PARKING GARAGE OPERATION

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PREFACE

Due to the growing importance of parking-space needs and the many problems encountered in providing such space, and because of the importance of transportation in much of the business of our country, it is hoped that this publication will assist those concerned with providing terminal facilities in conjunction with automotive transportation.

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CHAPTER ONE

INTRODUCTION

During recent years increased vehicular use brought unprecedented demands for parking space. Also augmenting the demand has been the continued improvement in the economy of most areas. Merchants and businessmen have long realized that adequate provision for parking was essential to prosperity in the central business district. Investments in land and improvements must be protected.

Planned programs are essential to overcome the increasing deficiency of spaces and to provide a basis for future requirements. Businessmen fully realized the urgency of taking positive steps to maintain the tax base, the focal point of metropolitan area economic and business activity. As new spaces were added, however, parking demands usually increased. Important factors in their efforts have been the attractiveness of the facilities, well located with respect to parkers' destinations and to improved traffic accessibility.

The attractive appearance of a parking facility usually indicates —and often induces—other improvements or face-lifting that tend to revitalize the area. This emphasizes the importance of good planning and location. Parkers demand economically priced stalls close to their destination.

In smaller cities, curb space provides most of the parking facility. As the city grows, curb spaces are usually supplemented with surface parking lots or garages. Garage facilities have been relatively rare until cities reach an undesirable situation of traffic stagnation. In larger cities garages provide only about one-fourth of the supply.

The initial step in developing a parking program involves a comprehensive study. The basic method has been outlined and used by the United States Bureau of Public Roads and by engineers. The study includes a parking space inventory, and interviews with parkers to determine their origins, destinations, walking distances, duration of parking, and other essential characteristics. Generally, the need is obvious long before appropriate action is taken.

Parking demands are calculated for each block of the central business district. The need for additional spaces plus parking characteristics are essential guides in selecting sites and estimating usage, revenue, and operating costs. These needs are usually projected for periods ranging from ten to fifteen years, enabling the staging of parking facility development.

Increases in vehicle registration, population, and floor area of business and retail establishments are key factors in projecting parking demands. Estimates are made of anticipated losses in curb and off-street parking spaces. In most cases, off-street parking spaces have not increased unless a properly planned and executed parking program was initiated.

Traffic accessibility and abundant parking space are key factors in developing the business area. Curb parking should be removed as fast as off-street parking improvements are provided to produce adequate traffic lanes. Interests of merchants should stress more off-street facilities rather than a retention of curb parking. Actually, the solution of the parking problem involves an orderly retreat from curb parking to off-street parking.

As parking demands increase, it becomes essential to develop permanent parking lots and structures to supplement the present supply. Since these facilities represent a substantial capital investment great care should be used in design, location and financing to insure soundness and suitability.

TYPES OF PARKING FACILITIES

There are two basic types of off-street parking facilities: Surface lots, and multi-deck structures. Parking lots in the central business district are usually in areas not occupied by buildings. Such CBD lots usually have little guarantee of permanency. The enlargement of adjacent buildings or the construction of new buildings often eliminates surface lot facilities. Some, however, were created by the demolition of outmoded structures. In contrast, parking *garages* usually represent a permanent structure. They provide considerable capacity in a small area, often in highly congested sections where parking demands are highest and where the absence of facilities affects the volume of trade.

Facilities may be further classified as self- or -attendant parking. They can be considered in terms of ownership—whether publicly owned and operated; publicly owned and leased for private operation; or privately owned and operated. Parking facilities may be operated as an adjunct to another business where there is a mutual benefit, or as an individual enterprise.

CITY ACTION

Many cities have launched concerted parking programs to maintain the economic vitality of the business district.

The provision or lack of provision of parking in terminal facilities has a marked effect upon income-producing values of property situated within the area. Adequate parking, terminal and free access facilities are vital to a community's business health. With concerted city programs, most parking plans have been developed and operated by private enterprise.

There are essentially four possible levels of participation by municipalities in the development of parking:

1. *Technical Assistance:* Many communities have conducted comprehensive studies to ascertain parking needs. These studies have been made available and served as guides to private city development of facilities by private enterprise.

2. *Land Acquisition by the City:* One of the major problems encountered by private enterprise is the assembling of land parcels to provide suitable dimensions for an efficient garage or lot development where parking is essential. Multiple and absentee ownership often are contributing factors. Some cities using their right of eminent domain have acquired properties and leased them to private enterprise for the development of parking facilities.

3. *Land Acquisition and Construction by the City:* Complete development of the facilities, including land acquisition and construction, has been resorted to in numerous municipalities. Financing methods have included general obligation and revenue bonds, or accumulated revenues. After construction, the facilities have been either leased or managed by experienced operators.

4. *Land Acquisition, Construction and Operation by the City:* The activities of many municipalities include complete development and

operation. Finding no other way to provide the needed off-street parking, many cities have developed and now operate extensive facilities, including both lots and garages.

PURPOSE AND SCOPE OF STUDY

To collect data on parking garage and lot development, financing and operating procedures, the Eno Foundation undertook this study. Emphasis was given to garage operations and finance. The previous survey of parking lot operations provided a substantial base for this exposition.[1]

Case studies of eighteen municipal garages and thirteen lots located throughout the country have been procured to present information on location, design development costs, operating procedures and costs, and revenues. No attempt has been made to develop over-all data. However, the representative cases reflected precise experiences and problems encountered in the various phases of parking development and operation.

It has been necessary to limit studies to cities in which co-operation and assistance of a qualified parking technician could be obtained. Accurate and comparable data could not be procured except through persons having a wide background in parking.

For understandable reasons, the identity of the facilities has been kept confidential. The study was limited to public facilities since fiscal records and other pertinent data were readily available.

METHOD OF STUDY

Detailed information was segregated and analyzed in the following categories: location, design, development costs, capital financing, operating procedures, usage characteristics, operating costs and revenues. The data permitted more elaborate analyses of garages and lots by their very nature of development. In most instances, detailed financing records are developed and retained for garage development. Parking lots represent a substantially smaller capital investment and, frequently, the development and operation of these facilities are included in the general budget of a department and are not readily defined.

1. *Parking Lot Operation*, The Eno Foundation, 1948. (Out of print.)

To collect information for the study, a detailed outline and specific instructions were prepared for obtaining the data required. Consideration was given to such factors as geographic distribution, population, type of operation, and types of parker ultimately served.

Studies were made of garages and lots in cities of varied populations. Two garages are situated in each of three cities; the list includes twelve states. Three garages are in cities of less than 100,000 population, and four in cities of more than 1,000,000. As shown in Table I, twelve of the thirteen lots are in cities of less than 100,000 population.

TABLE I—LOCATION OF FACILITIES STUDIED

City Population	*Number of Garages*	*Number of Lots*
Less than 25,000	1	3
25,000– 50,000	1	6
50,000– 100,000	1	3
100,000– 250,000	2	1
250,000– 500,000	3	0
500,000–1,000,000	6	0
Over 1,000,000	4	0
Total	18	13

Several of the study cities have undertaken extensive parking programs; in one, however, the garage is the only facility thus far developed. In seven others, only off-street parking lots have been constructed in addition to one garage. Four cities have developed only additional garages. Three cities have constructed both additional lots and garages.

TABLE II—WHEN GARAGES AND LOTS COMPLETED

Year of Completion	*Number of Garages*	*Number of Lots*
1958	2	0
1957	3	0
1956	1	2
1955	4	0
1954	3	3
1953	1	2
1952	2	2
1951	1	2
Prior to 1951	1	2
Total	18	13

Garages of various stages were studied. As shown in Table II, one was developed prior to 1951, nine in 1955 or subsequently. Obviously, some of the facilities are relatively new but have profited from the important advances in the past ten years in both construction and operation. Some garages are the acme of efficiency.

Maps and sketches submitted with each case study denoted the boundaries of the central business district and the core area, "Main Street," focal points of business and commercial activity. Pertinent design features outlined included dimensions and locations of ramps, aisles, offices, cashier's booths, waiting areas, elevators, and stairs.

Considerable information was made available with special emphasis on financing methods employed by the cities, or their agencies. Land acquisition and construction costs were explored on both a current base and a square foot basis.

Various types of operation were reviewed including leases and management agreements. Cashiering and ticketing procedures have been given particular attention. Other key features included the hours of operation and the number of employees.

Transient and monthly parking were related to station and time. Monthly and annual use fluctuations were noted. Analyses of operating cost included salaries, insurance, utilities, maintenance and other items. Comparisons were made of attendant and self-parking operations. Monthly and annual revenues were ascertained and incomes were related to the type of use on per-space and per-parker bases.

ADMINISTRATION

The responsibility of administering the parking program of cities may be classified in four categories:

1. An existing conventional department of city government.
2. Separate department for parking only.
3. Commission or board.
4. Public parking authority.

Of the fifteen cities in garage studies, the program is administered in three by existing departments; involving the traffic engineering department in two instances and the finance department

in another. In two other communities, separate departments of parking have been established. Commissions or boards comprised of citizens have been established in three cities, and a parking technician usually has been employed on a full-time basis. Seven cities have separate parking authorities; only four of these authorities, however, have the power to issue revenue bonds. Authorities of the other three communities have powers and duties similar to those of the commissions and boards where final decisions are made by city council.

The general duties and powers of a typical parking board are as follows:

1. It shall make complete and comprehensive studies to determine the extent and character of parking demands.

2. It shall develop estimates of the cost of acquiring real property necessary for or incidental to the construction or operation of parking garages or lots.

3. It shall prepare construction-cost estimates of public parking garages and lots, and of the cost of facility maintenance and operation.

4. It shall control the management and operation of parking garages and parking spaces owned by the city, and may, subject to approval by resolution or ordinance of the council, fix and establish a schedule of charges for the use of such parking garages and issue permits for such use in accordance with such schedule of charges.

5. It may recommend to the council the legally authorized sale, lease or other disposal, of real property acquired by the city for parking garages or parking purposes.

6. It shall encourage and promote the construction of private parking garages and parking spaces and shall coordinate the same with parking garages and parking spaces owned by the city and with existing private facilities with the view of relieving traffic congestion and promoting and aiding in the clearance, re-planning, reconstruction, and rehabilitation of substandard, insanitary areas in the city.

The purposes and broad powers of parking authorities stipulated in the enabling legislation of one state are as follows:

1. The authority incorporated shall constitute a public body,

exercising public powers of the state as an agency thereof, and shall be known as the parking authority of the city, but shall in no way be deemed an instrumentality of the city or engage in the performance of a municipal function.

2. The authority shall conduct the necessary research activity to maintain current data leading to efficient operation of off-street parking facilities for the fulfillment of public needs in parking, establishing a permanent coordinated system of parking facilities, planning, designing, locating, acquiring, holding, constructing, improving, maintaining and operating, owning, leasing, either in the capacity of lessor or lessee, land and facilities to be devoted to the parking of vehicles of any kind; provided, however, that the authority shall not have the power to engage in the sale of gasoline, of automobile accessories, automobile repair and services, or of any other garage service, and shall not engage in the sale of *any* commodity of trade or commerce.

3. The authority shall have the power to lease portions of the first floor of the parking facilities for commercial use where in the opinion of the authority such leasing is desirable and feasible to assist in defraying the expenses of the authority.

4. The authority may borrow money, make and issue negotiable notes, bonds, refunding bonds and other evidences of indebtedness or obligations of the authority, such bonds to have a maturity date of not longer than forty years.

5. It may borrow money and accept grants from and enter into contracts, leases or other transactions with any federal agency, state, municipality, corporation, or authority.

6. The authority has the power of eminent domain.

7. The authority shall have no power at any time or in any manner to pledge the credit or taxing power of the state or any political subdivision.

8. The authority has the power to establish a benefit district.

CHAPTER TWO

LOCATION OF GARAGES

The locating of garages influences use and operating procedures. Proximity and type of major parking generators are reflected in proportions of short-time shopper and business trips, long-time and all-day employee parking. The need for additional parking capacity, land availability, and the presence of other permanent parking facilities are considered in the selection of garage sites.

In the central business district of nearly every city, a core has deficient parking space surrounded by a fringe area with more space than needed. Also in most cities the surplus space in the fringe is more than enough to balance the deficit in the center. The central business district as a whole has enough parking space but not where it is needed. In small cities, there may be a space *shortage* along the *main street* but space enough on side streets reasonably near to most destinations. As cities grow, the core grows also. Accordingly, the average walking distances also increase.

The basic study on parking-space inventory habits, demands, and needs of the business district provides an accurate measure of the existing problem. The chief characteristics provide the average distances parkers walk from the parking facility to the generators. Also, durations of parking and trip-purposes are ascertained for each generator and block of the area. The core area is usually easily defined based on the parking demand and the location of the generators.

Characteristics of automobile parkers indicate the necessity to distribute parking facilities throughout the downtown district. It is desirable to have several facilities instead of a limited number of large ones. In this way, the lots and garages can be spread throughout the area of demand so that they will be convenient to major streets and routes as well as parking generators. This reduces the walking distances and spreads the traffic loads, a particular advantage during peak hours.

Many parking facilities came into existence because buildings that formerly occupied the land became financial liabilities. Build-

ings were razed to lower assessment where land was in use for parking purposes because such use offered the best opportunity for immediate cash return with a minimum of capital investment. Lots were located in a haphazard and chance manner, frequently in areas where a majority of the buildings were below standard, often some distance from the retail shopping center of the city.

The recent trend is to locate parking facilities where they will closely fit traffic needs. Since traffic demands for terminal facilities almost invariably are at a maximum in the overcrowded central business district, the question of where to seek land for parking purposes warrants careful study.

A site between the central business district and the expressway approach facilities is highly desirable since it affords an easy access to the garage and keeps traffic off congested streets. Sites should be psychologically close to major generators. Pedestrians should have a short distance to walk and not be required to travel through undesirable sections.

Location of any garage must be compromised between two factors—site cost and suitability for parking demands. Often, cost factors prevent a parking structure from adequately serving demands, and the facility may be financially unsuccessful. The concept of parking garage development is undergoing radical changes. Several years ago, a garage could be thought of as situated two blocks from busy stores and office buildings. Today, garages are designed as an integral part of the over-all development.

Construction of new highways and major routes in our cities often presents opportunities to include parking facilities and their integration with the traffic plan.

In a core area situated on level ground, a garage or a lot on a steep grade is at a disadvantage because of the extra walking effort requirement and sometimes unfavorable weather conditions. In some cities, residents are accustomed to steep grades.

DISTANCE TO "MAIN STREET"

All eighteen garages are situated within central business districts. Ten are in the core area or most highly developed section. The remaining eight garages are immediately adjacent to the core.

In many cities, there is at least one Main Street. When more than one, they sometimes are parallel, sometimes perpendicular, such as Broad and Market Streets in Philadelphia, or Broad and High Streets in Columbus, Ohio. Generally the key retail stores, office buildings, banks, and business establishments are on "Main Street."

In Table III, nine of the facilities are within one block of the main street; four are two blocks distant, and two are five or more blocks from the main retail streets. The average distance is about 2.3 blocks or about 1,000 feet.

TABLE III—RELATION OF GARAGES TO "MAIN" STREET

Distance (Blocks)	*Number of Garages*
1 or Less	9
2	4
3	1
4	2
5 or More	2
Total	18
Average	2.3 Blocks

DISTANCE TO MAJOR PARKING GENERATORS

The walking distance to primary parking generators is directly related to the type and number of users of a particular facility.

For short-time shopper and business trip parkers, facilities should be within convenient walking distance. Rate schedules should be tailored accordingly. In Table IV, three of the garages are within

TABLE IV—RELATION OF GARAGES TO FOCAL POINTS OF BUSINESS AND SHOPPING ACTIVITIES

	Number of Garages	
Distance (Blocks)	*Business Focal Point*	*Shopping Focal Point*
1 or Less	3	4
2	8	5
3	3	3
4	1	2
5 or More	3	4
Total	18	18
Average	2.9 Blocks	3.3 Blocks

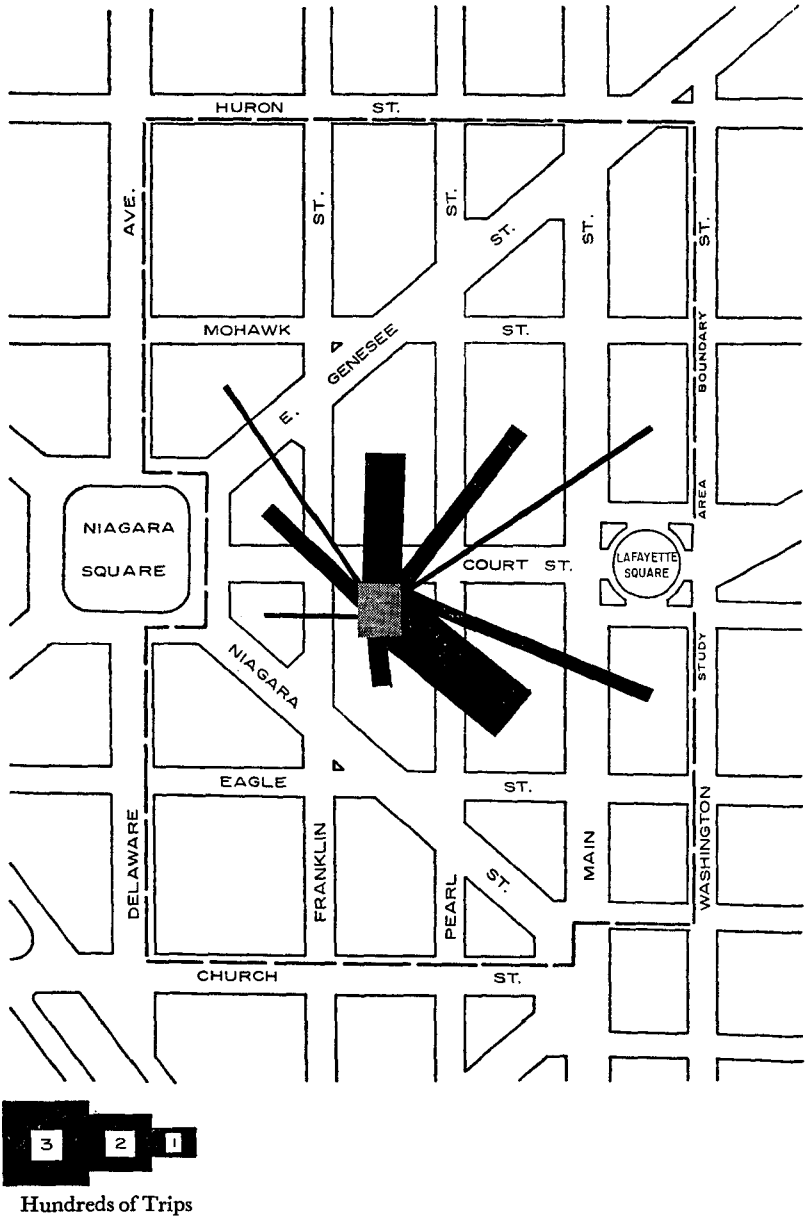


Figure 1. Parking Garage Influence Area.

one block of the focal point of business activity whereas four are within one block from primary shopping intersections. The most common distance from the focal business point is two blocks. The average distance to business and shopping focal points is 2.9 and 3.3 blocks.

Influence Area: The distribution pattern of parker destinations is shown in Figure 1 for three-garage facilities. Heavy usage by shopping and business trip parkers is generated by nearby establishments. The primary area of garage influence extends at least two blocks in most instances. One of the garages is on the main street outside the core area, and the other two are a block away. However, they are near the focal points of activity.

SUMMARY

The first step in developing a new garage facility is to ascertain the potential or market. A survey of the business area can define the over-all parking demands and needs, pinpoint the critical areas and the influence of major generators.

Studies of off-street facilities establish operating procedures, rate schedules, influence areas, walking distances, durations, trip purposes and other characteristics. While these characteristics are for existing facilities, they are important considerations in the development of a new pay facility. The parking survey defines the core area and delineates the areas of possible development of facilities.

Three types of facilities are required to provide adequate parking for the entire central business district. The *penetration* facilities must be situated in the core area, preferably immediately adjacent or as an integral part of key generators, such as department stores, office buildings, and banks. These facilities provide the turn-over parking required for shopping and business patrons. The rate schedules are correspondingly high in view of the high land costs involved.

The second ring of facilities around the core area provides short-time parking for nearby short-time generators and all-day parking for the core area destined parkers. Finally, the facilities at the fringe of the business district cater primarily to the all-day parkers. Even these facilities may accommodate some short-time parking based on the adjacent land use.

A site between the central business district and expressway approaches of facilities is highly desirable since it makes access to the garage easy and tends to keep traffic off congested streets. The frontage on two or more steets provides easier access.

On heavily traveled streets, the location on the inbound site is preferred as it is attractive to incoming patrons. Traffic on adjacent streets should be free flowing; otherwise, vehicles are unable to reach or leave the garage easily for limited patronage.

In selecting locations for parking facilities, present and future land-use planning of the area is important. Current urban renewal and redevelopment programs afford maximum opportunities to develop the most efficient and well-situated garages. Adequate parking will be essential in attracting new generators and in maintaining the tax base of the core area.

CHAPTER THREE

GARAGE DESIGN

With the growing importance of terminal facilities as an integral part of transportation patterns, considerably more attention has been directed toward garage design. There are many factors that affect the design of a parking garage. Land-area available, site dimensions, topography, street pattern, anticipated use, and the economic feasibility all play important parts.

The traffic or functional design of parking garages is of greater importance than the architectural treatment, although the two aspects must be thoroughly coordinated to produce the most economical and practical design. Frequently it has been said that parking facilities create a hole in the glass wall of our business areas, especially if the facilities are situated along key streets. The inclusion of stores and business areas and an attractive façade have been effectively used to maintain a desirable atmosphere, without the least detriment to the nearby area.

CLASSIFICATION

Garages may be classified by their *general type* as above-ground, underground or integral; by their *means* of inter-floor *travel*, elevators or ramps, or by the method of *operation*, attendant parking, self-parking, or mechanical.

The method of operation—attendant or self-parking—a significant factor, dictates the interior design. Different design standards apply to each type. Self-parking is rapidly becoming acceptable to all types of parkers, including shoppers, businessmen, and employees. With self-parking, customers park their own cars, may return and deposit packages and experience fewer delays on entering and exiting. The major advantage of an *attendant* parking garage is slightly less area is required for car space, since many of the vehicles are stacked or double-parked.

Twelve of the eighteen garages in this study offer complete self-parking; four are attendant operated. Table V. Two facilities have combination parking: *monthly* parkers park their own cars and

attendants are used for *transient* parkers. In subsequent analyses, the two combination facilities have been included with attendant garages, since most of the spaces are used by transient parkers.

TABLE V—CLASSIFICATION OF GARAGES BY TYPE OPERATION

Type Operation	*Number of Garages*
Self-parking	12
Attendant Parking	4
Combination—Self and Attendant Parking	2
Total	18

One garage was converted from attendant to self-parking after several years of operation. This stresses the importance of flexibility in design. Though it may appear advantageous at present to provide attendant parking, consideration should be given to future conversion. This garage operation was changed to provide for improved operation and reduced labor costs. For comparable periods, the similar use was provided with self-parking entailing a space loss of about fifteen percent. Operating costs decreased, primarily due to a fifty percent reduction in personnel.

CAPACITY

The intensity and distribution of the parking demand and the dimensions and location of the site are contributing factors in determining the ultimate capacity. A distribution of parking facilities will provide the greatest over-all service to the various generators in the business area. With high land costs especially in the core area, maximum development is required to distribute land costs.

The amount of short-time parking is an important factor in determining the ultimate capacity. Since these spaces usually provide the most income per space per day, the construction and operating costs of providing additional spaces for the all-day parkers should be carefully weighed. These all-day spaces act as a reservoir, of course, for future expansion of the short-time parking operation.

