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Marketing Research Report No. 874

FOOD DISTRIBUTION FACILITIES FOR OAKLAND, CALIFORNIA

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FOOD DISTRIBUTION FACILITIES FOR OAKLAND, CALIFORNIA

By

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and

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UNITED STATES DEPARTMENT OF AGRICULTURE

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The report was prepared under the general supervision of William C. Crow, Director of the Transportation and Facilities Research Division, Agricultural Research Service. The building design and site layout were developed by Allison B. Lowstuter, architect. James N. Morris, Jr., industrial engineer, assisted in the cost sampling used to determine estimated cost of operations.

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FOOD DISTRIBUTION FACILITIES FOR OAKLAND, CALIFORNIA

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SUMMARY

A significant part of the food products moving through wholesale food distribution channels in Oakland must pass through unsuitable, outdated, or inefficient marketing facilities. This report was designed to assist State and local authorities and the food industry in planning new wholesale food facilities to replace present facilities in the area which are inadequate to meet today's needs. This report presents guides for constructing an efficient and modern food distribution center.

In 1966, 148 independent wholesalers of fresh fruits and vegetables, meat and related products, dairy and egg products, groceries, and frozen foods received 757,900 tons of food products. These firms distributed about 74 percent of their volume within the San Francisco Bay area.

Of these 148 independent wholesalers, 92 of them could benefit by moving to new facilities within a food center. Their major problems were improper loading and unloading methods and inadequate facilities, lack of centralized marketing facilities, and traffic congestion. These problems and other factors contributed to raising their costs of operation. Selected handling costs incurred by the 92 wholesalers were estimated to be \$5.3 million during 1966. In new facilities, these costs could be reduced by only a modest amount, and then only if fluctuating interest rates should be the same at the time of construction as they were at the time this study was made.

Other firms in the area either occupy facilities that meet their needs or would be unable to move because of lease commitments or other reasons.

Plans developed for new facilities provide for five single-occupancy buildings containing 129,400 square feet of space, and six multiple-occupancy buildings with 386,760 square feet of space. A grand total of 516,160 square feet of space will serve the firms included in the plans. The acreage required for the proposed wholesale food facilities could vary, depending on the shape of the site. A minimum of 74 acres should be obtained to develop an adequate food distribution center for Oakland.

Four sites were considered representative of the possible sites available. These four are (1) The Port of Oakland, (2) West End Redevelopment, (3) Standard Estuary, and (4) Encinal-Alameda. Total cost of all buildings, other facilities, and associated costs were estimated to be about \$8.1 million. To determine an estimated total development cost, \$60,870 per acre was used as land cost, which brought the total estimated cost for the proposed food center to \$12,561,000.

A common rental per square foot per year would be \$3.06 for private financing and operation and \$2.36 for public financing and operation. For most firms, these rates would represent a substantial increase in rent. The higher rental cost may be largely offset, however, through more efficient operations resulting from better handling methods and product flow, improved layout design, proper platforms, and generally improved working conditions. In addition to these measurable benefits, firms relocating, producers, consumers, and communities in the Oakland area could expect other benefits such as closer compliance with health and sanitary regulations, improved quality of food, reduced damage, and simplified rail and truck operations.

¹ Mr. Hanlon retired in 1969.

INTRODUCTION

At the request of food wholesalers in Oakland, the Industrial Development Commission made inquiries of individual wholesale food firms in the city during the fall of 1966 to determine the extent of interest in building a new market that would house all types of food wholesalers. These inquiries showed substantial interest.

As a result, Mayor John H. Reading requested the Transportation and Facilities Research Division, Agricultural Research Service, to make a complete study to determine what action should be taken to improve wholesale food distribution in the Oakland area. The study began in the spring of 1967.

This report contains the findings from the study. Data in the report were supplied by wholesale food firms; rail firms; labor organizations; and Federal, State, and municipal governments. Unless otherwise stated, the data

relating to volume of commodities handled and costs are based on the calendar year 1966, the latest year for which data were available at the time of the study.

This study had the following objectives:

1. To determine the adequacy of food marketing facilities in the Oakland area for present and future needs.
2. To develop plans and designs for improved facilities.
3. To consider sites that would be adequate to provide the most efficient means of distributing food supplies to Oakland and the surrounding area.
4. To estimate construction costs, possible operating expenses, and rental requirements.
5. To estimate possible savings and other benefits from improved food-marketing facilities.

POPULATION AND POTENTIAL GROWTH

In 1959, the U.S. Department of Commerce published a report on the projected growth and development of the San Francisco Bay area² from the year 1960 to the year 2020.³ A summary of these projections is shown in table 1. Of special interest is that population projections for 2020 show a bay area population of 14.4 million, 14 times greater than it was in 1960. This population figure is equivalent to that of the present population of the metropolitan area

of New York City, which includes northeastern New Jersey. In addition, the publication provides other detailed estimates of future population, economy, and land use patterns for the bay area. This material is essential to the development of food distribution facilities because it emphasizes the tremendous growth potential of the region. For this reason, pertinent excerpts from the publication are included in this report in the appendix.

FOOD MARKETING IN THE OAKLAND-EAST BAY AREA

The Oakland-East Bay area received over 1.4 million tons of food commodities in 1966 from producing areas throughout the United States and abroad. This food was distributed by 148 independent wholesale firms and food chains to

retail outlets throughout the area. Some food was shipped directly to local processors, retail establishments, and public warehouses without going through Oakland wholesalers. This volume was not included in the study.

Oakland is the primary urban and commercial center of a group of concentrated, incorporated areas. These areas are located strategically to the east of San Francisco Bay, commonly referred to as "East Bay." Railroad lines terminate here and access to highways is excel-

² Comprises the counties of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma (fig. 1).

³ U.S. DEPARTMENT OF COMMERCE. FUTURE DEVELOPMENT OF THE SAN FRANCISCO BAY AREA, 1960-2020. 94 pp. 1959. Washington, D.C.

TABLE 1.—Summary of projected population and density changes, San Francisco Bay area for 1960, 1990, and 2020

Area	1960			1990			2020		
	Population	Percentage of bay area	Density (persons per square mile)	Population	Percentage of bay area	Density (persons per square mile)	Population	Percentage of bay area	Density (persons per square mile)
	Thousands	Percent	Number	Thousands	Percent	Number	Thousands	Percent	Number
San Francisco County.....	793	21.1	17,780	938	12.6	21,031	1,018	7.1	22,825
South Bay counties:									
Alameda.....	954	25.4	1,301	1,673	22.5	2,281	2,854	19.8	3,891
Contra Costa.....	396	10.6	540	961	13.0	1,310	2,140	14.9	2,916
San Mateo.....	441	11.8	970	933	12.6	2,051	1,749	12.1	3,846
Santa Clara.....	657	17.5	503	1,532	20.6	1,173	2,931	20.3	2,245
Total or average.....	2,448	65.3	758	5,099	68.7	1,580	9,674	67.1	2,951
North Bay counties:									
Marin.....	152	4.0	292	347	4.7	666	790	5.5	1,516
Napa.....	67	1.8	85	193	2.6	244	655	4.6	830
Solano.....	141	3.8	170	362	4.9	438	1,116	7.7	1,349
Sonoma.....	151	4.0	96	486	6.5	308	1,157	8.0	733
Total or average.....	511	13.6	137	1,388	18.7	373	3,718	25.8	1,000
Grand total or average.....	3,752	100.0	537	7,425	100.0	1,062	14,410	100.0	2,062

Source: U.S. Department of Commerce. Future Development of the San Francisco Bay area, 1960-2020, table 8. Washington, D.C. 1959.

lent. Five major bridges link the cities and towns on both sides of San Francisco Bay. The immediate food distribution area comprises a five-county area—Alameda, San Mateo, Contra Costa, Solano, and Marin. A map of this area is shown in figure 1. Foreign and domestic steamship lines serve importers of food commodities through the ports of Oakland and San Francisco. Some highly specialized seasonal food commodities are received by air freight at Oakland International Airport.

The total volume of direct receipts arriving in the Oakland-East Bay area in 1966 is shown in table 2 by type of commodity and method of transportation. Although this table includes the volume received by food chains, it is provided only for comparison. No further statistical data on food chains are given in this report because

the chains in the Oakland-East Bay area are housed in relatively new and modern facilities.

Truck receipts represented by far the largest percentage of direct receipts. All but one of the commodity groups studied received over 90 percent of their direct receipts by truck. Many dealers received all their volume by truck because this was the only method of receiving commodities direct at their facilities.

Only 15 percent of the total direct receipts came by rail. The largest percentage of rail receipts went to food chains. Of the independent food firms, grocery firms received a higher percentage of their supplies by rail than did any of the others. Meat firms were second highest. Approximately 2 percent of the direct receipts of independent dealers arrived by ship and 1 percent by air. Grocery firms were the prime receivers of both ship and air receipts.

DESCRIPTION OF PRESENT MARKET FACILITIES

In this study, Oakland-East Bay food marketing facilities were divided into three classifications according to location: The Franklin market area, the Suburban market area, and Other East Bay market area. Location of the wholesale food firms is shown in figure 2.

Franklin Market Area

The Franklin market area is bounded on the north by Fifth Street and on the west by Broadway. It covers about 7 acres and is the most important market in the city in number of dealers located there. It is in the downtown business district near office buildings, apartment houses, and retail stores.

A total of 57 wholesale food firms are located in the Franklin market area. These firms are composed of 36 fresh fruit and vegetable firms, nine meat and related products firms, three dairy and egg products firms, five grocery firms, and four frozen food firms (fig. 3). A few firms handling other food commodities are in the same general area.

Most of the buildings in the Franklin market area occupied by wholesale food dealers are old, outmoded, multiunit frame buildings with loading and unloading at the curb. Others are sepa-

rate frame or brick buildings which are obsolete and inefficient for food marketing purposes. Many of them were not designed for handling food. Some buildings have been remodeled, but they are still inefficient.

Traffic is heavy during peak hours and often becomes congested, especially with nonmarket vehicles occupying market parking space (fig. 4). Costly delay time results, which affects the food wholesalers' costs of operations. Little can be done to correct the traffic problem in the market at the present location.

Suburban Market Area

The major part of the Suburban market area lies in southern Oakland. Its boundaries include all the southern portion of Oakland and part of the city of San Leandro. Originally, the nucleus of this market area centered around a few older food firms serving the southern neighborhoods, San Leandro, and points south. But as the center of population shifted southward, food firms located in that direction—toward the consumers.

The Suburban market area contains a total of 34 wholesale food firms, made up of five fresh fruits and vegetables firms, 14 meat and related products firms, three dairy and egg prod-

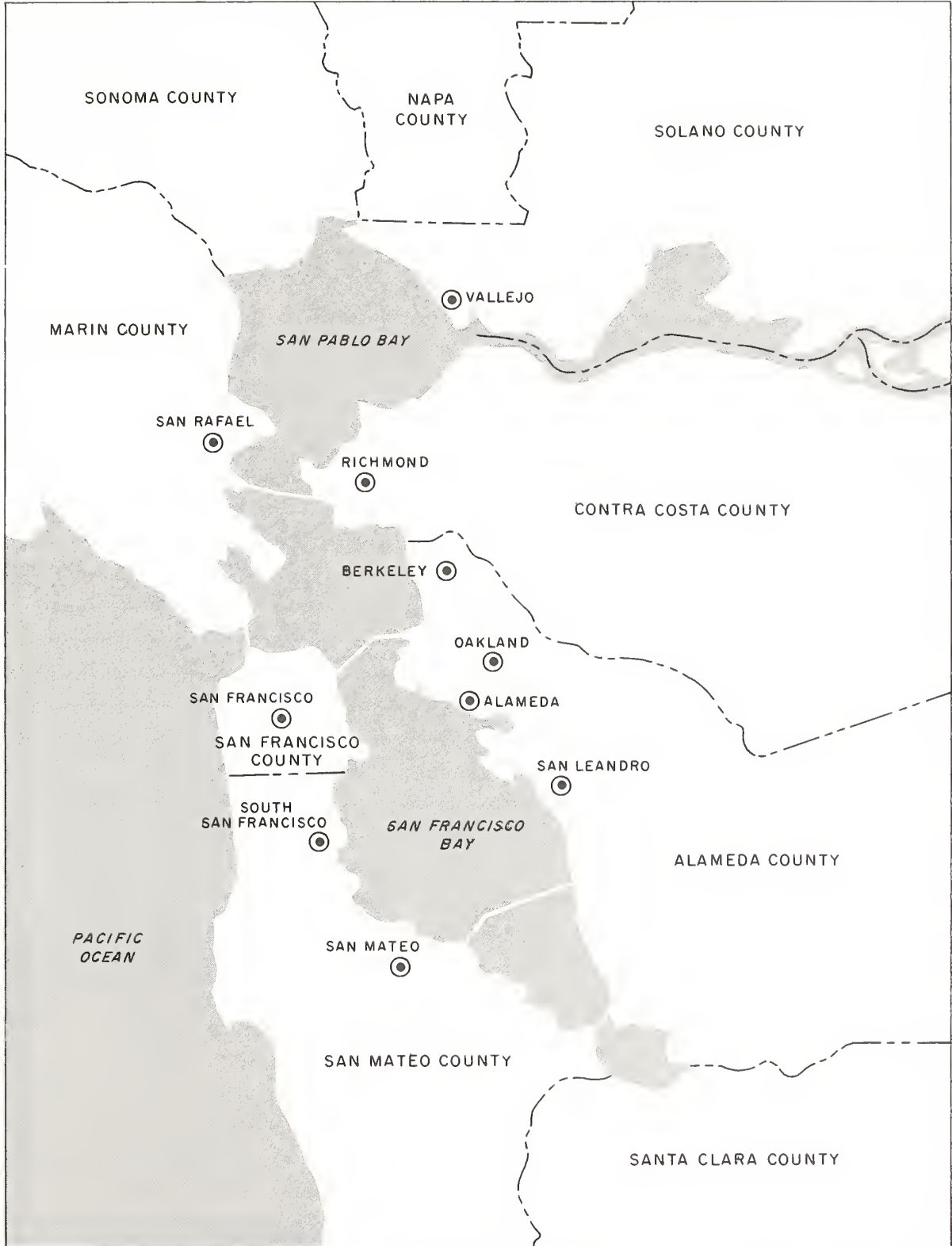


FIGURE 1.—Map of the San Francisco-Bay area.

TABLE 2.—Direct receipts of wholesale food firms, by type of firm, commodity, and method of transportation, Oakland—East Bay area

Type of food firm	Volume received by—					Total volume received	Percentage of total volume received by—					
	Truck	Rail	Rail-truck ¹	Air	Ship		Truck	Rail	Rail-truck ¹	Air	Ship	Total
	Tons	Tons	Tons	Tons	Tons		Percent	Percent	Percent	Percent	Percent	Percent
Independent food firms:												
Fresh fruits and vegetables.....	186,430	11,240	0	0	4,500	202,170	92	6	0	2	100	
Meat and related products.....	76,250	5,310	0	200	40	81,800	93	7	(³)	(³)	100	
Dairy ⁴ and egg products.....	42,800	610	0	0	0	43,410	99	1	0	0	100	
Groceries.....	287,778	55,322	8,382	5,240	7,335	304,057	79	15	2	2	100	
Frozen foods.....	62,880	3,640	0	0	0	66,520	95	5	0	0	100	
Total or average.....	656,138	76,122	8,382	5,440	11,875	757,957	86	10	1	2	100	
Food chains (all commodities) ²	461,393	131,329	26,364	18,934	20,024	658,044	70	20	4	3	100	
Grand total or average.....	1,117,531	207,451	34,746	24,374	31,899	1,416,001	79	15	2	2	100	

¹ Includes railroad team track receipts trucked to distribution facilities.

² Includes unloads picked up in the West and South Bay area as well as the Oakland-East Bay area.

³ Less than 1 percent.

⁴ Excludes milk and cream and includes margarine.

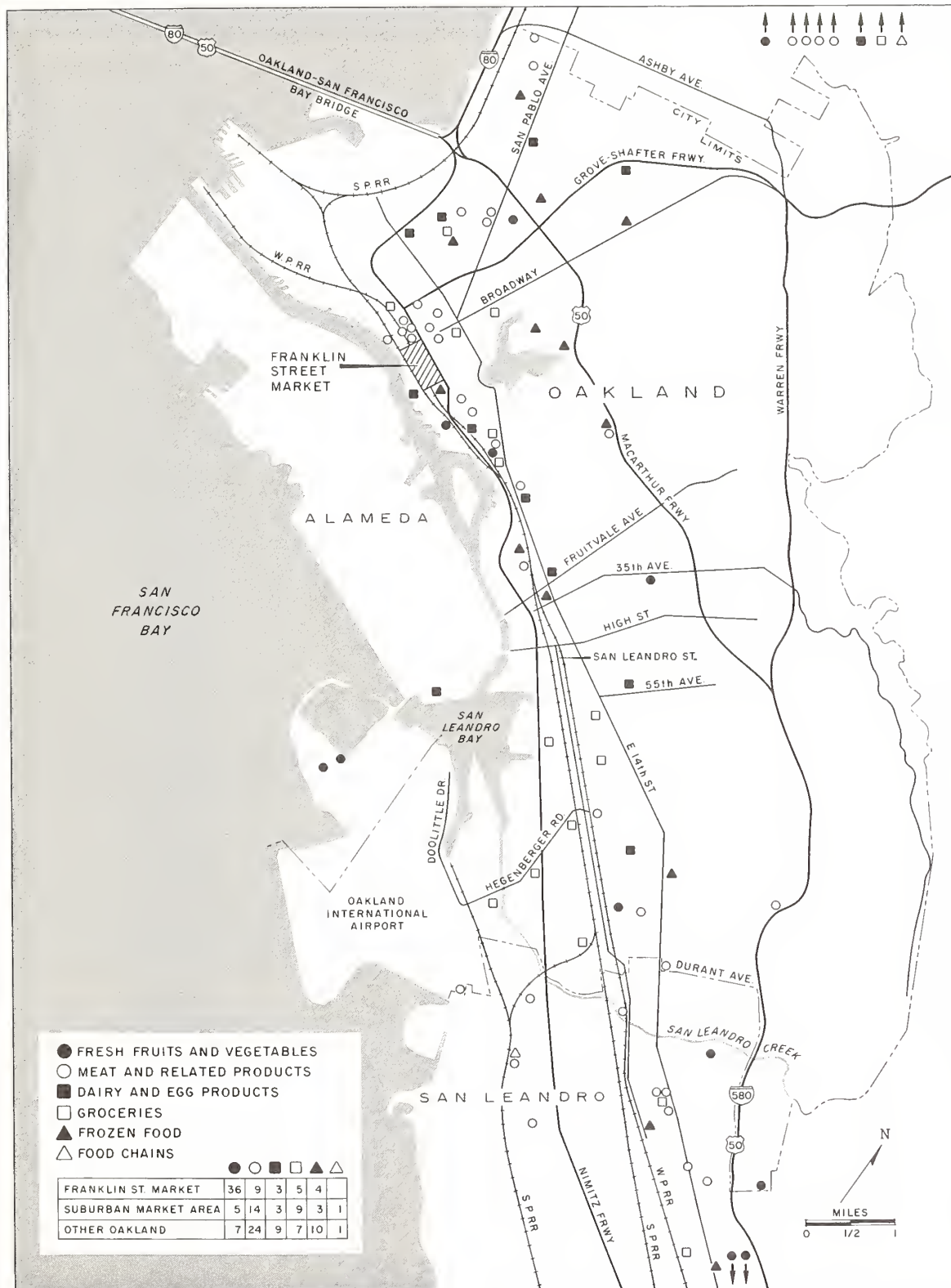


FIGURE 2.—Location of 148 food firms and food chain warehouses in the Oakland-East Bay area.



FIGURE 3.—Facilities in the Franklin market area.



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FIGURE 4.—Congested streets are evident—too narrow to accommodate large over-the-road trailer trucks, resulting in costly delay time.

ucts firms, nine grocery firms, and three frozen foods firms.

Although facilities range from relatively modern to “make-do” structures, they are generally more substantial and tend to meet the needs of individual firms better than those in the Other East Bay market area.

Food firms who have relocated in the Suburban market area within the last few years tend to choose established industrial park sections. As a result, food firms are less scattered.

Other East Bay Market Area

Firms in other parts of the Oakland metropolitan area are considered to be in the Other East Bay market area.

Independent food wholesalers in this area include seven fresh fruits and vegetables firms, 24 meat and related products firms, nine dairy and egg products firms, seven grocery firms, and 10 frozen foods firms.

Most fresh fruits and vegetables firms, with one exception, have inadequate facilities. One

large produce firm has a newly constructed, modern, one-story facility.

Meat and related products wholesalers also have inadequate facilities, some of which are old, multistory buildings. A few firms have developed relatively good layouts despite their facilities, but loading and unloading still remains a problem. There is no major concentration of meat firms in this area. At most, two or three firms can be found in the same general vicinity. Some of the firms have adequate refrigeration space, but others must use commercial cold storage facilities for their products.

Facilities of the dairy and egg products firms range from poor and inefficient to highly efficient. Many of the buildings have been enlarged to rather extensive structures. Others, however, need further enlargement and no space is available to do so at their present locations.

The grocery firms are scattered throughout the area. They are located in various kinds of facilities, ranging from old multistory buildings to modern, one-story warehouses. Their equip-

ment ranges from nonmechanized to mechanized. In the multistory warehouses, commodities are moved by hand, conveyor, and slow-moving freight elevators. In the modern one-story warehouses, commodities are moved by mechanical handling systems. Large-volume grocery firms generally have direct rail service. But small firms must transport their rail receipts from team tracks or tracks located at another dealer's facility.

