

A BUS TERMINAL STUDY FOR TACOMA, WASHINGTON

BY

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Bachelor of Architecture

University of Washington, 1951.

Submitted in partial fulfillment for the requirements for the degree of Master in Architecture at the Massachusetts Institute of Technology, November 27, 1957.

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ABSTRACT

A Bus Terminal Study for Tacoma, Washington

Sigmund A. Brudevold

Submitted for the degree of Master in Architecture in the
Department of Architecture on November 27, 1957.

This thesis proposes a Union Bus Terminal to serve the suburban and long-distance bus needs of Tacoma, Washington. These needs now depend on two old and completely inadequate stations.

Goals of this project were to provide architectural surroundings which would both enhance downtown values and add attractiveness to bus transportation whereby it might be helped to increased importance. An increased emphasis on bus transportation is suggested as a means of alleviating traffic congestion throughout the Metropolitan area.

The project program is based upon a study of existing bus transportation in the area from which increased future needs have been estimated.

The site is a heretofore disused 300 by 280 foot block in a declining area near the city center.

The building has a passenger level oriented toward a plaza and the downtown center beyond. Buses enter from a secondary street at the opposite side and circulate on a level beneath the upper passenger level.

A restaurant, shops and concessions are included for the convenience of travelers and the financial well-being of the Terminal venture.

Roter - May 6, 1958 -

Cambridge, Massachusetts
27 November 1957

Pietro Belluschi, Dean
School of Architecture and Planning
Massachusetts Institute of Technology
77 Massachusetts Avenue
Cambridge, Massachusetts

Dear Dean Belluschi:

In partial fulfillment of the requirements for the degree of Master in
Architecture, I herewith submit this thesis entitled: A Bus Terminal
Study for Tacoma, Washington.

Respectfully yours,

Sigmund A. Brudevold

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Members of the 1957 Graduate Class.

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Tacoma, Washington

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I INTRODUCTION

I INTRODUCTION

a. Metropolitan Dilemma

Today's trend toward suburban living accompanied by an increasing reliance upon private automobiles by both the working and shopping population is literally saturating the thoroughfares and parking facilities of American cities.

This trend is driving shopping outlets from our metropolitan centers into more accessible suburban locations. Among the conclusions of a recent study in nine medium-sized cities throughout the nation are first, that our central business districts are taking on more and more the character of "central office districts" and second, that some way of expediting travel in and out of these districts must be found if they are to continue to be retail shopping centers as well as office centers.¹

Lewis Mumford, in a recent lecture at Massachusetts Institute of Technology, stated, "Unless something is done soon. . .we face. . .the ruin of the city as we know it today."² Remedies he proposed as absolutely essential are the curtailment of mass motor vehicular traffic in favor of large scale commuter service and the limitation of urban densities.

Many larger cities are currently considering the construction of gigan-

¹Raymond E. Murphy, J. E. Vance, Jr., and Bart J. Epstein, "Internal Structure of the C.B.D.," Economic Geography, 31, No.1 (January, 1955), 45-46.

²The Christian Science Monitor, October 30, 1957, p. 1.

tic new transit facilities. Plans have been advanced in San Francisco for a comprehensive Bay Area transit system utilizing either elevated tracks or monorails.¹ In Los Angeles after a lengthy study, the city's Metropolitan Traffic Association has proposed a system of elevated roads to remove the choking truck traffic from its freeways and also to ease movement of suburban and long-distance buses.²

b. Bus Transportation

An increased emphasis on bus transportation linking suburbs and downtown via regular thoroughfares seems to offer a reasonable solution to the problem of mass-movement in many medium-sized metropolitan areas. This approach has, of course, considerable advantages of flexibility and lower cost of facilities and equipment.

Bus transportation has had a steady but back door type development; it has missed completely the heraldry that surrounded the railroads during their great period of expansion in the last century. Small bus companies, many lacking adequate capital, sprang up rapidly and haphazardly during World War I and in the several years thereafter; they developed business largely in communities lacking convenient access to the railroads. Bus stations were less than makeshift and were usually associated with corner drug stores and cheap restaurants; locations were most often in neighborhoods of lowest commercial character.

¹"Crisis in City Transit," The Architectural Forum, 106 No. 6 (June, 1957), 111.

²The Christian Science Monitor, November 15, 1957, p. 5.

Bus operations continued to expand during the 1920's in the wake of mass automobile production and the development of a national highway network. Many small companies disappeared to be replaced by large well-managed and soundly financed organizations. After the first years of the depression of the 1930's, suburban and long-distance bus service once again began to expand rapidly and has been doing so ever since. During the years 1935 - 44, there was an average annual increase in business of ten to fifteen per cent.¹ Some of this increase has been due to business captured from the railroads; railroad commuter service, however has been of little importance in the West.

Bus terminals were developed as a building type but they have seldom risen above a second-rate commercial reputation nor have they often been located in anything but the dreariest of surroundings. Exceptional developments are the New York Port Authority Bus Terminal and the new Chicago Greyhound Bus Terminal.

But much as bus transportation has expanded, there is yet much to be accomplished before it can begin to alleviate the metropolitan daily mass-movement problem.

The atmosphere surrounding bus transportation has been that of an inferior and despised method of travel. It would be difficult to imagine

¹J. Gordon Carr, "Bus Terminals", Talbot Hamlin (ed.), Forms and Functions of Twentieth Century Architecture (New York: Columbia University Press, 1952) IV, 12; cf. Harry D. Pack, "Bus Terminal Design and Construction," Architectural Record, 90 (October, 1941), 83.

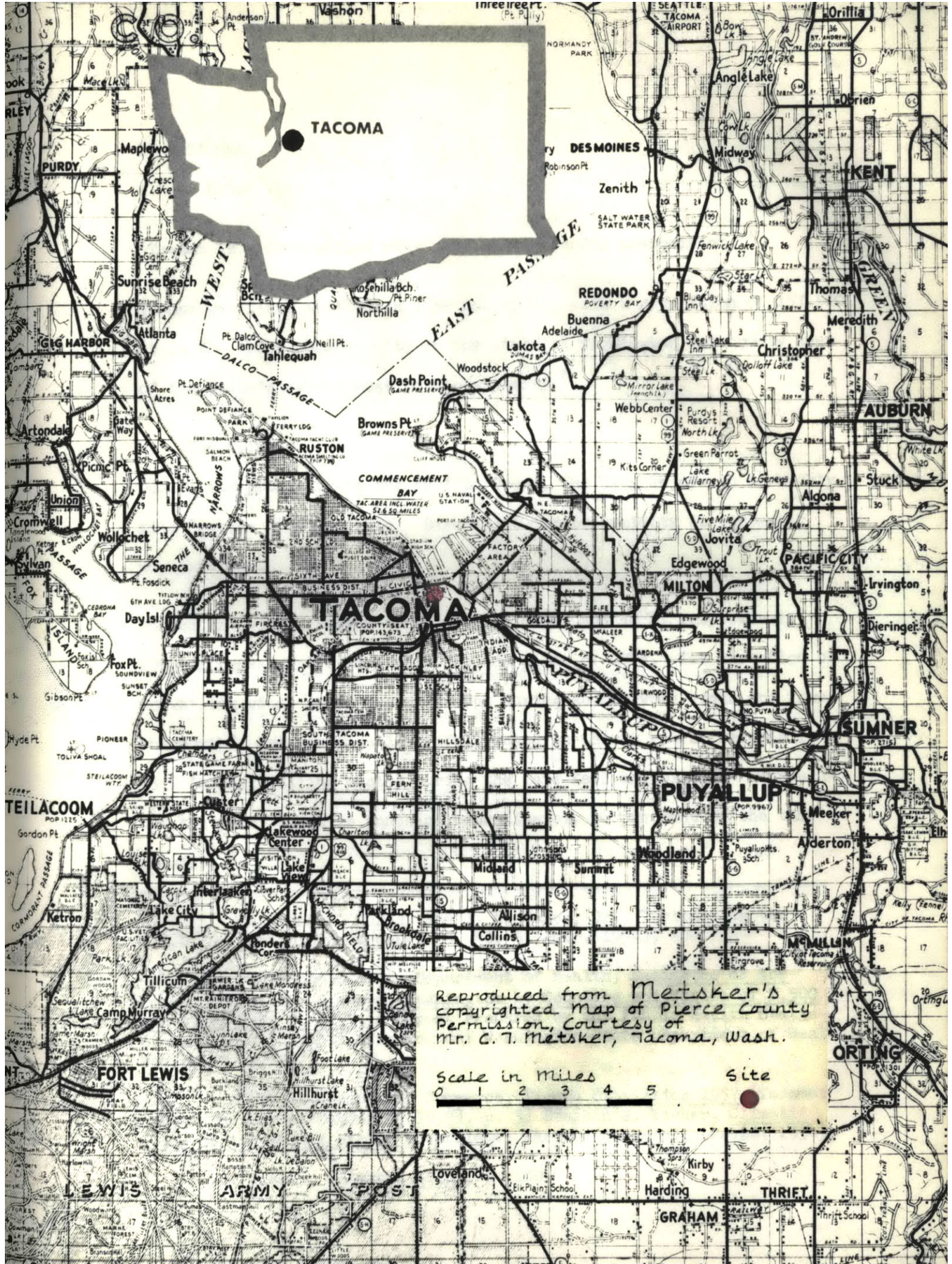
anyone thinking of a bus in the same terms a San Franciscan thinks of a trolley.

