LUBBOCK TRANSIT CENTER

by

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AN ARCHITECTURAL
PROGRAM
FOR DEVELOPMENT OF
THESIS PROJECT

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LUBBOCK TRANSIT CENTER

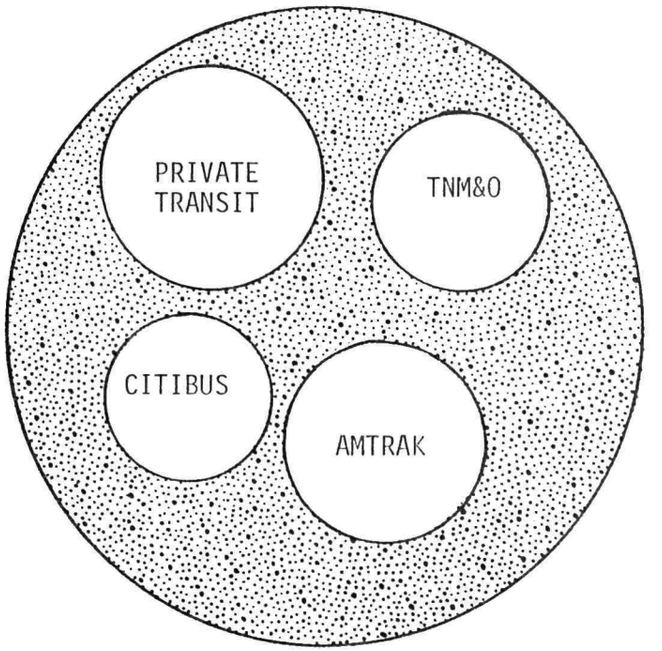
Introduction

In this age of increasing oil prices, difficulties with the OPEC oil cartel, and the uncertainties involved in providing a constant supply of oil in the future, more and more emphasis is being placed on the public transportation market.

The Lubbock Transit Center will combine facilities for TNM&O Buslines, AMTRAK rail service and Citibus, the urban transit company serving the Lubbock community. The Lubbock Transit Center will be owned and operated by the City of Lubbock, the primary client. AMTRAK, TNM&O and Citibus will lease the facilities and will be the secondary clients.

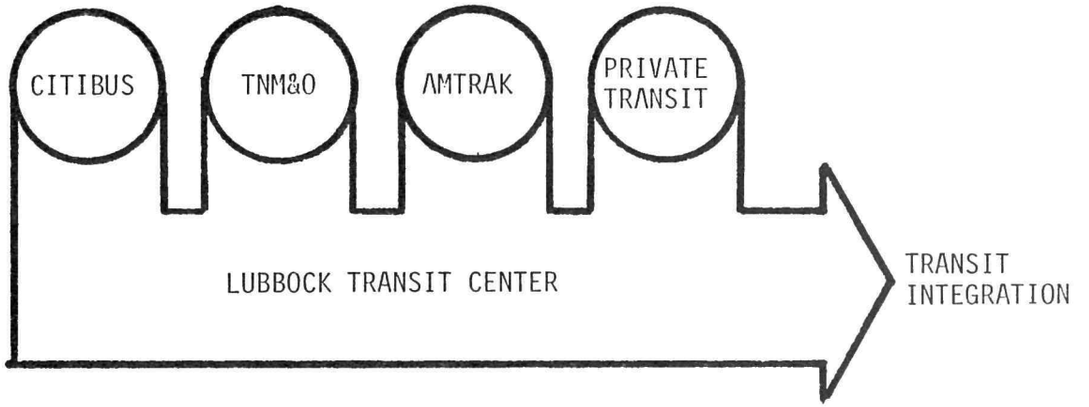
Emphasis is being placed upon the integration and interface of these public transportation modes with each other as well as with the various modes of private transportation. This will result in a greater ease of using public transportation, and will hopefully encourage the use of these transportation modes. A special feature of the Transit Center will be facilities for loading automobiles onto rail cars, integrating the private automobile with long-haul transportation as is presently done by the Auto-Train Corporation.

The project site is located at the Broadway railroad underpass in downtown Lubbock. This site was found to be the most promising in successfully integrating the modes of transport involved.



Problem Statement

By the integration of various modes and user/operator activities, the Lubbock Transit Center will provide transportation alternatives which will be necessary to deal with the energy problems of the future and encourage the use of the public transportation system. By doing so, the Transit Center should stimulate the growth and development of the City and of the neighborhood surrounding the Transit Center and firmly establish these public modes of transportation within the City.



Goals of the Transit Center

1. To efficiently integrate public transportation systems within the City of Lubbock and the Lubbock region, stimulating use of public transportation systems.

2. To provide for the future transportation needs for both Lubbock and Lubbock area.

3. To provide an atmosphere conducive to the various activities which would occur in the neighborhood of the Transit Center.

4. To provide a building in which the City of Lubbock and residents of the Transit Center can take pride and which would be viewed as a positive influence within the city.

5. To provide an atmosphere conducive to the activities which will occur within the Transit Center.

6. To provide transportation alternatives for the transportation disadvantaged of Lubbock.

7. To act as a magnet for the attraction of compatible land uses in the Transit Center area.

8. To provide the greatest amount of service at the least possible cost.

9. To expand the limits of the CBD by utilization of substandard and undeveloped areas available to CBD expansion.

Goals and Interest Groups

GOAL NUMBER	USER	SPECIAL USER	OPERATOR	NON-USER
1.	X	X	X	X
2.	X	X	X	X
3.	X	X	X	X
4.	X	X	X	X
5.	X	X	X	
6.	X	X	X	
7.	X	X		X
8.			X	X
9.				X

Design Objectives of the Transit Center

1. To ease the process of transferring from one transportation mode to another.

2. To maximize net income for the facility so that it will not become a finincial drain on the Lubbock economy.

3. To provide supplementary services which travelers find necessary.

4. To provide for user security and safety.

5. Utilize energy in a conscious manner.

6. To provide for user orientation needs, a critical element of transportation facilities.

7. To minimize the number of level changes.

8. Minimize travel distances and circulation conflicts within the building.

9. Minimize obstacles for the benefit of the mobility limited without detrimentally affecting service for the remainder of facility users.

10. To utilize durable, functional materials thereby keeping maintenance costs to a minimum.

11. To provide structural flexibility so that any major change in transportation patterns in the future may be dealt with.

Objectives and Interest Groups

OBJECTIVE	USER	SPECIAL USER	OPERATOR	NON-USER
1.	X	X	X	
2.			X	X
3.	X	X		
4.	X	X		
5.			X	X
6.	X	X		
7.	X	X		
8.	X	X		
9.		X		
10.			X	
11.			X	

LUBBOCK, TEXAS

Introduction

Lubbock is a relatively young city, incorporated in 1909 in the center of what was then an immense cattle empire. A short time later, after discovery of underground water, emphasis turned from cattle to agriculture.

Lubbock has expanded rapidly since the Santa Fe Railroad established service in 1909. Lubbock soon became the major transportation center of the South Plains, and became known as the "Hub of the South Plains".

Texas Tech University, then known as Texas Technological College, has paced the city's growth. There are currently 22,000 students enrolled at Texas Tech, and the University is a major factor in Lubbock's economy. Lubbock Christian College, established in 1957, currently has an enrollment of 1200.

Lubbock is a major marketing center for agricultural products and produce and has always been a major center for agricultural processing and distribution. Manufacturing has increased immensely during the 1970's and is becoming more diversified. Electronic equipment, agricultural machinery, and transportation equipment are some sophisticated items currently manufactured in Lubbock.

There are currently 170,000 persons in the city and every indication is that the city will continue to grow. There has been some concern in recent years, that a lack of an adequate water supply will thwart future growth but many feel that this problem will soon be rectified.

