

# Transportation in the Center City Development Plan for Philadelphia

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The roots of a development plan lie in past ideas and/or decisions. The plans themselves generally come out of an interplay over time that is extremely difficult to retrace and recapture. And the development plan adopted by the Planning Commission in 1960 will someday be one of the roots for further plans. The decision of William Penn's surveyor to place the City at the narrow point between the Delaware and Schuylkill Rivers and to reserve five park squares was the beginning. The siting of Independence Hall and adjoining buildings of the period are important elements in the Center City structure proposed today. The construction of the railroads, and later the subways, coupled with the development patterns they generated, suggest both limits and new requirements for the present plan. The Benjamin Franklin Parkway, laid out first in 1904, strengthens visual structure, locates important metropolitan cultural resources, and provides traffic access to Center City. Penn Center has both replaced an obsolete barrier to development and opened Philadelphia's eyes to Center City's potential. Ideas expressed in the Greater Philadelphia Exhibit of 1947, the CBD Study of 1950, the report Plan and Program (1955) of the Urban Traffic and Transportation Board all have, and continue to, contribute to the plan for Center City.

● A MAJOR PREMISE of the Physical Development Plan for the City of Philadelphia is that the City should have a dominant and intensely developed center.

The Development Plan for Center City is based on the premise that the following activities are the proper components of the Regional Capital:

1. The center for economic decision-making in the region.
2. The center for specialized professional and business services within the region.
3. The chief market place of the region.
4. The cultural center of the region.
5. The City government and regional offices of state and Federal governments.
6. Special manufacturing and goods distributing functions for the region.
7. High intensity residential areas.

Estimates of the Center's economic potential have been made in the context of estimates of employment distribution for the metropolitan area. Assuming a metropolitan transportation system as proposed in 1955 by the Urban Traffic and Transportation Board, it has been estimated that Center City's employment can be expected to increase by 11 percent by 1980 (1). In absolute numbers this means an increase from 375,000 in 1956 to 416,000 in 1980. Proportionately, as one would expect, it represents a relative loss from 25 percent of the 1956 metropolitan employment to 19 percent of the 1980

metropolitan employment. Yet this modest increase in employment produces an increase in floor space requirements of some 20 million sq ft. This increase in floor space, coupled with the necessary replacement of obsolete space indicates a great potential for rebuilding if the necessary improvements in access can be made.

An important aspect of this increase is its composition. Employment in retail trade is not expected to increase. The potential in goods-handling activities is 4 percent, but actually this may occur on the periphery of Center City. Business and consumer services on the other hand are expected to increase on the order of 15 and 80 percent, respectively. Business services comprise such activities as finance, insurance and real estate; professional business services; communications; public administration; wholesale agents. Consumer service increases are forecast in medical services and education.

These of course are statistical estimates of potential. The plan may deflect some of these activities elsewhere, and may, in turn, attract a greater number of other activities. The important thing is the general direction of change in a reasoned estimate of generally increasing potential if the metropolitan transportation requirements are met in a systematic way.

A characteristic of an efficient center is small size. The statistical area defined as Center City comprises 2.2 sq mi. To put this in scale, the City's area is 134 sq mi and the present urbanized area in the region is estimated at 500 sq mi.

The high intensity core of Center City (to be discussed later) is exactly one-half a square mile.

### THE METROPOLITAN TRANSPORTATION PLAN

Whether or not it is an objective to increase the activity of Center City, and whether or not the economic estimates of potential are up or down, any metropolitan transportation system must focus on this area because it will remain the most important particular space in the region. Choices must be made in terms of degree of improvement of different kinds of facilities, and choices must be made in timing, but there is no choice as to the general form of the transportation network.

Figures 1 through 7 show the proposed metropolitan transportation plans within the City of Philadelphia and the immediate environs.

The general configuration of the expressway system is similar to most: radials, circumferentials or distributors, and a central loop. Underlying the expressway system is the proposed arterial street system. Within the City there are 100 mi of expressway in the system and about 500 mi of arterial street (Fig. 1). This density of expressways is probably less per square mile or per 10,000 of population than in some other cities (2). In Detroit there are proposed for example, 150 mi of expressway for a city of about the same population and geographic extent. The reason for Philadelphia's lower mileage is the proposed use and expansion of the rail rapid transit system.

Figure 2 shows the proposed rail system. It consists of improvement to the existing subway system and extensions thereto, and of improvement to the commuter rail system by connecting the two separate systems downtown (explained later). To retain ridership on these systems (and if possible to increase it) is a basic tenet of City policy. This decision is based on pragmatic grounds rather than on a scientifically based prediction of the probable distribution of travel mode. These grounds are as follows:

1. The carrying capacity of the rail transit systems (including commuter rail) represents a resource much too valuable to permit withering away.
2. The Center City as now constituted in space cannot be served by automobile alone.
3. The Center City development objectives for the future, and for certain central (regional) activities displaced from Center City, (for example the Universities) can not be achieved without a combined rail and expressway system.
4. The outlays required for expressways, for street connections to them, and for downtown parking facilities, can be kept down if ridership on the rail system can be held up.

