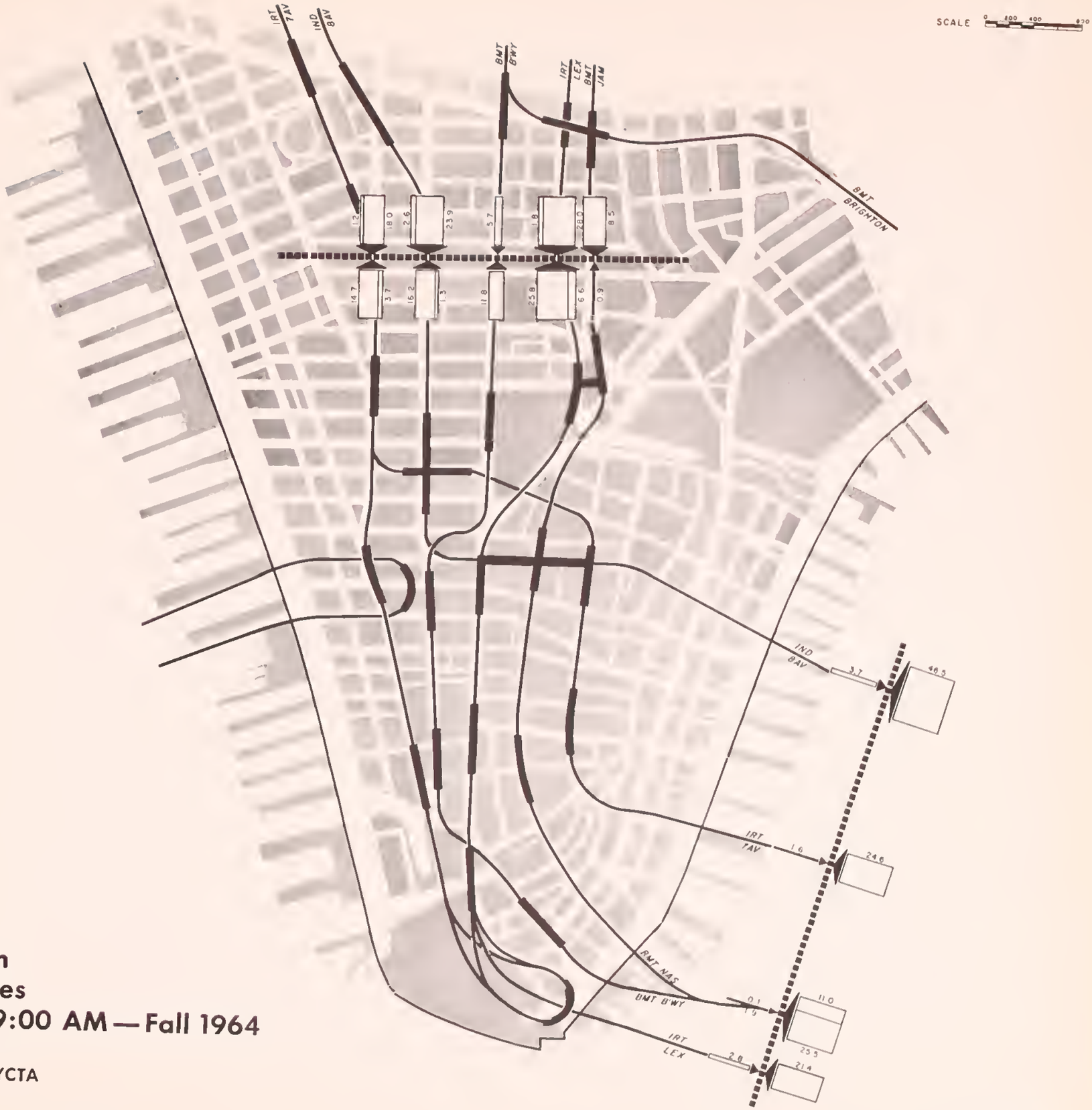


Cordon Volumes 8:00-9:00 AM — Fall 1964

Source: NYCTA

All figures in thousands

LOWER MANHATTAN PLAN 2-35



Cordon Volumes 8:00-9:00 AM — Fall 1964

Source: NYCTA

All figures in thousands

STATIONS CAPACITIES

While the number of cars which can be moved past a certoin point in a given time determines averall capacity, the statians control whether this capacity can be used. There may be excess capacity on a line, but it means very little if the stations, which channel the people fram the street into the cars, cannot process the requisite number of passengers. To determine existing utilizatian and possible future loading patterns, counts were made to develop meons for quantifying statian capacities.

These parameters were then checked in test stations and compared with those used by the Transit Authority. Based on the twa minute scheduling af the Peak Period, each station wos then calculated on the basis of the longest allowable headway. In all cases except the IRT Lexington Avenue Line, six (6) minutes was an acceptable maximum. On the Lexington Avenue Line, it was four (4) minutes due to small stations with balanced components.

For the initial capacities, each item was factored for two minutes. The lowest component ot each station was then taken as the actual limit. In most cases, it was the turnstiles which limited the mavements of potential riders.

Extending these for twenty (20) minute periods, a functioned factor of 85 percent was applied to allow for congestian at certain points within the station and actual differences in the headways.

The hourly capacities, against which the turnstile registrations were compored, were modified on the basis of line surge during the peak hour. In the Study Area, the total hourly line load is approximately 2.6 times the load for the Peak 20-Minute period. Applying this to the copacity figure for twenty (20) minutes gives the hourly capability, which is a better measure of probable limitations than a strict capacity figure.

The results are shown in Table 3.

STATION CAPACITY CRITERIA

Corridors and Passageways:

0.33 persons/ft. width/second, or 1200 persons/hour.

Ramps:

0.25 persons/ft. width/second, or 900 persons/hour.

Stairs:

0.22 persons/ft. width/second, or 800 persons/hour.

Escalators:

	@90 fpm	@ 120 fpm
2'8"	4,000 persons	5,400 persons
4'0"	7,500 persons	10,000 persons

Turnstiles:

Standard Bar Type - 35 persons per minute

Revolving Gate - 10 persons per minute

Platforms:

Based on Net Area, 1.5 feet from platform edge, minus all stairways, stanchions, kiosks, etc.