Lubbock citizens are proud of their ranch and agricultural heritage, and the windmill is strongly associated with this heritage and is often depicted as the city's "trademark". Citizens of Lubbock tend to be politically conservative and American "free enterprise" is very much in evidence. Lubbock, like most cities of the South is religious and many citizens are proud of the fact that there are more churches per capita than any other U.S. city.

History of Lubbock
(Ref. 1, Ref.2)

The first inhabitants of the Lubbock area, were bands of nomadic indians, who came to the area for hunting buffalo and often camped in the Yellow House Canyon area.

The first white man to see the Lubbock area were members of Francisco de Coronado's exploration expedition of 1540. Coronado was amazed at what he found in the Lubbock area; there were countless thousands of buffalo grazing on a huge featureless plain, seemingly without trees or water. Coronado, though amazed, deemed the land of little economic value.

Because of Coronado's description of the area, many years passed before the influence of the white man was felt. By the early 18th century, bands of indians had acquired guns and horses from French and Spanish sources, creating a major social change. Tribes of peaceful hunters had become a fierce and warring people. The land remained the domain of the indians for many years, for the climate as well as the indians repelled white settlers.

The first white intruders were white buffalo hunters, who laid to waste thousands of buffalo, on whom the indian's livlihood depended. By the late 1870's, buffalo were nearly non-existent, and so went the indian's source of food, clothing and shelter. Severely weakened, the indians were finally subdued by the U.S. Army and placed on reservations.

With the absence of the indians, traders, cattlemen, and buffalo hunters, quickly filled the vacuum, and in 1876 the Texas Legislature, divided the South Plains Area into 54 countries. Lubbock County was one of these 54 countries, named after Thomas S. Lubbock, a Texas civil war hero.

In 1877, the first ranch in the area was established in the Blanco Canyon area of Crosby County. By the early 1880's, some monstrously huge ranches were flourishing in the area, including the XIT ranch which consisted of over 3,000,000 acres. In 1884, the Western Land and Livestock Company established a 72,000 acre ranch in Yellow House Canyon in Lubbock County and soon acquired another 245,280 acres, over half the county.

In 1886, Estacado, which lay on the Lubbock-Crosby county line and had a population of 200, was named the county seat of Crosby County. In 1891, the Crosby County seat

was moved to Emma, and Estacado disappeared within a few years,

Starting around 1885, the cattle boom began to fizzle due to severe winters, dry summers, and a drop in the price of beef. Legislation passed during the 1880's, made agricultural production more profitable than cattle, and the big ranch era was over.

In 1884, George Singer established a store in Yellow House Canyon, which became the U.S. Post Office for Lubbock County. Settlers began to pitch tents around "Singer's Store", and efforts were made to organize Lubbock County and establish a county seat. Disagreement on the location of the county seat lasted until 1891 when Section 1, Block O of Lubbock County, the very center of the County, was selected as County Seat and on May 10, 1891, Lubbock County was organized. Houses were moved, intact, distances as far as five miles to the new County Seat. In two months, Lubbock had a population of 200 persons.

In 1892, the first county courthouse was erected for a cost of $2000 and businesses of all sorts were erected across the street from it. Lubbock citizens established homesites usually consisting of two to three city lots, which gave the town a spread out effect, a characteristic evident even today. Windmills were an essential fixture on every homesite, and so began Lubbock's love affair with the windmill.

Religion, always a major factor in Lubbock's social life, was already evident by 1909 when a total of nine churches had already been constructed.

In 1907, the Lubbock Independent School District was created and the first school constructed. In 1909 this school had been destroyed in a fire and a new school, with an enrollment of six hundred students, was constructed just south of Avenue "P" and 4th Street.

The Avalanche, Lubbock's first paper was established in 1900 and by 1909 had 2500 daily subscriptions.

By the early 1900's, it was evident that if Lubbock was to grow, access was needed to cheap and rapid transportation. In 1905, the Santa Fe Railroad decided to extend a branchline down into the South Plains from its northern network, and by 1907 the branchline extended down to Plainview. In 1909, track construction had

reached Lubbock, and in 1911 the track was extended southward to Sweetwater. The establishment of railroad service in Lubbock had the greatest impact of any event, save the establishment of Texas Tech in 1923.

In the early 1900's the automobile had also arrived in Lubbock. In 1905, Phelps White tried to establish a Lubbock-to-Canyon bus route, but it soon failed. Two years later, Frank Wheelock and Rollie Burns established a Lubbock-Amarillo bus route, which existed until 1909 with the establishment of Lubbock rail service. In 1909, more than 200 cars were located within the county.

Early residents of Lubbock tried to promote the area as an agricultural center and made exaggerated claims of agricultural production to draw more farmers to the area. In 1904, 100 bales of cotton were produced in Lubbock and the first cotton gin was erected in 1907, processing 700 bales in its first year of operation. The Texas Agricultural Experiment Station, established in 1909, discovered an almost limitless supply of water only 80 feet underground. The first agricultural irrigation wells were drilled in 1910.

Lubbock's population grew as agricultural production grew. For a period of time, Lubbock's population doubled every ten years, and by 1926, Lubbock had become the third largest inland cotton market in the world.

The establishment of Texas Technological College in 1923 was the biggest event to effect Lubbock. Texas Tech had four basic economic impacts on Lubbock: 1. The majority of expenditures made by the students were made in the local market; 2. The annual expansion of college facilities represented capital expenditures which flowed through local firms; 3. Tech employees established permanent residency in Lubbock, thus expanding the local labor market; 4. The college attracted visitors which resulted in increased expenditures and a greater demand for service industries.

In 1925, the first Lubbock intracity bus service was established. This bus service was intended primarily for the use of Texas Tech students.

In 1926, the city purchased a large tract of land for a recreational area, now known as Mackenzie Park. Other municipal projects in the '20's included expansion of the city electric plant and a municipal airport and in

1928 a Federal Court was established in Lubbock. Housing habits also changed during the '20's. The wooden-box-strip type of construction, predominant in the early history of Lubbock, gave way to brick and stone construction.

Other improvements in the 1920's included paved streets, lighting, and sidewalks. In 1928, another railroad line extended lines into Lubbock, the Fort Worth & Denver Railroad. Major bus service was made possible by the seven major highways which intersected within the city.

During the 1930's, the Great Depression left its mark on Lubbock as it did across the country. Lubbock, with its economy based on agriculture, was somewhat luckier than the rest of the U.S. Also, during this period of time, Texas Tech continued to expand, giving the local economy a shot in the arm. In 1933, "New Deal" legislation provided the funds for paving and highway development, and also power expansion..

By the late thirties, economic conditions had eased, but new problems were becoming apparent. The city was in dire need of zoning ordinance and by 1941 a zoning ordinance was approved and put into effect.

Lubbock's growth rate increased after the depression, and was partially spurred on by World War II. In 1941, Lubbock Army Airfield, later renamed Reese Air Force Base, was established as a training base west of the city limits. The Municipal Airport was also converted into a training base for a short period of time, known then as South Plains Army Air Field.

Manufacturing and chemical processing began to increase in the Lubbock area following discovery of the Slaughter Oil Field, just north of town.

Lubbock expansion was not limited to manufacturing during the 1940's. In 1940, 19th Street was the major artery of business activity, but by 1950, 34th Street was being developed into a retail district.

The 50's, 60's, and 70's could be characterized as periods of great expansion and construction boom. Residential areas, shopping centers, hospitals, and churches appeared at a staggering rate. In 1957, Lubbock Christian College opened its doors and in 1980, boasted an attendance of over 1200 students.

On May 11, 1971, Lubbock was devastated by a tornado which virtually obliterated the residential area east of

Avenue "Q" and between 4th Street and Main Street. The area has been developed containing many civic and public buildings including: the Lubbock Memorial Civic Center, motels, the Public Library, West Texas Hospital, and the Department of Public Safety.