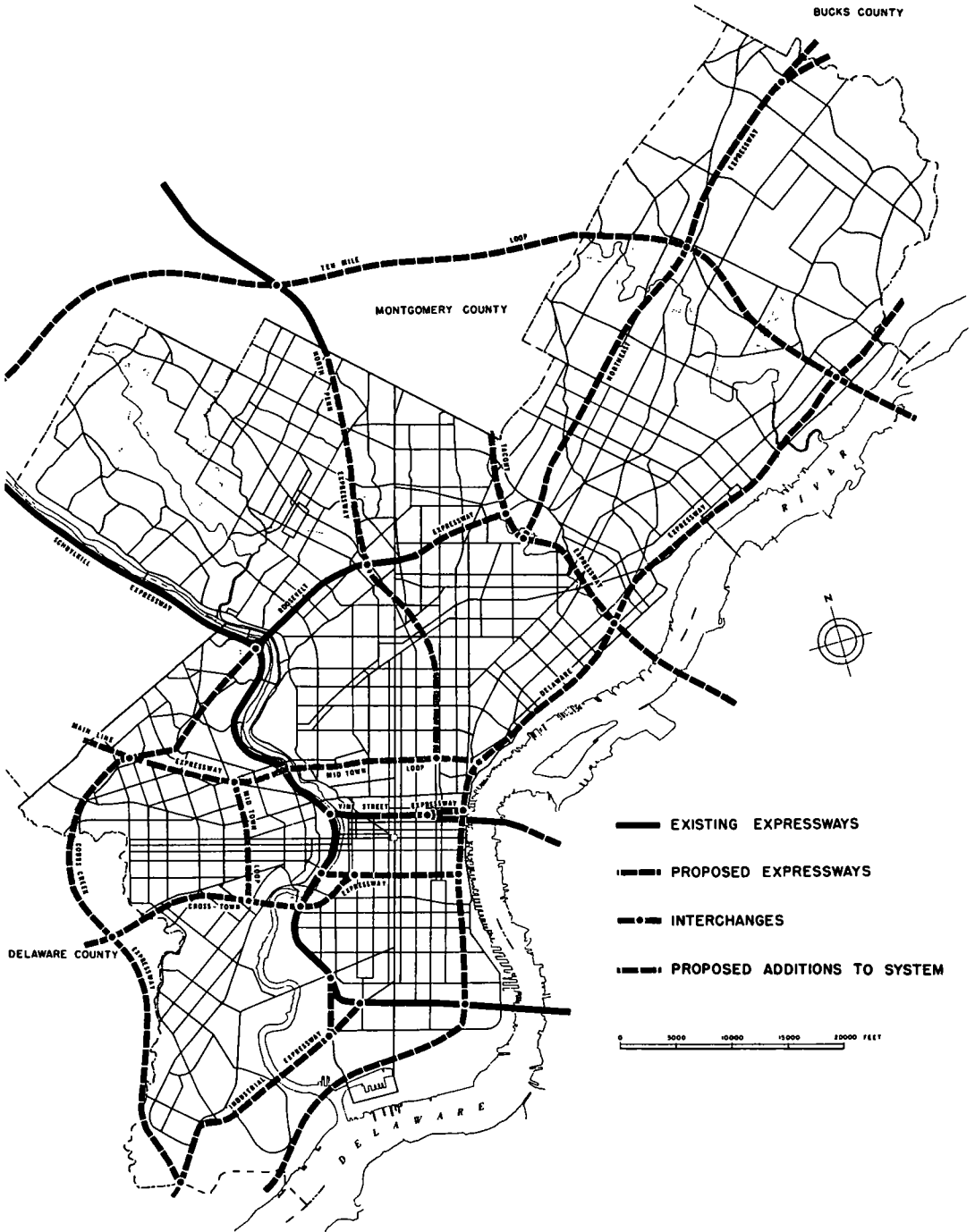


Figure 1. Expressway and arterial system.