Bus transportation must be made attractive enough to induce great numbers of persons, commuters especially, away from their constant use of automobiles. An important step in this direction would be the development of downtown bus terminals of inherently fine architectural qualities and urban relationships.

c. The Project

The subject of this thesis is a study of the downtown bus terminal needs of the city of Tacoma, Washington, and developing therefrom an appropriate architectural solution: a solution enhancing the urban center and in a measure facilitating daily mass-movement.

II T A C O M A



Reproduced from Metsker's copyrighted Map of Pierce County
 Permission, Courtesy of
 Mr. C. T. Metsker, Tacoma, Wash.

Scale in Miles
 0 1 2 3 4 5

Site



II TACOMA

a. A Brief View

"Tacoma is a diversified city with manufacturing predominant."¹

Tacoma was first settled in 1852 and today, with a population of 157,500, it is the third largest city in the state of Washington and county seat of the State's second most populous county.²

b. The Climate

Due to its proximity to the Pacific Ocean, the City enjoys an agreeably mild "marine type" climate. Discomfort due to humidity is virtually non-existent.

Summer and winter temperatures average 64°F. and 40°F. respectively. 1956 extremes were a high of 90°F. and a low of 17°F. The direction of prevailing winds is southwest except during summer when winds are from the north. Average annual rainfall based on thirty years' records is 35.2 inches, falling mostly during the late fall and winter.³ Throughout the year, there is sunshine approximately 46 per cent of the time possible.⁴

¹Raymond E. Murphy and J. E. Vance, Jr., "Delimiting the C.B.D.," Economic Geography, 30, No. 3 (July, 1954), 202.

²Washington State Department of Health, Estimates of the Population of the State of Washington by Counties and Cities of 2,500 and over, July 1, 1957, A Report Prepared by the Public Health Statistics Section (Olympia, Washington: Washington State Department of Health, September 6, 1957), p. 2.

³Tacoma Chamber of Commerce, Tacoma Statistics 1957 (Tacoma: Tacoma Chamber of Commerce, 1957), p. 3; Stephen S. Visher, Climatic Atlas of the United States (Cambridge: Harvard University Press, 1954), p. 176.

⁴Visher, Climatic Atlas, p. 180.

c. The People

Tacoma's Population is predominantly white -- 96.9 per cent.¹ A surprisingly large number are of very recent European derivation.²

Civic spirit is abundant and vigorous. Home ownership is 65 per cent.³ Parks, educational institutions, a little theater group and like endeavors receive enthusiastic support. A militant but friendly rivalry has been carried on with Seattle from the moment the cities were founded.

Many older residents personally experienced frantic eras of lumbering, sailing ships, railroad building and Alaska gold. The younger generations are very active in the out-of-doors, participating in skiing, mountaineering, camping, boating and fishing throughout the Northwest.

d. A Description

Tacoma's setting on the inner reaches of Puget Sound is really spectacular. Across the sound to the west are the panoramic Olympic Mountains, linked to the city by the new Narrows Bridge. An hour's driving distance to the southeast is Mount Rainier, rising out of the Cascades.

Tacoma's main focal point is its exceptionally fine natural harbor, Commencement Bay. Practically the entire city's development can be traced to it in some way. Along the head of the Bay is a concentration of industries and shipping facilities extending in a thin strip along the

¹Tacoma Chamber of Commerce, Tacoma Statistics 1957, p. 3.

²Washington Writers Project of the Works Projects Administration, Washington (Portland: Binford and Mort, 1941), p. 263. One-fifth of Tacoma's population is described as "foreign born."

³Tacoma Chamber of Commerce, Tacoma Statistics 1957, p. 5.

southwest shore. Also at the head of the Bay are the mouth of the Puyallup River and entrances to several ship waterways which penetrate the tideflats area, the industrial heart of the city.

Rising rather steeply at each side of the harbor and tideflats are heights which develop into uneven plateaus. On the plateau to the northeast are newer residential areas coalescing with the suburbs of Seattle which is thirty miles to the north.

Toward the southwest, a projecting shelf forms an elevated base along which the elongated central business district extends. Beyond the downtown district are residential areas with occasional local business districts and a good deal of undeveloped land. These radiate westward to the narrows and southward to a group of lakes and large military installations.

Generally, the residential areas are a credit to the city, especially the very fine North End Districts. A few downtrodden neighborhoods may be found bordering the central business district to the southwest; these however are slated for an early urban renewal project.¹

e. Transportation

Highway connections in the region are constantly being improved. Portland, Oregon, is a three-hour drive over an excellent new highway to the south. Under construction is a twenty-nine mile direct express link to Snoqualmie Pass, the main gateway to Eastern Washington. At present,

¹This project was mentioned to the author in correspondence with the Tacoma City Planning Department in July, 1957.

this traffic follows a devious route through the outskirts of Seattle.¹ Construction is also about to begin on a one-hundred mile long limited-access tollway linking from north to south, Everett, Seattle, Tacoma and Olympia.

Virtually all forms of transportation serve Tacoma. The waterfront offers foreign and coastal steamship service and ferry service to many Puget Sound points. Four transcontinental railroads serve Tacoma and a city-owned belt line expedites local rail traffic in the industrial area. Fast motor freight service is also available. Halfway to Seattle is the Seattle-Tacoma International Airport, an important link between the United States and the Orient.

Bus service within the city is furnished by an employee-owned system. Service to outlying districts and distant points is provided by twelve bus lines; these are covered in detail later in this report.

f. Industries

Tacoma was known until recently as the "Lumber Capital of the World." During the last three decades, however, and especially since World War II, lumbering has slipped into a secondary position while emphasis has shifted to process industries requiring large quantities of electricity and water.²

Wood products are still of great importance, but today, Tacoma's major

¹Tacoma News Tribune, September 29, 1957, p. 1.

²Tacoma Chamber of Commerce, The Future: Tacoma and Pierce County, Washington, A Report prepared by the State Development Committee (Tacoma: Tacoma Chamber of Commerce, 1955), pp. 11-12.

industries are producing industrial chemicals, petroleum products, paper, aluminum and copper (ten per cent of the nation's copper is produced in Tacoma).¹

g. The Future

Future growth seems assured. The tidelands contain a great number of prime industrial sites, all under a well-conceived long-range Port Authority development program.²

Tacoma City Light rates and generating capacity are most attractive to heavy industrial users. By 1965, projects now under construction will have increased generating capacity to two and two-thirds that of the present.³ Additional capacity is available from generating surpluses of the Northwest Power Pool.

Water demand during this same period is expected to rise twenty per cent. This is well within the capacity of the present system; however, large undeveloped water supplies are available.⁴

Population projections indicate that Tacoma will grow at a rate consistent with that of Pierce County and the State. From 1955 to 1975, the population of Tacoma is expected to rise from 156,600 to 223,000 while the County as a whole increases from 301,700 to 464,000.⁵

¹Tacoma Chamber of Commerce, Tacoma Statistics 1957, p. 10.

²Ibid, The Future, p. 1
Ibid, The Future, p. 11.

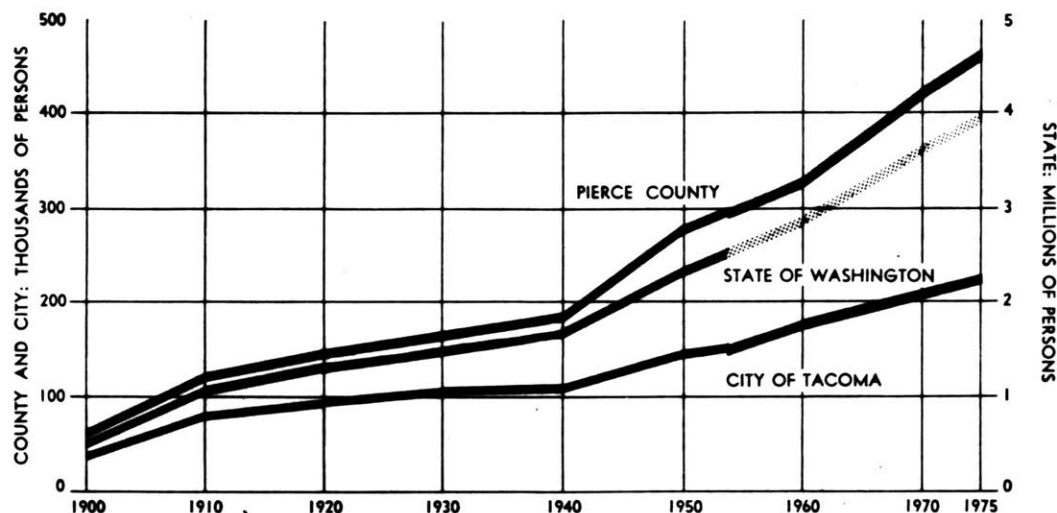
³Ibid, Tacoma Statistics 1957, p.7;

⁴Ibid, p. 12.