Capacity of the eighteen garages under study ranges from 179 to 1,230 spaces, averaging 603 spaces. Fewer than 400 spaces are noted

in four facilities, whereas seven contain between 400 and 600 spaces. Table VI.

TABLE VI—CAPACITIES OF GARAGES

Capacity (Parking Spaces)	*Number of Garages*
Less than 400	4
400–600	7
600–800	4
Over 800	3
Total	18
Average	603 Spaces

NUMBER OF LEVELS

Generally, the large garages have been limited to a basement, main floor, and six levels above the ground. The operation of additional upper levels has proved uneconomical in some instances. Design standards and building codes also affect the number of levels. In one city, a live load is used; the number of levels is restricted to five above the main level, if a live load of fifty pounds a square inch is used.

Studies revealed that women are apparently willing to drive to any level in a self-parking facility. Conveniently situated stairs, elevators, and direction systems help a facility to be acceptable to the general public.

The number of parking levels of the garages under study range from three to eight, averaging four. Four garages have three levels; six have four levels. Table VII.

TABLE VII—NUMBER OF PARKING LEVELS

Number of Levels	*Number of Garages*
3	4
4	6
5	4
6	2
7	1
8	1
Total	18

Though eight of the garages are designed for additional levels, expansion is contemplated at only four of the facilities. It is usually best to build the ultimate garage initially, especially when vertical expansion is involved, since some of the parking space would be unavailable during the construction. With horizontal expansion, full operation probably could continue.

Most facilities have basements and in many instances, specially sloping and stagger-floor garages when half basements are used in the basic design. Open roof parking is afforded in all of the garages.

LAND AREA

The area and dimensions of a site often dictate the type and ultimate design of a garage. Self-parking garages require more generous dimensions to provide ample stalls and aisles, ramps with suitable grades, and free circulation without dead-end aisles. A minimum width of about ninety feet and a depth of 150 are required for self-parking. Greater dimensions provide more efficient design since the aisles and ramps consume a relatively smaller proportion of the floor area.

TABLE VIII—LAND AREA UTILIZED FOR GARAGES

Area (*Square Feet*)	*Number of Garages*
Less than 30,000	4
30,000–40,000	5
40,000–50,000	2
50,000–60,000	2
60,000–70,000	3
Over 70,000	2
Total	18
Average	49,500 Square Feet

Of the garages reported in this study, four sites have land areas of less than 30,000 square feet, while land areas of five facilities are between 30,000 and 40,000 square feet. The sites contain more than 70,000 square feet at two locations. The average site area is about 49,000 square feet. Table VIII.

The land area per stall is dependent primarily on the number of levels and the floor designs. Assuming an average floor area per stall of 320 square feet in a self-parking garage, the ground area per

space would be forty square feet for eight levels and eighty square feet for four. This emphasizes the importance of dimensions and area in site selection since land costs represent the largest variable item.

For garages under study, the ground area per stall ranges from forty-five to 130 square feet, and averages eighty-four. The per-stall area is between seventy-five and one hundred square feet for six facilities. Table IX.

TABLE IX—LAND AREA PER PARKING SPACE

Land Area Per Space (Square Feet)	*Number of Garages*
Less than 50	2
50– 75	5
75–100	6
100–125	4
Over 125	1
Total	18
Average	84 Square Feet

There is no one best garage type or ramp system. For layout of methods of operation, the determination of each of these may be influenced by the area and dimensions of the site, the street traffic pattern, the topography, the needed or desired capacity, the type of patronage expected, and various economic considerations.

DESIGN TYPE

Besides being designed for self-parking or attendant parking, garages may be classified by their ramp systems. The ramps may be curved or straight. In curved ramps, the turns are usually either half-circle or full-circle. In straight ramps, the turning movements are made on the garage floors.

A continuous curved ramp is, in effect, a spiral of the entire ramp system and one unit of a structure. A non-continuous curved ramp usually consists of half-circle sections connected by level sections of garage floor. Curved ramps may or may not be super-elevated. The semi-circular ramp eliminates most of the sharp turns that accompany straight ramps and permits use of the core space inherent in full-circle ramps.

In a sloping floor garage, the straight ramp serves a dual purpose

—floor-to-floor travel and direct access to the parking stall. The ramp is wide enough to accommodate two-way travel. Parking maneuvers are executed directly from the travel aisle; the ramp or sloping floor is held to a flat slope, usually four or five degrees.

In a staggered floor garage, the floor levels in each section are staggered vertically by one-half level. Access is provided by short, straight or curved ramps connecting the half-storeys in alternate directions. Ramps are separated by the distance required to make a 180-degree turn easily between the ramps.

These eighteen garages have been segregated into five categories, primarily differentiated by the ramp systems employed in design. The sloping floor, or continuous ramp system, is used in five garages. Straight ramps and spiral ramps are employed in four and five facilities, respectively. There are three staggered floor garages and one has both straight and spiral ramps. Table X. All of the sloping floor facilities afford self-parking. One of the five spiral ramp facilities has attendant parking.

TABLE X—BASIC DESIGN AND TYPE PARKING

	Type Parking			
Type Design	*Self*	*Attendant*	*Combination*	*Total*
Sloping Floor	5	–	–	5
Spiral Ramps	4	1	–	5
Straight Ramps	2	1	1	4
Staggered Floor	1	1	1	3
Straight and Spiral Ramps	–	1	–	1
Total	12	4	2	18

DESIGN FEATURES

Most modern garages are open-deck (open-wall). This design has become acceptable in all sections of the country. Ventilation and fire protection are kept to a minimum. Depending on local fire codes, enclosed walls are required within fifteen feet of adjacent property lines. At least two sides should be open to eliminate special provision for ventilation.

Various materials and construction methods have been used,

such as concrete and exposed steel. Prestressed concrete has enabled the use of clear spans ranging from fifty to seventy-five feet. This permits complete removal of the columns from the parking bays. The width and angle of parking may be easily changed.

Two of the eighteen garages are underground. In each case, a traditional interior design has been employed. The underground affords no operating advantages over an opendeck structure. The construction costs are higher because of ventilation, lighting, excavation, retaining walls, and enclosed construction. A carefully landscaped city park has been developed on top of both underground facilities.

In three of the eighteen garages, retail areas have been established on the ground floor. Besides providing additional income, the *glass wall* or continuity of retail frontage is maintained. For municipal developments, retail areas in garages are prohibited in some states. In others, the retail areas are limited in scope, usually to the first level.

Automotive services such as gasoline, oil, washing and greasing, tire changing, are afforded at only two of the eighteen facilities. There are restrictive laws against the provision of these services in some municipal developments. If service facilities are to be provided, they should be planned for in the initial design since additional fire protection, ventilation and storage facilities are required.

Entrances and exits are on one street in eight garages; on two streets for seven facilities; on three streets in two garages. One has entrances and exits on four streets. The frontage on two or more streets provides easier access. Also, greater flexibility in design. Right-hand turns into and out of the facilities provide the most efficient operation and reduce conflicts.

Waiting areas, including rest rooms, are a vital service. Comfortable chairs should be provided facing the windows to give an unrestricted view of the parking area. Usually, access to stairwells and elevators is afforded from the waiting area.

DESIGN SPECIFICATIONS

The general sample outline of specifications for a garage are as follows:

1. ARCHITECTURAL AND STRUCTURAL

a. *General Description:* The work consists of the construction of a split level above grade garage. The first level is to be on grade and follow the slope of property. There will be 3 floors of split level parking above the grade level floor. Garage to be designed for future 2 floors of split level construction.

b. *Excavation:* There will be no excavation except for pile caps, elevator pit and concrete slab on grade.

c. *Pile Foundation:* The construction of the foundation will be cast in place concrete piles—50 ton capacity.

d. *Floor, Wall, and Column Construction:* Floor Slabs. The floor slabs will be designed for 50 lbs/sq. ft. live load and the roof parking level will be designed for 75 lbs/sq. ft. All concrete for floor slabs is to test 3000 PSI at twenty-eight days.

Framing: Construction will be steel frame without fireproofing.

Exterior Walls: No walls are considered except as required for toilets, office and stairways or elevator shafts. The outside periphery of the building will have a metal guard construction— 3 feet 6 inches high.

Ramps: Ramps between the parking levels will be of reinforced concrete with the top surface broomed.

Roof Waterproofing and Wearing Surface: The roof-parking level to be protected by membrane waterproofing and covered with a two-inch layer of concrete.

e. *Partitions:* Toilet Room, Locker Room—Six-inch concrete block walls with two-inch structural tile glazed. Stairs and Elevator Enclosures —Eight-inch concrete block walls. Offices and Waiting Rooms—Eight-inch concrete block wall.

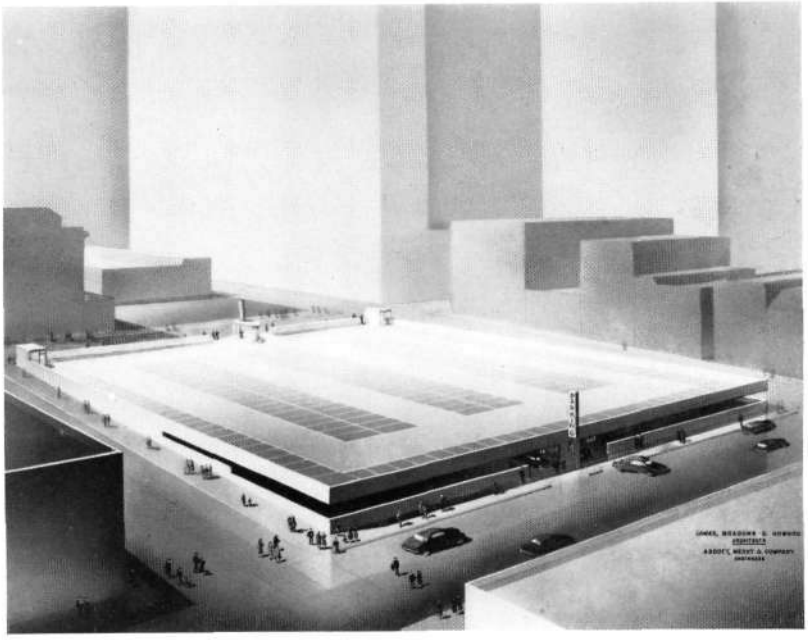
f. *Floors:* Toilet Rooms and Locker Rooms—Concrete floors. Stair Landings—Steel pan-type construction with non-slip treads. Offices and Waiting Rooms—Asphalt tile floor and base. Garage Floor—Concrete —broom finish—no hardener. All floors to have necessary drains connected to downspouts.

g. *Doors:* Stairways—Industrial Steel—"B" label. Offices and Waiting Rooms—Industrial Steel—glazed. Toilet Rooms—Industrial Steel —solid panel. Door Frames—Pressed metal or steel channel where applicable. Door Hardware—Door manufacturer's standard hardware is to be furnished with all doors.

h. *Toilet Partitions:* All toilet stall partitions are to be flush steel. One stall in each public toilet room is to be equipped with standard hardware —all other stalls in each public toilet room to be equipped with coin locks.

i. *Stairs:* Steel stairs—metal pan treads and intermediate landings—closed risers—filled cement treads—safety nosings—steel pipe handrails.

Auditorium Plaza Garage, Kansas City, Missouri



Eagle Garage, Buffalo, New York

Boulevard Garage
Public Parking Authority of Pittsburgh
Pittsburgh, Pennsylvania

St. Mary's Square, San Francisco, California

j. *Elevator:* Electric—automatic—2000 lbs.—150 ft. per minute—car size 5 feet 4 inches by seven feet automatic leveling.

k. *Painting:* The following items will be painted:

All wall faces of stairway closures; all wall faces of metal railing on all floors; all wall faces and ceilings of waiting rooms and offices; all doors and frames; all exposed structural steel, and toilet and locker room ceilings.

2. MECHANICAL

a. *Heating:* Offices, toilet rooms and locker rooms will be heated by electric unit heaters.

b. *Floor and Roof Drains:* Floor drains will be connected to roof downspouts.

c. *Hot and Cold Domestic Water:* Necessary hot and cold water will be supplied to toilet rooms, and cold water will be supplied to hose bibbs for floor washing.

d. *Hot Water Heater:* One 120 gal. Electric Hot Water Heater will be furnished.

e. *Soil, Waste, Vent and Drain Piping* (Inside of Building): All underground piping to be extra heavy cast iron soil pipe and fittings with joints caulked with oakum and lead. All piping above the bottom floors to be Schedule 40 screwed galvanized steel pipe with galvanized cast iron drainage fittings.

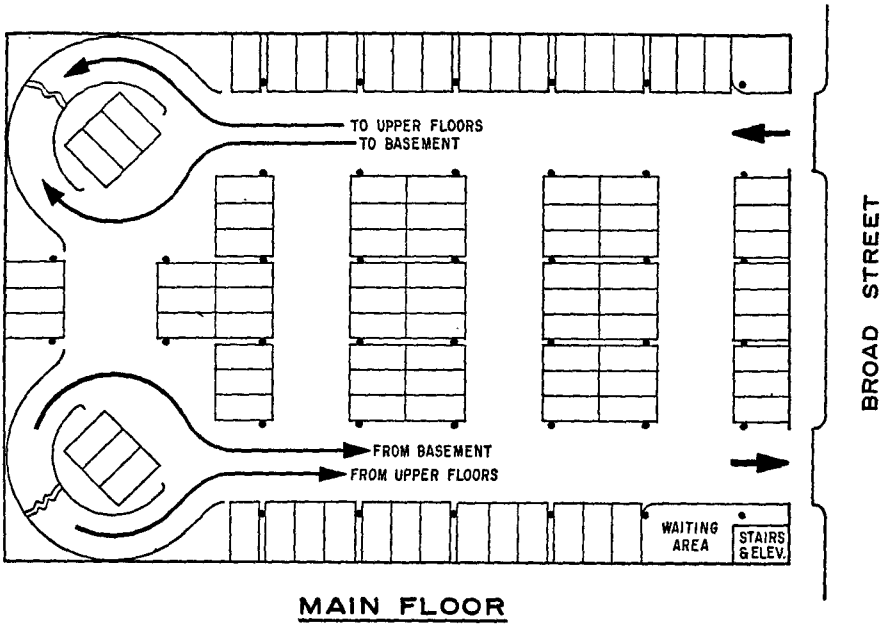
f. *Sanitary Sewer Connections:* From outside of the building walls to existing sewers, pipe to be standard strength vitrified clay sewer pipe with joints caulked with jute and hot poured bituminous compound.

3. ELECTRICAL

The work included consists of a complete electrical system as described later. All conduits will be exposed and supported from welded brackets, or ram-set mounted brackets or straps.

a. *Electric Power:*

1. The entire connected load will not exceed 75 KVS and will be furnished at 120/208 volts from the utility company's network system vault. A feeder consisting of four 350 MCM conductors will be run by the electrical contractor from the vault to a 400 A. switch which the electrical contractor shall furnish and install in the vicinity of the elevator shaft. The switch shall be equipped with 300 A. Chase-Shawmut current limiting fuses. From this switch a feeder consisting of four 350 MCM conductors shall be run up through the building to the third floor. The three lighting panels will be tapped from this bus at junction boxes one at each floor, not including the roof level.



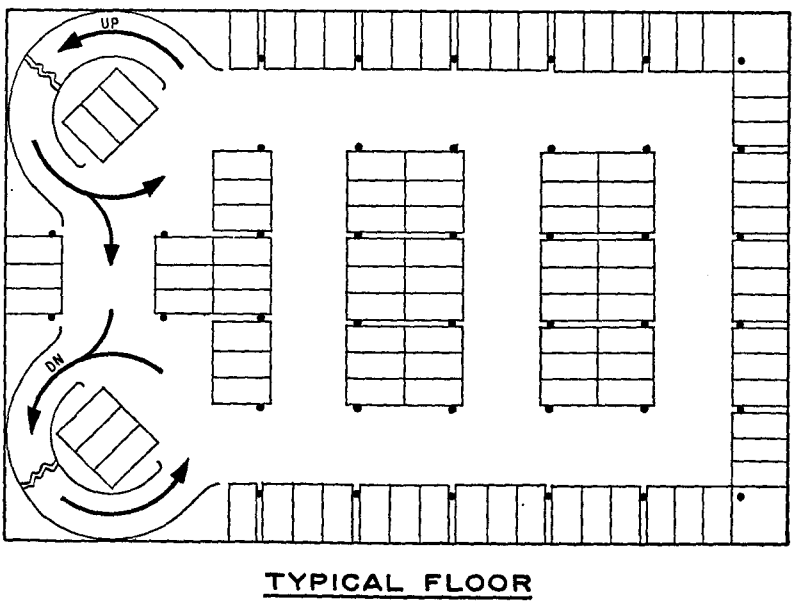


Figure 2. Functional Plan—Twin-spiral Garage.

2. The only large motor contemplated is on the elevator and it will not exceed 15 HP. (This is included in the 75 KVA mentioned above.) To supply this motor, a 100 A. circuit breaker will be connected to the lighting feeder riser at the third floor level and a feeder consisting of 3–No. 6 will be run to the top of the elevator shaft and connected to the top of the elevator shaft and connected to a 100 A. non-fusible disconnect switch. Switch and circuit breaker to be furnished and installed by the electrical contractor. The elevator vendor will wire the elevator beyond the switch.

3. Unit heater fan motors will be fed from the lighting panels.

4. The water heater will be fed from the first floor lighting panel.

b. *Electric Lighting:*

1. General lighting in the parking areas will be at an average level of approximately four foot-candles and will be accomplished with 200 watt incandescent vaportight fixtures without reflectors or guards.

2. The office and other small rooms will be lighted to appropriate levels with fluorescent strip lights.

3. The stairs will be lighted with 100 watt fixtures above the landings and will be controlled by a three-way switch at top and bottom.

4. The roof will be floodlighted with 300 watt units mounted on two-inch pipe standards fifteen feet high.

5. A lighting panel with twenty-four 30 A. plug-in type circuit breakers will be located near the elevator on each floor except the roof level. The panels will be 3 phase, 4 wire.

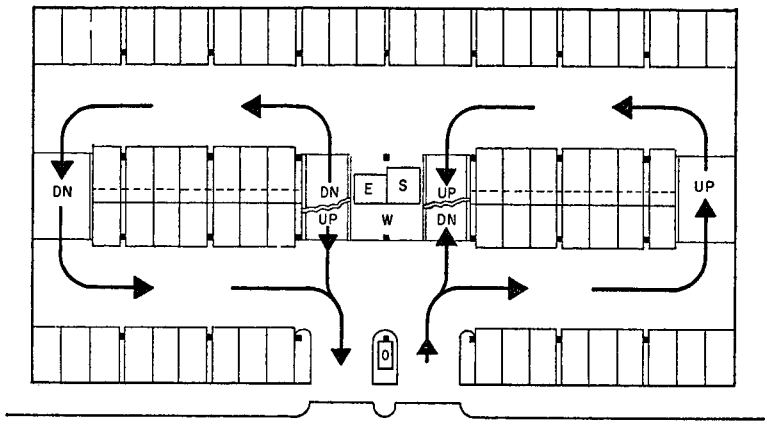
c. *Communication:* A telephone terminal cabinet will be installed in the office, and from it a one-inch conduit will be run to the curb line near the closest telephone company service connection point.

TYPICAL DESIGNS

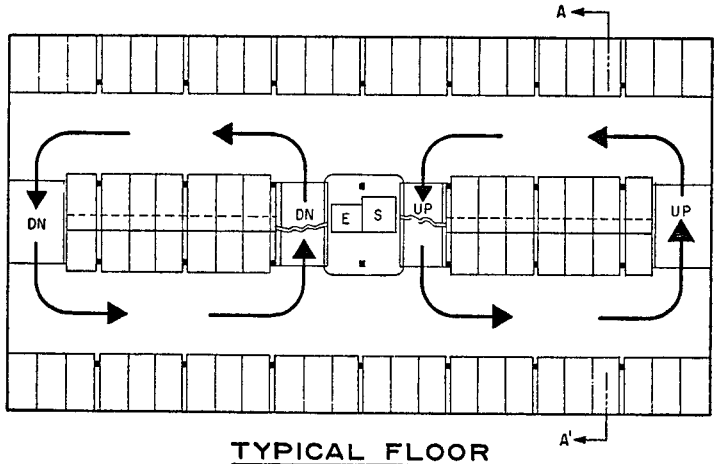
In the following sections the functional plans and design features of five self-parking facilities are presented. They are typical of the modern garage planning that has evolved during the past several years.

In Figure 2, the plan for a twin-spiral garage is shown. The ramps, situated in opposite corners, are angled to facilitate the movement from the floors to the ramps. Entrances and exits have been provided on two streets on separate levels to take advantage of the different elevations.

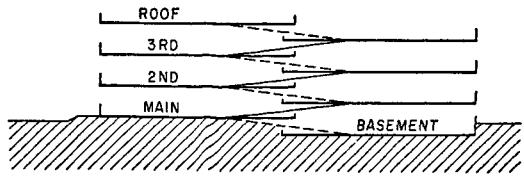
The waiting area—two elevators, rest rooms, cashier's booths, and vending machines—is in the center of the garage. A retail area



MAIN FLOOR



TYPICAL FLOOR



SECTION A-A'

Figure 3. Functional Plan—Staggered-floor Garage.

extends along the entire frontage of one of the streets and has a depth of about eighty-five feet. The fourth level of the garage, or roof deck, extends over the retail area. Ninety-degree parking is employed throughout the facility.

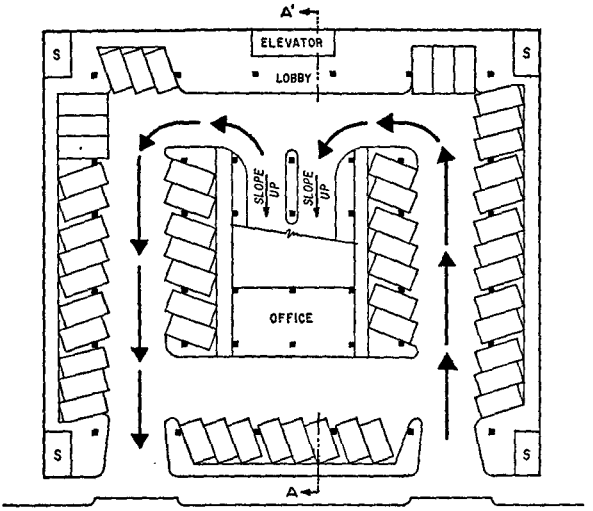
A staggered floor or split-level garage is shown in Figure 3. The ramp systems feature separated one-way operation, and access is on only one street. The over-all dimensions of the 352-space facility are 120 feet by 240 feet. Ninety-degree parking is utilized throughout the four floors. The cashier's booth is at the entrance, and the stairs and elevators are strategically located in the center of the facility to take advantage of the split-level and to afford minimum walking distances.

In Figure 4, a functional plan is presented for a facility with straight ramps. The garage has one-way aisles and angle parking. Actually, a portion of the aisles is used in the floor-to-floor circulation. There are three pedestrian elevators and four stairways to serve the eight floors. Though the entrance and exit were on the same street, they are widely separated to reduce conflicts. The over-all dimensions of the facility are 183 feet by 165 feet.

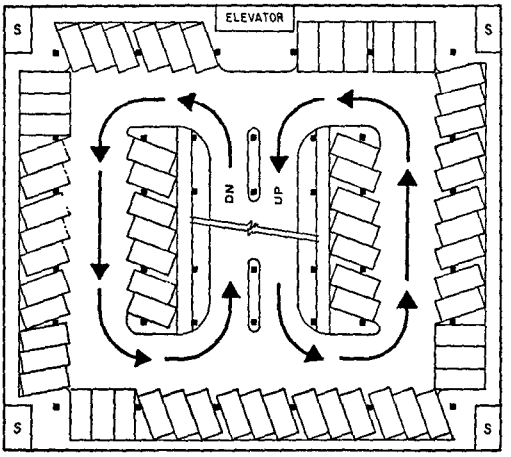
In a sloping floor or continuous ramp garage, the aisles serve two purposes: access to the parking stalls, and floor-to-floor circulation. In Figure 5, a typical garage is shown which provides 90-degree parking. One pedestrian elevator and three stairways have been provided for the five-level facility. The entrance and exit are on one street. The direction of travel on the ramps has been reversed to reduce the conflict at the contact with the one-way street. Over-all dimensions are 122 feet by 157 feet.