1 Line, Local or Express - 0.30 persons/sq. ft.

1 Line, Local and Express - 0.25 persons/sq. ft.

2 Lines or Directions - 0.20 persons/sq. ft.

TABLE 3

STATION CAPACITIES

Name and Line	2Min	20Min	1Hour
Bowling Green IRT Lex	520	4,420	11,400
Broad Street BMT Nassau	1,020	8,670	22,600
Canal Street IRT 7Av	420	3,650	9,300
Canal Street IND 8Av	1,280	10,870	28,200
Canal Street BMT Bwy	420	3,650	9,300
Canal Street IRT Lex	420	3,650	9,300
Canal Street BMT Nassau	420	3,650	9,300
Chambers Street IRT 7Av	560	4,760	12,400
City Hall BMT Bwy	490	4,160	10,800
Cortlandt Street BMT Bwy	980	8,320	21,700
Cortlandt Street IRT 7Av	530	4,500	11,700
Franklin Street IRT 7Av	350	2,980	7,800
Rector Street BMT Bwy	420	3,650	9,300
Rector Street IRT 7Av NB	280	2,370	6,200
South Ferry IRT Lex/7Av	490	4,160	10,800
Wall Street IRT Lex	1,470	12,500	32,500
Wall Street IRT 7Av	1,260	10,700	27,800
Whitehall Street BMT Bwy	560	4,760	12,400
Interdivisional Transfer Stations			
Brooklyn Bridge	1,290	11,000	28,600
Chambers/Park Place	1,490	12,700	32,900
Fulton Complex	3,900	33,200	86,500

STATION SERVICE AREAS

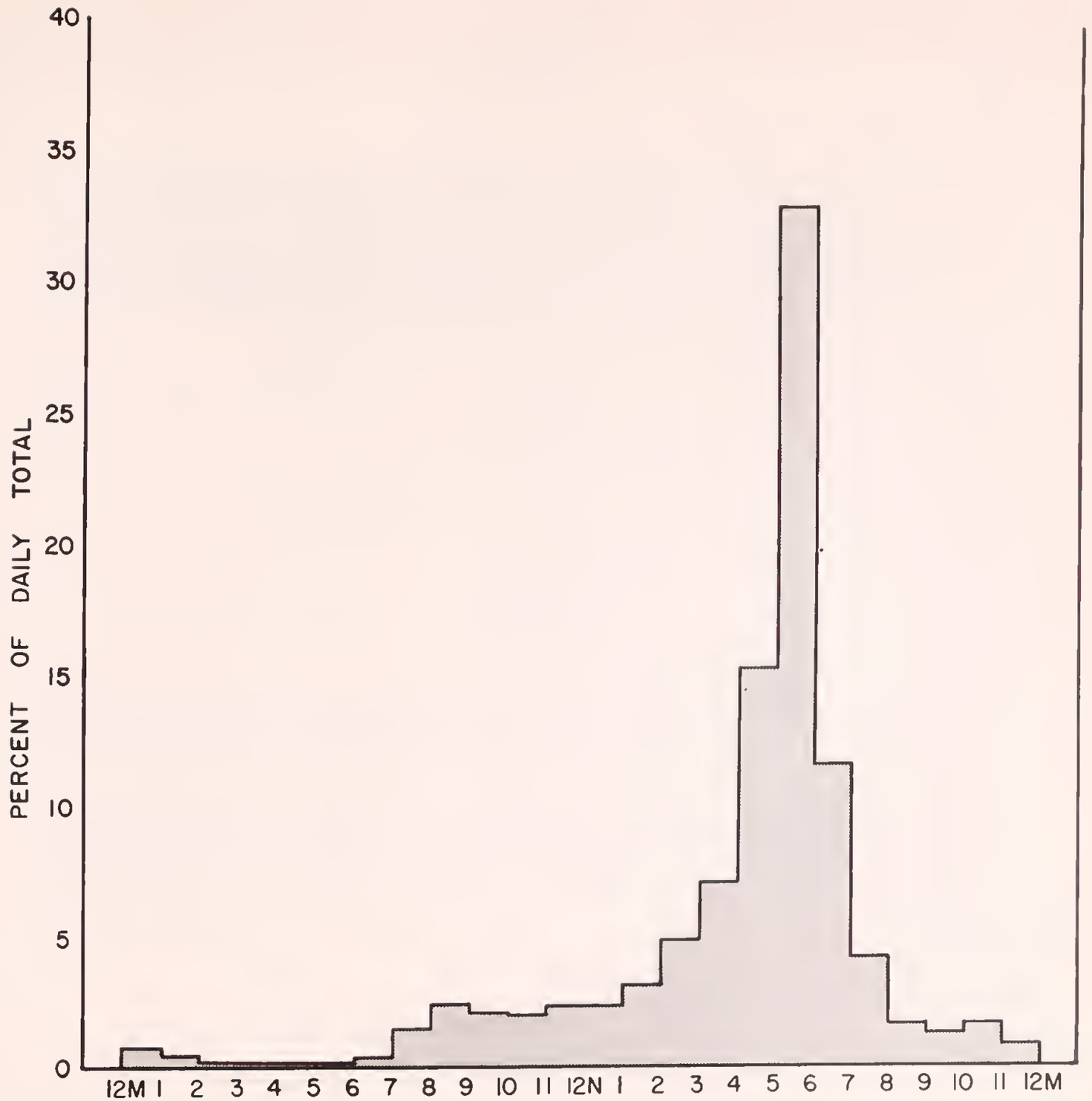
In an analysis of the subway system, the service area of each station is impartant because it is one of the determining factars of the level of service and, thus, has particular implicatians far the future that concern the amaunt and distribution af increased patranage should land use within the area be intensified.

Nationally, the standards are a five-minute walk at 300 feet per minute, or a straight-line distance of 1,500 feet. Conversion to airline distance on an attenuated grid street system gives a radius of 1,200 feet. This airline distance is a compromise, since it is possible to walk 1,500 feet in a straight line from a station and thus exceed the radius. On Figure 23, the five-minute walk is shown as a dashed line, the sum function of all of the stations in Lower Manhattan.

Because the Study Area has a heavy concentration of lines and statians, allawing wide latitude of choice, and because of the surface congestion during the peak periods, it was thought mare realistic to examine each station on a more restricted basis.

Therefore, an airline distance of 800 feet was chosen as the standard. This is equivalent ta a three-minute walk at 270 feet per minute. The inner, solid circles on Figure 23 show the coverage of each station under these conditions.

The map also shows the station choice available to the rider within the restricted walking distance. Measured from platform center, not the exits, these radii include the time spent negotiating the internal structure of the station. This tends ta limit rather than extend the actual service areas.



Hourly Distribution of Turnstile Registrations

CAR CAPACITIES

Since the psychological aspects of transit ridership are as important as the size of the cars in determining capacities, three (3) levels were develaped and used in this study.

The first, the Theoretical Capacity, was based on the seating capacity and the free floor area af each type. To allocate the free area, a factor of 1.4 was applied, giving:

Theoretical Capacity = No.of Seats + (Free Area/1.4)

Type 28 (IRT)	44 Seated
	154 Standees
	198 Total Passengers
Type 16 (IND/BMT)	54 Seated
	233 Standees
	287 Tatal Passengers
Type 27/30	50 Seated
	232 Standees
	282 Total Passengers

This loading assumes sufficient time to pack the vehicle, a minimum of packages, etc., and the willingness of the riders to stand packed together, without any extra space. This capacity forms the upper limit, which can be approached but not exceeded.

Functional Capacity is the realistic limit of the system. It takes into consideration the variety af passenger size and shape, the many, hand-carried packages, and, particularly, the tendency far people ta stand near the car doars in preparation for off-loading. A study of these factors produced a parameter of 0.85, which translates the Theoretical Capacity ta the Functional level.

Functional Capacities are:

Type 28	198 x 0.85 = 168 Passengers
Type 16	287 x 0.85 = 244 Passengers
Type 27/30	282 x 0.85 = 240 Passengers

At this level, it is borely possible to reod a newspoper, but the maximum fifty (50) second stotion stop can be maintained and o certoin omount of shifting in preporation for unlooding toleroted.