⁵Ibid, p. 2.

POPULATION DATA: STATE OF WASHINGTON, PIERCE COUNTY, TACOMA AND OTHER PIERCE COUNTY

TOTAL POPULATION 1900-1975



(000 omitted)	ACTUAL				PROJECTIONS		
	1940	1950	1954	1960	1965	1970	1975
Population	182	276	298	331	371	418	464

	POPULATION				RATIOS	
	State of Washington	Pierce County	City of Tacoma	Other Pierce County	Pierce Co. Wash.	Tacoma Pierce Co.
1900	518,103	55,515	37,714	17,801	10.7%	67.9%
10	1,141,990	120,812	83,743	37,069	10.6	69.3
20	1,356,621	144,127	96,965	47,162	10.6	67.3
1930	1,563,396	163,842	106,817	57,025	10.5	65.2
40	1,736,191	182,081	109,408	72,673	10.5	60.1
50	2,378,963	275,876	143,673	132,203	11.6	52.1
1951	2,444,030	279,140	144,500	134,640	11.4	51.8
52	2,496,050	281,740	145,170	136,570	11.3	51.5
53	2,528,200	283,800	146,200	137,600	11.2	51.5
54	2,540,000	298,000	154,000	144,000	11.7	51.7
55	2,586,000	301,700	156,600	145,100	11.7	51.9
1960	2,850,000	331,000	169,000	162,000	11.6	51
1965	3,200,000	371,000	185,500	185,500	11.6	50
1970	3,600,000	418,000	205,000	213,000	11.6	49
1975	4,000,000	464,000	223,000	241,000	11.6	48

SOURCES:

1900-50—Bureau of the Census
 1951-53—Washington State Department of Health
 1954 —Washington State Census Board
 1960-75—Figures for State of Wash., Stanford Research Institute
 Balance, State Development Committee

Compiled by Tacoma Chamber of Commerce

III BUS TRANSPORTATION

and

TACOMA

III BUS TRANSPORTATION IN TACOMA

a. Suburban Bus Service

Suburban bus service in the Tacoma metropolitan area is provided by nine suburban and one "long-distance" line. These operate in three general zones, according to location with respect to the central business district.

An east zone includes chiefly outlying communities within ten miles east of the city center. This zone includes Tacoma's oldest suburban centers, the two largest of which have populations of 11,200 and 3,100.¹ Several other towns in this zone have populations of from 1,000 to 2,000. Unincorporated areas are also quite thickly settled. Bus passengers from this zone are largely commuters and shoppers, although evening traffic is also important.

Extending to about fifteen miles south of the city center is a second zone. The character of the bus traffic to and from this area takes on a unique character due to several large military bases located in the area. In addition to serving commuters and shoppers coming into the city, the lines in this zone also carry large numbers of Tacomans to and from their jobs at the military installations. Also this zone has a considerable load of off-duty military personnel during evenings and weekends.²

¹Washington State Department of Health, Estimates of Population, p. 2.

²Tacoma Suburban Lines, Inc., one of the largest in this zone, informed the author its weekday peak hours are from 8:00 p.m. to 1:00 a.m., when it carries an average of 400 passengers per hour.

A third zone lies to the north along U.S. Highway No. 99, approximately from the city limits to the Seattle-Tacoma Airport. This highway between Seattle and Tacoma is representative of intensive ribbon development; new residential communities are constantly springing up behind the commercial strip. This has become one of the fastest growing areas of the State. Local bus service in this zone is provided at thirty-minute intervals throughout the day by the Greyhound Line.

b. Long Distance Bus Service

Long-distance bus service is provided by three lines of which Greyhound is by far the largest; it provides travel connections throughout the nation. Another line, Pacific National Trailways, operates in the western states while a third line provides four daily round trips between Tacoma and Bremerton, the only regular bus service across the Tacoma Narrows Bridge.

Long distance bus passengers include tourists, servicemen traveling on leave or for other reasons and many others desiring to travel considerable distances at low fares.

c. The Existing Bus Stations

At the present, Tacoma's suburban and long-distance buses are accommodated by two unsightly and completely inadequate bus stations.

The station at South Eighth Street and Pacific Avenue serves all the suburban lines plus one long-distance line, Pacific National Trailways. During its weekday peak hour, 4:30 p.m. to 5:30 p.m., it accommodates approximately twenty-two buses and nearly 800 passengers. It has only three

EXISTING BUS STATION

South Fourteenth and Pacific
Station at right; project site
in center



on-site loading positions and as many as six buses at once may be seen loading or unloading while double-parked on South Eighth Street. Toilets, waiting area, and ticket selling facilities are completely inadequate as may be seen in the table "Bus Terminal Facilities," following Section V of this report.

The Greyhound Station at South Fourteenth Street and Pacific Avenue has, except for bus positions, facilities that are about half-adequate. Loading and unloading of buses is especially cramped since there are only three bus positions including one on the street. Reserve buses park along the streets throughout the neighborhood as may be seen in the photographs in this report. In addition to the Greyhound Line, this station also serves the small Bremerton Line. This station handles a steady flow of about twelve buses and 432 passengers per hour from 9:00 a.m. to 6:00 on weekdays. Week-end traffic is also very important, especially during the summer.

d. The New Greyhound Project

The Greyhound Line is about to construct a new \$1,000,000 terminal on Pacific Avenue between South Thirteenth and South Fourteenth Streets. This building is planned to provide nine bus loading and unloading positions. Other accommodations will in general more than double those of the existing station.¹

e. A Proposed Union Terminal

As much of an improvement as the New Greyhound Terminal will be over

¹Tacoma News Tribune, October 18, 1957, p. 8.

present conditions, there still remains the larger problem of dealing with the existing South Eighth Street Station.

The solution of the city's entire bus terminal problem seemed after a study of the entire situation, to require a single union bus terminal to serve all the suburban and long-distance lines.

Such a solution would, it is thought, lend a degree of dignity and unity to the otherwise miscellaneous impression of the many smaller lines. Also, it would permit easy transferring among all the lines and would allow better common facilities by eliminating duplication. Such a terminal could become a downtown center of real importance -- a transportation center.

Only a few union bus terminals exist today; of these the prime example (architecture notwithstanding) is the New York Port Authority Bus Terminal which forms a smoothly-working link between a tangle of bus lines and thousands of daily bus passengers.

Union terminals have been used with success by the railroads and they are practically universal with air travel.¹

Private promotion of a large union terminal would be difficult and even if achieved might result in detrimental compromises. The 1957 State of Washington Legislature has passed enabling legislation permitting the establishment of governmental units on metropolitan and regional levels to deal with such widespread problems as transit. A union bus terminal might best be financed through the bonding authority of such a unit.

¹Carr, "Bus Terminals," Hamlin, Forms and Functions, p. 598.

f. Bus Transportation Statistics, Tacoma, Washington

The following table summarizes some of Tacoma's more important bus transportation statistics. Data is based on the following:

Present Terminals (Columns 1 & 2)

Figures were obtained from the managers through interviews conducted on the author's behalf.

New Terminals (Columns 3 & 4; individual replacements for each of the existing terminals.)

Figures for both terminals represent the managers' estimates of future conditions. South Fourteenth Street figures also take into account provisions shown on preliminary drawings for the proposed new Greyhound Terminal.

Program for a New Union Bus Terminal (Column 5)

These figures were derived from the first four columns while considering a population increase of approximately 40 per cent during the next ten years together with the possibility of increased popularity of bus transportation.

Note that although Greyhound's bus and passenger volumes are listed as "long-distance," these volumes also include a considerable amount of "suburban" traffic.

BUS TRANSPORTATION STATISTICS, TACOMA, WASHINGTON

	So. 8th St. Station, Present	So. 14th St. Station, Present	New So. 8th St. Station, Estimate	New So 14th St. Station, Estimate	New Union Bus Terminal, Estimate
BUS LINES USING TERMINAL					
Suburban	9	-	9	-	9
Long-Distance	1	2	1	2	3
DAILY BUS VOLUME (Arrivals and Departures)					
Suburban	210	-	263	-	300
Long-Distance	25	198	31	249	300
Total	235	198	294	249	600
DAILY PASSENGER VOLUME					
Suburban	7560	-	9500	-	10,800
Long-Distance	900	7148	1180	8960	10,800
Total	8460	7148	10680	8960	21,600
PEAK HOUR TIMES					
	4:30p.m. to 5:30p.m.	9:00a.m. to 6:00p.m.	4:45p.m. to 6:00p.m.	9:00a.m. to 6:00p.m.	4:30p.m. to 5:30p.m.
PEAK HOUR BUS VOLUME					
Arrivals:					
Suburban	4	-	5	-	6
Long-Distance	1	3	1	3	5
Total	5	3	6	3	11
Departures:					
Suburban	16	-	20	-	23
Long-Distance	1	9	1	11	14
Total	17	9	21	11	37
Total Arrivals and Departures	22	12	27	14	48

BUS TRANSPORTATION STATISTICS, TACOMA, WASHINGTON (cont.)