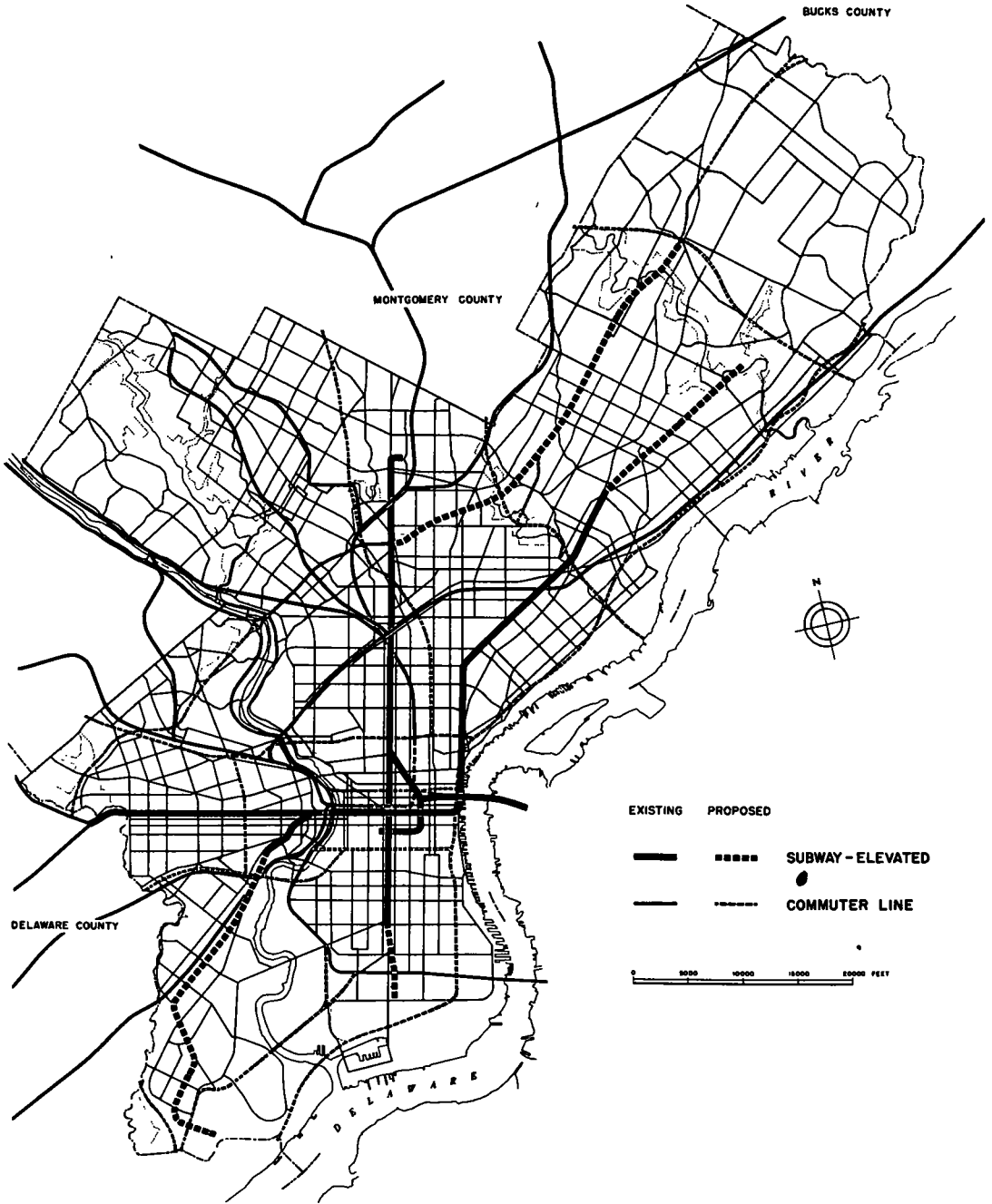


Figure 2. Rail transit plan.

In support of these grounds, it is argued that:

1. Peak-hour rapid transit riding has not declined.
2. The level of quality of ride between present automobile and (most) present transit equipment is in favor of the automobile and if speed and comfort of rail transit vehicles are improved, transit will hold its own and may recapture some.
3. Increased frequency of service and reduced fares on commuter rail lines can (and has) increased ridership.

Implied in the foregoing is a recognition that (as will be explained more clearly later) rail transit is primarily a peak-hour service facility. This means it is more expensive service than it was in the heyday of transit.

The obvious differences between the expressway system and the rail transit system are that the latter comes to a point in the center and there are no crosstown links. The rail system penetrates the heart whereas the expressway system skirts it.

### THE CENTER CITY LAND-USE PLAN

The proposed spatial composition is shown in Figures 3 and 4.

This spatial composition generally fixes the daily destination pattern, hence suggests terminal points, and, consistent with the objective of protecting the viability of the various land-use areas, limits possible channels of surface movement. Conversely, the location of present and proposed channels of high capacity movement and terminals suggests elements of the spatial composition.

Central land uses may be viewed in either of two ways, either of which is inadequate as a basis for a plan. First, to look at uses in terms of the particular functions, and the characteristics and requirements of each function; and second, to look at uses in terms of their relative competitive strength to command space. It is a requirement of the plan that it propose a use pattern that is both economically and functionally workable. To some extent, but not completely, these are two sides of the same coin.

Viewed in the first way Center City is, and will be, composed of uses which have different external characteristics, service requirements, environmental requirements. Thus Center City is composed of central office uses, central department and retail store uses, subcentral office uses, institutional uses, central industrial uses, and residential uses. Each of these is a primary user in various sections of Center City. A crude but logical structure already exists.

Viewed in the second way, Center City activities may be classified in terms of their productivity on the ground (3). Thus, uses with high value added per worker combined with high density tolerance can command the most expensive space, the space which is most accessible to the metropolitan region as a whole. Uses with high value added per worker, but lower density tolerance or the converse, can command the next most expensive space and so on down to those with both relatively low value added and low density tolerance. The first is characterized by high intensity office uses, the second by department stores and less intensive or less productive office activity, through expensive high density residence, and on down to the goods-handling activities with lower density tolerances. Again the pattern of activities looked at in these terms forms a crude but logical structure.

The plan for Center City seeks to clarify this structure where it makes sense, to eliminate the anomalies, to reduce the conflicts, to tie together where there are gaps, and to produce a complex where each contributes to the health of Center City as a whole as well as to the health of the region for which this is the capital area.

Each of the major use areas actually comprises a mix of activities. In the primary office area, shown in black on Figure 4, business and consumer service activities occupy about two thirds of the space. It is assumed that in each major use area there will continue to be a mix but the primary use will occupy more space and plans for new development and redevelopment will exclude the conflicting uses. For planning purposes it has been assumed that business and consumer service activities in the office core will occupy about 70 percent of the total space.