The facilities for handling frozen foods range from inefficient to fairly efficient. Although all firms have refrigerated space, they also use public refrigerated warehouses.

Public Cold Storage Warehouses

Four public cold storage warehouses serve the East Bay area. Three are one-story buildings and one is a multistory building. All have direct rail service. Platforms for receiving and shipping are largely inadequate, which causes costly delays. Highway access is indirect and traffic must move on heavily congested, narrow streets. Unrestricted parking causes further congestion.

SOURCES OF SUPPLY

Table 4 shows the origin of the approximately 758,000 tons of foods received by independent food firms in the Oakland-East Bay area. Of this total, fresh fruit and vegetable firms received 27 percent; meat and related products firms, 11 percent; dairy and egg products firms, 6 percent; grocery firms, 48 percent; and frozen food firms, 8 percent. Most supplies of food, with the exception of grocery products, came from other areas in California where vast

Chainstore Warehouses

Two national food chains maintain warehouses in the East Bay area. They are served directly by rail and have good highway access. The buildings have all the warehousing space on one floor, with additional land available for expansion. All facilities use modern methods of handling.

Two other food chains serving the East Bay area maintain branch warehouses outside the area.

Facility Ownership and Space Used

Of the 148 independent food dealers, 83 of them rented and 65 owned their facilities. The dairy and egg products group had the largest percentage of owners.

In all, the 148 independents occupied 1,654,950 square feet of floorspace, or approximately 38 acres (table 3). The average space occupied ranged from 5,295 square feet for fruit and vegetable dealers to 34,030 square feet for grocery dealers. The average for all firms was 11,182 square feet. About 75 percent of the space used was first floor space.

FLOW OF FOOD COMMODITIES THROUGH OAKLAND-EAST BAY DISTRIBUTION FACILITIES

A graphic illustration of the movement of food commodities through independent wholesale market channels is shown in figure 5.

This movement involves the handling of commodities from various points of initial receipt through the wholesale facilities to the areas of final destination. The points of initial receipt

producing areas are located. Production areas surrounding San Francisco Bay accounted for the volumes shown in the San Francisco Bay area source. About a third of the total supplies came from nearby States, other sections of the country, and points overseas. These are indicated as out-of-State sources. Meat wholesalers received an appreciable quantity of their products from the midwestern and southern sections of the country.

include dealers' facilities, team tracks, boat piers, and airports. Products received at points other than at the dealers' facilities were either transported to the dealers' facilities by the dealer or a cartage firm, or they were picked up at these points by buyers.

In the flow of commodities through distribu-

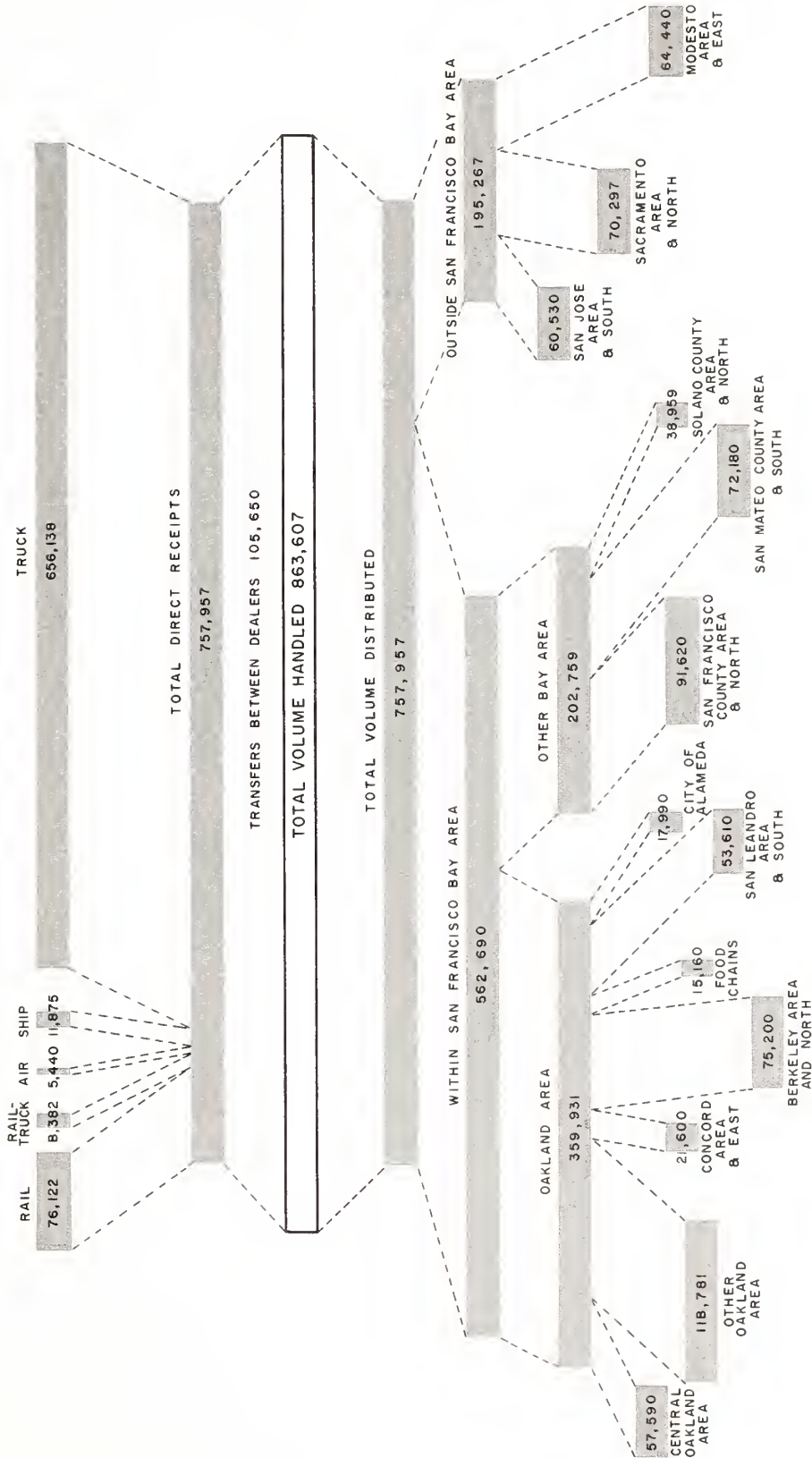


Figure 5.—Flow of food commodities (in tons) through independent wholesale food marketing facilities, Oakland-East Bay, 1966.

TABLE 3.—*Facility ownership and space used by 148 independent food firms, by commodity group and market area, Oakland—East Bay*

Commodity and market area	Tenure status			Space occupied					Special use ¹		
	Rent	Own	Total firms	First floor	Other floors	Total	Average space per wholesaler	Office	Cooler	Freezer	
	Number	Number	Number	Square feet	Square feet	Square feet	Square feet	Square feet	Square feet	Square feet	
Fresh fruits and vegetables:											
Franklin.....	32	4	36	136,690	64,550	201,240	5,590	17,025	230,290	0	
Suburban.....	0	5	5	28,600	500	29,100	5,820	800	820	500	
Other East Bay.....	3	4	7	20,000	3,800	23,800	3,400	1,500	730	900	
Total or average.....	35	13	48	185,290	68,850	254,140	5,295	19,325	31,840	1,400	
Meat and related products:											
Franklin.....	3	6	9	80,650	48,540	129,190	14,354	14,760	24,090	13,890	
Suburban.....	8	6	14	109,000	0	109,000	7,786	4,520	32,440	11,050	
Other East Bay.....	13	11	24	139,020	24,950	163,970	6,832	9,110	39,370	9,970	
Total or average.....	24	23	47	328,670	73,490	402,160	8,557	28,390	95,900	34,910	
Dairy and egg products:											
Franklin.....	3	0	3	18,500	5,900	24,400	8,133	720	3,500	1,500	
Suburban.....	0	3	3	9,770	0	9,770	3,257	820	3,020	290	
Other East Bay.....	0	9	9	57,650	46,300	103,950	11,550	7,710	11,480	10,730	
Total or average.....	3	12	15	85,920	52,200	138,120	9,208	9,250	18,000	12,520	

Groceries:										
Franklin.....	5	0	5	23,150	0	23,150	4,630	1,280	440	0
Suburban.....	3	6	9	194,600	42,700	237,300	26,367	5,830	1,880	2,040
Other East Bay.....	3	4	7	297,190	157,000	454,190	64,884	11,360	10,790	20,100
Total or average.....	11	10	21	514,940	199,700	714,640	34,630	18,470	13,110	22,140
Frozen food:										
Franklin.....	4	0	4	47,880	8,190	56,070	14,108	2,310	1,990	2,190
Suburban.....	0	3	3	11,220	4,920	16,140	5,380	1,180	540	2,800
Other East Bay.....	6	4	10	62,900	10,780	73,680	7,368	7,540	2,560	21,740
Total or average.....	10	7	17	122,000	23,890	145,890	8,582	11,030	5,090	26,730
All commodities:										
Franklin.....	47	10	57	306,870	127,180	434,050	7,615	36,095	60,310	17,580
Suburban.....	11	23	34	353,190	48,120	401,310	11,803	13,150	38,700	16,680
Other East Bay.....	25	32	57	576,760	242,830	819,590	14,379	37,220	64,930	63,440
Total or average.....	83	65	148	1,236,820	418,130	1,654,950	11,182	86,465	163,940	97,700

¹ Included in space occupied.

² Includes ripening rooms.

tion facilities, many items were handled by more than one dealer. This rehandling occurs when one wholesaler obtains supplies from another and is referred to as an interdealer transfer. About 14 percent of the direct receipts of independent wholesalers, or about 106,000 tons, were transferred from one dealer to another.

The independent wholesalers distributed about 563,000 tons of food within the San Francisco Bay area. About 64 percent of this volume was distributed within the Oakland area. The remaining 36 percent was distributed in the Other Bay area, which comprised San Francisco County area and north, San Mateo County area and south, and Solano County area and north. The largest volume distributed outside the San Francisco Bay area moved to the Sacramento area and north.

Fresh Fruits and Vegetables

Independent fresh fruit and vegetable dealers received 202,170 tons of products in 1966. Of this volume, about 92 percent arrived by truck, 6 percent by rail, and 2 percent by ship.

The firms in the Franklin Market area received almost 89 percent of the total and those in the Suburban Market area, almost 4 percent. About 15,700 tons, or over 7 percent, were unloaded at facilities in other East Bay markets (table 5).

Interdealer transfers of fresh fruits and veg-

etables were necessary because some dealers maintained facilities at more than one location, the carlot receivers in the Franklin market area supply jobbers in the Suburban market area and Other East Bay market area, and purchases were made of fill-in items. About 36,060 tons were handled more than once (table 6).

Of the 202,170 tons of direct receipts, 78 percent was distributed within the Oakland-East Bay area, 19 percent moved to Other East Bay area, and 3 percent went outside the San Francisco Bay area to other parts of the State and east. About 62 percent was delivered by the wholesalers.

Meat and Related Products

Independent meat and related products dealers received 81,800 tons of products in 1966. Of this total, 93 percent came by truck and 7 percent by rail. Dealers in the Franklin Street market area received almost 29 percent of the total, dealers in the Suburban market area about 32 percent, and dealers in the Other East Bay markets almost 39 percent (table 5). Interdealer transfers totaled 22,680 tons (table 6).

Sixty-one percent of direct receipts was distributed within the Oakland-East Bay area, 26 percent was distributed to Other Bay area, and 13 percent went outside the San Francisco Bay area to other parts of the State and east. Deliveries generally were made by the individual dealers.

TABLE 4.—Sources of food products handled by 148 independent food firms, Oakland-East Bay

Type of wholesaler	Source of supply			Total direct receipts
	San Francisco Bay area	Other California	Out of State ¹	
Fresh fruits and vegetables.....	27,970	122,870	51,330	202,170
Meat and related products.....	11,650	28,100	42,050	81,800
Dairy and egg products.....	7,510	29,140	6,760	43,410
Groceries.....	186,499	59,622	117,936	364,057
Frozen foods.....	12,600	16,120	37,800	66,520
Total.....	246,229	255,852	255,876	757,957

¹ Includes 9,970 tons of overseas arrivals.

TABLE 5.—*Volume of direct receipts handled by 148 independent food firms, by commodity and market area, Oakland—East Bay*

Commodity	Franklin		Suburban		Other East Bay		Total	
	Dealers	Volume	Dealers	Volume	Dealers	Volume	Dealers	Volume
	<i>Number</i>	<i>Tons</i>	<i>Number</i>	<i>Tons</i>	<i>Number</i>	<i>Tons</i>	<i>Number</i>	<i>Tons</i>
Fresh fruits and vegetables	36	179,130	5	7,300	7	15,740	48	1202,170
Meat and related products	9	23,680	14	26,340	24	31,780	47	81,800
Dairy and egg products	3	9,150	3	6,760	9	27,500	15	43,410
Groceries	5	6,550	9	41,470	7	316,037	21	364,057
Frozen foods	4	7,350	3	1,900	10	57,270	17	66,520
Total	57	225,860	34	83,770	57	448,327	148	757,957

¹ Includes some tonnage received in San Francisco and other nearby cities outside the Oakland-East Bay area.

Dairy and Egg Products

The independent dealers that handled butter, margarine, cheese, and eggs received 43,410 tons of these products in 1966. Ninety-nine percent of this tonnage was delivered by truck and only 1 percent by rail.

Dealers in the Franklin market area received about 21 percent of the total. Those in the Suburban market area received almost 16 percent, and those in Other East Bay area received over 63 percent (table 5). About 14 percent of the direct receipts were transferred between wholesalers.

Approximately 70 percent of the total direct receipts were distributed within the Oakland-East Bay area, 21 percent in Other East Bay area, and 9 percent outside the San Francisco Bay area in other parts of the State and east. Most of the volume was distributed by the wholesalers.

Groceries

The total volume of groceries received in the Oakland-East Bay area in 1966 was 364,057 tons. About 79 percent came by truck, 15 percent by rail, 2 percent by rail-truck, 2 percent by air, and 2 percent by ship. The Franklin market area received about 2 percent of this total volume, the Suburban market area about 11

percent, and Other East Bay markets about 87 percent (table 5). Interchanges of commodities between firms resulted in 35,160 tons, or slightly less than 10 percent, of direct receipts being handled more than once (table 6).

Of the total volume, 26 percent was distributed within the Oakland-East Bay area, 33 percent in Other East Bay area; and 41 percent outside the San Francisco Bay area in other parts of the State and east. Most of the volume distributed was delivered by the wholesalers.

Frozen Foods

Frozen food receipts totaled 66,520 tons. Of this amount, 95 percent came by truck and 5 percent by rail. The wholesalers in the Franklin market area received about 11 percent of the total; those in the Suburban market area, about 3 percent; and those in Other East Bay markets, about 86 percent (table 5).

Of the direct receipts, 5,610 tons, or over 8 percent, was transferred between dealers (table 6).

The frozen food dealers distributed about 42 percent of their volume within the Oakland-East Bay area, 18 percent in Other East Bay area, and 40 percent outside the San Francisco Bay area in other parts of the State and east. Frozen food dealers delivered almost all of their entire volume.

TABLE 6.—*Total volume handled by 148 independent food firms, by commodity and by market area, Oakland—East Bay*

Item	Franklin	Suburban	Other East Bay	All areas
	<i>Tons</i>	<i>Tons</i>	<i>Tons</i>	<i>Tons</i>
Fresh fruits and vegetables:				
Direct receipts.....	179,130	7,300	15,740	202,170
Interdealer transfers ¹	30,230	1,760	4,070	36,060
Total.....	209,360	9,060	19,810	238,230
Meat and related products:				
Direct receipts.....	23,680	26,340	31,780	81,800
Interdealer transfers ¹	6,760	8,400	7,520	22,680
Total.....	30,440	34,740	39,300	104,480
Dairy and egg products:				
Direct receipts.....	9,150	6,760	27,500	43,410
Interdealer transfers ¹	1,290	740	4,110	6,140
Total.....	10,440	7,500	31,610	49,550
Groceries:				
Direct receipts.....	6,550	41,470	316,037	364,057
Interdealer transfers ¹	1,590	6,350	27,220	35,160
Total.....	8,140	47,820	343,257	399,217
Frozen foods:				
Direct receipts.....	7,350	1,900	57,270	66,520
Interdealer transfers ¹	0	0	5,610	5,610
Total.....	7,350	1,900	62,880	72,130
All commodities:				
Direct receipts.....	225,860	83,770	448,327	757,957
Interdealer transfers ¹	39,870	17,250	48,530	105,650
Grand total.....	265,730	101,020	496,857	863,607

¹ Indirect receipts from wholesalers outside and within the market area.

SELECTED COSTS INCURRED BY FOOD FIRMS

Costs were determined for (1) moving commodities from initial points of receipts to dealers' facilities, (2) handling the commodities within the facilities, and (3) moving the commodities from the facilities. These are costs affected by the facilities, and methods, techniques, and equipment used in handling the commodities. Other factors that are affected by facilities, but which are not readily measur-

able in terms of costs, are discussed later in the report under nonmeasurable savings.

Costs of Moving Products to Market Facilities

Cartage and avoidable delay to inbound trucks were the cost items considered for mov-

ing commodities from initial points of receipt to the dealers' facilities. Loading commodities into trucks from various receipt locations and transporting them to facilities constitute the cartage costs, whether performed by contract haulers or by individual wholesale firms using their own trucks. The cartage and delay costs

for the five commodity groups totaled \$169,000 (table 7).

Delays encountered by trucks in delivering commodities to dealers' facilities, caused by either traffic congestion or lack of unloading space at the store, were termed avoidable delay. Costs of avoidable delay averaged \$4.48 per ton for all food groups.

TABLE 7.—*Estimated selected costs incurred by 148 independent wholesalers in moving food products through present market facilities, by commodity group, Oakland-East Bay area¹*

Cost item and commodity group	Volume involved	Cost	
		Per ton	Total
	<i>Tons</i>	<i>Dollars</i>	<i>1,000 dollars</i>
MOVING PRODUCTS TO MARKET FACILITIES			
Fresh fruits and vegetables.....	202,170	0.46	92
Meat and related products.....	81,800	.13	11
Dairy and egg products.....	43,410	.05	2
Groceries.....	364,057	.17	63
Frozen foods.....	66,520	.02	1
Total or average.....	757,957	.22	169
HANDLING AND OTHER COSTS WITHIN MARKET			
Fresh fruits and vegetables.....	238,230	6.15	1,465
Meat and related products.....	104,480	29.71	3,104
Dairy and egg products.....	49,550	6.60	327
Groceries.....	399,217	10.27	4,101
Frozen foods.....	72,130	10.84	782
Total or average.....	863,607	11.32	9,779
MOVING PRODUCTS AWAY FROM MARKET			
Fresh fruits and vegetables.....	202,170	4.56	922
Meat and related products.....	81,800	11.17	914
Dairy and egg products.....	43,410	4.24	184
Groceries.....	364,057	8.79	3,200
Frozen foods.....	66,520	13.50	898
Total or average.....	757,957	8.07	6,118
Total, all cost items			
Fresh fruits and vegetables.....	202,170	12.26	2,479
Meat and related products.....	81,800	49.25	4,029
Dairy and egg products.....	43,410	11.82	513
Groceries.....	364,057	20.23	7,364
Frozen foods.....	66,520	25.27	1,681
Total or average.....	757,957	21.20	16,066

¹ See table 20 for more detailed information.

Handling and Other Costs Within the Market Area

Handling costs included unloading commodities from railcars or trucks at the facility or directly into buyers' trucks, moving commodities into and within the store, sorting, setting up displays, selecting orders, and loading these orders onto a truck for delivery. The costs of making transfers between dealers were included, as well as those incurred in the use of handling equipment, facility services, and product waste, theft, and deterioration attributed to inadequate facilities. Costs for processing and sales, utilities, and management and office staff were not included.

A comparison of handling costs among the commodity groups generally indicates that the costs increase with the number of operations involved. For example, the cost for handling groceries is higher than for handling the average fresh fruits and vegetables, because groceries require more sorting and assembly operations within the warehouse. The number of operations involved in the processing of meat and related products is the greatest of all the commodity groups, with the result that this group has the highest handling costs.

In any given commodity group, handling costs are affected by the size of the commodity or the lot handled. Within the meat and related products group, it is apparent that a firm which makes and distributes sausage would have much higher handling costs per ton than one which distributes carcass meat. As a gener-

al rule, commodities handled in unit lots, such as pallet loads or large boxes, have the lowest handling costs.

Table 7 shows averages of estimated annual handling and other costs for all types of wholesale services. These figures should not be used by any one firm for a comparison of costs.

The estimated annual handling and other costs for 863,607 tons of food within the market areas totaled almost \$9.8 million (table 7).

Costs of Moving Products Away From the Markets

Costs of moving products away from the market include all the costs incurred from the time the products are picked up at the dealers' facilities or team tracks or from over-the-road trucks to the time of their arrival at destination points within the regional area. Out-of-State costs were excluded. The costs measured included costs of owning and operating motor vehicles as well as labor costs for drivers and helpers. These costs were estimated to be \$6.1 million, or an average of \$8.07 per ton (table 7).