Finally, in an ottempt to equate some level of comfort, o third level of capacity wos developed. This Comfort Loading accepts the psychologicol aspects of crowding ond comfort which contribute to the decision-moking process of whether to take o porticular troin, woit for onother, or, perhops, switch modes.

On the bosis of actual car counts, it wos found thot ot 70 percent of the Theoretical Copocity, or:

Type 28	198 x 0.70 = 139 Passengers
Type 16	287 x 0.70 = 200 Possengers
Type 27/30	282 x 0.70 = 197 Possengers

there wos a reasonable amount of space ovailable for reading, moving, or preporing to get off.

These three capocities give a wide range of possible loadings. The Theoretical Load is primarily a design limit, while the Functionol is on operationol one. Any time that the Functionol limit is exceeded, the system is being overlooded, and will tend to break down (slower speed, longer station stop, etc.). The Comfort Load is the proctical moximum, the ideal level of service which should be the target of ony program. When this loading is exceeded, it is on indication of definite problems, and a signal for long-range plonning.

LINE CAPACITIES

The capacity of a line is determined by three factors: the capacities of the cars, the ability of the system to move cars, and the car-loading patterns within the trains. From the functional and comfort car capacities, the design limitations of the system, and loading patterns as reflected by station usage, three capacities were developed for each line.

The ability to move cars depends upon such operating characteristics as the signal system, switches, curvature and grade of track, and acceleration and deceleration rates of the vehicles. All lines in the system are mechanically capable of 90-second headways, but manual operation, extended station stops, and other factors necessitate the scheduling of 120-second headways during the peak periods. After discussion with the Transit Authority, this figure was chosen for use in this evaluation. It gives a capacity of 30 trains per track per hour, each of which was assumed to be composed of the maximum number of cars which the station platforms were capable of handling.

Development of capacity levels must take into consideration both possible and probable distributions of passengers. Due to stairway locations on the platforms and the tendency of people to move toward the center of the train, there is unused, undesirable space on every train, primarily in the first and last cars. Allowing for this, a factor of 0.85 was applied to the operational capacity to get a comfort loading, which, although somewhat arbitrary, reflects the actual amount of space utilization under present psychological conditions.

There are, therefore, three capacities for each line: a functional capacity which is an upper limit, exceeded only under peak-hour conditions when the need for transportation outweighs any comfort consideration; a comfort capacity which forms an optimal utilization level, embodying certain criteria of humaneness; and an operational loading which considers the comfort capacity in light of unequal car loadings.

The following are the line capacity figures developed to represent maximum utilization under the different loading criteria, and for use as measures of overcrowding.

Division/Line	20 minutes	1 hour
IRT Flushing/Queensboro Express/Local		
F/11	18.5	55.4
O/	15.3	45.8
C/	13.0	38.9
Lexington Avenue Express and Local		
F/10	16.8	50.4
O/10	13.9	41.7
C/10	11.8	35.4
7th Avenue Express		
F/9	15.1	45.4
O/9	12.5	37.5
C/9	10.6	31.9
7th Avenue Local		
F/8	13.4	40.3
O/8	11.1	33.3
C/8	9.4	28.3
IND - All Lines - Express and Local		
F/10	24.0	72.0
O/10	19.7	59.1
C/10	16.7	50.3
BMT 14th Street/Canarsie - Local Jamaica/Myrtle - Express/Local Broadway - Express		
F/8	19.2	57.6
O/8	15.8	47.4
C/8	13.4	40.3
4th Avenue - Local		
F/8	4/ 7.7	12/ 23.01
O/8	6.6	19.7
C/8	5.6	16.7

Divisian/Line		20 minutes		1 haur
BMT Astoria - Express/Lacal				
F/8	6/	11.5	18/	34.6
O/8		9.5		28.4
C/8		8.1		24.2
Braadway - Lacal				
F/8	7/	13.4	21/	38.4
O/8		11.1		33.3
C/8		9.4		28.3
Nassau Laap - via Bridge ar Tunnel				
F/8	3/	5.8	9/	17.3
O/8		4.8		14.4
C/8		4.1		12.3

F/ - Functional Capacity
O/ - Operatianal Capacity
C/ - Comfart Capacity

/8 - Eight cars per Train
/9 - Nine cars per Train
/10 - Ten cars per Train
/11 - Eleven cars per Train

Narmal laads are ten (10) trains per 20 min., 30 per hour.
Any ather case is nated: X/
Lacal/Express - Bath utilize same track at cardan.
All passenger figures in thausands.

OTHER MASS TRANSIT FACILITIES

In oddition to the subway system, Lower Manhotton may be reached via the PATH System, the surface bus system and the Staten Islond Ferry. These contribute significantly to the totol number of employees tronsported to the Study Area every doy. While this study did nat ottempt to onalyze them in depth, same dota collection and evaluation did toke ploce within the context of examining the overall tronsportotian pattern.

The PATH System, operoted by the Port of New Yark Authority, brings some 30,000 persons into the Hudsan Terminol every day. Of these, about 18,000 arrive during the A.M. Peak Period. Since o seporate PATH line runs up inta Midtown, it con be ossumed that the majority af these passengers ore destined for jobs located in Lower Monhotton.

During the short period since its acquisitian by the Port Authority, PATH service has been improved through the addition of new cars and impraved scheduling. Plans call for a cantinuing increase in trains fram New Jersey; ond, with a new stotion in the Warld Trode Center, PATH will reach new levels of comfort and canvenience, porticularly at the Downtown terminal. Therefore, with the odditional capocity provided by these impravements ond the cantinued growth af the New Jersey sector, PATH con be expected to contribute significontly to the healthy grawth of Lawer Monhottan.

Surfoce bus service to the Downtown oreo is light. It provides an olternote mode for those who dislike the subway ond is the only public focility avoiloble to those living inconveniently for from the subway. The Bronx ond Monhattan Surfoce Operating Authority plons to increose service to Lower Monhottan if ridership shauld increase significantly above the present 15,000 possengers. Tronsit congestion makes surface relatively slow, but it is still mare effective as a meons af moving numbers of people than the privote outomobile. Figure 38 shows the rautes presently served.

Stoten Islond is naw connected ta the other boraughs by the Verrazana Narrows Bridge, yet ridership on the ferries operated by the New York City Deportment of Morine ond Aviation cantinues ta increase. Abaut 40,000 peaple ore thus tronsparted ocrass the harbor eoch way during the average day, some 23,000 during the Peok Periods. Although the provision af o highway connection hos increosed usoge of the Island os o residentiol orea far those employed in Manhatton, the ferry is evidently necessory to meet the commutotian needs of Island residents.

In comporison ta the daily tatol ridership on the subway system, the 60,000 employees transported daily by the obove focilities moy seem insignificant. If one considers, however, thot these 60,000 represent the overoge totol employment of a city of 200,000 people, the impartance of these oncillory focilities becomes cleor.

Bus Routes

LOWER MANHATTAN PLAN **2-38**

APPENDIX I

STRUCTURES OF PERMANENT VALUE

Na part of New York City contains so complete a record of post urbon ochievement os Lower Manhotton. The City's historic ond cultural heritage, os embadied in these many structures, should not only be safeguarded ogainst further encroachment, but incorporated into the future downtown development, wherever possible.