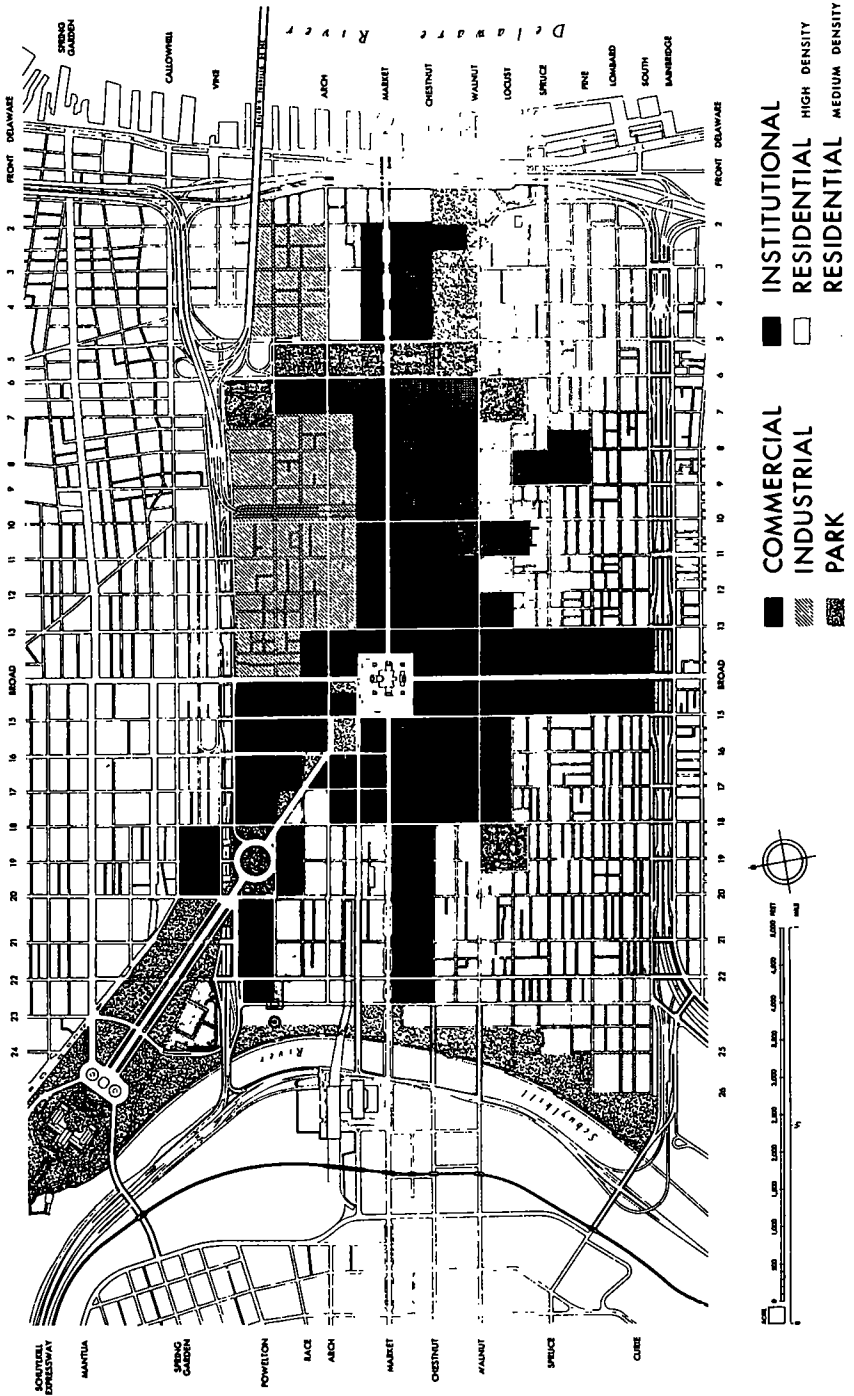


Figure 3. Proposed land use Center City, Philadelphia.