Summary of Selected Marketing Costs

Selected costs for moving almost 758,000 tons of food products through wholesale facilities in the Oakland-East Bay area totaled approximately \$16.1 million, for an average of \$21.20 per ton (table 7). The highest costs occurred in handling products within the markets and moving them from the markets.

INADEQUACIES OF PRESENT MARKETING FACILITIES IN OAKLAND

Some of the firms had modern, efficient, and well-planned facilities. Many of them, however, had inadequate facilities and outmoded methods of handling food products. As a result of these inadequacies, their costs of marketing were higher than necessary.

Improper Receiving Facilities and Methods

Many wholesalers occupied buildings that were old and inefficient for modern food distri-

bution operations. Many buildings lacked platforms and loading and unloading had to be done on the sidewalk and street (fig. 6). Few firms used modern materials-handling equipment and trucks and railcars were loaded and unloaded manually, adding extra costs and confusion to these operations. Few buildings had house tracks and wholesalers had the extra cost of carting to and unloading at their facilities.

At some buildings that had house tracks, the rails were not imbedded in the road surface, which made it practically impossible for trucks



BN-36412

FIGURE 6.—Lack of platform space in most food related facilities forces loading and unloading directly in the street, causing confusion and additional handling.

to use this area for loading and unloading at the buildings. Thus, all trucks had to load and unload at the front of the facilities, adding further congestion to the sidewalks already overcrowded with product displays and order assembly operations (figure 7).

Traffic Congestion

The Franklin market area had major traffic congestion problems. Franklin Street is a narrow one-way street and the main market thoroughfare. If medium-size trucks were parked on both sides of the street opposite each other, traffic was delayed. The unloading of a large trailer truck blocked all flow of traffic. Fourth Street is one of the principal entries for traffic coming from the downtown district or exiting

from the Nimitz Freeway. Two main line railroads cut through the market, one at First Street and the other at Third Street. Frequently, traffic tieups result because the market is located between these two lines. Some scattered firms in the area had individual traffic problems which varied from congestion during shift changes at industrial plants to a lack of parking space for employees, buyers, or others who must bring vehicles into the area.

Figure 8 shows a typical flow of motor traffic in the area. Traffic between 12 p.m. and 4 a.m. was relatively light; the lowest count recorded was at 2 a.m. Few trucks were loading or unloading at that time. By 6 a.m., traffic in the market was almost double that recorded at 12 p.m. The number of passenger cars in the area



BN-36410

FIGURE 7.—Sidewalks are utilized for display and assembly areas because of inadequate space within the facilities.

increased sharply beginning at 8 a.m., partly because nonmarket traffic was channeled through the area. Automobiles parked in the market belonging to nonmarket persons added to the congestion. The number of incoming trucks was highest at 5 a.m. and the number outgoing about an hour later, 6 a.m. Maximum activity involving all trucks occurred at 5 a.m., and gradually decreased thereafter.

Lack of Centralized Facilities

About 100,040 tons, or 13 percent of direct receipts, was handled by two or more wholesalers. Although most wholesalers try to keep a sufficient quantity of product on hand to meet demands, purveyors, jobbers, and commodity specialists often must purchase additional products from other wholesalers for their needs.

Sometimes rail receipts are stored at public warehouses and carted to the wholesaler's facility as needed.

Some food products move through more than one facility of the same firm within the same market area. This movement is in addition to the transfer of merchandise between dealers. Dealers who handle commodities through more than one facility are at a competitive disadvantage. Such extra handling increases their costs in loading, carting, and unloading from facility to facility. In addition, excessive handling of products increases the possibility of additional breakage, spoilage, and deterioration.

With wholesale food facilities scattered throughout the city of Oakland and Alameda and surrounding counties costs of distributing food increase. Although food wholesalers are concentrated in the Franklin market area, and

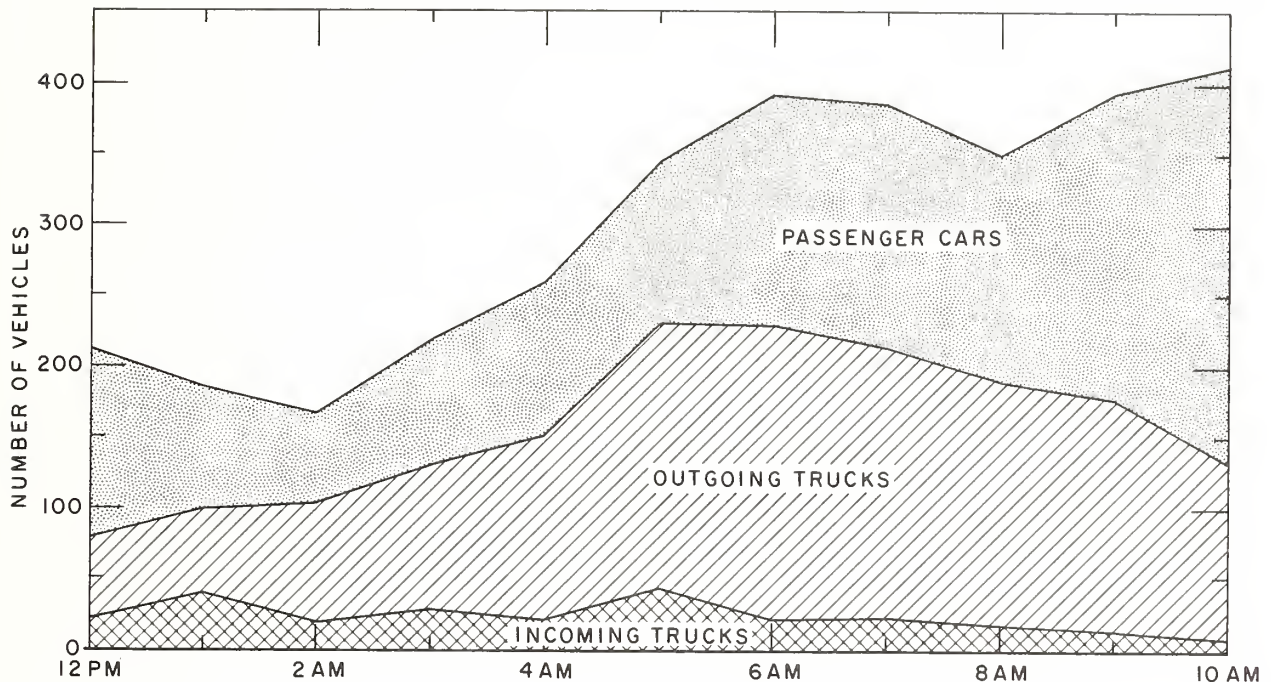


FIGURE 8.—Number of vehicles in the Franklin market area, by hour and type of vehicle.

to a lesser degree in the Suburban market area, neither of these areas can provide sufficient quantities and qualities of all the food needs of a retailer coming into the market to purchase supplies. The Franklin market area is primarily a grouping of wholesale fresh fruit and vegetable firms. Although it lacks the diversity of a complete market, it comes near meeting the

requirements of a complete market because a few related food firms are in the immediate area. Because of the scattered locations, transfers of products between wholesalers are expensive and time consuming. The advantage gained by transfers between markets is usually lost because of the cost of making such transfers.

FACTORS TO BE CONSIDERED IN PLANNING A FOOD DISTRIBUTION CENTER

The most important factors which must be considered in planning a food distribution center are: Completeness, adequacy of facilities, arrangement, location, land cost, management methods, financial arrangements, and design. A center planned and constructed without considering one or more of these factors could develop serious operating problems and fail to improve the efficiency of distributing food.

A food distribution center must be complete to best serve the industry and the public. Wholesale food operators providing all types of

services and products should be accommodated at a single location. Buyers should have to visit several locations to purchase a complete line of products. All types of transportation should be available to transport products and employees to and from the market. Space should be available for all types of operators, ranging in size from the small independent to the large chain operation. Some firms may not need to relocate immediately because their facilities are adequate at present. However, space should be provided for the relocation and growth of all firms

that might want to move into the area in the foreseeable future.

The facilities planned should be adequate to fill the needs of each type of wholesale operator. Operators who handle a large volume or conduct extensive processing require larger buildings than those who handle small volumes or do little or no processing. The facilities should provide ample space for unloading, selling, displaying, storing, and other operations required to distribute food in a major metropolitan area. Each structure, because of the varied and rapid changes occurring in food wholesaling, should be designed so that it can be modified to meet future needs. Above all, the buildings should be simple and relatively inexpensive, but constructed to withstand continued heavy usage.

Space is needed for auxiliary facilities such as team tracks, house tracks, restaurants, public restrooms, and service facilities for motor vehicles. Other space is needed for offices, market management and operation, inspection services, brokers, and affiliated organizations or groups. Adequate parking space should be available for vehicles of buyers, dealers, employees, and all others who need to be in the market.

In developing a wholesale food distribution center, it is most important that a master plan be adopted at the outset so that the overall development can be properly phased and controlled. In the development of a master plan, special consideration should be given to arranging the facilities on a given site to obtain maximum efficiency in the marketing functions. Facilities in the distribution center should be located so that operators handling the same commodity are near each other to facilitate transfers between operators. They should also be located according to the amount of traffic they generate. With proper arrangement, traffic can be evenly distributed throughout the center.

Firms catering to buyers who pick up supplies in their own trucks should be located in an area where they can serve their customers without interfering with normal and efficient

traffic flow. Facilities that will be used by operators from all parts of the market, such as refrigerated warehouses, should be strategically located to serve the entire market.

Proper location is essential to a new food distribution center. The market area should be readily accessible to major highways and arterial streets of the city. It should have access to both truck and rail transportation. Such a location will reduce the time required for deliveries.

Adequate land at reasonable cost should be acquired at the outset to accommodate all types of wholesalers who want to locate there, with space for future expansion. In addition, the site must be large enough so that sufficient land can be set aside for the eventual relocation of other food wholesalers and allied industries who may wish to move there in the future. In appraising the cost of the land, the acquisition cost and the cost of placing the land in condition to build should be considered. The advantage of land near the downtown area must be weighed against the lower cost of land in the suburbs. High rentals required to amortize a high investment might offset any savings or advantage from improved facilities.

Sound management and financial planning are of utmost importance for the success of the market. The management is responsible for the orderly and timely development and enforcement of regulations and operating procedures to insure the proper functioning of the market. The market should be operated at a minimum cost, without discrimination against any type of operator or buyer, form of transportation, or origin of shipment. Operators in the market should be allowed the greatest degree of individual initiative possible within the framework of good business practices. The management should be strong enough to assist the industry in developing and enforcing health, fire, traffic, and other regulations.

The board of directors or other management group should have an interest in the financial success of the market. Shippers, consumers, transportation agencies, and other groups vitally concerned with the market should be represented.

PROPOSED FACILITIES AND ACREAGE REQUIRED FOR A WHOLESALE FOOD DISTRIBUTION CENTER

The facilities and amounts of floor space recommended for a wholesale food distribution center are based upon the kind and volume of food handled by independent wholesalers who could benefit by moving to new facilities, or who might be required to relocate because of renewal projects or proposed highway development programs.

To meet the needs of operators that are expected to locate in the new facilities, two types of buildings are proposed—single-occupancy buildings and multiple-occupancy buildings. In general, large-volume wholesalers and firms with specialized operations requiring a large amount of floorspace would be located in the single-occupancy buildings. Wholesalers with small volumes and standard commodity lines would be housed in the multiple-occupancy buildings. Regardless of the type of facilities, functional buildings should be constructed to keep costs at the lowest level consistent with local building codes and users' specifications. Often the total costs can be kept down by contracting for construction at a time that is convenient to the builder.

The proposed facilities will have six multiple-occupancy buildings and five single-occupancy buildings containing 516,160 square feet of

floorspace (table 8). Total floorspace in the proposed facilities is less than that in the old facilities because of better interior arrangements. In addition, the high ceilings in the new facilities permit higher stacking of products than is possible in most existing facilities.

In the following sections the facilities proposed for each type of wholesaler are described. Particular details are given to the facilities for firms of moderate volume that would be housed in multiple-occupancy buildings. Interior arrangements can be designed to the requirements of each firm. Layouts presented herein should be considered as guides.

The number of wholesalers to utilize the food distribution center should be determined by the number who sign commitments to lease space or to construct buildings in the center. Therefore, the number of facilities actually constructed may vary from the number contained in this report.

For all dealers to leave the facilities they now occupy and move into a new market would be unrealistic. Some of them have modern or efficient facilities that are well located. However, 92 of the 148 firms in the Oakland-East Bay area could benefit from having new facilities. These firms handled 294,200 tons of products,

TABLE 8.—*Number, annual volume, and present and proposed space of independent dealers requiring facilities in a new food distribution center, Oakland-East Bay*

Commodity group	Dealers	Annual volume	Proposed facilities		Present floor space occupied	Total proposed floor space ¹
			Multiple-occupancy	Single-occupancy		
	<i>Number</i>	<i>Tons</i>	<i>Sq. ft.</i>	<i>Sq. ft.</i>	<i>Sq. ft.</i>	<i>Sq. ft.</i>
Fruits and vegetables.....	42	187,650	157,320	19,200	240,000	² 176,520
Meat and related products.....	29	52,540	129,000	50,000	267,000	179,000
Dairy and egg products.....	10	25,160	51,300	(³)	72,000	51,300
Groceries.....	11	28,850	49,140	60,200	169,000	² 109,340
Total.....	92	294,200	386,760	129,400	748,000	516,160

¹ Includes platform and second floorspace of meat units and platform and mezzanine space of all other units.

² Includes one unit for a restaurant.

³ No single-occupancy facilities proposed.

or about 39 percent of all the products handled. The facilities needed for these firms could be met with the following:

1. Six multiple-occupancy buildings—two for fresh fruit and vegetable firms, two for meat and related products firms, one for dairy and egg product firms, and one for grocery firms, containing a total of 386,760 square feet of floor-space.

2. Five single-occupancy buildings, containing 129,400 feet of floorspace.

3. Direct rail access to all buildings.

4. Paved streets at least 200 feet wide where buildings face each other.

5. Parking space for over 1,200 vehicles in addition to the space for loading and unloading at the platforms of buildings.

6. Space for expansion of present facilities and for construction of facilities for allied industries.

Many small firms do not need individual facilities. These firms can be housed together in multiple-occupancy buildings which consist of rows of individual units, called standard store units.

The standard store units will have certain basic features. They will be 25 to 30 feet wide and 100 feet deep, with 14-foot-wide front and rear platforms on most units. Floor-to-ceiling and wall-to-wall partitions will separate the space of the different firms; these partitions are removable to permit future adjustment of space among firms. The ceilings will be at least 21 feet high to permit high stacking. A 14-foot-deep mezzanine over the front platform will provide room for offices and restrooms. Units for meat wholesalers will have a second floor instead of mezzanine. This second floor is planned for offices and storage rooms. The first floor of these units will have 12-foot ceilings. Access to mezzanines and second floors will be by stairs in the interior of each unit.

Insulation for the floor of the refrigerated areas should be installed during initial construction; therefore, it is important to determine in advance the location of coolers and freezers. Refrigeration equipment could be placed either in a utility tunnel or elsewhere as proper installation may dictate.

Interiors of all units should be well lighted. For general office work, 15 to 20 foot-candles (unit of measure for illumination) is generally satisfactory. About 10 to 15 foot-candles should be used in storage areas, with supplementary lighting for display and loading areas.⁴

Heat could be provided by blower-type unit heaters. A central control panel for utilities should be conveniently located.

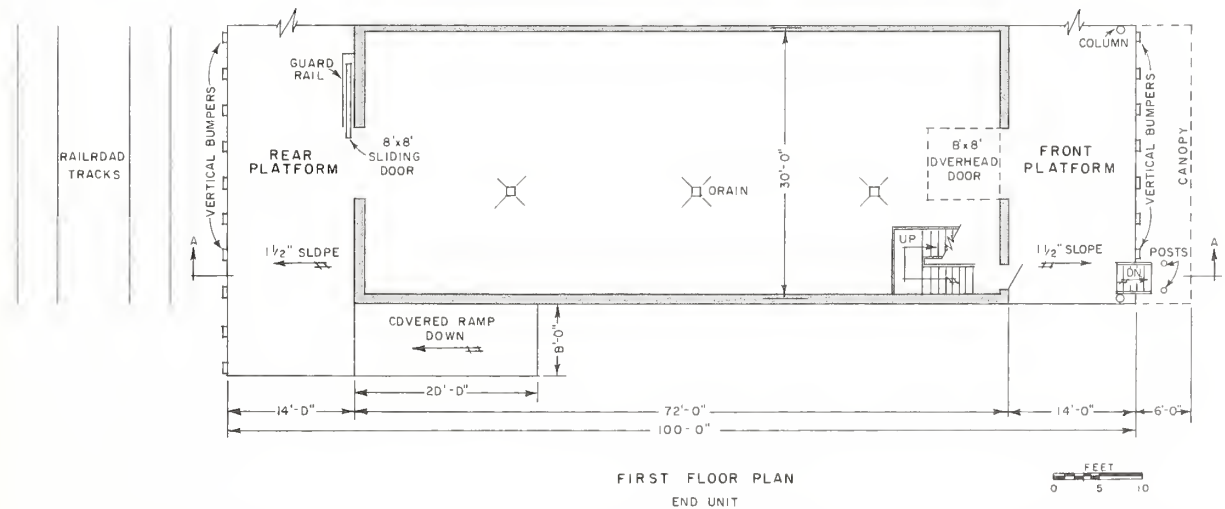
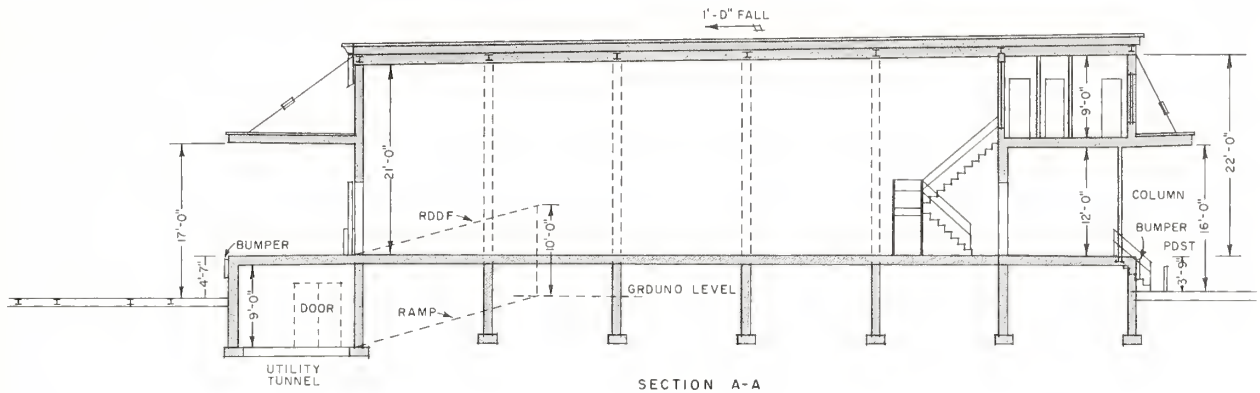
Fresh Fruits and Vegetables

Two multiple-occupancy buildings, and one single-occupancy building would be required to meet the needs of 42 fresh fruit and vegetable dealers who need new facilities. The multiple-occupancy buildings should have a total of 46 standard store units, 45 of them would be used to fill the space needs of the wholesalers. The extra unit would be used for a restaurant for the general use of the food distribution center.

Figure 9 shows the layout of a fresh fruits and vegetables unit in a multiple-occupancy building. Each unit would be 30 feet wide and 100 feet deep, including open front and rear platforms, each 14 feet deep. The height of the ceiling in the interior of each unit should be at least 21 feet. A mezzanine, 30 feet wide by 14 feet deep, extends over the front platform for offices and restrooms. Each unit contains 2,160 square feet of enclosed first-floor operating space, 840 square feet of platform space, and 420 square feet of mezzanine space, for a total of 3,420 square feet of floorspace per unit.

The platforms are covered and extend the length of the multiple-occupancy buildings. The front platform should be at truck-bed height, 45 inches from the street, with pedestrian access steps conveniently located. A canopy 16 feet above the street should extend 6 feet beyond the edge of the platform to provide protection from the weather for loading and unloading operations. The rear platform should be 55 inches above the rails, at the floor level of refrigerator cars and should have a roof

⁴ All lighting estimates are based on information from the Illuminating Engineering Society Lighting Handbook; they should be considered only as guides to specific lighting requirements of individual firms.



- NOTES: 1. Buildings shown have support columns. Recent studies, completed during the writing of this report, indicate there would be little or no increase in cost to construct this building without support columns.
2. The use of a utility tunnel is optional. Without the tunnel, refrigeration equipment could be located on the roof and utility lines along walls inside the building.

FIGURE 9.—Layout of a fresh fruit and vegetable unit.

flush with the edge of the platform and 17 feet above the street. The roof should be supported in such a way as to provide a clear operating area beneath.

The rails should be recessed in and flush with the top of the pavement to permit trucks easy access to the rear platform. A utility tunnel beneath the rear platform could house such things as refrigeration equipment and utility lines. Both front and rear platforms should be equipped with vertical rubber bumper strips along the front to prevent damage by trucks.

An 8- by 8-foot doorway should be provided at the front and the rear of each unit for receiving and shipping products. A pedestrian door should be provided at the front.

The interior layout of the units should be designed to meet the requirements of the individual dealers. Some general recommendations applicable to fruit and vegetable dealers follow.

Pallet racks designed for stacking three tiers high should be used for storage. A minimum of 21½ feet should remain clear at the ceiling to permit air circulation. Ventilation is important in storage areas to avoid overheating in warm weather and condensation during cool weather.