Lubbock in 1980
(Ref. 3)

Agriculture

As it has always been, agriculture remains the lifeblood of Lubbock's economic activity. The value of farm products produced in 1964, amounted to over $500,500,000, accounting for more than 25% of all agricultural sales within Texas.

In 1970, 1.6 billion bales of cotton were sold in the Lubbock market, 53% of the cotton produced within the state. In addition, 2.5 million tons of grain sorghum, 45% of the state production, were sold in the area. Cattle production is on the rise in the Lubbock area and there are currently eight meat packing and processing plants located in and around the city.

Manufacturing (4:44/24)(5:172-174)

Manufacturing in the past has been geared towards agriculture, but during the 1970's, manufacturing has become more diversified, for example the Texas Instrument's plant which opened up in 1974. This trend is continuing, with the scheduled opening of a Michelin Tire plant in 1983. Manufacturing has experienced a 20% increase in the six short years covering the period from 1971 to 1977. In 1977 there were 265 manufacturing operations in the area in comparison to the 220 operations that were in existance in 1971.

Major manufacturing activity in Lubbock includes:food preparation; textiles; apparel; lumber; printing and publishing; fabricated metals; farm and garden equipment; electronics; and transportation equipment.

Wholesale-Retail Trade (5:172-174)(6:44/132-136)

Despite a slight decline in the number of retail establishments, there has been a 59% increase in retail employment in the ten year period from 1967 to 1977. In 1977 there were 1374 retail establishments located within the city, a 14% decline from the 1611 retail establishments in 1967. Employment in 1977, was 16,401 employees versus the 9,743 employed in retail establishments in 1967. This employment increase, despite the establishment decrease, may indicate that the retail trade market is growing but that intense competition is forcing the weaker establishments out of business.

The Lubbock wholesale trade area is generally recognised to consist of 23 surrounding counties in West Texas, as well as 3 counties located in Eastern New Mexico. The wholesale trade of the Lubbock area has also been on the increase. In 1977 there were 584 wholesale establishments located within the city, as compared with 439 establishments in 1967. This represents a 10% increase over a 10 year period. During this same period of time, a 40% increase in the wholesale employment has occurred. The wholesale employment climbed from the 5,000 persons employed in 1967 to 7,025 persons in 1977.

Educational Facilities

Texas Tech University, established in 1923, has had a marked influence on Lubbock. Approximately 23,000 students attend Tech, the third largest state supported institute of higher education in Texas. Fields of research run the spectrum from liberal arts to engineering, with special attention given to the needs and problems of arid regions.

Lubbock Christian College, opened its doors in 1957 and has recently become a four year college. In 1971, Lubbock Christian had an enrollment of 1725 students.

The Lubbock Independent School District had a student enrolment of 33,000 students in 1971. In 1971 there were five senior highschools, 10 junior high schools and 37 elementary schools. In recent years the School District has had trouble in getting a de-segregation plan approved by Federal Court. A temporary busing program is currently in effect, but a long term solution is yet to be found.

Lubbock State School, located on University Avenue, just north of the Loop, is a school for exceptional children. It is a state supported school, and provides dormitory facilities, and vocational studies for its students.

Besides the before-mentioned educational facilities, there are numerous trade and vocational school, business colleges, etc.

Cultural Facilities

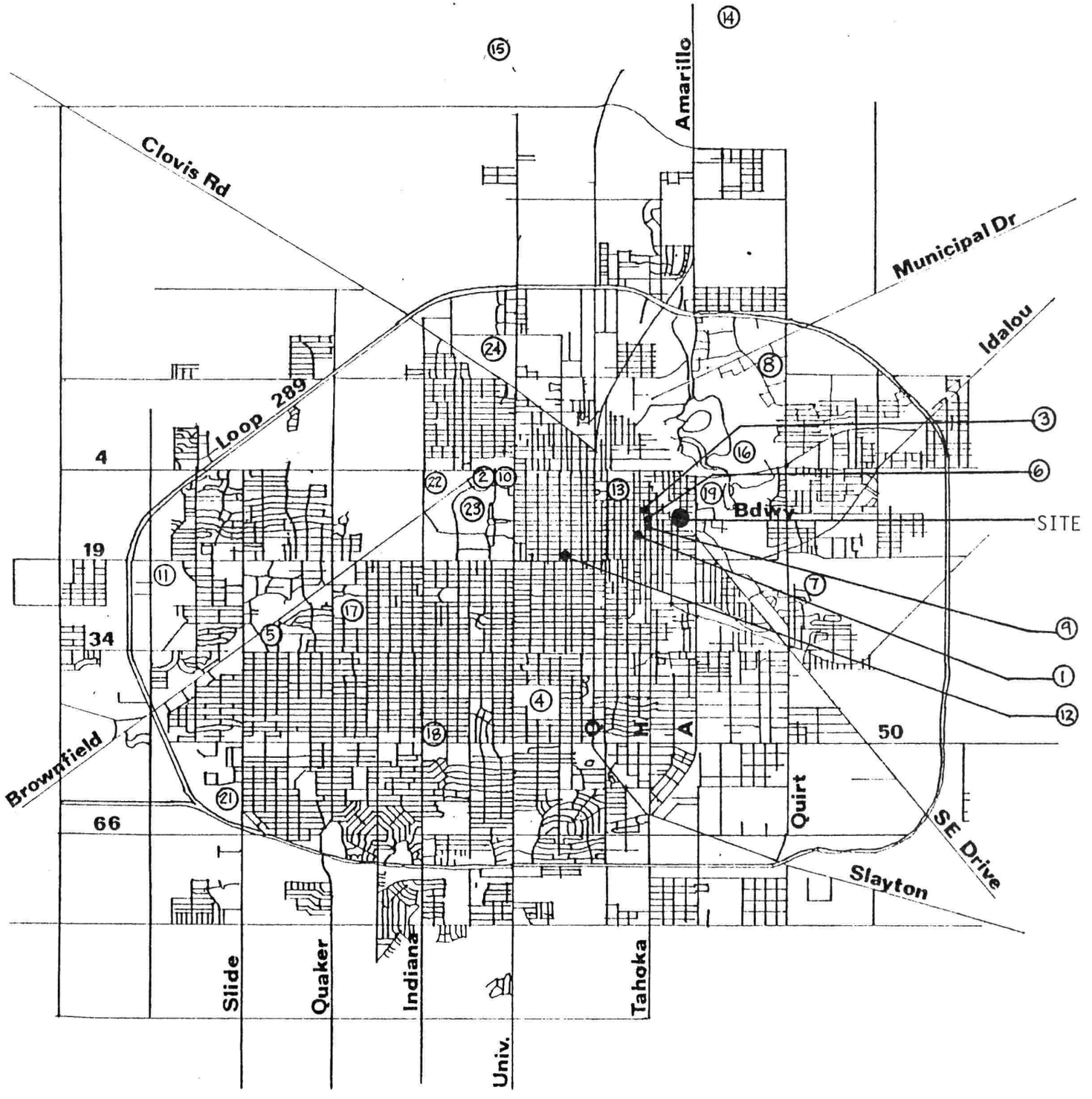
The Lubbock Memorial Civic Center, built on the site devastated by the 1971 tornado, is the main cultral attraction in the city. It is the home of the Lubbock Symphony Orchestra and plays host to many events throughout the year. Its facilities include an exhibition hall, a banquet hall and a fine theater. Though this civic center has just been opened recently, it has been attacked for having inadequate facilities to support large attractions.

Lubbock has also attained a reputation of being one of the most movie-going cities in the United States. In 1977 there was a total of 23 movie establishments within the city, many of these theaters are duplexes and quadplexes (5:172). The Lubbock Municipal Audotorium and Coliseum, a facility shared with Texas Tech, has continued to have major attractions throughout the years. The West Texas Museum, a Tech facility, is a point of interest. With its Moody Planetarium and Ranching Heritage Center, it attracts many Lubbock Citizens. Another major cultral asset within the city is the Lubbock Theater Center.