	So. 8th St. Station, Present	So. 14th St. Station, Present	New So. 8th St. Station, Estimate	New So. 14th St. Station, Estimate	New Union Bus Terminal, Estimate
PEAK HOUR PASSENGER, VOLUME					
Arrivals:					
Suburban	144	-	180	-	200
Long-Distance	36	108	36	108	200
Total	180	108	216	108	400
Departures:					
Suburban	576	-	720	-	810
Long-Distance	36	324	36	396	510
Total	612	324	756	396	1320
Total Arrivals and Departures	792	432	972	504	1720

IV THE SITE

THE SITE

A view from the North



IV THE SITE

a. Site Selection

The site selected for this project is the 300 by 280 foot block bounded by Pacific Avenue, South Thirteenth, "A," and South Fourteenth Streets. The elevation of the Northwest corner of the site is approximately fourteen feet above the southeast corner. The western half of this block is the actual site selected for the proposed new Greyhound Terminal. Until 1956 this block was owned by the Federal Government which for years had held the property in a state of neglect and disuse. Besides being readily available the site is also well situated with respect to the central business district and to traffic.

b. The Central Business District and The Site

The central business district can be thought of as consisting of two main parts bisected by Pacific Avenue, the main traffic street.

Between Pacific Avenue and "A" Street is a chain of short blocks, one of which is the project site. These are relatively level from east to west but they rise gradually from south to north. These blocks definitely front on Pacific Avenue and "A" Street has assumed a back-door relationship to them.

Along Pacific Avenue, the district slopes up rather steeply toward the west and alternate east-west streets are omitted. The Commerce Street level corresponds to the second floor of Pacific Avenue establishments and to the basement of Broadway businesses. This makes a convenient service arrangement for the two most important business streets, especially toward

THE MAIN TRAFFIC STREET

Pacific Avenue looking south



AVENUE

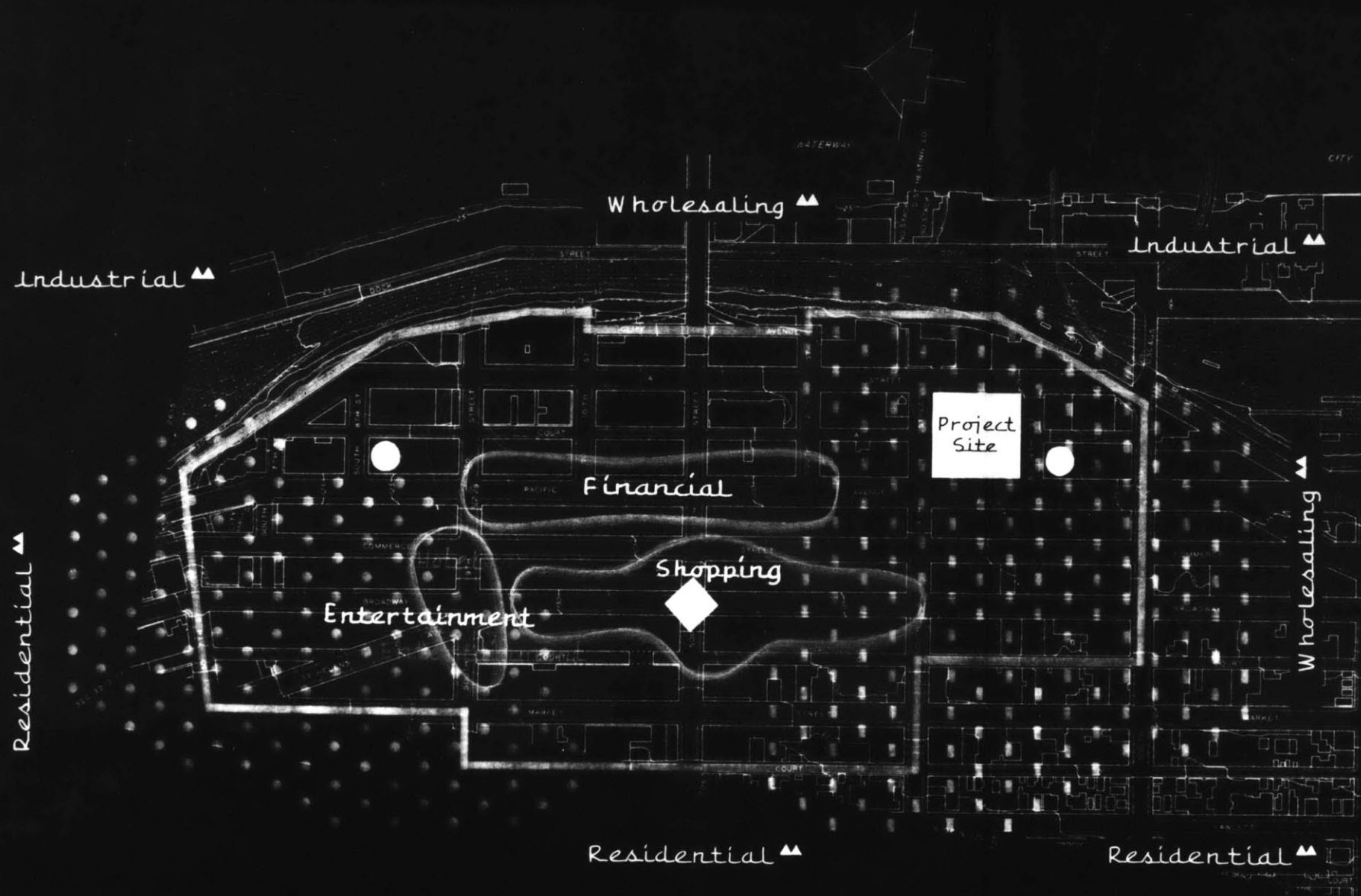
MONTHLY
Parking
ENTRANCE
IN REAR

HOENFELDS
FURNITURE

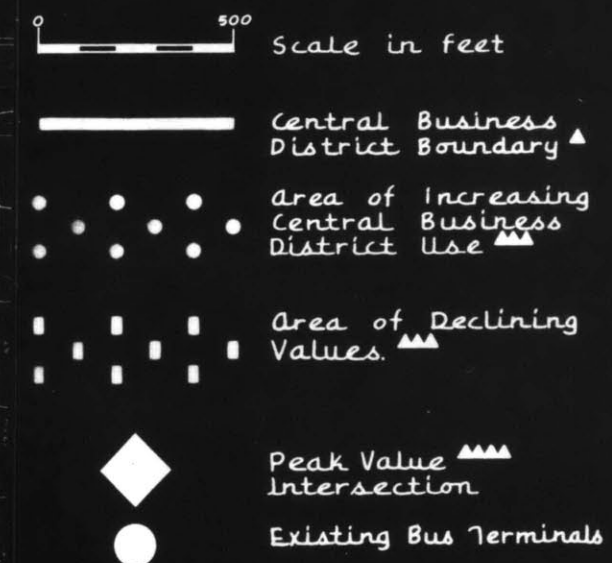
The Largest Store in Birmingham!
OLD CROW
THE ONLY ONE BOTTLED IN THE SOUTH

CIRCUS
HOTEL

TAVERN



Legend



Central Business District Tacoma, Washington

Sources:

Land use data for area bounded by Northern Pacific tracks, Broadway, South Ninth and South Fifteenth Streets provided by Tacoma City Planning Department, Aug. 1957. Remaining areas approximate, from first-hand acquaintance with scene.

▲ Murphy and Vance. Delimiting the CBD. *Economic Geography*, 30:213 July 1954. Defines Central Business District as including all land with a value at least 5% of peak value, with floor area (basements

excluded) equal or greater than lot area and with at least one-half of total floor area devoted to "Central Business Uses". (Boundary irregularities smoothed out.)

▲▲ Murphy, Vance and Epstein. Internal Structure of the CBD. *Economic Geography*, 31:47 Jan. 1955.
 ▲▲▲ *Ibid.* p. 43
 ▲▲▲ *Ibid.* p. 47

the interiors of the long blocks. Commerce Street corner locations from South Ninth to South Thirteenth Streets are quite valuable due to the large flow of pedestrians between Pacific Avenue and Broadway.