For this reason an inventory of downtawn's architectural and historic building stock wos token early in the study. Map 18 summorizes the result af this inventary, ond was subsequently used in the development of the plan for the area. Particular attentian was poid ta those older buildings which, forming part of a group, create significont urban spoces ond which stand together, on their own. An exomple is the group of buildings standing an the southern side af Fulton Street, between Frant and South Streets.

The bosis far this Map is shawn in this Appendix. The buildings cited are token from several saurces: the Municipal Art Society, the Landmarks Preservation Cammissian, and the nated orchitecturol histarian, Ado Louise Huxtoble. Still other buildings have been deemed worthy of preservotian in the apinion af Cansultonts on the basis of extensive field abservatian.

Several of the buildings hove been selected becouse they farm port of an oesthetic and historic district. The very distinctiveness of these oreas would be significantly impaired by their absence, olthough the buildings hove little historical or orchitectural merit of themselves. Similorly, several buildings have been included becouse they ore amang the skyscraper structures which define the traditianal lower Manhatton skyline.

Coherent oreos and spoces ore alsa shown on the mop in twa general categories:

a. The darker areos ore those thot are enclosed ar semi-enclosed; they generolly form "nodol" spatiol units, pivotol points in the progression of downtown space.

b. The lighter areas are open-ended spaces between the "nadal" spoces; they ore usuolly streets.

STRUCTURES OF PERMANENT VALUE

NO	NAME OR ADDRESS	LMP	MUNICIPAL ART SOCIETY	LANDMARKS PRESERVATION COMMISSION	ADA LOUISE HUXTABLE	FORMS PART OF COHERENT AREA
1	Monhottan Sovings Bonk			×		
2	5th Pct. Police Stotion	×				×
3	Ch. of the Tronsfig.				×	
4	18 Bowery			×		×
5	Chothom Towers	×				
6	Chothom Green	×				
7	Moriners Temple			×	×	
8	Groveyord			×		
9	St Jomes Church		×		×	
10	St. Jomes School			×		
11	Bklyn Br SW (proposed)	×				
12	181 Front Street			×	×	×
13	182-98 Front Street			×	×	×
14	171 John Street			×	×	×
15	2-18 Fulton Street			×	×	×
16	170 John Street			×	×	×
17	161-65 Front Street			×	×	×
18	156 Front Street			×	×	
19	Metol Exchonge Bldg.		×		×	
20	139-51 Front Street			×	×	×
21	142-54 Front Street			×	×	×
22	136 Front Street			×	×	×
23	133 Front Street			×	×	×
24	130-134 Front Street			×	×	×
25	129 Front Street			×	×	×
26	96-110 Front Street			×	×	×
27	101 Front Street			×	×	×
28	94 Front Street			×	×	×
29	91-93 Front Street			×	×	×
30	1st Pct. Police Stotion			×	×	×
31	76 Front Street			×		
32	62-4 Front Street			×	×	×
33	55-61 Front Street			×	×	×
34	65-75 Front Street			×	×	×
35	44-54 Front Street			×	×	×
36	10 Honover Squore	×		×	×	×
37	Groce Notionol Bonk	×				×
						×

STRUCTURES OF PERMANENT VALUE (Cantinued)

NO.	NAME OR ADDRESS	LMP	MUNICIPAL ART SOCIETY	LANDMARKS PRESERVATION COMMISSION	ADA LOUISE HUXTABLE	FORMS PART OF COHERENT AREA
38	2 Caenties Slip				×	×
39	62 Pearl Street				×	×
40	Fraunces Tavern		×	×	×	×
41	Furness Hause			×		×
42	32 Whitehall Street	×				×
43	Our Lady of the Rasary		×	×	×	×
44	Castle Clintan Man.		×	×	×	
45	U.S. Custam Hause		×	×	×	×
46	1 Braadway			×		×
47	Cunard Building			×		×
48	22 West Street	×				×
49	26 Broadway	×				×
50	67-97 Pearl Street				×	×
51	India Hause		×	×		×
52	Lehman Building	×				×
53	Chemical Carn Exchange Bank	×				×
54	1st Natianal City Bank	×				×
55	1st Natianal City Bank		×	×	×	
56	J.P.Margan & Ca.		×			
57	N.Y. Stack Exchange		×	×		
58	71 Braadway	×				×
59	67 Greenwich Street			×	×	
60	94-96 Greenwich Street			×	×	
61	Trinity Church		×	×	×	×
62	Irving Trust Campany	×				×
63	American Surety Ca.		×			×
64	Bankers Trust Ca.			×		×
65	U.S. Sub-Treasury Building		×	×	×	×
66	40 Wall Street	×		×		×
67	60 Wall Street	×				×
68	Chase Manhattan Bank	×				×
69	Equitable Building	×				×
70	Trinity Building	×				×
71	U.S. Realty Building	×				×
72	N.Y.U. Grd. Bus. Schl.	×				×
73	Thames Building	×				
74	134 Greenwich Street	×				
75	World Trade Center	×				×

STRUCTURES OF PERMANENT VALUE (Continued)

NO.	NAME OR ADDRESS	LMP	MUNICIPAL ART SOCIETY	LANDMARKS PRESERVATION COMMISSION	ADA LOUISE HUXTABLE	FORMS PART OF COHERENT AREA
76	Singer Building		×			×
77	140 Broadwoy	×				×
78	Chamber of Commerce		×	×		×
79	Federol Reserve Bonk		×	×		×
80	John St. Meth. Ch.		×	×	×	×
81	Am. Tel. & Tel. Co.		×	×		×
82	St. Pouls Chapel		×	×	×	×
83	Bennet Building	×				
84	NY Caunty Law Assn.		×	×		
85	Garrisan Bldg.			×		
86	St. Peters Ch.		×	×	×	
87	N. Y. Telephone Co.		×			
88	Woalwarth Building		×	×		×
89	City Hall		×	×	×	×
90	Surragates Caurt			×		×
91	Municipol Building			×		×
92	U.S. Caurt Hause			×		×
93	N. Y. City Ct. Hause			×		
94	317 Braadway	×				×
95	319 Broadway	×				×
96	925-31 Broadwoy	×				×
97	217-27 Church Street	×				
98	151 W Broodway	×				
99	39-47 Worth Street	×				
100	65-85 Worth Street	×				
101	65-94 Leonard Street	×				×
102	Fire Batt. No. 2 Sto.			×		
103	363 Broadway	×				×
104	40-48 Leonord Street	×				
105	18-20 Leonard Street	×				
106	US Public Hlth Ser.	×				
107	Mercantile Exchange	×				
108	180 Franklin Street	×				
109	Pawell Building	×				
110	158 Franklin St.	×				
111	154 Franklin St.	×				
112	3 N. Maare St.				×	
113	242 W. Braadwoy				×	
114	79-101 Laight Street	×				
115	63 Vestry Street	×				
116	34 White Street				×	×

STRUCTURES OF PERMANENT VALUE (Continued)

NO.	NAME OR ADDRESS	LMP	MUNICIPAL ART SOCIETY	LANDMARKS PRESERVATION COMMISSION	ADA LOUISE HUXTABLE	FORMS PART OF COHERENT AREA
117	31-65 Walker Street	x				x
118	382 Broadway	x				x
119	80 White Street	x				x
120	116-20 White Street				x	

APPENDIX II

COMPOSITE BLOCK EVALUATION

Deteremining the "quolity" of eoch block con provide o relotively simple, objective method of determining the "soft" blocks in the oreo, which by noture of their locotion moy be expected to develop shortly, or for which some development should be proposed. In either cose, development might be expected to proceed more reodily in blocks with o lower roting thon those with a higher one.