Recreational Facilities

Mackenzie State Park and over 40 other city parks, provide more than 14,000 acres of recreational space of all sorts.

The recently developed Canyon Lakes Project, is a linear park



Lubbock - Points of Interest

1. Chamber of Commerce
2. City Auditorium-Coliseum
3. City Hall
4. Clap Park
5. Coronado High School
6. County Courthouse
7. Dunbar High School
8. Estacado High School
9. Federal Building
10. Jones Stadium
11. Lubbock Christian College
12. Lubbock High School
13. Lubbock Memorial Civic Center
14. Lubbock Regional Airport
15. Lubbock State School
16. Mackenzie State Park
17. Maxey Park
18. Monterey High School
19. Panhandle/South Plains Fair Grounds
20. Reese Air Force Base
21. South Plains Mall
22. Texas Tech Museum/Ranch Heritage Center
23. Texas Tech University
24. Yellow House Canyon (Canyon Lakes Project)

1" = 1.5 MILES

located in Yellowhouse Canyon, includes areas for water recreation. A future development for the Canyon Lakes Project will be a park facility designed for the needs of the handicapped, one of the first facilities of this kind in the U.S.

Buffalo Springs Lake, located 4½ miles east of the city contains 225 acres of water surface and is a major center of aquatic activity during the summer months.

Lubbock also has five public swimming pools as well as three golf courses, four bowling alleys and facilities for tennis and rollerskating.

Population/Demography

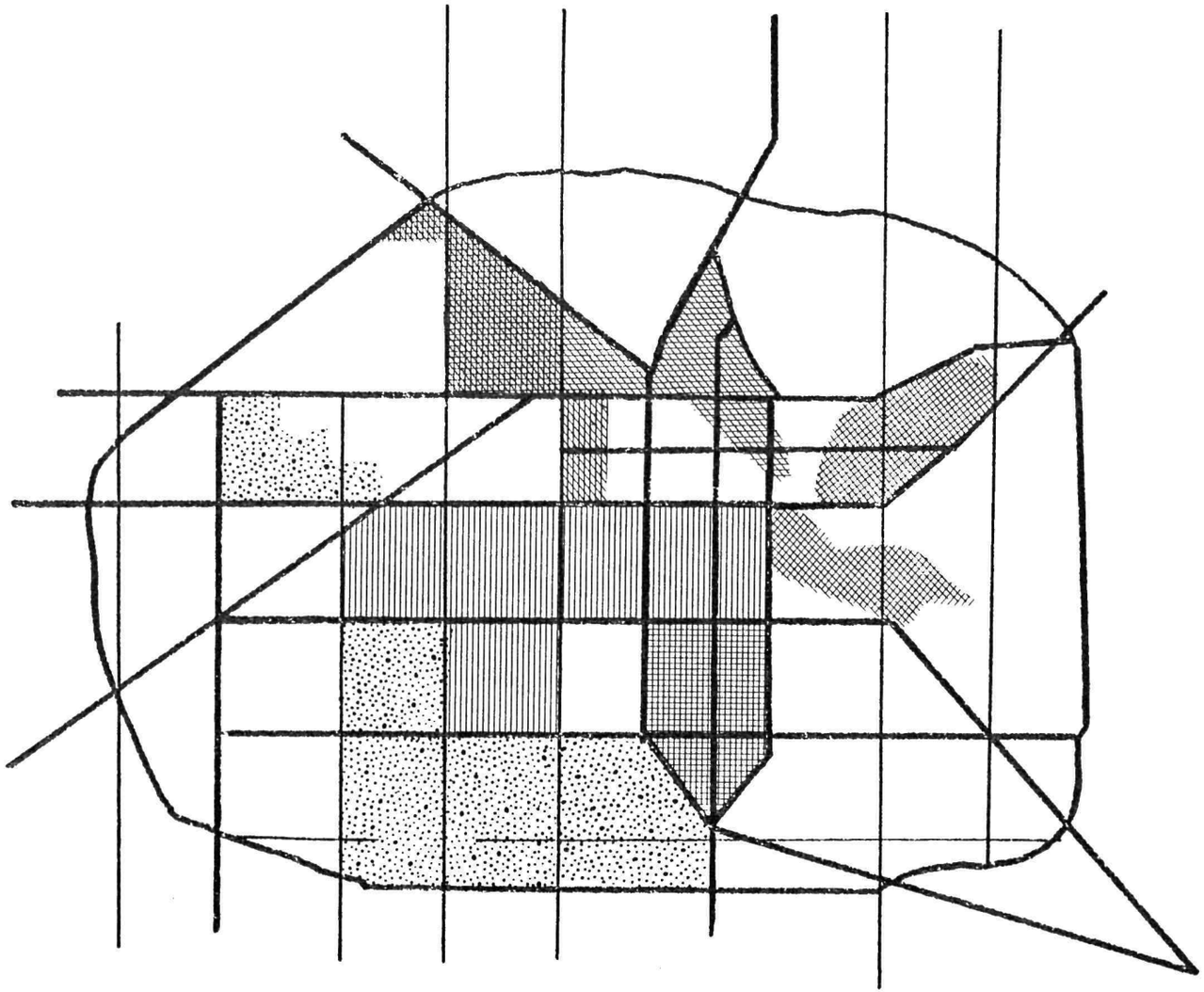
In recent years, the greatest factor producing the population gain within the city has been an excess of births over deaths. Lubbock once had a positive rate of migration but the trend has been reversed in recent years. Recent projections forecast a zero rate of migration in the future. The birth rate is also expected to decline in the future.

The 1980 population of Lubbock is estimated to be about 182,800 persons, an increase of over 20% since 1970. The population should approximate 206,500 and 235,000 for 1990 and 2000 respectively.

Total employment in Lubbock in 1980 was approximately 72,600, a 25% increase since 1970. Projected employment figures for 1990 is 86,400 persons. Greatest areas of employment growth are expected to be in the areas of manufacturing, service industries, goverment and retail trade. A slight decline is forecast in agricultral industry employment. In 1970 the unemployment rate was a low 2.4% and the mean and median incomes were $10,236 and $8,474 respectively. 4.7% of the population reported incomes below the poverty level. Census tracts 2.02, 3, 6.01, 8, 10, 12.02 and 24 had high concentrations of low income. These areas are located east of Avenue "Q" and north of 19th Street. Areas of high income concentration were located predominantly south of 50th Street. (7:P4) (8:Fig. 4-5, Fig. 4-9)

The 1970 census recorded a total city population of 149,101 persons. Racial breakdown consisted of 15.5% Mexican-Americans, 7.3% Blacks and 77.2% were white. Areas of Mexican-American concentrations are located north of 4th Street and east of Avenue "Q", whereas concentrations of blacks were located north of Quirt Avenue. (7:P1) (8:Fig. 4-2, 4-3)

40.6% of the 1970 population was younger than twenty years old and 9.3% were older than sixty years old. Elderly concentrations were located mostly between 19th Street and 50th Street. (7:P1) (8: Fig 4)



Lubbock Demographics

Legend:

- Elderly Concentrations
- Mexican-American Concentrations
- Black Concentrations
- Low Income Concentrations
- High Income Concentrations

1" = 1.5 Miles

Of the 57,990 employed workers in 1970, only 0.82% of them road buses to work, far below the national average and 3.6% of the population walked to work, and 8.4% of the population arrived to work as a passenger in a private automobile. The population segment that rode to work in a private automobile were fairly well dispersed throughout the city but the majority of one car households were located between Indiana Avenue and Avenue "H". Approximately 12% of the population worked in the CBD. (8: Fig. 4-6 thru 9)

Handicapped persons, a population segment of special interest, comprise approximately 5.5% of the population. About 3,000 persons have mobility limitations and 1,234 persons are visually handicapped and 242 have serious hearing impairments. (9:T5-1)

Physical Features
(Ref.10)

Geography

Lubbock is located in the heart of the plains country of West Texas. It is the county seat of Lubbock County and is the largest city within a 300 mile radius. Lubbock is located approximately 325 NNW of Dallas-Fort Worth, 120 miles South of Amarillo and 339 miles NE of El Paso. It is located centrally in the U.S. located 1,795 miles from New York City and 1,095 miles from Los Angeles and 1,134 miles from Chicago.