All floors and platforms on the first floor level should have a nonskid surface and be sloped to cause water runoff. A slope of at least 1/8 inch per foot is considered adequate. Interior first floors should be equipped with floor drains.

The first floor should support a live load of about 400 pounds per square foot. This capacity should be adequate for loads that result from stacking products three high on pallet racks. Mezzanine floors should be constructed to support a live load of about 100 pounds per square foot, which could include some light storage.

One fresh fruit and vegetable firm would require a single-occupancy building because of the volume involved and the nature of its operations. This building should contain 19,200 square feet of floorspace. Although it should be designed for the firm that will occupy it, it should also conform to the master plan developed for the food center.

The total floorspace needed by the produce dealers is 173,100 square feet, exclusive of the restaurant unit.

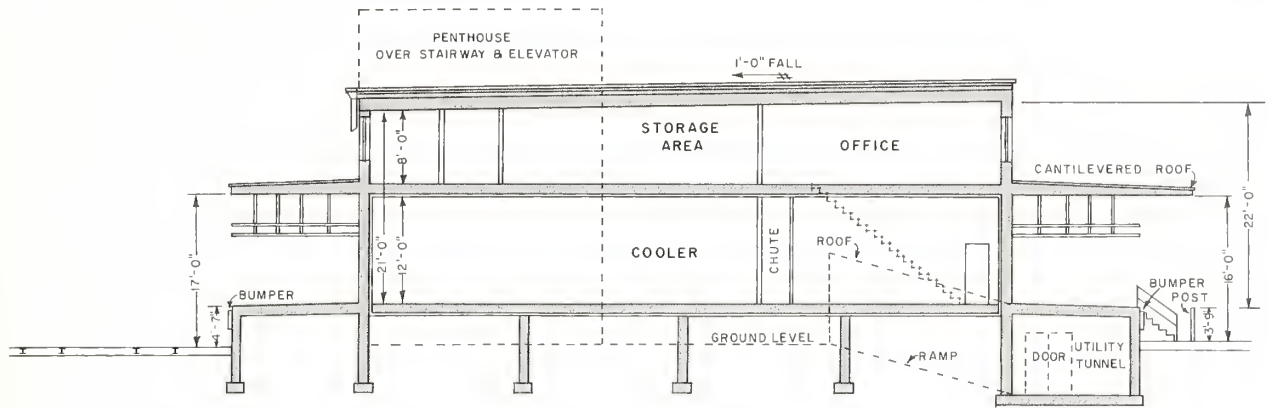
Meat and Related Products

Two multiple-occupancy buildings containing 30 units and two single-occupancy buildings would meet the needs of 29 meat firms considered as possible tenants in a new food center.

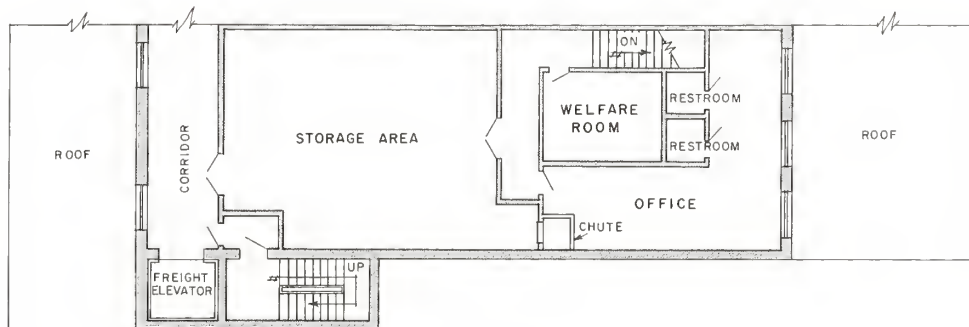
These multiple-occupancy buildings will have two floors. The second floor is provided for offices, a welfare area, restrooms, and storage rooms. The first floor of each unit is 25 by 100 feet, including open front and rear platforms 14 feet deep. Each unit will contain 2,500 square feet of first floorspace, including 700 square feet of platform space, and 1,800 square feet of second floorspace, for a total of 4,300 square feet per unit. Double rail tracks are behind both the multiple- and single-occupancy buildings. Ceilings on the first floor should be 12 feet high and 8 feet high on the second floor. Figure 10 shows a possible layout of a meat and related products unit.

The first floor should be constructed to support a live load of about 400 pounds per square foot. The earth beneath the reinforced concrete floor slabs should be firmly compacted with a vapor barrier between the earth and the concrete slab. The second floor should support a live load of about 100 pounds per square foot.

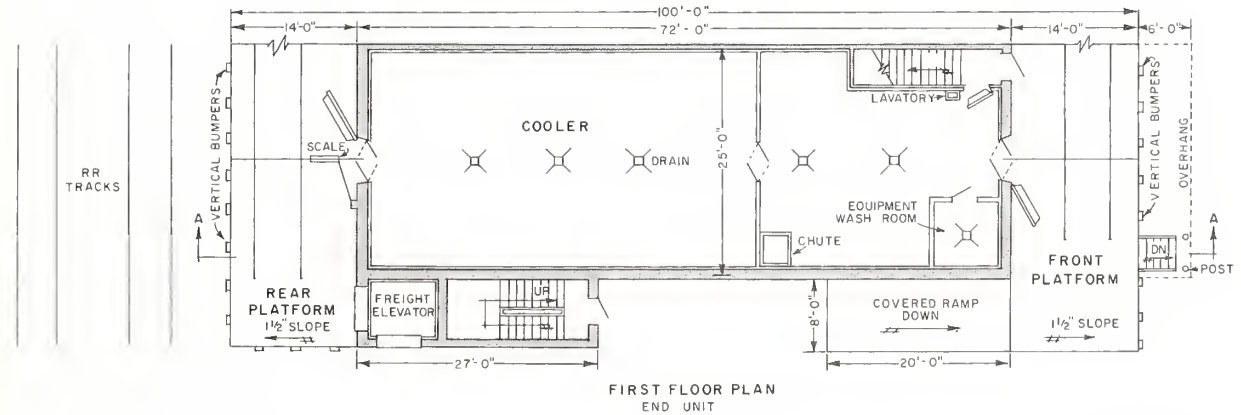
The platforms would extend the length of the multiple-occupancy buildings. The front platform should be 45 inches above the street for truck loading and unloading, with steps conveniently located for pedestrian access. The rear platform should be 55 inches above the top of the rails at refrigerator-car floor level. A utility tunnel under the front platform could house such items as refrigeration equipment, grease traps, and utility lines. The rails should be recessed in and flush with the top of the pavement to permit easy access by trucks to the rear platform. Both platforms should be covered. The roof on the front platform should extend 6 feet beyond the edge of the platform to provide protection from the weather during loading and unloading. It should be 16 feet above the street, and the roof on the rear platform should be 17 feet above the street. Both roofs should be cantilevered so that they will not require supports beneath that would obstruct clear operating space on the platforms. Vertical rubber bumpers should be attached



SECTION A-A



SECOND FLOOR PLAN



FIRST FLOOR PLAN
END UNIT



NOTE: The use of a utility tunnel is optional. Without the tunnel, refrigeration equipment could be located on the roof and utility lines along walls inside the building.

FIGURE 10.—Layout of a meat and related products unit.

along the front edge of the platforms to prevent them from damage by impact of trucks.

Two meat rails should be installed along the front and rear platforms and extend the length of the multiple-occupancy buildings. These rails should be at least 7½ feet but not more than 9 feet above the floor, with switches installed at each store unit, to permit efficient receiving and shipping operations and transfer of meat between dealers.

A future shift from shipments of carcass meat to boxed meat could eliminate the need for conventional meat rails in these facilities. Meat rails should be supported from the first floor on steel columns—not suspended on rods attached to the second floor. The second floor could be used for light storage of such things as packaging materials used in breaking down and packaging carcass meat. The second floor should be constructed so that all or part of it can be removed without damaging the basic building. This facility design satisfies the present needs for handling meat in carcass form.

Usually the storage and work areas where meat is handled are refrigerated; therefore, cooler doors, about 5 feet wide and 7 feet high with inner double-acting doors, should be installed at the front and rear of each unit. Insulation in the floor should be installed during initial construction.

Interior surfaces should be finished in accordance with the facility requirements of the meat inspection service as well as those of local health authorities. The following are examples of some of these requirements. First floors should be constructed of dense, acid-resistant, waterproof concrete; or of vitrified brick of good quality. Brick should be bonded with acid-resistant, waterproofing mortar and laid on a waterproof concrete base. Floors must be well drained, with at least one drainage outlet for each 400 square feet of floorspace.

Total space in the 30 units of the multiple-occupancy buildings is 129,000 square feet, which consists of 54,000 square feet of enclosed first floorspace, 21,000 square feet of platform space, and 54,000 square feet of second floor space. Two meat and related products firms would require single-occupancy buildings because of the volume of product they handle and

the nature of their operations. The two single-occupancy buildings would contain 30,000 and 20,000 square feet of floorspace, respectively. Although these buildings should be designed for the individual needs of the firms they should also conform to the master plan developed for the food center.

The floorspace in the multiple and single-occupancy buildings totals 179,000 square feet.

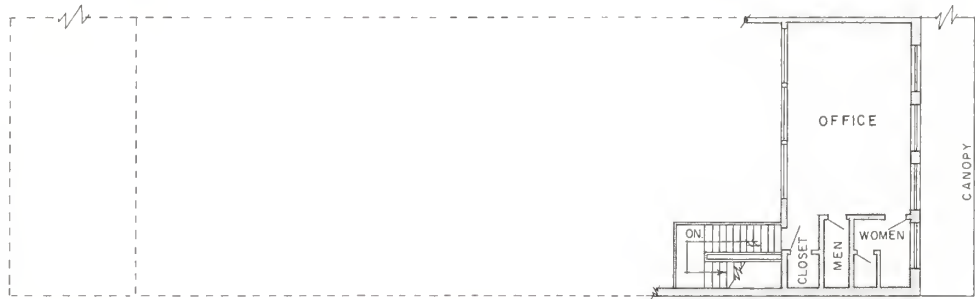
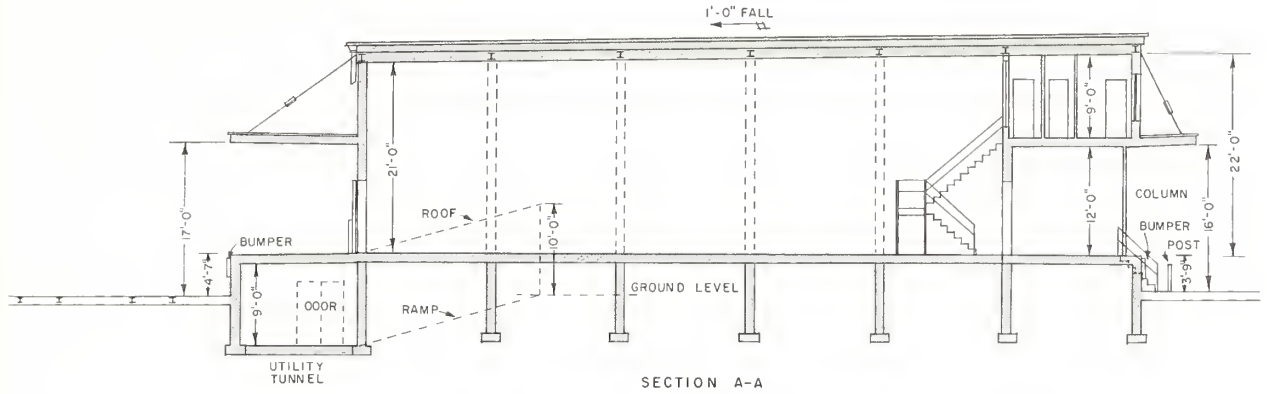
Dairy and Egg Products

Ten dairy and egg products firms need new facilities. Their space needs could be satisfied with one multiple-occupancy building that has 15 standard store units. Each unit is 30 feet wide and 100 feet deep, with a ceiling height of at least 21 feet. This space includes open front and rear platforms, each 14 feet deep. A mezzanine, 30 feet wide by 14 feet deep, extends over the front platform for offices and restrooms. Each unit contains 2,160 square feet of enclosed first floorspace, 840 square feet of open platform space, and 420 square feet of mezzanine space, for a total of 3,420 square feet per unit.

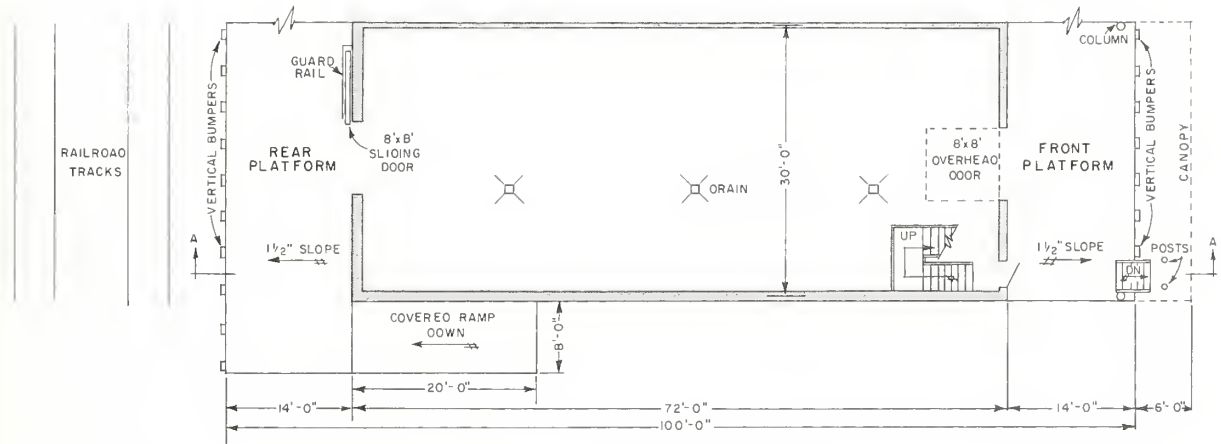
An interior layout for a dairy and egg products unit may be seen in figure 11.

The front and rear platforms will extend the length of the building. The front platform should be 45 inches from the ground, at truck-bed height, with pedestrian steps conveniently located. The rear platform should be 55 inches from the top of the rails, at refrigerator-car floor level. A utility tunnel under the rear platform could house such items as refrigeration equipment and utility lines. The rails should be recessed in and flush with the top of the pavement to permit trucks easy access to the rear platform. A canopy, 16 feet above the street, should extend 6 feet beyond the edge of the front platform to provide protection during inclement weather. The roof over the rear platform should be 17 feet above the street, flush with the platform edge, and supported in such a way as to provide clear operating space beneath. Vertical rubber bumpers should be installed along the edge of both platforms to protect them from damage by trucks.

An 8- by 8-foot overhead door and a door for pedestrians will be at the front of the unit, and



MEZZANINE PLAN



FIRST FLOOR PLAN
END UNIT

- NOTES: 1. Buildings shown have support columns. Recent studies, completed during the writing of this report, indicate there would be little or no increase in cost to construct this building without support columns.
2. The use of a utility tunnel is optional. Without the tunnel, refrigeration equipment could be located on the roof and utility lines along walls inside the building.

FIGURE 11.—Layout of a dairy and egg products unit.

an 8- by 8-foot sliding door at the rear of the unit.

All floors and platforms should have a non-skid surface. The inside first floor area should slope at least 1/8 inch per foot to drains. The first floor should be constructed to support a live load of about 400 pounds per square foot to provide for use of pallet racks for storage. The mezzanine floor should support a live load of about 100 pounds per square foot.

Space for the dairy and egg products firms totals 51,300 square feet, consisting of 45,000 square feet of first floorspace and 6,300 square feet of mezzanine space.

Groceries

One multiple-occupancy building and two single-occupancy buildings are needed to provide space for 11 grocery dealers who should relocate. The multiple-occupancy building should contain 13 standard store units to be used by the dealers and one additional unit to be used as a restaurant for the food distribution center.

Figure 12 shows a layout for a grocery unit. Each unit in the multiple-occupancy building is 30 feet wide and 100 feet deep, including a 14-foot-deep rear platform. No front platform is provided. Each unit contains 2,580 square feet of first floorspace, 420 square feet of rear platform space, and 510 feet of mezzanine space, for a total of 3,510 square feet per unit. Ceilings should be at least 21 feet high. The floor should be at truck-bed height, 45 inches above street level. A mezzanine, 30 feet wide by 17 feet deep, over the front of the store unit is for offices and restrooms.

Trucks will be loaded and unloaded at the front of the unit through 8- by 8-foot doorways. A canopy, 6 feet deep and 16 feet above the street, should extend over the front loading area to provide protection during inclement weather. A pedestrian door at street level will open to stairs leading to the first floor of the unit and to the mezzanine.

The rear platform will extend the length of the building, and should be at boxcar floor level,

45 inches above the rails. The rails should be recessed in and flush with the pavement to permit trucks access to the platform. The roof over the rear platform should be 16 feet above the rails. This roof should be supported in such a way as to provide clear operating space beneath on the platform. Two 4- by 8-foot double-acting doors will be at the rear of the unit. Vertical rubber bumper strips should be attached to the front of the building and to the edge of the rear platform to prevent damage from trucks.

Although specific layouts of each unit depend on the needs of individual dealers, it is suggested that grocery dealers use pallet racks for storage. The first floor, therefore, should be designed to support a live load of about 400 pounds per square foot. The mezzanine floor should be constructed to support a live load of about 100 pounds per square foot. Surfaces on the first floor should be of nonskid material. The interior floors should slope at least 1/8 inch per foot to drains.

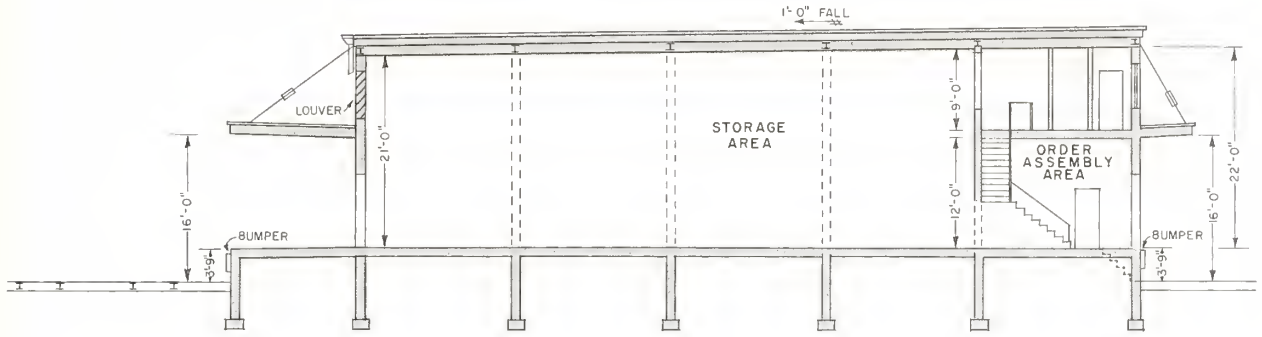
Some grocery firms handle frozen foods or other products that require refrigeration. If refrigerated rooms are anticipated, floors should be insulated during initial construction.

Grocery wholesalers occupying space in the multiple-occupancy building have a total of 45,630 square feet of floorspace, which consists of 39,000 square feet of first floor area and 6,630 square feet of mezzanine space. The additional unit, which would be used for a restaurant, contains 3,510 square feet of floorspace.

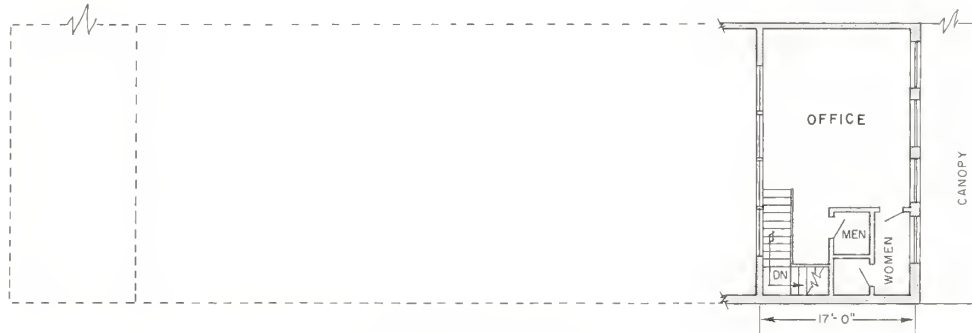
Two single-occupancy buildings would house two large volume firms. These two buildings will contain a total of 60,200 square feet of space—32,000 square feet in one building and 28,000 square feet in the other. The specific layouts for these buildings should be in accordance with the occupant's needs.