A similor process, described in detoil ot the beginning of Chopter III, wos used in the development (on o building-by-building bosis) of the Life Expectoncy Maps.

Rotings for eoch of the blocks ore listed below. These rotings ore o composite of the rotings for eoch of six individual criterion. Eoch of these criterion ond their point volue follow below.

1. Working Populotion	Point Volue
0-1999	1
2000-3999	2
4000-5999	3
6000-7999	4
3000-9999	5
10,000-11,999	6
12,000-13,999	7

2. Building Height	Point Volue
Mojority of Structures less thon 1-3 stories in height	1
3-6	2
6-9	3
9-12	4
12-15	5
15 ond over	6

3. Building Age ond Condition	Point Volue
Majority of structures built prior to 1885, not fireproofed, not modernized	1
Mojority of structures built prior to 1915, fireproofed not modernized.	2
Mojority of structures built prior to 1915, fireproofed not modernized	3
Mojority of structures built between 1915-45, not modernized	4
" " modernized since 1945	5
" " constructed since 1945	6

4. Those blocks which contoin buildings of historicol culturol or oesthetic significance as noted in Toble hove been ossigned o point volue of 4.

5. Thase blacks whase structures regardless farm part af a caherent area have been assigned a point value af 4.

6.

Assessed Valuatian	Paint Value
0-99	1
100-199	2
200-299	3
300-399	4
400-499	5
500-599	6
600-699	7
700-799	8
800-899	9
900-	10

APPENDIX II

COMPOSITE BLOCK EVALUATION

BLOCK NO.	EMPLOYMENT	BLDG. HEIGHT	BUILDING AGE AND CONDITION	ARCH. SIGNIF-ICANCE	COHERENT AREA	ASSESSED VALUATION	COMPOSITE RATING
1	1	3	1			1	6
2	1	4	2			1	8
3	1	2	2			1	9
4	1	2	2			1	6
5	1	4	3			1	9
6	1	2	3			1	7
7	1	2	3			1	7
8	1	4	3			1	9
9	1	4	5			1	11
10	1	2	3			1	11
11	1	3	2	4		1	7
12	1	3	2			1	7
13	1	3	2			1	7
14	1	4	4	4		1	14
15	1	2	4			1	8
16	1	3	3			1	8
17	1						
18	1	4	6			1	12
19	1	2	2			1	6
20	1	3	6			1	11
21	1	2	3			1	7
22	1	2	3			1	7
23	1	4	4			1	10
24	1	2	1	4		1	9
25	1	2	3	4		1	11
26	1	3	2	4		1	11
27	1	3	3			1	8
28	1	4	2	4		1	12
29	1	3	3			1	8
30	1	2	3			1	7
31	1	2	2	4		1	10
32	1	3	2	4		1	11
33	1	2	3	4		1	11
34	1	4	6		4	1	16

APPENDIX II

COMPOSITE BLOCK EVALUATION

BLOCK NO.	EMPLOYMENT	BLDG. HEIGHT	BUILDING AGE AND CONDITION	ARCH. SIGNIF-ICANCE	COHERENT AREA	ASSESSED VALUATION	COMPOSITE RATING
35	3	6	6			2	17
36	1	3	3		4	1	12
37	1	2	2		4	1	10
38	1	2	2			1	6
39	1	2	2			1	6
40	1	2	3			1	7
41	1	2	8			1	12
42	1	4	8			3	16
43	1	4	5			1	11
44	3	6	5			8	22
45	1	2	3			1	7
46	1	2	2		4	1	10
47	3	6	5			10	24
48	2	3	3	4	4	1	17
49	1	2	3			1	7
50	1	2	4			1	8
51	1	2	2	4	4	1	14
52	1	2	2			1	6
53	1	3	2		4	1	11
54	1	3	3		4	1	12
55	1	3	5			2	11
56	1	2	4	4	4	1	16
57	1	2	3	4		1	11
58	2	3	3	4	4	1	17
59	2	5	4	4		2	17
60	1	2	1	4	4	1	13
61	1	2	3			1	7
62	1	4	8			4	17
63	1	2	3	4	4	1	15
64	1	2	3			1	7
65	2	3	4		4	1	14
66	1	2	3			1	7
67	1	3	4		4	1	13
68	1	2	3		4	1	11
69	2	3	4		4	1	14

APPENDIX II

COMPOSITE BLOCK EVALUATION

BLOCK NO.	EMPLOYMENT	BLDG. HEIGHT	BUILDING AGE AND CONDITION	ARCH. SIGNIFI-CANCE	COHERENT AREA	ASSESSED VALUATION	COMPOSITE RATING
70	1	2	3			1	7
71	1	3	4		4	1	13
72	2	5	6			3	16
73	1	3	6		4	1	15
74	3	6	8			4	21
75	6	5	7	4	4	3	27
76	3	4	6			2	15
77	3	3	5	4	4	2	21
78	St. Paul's Church						
79	2	6	7	4	4	4	27
80	1	2	4			2	9
81	3	5	5			3	16
82	1	2	3			1	7
83	1	3	2			1	7
84	1	3	3			1	8
85	1	5	4		4	2	16
86	2	5	5			2	14
87	1	2	1	4		1	9
88	1	3	6	4	4	2	20
89	2	6	7	4	4	3	26
90	0	2	1			1	5
91	1	4	2			1	8
92	3	5	7		4	2	21
93	2	6	7	4	4	2	25
94	3	5	5			1	14
95	1	2	5			1	9
96	1	3	1			1	6
97	2	6	7			2	17
98	1	3	3	4		1	12
99	3	6	6	4	4	4	27
100	3	4	5		4	2	18
101	4	5	5	4	4	2	24
102	5	6	7	4	4	2	28
103	1	2	5			1	9
104	1	2	4			1	8
105	1	2	2			1	6

APPENDIX II

COMPOSITE BLOCK EVALUATION

BLOCK NO.	EMPLOYMENT	BLDG. HEIGHT	BUILDING AGE AND CONDITION	ARCH. SIGNIF-ICANCE	COHERENT AREA	ASSESSED VALUATION	COMPOSITE RATING
106	1	2	3			1	7
107	1	2	2			1	6
108	1	2	3			1	7
109	1	3	2			1	7
110	1	2	2			1	6
111	1	2	6			1	10
112	2	5	7		4	2	20
113	2	3	3		4	1	13
114	1	3	3			1	8
115	2	4	4			1	11
116	1	3	6			2	12
117	3	5	7	4	4	4	27
118	1	3	6		4	1	15
119	2	6	7		4	2	21
120	1	4	3		4	1	13
121	1	3	4		4	1	13
122	3	5	7		4	3	22
123	3	4	7		4	3	21
124	2	3	6		4	2	17
125	2	4	5		4	1	16
126	1	2	2			1	6
127	1	2	3	4	4	1	15
128	1	2	2	4	4	1	14
129	2	4	4		4	2	16
130	3	4	6	4	4	2	23
131	2	6	6		4	2	20
132	3	5	5		4	3	20
133	1	2	2	4		1	10
134	1	2	3	4	4	1	15
135	1	3	2	4	4	1	15
136	1	4	4		4	2	15
137	1	3	3		4	1	12
138	1	6	8			3	18
139	1	3	4	4	4	1	17
140	1	2	4			1	8