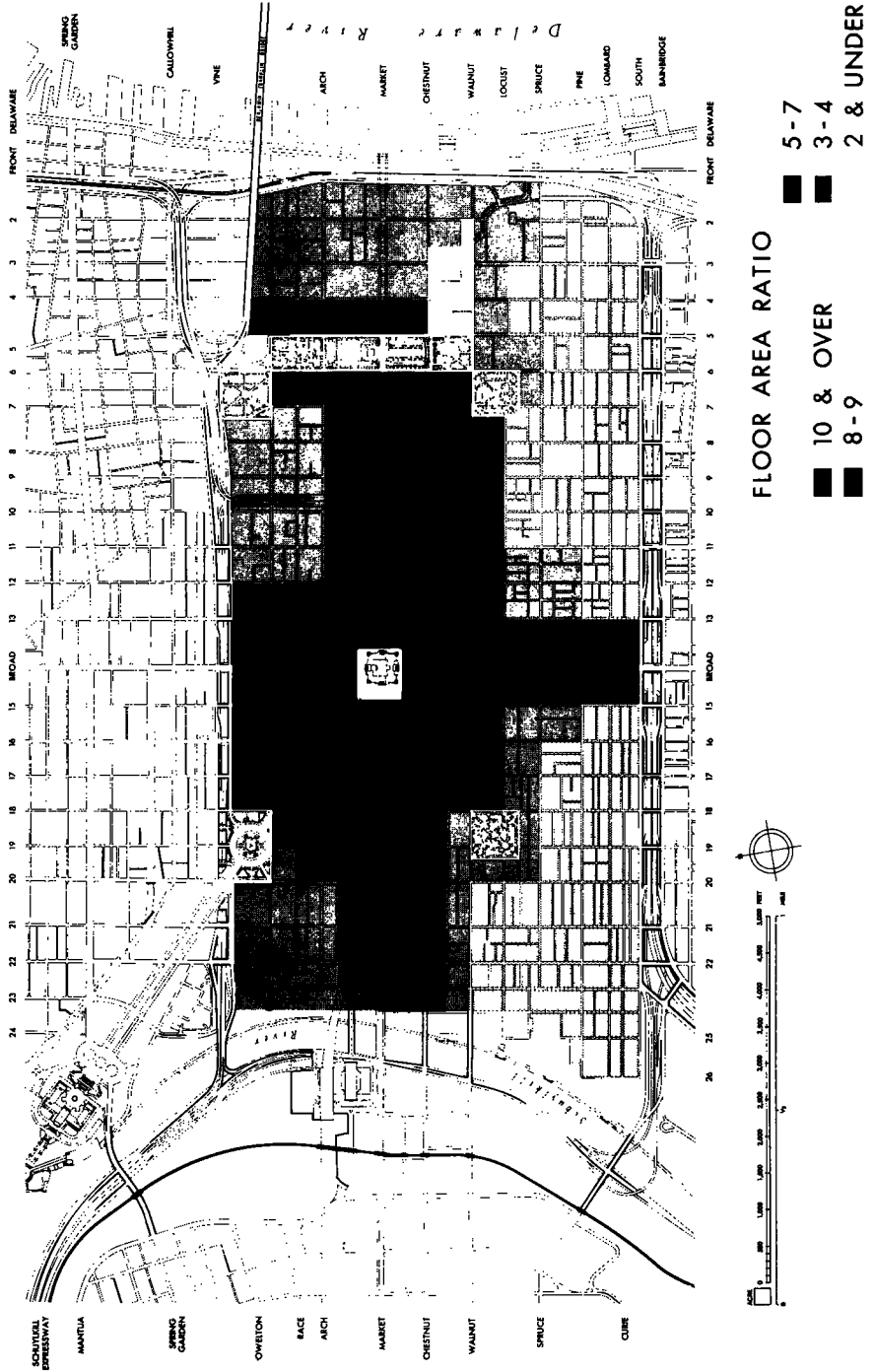


Figure 4. Proposed intensity, Center City, Philadelphia.

In simplified terms, the spatial composition proposed for Center City consists of a high intensity core of office concentration around City Hall and weighted toward the south and west, a slightly lower intensity office-retail mix to the east, maintenance of the department store concentration around Eighth and Market Streets, and a subcentral office area around Independence Mall. Retail activity will continue in a band along Chestnut Street through the office areas. Industrial uses will be confined largely to the northeast quadrant, and institutional uses primarily in the northwest quadrant and on South Broad Street. Residential uses will extend across the length of Center City on the south, and along the Schuylkill River on the west.

The intensity pattern proposed is directly related to the existing and proposed transportation system. As a bench mark to help visualize the floor area ratio proposed (ratio of floor area to ground area of the lot) Penn Center has a floor area ratio of 10.

The key to the transportation requirements lie in the scale. The highest intensity area, largely office, is proposed to occupy 215 acres. The radius of this area from its centroid is about 1,700 ft. The immediately adjacent office-retail area to the east occupies another 40 acres. Including the next adjacent peripheral office and retail areas brings the heart of Center City to 320 acres. In short, the efficient functioning of downtown, and indeed its development potential, is based on its being a small area.

The kind of office activities seeking locations in the heart depend on easy pedestrian travel to satisfy the daily needs for face to face contact.

This central area requires high capacity delivery to and from residential areas during peak hours and flexible high speed access from a variety of origins, particularly non-residential areas, during off-peak hours. Thus, the efficient functioning of this high intensity area requires both high capacity rapid transit access and high capacity highway access. The latter then generates demand for parking facilities immediately adjacent to, or within, this core area.

Just as the land-use plan generates transportation requirements, it limits the range of their solution. The proposal to retain, enhance, and expand residential development across the southern part of Center City means that surface vehicular traffic through this area should be limited. The problem is made easier by the fact that South Philadelphia is a peninsula, but the issue is by no means eliminated thereby. Egress from the Crosstown Expressway must be dealt with in a manner that avoids violation of these residential neighborhoods.

The case on the north is the converse. Non-residential activities not only can withstand the impact of the street traffic generated from the more populous part of the region serviced through the northern entrances but require good street service for access to the industrial and institutional uses in this area.

The proposed land-use pattern requires high capacity access at its center and in the northern quadrants, limited vehicular traffic in its southern quadrants.

#### THE CENTER CITY TRANSPORTATION PLAN

It is clear from the foregoing that the transportation system serving Center City is composed of several separate systems. It is also clear that the separate systems have different kinds of problems and deficiencies to overcome. Finally it should be evident that parts (not all) of these systems are interrelated.

Figure 5 shows the "moving parts" of the total system, the expressways shown in solid lines and the rail in dashed lines. The core area is shown in gray.

The expressway loop has two functions: to serve Center City, and to bypass traffic destined elsewhere. (This latter function is also to be carried out by the midtown loop shown in Figure 5.) The effectiveness of the loop to serve Center City itself obviously depends on the ease with which the intervening distance between loop and core can be traversed. This cannot be accomplished by dumping traffic directly onto city streets already under a heavy working load where they cross the loop into the center. And it depends on the provision of parking space in, adjacent to, or easily accessible to the core.