Floorspace in the Proposed Food Distribution Center

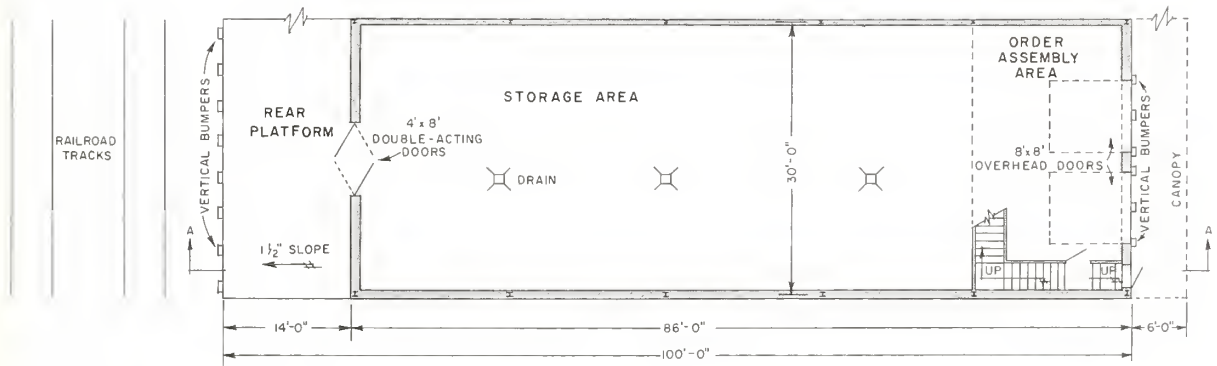
A grand total of 516,160 square feet of space will serve the four food groups included in new facility planning: Five single-occupancy buildings, totaling 129,400 square feet of first floor-



SECTION A-A



MEZZANINE PLAN



FIRST FLOOR PLAN
END UNIT



NOTE: Buildings shown have support columns. Recent studies, completed during the writing of this report, indicate there would be little or no increase in cost to construct this building without support columns.

FIGURE 12.—Layout of a grocery unit.

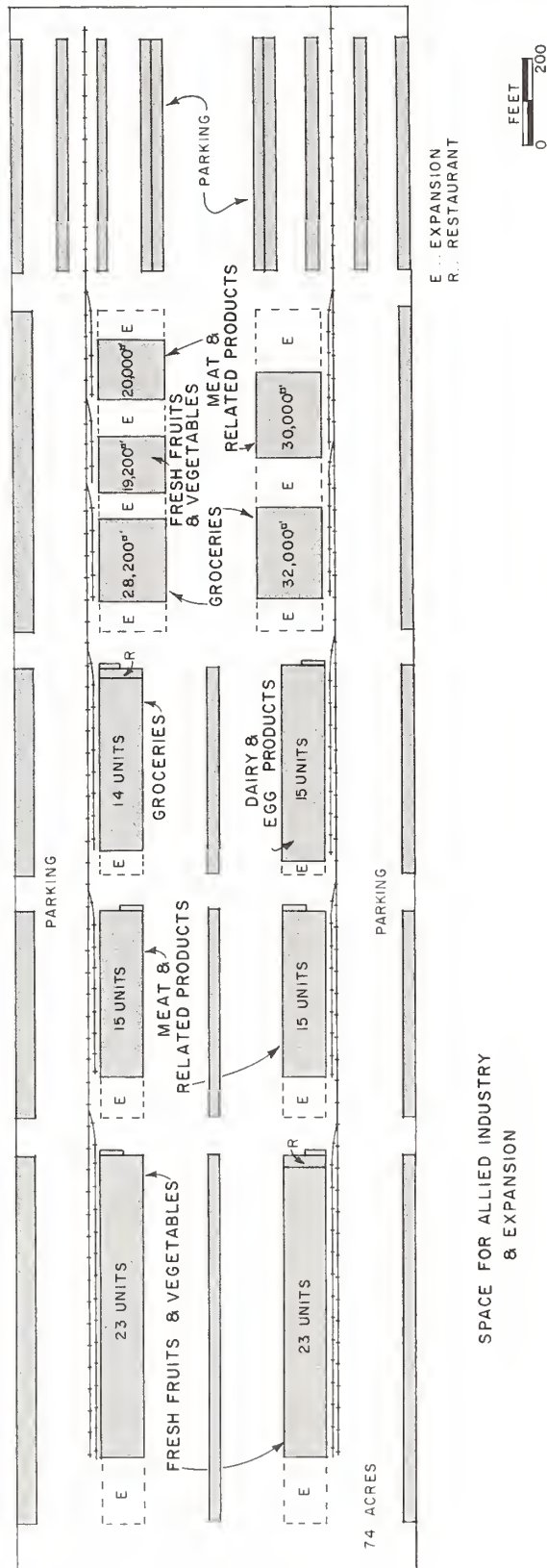


FIGURE 13.—Possible layout of the proposed facilities.

SPACE FOR ALLIED INDUSTRY
& EXPANSION

space; and six multiple-occupancy buildings, totaling 386,760 square feet of floorspace. Table 8 shows the space for each food group. Figure 13 shows a layout for the proposed food distribution center.

Auxiliary Facilities and Considerations

A number of auxiliary facilities are needed for a wholesale food center to function properly. Streets and parking areas, railroad facilities, expansion areas, restaurants, office space, public restrooms, and other necessary facilities should be an integral part of the market design.

Streets and Parking Areas

Streets in the proposed center should be wide enough to carry heavy traffic. Where buildings face each other the streets should be at least 200 feet wide to permit large tractors and trailers to dock perpendicular to the buildings on each side of the street and still allow room for a free flow of traffic in both directions. Streets behind buildings should be at least 100 feet wide to permit trucks to dock at rear platforms. Cross streets between and at the end of buildings should be at least 75 feet wide.

Parking areas should be convenient to the buildings, but should not interfere with traffic or loading and unloading areas. Because parking space is extremely important, space for additional parking should be reserved for future building construction. Some of the parking areas may be reserved for tractor-trailers or other large trucks and other areas for smaller trucks and personal vehicles.

Railroad Facilities

Direct rail access should be provided to each building. Double house tracks, parallel to the rear platform, are planned for all buildings. The inside track is for cars being unloaded or loaded. The outside track provides for switching into and out of the unloading areas and also for occasional spotting of cars for unloading.

The rail tracks should be flush with the pavement at the rear platform. This will allow trucks to use the rear platform also for loading and unloading commodities.

Expansion Areas

Sufficient land should be acquired at the outset for expansion and growth of the food center. No less than 15 percent expansion should be provided for. If additional land cannot be acquired at the time of the purchase, it should be committed by agreement to market use, if possible. Only in this way would the developers of the center be assured that the kinds of businesses locating in adjacent areas would be compatible with the overall market development.

Restaurants, Office Space, and Public Restrooms

Two restaurants are included in the proposed plan. One restaurant will be located in the multiple-occupancy building for produce dealers and the other in a unit of the grocery building. Restaurant equipment and furnishings should be supplied by the owners.

A building specifically designed for offices is not planned within the proposed market. Space should be available, however, in some of the multiple-occupancy buildings for use as office space by market related activities. Rentals from such space could accrue to the firms who control it.

Public restrooms should be provided in basement areas under the restaurants. Private restrooms for individual firms would be provided in the facilities of each firm.

Acreage Required

Although the acreage required for the proposed facilities could vary, depending on the shape of the site, a minimum of 74 acres should be obtained to develop an adequate food distribution center for Oakland. A site of this size would be needed for the initial construction of the facilities for each commodity group, including building area, streets, parking area, and expansion areas. Additional space should be available beyond the 74 acres for allied industries and other food wholesalers that would want to construct facilities close to the market. Failure to acquire adequate land can result in poor layout of the food center and unnecessarily high operating costs for the firms in the center.

SELECTING A SITE

Several sites were suggested by various persons and organizations, including local government officials, realtors, food wholesalers, and others interested in food marketing. Some were too small. Others had serious drawbacks or could not be considered because of zoning or long-range plans for the area by the City Planning Commission. As a result, relatively few sites were available and usable within the city of Oakland. A few were available in Alameda

County and farther out. As the distance from Oakland increased, the price per acre decreased.

Four sites that are considered representative of those available in the Oakland area are presented in this report. These four are (1) the Port of Oakland, (2) West End Redevelopment, (3) Standard-Estuary, and (4) Encinal-Alameda. Figure 14 shows their location, including the existing major and proposed highways and railroads. Table 9 summarizes these four sites.

TABLE 9.—*Summary of representative sites in the Oakland-East Bay area*

Characteristic	Port of Oakland Industrial Park	West End Redevelopment	Standard-Estuary	Encinal-Alameda
Boundaries (approx.)	North: Elmhurst Channel extended East: San Leandro Channel South: East Bay Municipal Utility District property line West: Airport channel	North: Yerba Buena Ave. East: Peralta St. South: 28th St. West: Nimitz Freeway	North: Embarcadero East: Inner Harbor Lagoon South: Inner Harbor West: Alice St.	North: Bethlehem Steel Corporation East: Grand St. South: Alameda Beltline West: Pope St.
Acreeage (approx.)....	200	67	37	150
Present land use.....	Approximately 30 acres of land available for construction, with 170 acres diked and ready to be filled.	Substandard housing and light industry.	Mostly vacant with a few structures and a lumber yard.	Mostly vacant.
Access to rail transportation.....	Rail must be extended to the site from Earhart Road.	Rail could be extended to the site.	Rail runs adjacent to the site at First St.	Rail access available on site.
Access to highways..	Access to Nimitz via Doolittle Drive and Hegenberger Road.	Access to Nimitz Freeway via Eastshore Freeway. Access to MacArthur Freeway via cloverleaf.	Access to Nimitz Freeway via Embarcadero.	Access to Nimitz Freeway via Posey Tube, High St., and Fruitvale Ave. and 29th Ave. bridges.
Distance from downtown Oakland (miles).. ..	5¾	1½	1	1½

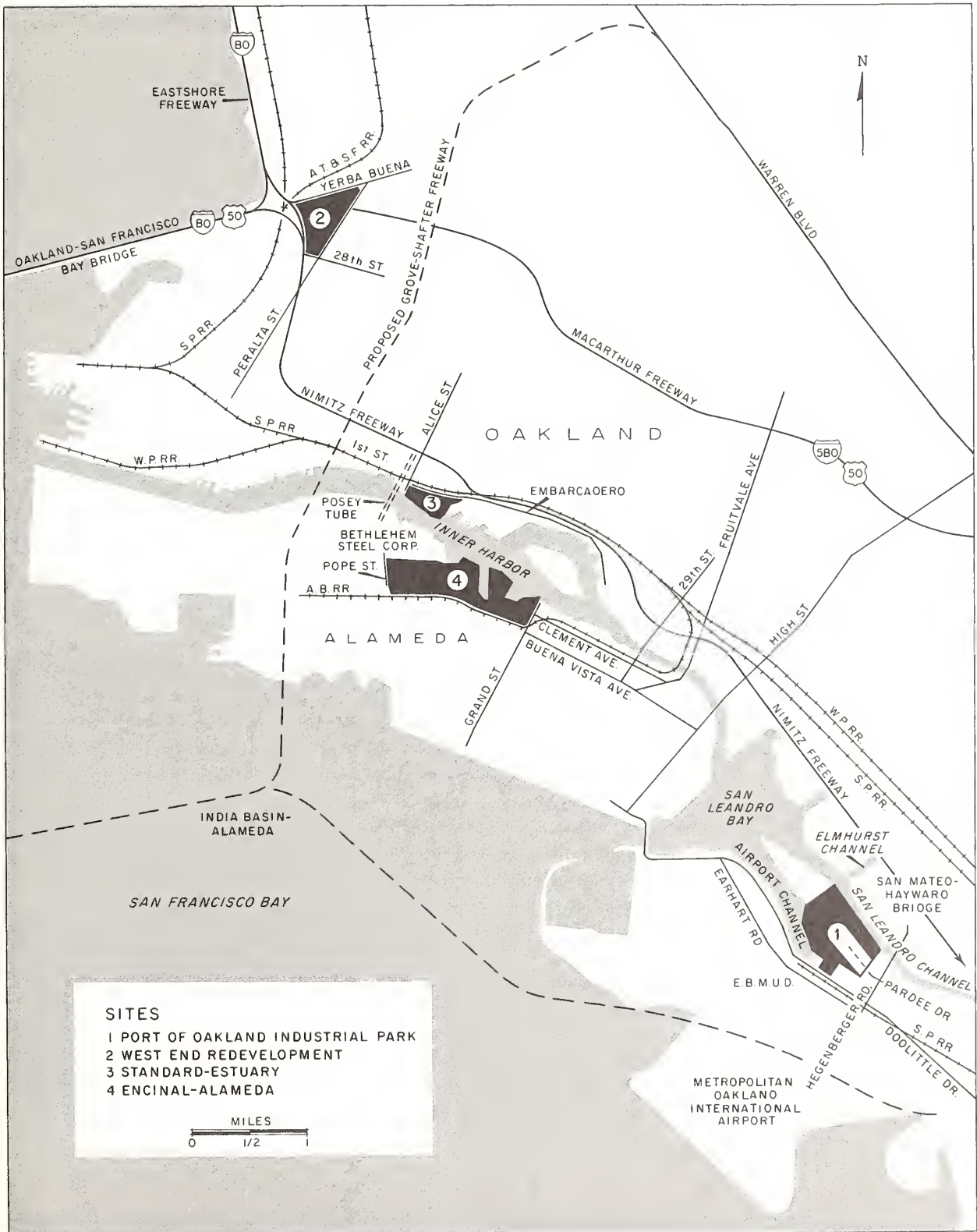


FIGURE 14.—Location of possible sites.

Port of Oakland

Port of Oakland is well located and has the possibility of providing sufficient land for present and future needs of a food distribution center. In 1960 a report was prepared by the Stanford Research Institute which pointed out the desirability of the Port of Oakland area as a location for a food distribution center. The site extends generally north to Elmhurst Channel extended, east to San Leandro Channel, south to East Bay Municipal Utility District property line, and west to the airport channel. It is readily accessible to San Francisco and the peninsula via the Bay Bridge and the San Mateo-Hayward Bridge. The proposed southern crossing will connect directly with the peninsula.

Filled land is available and additional land could be filled to meet the needs of a food distribution center. Pardee Drive, planned to be extended, could provide the main access route to the proposed food center. Rail facilities would have to be extended to the newly filled part, probably from Earhart Road.

West End Redevelopment

Approximately 67 acres might be made available in the West End area of Oakland. The general boundaries of this potential site are Yerba Buena Ave. on the north, Peralta Street on the east, 28th Street on the south, and Nimitz Freeway on the west. This site is predominantly substandard housing with scattered light industry. It would require redevelopment, with considerable time needed to acquire the land, clear the area, and prepare the site for construction.

There is access to Nimitz Freeway and to MacArthur Freeway. Rail could be extended to the site if an underpass were constructed.

The prime advantage of this site would be the possibility of acquiring land within the city of Oakland. Also the possibility of making the food center project a part of a model cities' program might offer additional benefits. Even if the site could be acquired, however, the avail-

able acreage would permit construction of only a limited food distribution center.

Standard-Estuary

The Standard-Estuary site is in the waterfront area north of the Port of Oakland. It is bounded on the north by the Embarcadero, on the east by the Inner Harbor Lagoon, on the south by the Inner Harbor, and on the west by Alice Street. Approximately 37 acres might be made available on this site; 23 acres on the Standard Oil property, plus an additional 14 acres extending south from the Standard Oil property to the Oakland Estuary.

There are a few buildings on the property and the land is relatively level. Access to the Nimitz Freeway is via the Embarcadero. Direct rail access to the site could be made by running spur tracks from the main line at First Street.

Although the site may be adequate for the fresh fruit and vegetable firms included in this study, it would not be adequate for a complete food center.

Encinal-Alameda

The Encinal-Alameda site is located in Alameda about 1 mile from the present fresh fruit and vegetable market area in Oakland. Its boundaries are about as follows: On the north, Bethlehem Steel Corporation property; on the east, Grand Street; on the south and southwest, the Alameda Beltline Railroad; and, on the west, Pope Street. There are about 80 acres which could be available for the initial food center development, and additional acreage could be available after suitable preparation.

The land is relatively level, but some grade and fill would be necessary. Rails could be provided to buildings with relative ease, because the site is presently served by rail. Access to the site from Posey Tube could be improved. Major arterial access would be to the Nimitz Freeway via Posey Tube, High Street, and Fruitvale Avenue and 29th Avenue bridges.

ESTIMATED INVESTMENT COST OF LAND AND FACILITIES

Cost estimates are based on the use of private funds in the acquisition of land and the development of the food center. Reference will be made to alternate costs using public funds.

Costs of developing a food distribution center involve two major components: Land and facilities. The cost estimates shown are those involved in preparing the site and in constructing the facilities needed. They do not include costs for any additional facilities that may be built later in expansion areas or for space reserved for allied food industries. These costs can vary depending on the characteristics of the site chosen.

Land

Although cost of land is important, too much emphasis on slight differences in cost at various locations might be misleading. The actual cost of land cannot be established until a site is selected and an agreement to buy is signed. The costs for land were based on the assessed valuations of the land and the present structures thereon, the estimated cost of acquiring and developing the site, and an estimated cost for grading and fill. The assessed valuation was adjusted to 100 percent to obtain an estimated market value. In this report \$60,870 per acre has been used as land cost.

Facilities

The estimated costs for facilities are based on construction indexes for January 1968, costs of similar facilities in other food centers, estimates made by local contractors, and costs of constructing similar facilities in Oakland and other cities in the San Francisco Bay area.

Buildings are of "light mill" type, generally described as being of steel frame construction with enclosing walls of masonry. The floors are cement finish; the interior walls are exposed masonry; and the ceilings are of exposed structure. Estimates include such items as general

illumination and a normal distribution of convenience power outlets, stairways, and restrooms. They do not include such items as specialized equipment, air-conditioning, or furnishings.

Railroad tracks and switches, paving, sewers, and floodlights are other facilities for which costs have been determined. Architects' and engineers' fees, construction loan charges, and contingency funds have also been included.

Construction costs shown in this section should be used only as a guide in estimating the total costs of the market. They are not intended to reflect firm estimates made by local architects and contractors.

The following tabulation shows the estimated costs of the facilities proposed.

Fresh Fruits and Vegetables Section

Multiple-occupancy facilities:

Buildings: ¹	
2 buildings with 46 units (one unit used as restaurant), including mezzanine and utility tunnel, 3,000 sq. ft. of 1st floor space per unit @ \$11.35 per sq. ft., or \$34,050 per unit	\$ 1,566,300
2 ramps for access to utility tunnel @ \$500 each	1,000
Restrooms under the restaurant, 24 by 30 ft.	9,000
Sprinkler system (1st floor and mezzanine), 157,320 sq. ft. @ \$0.35 per square foot	55,062
Total construction cost of buildings	<u>1,631,362</u>

Other facilities:

Trackage: ²	
House and lead-in tracks, 3,200 linear feet @ \$15 per foot	48,000
Switches, 2 @ \$3,500 each	7,000
Paving (8 in. reinforced concrete), 87,446 sq. yd. @ \$4.50 per sq. yd.	393,507
Sewers: ³	
15-in. storm, 3,000 linear feet @ \$9.50 per foot	28,500
12-in. sanitary, 3,200 linear feet @ \$8.50 per foot	27,200
Floodlights, 30 @ \$150 each	4,500
Public address system	1,500
Total construction cost of other facilities	<u>510,207</u>
Total construction cost of buildings and other facilities	<u>2,141,569</u>

See footnotes at end of tabulation.

Fruit and Vegetable Section—Continued

Associated construction costs: ⁴	
Architect's fee	\$ 128,494
Construction loan	113,503
Contingency allowance	<u>238,357</u>
Total construction cost of buildings, other facilities, and associated costs	<u>2,621,923</u>
Single-occupancy facilities:	
Buildings: ¹	
1 building containing 19,200 sq. ft. of 1st floor space @ \$11 per square foot	211,200
Other facilities:	
Trackage: ²	
House tracks, 600 linear feet @ \$15 per foot	9,000
Switch, 1 @ \$3,500	3,500
Paving (8-in. reinforced concrete), 16,666 sq. yd. @ \$4.50 per square yard	74,997
Sewers: ³	
15-in. storm, 650 linear feet @ \$9.50 per foot	6,175
12-in. sanitary, 600 linear feet @ \$8.50 per foot	5,100
Floodlights, 6 @ \$150 each	900
Total cost of other facilities	<u>99,672</u>
Total construction cost of building and other facilities	<u>310,872</u>
Associated construction costs: ⁴	
Architect's fee	18,652
Construction loan	16,476
Contingency allowance	<u>34,600</u>
Total building, other facilities, and associated costs	<u>380,600</u>
Total investment cost of fresh fruits and vegetables facilities	<u>3,002,523</u>

Meat and Related Products Section

Multiple-occupancy facilities:	
Buildings: ¹	
2 buildings with 30 units (15 units per building) including 2d floor and utility tunnel, 2,500 sq. ft. of 1st floor space per unit @ \$12.79 per square foot, or \$31,975 per unit	959,250
Ramps for access to the utility tunnel, 2 @ \$500 each	1,000
Grease traps, 30 @ \$300 per unit	9,000
Meat rails, 30 @ \$500 per unit	15,000
Elevators, 2 @ \$6,500 each	13,000
Total construction cost of building	<u>997,250</u>
Other facilities:	
Trackage: ²	
House tracks, 1,440 linear feet @ \$15 per foot	21,600
Switches, 2 @ \$3,500 each	7,000
Paving (8-in. reinforced concrete), 40,790 sq. yd. @ \$4.50 per sq. yd.	183,555
Sewers: ³	
15-in. storm, 1,224 linear feet @ \$9.50 per foot	11,628
12-in. sanitary, 1,875 linear feet @ \$8.50 per foot	15,938
Floodlights, 17 @ \$150 each	2,550
Total construction cost of other facilities	<u>242,271</u>
Total construction cost of buildings and other facilities	<u>1,239,521</u>
See footnotes at end of tabulation.	