APPENDIX II

COMPOSITE BLOCK EVALUATION

BLOCK NO.	EMPLOYMENT	BLDG. HEIGHT	BUILDING AGE AND CONDITION	ARCH. SIGNIFI-CANCE	COHERENT AREA	ASSESSED VALUATION	COMPOSITE RATING
141	3	5	4	4	4	2	22
142	2	4	5	4	4	4	23
143	1	6	5		4	3	19
144	3	5	8	4	4	4	28
145	7	2	5	4	4	7	29
146	7	6	8	4	4	8	37
147	3	4	6		4	3	20
148	5	6	5	4	4	3	27
149	6	6	8		4	5	29
150	1	2	2	4	4	1	14
151	1	2	1	4	4	1	13
152	1	2	2	4	4	1	14
153	1	3	1	4	4	1	14
154	4	6	7	4	4	6	31
155	7	4	7	4	4	6	32
156	5	5	6		4	3	23
157	1	4	4		4	2	15
158	1	2	5	4	4	1	17
159	2	6	7	4	4	2	25
160	3	5	7	4	4	6	29
161	4	5	6	4	4	6	29
162	4	6	7	4	4	6	31
163	1	4	7	4	4	3	23
164	2	4	6		4	5	21
165	3	6	6	4	4	3	31
166	3	5	6	4	4	3	25
167	3	5	5		4	2	19
168	2	6	7	4	4	7	30
169	7	5	7		4	3	26
170	3	5	7		4	3	22
171	2	6	3		4	4	19
172	1	5	4		4	2	16
173	2	4	4	4	4	2	20

APPENDIX II

COMPOSITE BLOCK EVALUATION

BLOCK NO.	EMPLOYMENT	BLDG. HEIGHT	BUILDING AGE AND CONDITION	ARCH. SIGNIFI-CANCE	COHERENT AREA	ASSESSED VALUATION	COMPO-SITE RATING
174	3	6	6		4	2	21
175	1	3	4		4	4	16
176	1	3	3		4	2	13
177	3	3	4	4	4	1	19
178	1	3	5		4	1	14
179	1	3	3		4	1	12
180	1	2	2		4	1	10
181	1	3	3	4	4	1	16
182	1	5	4		4	7	21
183	1	2	2	4	4	1	14
184	1	3	4	4	4	1	17
185	1	3	5		4	1	14
186	1	4	2	4	4	1	16
187	1	3	2		4	1	11
188	1	2	2	4	4	1	14
189	1	2	3	4	4	1	15
190	1	2	4	4	4	1	16
191	0	2	4			1	7
192	0	2	4	4	4	1	15
193	1	2	2	4	4	1	14
194	1	2	1	4	4	1	13
195	1	2	2	4	4	1	14
196	1	3	4		4	1	13
197	1	3	2		4	1	11
198	1	3	2		4	1	11
199	1	3	2			1	7
200	1	3	1			1	6
201	1	3	2	4	4	1	15
202	1	3	1	4	4	1	14
203	1	3	2	4		1	11
204	1	3	3	4		1	12
205	2	3	3		4	1	13
206	1	3	3		4	1	12
207	1	4	8			4*	17
208	1	5	5		4	4*	19

APPENDIX II

COMPOSITE BLOCK EVALUATION

BLOCK NO.	EMPLOYMENT	BLDG. HEIGHT	BUILDING AGE AND CONDITION	ARCH. SIGNIFI-CANCE	COHERENT AREA	ASSESSED VALUATION	COMPO-SITE RATING
209	2	3	3		4	1	13
210	1	4	5		4	2	16
211	2	4	5		4	4*	19
212	8	6	8	4	4	8*	38
213	1	6	5		4	4*	20
214	2	6	6		4	2	20
215	1	6	5		4	4*	20
216	3	6	7		4	4*	24

APPENDIX III

NEIGHBORHOOD DEVELOPMENT AREAS

(see Graphic 63)

The characteristics of the proposed waterfront development communities are shown in Graphic 63, Neighborhood Development Areas.

There are six Neighborhood Development Areas. Areas I- III are on the west side of the island. Areas IV-VI are on the east side.

The upland boundary of each Neighborhood Development Area is generally the line separating the "hard" Core area containing buildings with a long life expectancy from the low-intensity areas occupied by buildings with a shorter life expectancy which lie between the Core and the waterfront. This low-intensity area includes the Washington Street Renewal Area and other current redevelopment projects.

The basis for these development divisions are discussed elsewhere.

Inner and Outer Area

For purposes of analysis the Neighborhood Development Districts were divided into inner and outer areas. The inner area extends from the line of the "hard" core to the property line of South and West Streets. This land is predominantly in private ownership.

The Outer Areas extend from the South and West Street property lines to the outermost line of new development. They are now predominantly in public ownership.

Identity

Each Neighborhood Development Area is identified by the name of the street which terminates in its waterfront community plaza or the major new development adjacent to the plaza. The Chambers Street, World Trade Center and Rector Street Neighborhood Development Areas are on the West Side. The Stock Exchange, Wall Street and Fulton Street Neighborhood Development Areas are on the East Side.

Total Area

The total area of a Neighborhood Development Area is the inclusive area within its boundaries, including all public and private property, streets and wet areas.

Area of Sites to be Developed

The area of sites to be developed is the inclusive area of all land within each Neighborhood Development Area which can be reasonably expected to be redeveloped in the future, as indicated by Building Life Expectancy Map. They are the sum of all buildable sites within the Land Use Units in that Neighborhood Development Area.

New Uses

Basically, there were two categories of use proposed for the redeveloped land: office and residential. The third category -- "other uses" -- was a catch-all to account for both open space requirements and miscellaneous uses.

Under open space was included both passive and active recreation space, including parks, esplanades, pedestrian plazas, private play areas.

Miscellaneous uses include retail space, theatres, institutions, community facilities (schools, libraries, clinics, fire and police stations), and parking garages.

These uses are predominantly concentrated in the "outer areas", and occupy between 25 to 50 per cent of the area of the Land Use Units. By far the largest single element, in terms of land coverage, is open space.

In each Land Use Unit (see Graphic 62) a ratio of the three component elements was determined on a trial basis: for, example, in L.U.U. "A" in Zone VI, the ratio of office space to residential space was fixed at 3:1. This meant that three times as much area was given to office usage as was given to residential usage. After a complete "cycle" of figures, representing the entire downtown community, was assembled and appraised, many of these initial ratios were revised in light of various over-all feasability factors. In this particular case, the ratio was altered to 4:1, residential to office.