The preparation of a design for an irregular-shape site presents many problems, especially when self-parking is to be provided. An example of a good design is presented in Figure 6, where a spiral ramp is in the center of the garage. The aisles are one-way and two-way, and 90-degree parking is used throughout the facility.

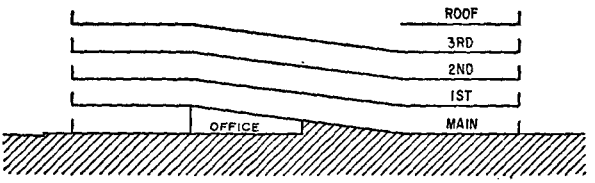
For the three-floor garage, there is one pedestrian elevator available at present. Plans and areas are provided for an additional elevator when warranted. There are four stairways. In the operation of the facility, an entrance has been provided on one street and two streets are used for exiting.



MAIN FLOOR

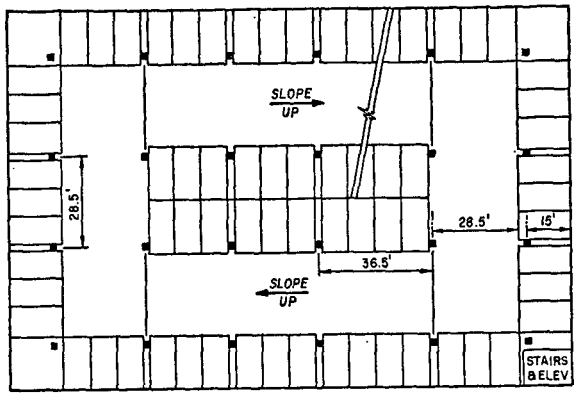


TYPICAL FLOOR



SECTION A-A'

Figure 4. Functional Plan—Straight Ramp Garage.



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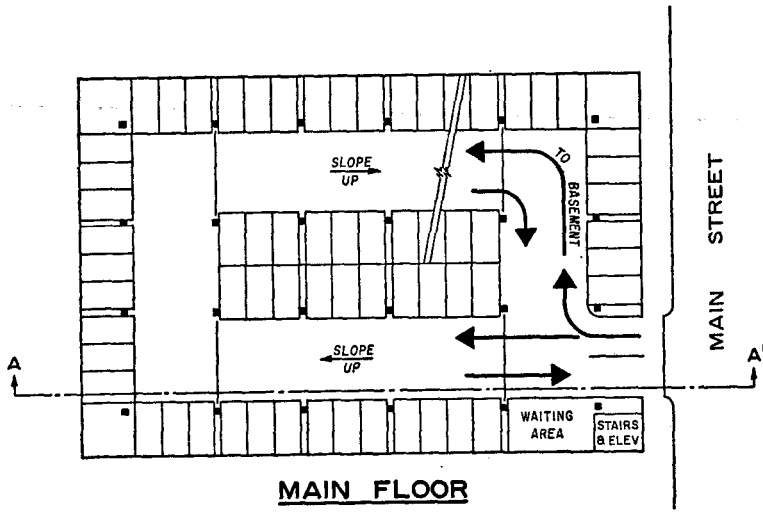
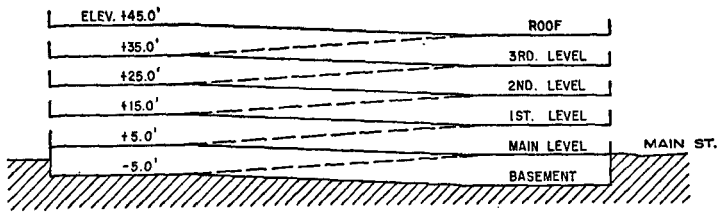
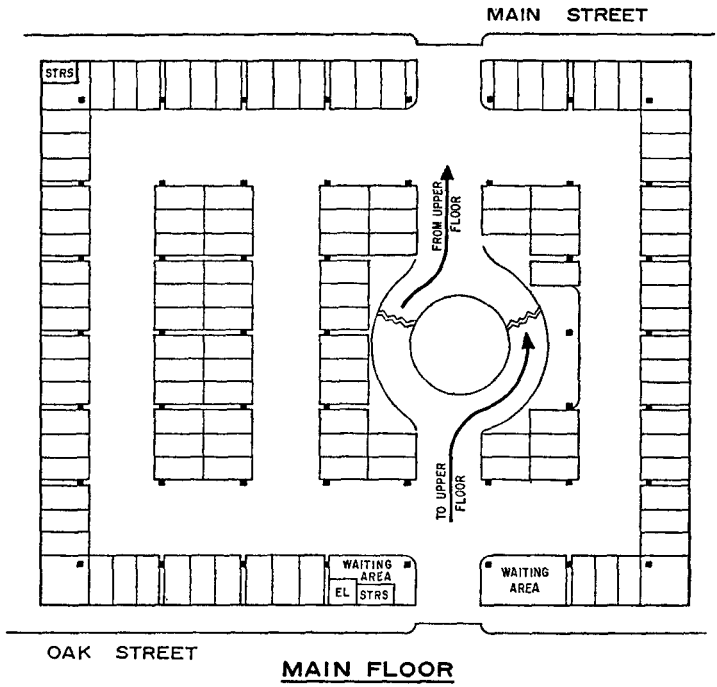


MAIN FLOOR



SECTION A - A'

Figure 5. Functional Plan—Sloping Floor Garage.



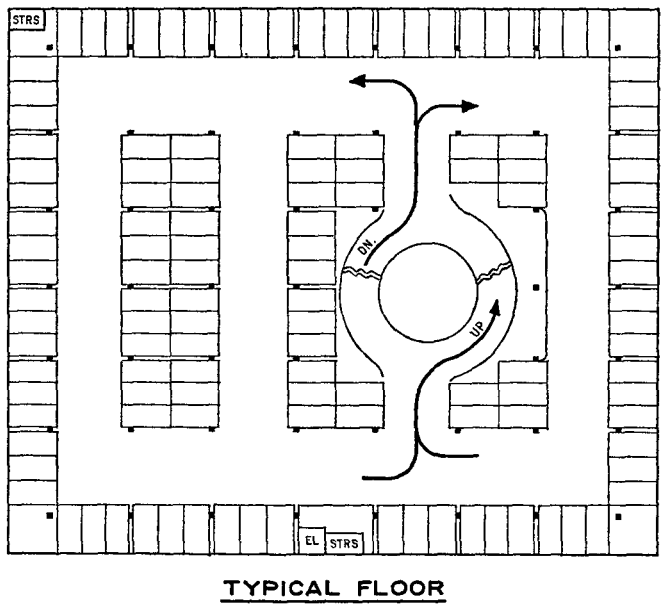


Figure 6. Functional Plan—Concentric-spiral Garage.

Many variations may be used in garage design. Previous examples are typical designs. Design criteria and standards were assembled in a recent study.[1] The designs must be tailored to the available land.

1. Ricker: *Traffic Design of Parking Garages*, Eno Foundation, 1957.

CHAPTER FOUR

OPERATING PROCEDURES

The operating procedures of a garage depend upon location, type of design, and parking characteristics of the influence area.

In this section, the operating procedures are outlined for various types of facilities. Both cities and private enterprise operate the garages under specific agreements with the city. There are many provisions in the management and lease agreement between the cities and private operators.

METHODS OF OPERATION

Of the eighteen garages this study reports, complete development including land acquisition and construction was undertaken by the city in seventeen. For one garage, the city acquired the land and leased it to a private corporation. The corporation developed the garage. The city received $1 during the time of construction. After the garage began to operate, the compensation equaled four percent of all gross receipts, including parking, gasoline, automotive services, and vending machine revenues.

Complete development and operation was undertaken by the city in six of the other seventeen garages. Private operators have leased seven garages and operate four under management agreements. Many aspects of the lease and management agreements will be explored in subsequent sections.

OPERATION BY CITY AGENCIES

Where complete operation has been undertaken by the city, either the parking authority or city departments are the administrative agencies. Typical examples follow:

Parking Authority Operation: The executive director of a parking authority is usually in direct charge of operation of all the lots and garages. In one case, a full-time manager is employed.

The staff is paid by the authority, and the employees are not considered part of the city government. However, the various salary schedules and benefits closely parallel those of regular city

employees. In another case, the manager and several attendants had prior experience in parking facilities before the authority employed them.

Operation by a City Department: When facilities are operated within the direct framework of city government, the employees are considered part of the over-all labor force. In some instances, the traffic engineer of the city has charge of operations of the garage and curb facilities, therefore the entire parking system is uniform.

In two communities, the traffic engineer operates the garage, and the parking authority serves as an advisory agency. Garages are operated by other city departments including a separate division of parking that comes under the mayor's direct administrative control.

Operation by Private Enterprise: About two-thirds of the garages are operated by private enterprise, either by lease, or management agreements. When leasing the garages, the private operator assumes all of the operating costs and pays the city a specified annual amount or percentage of the gross receipts. He therefore assumes monetary risk in the successful operation of the garage.

With a management agreement, the city usually pays all costs of operation and the operator is compensated for supervising the operation. An economic risk is not involved. Of the eleven garages being operated by private enterprise, seven are by lease agreements and four by management contracts.

In one community, local businessmen organized a non-profit corporation and entered into a long-time lease with the city to operate three garages. The basic annual rental equals the average annual principal and interest payments of the general obligation bonds used to finance the facility. Key points of the lease include:

1. *Payment of Rent:* An annual minimum rental equal to the amount sufficient to amortize, in annual payments over the period of the lease, the capital cost including interest during construction and interest on said sum at the coupon rate carried in the bonds. Additional annual rentals in lieu of taxes, consisting of the remaining annual net income of the corporation after the restoration of any capital impairment and the payment of the minimum annual

rental, payable annually within sixty days after the close of the fiscal year of the corporation.

2. *Reserve and Trust Fund:* Additional rentals will be set aside by the city in a special account as a reserve for future debt service until the total with interest, if any, equals two annual minimum rentals. After accumulation of sufficient reserve for future debt service of two minimum rentals, twenty percent of this additional rental shall be set aside in a special reserve account to be expanded upon recommendation of the division of parking with approval of the common council of the city for replacement and additions to the parking facilities.

After the accumulation of sufficient reserve for future debt service, twenty percent of the additional rentals shall be set aside by the city in a special trust fund for the purpose of assisting the city to provide funds for the accelerated retirement of the bonds. When the reserve for future debt service is sufficient to liquidate the remaining annual rental payments, all the excess annual gross operating income over-all operating expenses, which shall include the interest payable by the corporation on its debentures, shall be paid to the city as such additional rentals.

The corporation has provided $300,000 of debentures as working capital to operate the parking facilities. The funds, held in escrow by the city, draw interest. Provisions were stipulated to reduce the fund to $150,000 after sufficient reserves were accumulated. An experienced private operator with a management agreement with the non-profit corporation operates the facilities.

LEASE AND MANAGEMENT AGREEMENTS

The agreements are carefully drawn to outline the duties and responsibilities of the city and the operator. Key provisions included in the agreements are outlined in the following sections:

Qualifications of Operator: In most instances, the city ascertains the experience of the operator in the operation of parking facilities, particularly garages. In one agreement, however, the lessee said he was qualified by training and experience. One stated he had operated one or more garages for three or more years, having a capacity of more than 300 spaces.

Length of Time: Leases were entered into on a specific time basis, ranging from one to six years. In some instances, options that may be exercised by either the city or the operator for additional periods are included.

Amount: With leased operation the operator agrees to pay to the city an annual specified amount or percentage of the gross income. Examples follow:

1. 67 percent of the annual gross income, or a minimum of $36,000.

2. 72.6 percent of the annual revenues up to $100,000, and eighty percent in excess of $100,000.

3. $200,000, or 66.2 percent of the gross income up to $450,000 and seventy-six percent of the gross income in excess of $450,000, subject to renegotiation if rates are changed or general wage increases.

In another city, the operator leases two facilities under one agreement. The guaranteed annual rental is sufficient to pay the annual amortization charges on the bond issue. The operator receives a management fee of $50,000 and surplus revenues are distributed between the authority and the operator.

Though payment to the operator for a management agreement is usually a specified amount, additional earnings may be accrued based on the net income. Examples:

1. The operator receives $14,750 per year plus five percent of the net income over $324,000.

2. A monthly fee to the operator, plus a percentage over $70,000 of net income.

3. The payment to one operator for management is thirty-five percent of the net income in excess of annual debt service payment.

Rate Schedule: In most instances, the city establishes the rate schedule and approves any changes. Maximum rates are noted for only one facility.

Insurance: For leased operation, the operator usually provides all coverages as specified by the city. In management agreements, the premiums are paid by the city. In one instance, however, it is part of the operator's annual fee. The operator's policies cover several other parking facilities.

Repairs: The lessee usually performs all minor repairs, and the city is responsible for major and structural repairs. In one agreement, the city is required to make all major repairs and maintains the pavement markings, signs and bumper guards.

Deposit: Deposits, or surety bonds, are required in all instances relative to faithful performance of the agreement. In most instances, surety bonds are obtained ranging from $14,000 to $100,000. For one lease, the deposit consists of one year's minimum lease in cash or negotiable securities.

Capacity: Capacities of the facilities are usually established by the city, either by a stipulated number of spaces, or as shown on functional plans.

Audits and Financial Reports: For management agreements, weekly or monthly statements of revenues and operating costs are usually required. For lease agreements, at least an annual certified audit is stipulated.

Cancellation: In all agreements, cancellation clauses are included. These can be invoked by either the city or the operator. The time ranges from ten days to ninety days with usually considerably shorter periods permitted if the parking operation is not conducted in a manner deemed by the city to be satisfactory.

Operating Hours: The city stipulates the operating hours of the garages. For two facilities, the minimum daily periods are specified as well as specific holidays; however, the garages may be operated for longer periods. With management contracts, the city establishes the precise operating periods. Of course, parking demands and characteristics of the area dictate the operating hours. Some are open longer periods to provide "service."

TYPICAL LEASE

Key provisions in a lease between the city and a private operator may be as follows:

1. *Lease of Operations:* The city hereby grants to the operator the right to operate . . . herein called . . . , and demises the real property therein for such purpose for a term of five (5) years beginning at 12:01 o'clock a.m., on the date of occupancy. The date of occupancy shall be mutually determined between the operator and the city manager. Operator may be permitted to make inspections and installations prior to the date of

occupancy without instituting the running of the term of this lease if agreeable to the city manager.

2. *Option to Renew:* The city is hereby given an option to extend the term of this lease for an additional period of five years, provided such option shall be exercised by giving the lessee notice in writing of such intention at least one month prior to the expiration of this lease.

3. *Purpose of This Agreement:* The parking structure is being built and operated for the purposes set forth in the municipal parking law of . . . , the finding and declaration of necessity made by the state legislature. Accordingly, this lease is entered into with the specific intention of the city and with the understanding of the lessee that the city does not abrogate its police power and has the final determination in fixing rates to be charged for service so as to accomplish the purposes set out in the enabling statute.

4. *Rental:* As compensation for the right and privilege herein granted, the operator agrees to pay monthly to the city during the term hereof, a sum equal to 72.6 percent of the gross cash receipts of operation up to $100,000.00 and eighty percent of the gross cash receipts of operation for any receipts in excess of $100,000.00 per year. Payments shall be remitted to the city treasurer by the tenth day of the month following the month in which the receipts were realized . . . .

5. *Rates for Daily Parking:* Permanent parking is not allowed in the structure during the month of . . . . Subsequently, a proportion of permanent parking may be allowed with concurrence by the city. The initial rate for monthly parking will be $8 to $12 a month outside parking, and $20 a month inside parking. The city reserves its authority to initiate, approve or modify establishment or changes of parking rates provided, however, that no such action shall be taken by the city without hearing and considering the recommendations of the lessee with regard thereto.

6. *Rates for Hourly Parking:* Initially, the hourly rates to be charged will be twenty-five cents for the first hour and fifteen cents for each additional hour. The city reserves its authority to initiate, approve or modify establishment or changes of parking rates provided, however, that no such action shall be taken by the city without hearing and considering the recommendations of the lessee with regard thereto.

7. *Use of Facility:* The operator shall be entitled to the exclusive operation (but not possession) of the parking facility during the term hereof for the following purposes:

a. Offering of off-street parking service to the general public.

b. Sale of gasoline, oil, anti-freeze, tires, tubes, batteries and accessories, and any other items directly related to the operation of a parking facility.

c. Offering of car-washing service, polishing service, lubricating serv-

ice, tire and tube service, battery service and minor maintenance service directly related to the operation of such parking facility.

d. The installation as customer and employee conveniences of pay telephones, machines vending candy, cigars, cigarettes, gum and non-alcoholic beverages and package lockers.

e. The northwest corner . . . may be used by the lessee for automotive services and sale of petroleum products or for outside parking. In the event the lessee decides to use this space for automobile services, etc., the compensation to the city from the use of this property for this means, will be negotiated between the city and the lessee.

f. If the operator furnishes any services or sells any of the items mentioned for which no provision has been made, for payment to the city, the gross receipts of sales of such services and commodities shall be added to the gross receipts for car rental and the rental paid shall be computed according to the proportions above set out.

8. *Hours of Operation:* Unless otherwise required by the city, the operator shall operate the facility from . . . o'clock a.m. to . . . o'clock p.m. every week day of the year excepting only the following holidays, when they fall on week days: New Year's Day; Memorial Day; Independence Day; Labor Day; Thanksgiving Day; Christmas Day.

The operator may operate the structure at additional hours or may keep the facility open to the public at all times if in his discretion this is feasible.

9. *Supervision of Records:* The lessee shall provide for complete supervision of all functions of said business, including preparation of a budget, the posting of accounts receivable, maintaining, billing, collection and accounting controls, purchasing and processing payments, maintaining inventory controls, preparation of payroll, tax returns and reports, audit deposits and reconcile bank accounts, and shall submit to the city profit and loss statements, semi-annually.

10. *Supervision of Operation:* The lessee shall institute and maintain high quality service to the public and to this end shall design uniforms and require their use by garage attendants subject to approval by the city manager. The management shall submit a design for parking tickets subject to approval and in ordering and designing supplies for use in operation of the garage shall obtain approval of the city manager prior to making purchases. The management shall recruit personnel, shall institute an adequate training program and shall advise the city manager of its procedures in this regard. The management shall introduce modern and vigorous merchandising methods and shall do all in its means to make the operation of the garage effective.

11. *Duties of Operator:* The lessee shall formulate a plan of garage operation, including garage traffic control, inter-floor communications and coordination of operation, reception, parking and delivery of

vehicles, collection of parking fees and issuing parking tickets, and shall present a schedule of parking fees which shall be subject to the approval of the city manager.

12. *Records:* The lessee shall maintain adequate records in such form maintaining such information as the city may require for statistical analysis incidental to traffic control.

13. *Monthly Reports:* The lessee shall maintain a system of accounting satisfactory to the city manager, showing the financial operation of the garage and shall make monthly reports to the city manager showing the income and expenditures of the garage operation. All records maintained by the lessee shall be subject to inspection and audit by the city manager or his authorized representatives at all reasonable times.

14. *Free Use Prohibited:* No free parking facilities or complimentary parking privileges shall be provided in the garage, but the regular charge shall be made to all persons for the use of parking spaces, except employees of the garage and workmen or business representatives of firms having business on the premises and approved by the garage manager.

15. *Duty to Comply With Law:* In the conduct of garage operation, lessee will comply with all federal and state laws and ordinances of the city.

16. *Responsibility to Employees:* The lessee assumes all responsibility for employer-employee relationships respecting personnel employed in the garage, and such employees shall be deemed employees of the lessee. It shall be the duty of the lessee to maintain employer's liability insurance and workmen's compensation insurance, unemployment compensation taxes, social security taxes, and any employer obligations imposed by law, and to furnish proof of compliance with these requirements to the city manager.

17. *Maintenance and Repairs:* All maintenance and repair of the facilities and equipment included in the parking facilities shall be the responsibility of the operator, who agrees to maintain them in good repair and in sound operating condition, and to make necessary repairs, renewals, and replacements required during the term of his occupancy. The city will, however, maintain the structural soundness of the garage buildings at its expense. The city shall be responsible for making major repairs to the structure upon notification by the lessee of the necessity therefor.

18. *Damage:* It is mutually agreed that if said garage shall be partially damaged by fire, tornado or other casualty, said premises shall be repaired with all proper diligence by the city. If such damage is of such extent that the garage may continue operation at fifty percent of the capacity or more, the operation shall continue. If the damage is so great that the garage cannot be reasonably operated at as much as fifty percent of capacity in the opinion of the city manager, then the operation shall be suspended and the compensation of the lessee shall cease during

such times as is necessary to restore the premises to operating condition within the terms of this agreement.

19. *Remodeling and Alterations:* The operator may, with the prior written approval of the city manager, at its own cost and expense, erect or install in or on the parking facilities any fixture or improvement, or do or make alterations or remodeling. The operator shall, upon cancellation or termination of this agreement, in the event it removes such alterations, restore such parking facilities to the condition as existed in the beginning of the term hereof, ordinary wear and tear expected.

20. *Prohibited Acts:* The lessee shall not dispense or furnish any product other than those herein described and unless authorized by law and by supplemental agreement with the city.

21. *Title to Improvements:* Title to all buildings and other improvements constructed or installed by the operator in or on the parking facilities and to all materials forming part thereof shall pass to the city as the same or any part thereof are constructed or installed or otherwise affixed to the realty unless prior to the date on which they are constructed, installed or affixed, the operator gives written notice to the city manager that it desires to retain such title, in which event title shall remain in the operator until the expiration or earlier termination of this agreement. Any buildings or other improvements remaining in or on the parking facilities after the expiration or earlier termination hereof shall become the property of the city.

22. *Right to Make Repairs:* The city retains for its authorized officers, employees, agents, contractors, subcontractors, and other representatives the right, at such times as may be reasonable under the circumstances and with as little interruption to the operator's operations as is reasonably practicable, all as determined by the city manager, to:

a. Inspect the parking facilities at reasonable intervals during the regular business hours (or at any time in case of emergency) to determine whether the operator has complied and is complying with the terms and conditions of this agreement with respect thereto.

b. Perform maintenance and make repairs and replacements in any case where the operator is obligated so to do hereunder and has failed after reasonable notice so to do, in which event the operator shall reimburse the city for the cost thereof promptly upon demand.

c. Perform maintenance and make repairs and replacements in any case where the city manager determines it is necessary or desirable so to do to preserve the structural safety of such facilities.

23. *Personal Property:* Prior to occupancy, as hereinabove defined, the parties hereto agree to make an inventory of all personal property, including trade fixtures but not spare parts, then in or upon the parking facilities, which inventory will be approved in writing by the operator and the city manager. The operator agrees to return to the city, upon

the cancellation or termination of this agreement, as herein provided, all such items of personal property in the same condition in which they were received from the city, ordinary wear and tear excepted.

24. *The City's Responsibility:* The city agrees to furnish adequate outdoor advertising signs, equipment and furnishings initially and as the same may require replacement. The city will adequately furnish and equip the structure, taking due note of necessity for economy of operation and for promoting use of the facility. The lessee may request additional or replacement equipment, but the *purchase* of such equipment shall be at the discretion of the city manager except as to items purchased by operator at his own expense. The city covenants to engage in institutional advertising up to five percent of the gross receipts of the facility but this provision does not prohibit the operator's advertising at his own discretion and expense.