The peak value intersection as indicated on the Central Business District Map is at Broadway and South Eleventh Street where ground floor rents of \$4.00 per square foot prevail.¹ The principal shopping area is on Broadway in the two blocks at each side of the peak value intersection. Located along Pacific Avenue from South Ninth to South Thirteenth Streets is the city's financial center; most of the district's banks and office buildings are located here along with restaurants, real estate offices and secondary retail stores.² Most of the downtown building activity since World War II has been concentrated in the financial section on the east side of Pacific Avenue with some new buildings appearing on "A" Street.

Other indications of downtown character may be obtained from a ground floor use comparison between Tacoma and an average of similar-sized cities (see chart, "Land Use Comparison"). Tacoma appears to have in the area of peak values a greater than average concentration of retail business. The great proportion of space devoted to transient residence around the edge of the district should also be noted.

The project site is a short distance from the office and financial district and it is just over 300 yards from the peak value intersection, the great-

¹Tacoma Chamber of Commerce, Tacoma Statistics 1957, p. 5; Murphy, Vance and Epstein, Economic Geography, 31 January, 1955, 47.

²This description was given in a 1957 report to Greyhound Lines by Yates, Riley and MacDonald, Seattle Land Consultants.

Land Use Types

d Floor Area Comparison by Walking Distance Zones from Peak Value Intersection

Source: Murphy, Vance, and Epstein. A Comparative Study of Nine CBD's. *Economic Geography*: 30: 21, 29, Jan. 1955.

Key [▲]



Retail Business Uses

1. Food
2. Clothing
3. Household
4. Automotive
5. Variety
6. Miscellaneous



Financial, Office & Service

7. Financial
8. Headquarters Office
9. General Office
10. Service Trades
11. Transportation
12. Transient Residence
13. Parking

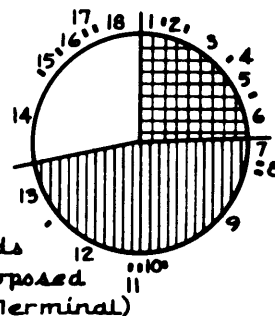
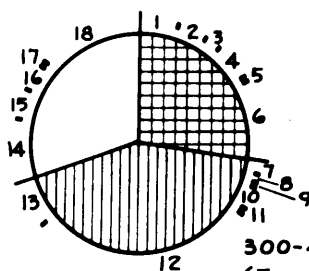
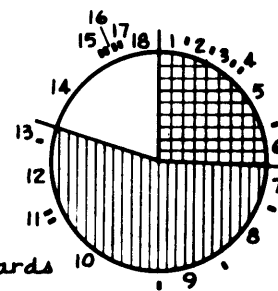
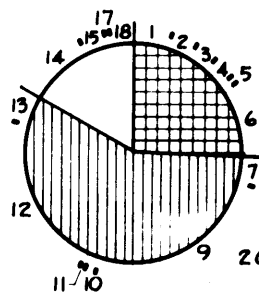
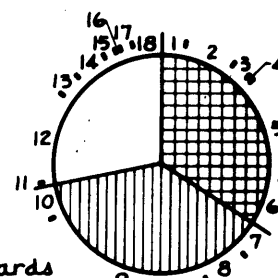
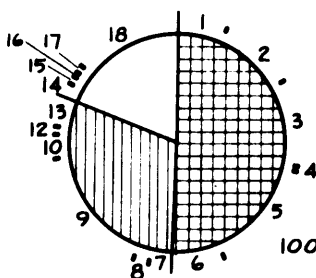
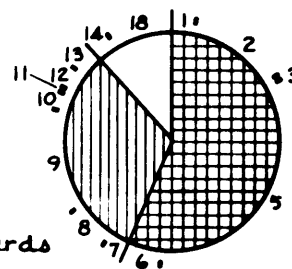
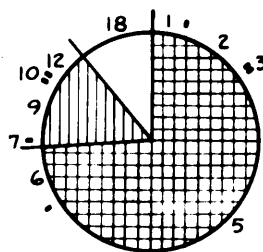


Non-Central Business Uses

14. Public & Organizational
15. Residential
16. Wholesale
17. Industrial
18. Vacant

Tacoma

8-City Av. ^{▲▲}



▲ Categories according to source material.
 ▲▲ Average of eight U.S. Cities of 150,000 to 250,000 urbanized area population: Worcester, Phoenix, Salt Lake City, Grand Rapids, Sacramento, Tulsa, Mobile, and Tacoma.

PACIFIC AVENUE

Looking North toward the site



est concentration of pedestrians.

c. Downtown Traffic and the Site

Pacific Avenue, running north and south the length of the business district, is the principal traffic street. Most traffic enters and leaves the district at the south via this artery.

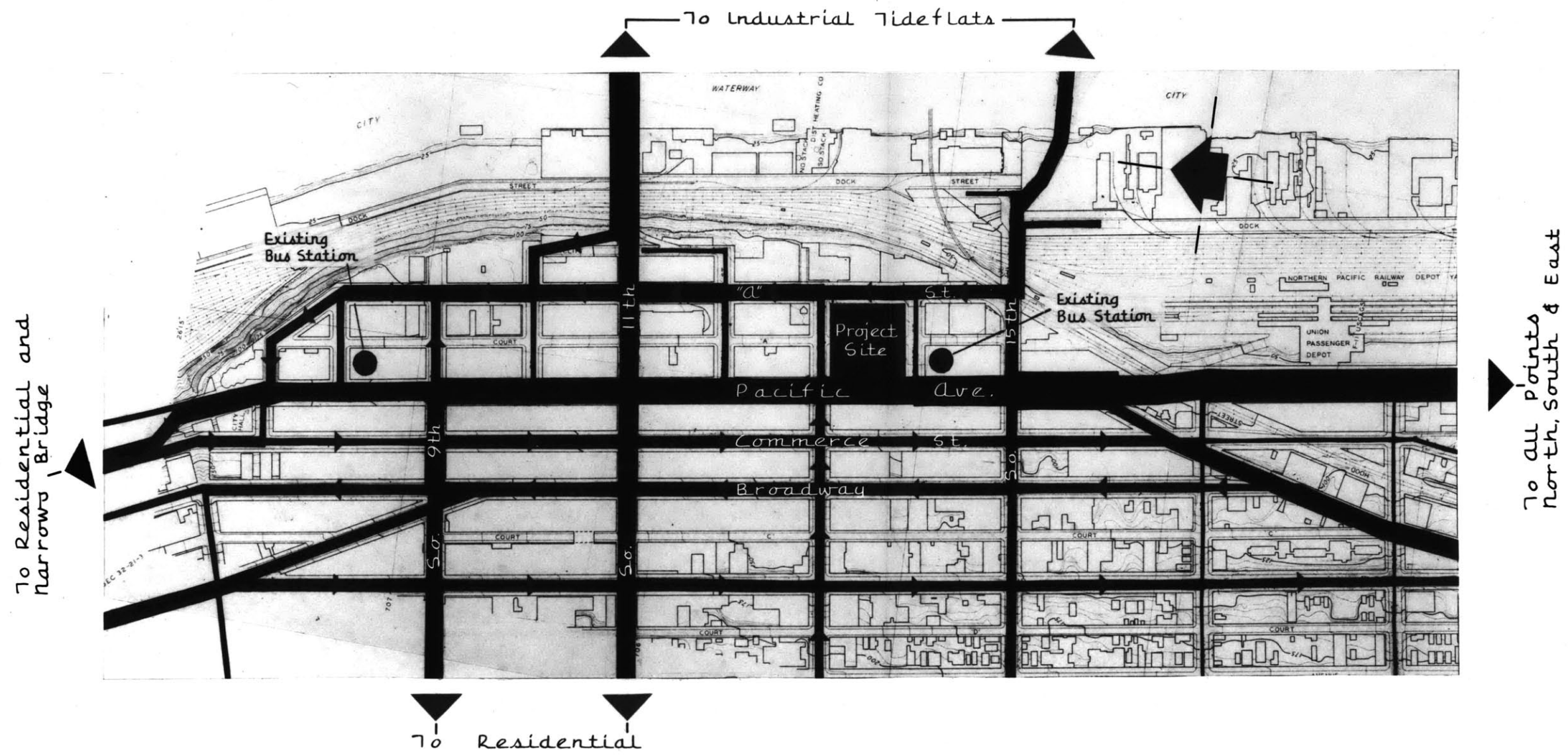
South Eleventh Street links up the tideflats industries, the central business district and the residential areas to the west and north.

Downtown city buses are confined to Broadway, Pacific Avenue and South Eleventh Street. Across from the northwest corner of the project site is a regular stop.

Tacoma's streets are now almost entirely two-way. According to the traffic Engineering Division, however, a number of one-way streets are planned for the central business district in the immediate future.

Pacific Avenue would remain two-way. South Eleventh Street would become one-way westbound and "A" Street one-way northbound. This would almost certainly induce more afternoon rush hour traffic across the Fifteenth Street Bridge, north along "A" Street at the east side of the site, and then west along South Eleventh Street to the residential areas.