Space

Space calculations were made for future residential and office use.

Space was calculated for residential and office use on the basis of the land assigned to each of these uses in the initial programming procedure within each Land Use Unit as follows:

Gross Residential Space. The maximum allowable gross square feet for this use on every parcel assigned to residential use was determined by multiplying the land area available by an FAR of 12. This represents an FAR 10, the maximum allowable under the New York City Zoning Ordinance for residential use, plus the maximum allowable plaza bonus of 20%.

Gross Office Space. The same method was employed, using F.A.R. maximums of 12 and 18 (see Graphic 46) for the two office zoning categories designated These represent the maximum allowable plaza bonus of 20%.

In cases where site area was restricted, and plazas were unfeasible, no bonus was included.

In the case of planned projects, such as the World Trade Center, Brooklyn Bridge Southwest, the New York Stock Exchange, the actual planned space figures were included. In many cases this represented floor area smaller than the allowable development.

Population

Present Employment

Existing population figures come from New York State Department of Labor survey of CBD employment, as modified and published in the 1963 Downtown Lower Manhattan Association report, Lower Manhattan. These figures were subsequently modified to account for recent trends (see Table V).

Future Employment

This figure is composed of two elements. First, that part of existing employment which is still presumed to work in the Land Use Unit -- consisting primarily of employees in buildings with a long "life expectancy." Second, the anticipated employment in new buildings.

This latter figure was arrived at by dividing the net office space (assumed to be 80% of gross space) by an assumed future average space-per-worker. Today this is believed to be around 150 square feet per worker; for purposes of this analysis (and based on current rates of change), the future figure is assumed to be 170 square feet per office worker.

Existing Residents

No significant residential population now lives in the future Neighborhood Development Areas.

Future Residents

The gross floor area figures arrived at earlier were converted into net floor area, assuming that the latter is roughly 80 per cent of the former, a commonly accepted ratio. This figure was divided by 350 square feet to determine the number of new residents. The city-wide average for middle-income housing is around 325 square feet per person; for luxury housing, 375 square feet per person.

Parking

The number of parking spaces was calculated on the basis of certain assumptions concerning planned residential and office usage. For a more detailed discussion, see Part II of this report

The number of residential parking spaces is based on the New York City Zoning Ordinance which, for the R-10 classification, requires space for 40 per cent of the dwelling units.

Parking for new office space was based on the principle of providing off-street space for 3% of the working population in each Neighborhood Development Area. This represents the difference between the 2% of the employment population now being provided with parking space, and the World Trade Center's plan to provide space for 4% of its employees.

DWELLING UNIT CHARACTERISTICS

Dwelling Unit Size

An average dwelling unit size of 2.0 and 3.0 persons reflects existing dwelling unit size in Manhattan today, for high income and middle income families respectively. These figures have been adjusted upward to account for the attempt to provide a range of housing choices for different incomes within each Neighborhood Development Area.

Number of Dwelling Units

The total number of dwelling units was determined by dividing the total number of future residents in each Neighborhood Development Area, as determined above, by the average dwelling unit size.

Ratio of Children Per Dwelling Unit

The ratio of children per dwelling unit was based on data gathered by the School Section of the New York City Planning Commission. This ratio is 0.1 child per upper income dwelling unit and 0.3 children in middle income dwelling units For the purposes of calculation, each Neighborhood Development Area was assumed to consist of one predominant income group.

Number of Children

The number of children in each Neighborhood Development Area represents the number of dwelling units in that Area multiplied by the appropriate ratio of children per dwelling unit.

Active Recreation Areas

Standards vary so widely in this field that no single figure could be accepted to cover so complex a problem One standard used for urban situations by the National Recreation Association calls for 2.5 acres of open space per thousand residents, of which 1.25 acres is to be specifically devoted to active recreation. This column lists the results of this equation. While the overall downtown total roughly corresponds to this requirement, there are of course substantial variations within each development unit. The stress, however, is on small units serving each local cluster of residential buildings (see Optimum Site Plan, Graphic 77).

Schools

To determine the number and type of schools, it was first necessary to determine the age distribution of prospective students The following table, based on information supplied by the New York City Planning Department, gives the currently accepted breakdown distribution of prospective students for different income levels.

	Children/D/U.		
	High	Middle	Low
Primary School K-4	07	.20	55
Intermediate School 5-8	.07	.20	55
High School 9-12	06	20	.55

Far each Neighbarhaad Develapment Area, the number of probable students was calculated by multiplying the total number af dwelling units in that area by the factor assumed to represent the predominant income level in that Area.

To determine the number of schools necessary to house these students, it was necessary to determine the optimum size af each of these schools. For planning purposes,the School Section of the New York City Planning Department uses the figures below, which were adapted for our purposes.

Type	Optimum Size
Primary	1200 students
Intermediate	1800 students
High	4000 students

By these standards, a high school for the exclusive use af the new dawntown residential community would nat be required. However, if the new downtown demand is taken in conjunctian with the need for new service for overcrowded schoals in the area to the northeast, a downtown high school could well be justified.

Libraries

Standards used by the New York Public Library far planning new facilities was adopted. Two libraries are called for within the Neighborhaod Development Areas, each serving a populatian af 35,000 - 50,000 persons, who live within a 1/2- 1 mile radius.

Cammercial Space

Based an current experience in major U.S. cities, approximately 4,000 square feet of retail space has been provided for each 1,000 residents. It is assumed that each Neighbarhaod Develapment Area wauld contain its own retail facilities,lacated in large part on or adjaining the waterfront community plaza

Residential Density

As shawn in the Table (Graphic 63), the net residential density is defined as the density per acre af all land used exclusively for residential use. Gross residential density (or "neighborhood density") is the density per acre of all newly developed land within each Neighborhood Development Area.

Subsequent detailed analysis af one prototype development district (the East Side Case Study) indicated that the de facto zoning resulting from these calculations would be better expressed as R-9 rather than R-10. That is to say, instead of analyzing each separate building parcel as a discrete unit (for which R-10 is an appropriate zoning category), the entire residential partian of the district should be treated as a single zoning entity, including open space, recreation area, etc. much of which has a public character. This would allow for a far more flexible program within the planning district.

The East Side develapment district (between Fulton and Wall Streets) is 1,060,000 square feet or 24.5 acres, of which the residential portion is calculated to be 19.5 acres. [1]

This means a residential density, for this portion, of 615 persons per acre (12,000 by 19.5).

The gross overall residential density (including the office area) is 490 persons per acre.

The residential density in the built-up residential area (excluding waterfront plaza and esplanade) is 830 persons per acre

In calculating zaning density it is the first of these definitians -- the residential area af 19.5 acres -- that is the mast appropriate. In this situatian, assuming medium-to-luxury apartments averaging three rooms and around 900 sq. ft. per dwelling unit -- the mast suitable categary would be R-9. That is, dividing the total square footage required -- 5.5 million -- by the land available -- 850,000 square feet results in an FAR of 6.5, which is at the battam of the range provided for in the R-9 Categary.