Topography

The topography of Lubbock and the surrounding area can be characterized as flat. There is a very gentle slop to the southeast at a rate of 10 feet per mile. More excessive slopes can be found on the edge of the "Caprock Escarpment" which enters the county north of Slaton. The highest point in the county is at the extreme northwest point of the county at 3405 feet and the lowest point is found in the southeast Yellowhouse Canyon at 2820 feet above sea level.

The Lubbock area is spotted with small depressions which fill up with water during periods of heavy rain. These are known as playa lakes. Drainage is limited to small stream valleys and water is easily absorbed into the soil.

Climate

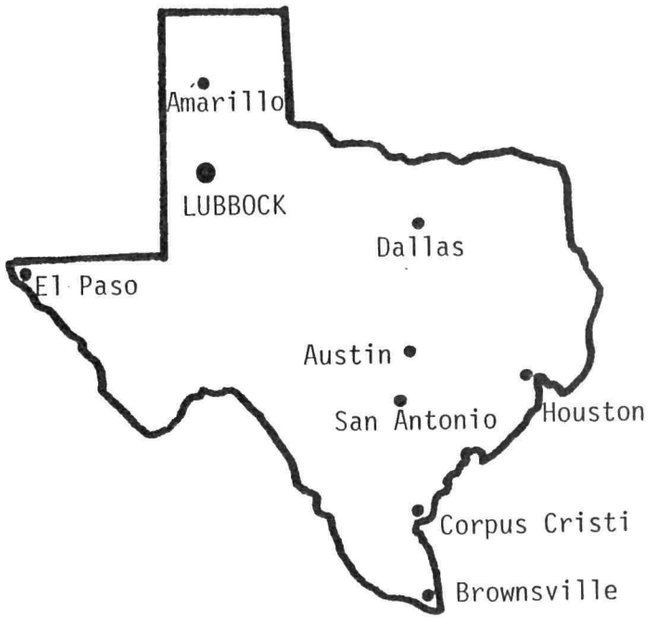
Lubbock is classified as a semi-arid area but the weather is generally pleasant. The average temperature for the year is 59.7^{o}F and ranges from a daily maximum of 92.4^{o}F in July to a normal daily miminum of 25.4^{o}F in January. Temperatures of 107°F and -16°F are the recorded record extremes. The area has a fairly long growing season from April 9 to November 1, the dates of the average last and first freezes of the year.

Average precipitation for the year is 18.08 inches with the majority of the precipitation occurring during heavy thunderstorms which sweep through the area in May, June and July. The area receives an average of 3 inches of snow per year.

Because of the extremely flat terrain of the area,windspeeds tend to be high. In springtime the combination of soil cultivation by area farmers and high winds cause severe dust storms, coming predominantly from the southwest.

Winds are predominantly out of the south with a slight shift towards the southwest during the winter months. The average wind velocity is 13 miles per hour but gusts of 50 to 70 miles per hour are not uncommon in the area.

Geographical Location - U.S.



Geographical Location - Texas

The sky is usually quite clear with a total of only 99 cloudy days per year. There's an average of 3,578 degree days of heating per year, occurring primarily between November and March. There is only an average of 1,649 degree days of cooling annually occurring primarily between June and September. From this date one can conclude that heating concerns would take precedence over cooling concerns and that the large number of clear and partly cloudy days makes the area a good prospect for the development of solar energy. (11:144)

Minerals

Mineral production in the area is not intensive. Petroleum production from the Slaughter Oil Field was the most valuable production. The 1965 oil production for the county was 318,900 barrels. Other mineral production occurring in the area are, in order of respective value: sand; gravel; and natural gas.

Hydrology

The Ogallala Formation underlies most of the Lubbock area. This aquafier of sand and gravel may have originally stored 300-400 million acre-feet of water. The recharge rate of the aquafier is extremely slow, only ½ inch per year, and cannot replenish the water removed by irrigation wells. A 1967 estimate of the aquafier was 125 million acre-feet. Both Lubbock and Slaton recieve their municipal water supply from Lake Meredith, located north of Amarillo to help concerve the Ogallala Formation.

Buffalo Spring Lake is the largest local body of water and has a storage capacity of 5360 acre feet.

Soils

The majority of the Lubbock area is covered with a soil known as the "Amarillo Fine Sandy Loam Association". These soils are a brown to brown-red sandy loam surface soil at a depth of 6-15 inches. The subsoil is a red-brown sandy clay and a layer of caliche can be found at a depth of 38 to 60 inches below the surface.

The Amarillo soils are excellent for both dry and irrigation farming and have a high water absorption rate. The shrink-swell potential is low for the surface layer but moderate for the sub-surface sandy clays.

Lubbock City Government
(Ref. 12)

Lubbock currnetly has a city council-city manager form of government. The council consists of four council members and a mayor, who are elected at-large by Lubbock citizens. The city council in turn appoints the city manager, who is an employee of the city.

It is the city council's responsibility to make decisions concerning matters of zoning, budget, items of public interest, appropriations of bond funds, grants and franchises, purchases of goods and services, and award contracts. It is the city manager's responsibility to administer the city and implement the decisions made by the city council.

In addition to the city council and city manager, there are the city secretary, city attorney and city tax accessor and collectors, whose jobs are fairly self-explanatory. There are thirteen major city departments. Their relationships and primary functions can be seen in the organizational chart.

The Lubbock TTransit Center and Lubbock Regional Airport could be incorporated into one city division, the Lubbock Transport Board. This would have to be done by city ordinancy and is basically an expansion of the existing Airport Board. Since both the facilities are city owned with rental space for carriers, and both are transportation facilities, this combination of the Airport and the Transit Center would be ideal. This combination would also lead to ease or coordinating transportation systems.