Meat and Related Products Section—Continued

Associated construction costs: ⁴	
Architect's fee	\$ 74,371
Construction loan	65,695
Contingency allowance	<u>137,959</u>
Total buildings, other facilities, and associated costs	<u>1,517,546</u>
Single-occupancy facilities:	
Buildings: ¹	
1 building containing 20,000 sq. ft. @ \$11 per sq. ft.	220,000
1 building containing 30,000 sq. ft. @ \$11 per sq. ft.	330,000
Total construction cost of buildings	<u>550,000</u>
Other facilities:	
Trackage: ²	
House tracks, 1,495 linear feet @ \$15 per foot	22,425
Switches, 2 @ \$3,500 each	7,000
Paving (8-in. reinforced concrete), 35,056 sq. yd. @ \$4.50 per sq. yd.	157,752
Sewers: ³	
15-in. storm, 1,395 linear feet @ \$9.50 per foot	13,253
12-in. sanitary, 770 linear feet @ \$8.50 per foot	6,545
Floodlights, 14 @ \$150 each	2,100
Total construction cost of other facilities	<u>209,075</u>
Total construction cost of buildings and other facilities	<u>759,075</u>
Associated construction costs: ⁴	
Architect's fee	45,545
Construction loan	40,231
Contingency allowance	<u>84,485</u>
Total building, other facilities, and associated costs	<u>929,336</u>
Total investment cost of meat and related products facilities	<u>2,446,882</u>

Dairy and Egg Products Section

Multiple-occupancy facilities:	
Buildings: ¹	
1 building with 15 units, each unit has 3,000 sq. ft. of 1st floor space @ \$11.35 per square foot, or a total cost of \$34,050 per unit	510,750
Ramp for access to the utility tunnel, 1 @ \$500	500
Total construction cost of building	<u>511,250</u>
Other facilities:	
Trackage: ²	
House tracks, 1,050 linear feet @ \$15 per foot	15,750
Switches, 1 @ \$3,500 each	3,500
Paving (8-in. reinforced concrete), 30,000 sq. yd. @ \$4.50 per sq. yd.	135,000
Sewers: ³	
15-in. storm, 900 linear feet @ \$9.50 per foot	8,550
12-in. sanitary, 600 linear feet @ \$8.50 per foot	5,100
Floodlights, 8 @ \$150 each	1,200
Total construction cost of other facilities	<u>169,100</u>
Total construction cost of buildings and other facilities	<u>680,350</u>
See footnotes at end of tabulation.	

Dairy and Egg Products Section—Continued

Associated construction costs:	
Architect's fee	\$ 40,821
Construction loan	36,059
Contingency allowance	<u>75,723</u>
Total investment cost of dairy and egg products section	<u>832,953</u>

Grocery Section

Multiple-occupancy facilities:	
Buildings: ¹	
1 building with 14 units (one unit used as a restaurant) with mezzanines but no utility tunnel. Each unit has 3,000 sq. ft. of 1st floor space @ \$11 per square foot, or a total cost of \$33,000 per unit	462,000
Restrooms under the restaurant, 24 by 30 ft.	9,000
Sprinkler system (1st floor and mezzanine), 49,130 sq. ft. @ \$0.35 per sq. ft.	17,195
Total construction cost of buildings	<u>488,195</u>
Other facilities:	
Trackage: ²	
House and lead-in tracks, 1,010 linear feet @ \$15 per foot	15,150
Switches, 1 @ \$3,500	3,500
Paving (8-in. reinforced concrete), 19,084 sq. yd. @ \$4.50 per square yard	85,878
Sewers: ³	
15-in. storm, 960 linear feet @ \$9.50 per foot	9,120
12-in. sanitary, 1,050 linear feet @ \$8.50 per foot	8,925
Floodlights, 2 @ \$150 each	300
Total construction cost of other facilities	<u>122,873</u>
Total construction cost of buildings and other facilities	<u>611,068</u>
Associated construction costs: ⁴	
Architect's fee	36,664
Construction loan	32,387
Contingency allowance	<u>68,012</u>
Total building, other facilities, and associated costs	<u>748,131</u>

See footnotes at end of tabulation.

Grocery Section—Continued

Single-occupancy facilities:	
Buildings: ¹	
1 building containing 28,200 sq. ft. @ \$11 per sq. ft.	\$ 310,200
1 building containing 32,000 sq. ft. @ \$11 per sq. ft.	352,000
Total construction cost of buildings	<u>662,200</u>
Other facilities:	
Trackage: ²	
House tracks, 1,120 linear feet @ \$15 per foot	16,800
Switches, 2 @ \$3,500 each	7,000
Paving (8-in. reinforced concrete), 29,465 sq. yd. @ \$4.50 per sq. yd.	132,593
Sewers: ³	
15-in. storm, 1,285 linear feet @ \$9.50 per foot	12,208
12-in. sanitary, 750 linear feet @ \$8.50 per foot	6,375
Floodlights, 8 @ \$150 each	1,200
Total construction cost of buildings and other facilities	<u>838,376</u>
Associated construction costs: ⁴	
Architect's fee	50,303
Construction loan	44,434
Contingency allowance	<u>93,311</u>
Total building, other facilities, and associated costs	<u>1,026,424</u>
Total investment cost of grocery facilities	<u>1,774,555</u>
Total cost of all buildings, other facilities, and associated costs	8,056,913
Land, 74 acres @ \$60,870 per acre	4,504,380
Total investment for food center	<u>\$12,561,293</u>

¹ Costs are based on San Francisco construction indexes, January 1968. These figures are composite costs; the cost per unit or building could be expected to decrease as the unit size is expanded or increased as specialized features are incorporated.

² Includes pro rata share of lead-in tracks. The cost of tracks and switches is based on information supplied by local railroads.

³ Cost of sewers based on tile pipe installed. Does not include any cost variations at different sites caused by subsoil condition or local codes or regulations.

⁴ Associated construction costs are estimated as follows: Architect's fee = 6 percent of buildings and facilities cost; construction loan = 5 percent of buildings and facilities cost and architect's fee; contingency allowance = 10 percent of buildings and facilities cost, architect's fee, and construction loan.

FINANCING AND OPERATING A FOOD DISTRIBUTION CENTER

Competent management is imperative in directing the orderly development and operation of a wholesale food distribution center. The finest in overall market design and construction will not insure the success of a new food distribution center, unless it is properly promoted and soundly managed.

Investors, insurance companies, and city officials are concerned with the operation of the market, as well as producers, processors, trans-

portation companies, wholesalers, retailers, and consumers. The investors, whether private or public, have a right to expect a reasonable return on their investment and assurance that their interests will be protected. The board of directors, or other governing body, should be sufficiently capable to look after the interests of all these groups.

If a new wholesale food distribution center is established to replace the present market

areas, its owners should not exploit the industry. If the market is to function as a public facility, certain safeguards should be provided. As the market becomes established and as its income becomes dependable and reasonable returns are made to the investors, the reason for precautions will become even more apparent.

Regardless of who may construct and finance the center, there should be definite assurances that—

(1) The center will be properly located, designed, and equipped.

(2) Overbuilding will be prevented to assure maximum occupancy.

(3) Funds will be invested wisely to provide for real needs so that increased efficiency will not be offset by high rents.

(4) Facilities of the center will be used in the best interests of the industry and the public.

(5) The center will be operated without discrimination against any buyer, seller, mode of transportation, or origin of shipment.

Methods of Financing

Some of the more common methods of financing food distribution centers are through private corporations, public benefit corporations, and direct public ownership, or a combination of these methods. The following descriptions of these methods are adapted from a report on types of ownership and methods of financing.⁵

Private Corporation

A private corporation, organized to own and operate a wholesale food center, is a legal entity. It is organized in conformity with State statutes and made up of individuals bound together for a common purpose or objective. Usually, a private corporation is operated on a profit basis, but it may also be operated on a non-profit basis.

When a private corporation is operated for profit, there are usually no restrictions on the

sale of voting stock to any individual because of his occupation or profession, nor on the number of shares of voting stock that may be held by any one individual. Stockholders have one vote in corporate affairs for each share of voting stock held. Some wholesale food markets are owned and operated by private corporations. The principal stockholders in some of these corporations are the tenants. In others, the corporation is a rail company or other firm that was primarily organized for another type of business. Most of the large terminal produce markets built in the 1920's were sponsored by rail companies.

To form a private corporation, the incorporators usually obtain a charter from the State. This charter defines the powers of the corporation and of its officers and directors. It specifies the stockholders' rights and how control shall be exercised.

Among the characteristics of a private corporation is the power of the board of directors to make decisions quickly and without the delay found in some other types of organization. Often, this executive authority is exercised through the immediate management. Quick decisions on major policy matters may be the difference between success and failure of the organization. In addition, when the period of amortization expires, the entire investment belongs to the stockholders, tenancy changes have no effect upon stock ownership, and transfer of stock is unrestricted.

Wholesale food markets owned by private corporations tend to become so-called "closed" markets. Some have prohibited the delivery of food items brought in by truck, especially out-of-State trucks. Often, private corporations do not provide adequate space for expansion, either for increased volume or for new food handlers and allied industries. The major problem of corporate ownership is that substantial financial equity is required. Sometimes sponsors of private corporation markets have more difficulty in obtaining funds for the preliminary organization and equity than sponsors of public markets.

A nonprofit private corporation is not a government agency, but must be organized in conformity with existing State statutes. In a non-

⁵ CLOWES, HARRY G., ELLIOTT, WILLIAM H., and CROW, WILLIAM C. WHOLESALE FOOD MARKETING FACILITIES, TYPES OF OWNERSHIP AND METHODS OF FINANCING. U.S. Dept. Agr. Market. Res. Rpt. 160, 96 pp., illus. 1957.

profit corporation, participation in corporate rights and activities is usually based either on a system of dues, which limits each member (stockholder) to one vote; or bylaws, which restrict ownership of voting stock to one share per member. As a rule, State statutes place no limitations on participation in the corporation of any individual because of his occupation or profession. However, membership in such corporations can usually be limited or restricted through bylaws. Thus, it is possible for those who are directly interested in the ownership and operation of a wholesale center to form a nonprofit corporation to construct and operate the market. An example of a nonprofit private corporation is the small business investment company set up under the Small Business Administration. Following is a short description of this type of organization.

The Congress in 1958 passed the Small Business Investment Act, which established a program to stimulate the flow of private equity capital and long-term loans for the sound financing of the operations, growth, expansion, and modernization of small business concerns. Under this act, the Small Business Administration is authorized to make loans to so-called "State development companies" or to local development companies, and to license, regulate, and give financial assistance to privately organized, privately financed companies called "small business investment companies."

A development company may be either a profit or nonprofit enterprise incorporated under State law, with authority to promote and assist the growth and development of small businesses in specific areas. A State development company is a corporation organized under a special legislative act to operate statewide. A local development company is a corporation with a broad base of ownership, formed under applicable State laws, to further the economic development of its communities.

The Small Business Administration is authorized to make loans to State and local development companies in exchange for obligations of the development company. It is also authorized to make loans for construction, conversion, or expansion of plants and for the acquisition of land. Such loans may be made ei-

ther directly or in cooperation with banks or other lending institutions. Certain rules and regulations have been set up defining eligible business categories and needed collateral.

Public Benefit Corporation

Public benefit corporations, sometimes called "market authorities," offer some desirable features not found in other types of ownership. They differ from nonprofit private corporations only in that they are publicly owned.

A public benefit corporation is a nonprofit agency. Rentals and other charges do not exceed the amount needed to pay the costs of operation, amortize the original investment, and maintain a limited contingency fund. Under public ownership, the revenues would be considered as public funds and as such could not be paid to lessees as dividends. However, there is the possibility that these funds might be appropriated for other public uses while bonds remained outstanding, unless such funds were specifically committed to redemption of bonds.

Public benefit corporations usually have the power of eminent domain, which can be useful in the acquisition of a site. Such corporations usually finance market improvements through the sale of revenue bonds. This type of financing normally is not a full obligation of a State or a political subdivision. These revenue bonds are often tax exempt; therefore, the interest cost is lower. A public agency, such as a market authority, is more likely than some types of private ownership to provide for future expansion and to work toward the establishment of a complete wholesale food distribution center. A market authority may or may not be required to pay taxes to the community in which it is located.

Market authorities have certain limitations, especially in the financing and operation of the facilities. They have difficulty in raising funds through revenue bonds unless considerable equity funds are provided in some way or the bonds are guaranteed by the city, county, or State. Some State or city governments have appropriated part of the funds needed for land acquisition and original construction. The continuity of management may be dependent on the continuance of a State or municipal govern-

ment administration in office. As a whole, market authorities do not have as complete freedom of operation as is possible under private ownership.

Direct Public Ownership

Many wholesale food market facilities have been financed, constructed, and operated by States, counties, or municipalities. Several States and some municipalities have enabling legislation covering the improvement or establishments of produce markets.

Direct State ownership and operation usually can be differentiated from ownership and operation by a State market authority by the methods of financing used and the delegation of authority made by the State legislature. Although some States have appropriated funds and otherwise assisted market authorities with financial problems, they do not usually underwrite the total cost of a market constructed by an authority, nor have the States always assumed responsibility for the operation of these markets.

Under direct State ownership, a market facility is financed in whole or in part by an appropriation of State funds. If the financing is not entirely by this method, the State usually is obligated for the remainder unless this balance is obtained through grants or donations. Also, the State is responsible for maintenance and other expense involved in the operation of a State-owned market.

States may finance, construct, and operate wholesale food market facilities because of enabling legislation. Several State legislatures feel that improved facilities will in themselves serve the public interest.

Municipal ownership of a wholesale food market is comparable in many of its basic aspects to direct State ownership. Some municipalities are authorized in their charters to construct and operate food markets. However, some city councils or commissions are not authorized to make appropriations from general funds in the city treasury for the construction of market facilities. Three methods are usually open to municipalities for financing a market program: (1) Issuing municipal bonds, (2) issuing revenue warrants, and (3) obtaining loans from

public corporations. In most cities, issuing bonds for such purposes must be approved by a majority of the qualified voters in a referendum.

Facilities constructed with municipal or county funds would necessarily be owned by the county or municipality, and rent would have to be paid by the tenants indefinitely.

Combinations

Because of the complexity of building large wholesale food distribution centers, some are built by a combination of private and public funds. Recent construction of a food distribution center in the Northeast typifies the possibilities of various combinations of financing.

In Philadelphia, the food distribution center was built partly by a nonprofit corporation and partly by private owners on land owned and put into condition for building by the city. The city subordinated its interest in the land so that the land could be used as equity in borrowing money for building construction. When the multiple-occupancy units were built, the development company leased the units to operating stock companies formed by the prospective tenants. At the end of 30 years, all buildings will become the property of the city, except for the parcels of land sold by the development company with city's approval for construction of single-occupancy buildings.

In Oakland, a food center could be financed using two or more of these methods. Officials responsible for regional and local development are designing financing plans that group the advantages of several financing alternatives. The Federal Government has initiated or continued area redevelopment and urban redevelopment projects in Oakland. Low-cost loans or loan guarantees for private capital under these programs provide a means by which funds can be obtained through municipal tax-free bonds or other government debt instruments, at approximately 4 percent, for such projects as the development of improved wholesale food marketing facilities. Such loans normally are available to local public groups created to administer development functions. Thus, an authority for market development coordinates financ-

ing arrangements with the city, county, State, Federal, and private groups.

The proposed wholesale food distribution center is planned to be a self-supporting entity. Thus, all steps possible should be taken to minimize revenues required.

The following are examples of ways in which a combination of methods might be applied in financing a food distribution center in Oakland.

(1) An authority with the power of eminent domain and financial bargaining power might develop either of the two larger sites discussed. (2) Federal and State funds may be made available to local municipalities for access highways, sewers, or engineering studies.⁶ (3) The redevelopment authority might prepare the land on one of the potential sites. This last assumption is based on the possible development of a food distribution center through an urban renewal or related project. Such a development program is possible should a redevelopment project be approved for the West End.

The entire wholesale market could be constructed and operated by a single agency, or various parts could be constructed and operated by different agencies. A corporation, possibly known as the Oakland-East Bay Food Distribution Center, could promote the complete land area in stages, with land obtained and held for market development by the redevelopment or port authorities. Subdivisions such as the multiple-occupancy buildings would have control of their operations and possibly ownership of their respective areas, depending on the methods of financing used.

Initially, an organization such as the Port Authority could sponsor the proposed food facilities.⁷ The agency commissioned to develop and promote the food distribution center should be designated before lease negotiations or land sales. The developer-promoter would obtain land in stages from the redevelopment or port

authorities that had assembled the complete land parcel for the food facilities. The cost of holding this land would be 2 percent per year of the value of land in condition for building; this additional development cost should be borne by latecomers as long as the land price remains competitive. Land held for the distribution center by the redevelopment or port authorities should be designated for food marketing purposes and allied industries for at least 10 years.

Financing and Operating Costs

The wholesale food distribution center should be financed so that it will be self-sustaining. The investment should be repaid from revenues, and the method used to finance and operate the food center will affect the annual revenue required. For purposes of estimating the annual revenue requirements, private financing was used. The selection of private financing is not intended to suggest a preference in methods of financing, but, instead, only to establish a basis for estimating probable annual costs.

The annual costs are considered under three broad categories (1) debt service on land and facilities, (2) taxes on real property and improvements, and (3) management and maintenance costs.

Debt Service

The primary item of cost that must be paid by a private corporation financing and operating a food distribution center is debt service, or the repayment of the principal and interest costs for the facilities. The facilities should not become obsolete in less than 30 years and should carry full value for at least 25 years. They should have a useful life extending over a much longer period.

To determine an annual debt service, certain assumptions were made. These assumptions were that: (1) 65 percent of the required investment cost could be secured through a first mortgage at 6 percent interest rate; (2) 25 percent of the required investment cost could be secured through a second mortgage at 7 percent interest rate; and (3) 10 percent of the required investment cost could be secured through equity capital at 8½ percent interest rate. The av-

⁶ Partial grants for technical assistance and preparation of site, sewage, water, and local roads may be available through the Economic Development Administration, U.S. Department of Commerce, Washington, D.C., and similar agencies in Sacramento, Calif.

⁷ The Port considered such a proposal in the early 1960's.

erage interest rate would be 6½ percent. Because interest rates were unstable at the time this study was made, no attempt was made to estimate rates that might be in effect when the facilities are built. Assumed rates were used to calculate debt service in this report.

A debt-service reserve or contingency should be established. This reserve should be 10 percent of the annual amortization costs and could be discontinued when a full year's amortization cost is accumulated.

Table 10 shows the annual debt service payments required for amortizing the investment costs of land and facilities.

Real Estate Taxes

The food distribution center organization would be expected to pay taxes on land, buildings, and other taxable facilities at the current rate for city and county taxes on the assessed valuation of the property. The tax rate used for illustration was \$92.90 per \$1,000.⁸ The assessed valuation was based on 25 percent of full value.

Although actual taxes paid on similar properties appear to vary from time to time, reassessments and adjusted tax rates tend to equalize the taxes charged so that eventually no site

has much tax advantage over any other possible site. The counties of Alameda and Contra Costa are aware of the problem of numerous jurisdictions of the various cities of the East Bay area. They may be able to offer a plan of coordination that will be acceptable to the cities, which may result in more standardized taxes.

Since the tax rate will probably increase in the future, a reserve of 10 percent has been included in the total annual estimated real estate taxes in this report (table 11).

Management and Maintenance

The costs for management of the food distribution center include salaries for the market manager and his staff, auditing and legal services, office rental and janitorial services, utilities, travel and business expenses, advertising and promotion fees, office equipment and supplies, and communications service. The maintenance costs include street cleaning, general maintenance, security patrol, and insurance.

Insurance rates on commercial buildings in the Oakland area are \$2.07 for liability on limits of \$300,000 per accident for each 100 square feet of first floorspace, and 25 cents per 100 square feet for property damage. Fire insurance rates for buildings of the type recommended in this report, with sprinkler systems, would be an average of 17 cents per \$100 of cost.

To cover possible increases in management and maintenance costs, a 10 percent contingen-

⁸ OFFICE OF TREASURER AND TAX COLLECTOR. TAX RATES, COUNTY OF ALAMEDA, STATE OF CALIFORNIA, 1967-68 FISCAL YEAR.

TABLE 10.—Estimated annual cost of debt service for the proposed food center, by commodity group

Commodity group	Investment cost			Debt service ¹		
	Land ²	Facilities	Total	Land	Facilities	Total
	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars
Fresh fruits and vegetables.....	1,522	3,002	4,524	125	246	371
Meat and related products.....	1,521	2,447	3,968	124	201	325
Dairy and eggs products.....	304	833	1,137	25	68	93
Groceries.....	1,157	1,775	2,932	95	145	240
Total.....	4,504	8,057	12,561	369	660	1,029

¹ Based on 6½ percent interest on the investment cost over a period of 25 years.

² Based on land value of \$60,870 per acre.

TABLE 11.—Estimated annual real estate taxes to be paid by commodity group for the proposed food distribution center

Commodity group	Amount ¹	Reserve ²	Total
	1,000 dollars	1,000 dollars	1,000 dollars
Fresh fruits and vegetables . . .	105.1	10.5	115.6
Meat and related products . . .	92.2	9.2	101.4
Dairy and egg products	26.4	2.6	29.0
Groceries	68.1	6.8	74.9
Total	291.8	29.1	320.9

¹ Taxes are computed on an assessed valuation of 25 percent of the cost of land and facilities, and a tax rate of \$92.90 per \$1,000 of assessed value.