Since virtually all bus traffic enters and leaves the central business district at the south along Pacific Avenue, the site selected requires of buses a minimum of circulation in downtown traffic. South Fourteenth Street seems to lend itself well for the entry and exit of buses to the site.



Central Business District Traffic Tacoma, Washington

Average Peak Hour Traffic Flow (P.M.)[▲]
 Proposed One-Way Street System^{▲▲}

▲ Adapted from a Tacoma Traffic Engineering Division diagram representing the average vehicle flow during the afternoon peak hour for the month of April 1955.
 ▲▲ Tentative flow directions according to Tacoma Traffic Engineering Division (Sept. 1957)

0 500 Feet
 2000 1500 1000 500 250 Vehicles per hour

▶ Existing one-way (Others now two-way)
 ▶ Proposed one-way

d. The Site Neighborhood

For years while in Federal ownership, about two-thirds of the Pacific Avenue frontage of the site was devoted to an unsightly pit which served as a parking lot. The remainder of the lot has been covered by over-age abandoned structures. This block seems to have had a tremendous downgrading influence on the entire neighborhood. Pacific Avenue in the immediate vicinity of the site has been described as ". . .a low grade commercial street. . .[with a]. . .conglomeration of cheap retail and amusement establishments, such as cafes, novelty shops, beer parlors, Army and Navy surplus stores. . .and third and fourth rate hotels of the cheapest walk-up character. . . ." ¹

The only asset in the neighborhood has been the large, successful and well-kept furniture store at the corner of South Fifteenth and Pacific Avenue.

The bus terminal on the selected site should do much to reverse the present trend of decline and stagnation in this area. Values throughout this neighborhood would certainly be enhanced and perhaps more desirable uses would be encouraged to move in.

¹A description by Yates, Riley and MacDonald in their report to Greyhound Lines.

SITE CLOSEUP

Room for improvement



THE SITE

Southwest corner of the site
and "low-grade commercial"
neighborhood



V PROGRAM
REQUIREMENTS

V PROGRAM REQUIREMENTS

a. Passengers

Circulation is of great importance where crowds of bus passengers must move quickly and easily. Paths of arriving and departing passengers should be readily apparent and free of crossing. Adjuncts necessary to the routines of arriving and departing should be logically disposed along these paths so as to prevent backtracking and confusion.

Most persons would arrive at and leave the terminal on foot, but provisions are also required for those coming and going via car, taxi or city bus.

Waiting areas, especially required by long distance travelers should be easily reached by persons leaving the ticket counter. These areas should be removed from circulation, but should be near the buses.

Extensive toilet and cleanup facilities are needed, especially by arriving long-distance travelers.

b. Tickets

Ticket counters should be easily seen and reached from the entrances. These should be arranged to permit lining up without blocking circulation. Separate positions are desirable for lengthy and short transactions and an information clerk is desirable to direct purchasers to proper points. A small office is used for supervision and preliminary accounting.

c. Baggage and Express

An efficient baggage handling system capable of moving all the baggage of

one or more arriving buses quickly to a point where debarking passengers may claim their bags is essential. Baggage checking and claiming stations should be so located that bags need not be carried great distances within the terminal.

Express business is of considerable importance. A separate room with access to the street and provision for parking is desirable.

d. Revenue and Convenience

An assortment of stores and concessions are needed both for the convenience of travelers and for balancing the terminal's books.

Counter type concessions will attract many suburban passengers while long-distance travelers have more time to go into stores. Shops should also be made convenient to the neighborhood pedestrian trade. One block north of the site are a number of banks and large office buildings; restaurant trade especially, could be attracted from these.

Among the concessions which should be included are checking lockers, telephones, barber shop, valet service,¹news stands and drugs. The demand for car rentals and travel service is increasing at bus terminals.

e. Buses

Buses should be able to move easily on and off the street and to circulate and park freely within the terminal itself. The largest long-distance buses are 40 feet long, 8 feet wide and twelve feet high. They have a

¹Arrivals have practically turned the men's toilet room of the existing South Fourteenth Street Station into shaving and dressing quarters.

turning radius of 55 feet.

Reserve parking for six standby buses is desirable, but bus servicing activities are carried on outside of the central business district.

Movements of arriving and departing buses are controlled by a dispatcher who should have good visibility of the bus entrance and exit.

Drivers require a room in which to make out reports which are turned over to the dispatcher.

Entrances to individual bus loading positions should be controlled by the drivers.

f. Administration

Offices are required for the terminal manager and for five bus lines (remaining lines have offices in outlying areas served). Spaces are also required for conferences, accounting, reception, and for a telephone information center.

g. Personnel

Separate lounge and toilet facilities are desirable for personnel connected with bus operation and for those concerned with administration and with concessions.

h. Service

Provisions are required for service to the terminal proper and to the concessions and stores.

i. Economy and Maintenance

The janitor item is one of the largest in a bus terminal operating budget. Quality materials which offer a reasonable balance between first cost and subsequent maintenance costs should be used.

j. Space Allocations

The main determinant in establishing specific areas for the various spaces of a bus terminal is the peak hour load.¹ For Tacoma, this was estimated to be 1720 passengers and 48 buses by 1965.

Then accommodating both suburban and long-distance travelers in a single terminal, the proportions of each must be considered with respect to their differing needs.²

Column 5 of the following table of space allocations includes estimated requirements for this project. These requirements are based in part upon the opinions of the managers of the existing bus stations and upon preliminary drawings for the proposed new Greyhound Terminal. These are represented in Columns 3 and 4. Column 5 also reflects available recommendations for areas required with given peak-hour loads.³

Columns 1 and 2 represent accommodations of the two existing stations as determined in an on-the-spot examination.

The passenger space requirements determined for this project were compared

¹J. Gordon Carr, Talbot Hamlin, Forms and Functions of Twentieth Century Architecture, p. 592.

²Ibid

³Ibid, p. 606; "Motor Transport Terminals," Architectural Record, 90 (October 1941), 97.

with American Railway Engineering Association recommendations for railway stations. Railway station recommendations are considerably more generous¹, due probably to the somewhat more leisurely and "formal" pace of rail travel. Also, a single arriving or departing train represents much more of a passenger impact on station facilities than does a single bus.

¹American Railway Engineering Association "Tables of Railroad Station Element Capacities," Construction and Maintenance Section, Association of American Railroads Manual, V.II (1956), p. 14-2-11.

BUS TERMINAL SPACE ALLOCATIONS - TACOMA, WASHINGTON

EXISTING and REQUIRED

Square foot areas except as noted

X : Not provided

--: Not determined

	So. 8th St. Station, Existing	So. 14th St. Station, Existing	New So. 8th St. Station Est. Require.	New So. 14th St. Station Est. Require.	New Union Bus Terminal, Est. Requirements.
PUBLIC SPACES					
Waiting Room	X	X	X	2350	5000
Seats:	25	52	--	125	225
Women's Lounge	X	X	--	395	600
Women's Toilet Room. . .	--	--	400	542	800
W.C.'s:	3	6	4	10	17
Lavs:	2	3	4	10	12
Men's Toilet Room.	--	--	550	840	1300
W.C.'s:	2	6	4	8	19
Lavs:	2	3	4	8	12
Urs:	2	3	4	8	15
Dressing Rms:	X	X	X	X	3
Passenger Concourse and Circulation, Approx . . .	--	--	--	--	10000
CONCESSIONS					
Restaurant					
Dining	--	--	--	1720	2400
Seats:	26	30	--	80	110
Bar	X	X	X	720	800
Men's Toilets				60	100
Women's Toilets.				60	100
Kitchen				1100	1500

BUS TERMINAL SPACE ALLOCATIONS - TACOMA, WASHINGTON (Cont.)

	So. 8th St. Station, Existing	So. 14th St. Station, Existing	New So. 8th St. Station Est. Require.	New So. 14th St. Station Est. Require.	New Union Bus Terminal, Est. Requirements.
CONCESSIONS (cont.)					
Kitchen Storage				960	1000
Staff Men's Toilets & Lockers	--	--	--	126	150
Staff Women's Toilets & Lockers	--	--	--	250	300
Office				160	160
Soda Fountain	X	X	--	--	250
Seats:	X	X	--	--	10
News, Tobacco, Candy . . .	60	75	--	250	350
Travel Bureau	X	--	--	110	200
Auto Rental	X	X	--	60	80
Public Telephones, Booths:	3	4	--	12	18
Checking Lockers, Lin. ft:	--	10	--	60	120
Barber & Valet	X	--	--	--	400
Additional Shops as Required to Justify Investment . .	X	X	--	--	14000
TICKET and INFO. SPACES					
Information	X	X	X	X	50
Ticket Counter	--	--	150	150	400
Positions:	1	4	3	4	8
Ticket Office	X	150	--	120	200
Telephone Info.	X	--	--	190	250
Clerks:	X	--	--	3	5
BAGGAGE and EXPRESS					
Baggage	--	--	--	1100	1200
Storage (holdover)	--	--	--	X	400
Office	--	--	--	130	130
Express	--	--	--	100	200

BUS TERMINAL SPACE ALLOCATIONS - TACOMA, WASHINGTON (Cont.)