25. *Insurance:* During the time of this lease or any extension thereof, the lessee shall save harmless and indemnify the lessor on any and all claims of either personal injuries or property damage sustained as a result of the operations of the lessee, and, in performance of this obligation, shall carry at its own expense insurance as follows:

a. Workmen's compensation insurance in an amount sufficient to comply with the requirements of the Laws of the State of New Mexico.

b. Insurance against the hazard of damage to adjoining property in the amount of $25,000.

c. Liability insurance for bodily injury in the amount of $100,000.00 for each person and $300,000.00 for each accident.

d. Garage keeper's legal liability insurance which covers the loss attendant on fire, theft, and collision to automobiles owned by customers using the parking garage.

The city will carry lessor's risk insurance covering its own liabilities. The lessee is permitted to carry additional insurance coverage of any kind or to carry insurance with limits higher than those specified.

If any of the plate glass on the demised premises is damaged or broken, the lessee shall replace the same at his own cost and expense.

By requiring insurance coverage, the city in no way waives or surrenders its defenses to liability for damages incurred nor by doing so does it extend the area of its liability for any risks, it being the city's intention to require such coverage as would be required for the protection of the owner of the demised premises if the owner were a private person rather than a municipal corporation.

26. *Cancellation on Notice:* Either operator or city may cancel this agreement by giving ninety days notice of intention to do so in writing to the other party. Such cancellation shall be effective the last day of the calendar month following the lapse of the period of ninety days from such notice.

27. *Default:* In the event of default by either party in the performance of its obligations provided herein, the other party may deliver in writing to the defaulting party, a notice of the matters in default, and in the event the offending party shall not have corrected such default or defaults within thirty days after such notice, the complaining party shall have written notice of termination.

28. *Assignment:* This agreement may not be assigned or otherwise transferred without the permission in writing of the city.

29. *Waivers:* No waiver of default by the city of any of the terms, covenants or conditions to be performed, kept and observed by the operator, shall be construed as, or operate as, a waiver by the city of any subsequent default of any of the terms, covenants or conditions herein contained, to be performed, kept and observed by the operator.

30. *City Manager:* The city manager shall be the agent of the city in all matters pertaining to the agreement. In his discretion he shall delegate the performance herein charged to him.

31. *Bond:* Coincident with the execution of this lease, the lessee agrees to provide a bond secured by a surety company for the faithful performance and honest performance of its duties under this lease in the amount of $14,000.

32. *Audit:* With reference to the payment of rental by lessee to lessor, and particularly with reference to the compensation . . . , it is agreed and stipulated as follows: That at the end of each year of occupancy under this lease, commencing one year from the date specified in the certificate of occupancy, the city will make an audit of the books and rental payments of lessee for the preceding year; said audit shall be completed within sixty days after the end of each year of occupancy or within sixty days after the termination of this lease, whichever event first occurs, and unless written notice of deficiency in the lessee's payments to the lessor be delivered to the lessee in the manner herein provided within such sixty-day period, the books and payments of lessee shall be deemed correct and the lessee shall have no further liability to the lessor for compensation for periods of occupancy prior to the closing date of the audit. If the city fails to perform an audit within the specified time, the city shall be deemed to have accepted the records and payments of the lessee for any preceding period and the lessee shall have no further liability to the city for prior operations that would have been covered by the audit.

TYPICAL MANAGEMENT CONTRACT

A management contract between a city and an operating company has the following stipulations:

1. The management agrees to supervise completely on behalf of the

city, during the period of this agreement and its renewal, all functions of the business of said premises with energy, fidelity and diligence, giving to said business at all times the benefit of the management's special knowledge and wide experience and applying to said business from time to time as may be developed all the latest and most modern features of service and techniques of management as may be applicable thereto. Included in the duties of the management shall be the following:

a. Prepare each year an annual operating budget and submit the same to the director of the traffic department for his approval; such budget to be in a form approved by the director of finance and to be for the city's fiscal year beginning May 1, such budget to be presented to the director of the traffic department by January 1. All references in this contract to "fiscal year" shall mean the city's fiscal year beginning May 1.

b. Post accounts receivable. Maintain billing, collection and accounting controls.

c. Purchasing of supplies, maintaining *accounts payable* records and inventory control.

d. Make up payroll: File social security and withholding tax and workmen's compensation returns and such other reports as may be required of employers by federal, state or city governments.

e. Audit deposits and reconcile bank account.

f. Maintain continuous audit control of revenues and parking tickets.

g. Prepare and submit to the city on or about the 20th of the following months, a *monthly profit and loss statement* and a *balance sheet.*

2. It is understood and agreed that, during the term of this agreement, the management shall recognize the special interest of the city to render the highest possible quality of service, and shall maintain a policy providing the highest standards of service and courtesy to the customers and patrons of the garage.

3. The management agrees to make available to the city the advantages and buying resources of its group purchasing activities so that in the purchase of equipment, furniture and supplies, any savings and benefits including trade discounts and other concessions will inure to the benefit of the garage business herein.

4. The management agrees to place at the disposal of the garage all its facilities and resources for the employment and training of the personnel used in its operation.

5. The management shall also use the skill and experience of various members of its headquarters' personnel located elsewhere who shall devote to the work such time, both here and elsewhere, as may be deemed necessary by the management to the proper and efficient conduct of the enterprise.

6. The city shall provide office space in the garage for the management. The city will provide at its expense all equipment necessary for the operation and administration of the garage. The management shall keep and maintain the garage, its furniture, fixtures and equipment at all times from and after beginning of business in good condition and repair, ordinary wear and tear excepted. The expense of such maintenance and repair shall be charged as an item of operating expense of said garage. In the determination of what shall or shall not constitute maintenance, repair and expense as distinguished from replacement or addition to property or capital investment, standard principles of accounting shall govern.

7. Within thirty days after the effective date of this contract, the management shall prepare and deliver to the city, through its director of the traffic department, separate, complete, specifications for each type of equipment to be furnished by the city. Such specifications shall be prepared on the basis of the requirements of service that such items of equipment are designed to perform and shall be in a form susceptible to competitive bidding . . . .

8. Promptly after the effective date of this contract, the management shall proceed to design uniforms for garage attendants, such design to be subject to the approval of the director of the traffic department, and following such approval, the management shall proceed to purchase such uniforms out of the *working capital account* hereafter provided for. The management shall also submit a design for parking tickets and recommend the quantity deemed necessary to be purchased. The management shall also recommend the type and quantity of consumable supplies to be purchased for operation of the garage and, upon approval by the director of the traffic department, shall proceed to purchase all of said items and pay for the same out of the working capital account.

9. The management shall deposit in the city treasury each week day, all receipts from parking operations and shall be responsible for the safekeeping, storage and transportation of said receipts until they are delivered to the city treasurer.

10. Within ten days after the effective date of this contract, the city will deposit in a working capital account in a bank in . . . , to the credit of the management, the sum of $30,000 as working capital for the commencement of operations and for the current operating expenses for the first month of operation. The city will maintain such working capital account out of prior months' revenues so that at the beginning of each current month after the first month of operation, there shall be to the credit of the management such sum, not exceeding $20,000. Out of said working capital account the management is authorized to pay the following expenses: insurance, wages or salaries of all garage employees,

social security taxes, unemployment compensation taxes, utility services, including local telephone service, garage and equipment maintenance, operating equipment and consumable supplies, uniforms and laundry, payment of claims not paid out of insurance, and other usual operating expenses of garage operation, provided that no contract or obligation involving more than $200 for supplies or repairs shall be entered into by management without first having the approval of the director of the traffic department. The management is also authorized to pay out of such account sums necessary for the purchase of supplies required for the commencement and continuation of operation.

11. The management, within sixty days after the effective date of this contract, shall prepare a plan of organization for garage personnel specifying its proposed method of selection and training, the number of personnel to be used in each type of employment and the proposed schedule of salaries for each category. This schedule, and any changes therein from time to time, shall apply to all garage employees. Upon approval by the director of the traffic department of such schedule of organization and salaries, as submitted or as amended, the management shall proceed to select and employ such personnel. In the event, thereafter, that the management shall desire to make changes in the plans of organization or salaries, such changes shall be submitted to and be approved by the director of the traffic department before being put into effect.

12. The management shall formulate a plan of garage operation, including garage traffic control, inter-floor communications and coordination of operation, reception, parking and delivery of vehicles, collection of parking fees and issuing parking tickets, and shall present a schedule of parking fees.

13. The management shall maintain traffic records and statistics on the operation of the garage in a form acceptable to the director of the traffic department, which shall be made available to the city from time to time on request.

14. The management shall maintain a system of accounting to be approved by the director of finance of the city, showing the financial operation of the garage and shall make monthly reports to the director of finance showing the income and expenditures of the garage operation....

15. No free parking facilities or complimentary parking privileges shall be provided in the garage, but the regular charge shall be made to all persons for the use of parking spaces.

16. All approvals required to be made by the city authorities shall be effective only when in writing.

17. Beginning on the effective date of this agreement, the city agrees to pay the management, as complete compensation for its services, the

fixed compensation of $14,750 a year, payable in equal monthly installments within fifteen days after the termination of the calendar month for which the services are rendered. In addition thereto, the city shall pay the management an incentive percentage in the amount of five percent of the operating profit from said garage operations . . . , exceeding $324,000 in any full fiscal year.

18. It is agreed that for the purpose of determining such incentive percentage compensation, said operating profit shall be the amount of earnings from the operation of said garage as determined by deducting from the gross revenue of said business all operating expenses. Operating expenses for the purpose of and generally referred to in this agreement shall include management's fixed compensation, salaries and wages paid to the garage employees, cost of materials and supplies, workmen's compensation insurance, liability insurance and all other insurance covering the operation of the garage, social security taxes, unemployment compensation taxes, heat, light, water, gas and local telephone service, ordinary maintenance and repair expenses not including major structural repairs, damage claims paid out and other usual operating expenses of such garage business, but excluding reserves and deductions for depreciation of the building or equipment, and interest and serial payments on the revenue bonds.

19. The management assumes all responsibility for employer-employee relationships respecting personnel employed in the garage, and such employees shall be deemed employees of the management. It shall be the duty of the management to maintain employer's liability insurance and workmen's compensation insurance, unemployment compensation taxes, social security taxes, and any employer obligations imposed by law.

20. The city will place all other insurance . . . , and the management will pay for all insurance out of the working capital account and will pay for such insurance as is placed by the city upon invoicing by the city. The management will co-operate in the enforcement of all regulations that will secure the most advantageous insurance rates.

21. This agreement shall be in effect for a period of five years from the date hereof unless terminated by the city prior to the end of such term. The city shall have a right to terminate this agreement as of the end of any year (the date of this contract being the beginning of the first year) when this contract has been in effect two years. If the city desires to terminate this agreement, it shall notify the management in writing not less than sixty days prior to the end of the year, and as compensation to the management for such termination, shall pay the management one of the following sums, depending upon the time of termination:

If terminated at the end of two years, the sum of..... $3,500
If terminated at the end of three years, the sum of..... $2,500

If terminated at the end of four years, the sum of..... $1,500

Upon termination, the obligations of the respective parties, with respect to the remaining term of the contract, shall cease.

22. This agreement may be extended by mutual agreement of the parties for an additional term not exceeding five years, such extension to be approved by ordinance of the council.

23. The city shall be responsible for making major repairs to the structure upon notification by the management of the necessity therefor.

24. It is mutually agreed that if said garage shall be partially damaged by fire, tornado or other casualty, said premises shall be repaired with all proper diligence by the city. If such damage is of such extent that the garage may continue operation at fifty percent of the capacity or more, the operation shall continue.

25. The management shall not dispense or furnish any product or services other than the parking of motor vehicles unless authorized by law and by supplemental agreement.

26. In the event of default by either party in the performance of its obligations provided herein, the other party may deliver in writing to the defaulting party, a notice of the matters in default, and in the event the offending party shall not have corrected such default or defaults within thirty (30) days after such notice, the complaining party shall have the privilege of terminating this agreement forthwith by written notice of termination.

27. Upon the taking effect of this agreement, the management shall deposit with the director of finance of the city, and thereafter keep in effect during the term of this agreement, a surety bond to the city in the amount of $25,000 and in a form approved by the city counselor, and with a corporate surety approved by the director of finance guaranteeing the faithful performance of this agreement by the management.

OPERATING PERIODS

Operating periods of a garage are usually determined by types of generators in the primary influence area. Parking demands of hotels, theaters, restaurants, and other evening generators in the immediate vicinity establish the operation periods. Municipal garages are operated for longer periods than the income would normally justify, since they offer a public service. Twelve of the eighteen garages are operated twenty-four hours a day throughout the year, including Sunday and holidays.

One facility is operated twenty-four hours a day except Sunday. Four garages are closed on Sundays and holidays and after certain

hours in the evening. Two generally close at approximately 7 p.m. while the others remain open until midnight. One garage is operated from 1 p.m. to midnight on Sundays and from 8 a.m. to 9 p.m. on weekdays.

PERSONNEL

Salaries and wages represent about two-thirds of the total operating costs of a garage. They are the most variable and are related to type parking, either self or attendant, internal design, number of entrances and exits, and cashiering procedures.

Personnel required for operating a garage usually include the following: manager, assistant managers, attendants and cashiers, maintenance, secretary and bookkeeping.

The duties of an individual employee are varied and may include several positions based on time of day and the usage. Also, greater flexibility and judicial scheduling is required with smaller garages to minimize labor costs.

The manager supervises the entire garage operation. Another important duty is the selling of parking. This includes the training of personnel and providing for customer conveniences. Parking is competitive, therefore service provided is an important measure in patronage.

Days and periods of heavy and unusual usage must be anticipated and adequate personnel should be available. In smaller garages, the manager frequently assists attendants or cashiers during peak periods. Most managers have served their apprenticeship in these positions.

Assistant managers supervise a particular shift, usually eight to twelve hours. They are on the floor and many times function as a cashier or attendant. Good customer relations is essential for this position in dealing with accidents, complaints, and giving general information.

Attendants' duties depend on the garage design. With self-parking, they issue tickets and direct entering motorists to parking areas. If needed, they park cars for patrons. During off-peak periods, especially during evenings, attendants are used for maintenance and as cashiers.

Attendant parking requires considerably more attendants as they must drive individual cars to the various parking areas. Generally, women are used as cashiers during the daytime at most facilities. Their basic duty involves the calculation and collection of fees. During slack periods, attendants function in a dual position.

A systematic maintenance program is essential. Proper cleaning and painting should be stressed, especially in self-parking facilities where patrons drive throughout the building. Most cleaning is accomplished during evenings to avoid interference with parking operations.

Accurate and complete records provide vital information for scheduling of personnel and the entire operation. In many instances, the secretarial and bookkeeping positions are combined, or they both may be assumed by the cashiers.

In Table XI, the number of employees is presented for self-parking and attendant operations. For self-parking, employment ranges from two to twenty-seven, averaging eleven. Attendant operation involves a minimum of nine, a maximum of thirty-three, and an average of twenty employees or twice the requirement of self-parking. Attendant parking requires considerably more attendants —an average of sixteen attendant-cashiers, as compared to only seven for self-parking. Approximately the same number of employees occupy other positions.

TABLE XI—NUMBER OF EMPLOYEES BY TYPE PARKING

Position	*Number of Employees*					
	Self-Parking			*Attendant Parking*		
	Min.	*Max.*	*Aver.*	*Min.*	*Max.*	*Aver.*
Manager	1	1	1	1	1	1
Assistant Manager	0	3	1	1	2	1
Attendants-Cashiers	1	18	7	7	26	16
Maintenance	0	3	1	0	2	1
Secretary and Bookkeeping	0	2	1	0	2	1
Total	2	27	11	9	33	20

A more comparable analysis may be presented on a per-space basis. The average number of spaces for each employee ranges from twenty to 117, and averages sixty-eight with self-parking. For attendant operation, the minimum is eighteen spaces for each em-

ployee; the average is thirty-five. On a per-space basis, the employee requirements for attendant operation are about twice self-parking.

The number of employees on duty per space is shown in Table XII for various periods of the day between 8 a.m. and 4 p.m., for self-parking and attendant operation. For self-parking, the maximum number of employees occurs at 2 p.m., when an average of one employee is on duty for every 105 spaces. About one employee for sixty-four spaces is needed for attendant operation at 2 p.m.

TABLE XII—PARKING SPACES PER EMPLOYEE

Time of Day	*Spaces per Employee*					
	Self-Parking			*Attendant Parking*		
	Min.	*Max.*	*Aver.*	*Min.*	*Max.*	*Aver.*
8:00 a.m.	50	260	124	49	115	85
10:00 a.m.	33	260	117	37	95	68
12:00 Noon	31	260	105	35	88	65
2:00 p.m.	33	260	105	35	88	64
4:00 p.m.	39	260	109	38	85	61

The employment is given in Table XIII for two garages operated and developed by a parking authority with capacities between 700 and 800 spaces. One was converted to self-parking after several years of operation. Use and revenues remain at the same level; operating costs are substantially less. With the exception of attendants, the same number of personnel is required. However, only eleven attendants are required for self-parking, as compared to twenty-three for the attendant parking facility.

TABLE XIII—COMPARATIVE PERSONNEL REQUIREMENTS

Position	*Self-Parking Garage*	*Attendant Parking Garage*
Manager	1	1
Assistant Manager	2	2
Attendants	11	23
Cashiers	3	3
Maintenance	2	2
Secretary-Bookkeeper	1	1
Total	20	32

The number of employees on duty at the two facilities is outlined in Table XIV. Again, about twice the number of attendants is required.

TABLE XIV—COMPARATIVE TYPICAL EMPLOYEE SCHEDULES

Time of Day	*Self-Parking Garage*					*Attendant-Parking Garage*				
	Manager Ass't. Mgr.	*Attendants Cashiers*	*Maintenance*	*Sec'y Bkpr.*	*Total*	*Manager Ass't. Mgr.*	*Attendants Cashiers*	*Maintenance*	*Sec'y Bkpr.*	*Total*
8:00 a.m.	2	6	1	–	9	2	8	1	–	11
10:00 a.m.	2	9	1	1	13	2	16	1	1	20
12:00 Noon	2	9	2	1	14	2	16	2	1	21
2:00 p.m.	2	9	3	1	15	2	16	2	1	21
4:00 p.m.	2	9	3	1	15	2	14	2	1	19
6:00 p.m.	2	6	1	1	10	2	9	2	1	14
8:00 p.m.	1	2	1	–	4	1	8	2	–	11
10:00 p.m.	1	2	–	–	3	1	8	–	–	9
Midnight	1	2	–	–	3	1	2	–	–	3
2:00 a.m.	–	1	–	–	1	1	1	–	–	2
4:00 a.m.	–	1	–	–	1	1	1	–	–	2
6:00 a.m.	–	1	–	–	1	1	1	–	–	2

A five-or-six-day work-week is the common garage operation. The peak periods such as evenings when stores are open offer flexibility in personnel assignments.

Hours Worked: Table XV shows the minimum, maximum, and average hours per week for various positions: for managers, 51; assistant managers, 48; attendants, 49; cashiers, 43; and for secreatries, bookkeepers, 44 hours.

TABLE XV—HOURS WORKED PER WEEK

	Hours Per Week		
Position	*Minimum*	*Maximum*	*Average*
Manager	40	60	51
Assistant Manager	40	60	48
Attendants	40	60	49
Cashiers	40	54	43
Maintenance	40	48	45
Secretary-Bookkeeper	40	54	44

Uniforms of Employees: In most garage operations, the attendants are in uniform, either coveralls, special shirts and hats, or a complete outfit. Some type of uniform is worn by the attendants in the operation of seventeen of the eighteen facilities. All uniforms are provided by the operator for fifteen of seventeen facilities. The employee provides his own in one garage, and the cost is on a fifty-fifty basis in another. Uniforms are rented for part-time, or initialed for regular attendants, since properly fitting uniforms are essential for a neat appearance.

CASHIER AND TICKETING PROCEDURE

To provide an efficient operation, it is necessary to use a precise and systematic method of ticketing and cashiering. Adequate records must be maintained for auditing, location, description of cars, duration of stay and the collection of fees.

Claim Checks: With the exception of the meter-operated garage, all facilities use tickets of some kind, giving this pertinent information: name of garage; operator's name; location of garage; ticket number; brief description of legal responsibilities; hours of operation, and the city agency administering program.

In only two of the seventeen facilities do tickets carry advertising.

The entire cost of ticket printing is defrayed by this type of advertising income in one garage.

Monthly Parker Designation: Monthly parkers are distinguished as follows: sticker on windshield in seven garages; sticker on rear-view mirror in three; metal emblem on license plate in two; assigned specific space or sticker on rear window in one garage.

The most common method of distinguishing monthly parkers is by a sticker on the *windshield.* This is readily visible to the attendant

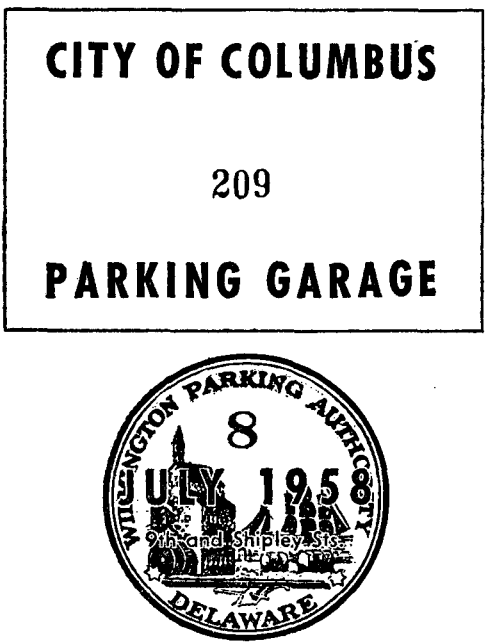


Figure 7. Typical Monthly Parking Stickers.

and expedites entering and leaving traffic. Stickers on rear-view mirrors have visibility almost equal to the metal emblem on the license plate.

Stickers on rear windows are not readily apparent to the attendant as the parkers enter the garage, but they may assist in checking vehicles in parking spaces. Typical monthly stickers are illustrated in Figure 7.

Location of Stub on Car: As a vehicle enters the parking facility, the attendant usually places on the car a stub showing the ticket number. This assists in locating vehicles and in accounting. These stubs are placed at one of four places: under windshield wiper in eight garages; on windshield in five; on the cowl in two, and between the hood and fender in two.

A stub under the windshield wiper affords the maximum security against rain, winds, etc. The stub may be removed more easily in *other* positions.

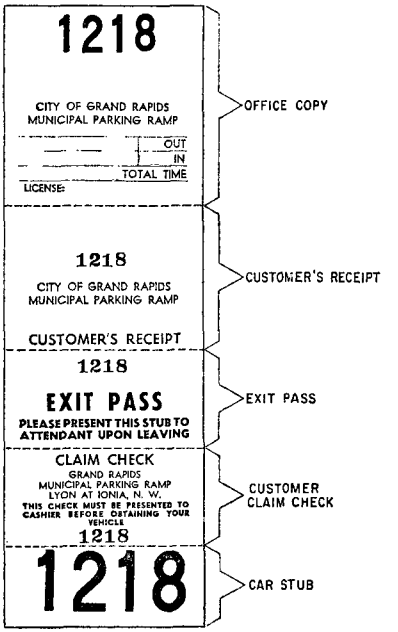


Figure 8. Five-part Ticket Self-parking.

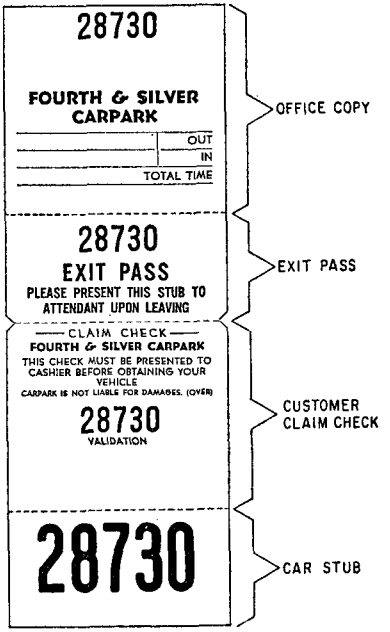


Figure 9. Four-part Ticket Self-parking.