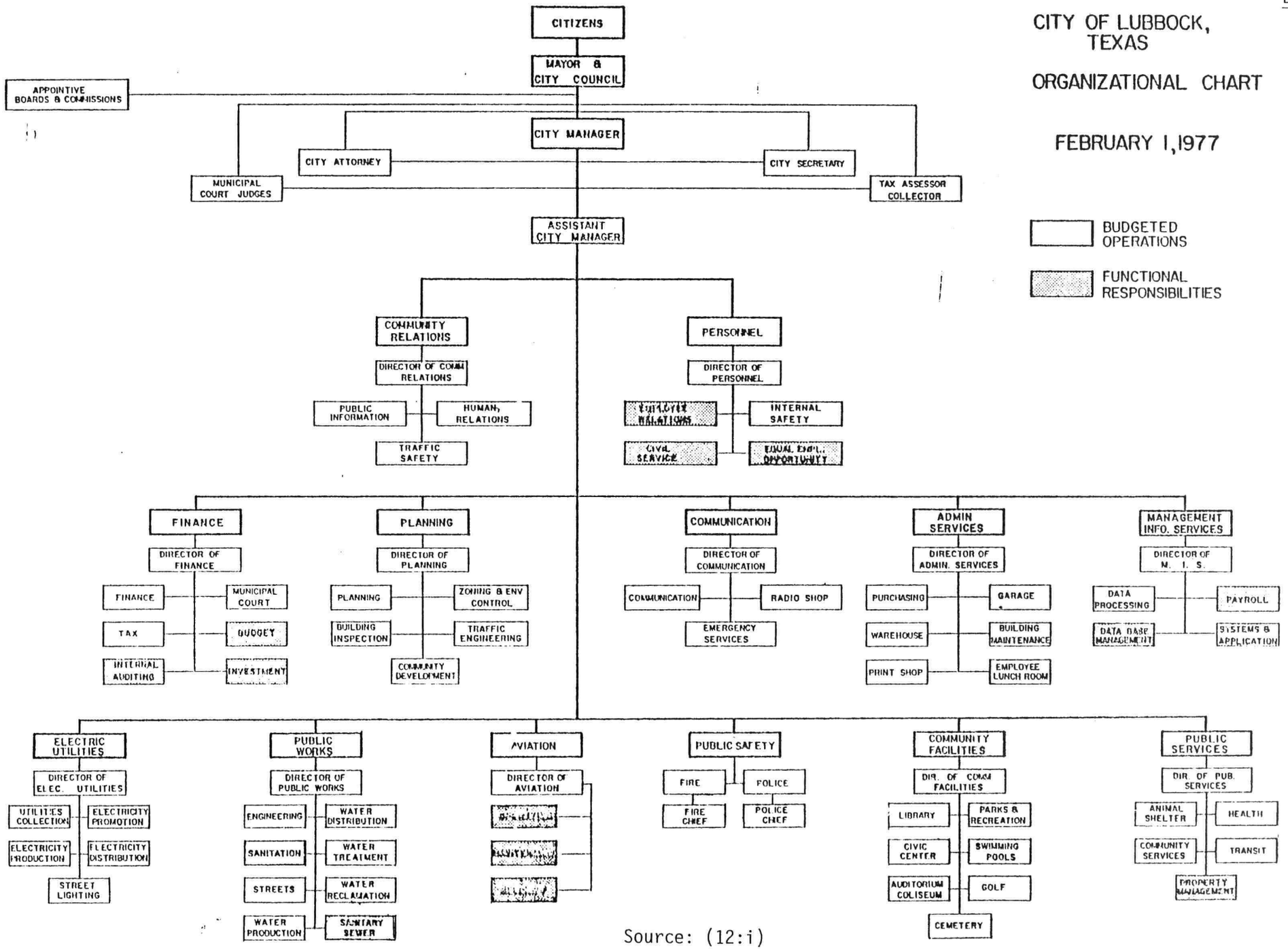
The Transport Board would be composed of five members, each a resident of the city. Members of the Board would be appointed by the City Council for a three year term. One person of the Board shall be appointed as secretary. The city council shall have full authority to remove any members found to be incompetent, unfit or unsuitable to serve on the Board.

The Transportation Board will be delegated authority for the planning, development, construction, enlargement, improvement, maintenance, equipment, operation, protection and policing of airports and transportation facilities established, owned, and controlled by the city. The Transportation Board would be authorized to enter into agreements for the rental of land, buildings, and facilities of any airport or transportation facilities owned and/or operated by the City. A fund will be established and all revenues received from airport/transportation center operations shall be placed into the

CITY OF LUBBOCK, TEXAS

ORGANIZATIONAL CHART

FEBRUARY 1,1977



Source: (12:i)

fund. The exclusive purpose of the fund will be to provide for the operation, maintenance and development of the facilities.

Lubbock Transportation
(Ref. 13)

For many years, Lubbock has been nicknamed the "Hub City" because of the city's predominant role in the transportation systems of the South Plains region. Many transportation facilities are located in Lubbock not only for the transportation of people, but material goods as well.

Highways

Lubbock is the terminal end of an Interstate Highway connecting with Amarillo and Interstate 40. This Lubbock-Amarillo link, Interstate 27, is currently under construction and plans are being made to extend it through the city itself, creating a north-south expressway. In addition, several major highways serve Lubbock. U.S. 87 runs north-south, U.S. 62 and U.S. 82 run east-west and U.S. 84 runs northwest-southeast. Texas 116 runs west out of Lubbock to the New Mexico state line. Five farm and market roads as well as 25 county roads are located within Lubbock County limits, providing access to all county sectors.

Automobiles

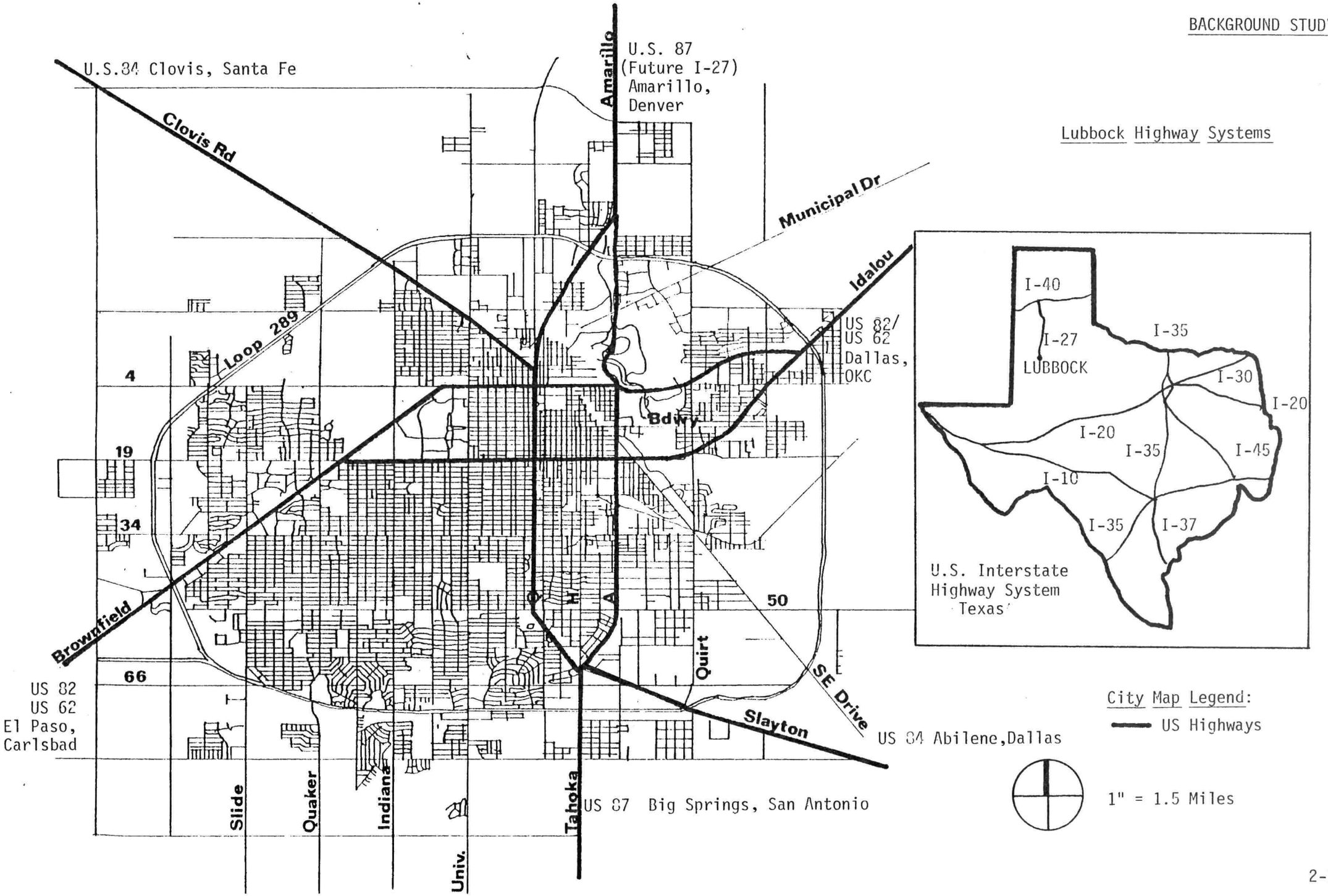
The major mode of transportation in Lubbock, as well as almost every American city is the automobile. In 1970 there were 82,521 cars and 45,987 trucks registered in Lubbock County. These figures represent a 35% increase in automobile registrations and a 76% increase in truck registrations since 1960.