	So. 8th St. Station, Existing	So. 14th St. Station, Existing	New So. 8th St. Station Est. Require.	New So. 14th St. Station Est. Require.	New Union Bus Terminal, Est. Requirements.
ADMINISTRATIVE SPACES					
Terminal Mgr's Office	100	100	--	155	200
Reception	X	X	--	220	220
Conference	X	X	--	200	250
Accounting Office . .	--	--	--	310	600
Bus Line Offices (5)	X	X	X	X	750
PERSONNEL SPACES					
Drivers Lounge, Lockers and Toilets	--	--	--	630	950
Staff Men's Toilets and Lockers	--	--	--	132	200
Staff Women's Toilets and Lockers	--	--	--	120	200
Staff Women's Lounge	--	--	--	--	120
BUS TRAFFIC SPACES					
Dispatchers Office	--	--	--	132	180
Driver's Report Room	--	--	--	112	180
Bus Loading Positions and Driveway	--	--	--	--	27,000
No. Off-street:	3	2	10	9	18
No. On-street :	6	1	--	X	X
Bus Reserve Parking	X	X	X	X	2500
No. Off-street :	X	X	--	--	6
MISCELLANEOUS SPACES					
Terminal Storage	--	--	--	150	300
Cleaning Closets	--	--	--	235	350
Equipment Spaces	--	--	--	700	2000

VI THE SOLUTION

VI THE SOLUTION

a. Design Considerations

All too often we have been inclined to think that ". . .the passenger is a package on legs -- or more accurately a weak swimmer in the strong current of a Circulation Diagram -- accepted, inhaled, sucked into a back-water, ejected, swept on, tempted by well-sited impulse salesgirls, automatically sorted and counted by turnstiles and finally disgorged into some kind of streamlined transport of which all kinds look increasingly alike."¹

In carrying out this project, the intent has been to develop a series of pleasant interesting spaces through which the traveler could easily and without frustration move between being a passenger on a bus and an inhabitant of the city.

Early in the project it was decided that because of the difference in elevation around the perimeter of the site, passengers would enter primarily from Pacific Avenue at the high northwest corner which is oriented toward the downtown center. A passenger level could be developed from this point with buses entering a lower level from South Fourteenth at the other side of the property.

In order to accommodate eighteen bus positions, a circular arrangement around a central passenger concourse seemed to be the only one which required neither crowding at the boundaries nor splitting of the passenger concourse. The circular form also presented an interesting architectural challenge.

¹Lionel Brett, "Arrival and Departure," Architectural Review, 116 (July, 1954), p. 5.

Circulation of traffic on the bus driveway must necessarily be clockwise because of the placement of bus doors. However, when "A" Street is made one-way Northbound as proposed, buses will be required to approach the site in a counter-clockwise manner and make a fairly sharp turn into the bus driveway. It is not feasible for buses to turn off Pacific Avenue onto South Fifteenth and then onto "A" Street because of the grades involved. Buses could enter and leave the bus driveway in a more natural manner if "A" Street were made one way Southbound so buses could circle the site in a clockwise direction. This again would bring more buses farther in toward the center of the district and would increase traffic on South Thirteenth Street considerably.

The central passenger concourse was developed as a space to impress the traveler as he entered or left the closer quarters of his bus. This space also allows the departing passenger to locate his gate and mentally map his route as he descends the escalator or stairs.

A crowd scaled plaza is provided along Pacific Avenue before the main terminal entrances. This plaza can be justified economically in that a former service alley is incorporated into the site and that it becomes an asset to the shops and to the terminal itself.

Servicing of the shops and much of the terminal itself is done from the bus level during off-peak hours. Vertical circulation units had to be placed outside of the bus traffic area and they appear as features on the exterior of the building. These units are so located and doors are so arranged that the space around one of them may be leased as one shop or two.

Two different spans are used over the bus driveway. The shorter spans are adequate for suburban buses while the larger spans accommodate cross-country buses and reserve parking.

Baggage claiming and checking points are on the upper passenger level and are oriented toward arriving and departing passengers respectively.. On the bus level, baggage is circulated on carts in the wide band at the front of the buses. Conveyors lift and lower baggage between levels. Express and baggage functions are separated to allow the best location for each.

Likewise, the drivers' report room and the dispatcher's office are separated but connected by telephone and vacuum tube. Telephones are also located around the circle of bus positions. The dispatcher is thus given a good view of buses entering and leaving the terminal and drivers are not required to cross bus traffic.

b. Structure

The structural concept is governed chiefly by the following considerations:

1. First fire zone location requires three and four hour incombustible construction.
2. High probability of major seismic damage requires added attention to lateral loads.
3. Soil conditions at the north end of the site are adequate for 8000 psf loads near the surface. The southern portion of the site has apparently been filled and solid bearing is up to 25 feet below the surface.¹
4. Rather long spans over bus spaces are required.

¹This information is contained in the report of a soil investigation to Greyhound Lines by Dames & Moore, Soil Mechanics Engineers, Seattle.

5. Vibration of buses needs consideration.
6. Economy is essential.

With these requirements in mind, it was decided to support the passenger level and plaza on reinforced concrete bearing walls and on precast prestressed columns supported by treated wood piling.

The bus driveway inside the building is an eight-inch thick reinforced concrete slab, structurally isolated from the remainder of the building.

The large spans over the bus drive seemed to call for either steel or prestressed concrete. Steel is comparatively expensive in the Northwest and requires fireproofing while the techniques of prestressing and precasting concrete are well advanced in the Tacoma area. The decision was therefore to use precast, prestressed concrete beams in a radial arrangement. These are 3 ft. 6 in. deep with perforated webs permitting both annular and radial service runs. The main floor is of poured light-weight concrete pan construction.

Roof construction except over the central passenger space is of thin precast vault sections supported on precast prestressed concrete beams and columns. Joints between vault sections and beams and between beams and columns are formed by welding the steel and grouting in place. Enough rigidity is developed in the joints to make the columns mutually supporting and yet allow for expansion and contraction through flexing of the thin roof sections.

The central passenger concourse space is roofed by a series of concrete thin-shell forms with end stiffeners. The thrust of these is taken up by

a tension ring. Rain leaders are incorporated into the columns and stainless steel inserts prevent erosion effects of runoff from the central shells to the lower roof.

c. Materials

Materials are selected for appearance and economy but primarily for ability to withstand the punishment of the traveling public.

Sash are aluminum with provisions for movement in both horizontal and vertical directions. Building and shop entrances are of tempered plate glass while other doors are of hollow metal.

Floors of the passenger level and the passenger concourse are terrazzo.

Interior partitions are constructed of steel studs, metal lath and plaster.

In all public spaces a door height wainscot of glazed tile is provided.

d. Acoustics

The chief acoustical problem is to subdue the noise level throughout the building. Noise due to buses is held down by structural isolation of the driveway slab. The effects of the hard floor and wall surfaces is tempered by a sprayed-on asbestos ceiling treatment. Announcements are made over a system of small speakers each covering its own small vicinity.

Attention is also given curved surfaces to prevent annoying focusing effects.

e. Heating and Ventilating

Steam for heating is purchased from a central steam plant a few hundred yards east of the site. Heating is performed by convectors in the smaller

spaces and by volume heaters in the larger spaces. Ventilation is accomplished mainly by introducing fresh air into the volume heaters. Heaters are located on the bus level and steam lines and duct runs are in the deep beam space above the bus drive. Heated air is supplied around the building perimeter and a smaller amount is introduced into the passenger concourse on the bus level. Air to be exhausted or recirculated is drawn off at the rim of the passenger concourse.

Due to the mild climate, air-conditioning is not included and the bus driveway is not heated. Fresh air, however, is introduced into the bus drive to maintain positive pressure where required and the heavier than air fumes are exhausted through grilles in the driveway slab.

f. Estimated Cost of Project

Cost of Building:

Passenger level	62,200 SF @ \$25:	1,530,000.00
Bus level (includes plaza over)	70,000 SF @ 8:	560,000.00
Foundations	76,800 SF @ 3:	230,000.00
Special Equipment (Bus exhaust and motor stairs)		<u>100,000.00</u>
Total		\$ 2,420,000.00

Cost of Land and Demolition:⁼\$ 325,000.00

Total Cost of Project 2,745,000.00

g. Financial Feasibility

Annual return required to justify investment (30 year amortization):

Building:	\$2,420,000 @ 6% + 3-1/3%:	226,000.00
Land:	325,000 @ 6%:	<u>19,500.00</u>
Total		\$ 245,500.00

⁼\$ Greyhound lines purchased west half of site for \$200,000 in 1956.