METER OPERATION

One garage is operated entirely by parking meters. The eight-level facility affords self-parking and a system of electronic devices denotes the availability of space on each floor. This eliminates delays encountered upon entering and leaving the facility.

The most common operation in parking garages uses attendants and cashiers. Many procedures are used. Various methods involve tickets containing from two to five parts. Descriptions of the various types of self-parking operation are outlined in the following sections.

SELF-PARKING TICKETING PROCEDURES

One self-parking facility uses a five-part ticket. Figure 8. As the motorist enters the facility, the car stub, Part 1, is placed on the car. Part 2, the claim check, is given to the customer. The office copy, time-stamped, is retained at the cashier's booth, with the customer's receipt and exit pass. The license number of the vehicle is written on the office copy to assist in finding the ticket in case the parker loses the claim check. Upon his return to the garage, the parker presents the claim check matched by the ticket number with the office copy. A receipt on which the parking fee is entered and an exit pass are given to the parker. The exit pass is collected by an attendant as the parker leaves the garage.

A four-part ticket is used in another garage. As illustrated in Figure 9, one part of the ticket is detached and placed under the windshield wiper. Part two, a claim check, is given to the customer. Parts three and four are retained at the cashier's booth. The exit pass, issued after payment, is presented to the attendant upon departure.

One facility uses a three-part ticket, Figure 10, of which one part is placed on the automobile, one retained in the office, the other used as a claim check. The customer pays at the cashier's booth when returning for the car, surrenders a pass-out check (stub of ticket stamped "paid") to the doorman. In this facility, the evening parker pays on entering; hence only a two-part ticket is required.

TICKETING PROCEDURE—ATTENDANT PARKING

A two-part ticket is used at another garage. Both the customer's claim check and the hood stub are time-stamped. The claim check is presented to the cashier and the receipt tape from the cash register given to the parker. The receipt and hood-tag are collected by an attendant at the exit.

The ticket procedure in an attendant parking garage needs to be more elaborate. In one example, a four-part ticket is given. Figure 11. It includes: A claim check to customer; car stub; office copy; and a release check.

Upon arrival at the garage, the customer is given the claim check with the arrival-time recorded. The attendant places the top stub, a car check, on the windshield and parks car. The stub, filled out

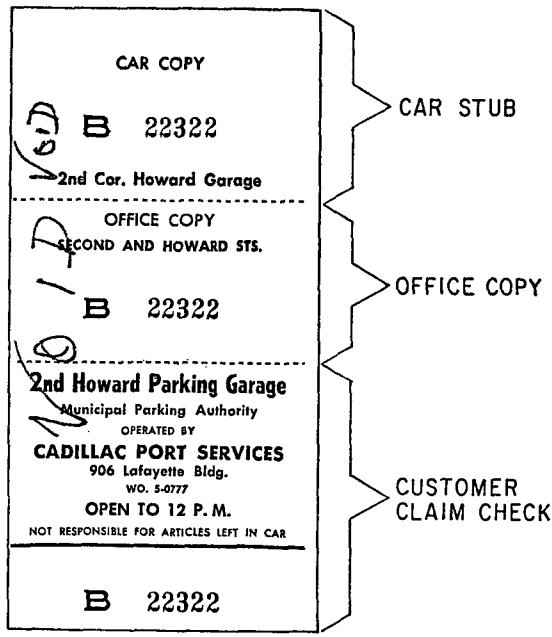


Figure 10. Three-part Ticket Self-parking.

with the license number, time-in, and car-location, is filed in the office. When the customer returns, he presents the claim check at the cashier's booth. It is matched with the ticket on file and the time-out is recorded. After paying the fee, the attendant is given the release check. The attendant gives the customer the release check in return for the claim ticket.

An example of a five-part ticket, used in an attendant parking garage, is shown in Figure 12. Upon arriving at the garage, the

attendant gives the customer one part of the claim check and puts all remaining sections on the windshield. After parking the car, he marks the location of the car on the part he delivers to the cashier. The numbered stub is placed on the windshield. When the customer returns to claim the car, he pays the cashier who gives ticket (with location marked) to an attendant. The attendant delivers car to customer who gives the receipted ticket to the attendant. The

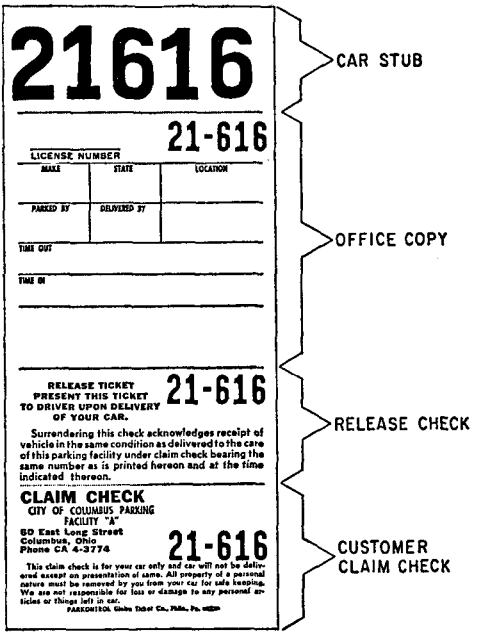


Figure 11. Four-part Ticket Attendant Parking.

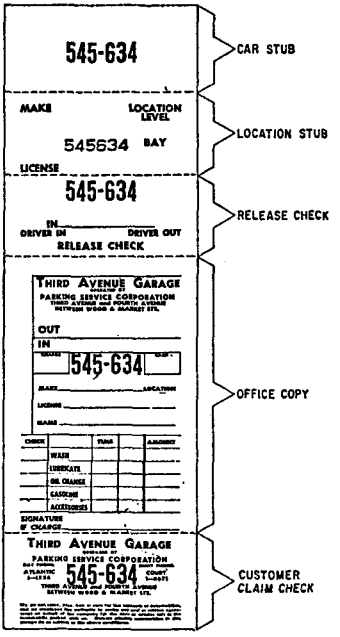


Figure 12. Five-part Ticket Attendant Parking.

attendant compares the ticket number with the numbered stub on the windshield in releasing the car.

AUTOMATIC PARKING DEVICE

Labor costs account for more than half of the operating costs of garages. Electric gates and ticket-issuing machines have been employed to reduce labor costs. With some systems, no attendants are needed.

With gate controls, the insertion of the proper coins actuates the arm, allowing the vehicle to enter. At some facilities, the parker pays when he leaves. Differential counting equipment may be used to indicate space availability. Magnetically imprinted cards are used for monthly contract parkers in some facilities.

The counting equipment may be adjusted to insure space for these parkers. This type of operation is usually limited to one fee; hence, they are found most often in all-day facilities. In one of the garages, gates are used for the collection of evening fees, after the cashier has left.

Automatic ticket dispensers are becoming increasingly popular. The machine at the entrance eliminates at least one employee. A customer automatically receives a time-stamped ticket upon entering. The tickets are serially numbered for control purposes. With differential counters and ticket dispensers, only a cashier is used at one facility.

Customer Conveniences: Like most other businesses, parking is highly competitive. Therefore it behooves an operator to provide the plus items. Many customer conveniences are employed, including the following: baby strollers; wheel-chairs; parcel checking (in self-parking garages, customers often return and deposit packages in their car); baby diaper changing areas and bottle warmers; umbrellas; maps showing stores and parking facilities; comfortable waiting areas, and information brochure on operating procedures of the garage.

ALLOCATION OF PARKING SPACE

Usually, transient parkers may park in any area of the garage. Garages are usually "filled" upward, however, from the first level. In one garage, a special one-dollar fee, about two-thirds the normal fee, is charged for roof parking.

It is advisable to avoid assigning a specific space to monthly parkers. In many instances, areas are designated for contract parking. This permits greater operational flexibility and additional space to accommodate transient parkers during peak periods of short-time demands. In most facilities, an area or an entire level of the garage is used for this type of parking. In one facility, for

example, only seventy percent of the monthly contract parkers use the facility on a typical day. This ranges to a *maximum* of ninety-five percent and *averages* eighty-three percent.

Validation: A portion or all of the parking fee is paid or "validated" by stores, banks, and business firms at nine of the garages. Typical examples of this "free" parking:

a. First hour paid by business, parker pays additional charges.

b. Merchants give thirty cents in cash (first hour fee) to parker, and stamp ticket to avoid duplication.

c. Merchants give one hour of free parking to customers with minimum purchase. Free parking dependent upon number of different validating merchants patronized.

d. Stamps are issued by merchants—a five-cent stamp for each one-dollar purchase is given up to fifty cents in stamps.

e. Five merchants and four banks pay first one-half hour or first hour of parking through stamping of ticket.

f. Merchants issue validating stamps purchased through businessmen's group.

CHAPTER FIVE

USAGE CHARACTERISTICS

The use of a particular facility depends upon several factors, including the proximity of the facility to the parker's destinations, the type of services provided, and the rate schedule. In following sections, the use of facilities is presented on an annual basis including transient and monthly parking. Hourly, daily, and seasonal demands are illustrated.

ANNUAL USAGE

The total number of cars accommodated throughout the year has been divided by the number of designated stalls to ascertain the use per space per year. As shown in Table XVI, this value ranges from a minimum of 342 parkers per space per year for a facility serving principally all-day parkers to 775 parkers per space per year for a garage used primarily by short-time shopper and business-trip parkers.

TABLE XVI—PARKERS PER SPACE PER YEAR

Parkers Per Space Per Year	*Number of Garages*
300–400	3
400–500	3
500–600	5
Over 600	3
Data not available	4
Total	18
Minimum	342
Maximum	775
Average	533

The average usage per year is 533 parkers a space based on reports of fourteen facilities. Assuming 306 days of actual normal operation, excluding Sundays and holidays, an average garage accommodates about 1.4 parkers a space each day.

TRANSIENT USAGE

The parkers have been divided into two basic categories: *transient* and *monthly*. Monthly parkers, on a contract basis, are principally all-day users, whereas the majority of transient users remain for

relatively short periods (shoppers, etc.). The turnover per stall for transient parking, therefore, is considerably more than for monthly.

In one facility, the monthly spaces serve an average of one parker a space each day, as compared with about four transient parkers a space daily. Monthly stalls frequently provide a reservoir for transient parking if that demand increases. Careful attention should be given to the distribution of spaces between the two categories. With transient use subject to seasonal variation, the monthly space may be controlled in most cases by normal attention.

Table XVII lists forty-five percent of the users as transient parkers in one facility. An *over-all* average of seventy-five percent of the users are transient parkers. The percentage of transient parkers ranges between sixty and seventy percent for four facilities; between eighty and ninety percent for five others.

TABLE XVII—TRANSIENT USAGE OF GARAGES

Range in Percent	*Transient Parkers Percent of Total Parkers*	*Percent Space Designated for Transient Parking*
	Number of Garages	*Number of Garages*
30–40	0	1
40–50	1	2
50–60	0	3
60–70	4	4
70–80	2	3
80–90	5	0
90–100	2	1
Data not available	4	4
Total	18	18
Minimum	45 percent	33 percent
Maximum	100 percent	100 percent
Average	75 percent	63 percent

The higher turnover achieved with transient parking is illustrated, since an average of sixty-three percent of the spaces are *designated* for transient parkers. They accommodate, however, seventy-five percent of all parkers. In one facility, situated at the fringe of the business district, only one-third of the spaces are designated for transient parking. Between sixty and seventy percent of the spaces are utilized for transient parking in four facilities.

TABLE XVIII—MONTHLY VARIATIONS IN USAGE

Month	*Month of Peak Usage*	*Month of Least Usage*
January		
February		2
March	1	
April		
May	1	
June		
July		9
August		2
September		1
October	1	
November	2	
December	9	
Data not available	4	4
Total	18	18

Usually, the peak month of activity is December, as noted for nine of fourteen garages. Table XVIII shows November the peak month for two, with March the best month for another garage adjacent to an auditorium. In nine of fourteen cases, July usually has least activity. Other low-use months noted are February, August, and September. Garages in this study are in the central business district and usage characteristics are relatively similar. Seasonal characteristics are radically different in some areas such as Florida.

TABLE XIX—MONTHLY VARIATIONS—TYPICAL FACILITIES

Monthly	*Percent of Typical Month*					*Average*
January	109	95	105	98	100	1.01
February	98	88	73	95	87	.88
March	110	96	111	105	99	1.04
April	99	95	106	107	98	1.01
May	96	100	93	99	108	.99
June	94	99	91	94	98	.95
July	87	83	81	82	103	.87
August	89	98	95	85	98	.93
September	93	98	100	93	95	.96
October	101	115	93	104	98	1.02
November	106	115	113	116	103	1.10
December	118	118	139	122	113	1.22

July is usually the over-all month of least business as well as least traffic and parking in the central business district. As shown in Table XIX, it is eighty-seven percent of the average month, based

on the distribution of five garages. December experiences the highest usage: 122 percent of the average. The peak operating period extends from October through April with the exceptionof February.

TABLE XX—DAILY VARIATION IN USAGE

Day	*Day of Peak Usage*	*Day of Least Usage*
Monday	5	2
Tuesday	0	3
Wednesday	2	2
Thursday	1	1
Friday	3	0
Saturday	4	7
Data not available	3	3
Total	18	18

Daily variations in transient demands were determined for each of the facilities. For five of the fifteen garages, Monday is the day of peak activity; Saturday for four. Factors affecting the peak day are the late closing of stores, and the Saturday activity of retailers, banks and office buildings. Saturday, however, is the day of *peak* activity for *four* facilities, but the day of *least* activity for *seven*. Facilities experiencing peak activity on Saturday are generally close to key department stores. Other days where minimum usage is experienced include Monday, Tuesday, Wednesday, and Thursday. Table XX.

PEAK HOUR OF ACTIVITY

The peak-hour of parking activity depends upon the type of use. For one facility catering primarily to all-day parking, both transient and monthly, the heaviest hour is usually from 8 to 9 a.m. In other facilities, combining monthly and short-time transient use, the busiest hours occur between 11 a.m. and 3 p.m. The most common peak period is from 12 noon to 1 p.m. for seven of the eighteen facilities. Other active periods are between 11 a.m. and 12 noon in five garages and from 1 to 2 p.m. in three.

HOURLY VARIATIONS

The frequency with which cars enter and leave a parking facility is an important consideration in its design and operation. Variations in demands during periods of the day should be recognized.

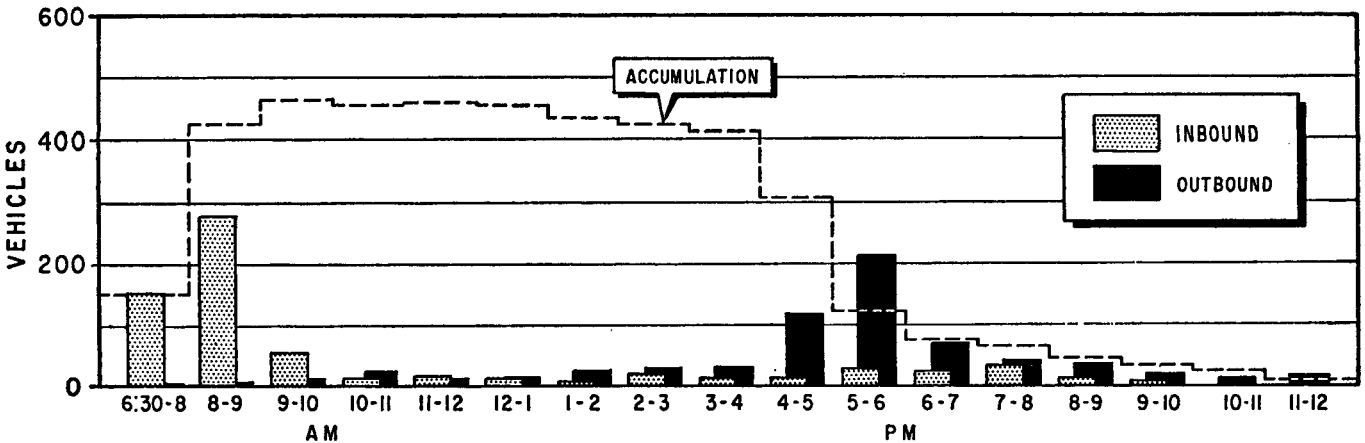


Figure 13. Parking Accumulation—Principal Use by All-Day Parkers.

Knowledge of these demands is essential in developing rate schedules and in scheduling attendants' working hours to provide for peak periods. It is further needed in planning reservoir space.

During the daytime, general demands for parking services are normally classified as all-day or short-time. All-day parkers, arriving in the morning and leaving in the late afternoon, create two periods of peak demand. Short-time parkers, fairly well distributed throughout the day, usually develop a steady turnover. Either or both of these types of parkers may be combined with a peak demand for evening parking. The most common example of this type of operation is the garage serving theatre or auditorium patrons with a peak demand in the early evening and another, generally at the end of the program.

All-Day Parkers: The demand for all-day parking responds to the type of business and other generators in the influence area of the facility. Figure 13 illustrates the "in and out" data and the accumulation of vehicles in one garage that accommodates principally all-day parkers. At 6:30 a.m., there was only one transient parker in the facility. The peak period of arrival occurred between 8 a.m. and 9 a.m., when 278 of the total users entered. There was a small influx of short-time parkers between 9 a.m. and 7 p.m. The primary exiting period occurred between 5 and 6 p.m., when 211 transient users left the facility.

Short-Time Parkers: Data appear in Figure 14 for transient parkers of a large facility with many spaces devoted to monthly parking. The transient usage was primarily generated by shoppers and business trips. During the day the peak in-bound activity occurred between 10 a.m. and 2 p.m., with the peak hour from 11 a.m. to 12:00 noon. The out-bound movement occurred between 3 p.m. and 4 p.m., which coincided with the usual decrease in the number of shoppers.

The garage is used heavily during the evenings of auditorium activities. The peak in-bound hour in the evening was from 8 to 9 p.m., when 574 vehicles entered the facility. A majority of them remained until between midnight and 1 a.m. During the evening, the majority of the monthly parkers were not present. This provided more spaces for transient usage.

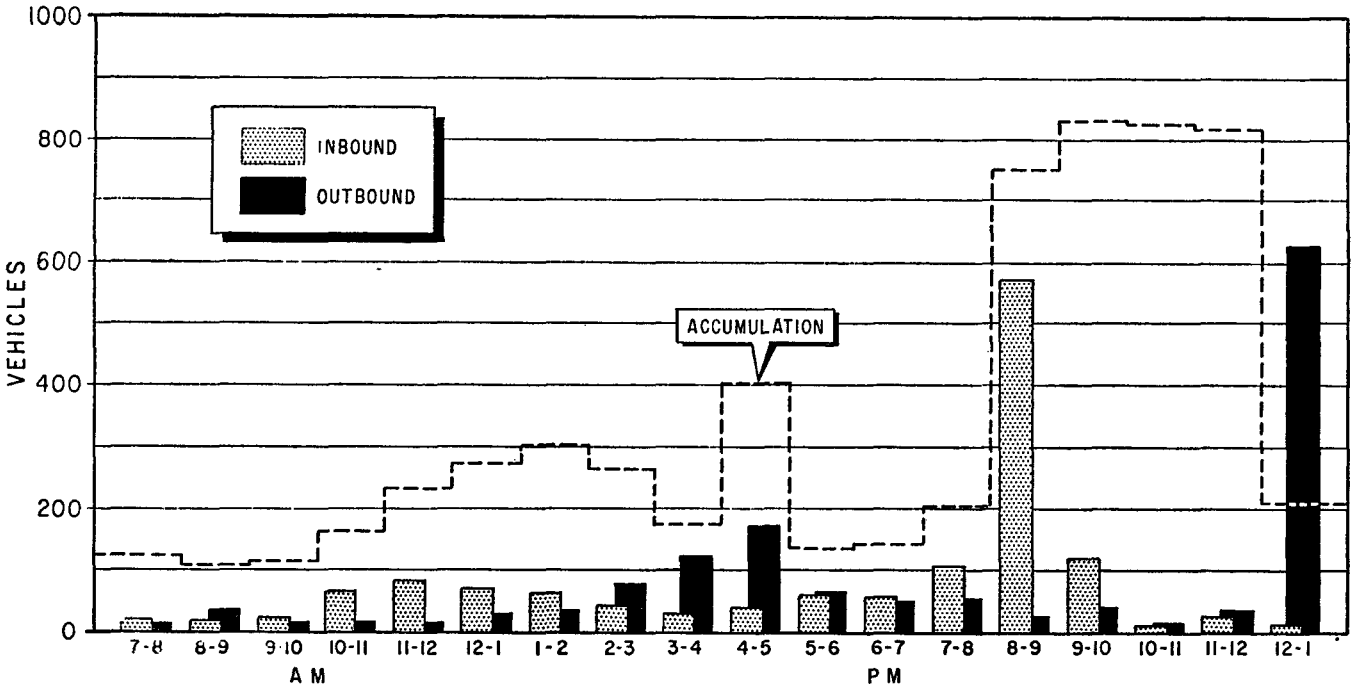


Figure 14. Parking Accumulation—Principal Usage by Daytime Transient and Evening Auditorium Parkers.

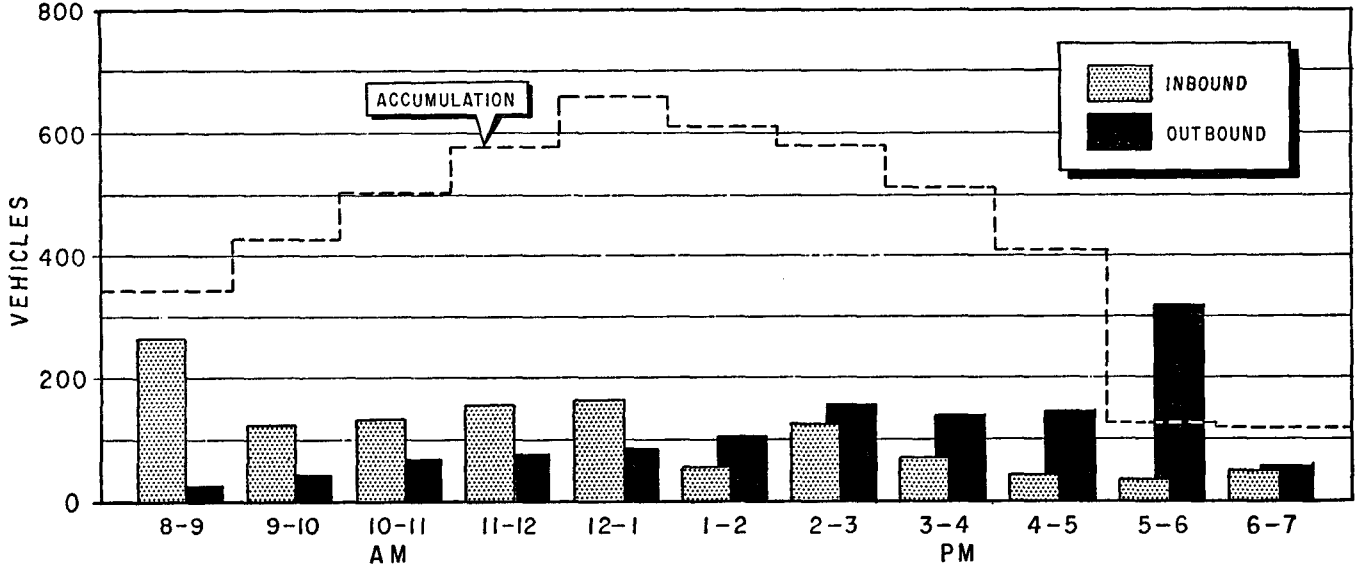


Figure 15. Parking Accumulation—Usage by Transient Parkers.