Motor Freight

Lubbock is a major center for motor freight activity, but curiously it receives more motor freight than it ships out. Figures for 1970 indicate that 175,000 tons of freight shipped into Lubbock while only shipping out 90,000 tons. A partial explanation to this may be that Lubbock's major product, agriculture products, are usually transported by rail carriers. In 1980 there are twenty motor freight carriers serving the city providing interstate and intrastate service to most major U.S. cities.

Besides these common carriers, there are many specialized truck carriers, transporting such items as chemicals, liquid cargoes, petroleum, agricultural products and live stock.

Lubbock Highway Systems



Rail Systems

The Santa Fe Railway currently connects Lubbock with direct freight service to Dallas-Fort Worth, Galvaston, and Houston, Amarillo, Denver, Kansas City, Chicago, and Clovis, Albequerque, Los Angeles, and San Francisco. Three Santa Fe lines radiate from Lubbock to serve the South Plains area, connecting Lubbock by rail to all eight of the adjacent counties.

The Fort Worth and Denver Railway, a division of the Burlington Northern system, provides service to Dallas-Fort Worth, Amarillo and Denver.

Both railroad systems have been expanding their facilities as customer demand has been increasing. New railroad spurs have been constructed and both companies are leasing land to industrial developers.

Rail passenger operations ceased in 1968 due to unprofitability, but an application for AMTRAK service is currently being prepared by the Chamber of Commerce. This development will be thoroughly discussed in the "Client" section of this program.

Bus Service (Intercity)

Texas, New Mexico, and Oklahoma Motor Coaches (TNM&O) is the sole intercity bus line in Lubbock. Details of its operations and background will be discussed in the "Client" section of this program.

Airline Operations

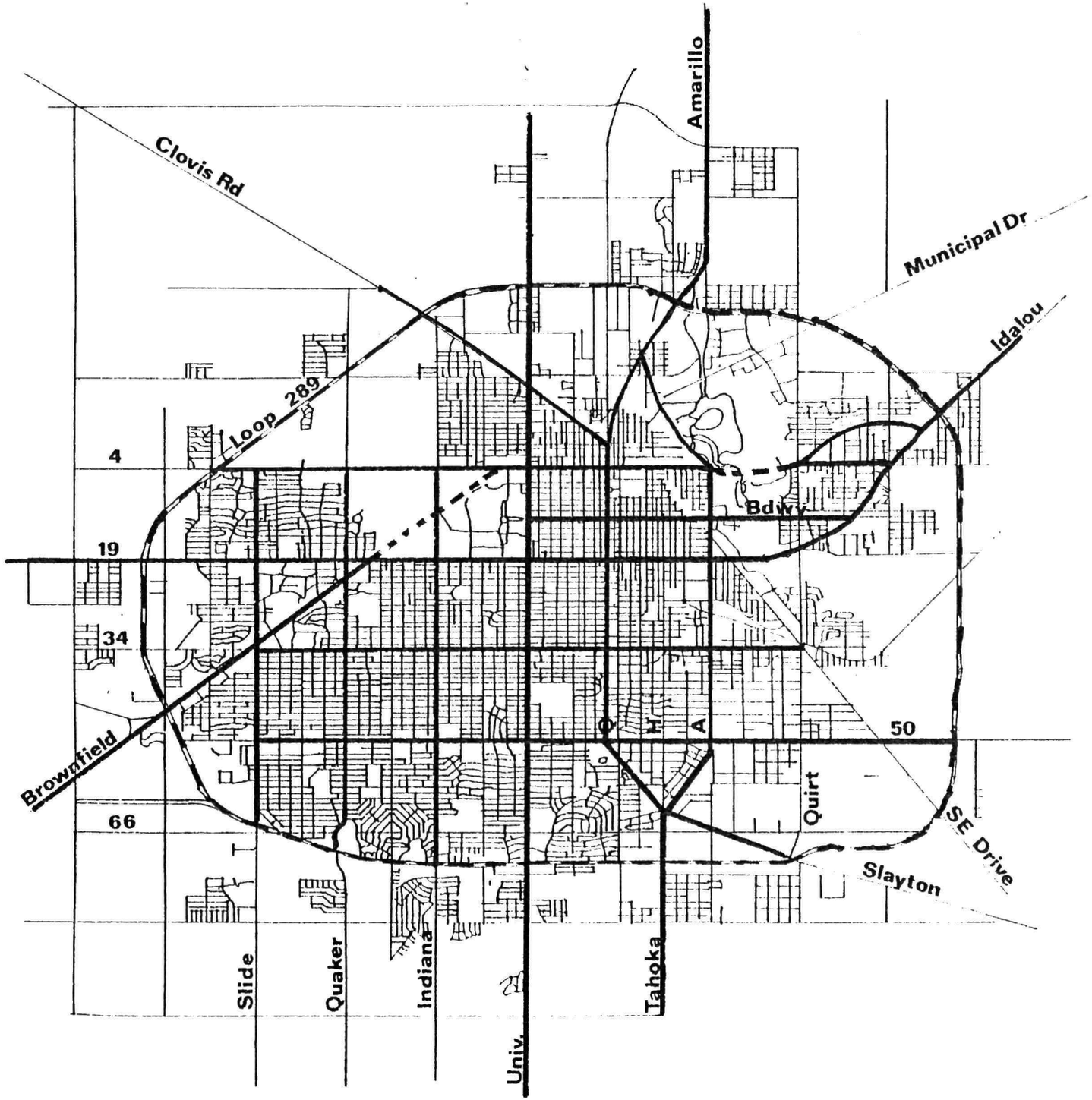
Lubbock is currently served by four major airlines: Braniff, Continental, Texas International, and Southwest. In addition, there are two commuter airlines serving Lubbock. The Lubbock Regional Airport serves a large area of the South Plains and Eastern New Mexico.

An estimated 460,000 passengers will use the facilities in 1980, an increase of 255% over the 1970 figure of 176,000 passengers. In addition, an estimated 1,230 tons of cargo will pass through the terminal in 1980.

Intracity Transportation

The major mode of transportation in Lubbock is the private automobile and utilization of public transportation, i.e. Citibus, is far below the national level. However, should use of mass transit increase, it is expected that it will have only a minimal effect on Lubbock's thorough fare system.

Transportation planning has centered primarily on developing a system of arterial streets and expressways



Lubbock Street Plan

Legend:

Expressway

Arterial Streets

1" = 1.5 Miles

that will meet standards of safety, speed economy and comfort for both public and private transit.

Lubbock's current thoroughfare system is based on a 1964 study in combination with anticipated land usages. Thoroughfares are laid out in a grid pattern of one mile intervals. There are few diagonal thoroughfares in the city and no diagonal thoroughfares are to be constructed in the near future.

Loop 289 surround the city, providing a connecting link between the major city streets and highways. As city expansion has extended beyond Loop 289, a future outer loop is anticipated before 2000.

A proposed north-south expressway, an extension of I-27 routed along the present Avenue "A", has been an item of much controversy lately. Minority elements of the population, whose residential areas are concentrated north of Avenue "A", contend that the proposed North-South Freeway will effectively cut them off from the rest of the city. There has also been some concern as to whether or not the Avenue "A" route of the expressway would fulfill any real need of Lubbock citizens.

Completion of the thoroughfare plan is continuing. The Indiana Avenue thoroughfare through Texas Tech has been completed recently but efforts to improve University Avenue between 4th Street and 19th Street will be extremely difficult and costly to achieve.

Public Transit

Citibus, a municipally owned transportation company is the major public transit system in the city. Citibus will be discussed in further detail in the "Client" section.

Yellow Cab Company is the major taxi service in the city.