The subway system requires station improvements in Center City. Station platforms on the Market-Frankford line east of Broad Street have to be lengthened to increase



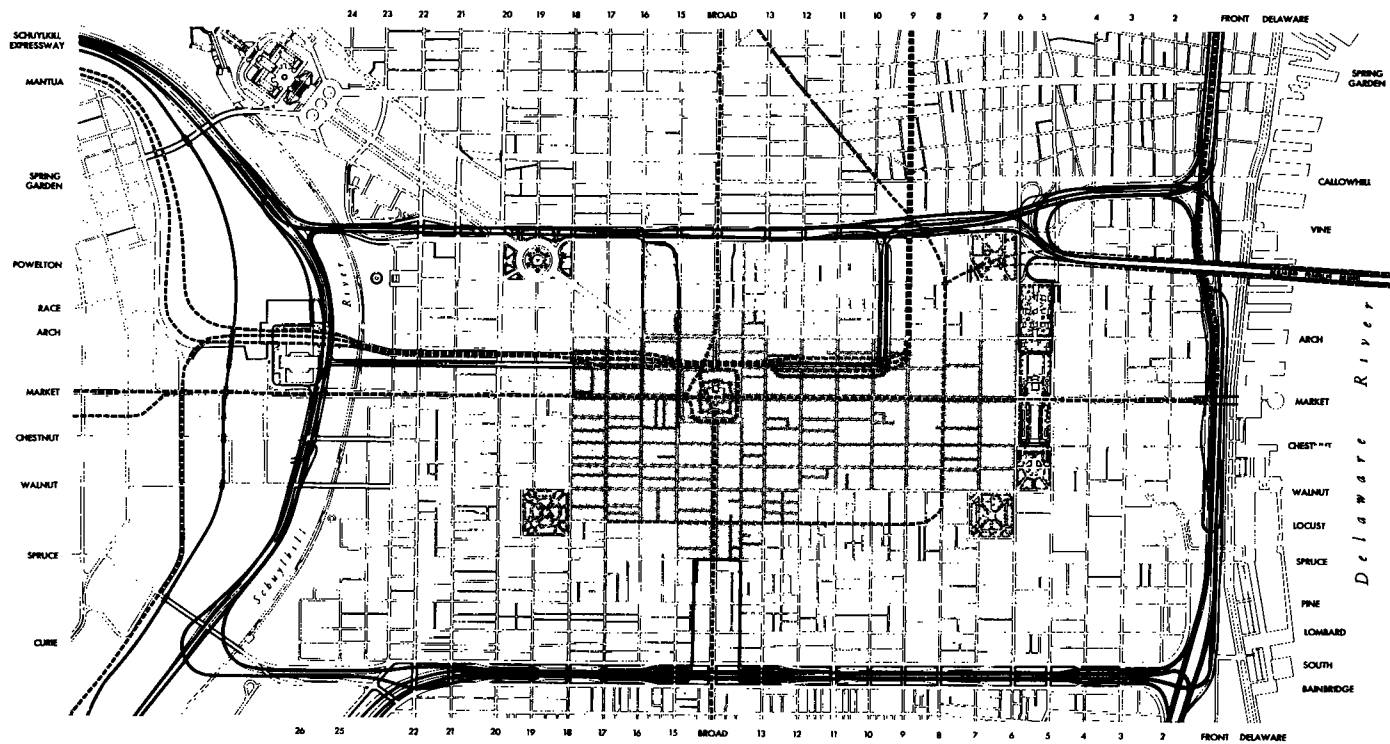


Figure 5.

- == EXPRESSWAYS
- ACCESS RAMPS
- - - RAIL TRANSIT

capacity. Platform lengthening along the entire line would increase capacity one-third because it would permit 8-car trains to operate instead of the present 6.

The Broad Street subway has adequate capacity, recently increased by the initiation of express service on trackage—the space for which was provided but not built when the line was first constructed.

To handle South Jersey service the Locust Street Bridge line will require improvement of the major station at 8th and Market Streets.

The above improvements increase capacity. But capacity is only the numerical aspect of the problem. The comfort and attractiveness of the entire system has to be increased. The City has recently purchased new cars for the Market-Frankford line, which will replace a fleet of cars built between 1906 and 1922. The quality level of such rapid transit ride is hardly equivalent to that of automobile travel. Finally, Center City stations must provide easy and pleasant transfer to foot travel at the destination point.

The most important change in the commuter-rail system is the proposal to connect the two lines underground in Center City (Fig. 6). This is shown by the heavy dashed line just north of City Hall. The present Reading Terminal at 12th and Market Streets would be removed and the line carried underground to 9th Street and then north. This device would permit the entire commuter service area of the two railroads two destination points in Center City, each in the core, although in the northern part. Thus, the entire suburban area served by the railroads can more conveniently be connected with Center City. Elimination of terminal facilities and replacement at the eastern point by a new station would increase capacity of the system by 25 percent. Finally, operating cost savings would amount to an estimated 1.7 million dollars annually.

Figure 7 shows the addition of the "static parts" of the entire complex of systems. The black areas are parking facilities, the white areas are subways and commuter rail stations.

The expressway system is connected directly to Center City parking facilities via separate ramps or widened streets. The eight major facilities shown provide 17,000 spaces. Four of these parking facilities provide 14,000 spaces accessible without entering the City street system. The most direct is the 3,000 car aboveground garage on East Market Street. This is in the core area. The next most is at South Broad Street where a 6,000 car underground facility abuts the southern boundary of the core. The remaining two are separated from the core. This distance would be covered by an east-west trolley or bus system operating between the garages.