All-Day and Short-Time Usage: Use by hours is shown in Figure 15, for a large garage that accommodates about 160 monthly parkers in addition to the short-time parking demand. The peak in-bound movement occurred between 8 and 9 a.m., when 266 vehicles entered. There was a slight decrease in the in-bound movement until 11 a.m., when the peak period of short-time parking occurred. The peak out-bound flow occurred between 5 and 6 p.m., when 316 parkers left the facility. A peak accumulation of 661 parkers used the facility.

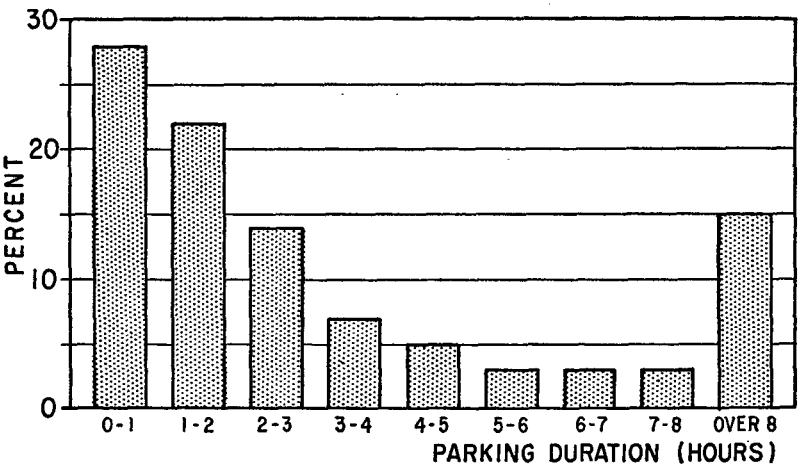


Figure 16.
Parking Duration—Garage Affords Transient Parkers Only.

The time vehicles are parked in a garage bears an important relation to the over-all usage. The stay for parkers in a typical short-time garage is shown in Figure 16. All parkers using the facility on a weekday were grouped according to length of time parked to the nearest one-hour increment.

DURATION OF PARKING

About twenty-eight percent of the motorists parked less than one hour; twenty-two percent parked from one to two hours; fourteen percent between two and three hours. This means that about two-thirds of all the garage users remained for fewer than three hours.

The duration of parking for two garages accommodating principally all-day transient users is illustrated in Figure 17. In one facility, seventy-two patrons stayed more than five hours, while forty-four percent remained longer in the other facility. A fairly even distribution was found for the shorter parking periods.

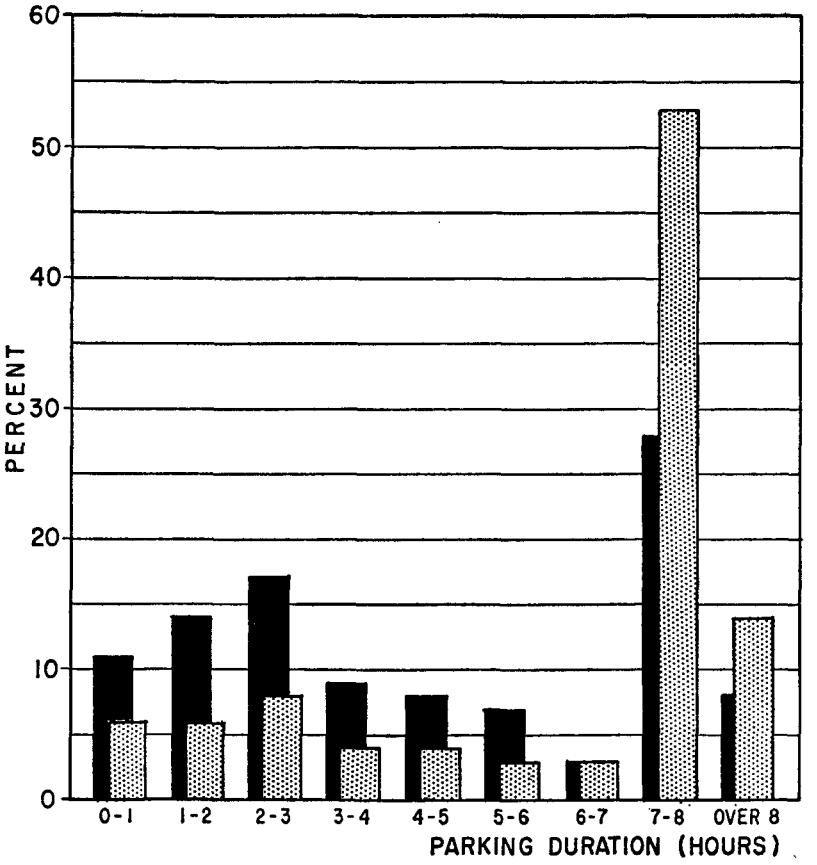


Figure 17. Parking Duration—
Two Garages Accommodating Primarily All-day Parkers.

The duration pattern is shown in Figure 18 for two garages, where about twenty-five percent of the spaces are devoted to monthly parking with the remainder used by transients. The

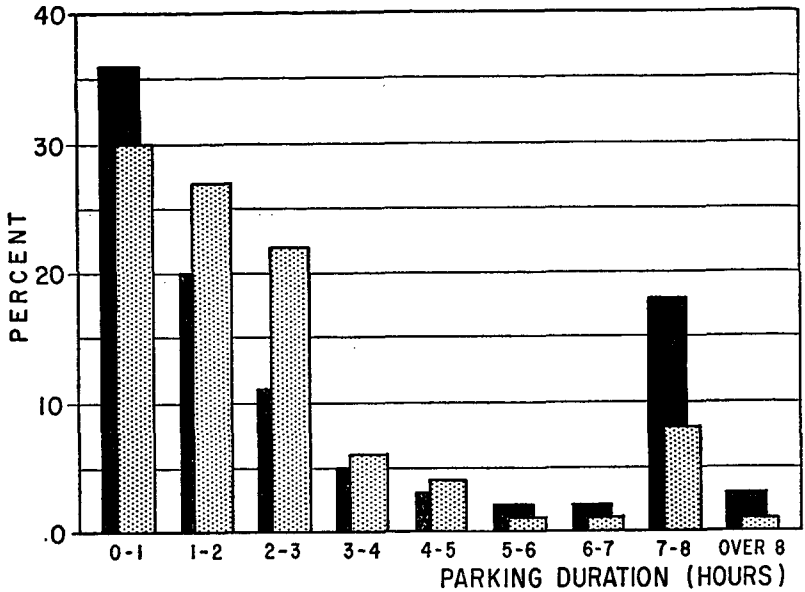


Figure 18. Parking Accumulation—
Two Garages Accommodating Transient and Monthly Parking.

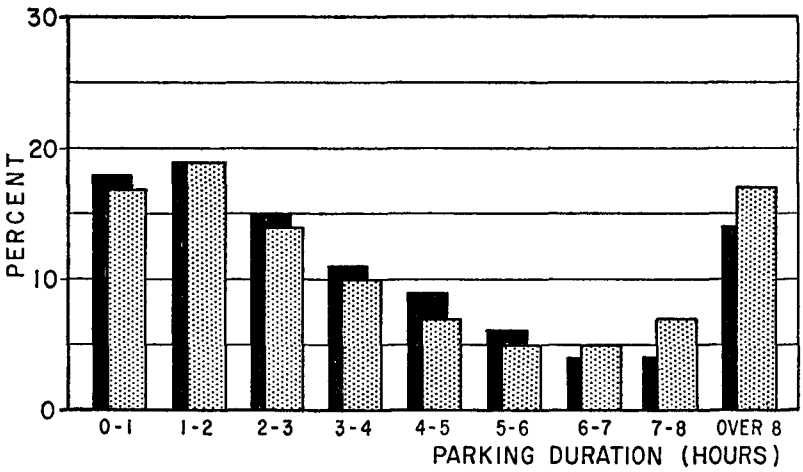


Figure 19. Parking Duration—
Two Garages Located in Same Area of City.

transient use is primarily short-time. The all-day parking is primarily accommodated by the monthly space allotment. Heavy short-time (less than three-hour) use is indicated for both facilities. The number of parkers remaining fewer than three hours is sixty-seven and seventy-nine percent, respectively.

A similar duration pattern is shown for two other garages situated in the same city (Figure 19), though in *different sections* of the central business district. Both of the facilities accommodate monthly parking; the all-day parking fees, however, encourage all-day parking. About one-half of the parkers in each facility remain three hours or less.

CHAPTER SIX

DEVELOPMENT COSTS

Garage development costs include primarily land acquisition and construction. Other major items are legal and financing expenses and architectural and engineering fees.

LAND ACQUISITION

Land costs constitute the most variable item. The assembling of land parcels to produce suitable dimensions for garage construction is one of the most difficult tasks. In the central business district, property dimensions are quite variable because of intense development, frequent land-use changes, and different ownerships. With private development, there must be a willing buyer and seller with multiple and absentee ownerships the major obstacles.

Many cities have broad powers of eminent domain in assembling land parcels. State statutes limit condemnation of certain types of properties. In Pennsylvania, authorities cannot condemn property devoted to public use, property of a public service company, property used for burial purposes, and places of public worship. Also, condemnation is prohibited for property which at the effective date of the Act (Parking Authority Law, approved June 5, 1947), was used for parking, as long as the operation continues, if the operation complies with the parking and traffic ordinances of the city.

Condemnation has been contested on the grounds of need for additional parking and price. The Philadelphia Parking Authority purchased properties, on which to build a garage. A private corporation claimed it had purchased property a block away for garage construction. In court, the corporation argued that with the development of its facility, the parking needs of the area would be met. The Supreme Court of Pennsylvania dismissed the case stating that the courts do not have the power to overrule administrative determinations by an authority as to the proper location of its projects.[1]

The following excerpt is quoted from the Supreme Court's opinion:

1. 373 Pa. 274, 95A. 2d 553 (1953).

The essential allegations of this complaint are that the parking needs of the neighborhood involved will be met by the facilities of private interests so that the Authority's construction will only provide unnecessary competition. The very fact that the Authority plans to build establishes that it has exercised its judgment to the contrary. In the nature of the case the resolution of this conflict would involve the court in a process more administrative than judicial. We would ourselves have to appraise all the available evidence and in effect make our own forecast of the business justification for the Authority's project in order to measure against it the conclusion of that body. We would have to repeat in substance the scientific analysis and calculated estimates of the Authority.

If the court is to pass upon the propriety of new construction, it must determine such questions as priority of purchases of the property, suitability of the respective locations in view of all the needs of the area and of the city as a whole, whether the plantiff's prospective construction will provide for as much parking facilities as alleged, whether that facility will be adequate, whether the defendant's facilities and location are preferable to the plaintiff's and whether the plaintiff has the corporate power and financial or other ability to take care of the need properly.

As with other municipal improvements, negotiated purchase of required property is attempted in most instances. Condemnation proceedings are instituted when the owner's price varies considerably from the appraised value, or when there is an unwilling seller. One city automatically initiates condemnation proceedings and then starts negotiations. The appraiser's reports are available for review.

There are friendly condemnations whereby the property incurs tax advantages and sometimes has more flexibility in reinvestments.

All properties involved at twelve of the sites were acquired by direct purchase. Condemnation proceedings were used for one site entirely, and both condemnation and direct purchase were used in the acquisition of five parking areas.

NUMBER OF PROPERTIES INVOLVED

An influencing factor in the acquisition cost is the number of individual properties involved. The assembling of sufficient land parcels to achieve a suitable area is a key problem of private developers. The site consists of only one property in four instances. Sixteen properties were involved in one site area, however. An

average of 5.3 parcels was found for the eighteen sites. Table XXI.

Land Use of Properties: The existing land-use, prior to the development of the garage, was determined for each of the sites. All or part of the area was used for surface parking. Several state enabling acts

TABLE XXI—NUMBER OF LAND PARCELS ACQUIRED FOR SITES

Number of Land Parcels	*Number of Garages*
1	4
2	3
3	1
4	1
5	0
6	3
7	1
8	1
9	1
10 or more	3
Total	18
Minimum	
Maximum	16
Average	5.3

restrict the acquisition of private parking facilities by condemnation, with certain stipulations. Hotel and/or rooming houses were situated on four sites; commercial establishments (business or retail) were included in eleven sites; and service stations were on three sites prior to acquisition.

LAND ACQUISITION COSTS

Land costs are variable, depending on the area, proximity to the core of the business district, and existing improvements on the site. For the eighteen garages studied, the land costs range from $114,000 to $2,000,000; they average $636,000. Costs of between $500,000 and $750,000 were found for each of six facilities. Table XXII.

Cost Per Square Foot: Land costs based on unit measure give indications of comparative costs of sites. A new dimension, depth, is combined with the usually front foot value.

Unlike many central business district retail and business establishments, garages require substantial area.

For the garages under study, the average land cost is $12.15 a square foot, ranging from $2.65 to $27.50 (Table XXIII). The two price categories: $5 to $10 and $10 to $15 account for seven and six garages, respectively.

Based on an area per parking stall of 350 square feet, the cost would average $4,250 a space for a surface lot. This over-all cost is frequently exceeded in the development of core area garages.

TABLE XXII—TOTAL LAND ACQUISITION COSTS

Cost	*Number of Garages*
Less than $250,000	4
$250,000–$ 500,000	4
$500,000–$ 750,00	6
$750,000–$1,000,000	2
Over $1,000,000	2
Total	18
Minimum	$114,000
Maximum	$2,000,000
Average	$636,000

TABLE XXIII—LAND ACQUISITION COSTS PER SQUARE FOOT

Cost per Square Foot	*Number of Garages*
Less than $5.00	1
$ 5.00–$10.00	7
$10.00–$15.00	6
$15.00–$20.00	3
Over $20.00	1
Total	18
Minimum	$2.65
Maximum	$27.50
Average	$12.15

TABLE XXIV—LAND ACQUISITION COST PER PARKING SPACE

Cost per Space	*Number of Garages*
Less than $500	2
$ 500–$1,000	9
$1,000–$1,500	3
$1,500–$2,000	3
Over $2,000	1
Total	18
Minimum	$190
Maximum	$3,600
Average	$1,597

Cost Per Space: The land-acquisition cost per space is related to the garage-area per stall and the number of levels. With a multi-level structure, land costs are distributed over a larger number of

TABLE XXV—CONSTRUCTION COSTS OF FOUR GARAGES

Item	*Garage A*		*Garage B*		*Cost Garage C*		*Garage D*		*Average*	
Demolition	$ 6,340	2.7%	$ 15,000	2.8%	$ 3,800	0.5%	$ 16,784	1.8%	$ 10,481	1.7%
Excavation, concrete and steel	146,000	61.1	321,600	60.8	549,129	73.1	641,450	69.9	414,545	68.1
Plumbing and Heating	2,500	1.0	14,000	2.6	35,693	4.8	43,000	4.7	23,798	3.9
Electrical	5,000	2.1	40,000	7.6	16,479	2.2	21 000	2.3	20,620	3.4
Other (including equipment)	59 258	24.8	103,197	19.5	117,817	15.7	139,310	15.2	104,896	17.2
Sub-Total	$219,098	91.7	$493,797	93.3	$722,918	96.3	$861,544	93.9	$574,340	94.3
Architectural, Engineering and Inspection Fees	20,000	8.3	35,366	6.7	27,357	3.7	55,755	6.1	34,620	5.7
Total	$239,098	100.0%	$529,163	100.0%	$750,275	100.0%	$917,299	100.0%	$608,960	100.0%
Number of Spaces	179		336		352		605		368	
Cost Per Space	$ 1,336		$ 1,575		$ 2,131		$ 1,516		$ 1,655	

spaces, thereby reducing the per-space cost for land. Additional levels may be justified since the over-all costs are increased by the actual construction costs. The added spaces could serve monthly contract customers until transient usage warrants.

Land costs average $1,597 a stall. The minimum is $190 and the maximum is $3,600 per space. The costs, however, range between $500 and $1,000 a space for one-half of the facilities. Table XXIV.

CONSTRUCTION COSTS

In calculating construction costs, these are normally included: demolition, excavation, concrete and steel, plumbing and heating, electrical equipment, plus architectural, engineering and inspection fees. Construction costs vary considerably in different parts of the country. Other factors causing variances include the year of construction and the type of design. The average construction cost of the sixteen above-ground garages was $1,817 a car space, ranging from $720 to $3,350 a space.

For underground garages, the average construction costs for two facilities was $2,790, or about fifty percent greater than that of an above-ground open deck facility. The construction cost of one underground facility was $2,660; the other, $2,920. The *average* cost per square foot of structure was $5.45, ranging from $2.50 to $7.50.

Construction costs are itemized on Table XXV for four recently constructed self-parking garages. The capacities range from 179 to 605 spaces. Demolition costs are relatively minor, averaging only 1.7 percent of the total cost. Basic construction, including excavation, concrete and steel accounts for sixty-eight percent of the total. With open-deck construction, the plumbing and heating costs are low. The cashier's booth and waiting area are usually heated.

These costs average about 3.4 percent for the four facilities. Other costs including elevators, ticketing and cashier equipment, and appurtenances, account for about seventeen percent of the total cost. Architectural, engineering and inspection fees are about six percent of the total construction cost. The cost per space ranged from $1,331 to $2,131, and averaged $1,655 for the four facilities.

CHAPTER SEVEN

REVENUES AND OPERATING COSTS

Revenue is a function of parking rates applied to the demands for use of the facility. The rate needs to attract users and furnish sufficient income to meet operating costs and debt payments. Operating costs vary, depending on the type of parking and the relative use by short-time and all-day parkers.

RATE SCHEDULES

Parking fees should be tailored to the garage's parking potential. Even though a facility may primarily cater to all-day employee-parking, additional revenues could likely be derived with a graduated schedule that would attract patronage from the immediate area. Generally, the first-hour rate and the maximum fee readily attract the parker's attention. As curb parking gradually disappears, off-street facilities should accommodate the extremely short-time parkers, such as bank *customers*. Special fees for the first half-hour are used at many facilities.

The rate distribution of the eighteen garages appears in Table XXVI. For one-hour parking, the rate ranges from ten to fifty cents, and averages 28.1. Average fees are listed in Figure 20 for daytime parking intervals. Between one and six hours, the hourly increase in average fees ranges from about five cents to fifteen cents. The average fee for all-day parking varies between sixty-five cents and $1.50, and averages about $1.05.

Adjustment of the all-day or maximum fee may control the use. With a low maximum, greater employee parking will be accommodated. Short-time parking usually produces the highest revenue per space. As this patronage increases, the all-day rate could be raised. Frequent rate changes are not advisable, and a careful study should be made.

Relationship of the initial fee to the all-day fee is presented in Table XXVII. The initial fee averages twenty-seven percent of the all-day fee. The minimum is ten percent; the maximum is thirty-five percent.

Monthly Fees: The monthly parker usually saves, compared with his paying daily. Ratios of monthly fees to all-day fees are shown in Table XXVIII. The minimum ratio is thirteen; the maximum

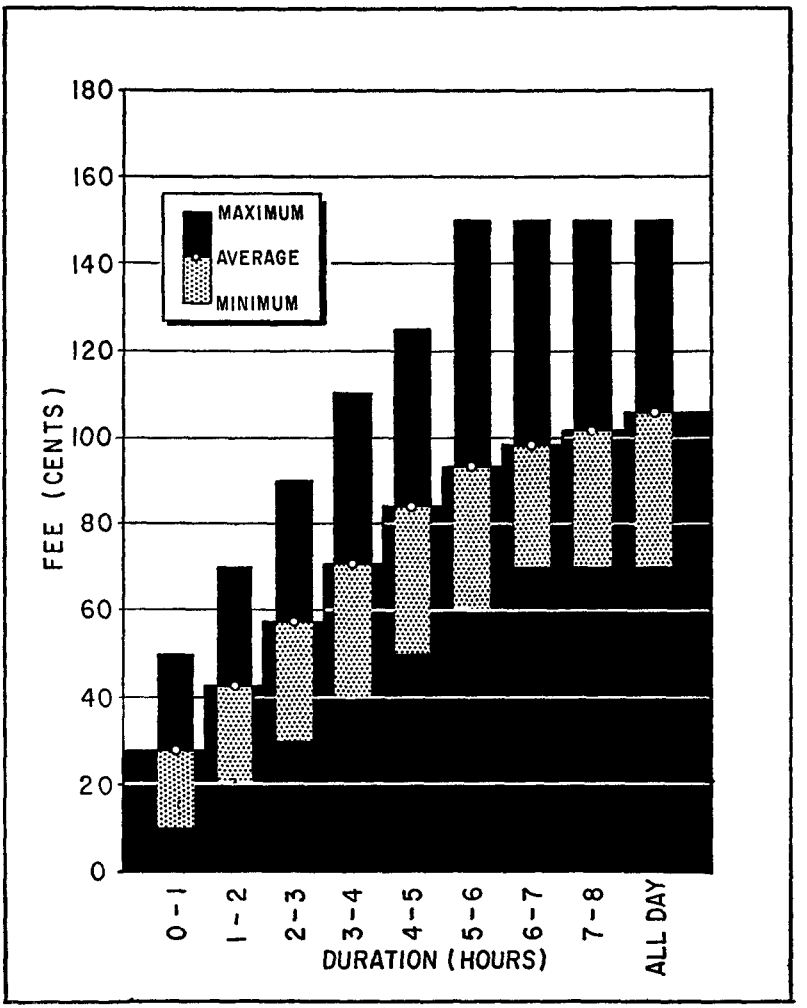


Figure 20. Average Parking Fees.

monthly rate is twenty-five times the all-day transient fee; and the average ratio is 17.8. Based upon twenty-two days a month, Monday through Friday, the monthly charge would be eighty percent

TABLE XXVI—DISTRIBUTION OF PARKING FEES

Parking Fee (Cents)	*Length of Time Parked Hours*								*All Day*
	1	2	3	4	5	6	7	8	
10	1								
15	1								
20	3	1							
25	3	1							
30	4	1	1						
35	5	4	1						
40		3	1	1					
45		1	1	1					
50	1	4	5	2	1				
55		1	1		1				
60		1	1	2	2	2			
65			3	4		1	1	1	1
70		1		1	2	2	3	1	1
75			2	1	1				
80				2	3	3	1	2	
85			1		1				
90			1		1		3	2	
95				1		2			
100				2	2	2	4	6	10
105									
110				1	2	4	2	2	2
115					1				
120							2	2	2
125					1				
130						1			
135									
140									
145							1		
150						1	1	2	2
Total	18	18	18	18	18	18	18	18	18
Average Fee (Cents)	28.1	42.5	57.5	70.8	84.2	93.1	98.9	101.9	105.3

of the all-day fees. Of course, monthly parkers enjoy in-and-out, guaranteed space, and other privileges.

Of fifteen garages having a monthly rate, ten have one standard fee; there are two different fees at three facilities, and three fees at two. Usually, the different fees apply to various sections of the garage. One facility, for example, has a lower rate for the roof. In another, different fees are charged for first floor, intermediate floors, and roof-level parking. Different fees apply if a customer parks his own car in the combination facilities.

TABLE XXVII—RELATION OF INITIAL TO ALL-DAY FEE

Percent Initial Fee is of All-Day Fee	*Number of Garages*
20 or less	4
21–25	3
26–30	7
31–35	4
Total	18
Minimum	10 percent
Maximum	35 percent
Average	27 percent

Evening Rates: The evening fee is the same as daytime for seven of the eighteen facilities; flat evening rates obtain at eight. Although daytime schedule applies at three, however, there is a lower maximum rate.

The ratio of twenty-four-hour fees to all-day fees ranges from 1 to 1.9 and averages 1.5 times the all-day fee.