[1] Since the affice and residential portians of the district are nc geographically exclusive of each other, this figure has anly abstract significance. It was arrived at by dividing the designated residential and affice flaor areas (5.5 million and 2.2 million sq. ft.) by the respective FARs (12 and 18) to abtain a proportian of the "land" covered by each usage 80% of 24.5 acres would thus be residential, that is, 19.5 acres.

APPENDIX IV

COST ESTIMATES: DEPRESSED HIGHWAY AND NEW LAND FILL

Highway

Fundamentally, the praposed highway solutian is what is termed o "one bosement" solution, which is ta soy, one level below grode.

The tap of the prapased fill is at plus 7 (Baraugh Warks Datum, Meon High Tide ot Bottery - 0), which is two - ta - three feet abave existing grode ot the edge of the island. The new raodway, which requires 14 feet clearonce and at least twa feet of canstructian , will then be at elevation minus 9.

Good engineering practice requires that, in designing for hydrostatic pressure, water level is assumed at faur feet obove mean high tide -- to allow for exceptianal high tides. Assuming raughly three feet of canstructian beneoth the raodway, this wauld mean approximately 16 feet af canstruction belaw this maximum theoreticol woter level (araund 1000 lbs. of uplift per square faat).

Since casts af such canstructian increase at o geometrical rate with each additianal faot af depth belaw water-line, closer analysis may suggest o madificatian af the height of the fill as ane af the voriables in fixing the final highway-and-fill cost equatian.

Placement af the highway past the bulkhead line shauld minimize its cast. No existing services need be interrupted, na relacation of utility lines is invalved. Fill wauld be placed in the future highway locatian to assist in the campactian af the materials belaw. This fill wauld then be easily remaved.

It is assumed thot the highway will be built priar to the canstructian af the structures overheod. If, hawever, they are built simultaneously, the weight of the averh ad tructures would ossist in avercoming the hydrostatic uplift, and reduce highway costs accordingly.

Far purposes of approximotion, the cost af the depressed highway has been assumed at $75 a squore faot. This is based on the updated cast of the neorby Battery Underpass (a similar "one-basement" praject), which checks aut with prajected costs far onother camparable project, the Delaware Expressway in Philodelphia (around $45,000,000 per mile).

Eost Side

The new Eost Side Highway, which will be comprised of faur depressed express lones and faur partially depressed service lanes, will thus cost around $7,000 per linear foot of woterfront development. Assuming o cast of $15 per square foat far land fill (including site preparation), the cost per linear faat af fill will be $5,000.

Thus, the cost of both highwoy ond fill for the East Side will be oraund $12,000 per linear foot. Altagether, including the bed af South Street, same 530 squore feet of land are naw available far each linear foot, moking the averoll cost of the "created" land $22.50 per square foat.

The highwoy ond fill far the Eost Side should therefore come to araund $57,000,000.

West Side

The West Side highway will be camprised of six campletely depressed lanes and faur partially depressed lanes, costing $9,000 per linear faot af waterfront development. New fill will extend 560 feet inta the river, costing $8,400 per linear faat af development. The cost of the highway and fill will thus be around $17,400 per lineor foot.

Including West Street, same 790 feet af land will thus be available far each linear foot, and the cost will be raughly $22.00 per square faot. Highway and fill on the West Side shauld therefore cast oround $132,000,000.

APPENDIX V

INTERVIEW SOURCES

In the course of this Study, a wide variety of people were interviewed, as a source of both experienced opinion and broader understanding.

Their contribution to this study has been substantial. The Downtown-Lower Manhattan Association, through its Executive Director, John Goodman, was helpful in arranging for many of the interviews.

Clark T. Abbott, Senior Engineer, Coverdale and Colpitts; John Quincy Adams, President, Manhattan Refrigerating Co.; Charles A. Agemian, General Comptroller, Chase Manhattan Bank; Edward Alcott, Chief, Planning Division, Port of New York Authority.

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John Nordlen, Vice-President, Director, Personnel, Continental Insurance Company.

Paul O'Keefe, Chorles Noyes Associotes; Roy. T. O'Keefe, Senior Vice President, Chase Manhatton Bank; Paul O'Brien, Executive Director of Printing Industries of Metropolitan New York.

Sanford Parker, Chief Economist, Fortune Magozine; Everett Post, Plonning Manager, Federol Reserve Bank of New York; Anthony J. Peters, Executive Vice-President, Cushman & Wakefield, Inc.

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Charles H. Upham, General Manager, John Wanamoker Department Store.

William Walker, Comptroller, U.S. Steel Corporation; Max Wechsler, Partner, Wechsler & Schimenti; Admiral John M. Will, President, American Export Lines- Isbrandtsen; John Wilson, Director of Marine Terminal Design, Port of New York Authority; Edward Wagner, President, Seaman's Savings Bank; Crawford Wheeler, Vice-President (retired), Chase Manhottan Bank; Grant W. Van Saun, Vice President, Irving Trust.

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APPENDIX B

ORGANIZATION OF THE STUDY

This study wos conducted by three firms, serving os Consultants to the Deportment of City Planning. It was begun in Morch 1965 ond completed in May, 1966.

The work wos done within the context af the full participation and ossistance af the staff of the Department of City Fionning. Its directar, William F. R. Ballard, persanolly guided the study throughout its length, providing bath ideos and leodership.

Mr. Richard K. Bernstein, the Department's Executive Directar, and Mr. Alan K. Sloan, the Assistant Executive Directar, assisted in the overoll develapment af the study.

Mr. Jock C. Smith, Special Consultont ta the Department of City Planning, had speciol supervisory responsibility far the Lower Manhotton Plon.

Mr. Joseph Leiper, Directar of Tronsportatian Planning, supervised the development af the transportotion side of the study.

The first series of analytical mops af Lawer Manhattan were prepared by the Deportment af City Plonning under the directian af Mr. Arthur Wrubel, wha served as coordinatar with reloted city agencies, ond, as the Deportment's Project Manager, warked clasely with the Consultants.

Amang other members af the Deportment's staff who were porticularly helpful at various criticol paints were Irving Ashwarth, Ralph Field, Edwin Friedman, Harvey Gordan, Millard Humstone, Lebyl Kahn and Adolph Oppenheim.

In o still lorger context, the Report is based an the substantial contribution and support of many City depor tments and ogencies, in particular the Departments of Traffic, Parks, Highways, ond Public Works ond the Tronsit Authority. The help given by the Housing ond Redevelopment Baord, an agency heavily invalved in the downtown area, wos olso very important ta the study, os was the help of the office of the Borough President.

The tronsportation phase of the study benefited from the guidonce of a special graup established far this study -- the Street System Technical Committee far Lower Manhattan -- compased of representotives of the Deportments of Traffic, Public Works, Highways, the Barough President's Office ond the New York City Transit Authority.

Amang civic ond business arganizotions, the cooperation of the Regianal Plan Assaciatian and the Downtown - Lawer Manhattan Associotion wos of particular impartance -- the former for helping pinpoint significant regional trends, ond the latter for having prepared the basic groundwark for this Report in its two earlier studies af 1957 and 1963. Discussions with the DLMA were also helpful throughout the length of the study.

The Part af New York Authority ond the Tri - State Transportatian Commissian also lent their great technical and professional support.

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