² Reserve of 10 percent based on tax payment.

cy fund is included. Annual management and maintenance costs for the food center as planned are estimated as follows:

<i>Management:</i>	
Salaries:	
Manager	\$ 15,000
Secretary-bookkeeper	6,000
Total salaries	<u>21,000</u>
<i>Associated expenses:</i>	
Auditing and legal services	1,500
Office rent	1,500
Advertising and promotion	600
Office supplies and equipment	600
Telephone and other communication	600
Utilities	3,000
Travel and business expenses	1,500
Janitorial services	400
Total associated services	<u>9,700</u>
<i>Maintenance:</i>	
Security	6,000
Insurance (liability, fire, and property damage)	25,000
Sanitation and refuse	10,000
General maintenance ¹	40,000
Total maintenance	<u>81,300</u>
Contingency ²	<u>11,200</u>
Grand total	<u>123,200</u>

¹ ¾ of 1 percent of investment in buildings and facilities.

² 10 percent of total costs.

Total Annual Revenue Required by Private Financing and Operation

Table 12 shows the estimated total annual revenue needed to operate and finance the development using private financing. Included in this estimate are costs for debt service, real es-

tate taxes, management, and maintenance. Operating costs for the individual firms occupying these facilities are not included. Annual costs of financing and operating the food distribution center are estimated at \$1.6 million.

Total Annual Revenue Required by Public Financing and Operation

The amount of revenue required for public financing and operation would be about \$400,000 less than for private financing and operation. Some of the costs will remain the same regardless of the organization (private, public, or a combination of the two) financing the food distribution center. Management, insurance, maintenance, and repair costs would be about the same; but substantial savings might be realized in the costs of both taxes and debt service by public financing and operation. The amortization and reserve would be less, assuming municipal bonds at a 4.5 percent interest rate; and real estate taxes might be about half that of private financing, assuming 50 percent payment in lieu of taxes. Table 13 shows the estimated total amount of revenue needed to finance and operate the proposed market using public funds.

Sources of Revenue

Rental costs for facilities could be materially affected by the method of financing and operation used. For example, an average rental charge per square foot per year would be \$3.05 for private financing and operation, and \$2.36 for public financing and operation. Rental charges according to commodity group (excluding restaurants) range from \$2.62 to \$3.38 per square foot for private financing and operation, and \$2.02 to \$2.60 for public financing and operation.

Variations in rentals for similar appearing facilities are due to differences in land required, paving, and building costs. The rentals given in table 14 would be sufficient to cover costs and reserves.

Measurable Costs and Benefits

The proposed master plan for the new market provides rail connections to each building

TABLE 12.—Estimated total annual revenue required by a private developer to operate and finance the facilities in the proposed food distribution center, Oakland—East Bay area

Commodity group	Investment cost of land and facilities <i>1,000 dollars</i>	Debt service		Real estate taxes			Management ⁴ and maintenance <i>1,000 dollars</i>	Total revenue required <i>1,000 dollars</i>
		Amortization cost ¹ <i>1,000 dollars</i>	Reserve ² <i>1,000 dollars</i>	Total <i>1,000 dollars</i>	Amount ³ <i>1,000 dollars</i>	Reserve ² <i>1,000 dollars</i>		
Fresh fruits and vegetables.....	4,524	371	37.1	408.1	105.1	10.5	46.0	569.7
Meat and related products.....	3,968	325	32.5	357.5	92.2	9.2	37.4	496.3
Dairy and egg products.....	1,137	93	9.3	102.3	26.4	2.6	12.7	144.0
Groceries.....	2,932	240	24.0	264.0	68.1	6.8	27.1	366.0
Total.....	12,561	1,029	102.9	1,131.9	291.8	29.1	123.2	1,576.0

¹ Amortization cost is based on 6.5 percent per year of the investment in land and facilities.

² Reserve of 10 percent of amortization cost and taxes.

³ Taxes are computed on an assessed valuation of 25 percent of the cost of land and facilities at a rate of \$92.00 per \$1,000 of assessed valuation.

⁴ Prorated on the basis of relative value of facilities.

TABLE 13.—Estimated total annual revenue required by a governmental agency to operate and finance the facilities in the proposed food distribution center, Oakland—East Bay area

Commodity group	Investment cost of land and facilities <i>1,000 dollars</i>	Debt service		Real estate taxes			Management ⁴ and maintenance <i>1,000 dollars</i>	Total revenue required <i>1,000 dollars</i>
		Amortization cost ¹ <i>1,000 dollars</i>	Reserve ² <i>1,000 dollars</i>	Total <i>1,000 dollars</i>	Amount ³ <i>1,000 dollars</i>	Reserve ² <i>1,000 dollars</i>		
Fresh fruits and vegetables.....	4,524	305	30	335	52.6	5.3	46.0	438.9
Meat and related products.....	3,968	267	27	294	46.1	4.6	37.4	382.1
Dairy and egg products.....	1,137	77	8	85	13.2	1.3	12.7	112.2
Groceries.....	2,932	198	20	218	34.0	3.4	27.1	282.5
Total.....	12,561	847	85	932	145.9	14.6	123.2	1,215.7

¹ Amortization cost is based on 4.5 percent per year of the investment in land and facilities.

² Reserve of 10 percent of amortization cost and taxes.

³ Based on 50 percent payment in lieu of taxes as shown under private financing.

⁴ Prorated on the basis of relative value of facilities.

TABLE 14.—*Estimated annual rental necessary per square foot of floorspace to finance and operate the proposed market by private and public agencies, Oakland—East Bay area*

Commodity group and type of facility	Space proposed	Estimated annual rent			
		Private agency		Public agency	
		Per square foot	Total ¹	Per square foot	Total ¹
	<i>Square feet</i>	<i>Dollars</i>	<i>1,000 dollars</i>	<i>Dollars</i>	<i>1,000 dollars</i>
Fresh fruits and vegetables:					
Multiple-occupancy.....	153,900	3.21	494.7	2.47	380.8
Single-occupancy.....	19,200	3.20	61.4	2.46	47.3
Total or average.....	173,100	3.21	556.1	2.47	428.1
Meat and related products:					
Multiple-occupancy.....	129,000	2.62	338.5	2.02	260.6
Single-occupancy.....	50,000	3.15	157.5	2.43	121.5
Total or average.....	179,000	2.77	496.0	2.13	382.1
Dairy and egg products:					
Multiple-occupancy.....	51,300	2.81	144.0	2.19	112.2
Groceries:					
Multiple-occupancy.....	45,630	3.26	148.7	2.52	115.2
Single-occupancy.....	60,200	3.38	203.4	2.60	156.5
Total or average.....	105,830	3.33	352.1	2.57	271.7
Restaurants ²	6,930	4.01	27.8	3.12	21.6
All types, total or average.....	516,160	3.05	1,576.0	2.36	1,215.7

¹ Must be equal or more than the annual revenue required.

² 2 restaurants, each containing 3,465 square feet of floorspace, one in building for fruit and vegetable firms and the other in building for grocery firms.

permitting deliveries directly at the warehouse. Such connections afford less cartage costs and could promote greater rail usage. Cooperative buying and the use of "pool cars" among dealers in the proposed facilities could reduce the total cartage cost even more. Avoidable delay to inbound trucks could be reduced in the proposed food distribution center because it is designed with wide streets and adequate parking to accommodate trucks.

The only food group with any measurable amount of cartage is fresh fruits and vegetables. But even this amount is low in comparison with that of other cities, because the producing

areas are nearby and products are trucked direct to dealers' facilities with very little going to railroad or other terminals.

The present total cost of cartage is about \$80,000. This cost is estimated to be \$11,000 in the proposed facilities, an estimated saving of \$69,000 (table 15).

The largest potential saving to be derived from improved facilities would be from lower costs of handling within the facilities. Efficiency can be gained only through the utilization of proper handling equipment and techniques of unloading, storage, assembly, and loading out in single-level buildings with platforms at

truck-bed level. All buildings are designed to permit modern materials-handling practices. It is each wholesaler's responsibility to make improvements in his handling operations within the new facilities and to take full advantage of the opportunities offered.

Reduction in cost of handling is estimated at \$364,000 (table 16). This cost reduction was computed through research and evaluation of

modern food distribution operations in other cities and through application of industrial engineering techniques of specific handling operations.

Rents would increase considerably in the proposed facilities when compared with present rents. The benefits made possible by modern facilities, however, will more than offset these higher rents. The total increase in rental costs

TABLE 15.—*Estimated annual costs and savings for moving food products to facilities of 92 independent dealers in a proposed food center for the Oakland-East Bay area¹*

Commodity group	Volume involved	Cost ²				Cost reduction
		Present		Proposed		
		Per ton	Total	Per ton	Total	
	<i>Tons</i>	<i>Dollars</i>	<i>1,000 dollars</i>	<i>Dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>
Fruits and vegetables.....	187,650	0.41	77	0.05	10	67
Meat and related products.....	52,540	.06	3	.02	1	2
Dairy and egg products.....	25,160	0	0	0	0	0
Groceries.....	28,850	0	0	0	0	0
Total or average.....	294,200	.27	80	.04	11	69

¹ For more detail, see table 21 for present costs and table 22 for proposed costs and savings.

² Includes cartage and avoidable delay.

TABLE 16.—*Estimated handling costs and savings for moving food products within markets for 92 independent dealers in a proposed food center for the Oakland-East Bay area¹*

Commodity group	Volume involved	Cost ²				Savings
		Present		Proposed		
		Per ton	Total	Per ton	Total	
	<i>Tons</i>	<i>Dollars</i>	<i>1,000 dollars</i>	<i>Dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>
Fruits and vegetables.....	204,163	3.63	741	2.94	601	140
Meat and related products.....	59,108	17.20	1,017	14.62	864	153
Dairy and egg products.....	25,437	3.15	80	2.16	55	25
Groceries.....	28,850	6.34	183	4.75	137	46
Total or average.....	317,558	6.36	2,021	5.22	1,657	364

¹ Includes unloading cars and trucks; interdealer transfers; handling within stores; loading out; and equipment use.

² For more detail, see table 21 for present costs and table 22 for proposed costs and savings.

for all commodities is \$954,000. This increase is offset somewhat by potential savings of \$239,000 in facility services and \$223,000 in waste, theft, and deterioration for an increase in other costs of \$492,000 (table 17).

Costs for distributing products to retail and other outlets would also be reduced in a modern distribution center. Although the actual distribution costs will depend on the location of the

center, these costs are based on having the facilities centralized in the general area of distribution. Savings could amount to \$103,000 each year (table 18).

The estimated annual costs for the 92 independent wholesale dealers in the proposed food center would amount to about \$5.3 million, a modest net saving of about \$44,000 over the present costs.

TABLE 17.—Estimated other costs and savings for 92 independent dealers in a proposed food center for the Oakland–East Bay area¹

Commodity group	Volume involved	Cost				Savings or increase (–) in costs
		Present		Proposed		
		Per ton	Total	Per ton	Total	
	<i>Tons</i>	<i>Dollars</i>	<i>1,000 dollars</i>	<i>Dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>
Fruits and vegetables.....	196,282	2.61	512	3.68	722	–210
Meat and related products.....	59,108	14.75	872	13.86	819	53
Dairy and egg products.....	25,437	3.77	96	6.80	173	–77
Groceries.....	28,850	3.95	114	12.89	372	–258
Total or average.....	309,677	5.15	1,594	6.74	2,086	–492

¹ Includes rentals or ownership charges, facility services, and waste, theft, and deterioration. For more details, see table 21 for present costs and table 22 for proposed costs and savings.

TABLE 18.—Estimated annual costs and savings for distribution of food products for 92 independent dealers of a proposed food center for the Oakland–East Bay area¹

Commodity group	Volume involved	Cost ²				Savings or increase (–) in costs
		Present		Proposed		
		Per ton	Total	Per ton	Total	
	<i>Tons</i>	<i>Dollars</i>	<i>1,000 dollars</i>	<i>Dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>
Fruits and vegetables.....	150,871	5.69	858	4.94	745	113
Meat and related products.....	38,617	11.60	448	11.83	457	–9
Dairy and egg products.....	24,009	4.25	102	4.71	113	–11
Groceries.....	28,850	7.94	229	7.59	219	10
Total or average.....	³ 242,347	6.75	1,637	6.33	1,534	103

¹ Includes moving to retail and other outlets in the Oakland area, to other San Francisco Bay points, and outside the Bay area.

² For more detail, see table 21 for present costs and table 22 for proposed costs and savings.

³ Excludes volume picked up by customer.

Costs for some dealers will increase in the new center. For example, costs of grocery firms would be increased by \$202,000 (table 19).

Nonmeasurable Costs and Benefits

It is not possible to place a dollar value on all savings and benefits resulting from the development and operation of a new food center. Improved facilities would bring some advantages to the food dealers and employees, buyers, transportation firms, the city, consumers, and others who are associated with the market. Such things as having good working conditions and proper welfare facilities for employees, adequate parking for employees and buyers, and adequate police and fire protection for firms in the center are not measurable, yet they greatly affect the operations associated with food distribution.

Food dealers could regulate selling hours. Their inventory control would be simplified in one-level facilities. Sacrifice sales, brought about because of lack of proper refrigeration, and loss of sales, brought about because of inability to serve the customer properly, could be reduced.

The food distribution center would provide a better work environment, thus improving mo-

rale and work efficiency of employees. Furthermore, the center would provide a centralized area of employment with the prospect that an increasing population would result in additional jobs.

The grouping of wholesalers by commodity should enable buyers to make purchases in less time. They would be better informed regarding prices and supplies.

Transportation firms could better serve the market. With wide streets, adequate parking, direct rail, and good loading and unloading facilities, trucks and other vehicles could serve the center more efficiently. Delays caused by traffic congestion and inadequate parking would be greatly reduced.

The city would benefit from the center by relocating food firms displaced by civic improvements and providing locations for new firms coming into the area. With better handling methods and facilities, opportunities for better paying jobs would be greater. Areas now used by food wholesalers could be put to other uses that would provide higher revenues to the city. Traffic could be better controlled and sanitary, health, and fire regulations more easily enforced.

As the result of the development of a food distribution center, consumers could expect food in better condition and at lower prices.

TABLE 19.—Summary of estimated total selected annual costs of moving food products by 92 independent dealers through a proposed food center for the Oakland–East Bay area¹

Commodity group	Volume involved	Cost				Savings or increase (–) in costs
		Present		Proposed		
		Per ton	Total	Per ton	Total	
	<i>Tons</i>	<i>Dollars</i>	<i>1,000 dollars</i>	<i>Dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>
Fruits and vegetables.....	187,650	11.66	2,188	11.07	2,078	110
Meat and related products.....	52,540	44.53	2,340	40.74	2,141	199
Dairy and egg products.....	25,160	11.05	278	13.55	341	–63
Groceries.....	28,850	18.23	526	25.23	728	–202
Total or average.....	294,200	18.12	5,332	17.97	5,288	44

¹ For more detail, see table 21 for present costs and table 22 for proposed costs and savings.

APPENDIX

Future Development of the San Francisco Bay Area⁹

South Bay Land-Use Trends

The South Bay counties of Alameda, Contra Costa, San Francisco, San Mateo, and Santa Clara will have 80 square miles of land occupied by industry in 1960; by 2020, more than 200 square miles of land in these counties are expected to be in industrial use.

Residential and commercial uses, which will require about 400 square miles of land in 1960, will need 1,300 square miles by 2020. During the same period, land devoted to agriculture will decline from 1,900 square miles in 1960 to about 1,100 square miles in 2020.

In the South Bay, excluding San Francisco, San Mateo is the most highly developed in urban land—38 percent of potential urban land in 1958. Well over one-third of the potential urban land in that county will be in urban development in 1960. Urban development in Alameda County is the most extensive, covering 106 square miles in the county in 1958. Contra Costa County is the least developed in the South Bay, with about 110 square miles, or 19 percent, of the approximately 580 square miles of potential urban land expected to be in urban use in 1960.

South Bay vs. North Bay Growth

Table 8 summarizes future population and density changes projected for 1960-1990-2020 for San Francisco County, the South Bay counties, and North Bay counties.

San Francisco County.—San Francisco County is expected to show the least growth of all Bay Area counties during the period 1960-2020, increasing from 793,000 in 1960 to 938,000 in 1990, and reaching 1,018,000 by 2020. On the basis of these projections, the 21-percent share San Francisco County will have of total Bay Area population in 1960 may be expected to decline to a 13-percent share in 1990, and to a 7-percent share by 2020.

Population densities of San Francisco County will not increase substantially from the estimated 1960 density of 17,800. In 1990 the pro-

jected density for the county is estimated at 21,000, increasing to 22,800 by 2020. These low increases in population and density projection are based on the limited land available for development. However, it is believed the comparatively small increases in population and density in San Francisco County over the next 60 years will result from the development of higher density housing near the center of the city.

South Bay counties (exclusive of San Francisco).—From 1960 to 1990, population in the South Bay counties of Alameda, Contra Costa, San Mateo, and Santa Clara are expected to more than double—from 2.4 million to 5.1 million—an increase of 2.7 million. It is estimated that, from 1990 to 2020, the South Bay counties will increase from 5.1 million to nearly 10 million, almost a twofold increase. Over the projection period, South Bay counties are expected to increase their share of total Bay Area population—from 65 percent in 1960 to 69 percent by 1990, leveling off to a 67-percent share of Bay Area population by 2020.

Population densities of the South Bay counties are expected to double from an average South Bay density of nearly 800 persons per square mile in 1960 to almost 1,600 in 1990. By 2020 the South Bay density will be 3,000 persons per square mile or nearly four times the 1960 density.

These projections reflect the strong economic potential of the South Bay Area for future growth. The South Bay counties offer ample land for anticipated industrial and residential development; moreover, it is expected that the southward growth along the San Francisco-Los Angeles axis will serve increasingly as a stimulus to rapid development of the extreme southern and southeastern portions of the study area and the areas immediately beyond its borders.

Through 1970, major growth in the South Bay counties will be in San Mateo County, northern Santa Clara County, and western Alameda County. The eastern parts of Alameda, Contra Costa, and Santa Clara counties are too rugged, too isolated, and lack sufficient transportation and communication facilities to attract enough people to occupy land at high densities in the near future.

The decade 1980-90 is expected to be marked by a shift in the direction of new population growth. There are anticipated increasing urban development in Contra Costa County and suburban development in the Livermore Valley

⁹ From a publication of the U.S. Department of Commerce. See pp. 9, 22, 24 of the reference listed in footnote 3, p. 2.

of Alameda County, in Contra Costa County, and along the shores of Suisun Bay. In the period 2000–2020, there will be additional suburban development in southern Santa Clara County and the eastern parts of Alameda and Contra Costa counties.

North Bay counties.—From 1960 to 1990, the North Bay counties will increase from 0.5 million to 1.4 million—an increase of 0.9 million. North Bay population will increase further from 1.4 million in 1990 to 3.7 million in 2020. North Bay population densities, based on these projections, will increase from over 100 persons per square mile in 1960 to nearly 400 in 1990 and to 1,000 in 2020.

Determining Volume, Flow Patterns, and Marketing Costs for Present and Proposed Facilities

Data on volume of receipts of commodities, flow of the commodities through marketing channels, and costs of receiving, handling, and distributing products were obtained from interviews with food dealers, city and State officials, personnel of the University of California at Berkeley, operators of rail and trucking firms, and others knowledgeable in the fields of food marketing and distribution.

Information on costs was gathered from a sampling of the records of food firms. The data of many firms were incomplete because the wholesalers' records were incomplete or individual dealers were reluctant to divulge their records or both. Where possible, the data were cross checked with information from public agencies and transportation firms, with data from published reports, or with information in our Division's files.

Volume of Receipts

Food dealers, processors, food chain organizations, and State government officials supplied the estimated volumes of the products handled. These figures were checked with arrivals as noted by transportation agencies and the California Department of Agriculture at Sacramento, and with unloads as listed by the USDA's Market News Service. The volumes of commodities that would be handled in the proposed development are the current receipts of the firms expected to relocate there.

Flow Patterns

After the volume of each commodity was determined, a flow pattern was developed from information on sales obtained from the dealers on (1) sources of supply, (2) method of receipts at dealer's facility, (3) transfer of products between firms, and (4) type of customer and destination of product.

Distribution to the various parts of California was estimated by using population statistics of each area as a percentage of the State's total population.

Marketing Costs

Marketing costs were for the volumes handled by independent food wholesalers during 1968. Table 20 shows estimated annual costs of moving food products through present facilities of 148 independent dealers in the Oakland-East Bay area.

Detailed marketing cost estimates, by commodity group, for the firms expected to relocate are shown in table 21. The basis for these costs is outlined in the following pages. Rental costs are based on private financing. Estimated annual costs and savings of moving food products through the facilities of the firms expected to relocate are shown in table 22.

Moving Commodities to Dealers' Facilities

Cartage and avoidable delay to trucks were the two costs computed for moving commodities to dealers' facilities. Cartage costs were determined on the basis of (1) the average elapsed time from the dealer's facility to the point of initial receipt and return, including the unloading and loading operations; (2) the distance traveled; (3) the cost per hour for owning (or renting) a truck; (4) the cost per hour for a driver (and his helper if one was used); (5) the operating cost of the truck per mile; and (6) any applicable tolls (bridge or tunnel). Cost per load was estimated from this information. The cost per ton was computed by dividing this cost by the average tons per load.

The cost per hour of owning or renting trucks varied with size and type of vehicle. Both refrigerated and nonrefrigerated trucks were used. The cost per hour of owning or renting

trucks varied substantially among commodity groups. The basic cost included fixed costs such as depreciation, insurance, and taxes.