The remaining facilities would be accessible via widened arterial streets. With one exception, all of these are in the core area.

The expressway system need not be limited to function as a channel for automobiles only. It is expected that buses will use it in increasing numbers—both inter-city and intra-city buses. The problem is how to handle the buses in the core area. It is proposed that a major bus terminal be built on East Market Street served by the same direct ramps as the parking garage. To reduce the limitations of a terminal as compared with operation along streets, the terminal would have two stops within it, one at 9th Street, and one at 13th Street.

The distribution of rail stations (Fig. 6) is self explanatory.

Figure 7 shows the final step in the delivery system and the basic form of the internal circulation system.

The intervening distance between parking of car or debarking from transit vehicle should be short enough to be covered by foot. Further, as stated earlier, the functioning of the core area depends in large part on pedestrian movement. This pedestrian movement, where possible, and particularly where it is heavy, should be separated from vehicular traffic.

Proposals in the plan for facilities limited to pedestrian movement are shown as underground concourse or elevated walkways. Figure 7 shows how these tie together the delivery system and the core.

In one of the lines shown, the distance is perhaps excessive, that from the South Broad Street parking terminal to the core. The concourse is big enough to permit the installation of a moving walkway or other similar device to close the distance.

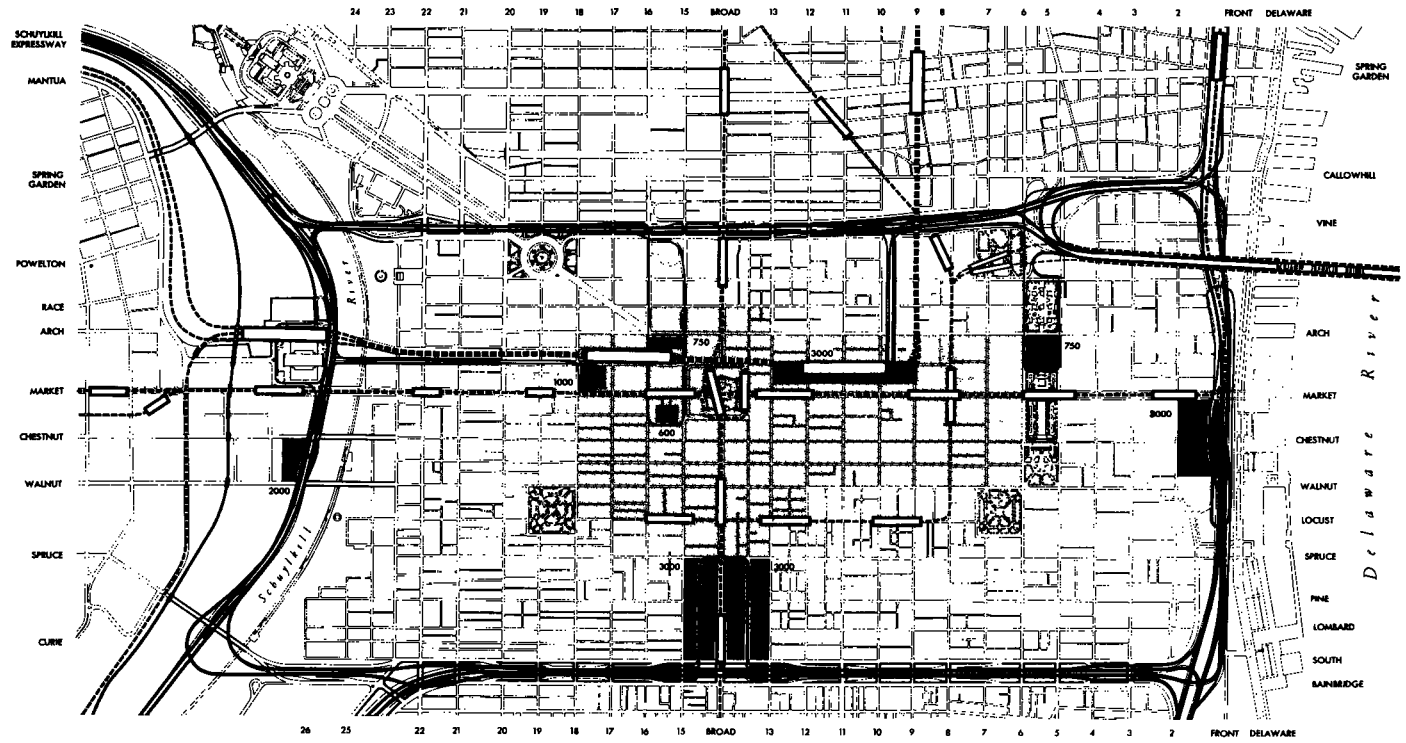


Figure 6.