TABLE XXVIII—RATIO OF MONTHLY TO ALL-DAY FEES

Ratio of Monthly to All-Day Fees	*Number of Garages*
15.0 or less	6
15.1–17.0	3
17.1–19.0	0
19.1–21.0	3
21.1–23.0	1
23.1–25.0	2
No monthly rate	3
Total	18
Minimum	13.0
Maximum	25.0
Average	17.8

Typical Rate Schedule: The complete rate schedules for four garages are shown in Table XXIX. All are situated in the core area and have a graduated rate schedule conducive to both short-time and all-day parking. In Garage 1, the initial fee for one-hour parking is thirty cents, with ten cents for each additional hour up to a maximum of one dollar for all-day parking. The same rate schedule prevails during the evening; there is, however, a fifty-cent maximum. For twenty-four hours, the fee is $1.50; the monthly fee, $17.

This rate schedule closely parallels the average found for all garages studied.

The initial hour fee at Garage 2 is twenty-five cents with fifteen cents for each additional hour, reaching a maximum of $1 at the sixth hour. The same rate schedule is used during the evening without a stipulated maximum. For twenty-four hours, the fee is $1.90; the monthly parking costs $11 a month on the roof, as compared to $15 on other levels.

TABLE XXIX—TYPICAL RATE SCHEDULES

Interval	*Charge*			
	Garage 1	*Garage 2*	*Garage 3*	*Garage 4*
Daytime				
1-Hour	$0.30	$0.25	$0.35	$0.30
2-Hours	0.40	0.40	0.50	0.45
3-Hours	0.50	0.55	0.65	0.60
4-Hours	0.60	0.70	0.80	0.75
5-Hours	0.70	0.85	1.00	0.90
6-Hours	0.80	1.00	1.10	1.00
7-Hours	0.90	—	1.20	—
8-Hours	1.00	—	—	—
All-Day	1.00	1.00	1.20	1.00
Evening				
1-Hour	0.30	0.25	0.35	—
2-Hours	0.40	0.40	0.50	—
3-Hours	0.50	0.55	0.60	—
Maximum	0.50	Same as Day	0.60	—
24-Hours	1.50	1.90	2.00	1.50
Monthly	17.00	11.00 Roof 15.00 Other	30.00	15.00 Roof 18.00 Other

Garage 3 has a slightly higher rate schedule, reaching a maximum of $1.20 by the seventh hour. For evening parking the same rate schedule prevails with a maximum fee of sixty cents. The twenty-four hour fee is $2 as compared to an all-day fee of $1.20. The monthly fee of $30 is twenty-five times the all-day parking charge.

In Garage 4, the first hour fee is thirty cents and each additional hour costs fifteen cents to a maximum of $1 reached by the sixth hour. For monthly parking the charge is $15 for the roof, and $18 in other sections.

The gross income varies over a wide range for many reasons. Key factors are the parking rate, distribution of spaces between

monthly and transients, garage capacity, and location to major generators. For comparative purposes, the income per space is the most important.

GROSS INCOME

For the eighteen facilities, the income per space varies from $141 to $491 as given in Table XXX. The average per space income is $338, or about one dollar a square foot of floor area.

TABLE XXX—ANNUAL GROSS INCOME PER SPACE

Annual Income Per Space	*Number of Garages*
Less than $200	1
$200–$250	2
$250–$300	3
$300–$350	1
$350–$400	2
$400–$450	3
$450–$500	2
Data not available	4
Total	18
Minimum	$141
Maximum	$491
Average	$338

Income the first year of operation is about sixty to eighty percent of the fifth year. During this period, the garage should become accepted as an integral part of the business area. Good service, reasonable rates, advertising design and maintenance are key factors in the revenue growth. Also, substantial land use changes and radical parking shifts are important. The over-all operation and the influence area should be carefully studied at least annually.

Six of the fourteen garages have a gross income of $300 or less a year and the income of five exceeds $400 a space. Most parking revenues are derived from transient parking, as compared to monthly parking. As shown in Table XXXI, forty-four percent of the revenues are derived from transient use in one facility and one has all transient parking. An average of seventy-five percent of the income of the fourteen facilities is derived from transient parking.

Income Per Parker: The average income per car ranges from forty-one cents to $1.04 for each parker. The average income for transient

parking is sixty-four cents. A slightly higher income is derived from monthly parking, ranging from forty-one cents to $1.06 and averaging seventy-one cents per parker per day. The over-all total parking income averages sixty-five cents per parker. The income per

TABLE XXXI—PERCENT TRANSIENT INCOME OF TOTAL

Percent	*Number of Garages*
40–50	1
50–60	0
60–70	4
70–80	4
80–90	4
90–100	1
Data not available	4
Total	18
Minimum	44 percent
Maximum	100 percent
Average	75 percent

TABLE XXXII—INCOME PER PARKER

Income Per Parker (Cents)	*Transient*	*Monthly (Per Day)*	*Total*
40–50	6	1	5
51–60	2	4	3
61–70	0	2	1
71–80	2	2	1
81–90	3	2	3
91–100			1
Over 100	1	2	0
No monthly parkers		1	1
Data not available	4	4	4
Total	18	18	19
Minimum	$0.41	$0.41	$0.41
Maximum	1.04	1.06	0.98
Average	0.64	0.71	0.65

parker averages sixty cents or less for eight facilities and exceeds eighty cents for four garages. Table XXXII.

OPERATING COSTS

The data are from parking garages on which there is a great variation in operational methods. Hence, there are wide variances in some of the tabulations. Operating expenses are grouped under the

following classifications: Salaries, insurance, utilities, maintenance and other expenses, and management fees.

Salaries: The largest single item of expense is salary for the personnel. Data are separated for self-parking and attendant operation. In most instances, salaries are not classified according to types of personnel; the over-all costs, however, can be related. In the analyses of the operation of garage expenses, a wide variance appeared in this category. As presented in Table XXXIII, the annual wages for a self-parking operation range from $40.22 a space to $115.15, an average of $76.68. For attendant parking, they vary from $77.89 to $167.03, and average $115.64 a space. The average cost a space for attendant parking is more than fifty percent above self-parking.

The various facilities are variable, especially those that cater primarily to short-time parking. For self-parking, the salary-cost per parker ranges from 8.6 cents to 19.3 cents and averages 13.4 cents.

TABLE XXXIII—ANNUAL SALARY COSTS

	Cost Per Space		*Cost Per Parker*	
Range	*Self-Parking*	*Attendant-Parking*	*Self-Parking*	*Attendant-Parking*
Minimum	$ 40.22	$ 77.89	$0.086	$0.219
Maximum	115.15	167.30	0.193	0.289
Average	76.68	115.64	0.134	0.248

For attendant parking, the cost varies from 21.9 cents to 28.9 cents; average, 24.8. On a per-parker basis, the cost for attendant parking is eighty-five percent greater than for self-parking. The salary ranges for various employees are listed in Table XXXIV. As expected, the salaries of managers are the highest, averaging $6,300 annually. Assistant managers average $4,300 and range from $3,400 to $5,200. The average salary for attendants is $3,400. Other average salaries are: cashiers, $2,850; maintenance personnel, $3,300, and secretary-bookkeepers, $3,600.

Insurance Costs: Insurance costs are involved for every garage, with the exception of one operated by a self-insured city. For those having insurance costs, the average is $8.36 a space, or 1.8 cents per car parked, as given in Table XXXV. The costs per stall are $1.94

to $21.02. On a per-car basis, the range is from 0.6 cents a car up to 5.4 cents.

TABLE XXXIV—SALARIES OF EMPLOYEES

Position	*Annual Salary* *Minimum*	*Maximum*	*Average*
Manager	$4,650	$7,800	$6,300
Assistant Manager	3,400	5,200	4,300
Attendant	1,800	4,400	3,400
Cashier	2,250	4,400	2,850
Maintenance	2,750	3,900	3,300
Secretary-Bookkeeper	2,850	4,700	3,600

TABLE XXXV—ANNUAL INSURANCE RATES

Range	*Cost per Space*	*Cost per Parker*
Minimum	$ 1.94	$0.006
Maximum	21.92	0.054
Average	8.36	0.018

One parking authority has this rather comprehensive insurance program:

Comprehensive Liability: The insurance provides as complete coverage as possible for accidents involving injuries to persons, other than employees, and damage to property of others not in custody of the authority, arising out of ownership maintenance, use and operation of the business of the authority, including all parking facilities. The limits of liability are $300,000 per person and $1,000,000 per accident for bodily injury liability and $50,000 per accident for property damage liability.

A special endorsement has been attached to the policy, extending it to cover legal liability for damage to automobiles in the authority's custody against those risks that are not included in the standard form of garage keeper's legal liability insurance. The limit of liability for such damage is $250,000, subject to a deductible item of $100 per loss. Elevator collision insurance on the two pedestrian elevators is included, subject to a limit of $50,000 per accident. The policy is written on an annual basis.

Garage Keeper's Legal Liability: This is the basic garage keeper's legal liability coverage for damage to customers' automobiles in the authority's custody caused by fire, theft, riot and civil commotion, malicious mischief and vandalism ($25.00 deductible). The coverage is supplemented by the all-risk endorsement on the comprehensive liability policy, and with the $100 deductible collision endorsement. The policy is written on an annual basis.

Workmen's Compensation Insurance: The annual policy covers the obligation to the authority under the state workmen's compensation laws, which provide specific benefits for injuries to employees injured during the course of their employment.

Boiler and Machinery: This policy provides a limit of liability of $25,000 covering damage to two boilers, storage water heater and three motors. Annual inspection service is included with the three-year policy.

Money and Securities: This policy covers loss of money by holdup, robbery, theft, and mysterious disappearance from the premises, and loss in the same manner *off* the premises, if the money is in the custody of one of the authority's messengers. The policy is written on a three-year basis.

Blanket Honesty Insurance: This provides up to $50,000 for loss from dishonest acts of employees, including members of the authority. It is obtained on a three-year basis.

Fire and Extended Coverage: This covers the garage itself against the risks of fire, extended coverages, and a special endorsement that extends the coverage to practically an all-risk basis. The five-year policy has been obtained.

Rents and Business Interruption: This policy provides the equivalent of one year's net income due to business interruption. The coverage is written on a five-year basis.

TABLE XXXVI—ANNUAL UTILITY COSTS

Range	*Cost Per Space*	*Cost Per Parker*
Minimum	$ 4.76	$0.010
Maximum	20.00	0.041
Average	11.90	0.021

Utilities: Utility costs include heat, electricity and water. The primary cost is electricity (lighting), since even in most open-deck garages, the waiting areas and cashier's booths and offices are the only sections where heat is required and relatively little water is used in the operation of the facilities. With the multi-deck structure, however, some lighting is required throughout the day and evening. On a per-space basis, the costs range from $.76 a stall up to $20, and average $11.90 annually. The cost per parker varies from one cent to 4.1 cents a parker. Table XXXVI.

Maintenance and Other Costs: These costs cover a wide variety of operating costs, including physical repairs and general upkeep of the building. Also, such items as uninsured damages, depreciation of equipment, office supplies, parking tickets, telephone, uniforms,

and auditing fees, are included. The costs range from $3.13 a space to $41.33, and average $23.69 annually. Table XXXVII. On a per car basis, the average cost per car parked is 4.4 cents.

TABLE XXXVII—MAINTENANCE AND OTHER COSTS

Range	*Cost Per Space*	*Cost Per Parker*
Minimum	$ 3.13	$0.007
Maximum	41.33	0.078
Average	23.69	0.044

Management Fee: A management fee is involved in the operation of nine facilities. The average annual cost per stall ranges from $5.79 to $33.87, averaging $15.97. On a per-car basis, the over-all average is 3.1 cents a car parked. Table XXXVIII. In operation by private enterprise under a lease agreement, management expenses are not necessarily reflected in the operating costs. In leased operations, for example, the difference between the total income retained by the operator and the reported direct operating expenses may be classified as profit or management fees. Also, in city operation there are charges of administration and management incurred by the department or agency, which are not included in the over-all cost of operation of the facility.

TABLE XXXVIII—ANNUAL MANAGEMENT FEE COSTS

	Cost Per Space	*Cost Per Parker*
Minimum	$ 5.79	$0.010
Maximum	33.87	0.060
Average	15.97	0.031

Total Operating Costs: The operating costs are classified in several categories. With self-parking, the average cost a space is $136.60 a year, or 24.8 cents a parker including a management fee. Excluding the management fee, the cost is $120.63 a space and 21.7 cents a parker. For attendant operation the averages are $175.56 a space or 36.2 cents a parker including management fee cost. Excluding the latter, the over-all cost a year averages $159.59 a space and 33.1 cents a parker. Table XXXIX.

Operating costs are itemized in Table XL for two self-parking facilities. Garage X has a capacity of 300 spaces and caters ex-

clusively to transient parkers. It is operated with city personnel. The turnover averages three cars per space per day. Garage Y accommodates considerable monthly and all-day transient parking. Evening use of the 600-space facility is small. A private operator manages the garage.

OPERATING COSTS—TYPICAL FACILITIES

Labor costs for the smaller facility are higher than for a garage with twice the capacity. Greater use, both daytime and evening, are key factors. Apparently, there is a base labor cost involved and additional capacity could be served.

TABLE XXXIX—TOTAL ANNUAL OPERATING COST

Item	*Cost*		*Cost/Parker*	
	Self-Parking	*Attendant-Parking*	*Self-Parking*	*Attendant-Parking*
Salaries	$76.68	$115.64	$0.134	$0.248
Insurance	8.36	8.36	0.018	0.018
Utilities	11.90	11.90	0.021	0.021
Maintenance and Others	23.69	23.69	0.044	0.044
Management Fee	15.97	15.97	0.031	0.031
Total	$136.60	$175.56	$0.248	$0.362
Total excluding Management Fee	$120.63	$159.59	$0.217	$0.331

TABLE XL—ANNUAL OPERATING COSTS—TYPICAL FACILITIES

Item	*Garage X*	*Garage Y*
Personnel	$34,166	$23,024
Employee Taxes	647	1,309
Insurance Premiums	[1]	406
Heat	114	623
Light	7,224	3,775
Water	48	65
Maintenance	3,221	321
Depreciation	2,989	—
Supplies	1,532	411
Management Fee	—	10,015[2]
Other Expenses	3,335	1,436
Total	$53,276	$41,385

1. City is self-insured.
2. Includes approximately $3,600 for insurance paid by operator from his fees.

Annual operating costs are itemized in Table XLI for two garages developed by an authority. One facility has been converted to self-parking. Both have about the same use characteristics. Labor costs of the self-parking facility were about $51,000 less.

TABLE XLI—COMPARATIVE ANNUAL OPERATING COSTS

Item	*Self-Parking Garage*	*Attendant-Parking Garage*
Personnel	$66,991	$118,535
Employee Taxes	2,093	4,735
Insurance Premiums	4,292	5,469
Heat	1,896	2,623
Light	4,907	4,736
Water	242	132
Maintenance	11,723	14,098
Depreciation	513	513
Supplies	1,944	2,209
Management Fee	25,000	25,000
Other Expenses	6,610	16,541
Total	$126,211	$194,591

TABLE XLII—ANNUAL NET INCOME PER SPACE

Fiscal Item	*Self-Parking*		*Attendant-Parking*	
Gross Income	$338	100%	$338	100%
Operating Cost	137	41%	176	52%
Net Income	$201	59%	$162	48%

TABLE XLIII—ANNUAL NET INCOME PER PARKER

Fiscal Item	*Self-Parking*		*Attendant-Parking*	
Gross Income	$0.65	100%	$0.65	100%
Operating Cost	0.25	38%	0.36	55
Net Income	$0.40	62%	$0.29	45%

NET INCOME

The average annual gross income and operating costs are compared in Table XLII on a per-space basis. For self-parking, the operating costs are about forty-one percent of the gross revenue, whereas the operating costs are fifty-two percent for attendant parking. The average net incomes are $201 and $162 a space for self- and -attendant parking, respectively.

Similar percentages of operating cost and net income are found when calculated on a per parker basis. The average net income of $0.40 is sixty-two percent of the gross income of a self-parking facility as compared to $0.29 (forty-five percent) for attendant-parking facilities. Table XLIII.

CHAPTER EIGHT

FINANCING GARAGES

The development of parking facilities usually involves substantial capital outlays. Generally, some type of borrowing is required. Only one of the eighteen garages studied was developed with accumulated revenue. This came from curb meters and surface lots. Revenue bonds were issued for eleven garages and general obligation bonds for three.

For two garages, the *land* costs were financed with general obligation bonds, and revenue bonds were issued for construction. One city purchased the land with general obligation bond funds and leased the facility to a private corporation for construction of the garage.

GENERAL OBLIGATION BOND FINANCING

General obligation bonds, based on the faith and credit of the city, are generally the highest rated bonds and usually bear lower interest rates. These bonds have advantages from the standpoint of simplicity and net-interest cost. Financing expenses are greatly reduced and a detailed prospectus of the project is not usually necessary. Debt service payments depend on the over-all taxation revenues and not upon the revenues of the project.

The use of general obligation bonds may be restricted by constitutional, statutory, and charter debt limitations. Many cities are limited, and cannot have debts in excess of a percentage of the assessed valuation of taxable property. These debt limits, however, may not apply to bonds issued for a self-liquidating project.

Other municipal projects may be easily incorporated in an over-all bond issue. In most cases, consent by the voters is necessary for general obligation bond financing.

REVENUE BOND FINANCING

A complete discussion of revenue bond financing may be found in the publication, "Parking, Legal, Financial, Administrative."[1]

1. "Parking—Legal, Financial, Administrative," Eno Foundation, 1956.

Revenue bonds represent one of the most popular methods of financing off-street parking facilities by public bodies. Statutory provisions authorizing municipalities to engage in off-street parking provisions have often expressly authorized issuance of revenue bonds to finance the facility. They have also expressly authorized the charging of fees for parking, and their application toward meeting the interest and principal charges of the revenue obligations to be issued.

Revenue bonds are used increasingly for financing parking projects. Many state statutes provide for their use. Legislation providing for bonds not subject to debt limitations, can be drawn to fit a particular situation. Revenue bonds are often more adaptable to parking projects than other types of financing. Approval by the voters is generally not required, and the proceedings can be completed in a shorter time.

In some municipalities, reluctance to use tax funds, or funds from the supported bond issues, to finance the construction of municipal parking garages in competition with private garages makes the use of general obligation bonds difficult. Parking revenue bonds, payable only from rents, fees, and charges for parking facilities, after providing for the cost of maintaining, repairing, and operating the facilities appeal strongly to citizens interested in any step to solve the parking problem without increasing the tax on their property.

Principal sources of funds for revenue bonds issued to finance parking facilities are:

Revenues from parking garages and lots; and

Curb parking meter revenues.

Revenue bond financing appears popular; eleven of the garages were completely so financed. Also, the financing of two structures was accomplished by revenue bonds where the land was acquired with general obligation bond funds.

DEBT PERIOD

For revenue-bond financing, the debt period ranged from nine years to forty years, with six of the eleven financed for a period of thirty years. General obligation bond financing varied from fifteen to thirty years. The debt periods for the two-combination, general

obligation-revenue bonds, were thirty and forty years. Twenty-year general obligation bonds were used to develop the facility where the site was leased to private enterprise.

CURB METER REVENUES

In ten of fifteen cities, curb meter revenues were used to assist in financing the off-street parking program. In many instances, the curb and off-street revenues were combined into a single parking system. In six of ten cities, all of the net curb revenues are included in the parking program. A specific percentage—twenty-five percent, fifty percent, and seventy-five percent are diverted from meters to the off-street parking program in three cities, respectively. One city lends the net receipts from an indicated number of parking meters to the parking authority to develop a garage program.

CONSULTANTS

Most of the cities employed engineering consultants to ascertain the parking needs, and particularly the parking potential and economic feasibility of developing a garage structure. The consultants, using conventional techniques, submitted a report that outlined the recommended location and design of the facility and prepared estimates of development costs, and of operating revenue and expense. In addition to the engineering studies, financial consultants were used in the development of four garages. They reviewed all aspects of financing and recommended the debt periods, and covenants, and assisted in the preparation and sale of bonds.

INTEREST RATES

The interest rates of the revenue bonds varied from 2.5 percent to five percent, and averaged 3.7 percent over the life of the issues. Of course, the interest rate is dependent upon the attractiveness of the project in terms of economic feasibility, the pledging of curb meter revenues or other funds, and the market fluctuations for securities.

CONSTRUCTION PERIODS

An average of 14.5 months elapsed from the time the financing was arranged until the facilities were placed in operation. The

range was from five months to two years. For nine of the thirteen facilities, the architectural and engineering drawings were prepared and actual construction bids were taken before the bonds were sold. This greatly reduces the time-lag between the sale of bonds and actual operations.

CAPITALIZED INTEREST

Since the revenues of the parking system should be sufficient to meet the debt service obligations, interest is sometimes capitalized, usually during the construction period. In some instances, additional funds are included for the initial operating period. As a safeguard against delayed completion of the garage, initial revenues are many times quite low compared with subsequent years. For the facilities in this report, the period of capitalized interest ranged from one year to three.

DISPOSITION OF BOND PROCEEDS

Construction of Garage	$1,700,000
Engineering and Architectural Fees	104,000
Legal and Administrative Fees	32,000
Interest capitalized for two years	182,750
Bond Discount	65,000
Contingencies	66,250
Total	$2,150,000

General obligation bonds financed land acquisition. The bond discount was about three percent of the bond issue. Interest was capitalized for a two-year period. Operation commenced sixteen months after the bond sale. Architectural and engineering fees were about six percent of construction costs. The basic construction cost was seventy-nine percent of the bond issue.

CHAPTER NINE

SUMMARY AND CONCLUSION

Parking has become a vital utility, especially in the central business district. Studies reveal that unless a city or private enterprise, or a combination of both, undertakes a *planned* program, a significant increase in the parking supply will not result.

As new spaces are added, parking demands usually increase. The appearance of an attractive garage in an area indicates, and is often followed by, other improvements or face-lifting that tends to revitalize the area. The development of a parking program involves the following:

Assessment of needs.
Administrative decisions.
Site location.
Design preparation.
Cost analysis.
Financing.
Operating procedures.
Revenue and operating cost analysis.

ASSESSMENT OF NEEDS

The initial step in developing a parking program involves a basic comprehensive study that usually includes a parking space inventory, interviews with parkers to determine their origin, destination, walking distances, duration of parking, and other characteristics. Parking demands and needs are calculated for each block and area of the central business district.

The need for additional spaces, plus parking characteristics are essential guides in selecting sites and estimating use, revenue, and operating costs. Projection of demand-needs, usually ten to fifteen years, enables the staging of parking facility development.

ADMINISTRATION

There are essentially four possible levels of participation by municipal cities and parking program.

Following the comprehensive studies, the outline of the parking program cities has provided guidance and technical assistance to private enterprise and the necessary facilities. Actually, the majority of the existing parking supply has been provided by private development.

A problem encountered by *private* enterprise is land for sufficient development. Multiple and absentee ownership often are contributing factors. Cities may use eminent domain to acquire the property, then lease land parcels to private enterprise for facility development.

The third level of the cities' participation involves complete development of facilities, including land acquisition and construction. Facilities are either leased or managed by perfect friend operators.

Land acquisition, construction and operation by the city has been used after finding no other way to provide the needed off-street parking.

Responsibility to administer parking programs in cities may be classified in four categories:

An existing conventional department of city government.

Separate department for parking only.

Commission or board.

Public Parking Authority.

Responsibility is centralized by placing the parking program under an existing department head such as the traffic engineer, who has a technical staff. Of course, the official has other responsibilities and may be unable to devote adequate time to parking. Separate parking departments have been organized within the framework of the city, usually with a permanent staff.

Commissions or boards, comprised of citizens, have been established in many cities. These boards serve as advisors with final action resting with the Mayor or City Council. They are especially useful in determining the initial parking policy of the city and in formulating a parking program and basic parking policies.

Parking authorities, separated from the regular departments of government, have broad powers to acquire, construct and operate facilities. They can issue revenue bonds but cannot levy taxes. The

members act as a board of directors of a business enterprise conducted by the local government.