The operating cost of the truck per mile included gasoline, oil, maintenance, and repairs.

The total hourly rate of the driver and helper, if any, was used to compute labor costs of cartage.

Estimates of the cost of avoidable delay to trucks and drivers hauling products to the dealers' facilities were obtained by interviewing dealers and drivers. In certain areas of the city, traffic congestion was a problem during certain hours of the day. Brief waiting times for trucks were not considered as avoidable delay. Much of the traffic congestion was created by narrow streets and insufficient parking in market areas.

Handling Within the Market Area

Selected handling costs for each commodity group were estimated by observing warehousing and other operations in a sample of firms to determine typical labor requirements for unloading products, handling products within the wholesale facility, and loading products for delivery. Industrial engineering techniques such as time study and work sampling were used to measure the actual costs of performing specific operations. The research results were applied to the total volume of each commodity. This information was analyzed to determine the average costs per ton for handling within the market area.

Equipment costs were developed by determining the cost of the equipment and relating this information to the volume handled. Labor and equipment costs in the proposed development were based on costs of food markets in other cities with modern facilities and advanced handling methods. These costs were adjusted, when necessary, to reflect conditions and requirements of the Oakland food industry.

Rental costs for wholesalers' facilities and off-premise storage were obtained from the wholesalers. Wherever facilities were owned by the firms, a rental value per square foot was suggested that corresponded with similar rental space in the same general location.

Spoilage was estimated from dealers' esti-

mates, from the amount of spoiled material picked up by the sanitary department of the city, and from observations of food losses through deterioration in the nonrefrigerated stores of dealers. Spoilage costs in the proposed facilities were estimated to be as low as those in modern facilities built in other cities.

Distributing Commodities

The total cost for trucks for each food group was estimated by multiplying the number of delivery trucks used by an average cost for trucks of the size used by each group. Truck cost included general operating and maintenance expenses, insurance, licenses, and drivers' wages. The average cost per ton was obtained by dividing the total truck cost by the estimated tonnage hauled. Cartage cost per ton for service by cartage firms was assumed to be the same as that for dealers' trucks.

Total cost for trucks for each area was obtained by multiplying the tons delivered to the area by an estimated cost per unit of time required for delivery. Hauling cost (including sales and service stops) per ton within the city of Oakland and to other parts of California was obtained by dividing the total cost for trucks (including cartage) for each area by the number of tons delivered to the area.

Distribution costs were assumed to be the same in the proposed development as in modern facilities elsewhere.

Guides to Planning Interior Operational Layouts

Several general principles should be considered when planning interior layouts. Plans for an efficient interior operational layout are essential before construction to determine the locations of (1) insulation for refrigerated areas, (2) electrical outlets and utilities control panels, (3) lighting fixtures (over aisles for more accurate selection), (4) equipment servicing areas, (5) pallet racks, (6) drains, (7) thermostats, (8) columns, and (9) removable walls or partitions for future expansion.

These plans should be based on the following principles:

1. Maximum space use.—Making full use of

TABLE 20.—*Estimated annual costs of moving food products through*

Cost item	Fresh fruits and vegetables			Meat and related products		
	Volume involved	Cost		Volume involved	Cost	
		Average per ton	Total		Average per ton	Total
	Tons	Dollars	1,000 dollars	Tons	Dollars	1,000 dollars
MOVING PRODUCTS TO MARKETS AND FACILITIES						
Cartage from:						
Team tracks, piers, and airports.....	5,620	5.69	32	1,302	3.84	5
Other points.....	6,650	5.86	39	760	3.95	3
Total or average cartage costs.....	12,270	5.79	71	2,062	3.88	8
Avoidable delay to vehicles.....	27,930	.75	21	10,540	.28	3
Total or average receipts and costs ¹	202,170	.46	92	81,800	.13	11
HANDLING AND OTHER COSTS WITHIN MARKETS						
Labor:						
Unloading railcars into facilities.....	9,090	1.10	10	3,748	1.87	70
Unloading railcars to buyers' trucks.....	1,030	1.94	2	530	3.77	2
Unloading trucks into facilities.....	186,430	1.10	205	76,250	1.95	149
Interdealer transfers.....	36,060	4.13	149	22,680	7.41	168
Handling within stores.....	237,200	1.25	297	103,950	14.95	1,554
Loading out of stores to buyers' trucks.....	188,625	1.30	245	70,185	3.11	218
Equipment use.....	238,230	.05	12	104,480	.10	10
Total or average handling costs ¹	238,230	3.86	920	104,480	20.78	2,171
Other costs in the markets:						
Rentals.....	237,200	.95	225	103,950	3.72	387
Facility services.....	178,670	.55	98	65,440	.60	39
Waste, theft, and deterioration.....	202,170	1.10	222	81,800	6.20	507
Total or average other costs ¹	237,200	2.30	545	103,950	8.98	933
Total or average handling and other costs within markets ¹	238,230	6.15	1,465	104,480	29.71	3,104
MOVING PRODUCTS FROM MARKETS						
To retail and other outlets in—						
The Oakland area.....	156,700	3.15	494	49,670	8.80	437
Other San Francisco Bay points.....	38,660	8.85	342	21,550	12.90	278
Outside the bay area.....	6,810	12.63	86	10,580	18.81	199
Total or average receipts and costs ¹	202,170	4.56	922	81,800	11.17	914
All selected costs ¹	202,170	12.26	2,479	81,800	49.25	4,029

¹ Totals are composite figures and are not necessarily sum totals.

present facilities of 148 independent dealers, Oakland-East Bay area

Dairy and egg products			Groceries			Frozen foods			Total		
Volume involved	Cost		Volume involved	Cost		Volume involved	Cost		Volume involved	Cost	
	Average per ton	Total		Average per ton	Total		Average per ton	Total		Average per ton	Total
Tons	Dollars	1,000 dollars	Tons	Dollars	1,000 dollars	Tons	Dollars	1,000 dollars	Tons	Dollars	1,000 dollars
120	8.33	1	11,945	3.68	44	0	0	0	18,987	4.32	82
0	0	0	4,610	3.25	15	0	0	0	12,020	4.74	57
120	8.33	1	16,555	3.56	59	0	0	0	31,007	4.48	139
5,850	.17	1	14,380	.28	4	7,860	0.13	1	66,520	.45	30
43,410	.05	2	364,057	.17	63	66,520	.02	1	757,957	.22	169
520	1.92	1	55,322	1.84	102	10,640	2.07	22	79,320	2.58	205
0	0	0	0	0	0	0	0	0	1,560	2.56	4
42,800	.65	28	308,735	1.80	556	55,880	1.97	110	670,095	1.56	1,048
6,140	5.54	34	35,160	2.47	87	5,610	8.91	50	105,650	4.62	488
49,490	1.35	67	399,217	4.96	1,980	70,110	3.98	279	859,967	4.86	4,177
43,320	.88	38	364,057	1.77	644	66,520	1.95	130	732,707	1.74	1,275
49,550	.02	1	399,217	.18	72	72,130	.03	2	863,607	.11	97
49,550	3.41	169	399,217	8.62	3,441	72,130	8.22	593	863,607	8.45	7,294
49,550	2.20	109	399,217	1.24	495	72,130	2.27	164	862,047	1.60	1,380
33,360	1.05	35	273,040	.54	147	37,400	.59	22	607,910	.56	341
43,410	.32	14	364,057	.05	18	66,520	.05	3	757,957	1.01	764
49,550	3.19	158	399,217	1.65	660	72,130	2.62	189	862,047	2.88	2,485
49,550	6.60	327	399,217	10.27	4,101	72,130	10.84	782	863,607	11.32	9,779
30,750	3.06	94	95,011	4.23	402	27,800	7.30	203	359,931	4.53	1,630
8,790	5.80	51	121,559	7.72	938	12,200	14.02	171	202,759	8.78	1,780
3,870	10.08	39	147,487	12.61	1,860	26,520	19.76	524	195,267	13.87	2,708
43,410	4.24	184	364,057	8.79	3,200	66,520	13.50	898	757,957	8.07	6,118
43,410	11.82	513	364,057	20.23	7,364	66,520	25.27	1,681	757,957	21.20	16,066

TABLE 21.—Estimated annual costs of moving food products through the present facilities of 92 independent dealers expected to move into the proposed food distribution center, Oakland—East Bay area

Cost item	Fruits and vegetables			Meat and related products			Dairy and egg products			Groceries			Total	
	Volume involved Tons	Cost		Volume involved Tons	Cost		Volume involved Tons	Cost		Volume involved Tons	Cost		Average per ton	Total
		Average per ton	Total		Average per ton	Total		Average per ton	Total		Average per ton	Total		
		Dollars	1,000 dollars			1,000 dollars			Dollars	1,000 dollars		Dollars	1,000 dollars	
MOVING PRODUCTS TO MARKETS AND FACILITIES														
Cartage from—														
Team tracks, piers, and airports	5,340	5.62	30	0	0	0	0	0	0	0	0	0	0	5,340
Other points	4,920	5.69	28	0	0	0	0	0	0	0	0	0	0	4,920
Total or average cartage costs	10,260	5.65	58	0	0	0	0	0	0	0	0	0	0	10,260
Avoidable delay to vehicles	23,692	.80	19	9,904	.35	3	0	0	0	0	0	0	0	33,596
Total or average receipts and costs ¹	871,650	.41	77	52,540	.06	3	25,160	0	0	28,850	0	0	0	294,200
HANDLING WITHIN MARKETS														
Labor:														
Unloading railcars into facilities	8,726	1.03	9	3,433	2.33	8	0	0	0	7,616	.66	5	20,265	22
Unloading railcars to buyers' trucks	792	1.26	1	517	3.87	2	0	0	0	2,309	2.29	0	1,309	3
Unloading trucks into facilities	179,715	1.08	194	48,073	2.33	112	24,180	.68	16	273,202	.75	16	273,202	338
Interdealer transfers	27,274	4.14	113	11,743	6.30	74	1,135	5.29	6	40,192	0	0	4,81	193
Handling within stores	196,282	.98	192	58,004	11.43	663	25,437	1.49	38	308,573	4.54	131	308,573	1,024
Loading out to buyers' and delivery trucks	172,034	1.30	224	46,454	3.25	151	25,034	.76	19	28,850	.97	28	27,372	422
Equipment use	204,163	.04	8	59,108	.12	7	25,437	.04	1	28,850	.10	3	317,558	19
Total or average handling costs ¹	204,163	3.63	741	59,108	17.20	1,017	25,437	3.15	80	28,850	6.34	183	317,558	2,021
OTHER COSTS IN THE MARKETS														
Rentals or ownership charges	196,282	1.07	210	58,004	4.36	253	25,437	2.32	59	28,850	3.47	100	308,573	622
Facility services	169,385	.51	86	58,004	4.55	264	25,437	1.14	29	28,850	.49	14	281,676	393
Waste, theft, and deterioration	196,282	1.10	216	59,108	6.01	355	25,437	.31	8	0	0	0	280,827	579
Total or average other costs ¹	196,282	2.61	512	59,108	14.75	872	25,437	3.77	96	28,850	3.95	114	308,577	1,564
Total or average handling and other costs within markets ¹	204,163	6.14	1,253	59,108	31.96	1,889	25,437	6.92	176	28,850	10.29	297	317,558	3,615
MOVING PRODUCTS FROM MARKETS														
To retail and other outlets in—														
The Oakland area	98,821	3.15	311	23,363	8.43	197	16,659	2.76	46	13,069	4.51	59	151,912	613
Other San Francisco Bay points	23,571	8.76	265	7,569	13.87	105	4,970	6.04	30	7,905	8.66	68	50,015	468
Outside the bay area	22,479	12.55	292	7,685	19.00	146	2,380	10.32	26	7,876	12.95	102	40,420	556
Total or average distributed by delivery and costs ¹	150,871	5.69	858	38,617	11.60	448	24,009	4.25	102	28,850	7.94	229	242,347	1,637
All costs items ¹	187,650	11.86	2,188	52,540	44.54	2,340	25,160	11.05	278	28,850	18.23	526	294,200	5,332

¹ Totals are composite figures and are not necessarily sum totals.

TABLE 22.—Estimated annual costs and savings for moving food products through the facilities of 92 independent dealers expected to move into the proposed food distribution center, Oakland-East Bay area

Cost item	Fruits and vegetables				Meat and related products				Dairy and egg products				Groceries				Total	
	Volume involved	Cost		Savings or increase in cost	Volume involved	Cost		Savings or increase in cost	Volume involved	Cost		Savings or increase in cost	Volume involved	Cost		Savings or increase in cost		
		Average per ton	Total			Average per ton	Total			Average per ton	Total			Average per ton	Total		Average per ton	Total
Tons	Dollars	1,000 dollars	1,000 dollars	Tons	Dollars	1,000 dollars	1,000 dollars	Tons	Dollars	1,000 dollars	1,000 dollars	Tons	Dollars	1,000 dollars	1,000 dollars			
MOVING PRODUCTS TO MARKETS AND FACILITIES																		
Cartage from—																		
Team trucks, piers, and airports	5,340	.94	5	0	0	0	0	0	0	0	0	0	0	0	0	0		
Other points	4,920	1.02	5	0	0	0	0	0	0	0	0	0	0	0	0	0		
Total or average cartage costs	10,260	.97	10	48	0	0	0	0	0	0	0	0	0	0	0	48		
Avoidable delay to vehicles	23,692	0	0	19	9,904	.10	1	2	0	0	0	0	0	0	0	21		
Total or average receipts and costs	187,650	.05	10	67	52,540	.02	1	2	25,160	0	0	0	28,850	0	0	69		
HANDLING WITHIN MARKETS																		
Labor:																		
Unloading railcars into facilities	8,726	.80	7	2	3,433	1.46	5	3	0	0	0	0	7,616	.53	4	1		
Unloading railcars to buyers' trucks	792	1.15	1	0	517	0	0	2	0	0	0	0	0	0	0	0		
Unloading trucks into facilities	179,715	.80	144	50	48,073	1.50	72	40	24,180	.50	12	4	21,234	.52	11	5		
Interdealer transfers	27,274	3.81	104	9	11,743	5.19	61	13	1,135	3.52	4	2	0	0	0	0		
Handling within stores	196,282	.75	147	45	58,004	10.00	580	83	25,437	.98	25	13	28,850	3.50	101	30		
Loading out to buyers' and delivery trucks	172,034	1.10	190	34	46,454	2.99	139	12	25,034	.52	13	6	28,850	.70	20	8		
Equipment used	204,163	.04	8	0	59,108	.12	7	0	25,437	.04	1	0	28,850	.03	1	2		
Total or average handling costs ¹	204,163	2.94	601	140	59,108	14.62	864	153	25,437	2.16	55	25	28,850	4.75	137	46		
OTHER COSTS IN THE MARKET																		
Rentals or ownership charges	196,282	2.90	570	-360	58,004	8.55	496	-243	25,437	5.66	144	-85	28,850	12.69	366	-266		
Facility services	169,385	.21	36	50	58,004	1.50	87	177	25,437	.98	25	4	28,850	.21	6	8		
Waste, theft, and deterioration	196,282	.59	116	100	59,108	3.99	236	119	25,437	.16	4	4	0	0	0	0		
Total or average other costs ¹	196,282	3.68	722	-210	59,108	13.86	198	53	25,437	6.80	173	-77	28,850	12.89	372	-258		
Total or average handling and other costs within markets	204,163	6.48	1,323	-70	59,108	28.47	1,683	206	25,437	8.96	228	-52	28,850	17.64	509	-212		
MOVING PRODUCTS FROM MARKETS																		
To retail and other outlets in—																		
The Oakland area	98,821	3.11	307	4	23,363	9.84	230	-33	16,659	3.24	54	-8	13,069	5.51	72	-13		
Other San Francisco Bay points	29,571	6.80	201	64	7,669	11.89	90	15	4,970	6.64	33	-3	7,905	8.10	64	4		
Outside the bay area	22,479	10.54	237	45	6,685	17.83	137	9	2,380	10.92	26	0	7,876	10.54	83	19		
Total or average distributed by delivery and costs ¹	150,871	4.94	745	113	38,617	11.83	457	-9	24,009	4.71	113	-11	28,850	7.59	219	10		
All selected costs ¹	187,650	11.07	2,078	110	52,540	40.75	2,141	199	25,160	13.55	341	-63	28,850	25.23	728	-202		
Total																		
Total or average receipts and costs																		
Total or average handling and other costs within markets																		
Total or average distributed by delivery and costs																		
All selected costs																		

¹ Totals are composite figures and are not necessarily sum totals.

² Based on private financing and volume handled within stores.

the storage cube by using pallet racks to hold the pallets of merchandise in tiers.

2. Rapid flow of products.—Storage areas, platforms, doors, and aisles should be planned to provide access to the storage areas in the least amount of time and maximum use of space. Items having the most rapid turnover should travel the shortest distances.

3. Flexibility of space use.—In an industry undergoing rapid technological advancements, such as the food industry, flexibility is highly desirable. Large open areas with minimum obstructions will help provide this flexibility. In the storage areas, four-way entry pallets and adjustable pallet racks offer further flexibility.

4. Protection of product quality.—Maintaining the quality of food is essential. Handling systems that minimize the number of times that products are handled and the distance they are transported reduce the possibility of physical damage during handling. Refrigeration facilities that maintain the proper temperature and humidity for specific perishable foods help prolong product quality.

5. Future expansion.—Facilities must be planned so they can be expanded, or otherwise they may soon become obsolete. Expansion needs are estimated, but they are based on expected growth rates of various businesses or individual firms. Planning for the expansion of refrigerated areas is of primary concern because of insulation requirements.

6. Supervision and control.—The amount of supervising required, including the labor force to be directed and the area to be serviced, should be considered in designing the interior arrangement. The supervisor must keep waste, deterioration, and pilferage at a minimum and exert maximum control over the employees.

7. Safety and comfort of employees.—Adequate lighting, temperature control, and welfare facilities should be planned for the comfort of employees. A completely safety program should be incorporated into the layout. This program should include such features as protective guards on material-handling equipment, traffic signs strategically located, planned passageways for foot traffic, and fire preventive measures.

Recommended Handling Systems

To achieve maximum economy from new facilities, efficient internal handling operations are necessary. A palletized handling system would meet the requirements for moving and storing packaged products for most firms. To make full use of the storage space, adjustable pallet racks three tiers high are recommended. Each vertical rack support should have a 4- by 5-inch metal base plate to act as a weight distributor. For greater density of storage, drive-in and drive-through pallet racks are suggested instead of conventional pallet racks. Adjustable, clamp-type racks are recommended because they are easy to assemble and disassemble and offer flexible shelf height. The bottom tier of pallets should be used for product display and selection, and the upper tiers for replacement and storage. It is advisable to formulate a stacking pattern for each item to be palletized. Interlocking patterns that allow air circulation through the load for nonfrozen refrigerated items are necessary. Stacking heights on pallets will vary with the commodity and the size of package; they will generally be determined by the stability of the load and the ability of the bottom layer to withstand the load above it.

For quantities too small to palletize, adjustable storage shelves are suggested.

Large-volume dealers should use forklift trucks to transport pallet loads. These trucks should be equipped with overhead guards and load backrests and should be powered by batteries. The load capacity of the forklift truck should be determined by the largest weight it will be required to transport. Narrow-aisle, straddle-forklift trucks would be satisfactory for relatively short hauls, but the heavier duty counterbalance-forklift trucks would be more satisfactory for longer hauls. Patience and skill should be exercised in training forklift operators. Good training is certain to pay dividends in shorter operating hours and in correct care of products and equipment.

Planning should include space and equipment sufficient to absorb a projected increase in the firm's volume. This kind of planning will provide long range economic advantage in a competitive industry such as the food industry.

Four-wheel handtrucks are recommended for small-volume dealers for assembling orders and serving the "cash and carry" customers. For large-volume dealers, who select orders in large lots, mechanized equipment should be used.

These are general recommendations that will vary from dealer to dealer, depending on each dealer's volume of business and type of operation. Firms handling very small volumes would not need to use power equipment for handling operations; instead, they could use semilive skids and pallet jacks. Other small-volume dealers could form equipment pools or rent equipment so as to hold down the initial investment costs. Extremely large-volume dealers might employ more sophisticated mechanized operations, such as automatic tow-tractor systems with four-wheel handtrucks programed to certain areas for order selection and loading.

Refrigeration

All installation details for refrigeration should be completed before starting to build. Individual requirements for refrigeration vary and the choice of refrigeration should be left to the individual firms, unless a central refrigeration system is chosen. The advantages of a central refrigeration system are lower capital equipment investment and more significant

savings in owning and operating costs than would be possible if unitary systems for individual firms are used. With central systems, service regulations should protect both the supplier and the user of refrigeration.

If individual firms have their own complete refrigeration systems, the condensing units could be placed in a machinery area. With a central system, a separate, centrally located equipment room is required to house the compressors, condensers, and auxiliary components.

When refrigerated rooms are large, the palletized handling system is recommended. Coolers could be subdivided for specific commodities to alleviate possible odor problems. Certain coolers might be designed so that they could be converted to freezers. Circulation of cool air in refrigerated areas should be considered. According to the type of product stored, a sufficient area should be clear above the uppermost storage tier to allow for proper distribution of air. About 6 inches of clear space is required between pallets and wall for circulation of cool air. Humidity control to maintain quality and reduce shrinkage is also needed, particularly when meat and meat products are handled. If freezers are included in the design, their floors should be constructed to prevent buckling from frost.