Annual Terminal Expenses:

Salaries, Supplies, misc.	\$ 225,000.00
Taxes and insurance	<u>52,000.00</u>
	277,000.00

Gross Annual income required:

	245,500.00
	<u>277,000.00</u>
	\$ 522,500.00

Estimated Annual income:

Ticket sale commissions: (15% of \$2,640,000) [§]	397,500.00
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Concession commissions:	75,000.00
Rentals (20,000 SF @ \$2.50)	<u>50,000.00</u>
	522,500.00

[§]Greyhound Lines have estimated their ticket sales for 1958 will be approximately \$ 1,000,000.

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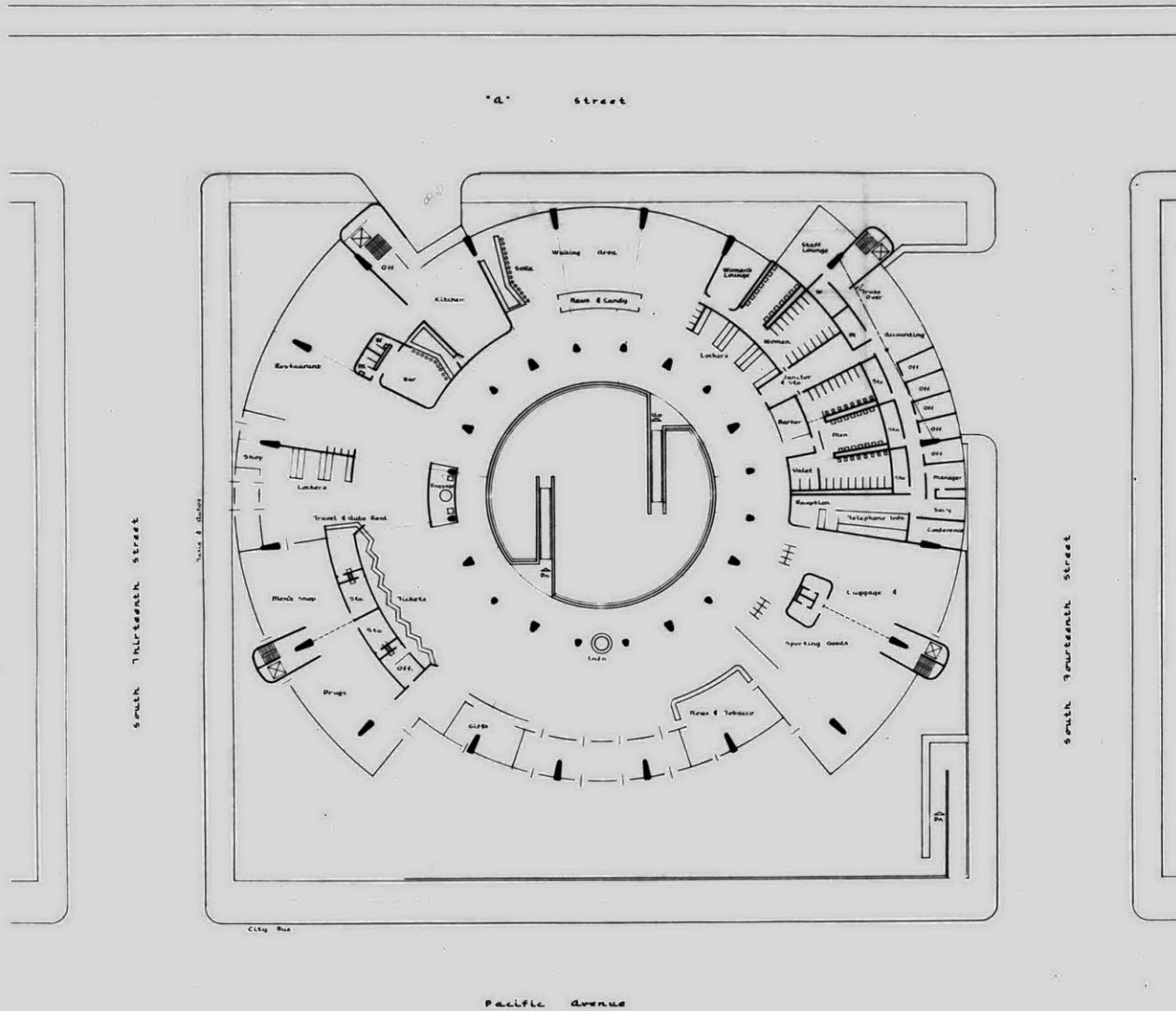
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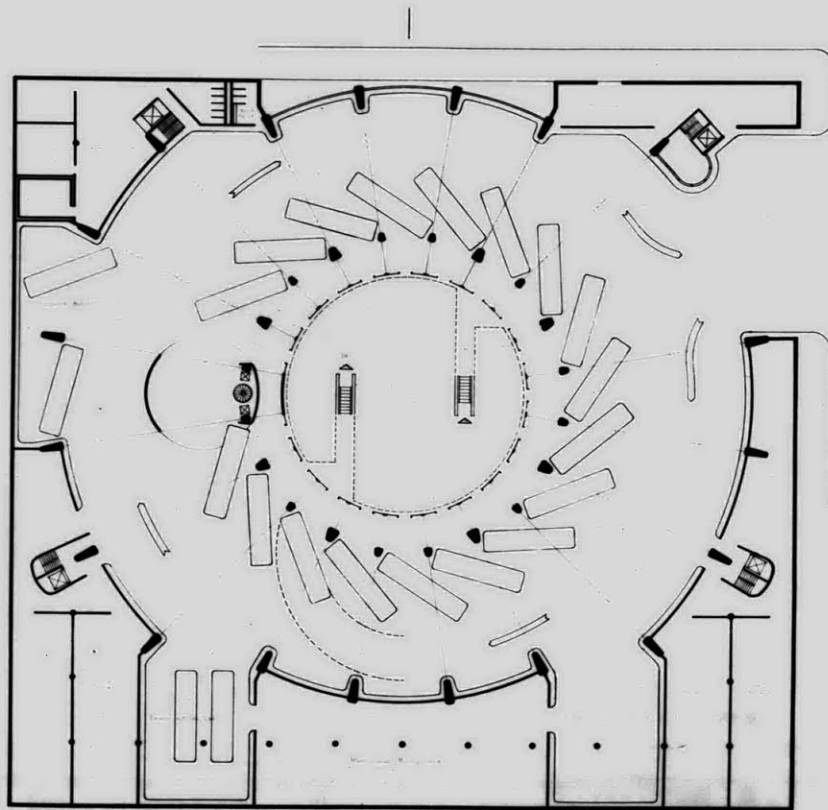
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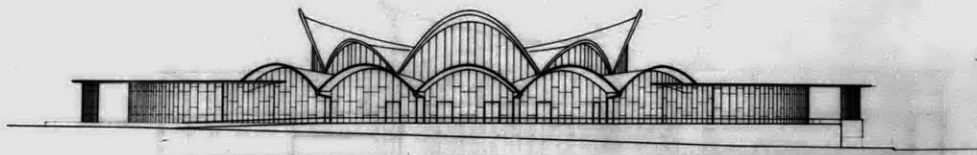
Passenger Level

A Bus Terminal for Tacoma, Washington

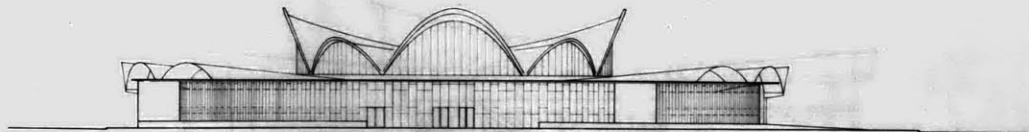
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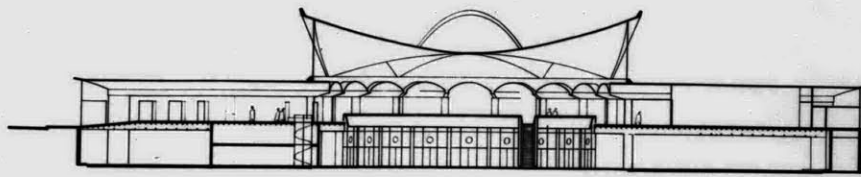
Bus Level



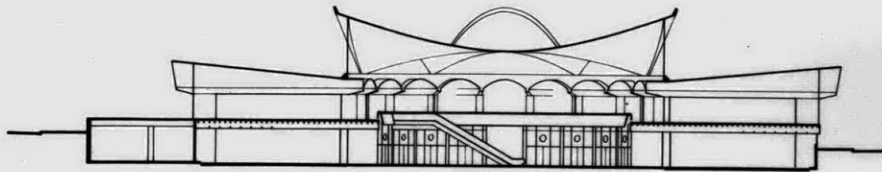
West Elevation



North Elevation



section "d"-"d"



section "B"-"B"