Characteristics of parkers indicate the need to distribute facilities throughout the downtown district. It is more desirable to have several facilities instead of a few large ones to keep walking distances to a minimum. The recent trend has become that of attempting to locate parking facilities where they will fit more closely the needs of traffic.

SITE LOCATION

A site between the central business district and expressway approach facilities is desirable, since it makes access to the garage easy and keeps traffic off congested streets. Sites should be close to major generators and pedestrians should have a short distance to walk and not be required to travel through undesirable sections.

Three types of facilities are required to provide adequate parking. The *penetration* facilities should be situated in the core-area, preferably immediately adjacent to or integral parts of key generators such as department stores, office buildings and banks. These garages provide the turnover parking required for shopping and business patrons. The second ring of facilities surrounds the core-area, provides short-time parking for nearby generators, and economically priced *all-day* employee parking for core-area parkers. Finally, facilities at the fringe of the central business district cater primarily to all-day parkers.

The location of any garage must be compromised between two factors—site cost and usefulness and parking demands. Frontage on two or more streets affords easier access and greater design flexibility. Locations that provide right turns in and out have fewer conflicts.

DESIGN

The method of operation—attendant or self-parking—dictates the interior design of a garage. Self-parking is rapidly becoming acceptable to all types of parkers including shoppers, businessmen, and employees. With self-parking, the customers can park their own cars, return and deposit packages during the trip, and expe-

rience fewer delays on entering and exiting. Also, a self-parking garage is more economical to operate.

Capacity depends upon the site area, the parking potential and the number of levels. Since short-time shopper and business parking usually provides the most income per space, construction and operating costs of developing additional spaces for the all-day parkers must be carefully analyzed. All-day spaces act as a reservoir for future expansion of the short-time parking operation. A garage capacity ranging between 400 and 600 spaces is adequate to serve most parking concentrations.

Generally, garages are limited to eight levels including a basement, main floor, and six levels above ground. The operation of additional upper levels has been proved uneconomical in some instances.

The average garage has four levels. Studies reveal that women are apparently willing to drive to any level in a well-located, economically priced self-parking facility. Conveniently situated stairs, elevators, and directional systems serve as valuable aids in the facility's becoming acceptable to the general public.

It is usually best to build the ultimate garage initially, especially when vertical expansion is involved, since most of the parking would be deleted during construction. With horizontal expansion, full operation could continue.

A self-parking garage requires a land area of at least 20,000 square feet.

There is no one best garage type or ramp system. The ramps may be straight or curved. Sloping floor garage, where the straight ramp serves a dual purpose—floor to floor travel and direct access to the parking stalls have been used frequently. Several recent garages of this type have included an express exit ramp. Staggered floor garages are especially adaptable to narrow sites.

Most modern garages have open-decks and prestressed or reinforced concrete or exposed steel construction. Clear spans ranging from fifty to seventy-five feet have been developed to remove the columns from the parking space, thereby affording greater operation flexibility.

Retail areas, constructed on the ground floor, provide additional

income and tend to eliminate the heat in the glass wall of retail frontage. Automotive services such as gasoline, oil, washing and greasing have been included. However, they should be planned for in the initial design since additional fire prevention and ventilation facilities are required.

DEVELOPMENT COSTS

Land costs are the most variable items in garage development. A garage site usually includes an average of about five parcels. The average land cost is about $12 a square foot—about $1,600 a car space.

Construction costs include demolition, excavation, concrete and steel plumbing and heating, electrical equipment, plus architectural, engineering and inspection fees. The average construction cost of sixteen open-deck garages was $1,817 a car space ranging from $720 to $3,350. For two underground facilities, the cost averaged $2,709—about fifty percent greater than above-ground multi-deck facilities. The average cost a square foot was $5.45.

FINANCING

The development of parking garages usually involves substantial capital outlays; hence some type of borrowing is generally required. General obligation and revenue bonds are the two most widely used methods of financing employed.

General obligation bonds, carrying the credit of the city, are the highest rated bonds and usually bear lower interest rates. These bonds have advantages from the standpoint of simplicity and net interest cost. The debt service payments do not depend upon revenues of the specific project. Other unrelated projects could easily be incorporated in an over-all bond issue.

Consent by the voters is necessary for this type of financing. The use of general obligation bonds may be restricted by debt limitations. These limits, however, may be inapplicable to bonds issued for a self-liquidating project.

Revenue bonds represent one of the most popular methods of financing off-street facilities by public bodies. Some cities are reluctant to use tax funds or monies from tax supported bond issues

to finance parking garages. Parking revenue bonds, payable only from the income received from the garages, after providing for all operating and maintenance costs, appeal to citizens who desire a progressive parking program without additional taxes.

Debt periods for bonds are quite variable usually ranging from twenty to forty years. Curb meter revenues have been utilized to assist in financing off-street programs in about two-thirds of the cities surveyed. Sometimes, curb and off-street revenues have been combined into a single parking system.

Most cities employ engineer-consultants to ascertain the parking needs, particularly the parking potential and economic feasibility of developing a garage structure.

An average of fourteen months elapses from the time financing is arranged until the facilities are placed in operation. If architectural and engineering drawings are prepared and actual construction bids are taken before bonds are sold, the time lag and interest costs are reduced.

OPERATING PROCEDURES

Complete development and operation is undertaken in about one-third of the cities. Private operators have either leased or operated the other facilities under management agreement. When leasing the garages, the private operator assumes all the operating costs and pays a specified annual amount or percentage of the gross revenues. He therefore assumes monetary risk in the successful operation of the garage. With a management agreement, usually all costs of operation are paid by the city. The operator is compensated for supervising the operation. No economic risk is involved.

In one community, local businessmen organized a non-profit corporation and entered into a long-time lease from the city for operating three garages. The basic annual rental equals the average annual principal and interest payment of the general obligation bonds. Excess profits are returned to the city and used for accelerated bond retirement or expansion of the parking system. An experienced private operator manages the facilities for the corporation.

Leases usually have a one-year minimum and range to about six years. In many instances, options may be exercised by either the city or the operator.

The following provisions should be included in agreements:

Rate Schedule: Cities should reserve the right to control the rate schedule and to approve any changes.

Insurance: The operator usually provides all insurance coverage. With management agreements, premiums are paid by the city.

Repairs: Lessee performs all minor repairs and the city is responsible for major and structural repairs.

Capacity: Capacities are usually established, either a specific number of spaces, or as shown on plans.

Reports: Weekly, monthly and annual reports of usage, revenues and operating costs should be required.

OPERATING HOURS

Minimum daily operating periods and specific holidays should be listed. Operating periods of garages are usually determined by types of generators in the primary influence area. About two-thirds of the garages are operated twenty-four hours a day throughout the year including Sundays and holidays.

Personnel required for operating a garage usually include the following: manager; assistant managers; attendants and cashiers; maintenance; and secretary and bookkeeper.

A systematic maintenance program is essential. Proper cleaning and painting should be stressed, especially in parking facilities where patrons drive and walk through the building. Major cleaning should be accomplished during evenings to avoid interference with parking operations.

About twice the employees are required for attendant operation as compared to self-parking. The average for attendant operation is one employee for every thirty-five spaces compared to one for every sixty-eight spaces for self-parking.

An efficient operation necessitates a precise and systematic method of ticketing and cashiering. Parking tickets range from parts depending upon the type of operation and the records maintained. Pertinent information on tickets is as follows: name of garage; operator's name; location of garage; ticket number; brief

description of legal responsibilities; hours of operation; and city agency administering program.

The most common method of distinguishing monthly parkers is by a sticker on the windshield. This is readily visible to the attendant and expedites entering and leaving traffic.

Electric gates and automatic ticket-issuing machines have been employed to reduce labor costs. A machine at the entrance eliminates at least one employee.

Many customer conveniences are employed including the following: baby strollers; wheel chairs; parcel checking; umbrellas; maps, showing stores and parking facilities; comfortable waiting areas; and information brochure on operating procedures of the garage.

Usually transient parkers may park in any area of the garage. It is advisable to avoid assigning monthly parkers a specific place. This permits greater operating flexibility and provides additional spaces to accommodate transient parkers during peak periods. Actually, only about eighty-five percent of the monthly parkers are in the garage at one time.

A portion or all of the parking fees are paid or validated by stores, banks and business firms at about fifty percent of the cost.

USE, REVENUES, AND OPERATING COST

The use of a particular garage depends upon its proximity to major generators, the type of service, and the rate-schedule. The average garage accommodates about 1.4 parkers per space per day or 530 parkers per space annually.

The peak month of activity is December; the least volume month is July. December is about twenty-two percent above the average month. Factors affecting the peak day of the week are late-closing stores and the activity of retail stores, banks and office buildings.

Revenues: Parking fees should be tailored to the anticipated use. Generally the first-hour and the maximum fees are noticed by the parker.

As curb parking gradually disappears, off-street facilities must accommodate the extreme short-time parkers. Special fees for the first half hour are often utilized.

The average fee is about twenty-eight cents for one hour of park-

ing. Between one and six hours, the average fee increases from five to fifteen cents. The average fee for all-day parking varies between sixty-five cents and $1.50 and averages $1.05. Adjustment of all-day for maximum fee may be used to control the use. With a low fee, more employee-parking will be attracted.

Short-time parking usually produces a high revenue per space. Therefore as this patronage increases, all-day rates could be raised. Frequently, rate-changes are not advisable. The initial hour fee averages about twenty-seven percent of the all-day fee.

The monthly parker usually enjoys a saving. In addition, he is assured a parking space. The average monthly fee is about eighteen times the all-day fee. Based on twenty-two days a month, Monday through Friday, the average monthly charge is about eighty percent of the all-day transient fee.

Although most garages have one standard monthly fee, when different fees are employed they usually apply to various sections of the garage such as first floor, immediate floors, and roof level.

The average annual gross income per car space is $338 or about one dollar per square foot of garage floor area. The income of the first year of operation is about sixty to eighty percent of the fifth year. The average income per parker ranges from $0.41 to $1.04, and averages $0.64 cents.

Operating Cost: The largest single item of expense is personnel salaries. The annual salaries average about $77 and $116 per space for self- and attendant parking, respectively.

Salaries of the managers average $6,300 annually. Other average salaries are: assistant manager, $4,300; attendants, $3,400; cashier, $2,850; maintenance personnel, $3,300, secretary-bookkeepers, $3,600.

Total average operating costs are as follows:

	Per Space	*Per Parker*
Self-parking	$136.60	$0.248
Attendant parking	175.56	0.362

An economic analysis is essential prior to the development of a garage facility. A cost-income comparison in Table XLIV uses averages of the study-garages. Land costs average $1,597. Con-

struction costs approximate $1,817 a space, including architectural and engineering fees and equipment. Other expenses including legal and financing expenses and capitalized interest are assumed to be eight percent. Therefore the total cost per space would be $3,687.

COST-INCOME COMPARISON

The average annual net income of $201 per space assumes complete self-parking operation. With a forty-year debt period, the entire cost financed, the level debt service would be $188, including principal and interest. A construction period of one year and an interest rate of four percent were used in the calculation. The net income would exceed the debt payment by $13; the entire cost, however, would be amortized.

TABLE XLIV—COST-INCOME COMPARISONS

Fiscal Item	*Per Space*
Development Cost	
Land	$1,597
Construction	1,817
Other	273
Total	$3,687
Annual Gross Income	$ 338
Operating Cost	137
Net Income	$ 201
Annual Debt Service[1]	$ 188
Reserve	13
Coverage	1.07
Annual Debt Service[2]	$ 165
Reserve	36
Coverage	1.22

1. Principal and interest, 40-year debt period at 4 percent interest, one year construction, 39 years operation. Assumes financing entire cost.

2. Principal and interest, 20-year debt period at 6 percent interest, one year construction, 19 years operation. Assumes financing one-half of development cost.

In the second example, one-half of the cost would be financed with a conventional twenty-year loan at six percent interest. The debt payment would be $165 as compared to net income of $201.

In both analyses, facilities would be self-liquidating, but there would be a very small profit. With revenue-bond financing, an assured profit of fifty percent is usually required as a minimum. Hence, subsidies such as curb meter revenues are frequently used. Several major department stores have leased and guaranteed the debt service. Their assets are pledged to the debt service.

With the usual twenty-year commercial loan, about fifty percent of the cost could be amortized. However depreciation and taxes have not been considered in the analysis. Most stores, banks, and office buildings depend upon an adequate parking supply. Parking becomes a utility or supporting member required to sell merchandise. A break-even facility could mean considerably more in over-all revenues.

The four basic fiscal items—land costs, construction costs, revenues, and operating costs are quite variable. Each should be examined carefully. Dual use of the land should be considered, such as store and office buildings incorporating parking to distribute the land costs.

New construction methods are continually being developed to reduce construction time and cost. Labor saving devices will reduce operating expenses. Efficient operation, provision of customer conveniences, proper rate schedules, and the selling of parking space will produce higher income.

CHAPTER TEN

PARKING LOT OPERATION

Parking lots provide a quick and, in many instances, an inexpensive means of off-street parking. Many parking lots just occurred. They are seldom planned and, as a consequence, they frequently are poorly situated and fail to provide service of the type desired. Lack of planning produces many varied services and operating practices, as well as varied financial results.

For this study, information was sought only on municipal lots in the downtown area. Relatively few municipal parking *garages* have been constructed, though almost every city has developed surface lot facilities. Some of the properties were purchased or acquired for parking lot development, while the city used existing or surplus properties in some instances.

Successful city parking programs indicate that many different financing plans are workable and are geared to meet varying conditions. Several of the proved methods of financing parking projects, including land acquisition, facility construction and operation, are as follows:

Current budget expenditures.
Parking revenues.
Leasing of land.
General obligation bonds.
Revenue bonds.
Benefit district assessments.
Temporary or short-term financing.
Cooperative measures between city and private enterprise.

In the following sections, the development and operation of the thirteen lots included in this study are outlined.

CURRENT BUDGET EXPENDITURES

Parking lots have been financed with the expenditures from current budgets in many communities. In recent years, this plan has been augmented by curb meter receipts and a spreading of financial

burdens more directly on those benefiting most from parking improvements. Parking plans, using this method, have necessarily been quite modest since available funds are relatively small.

In one community, six parking lots providing about 500 self-parking spaces have been purchased and developed from expenditures from the existing budgets.

For an eighty-eight-space lot, the costs were as follows:

Land acquisition	$69,801
Demolition	587
Construction	11,430
Parking Meters	4,399
Total	$86,217
Cost Per Space	$ 980

The pavement consists of a gravel base and an oil and sand surface. One land parcel was acquired by direct purchase. Parking facilities are meter-operated between the hours of 9 a.m. and 6 p.m. and a charge of twenty-five cents is levied.

Like many other communities, the operation of parking lots is assumed by various city agencies, divided between the treasurer's office for collection, the comptroller's office for records, and the police department for enforcement.

For the 488-space system, the total operating cost approximates $19,000 or about $40 a space, including the salaries of three parking meter mechanics. The salaries of other city personnel are not considered in the direct charge.

For a typical year, the income of the parking system was about $78,000 with operation expenses of $19,000, a net income of about $59,000. Approximately $5,500 was spent for payment for parking meters. The remaining income was transferred to the general fund for repayment of advances for construction.

A 160-space self-parking facility has been developed in a civic center. Four additional off-street lots of capacities ranging from forty-two to eighty-two spaces have been constructed in the 372-space parking system. Paving and grading costs were $8,777, or

about $55 a space, paid from the general fund. The land was acquired as part of the civic center. The constructed facility is operated between 8 a.m. and 5 p.m. at a rate of five cents an hour up to four hours, and twenty-five cents for all-day parking. The annual income is about $8,100 and operating costs were approximately $4,060. Administrative costs of the parking system are pro-rated with about $1,000 assigned to the 160-space facility.

A 100-space facility has been developed at a cost of $53,000, including $24,000 for land acquisition, and the remainder for construction. The self-parking facility was financed with cash from the annual traffic budget. A charge of five cents an hour is levied at the parking meters in operation between 9 a.m. and 6 p.m. The gross income approximates $8,000 annually.

PARKING REVENUES

Many cities provide lots with funds from other parking operations. Usually with this financing method the net revenues or a fixed percentage of the gross revenue of all curb parking meters and off-street facilities are set aside for acquisition of additional off-street space. The parking plan is relatively limited and careful attention must be given to stage development.

In one community, the entire income after operating expenses of curb and off-street facilities is used for acquisition and development of new lots. More than twenty facilities have been developed during the last ten years. The program is administered by the traffic and parking division of the department of public works.

An eighty-space lot was developed at a cost of approximately $189,000 including $80,000 for city owned properties. A lump-sum contract was let for $6,661 for basic construction, and the engineering was accomplished with the city personnel. The charge at the attendant parking facility is fifteen cents for the first hour, ten cents an hour thereafter, and it is operated between 8:30 a.m. and 6 p.m.

Merchants validate the parking tickets by stamping validations "Good for One Hour of Free Parking." A maximum of two hours of free parking is available at two different stores. The facility produces an annual income of about $40,000, of which the operator of

the leased facility retains 45 percent of the gross income for expenses and overhead.

The facility, in the heart of the central business district, is frequently filled to capacity. Peak activity occurs during April, August, and December, with the lows being in February and June. The *peak* day of the week is Friday; the day of *least* activity, Tuesday. Heavy parking demand occurs usually between 10 and 11 a.m. and fifty-five percent of the transient parkers are women.

A 160-space facility was developed as an integral part of a municipal market development. The construction cost was $9,500 and the parking meters cost $6,500. Curb meter revenues were used to finance the facility which is operated between 8 a.m. and 6 p.m. Monday through Saturdays with the exception of Friday, when it is operated until 9 p.m. A charge of five cents an hour is levied at the meter-operated facility. An annual income of $10,000 is received.

The revenue and finance department with the co-operation of various other departments of the city operates the facility. Two department employees make the collections, and police officers as part of their regular duty check the meters and issue tickets for overtime parking. The light department is in charge of the utilities and the street department maintains the parking area.

All records are maintained by the revenue and finance department, and the administrative costs of the parking program including two other facilities are absorbed by the various departments.

Peak activity occurs during the market days of Tuesday, Thursday, and Saturday.

LEASING OF LAND

The leasing of land has proved to be both an economical and fast method of developing additional parking. One disadvantage is that permanency is not fully guaranteed.

A 103-space facility was constructed at a cost of $6,246 or $60 a space for grading and paving. These costs were paid with current meter revenues. The land was leased for seventy-five percent of the annual gross income. The rate is ten cents an hour and the lot is operated twenty-four hours every day. The annual income totals approximately $14,700. The meter department operates nine lots

with 607 spaces. The parking fee of ten cents an hour is one of the most common complaints, since curb parking is five cents an hour. Directional signs are on two streets.

One city has developed two parking lots, having capacities of fifty-seven and thirty-two spaces, with monies from the general paving fund. The properties are leased at seventy percent of the gross income. They are operated between the hours of 9 a.m. and 6 p.m. at a fee of five cents an hour. The annual gross income approximates $2,660 and operating costs are $2,360 including the rental.

A flat rental of $10,100 is paid annually for four land parcels which comprise a 160-space self-parking lot. Construction costs of $9,000 were incurred including grading, fencing, landscaping and the stone surface. Payment was made from the parking meter revenues.

A transient fee of twenty-five cents is charged and monthly parking is afforded at $3. Tickets are not used. The customer pays an attendant as he enters. If the attendant is not on duty, an honor system is used: the parker deposits twenty-five cents in a container as he leaves. The annual gross income approximates $15,100 or $94 a space. Operating costs are $12,400 including the land rental.

GENERAL OBLIGATION BONDS

The financing with bonds enables the immediate development of a long-range program with the debt service spread over many years. For these bonds, debt service charges and amortization are paid through general taxation. The bonds are subject to charter limitation on the debt which a city may incur. General obligations for parking must be related to other projects usually financed by this method, such as schools, waterworks, and other capital improvements.

In one city, the off-street parking lot was included with several other civic improvements and was financed simultaneously with a bond issue. The debt period was twenty years at an interest rate of three per cent. Construction cost, including parking meters, was $24,500 for the sixty-two-space self-parking facility, or about $400 per space.

The metered-facility is operated from 9 a.m. to 9 p.m. Monday

through Saturday. Parking is free on Sundays and holidays. A rate of ten cents an hour is levied and the meters have a three-hour time limit. The parker, however, may return and place up to three more dimes in the meter, but this rarely occurs. The yearly gross income is $13,170.

The parking lot is maintained by city forces; one parking meter maintenance man and one helper maintain all parking meters in the city. One of the most common complaints by the customers was the lack of change-making facilities. Subsequently, these machines were installed.

REVENUE BONDS

Revenue bonds represent one of the most popular methods of financing the provision of off-street parking facilities by cities. This type of obligation is payable from the income derived from the project financed with the bond proceeds. Many communities have established an automobile parking system which includes the off-street facilities as well as the curb parking meters.

The entire parking system in one community consists of 1,460 spaces, of which 475 spaces are at the curb, and 985 spaces in ten off-street facilities. The off-street facilities were financed with fourteen-year revenue bonds at an interest rate of four percent. Properties were both condemned and acquired by direct purchase.

The off-street facilities operate between the hours of 8 a.m. and 9 p.m. at a rate of five cents an hour. Curb meters, however, are operated only between 8 a.m. and 6 p.m. The facilities are operated under the city traffic engineer with the collections being made by the police department.

BENEFIT DISTRICT ASSESSMENTS

This system of financing tries to proportion parking development costs among properties that benefit. Some of the bases used in determining each property's share of cost are: assessed valuation, front footage, area, and anticipated benefits. In theory the costs are borne by the various property owners in proportion to the benefits received. One of the difficulties has been the establishment of equitable assessments.

A 135-space self-parking facility was financed with 10-year improvement assessment bonds, at an interest rate of one and one-half percent. A four percent rate was levied against the property owners. The site consists of twelve different land parcels, all of which were acquired by direct purchase. Land acquisition was $125,000 and construction costs totaled about $20,000.

The facility, operated between 8 a.m. and 11 p.m., is closed on Sundays and holidays. Rates are fifteen cents for the first hour, thirty cents for two hours, forty-five cents for three hours, and ten cents for each additional hour to a maximum of $1. A gross income of $32,592 was derived for a year, of which $27,878 was from daytime parking, the remainder from evening operations.

The income of the first year was approximately eighty percent of the fifth year. Operating costs for the facility total about $19,000 annually, including the salaries of a manager and three attendants. The facility is operated on a combination self-parking, attendant-parking basis with the latter being used during peak hours. The police department administrates the parking program, which consists of two additional parking lots.

OTHER FINANCING METHODS

Temporary or local financing may be used in the cooperative construction of lots.

A ninety-four-space lot was financed with five-year bank notes at three percent interest. Development costs including the direct purchase of one land parcel were:

Land Acquisition	$40,000
Grading	2,000
Paving	12,000
Fencing	400
Curbing	850
Total	$55,250
Cost Per Space	$ 588

The facility is operated from 8 a.m. to 6 p.m., Monday through Saturday. A rate of five cents for two hours is charged. Also,

monthly parking at $5 is afforded. About ninety-five percent of the monthly parkers use the facility on a typical day. Peak activity occurs during December.

Tax anticipation notes at three percent with yearly renewals were used to develop a seven-lot system in a community of less than 10,000 population. Properties were acquired by direction purchase and auction. Others were leased for an annual fee. Land was lent to the city at no cost to develop 145- and 125-space lots. The facilities are open at all times. The five cent per hour meters are operated between 9 a.m. and 6 p.m., except after 1 p.m. on Wednesdays and all day Sunday.

SUMMARY

Cities have developed surface parking facilities for several reasons. Some concerted programs were initiated, while lots were constructed as integral parts of projects such as civic centers and markets.

Financing methods include leasing current revenues, and bonding. The bond issues frequently include other civic projects. General obligation or revenue-bond-financing affords the development on a much broader scale.

Most city facilities are meter-operated. Enforcement is provided by the police department. Other costs are usually assumed by various departments such as treasurers, public works and traffic engineering.