- == EXPRESSWAYS
- ACCESS RAMPS
- RAIL TRANSIT
- STATIONS
- PARKING

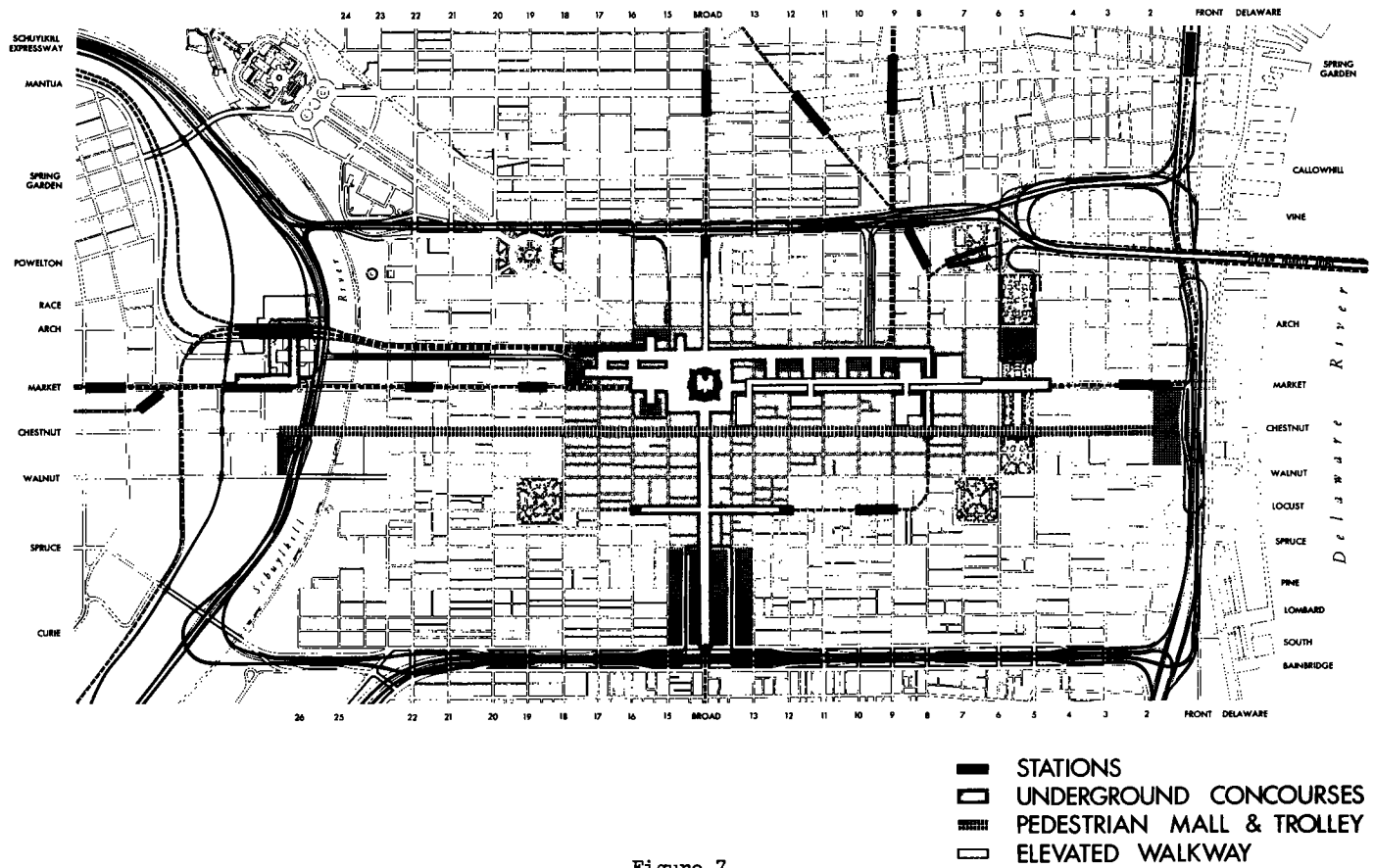


Figure 7.

In two other instances the distance is too great to be closed by walking. This is distance on Chestnut Street between the parking terminals adjacent to the expressways (Delaware and Schuylkill) and the core. It is proposed to connect these two garages by transit vehicles operating continuously between them. This is shown by the double dashed line in Figure 7. This system increases the carrying capacity along Chestnut Street itself and permits it to be closed to automobiles. The cartway can be narrowed and many of the advantages of the pedestrian mall realized. Finally this device permits easy movement east and west along the City's major retail street and between the core and the historic areas to the east.

### SUMMARY

The proposed transportation system provides the capacity for delivery of an increased work force in Center City and for more rapid and convenient access for off-peak business and shopping trips.

It is related to the intensity pattern of Center City as proposed.

The "transportation machine" created on East Market Street composed of the underground railroad connection, the improved subway station, the major bus terminal and parking garage connected directly with the expressway system radically increases accessibility to a presently underdeveloped area. This has led to the proposal for a major development project at this location to realize the potentials of Center City.

The several proposals for Center City, taken together, produce a complex picture. But it is not a machine in which all the parts depend on all the other parts. Many of these proposals can be undertaken separately and separately improve transportation in and to the Center.

It may be argued that such a complex of systems implies competition between them. This is so. There are a variety of transportation needs to be met: work trip of clerical worker residing in the City, work trip of executive living in the suburbs, business trip of professional working in an industrial area, shopping trip of resident from City or suburb. Meeting these needs requires a variety of modes.

The issues of downtown transportation requirements have been clouded by attempts to oversimplify them, and more particularly by expectations or assumptions that each kind of system will do more than its capabilities and limitations permit. The problem of delivering persons and goods to a complex downtown area in a large and complex metropolitan region is a complicated one. To expect the solution to be simple is to expect too much. The plan summarized herein is a complex solution to a complicated problem.

### REFERENCES

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