Lubbock Goals for the Eighties

Lubbock Goals for the Eighties, also known as "Committee 80", is a program sponsored by the Lubbock Chamber of Commerce. This program is an outgrowth of Goals for the Seventies, which was organized in the aftermath of the 1970 tornado and was fairly successful in establishing citizen goals.

Although the Committee 80 goals have not been established yet, some tenative goals concerning transportation have been set.

Intercity Transportation (14:84)

1. Highways

Vital to our economy are the highways over which agricultural commodities, produce, manufactured products, and other goods can move to markets. Objectives of our highway program for the "Eighties" are as follows:

A. Actively pursue the completion of I-27 through the city.
B. Seek funding for a "demonstration" type controlled or limited access 4 lane highway from Lubbock south intersecting highway I-20 and joining I-10...
C. State highway #114 from Dallas to Lubbock and west to New Mexico, ultimately connecting with U.S. 70 from Clovis, New Mexico, to Roswell, New Mexico should be upgraded to a 4 lane divided highway...
D. It is the intention of the Committee that all map makers be advised of the improved highway routes through Lubbock and ask that they be so designated.

2. Bus Transportation:

With ever declining gas supplies, intercity bus transportation will assume an ever increasingly important role in moving people and express from city to city. Your Chamber will cooperate closely with bus lines and package express lines serving this area to be of any help possible in developing and maintaining adequate routes.

3. Truck Lines:

Scheduled truck carriers will be assisted and encouraged to route freight to and through Lubbock as a distribution hub, thereby providing additional jobs and better serving our growing economy. Adequate truck service and terminals in and out of Lubbock can be instrumental in attracting new industry.

4. Rail Transportation

While new rail routes, because of excessive capital cost, are virtually prohibitive, the rail roads now serving this area will constantly be encouraged to maintain schedules, equipment and facilities to adequately service the freight needs of this area.

Further and because of the energy shortage, the Department of Transportation will be petitioned to extend AMTRAK passenger service through Lubbock, likely from Houston or Dallas through Lubbock to Clovis, New Mexico to connect with the trans-continental line from Chicago to the West Coast.

5. Intra-City Transportation

Public bus transportation will become increasingly important for reasons already stated.

Studies will be made to determine ways and means to effect more widespread acceptance and usage. Some suggestions are as follows:

1. Larger "express type" buses to run between central "park and ride" parking lots and large employers or other similar areas such as Texas Tech, Lubbock Christian College, etc.

2. Smaller "minitype" buses for more frequent schedules to accomodate a broader group of customers such as housewives to shopping centers, children to playgrounds, etc.

Private vehicle transportation presents Lubbock its greatest traffic problems. It has been said that Lubbock has a "Big City" traffic problem with a small town traffic system. This is largely because of a lack of a freeway cross-town system.

Lubbock's cross-town grid system, consisting of thoroughfares spaced on various increments has never been fully developed because of certain bottlenecks...Elimination

of these bottlenecks and the extension fo these arteries fully from one side of the "Loop" to the other would help immeasurably in moving traffic more freely through the city.

Grade separations and other engineering devices at critical intersections and other locations could also help.

Lubbock should begin planning for an "outer Loop" beyond Loop 289 to handle traffic needs of the future.

A close relationship between the officials of Texas Tech and the City of Lubbock is of paramount importance in solving Lubbock's traffic problems of which the personnel of Tech is such a real part.

It has been recommended that a permanent committee on transportation to be made up of Tech Administration, Tech Students, City of Lubbock Staff and Chamber of Commerce-Board of City Development members.

It has further been asked that additional bicycle routes be designated.

TRANSPORTATION

Introduction

(Ref. 14)(Ref. 15)

Transportation is a major component of American lifestyle and the economy. The transportation industry generates $200 billion a year in business and 13% of the American labor force is involved in transportation and 17% of Federal tax revenues are generated by the industry.

The traditional modes of transportation are today, threatened by several factors. These include the problems of energy conservation, the need for greater safety, a need for improved service and a concern for the environment. These factors will shape the transportation industry of the future. To compound matters, these problems must be faced during a period of high inflation and a sagging economy.

A goal of the U.S. Department of Transportation, is the molding of all the various components of transportation into a single, efficient unit, known as intermodal transportation . Secondary goals for intermodal transportation will be access to door-to-door transportation for all Americans, while employing the most efficient mode of transportation for each component of the transportation hierarchy.

Transportation is the major consumer of energy in the U.S. accounting for 40% of the total energy consumed and 60% of petroleum consumption. Other detrimental aspects facing future transportation are residue emissions, spillage and noise. New systems of transportation are being implemented and developed to correct these problems and some of these technologies will become apparent in the next 20 years.

Transportation Demographics

It is estimated that by the year 2000, the American population will be around 250 million persons and 16% of this population will be older than 65 as compared to only 10% in 1970.

In recent years, geographical population shifts have been to the Southern and Southeastern portions of the U.S. This trend is expected to increase as the proportion of elderly to the general population increases. This is due to the fact that the South and Southeastern U.S. have excellent climates for retired persons and

this will continue to draw the elderly to these parts of the country.

There have been many changes in urbanization in the past 100 years. Recently these changes could be characterized as flight from the urban centers to the suburbs and exurbs. Data from the early 70's also shows an increase in rural population, and in free standing small towns and smaller urban centers. This doesn't mean that urban areas will cease to exist for too much has been invested in these areas for this to occur. Another recent urban trend has been a migration of middle and upper income groups into the central city.

These complex demographic trends will require a sophistication unknown before, to anticipate future transportation needs.

Some other demographic trends affecting transportation planning are:

1. An increase of illegal immigration into the U.S., especially from Mexico. This is a substantial, yet relatively unknown component of U.S. growth, especially in the Southwest.
2. Abortion laws and their liberalization or outlaw will have a significant role in future population growth.
3. Births to teenaged women contribute greatly to population. Increased use of birth control or lack of it will be a factor.
4. The death rate is at the lowest point in history and all indications are that it will decrease further.

Energy and Resources

Former transportation systems depended on the availability of cheap and plentiful energy sources. This type of transportation system was necessary for the wide ranging developmental pattern typified by U.S. growth. This spatial arrangement is more easily effected by fuel shortages than the tighter developmental pattern found in Europe.

Three general scenarios appear possible for the future: (16:4)

1. Business as usual, transportation becoming more rapid, more personal and population more dispersed based on the availability of cheap liquid fuel. (This scenario, while possible, is viewed as improbable by many policy makers.)

2. Successful transition, in which energy sources are switched gradually from petroleum as the price rises. It also implies heavy dependence on coal or nuclear generated electricity in the next 10-20 years and significant rearrangement in urban and suburban ways of life.

3. Restricted supplies, in which energy costs rise drastically because of a great lag in substitute sources. Associated with this would be total and per capita energy decreases and massive changes in transportation and societal organization as the nation readjusts painfully, but successfully.

Any of these scenarios would have a drastic effect on the transportation economy, but change will come. Because of the changing energy situation, electrically powered transportation systems will assume greater importance because these systems would not be dependent on petro-chemical fuels. Electrical power could be generated in any of the following ways: (15:7)

1. Coal and similar non-petroleum fuels
2. Alternative alcohol based fuels (methanol-ethanol)
3. Synthetic fuels (oil shales and tar sands)
4. Hydrogen as a fuel
5. Solar heat
6. Solar voltaic
7. Nuclear fussion
8. Nuclear fission
9. Geothermal power
10. Hydroelectric power
11. Tidal power
12. Oceo-thermic power
13. Wind power

Electrical systems are less affected by the availability of any one fuel. However, transportation would still have to compete with other elements of the economy for access to these energy sources.

Any future energy shortage may also result in energy changes. Migration from the north towards the sunbelt regions may occur if a drastic reduction in home heating fuels occurs. A migration towards urban centers can be expected if the cost of transportation increases dramatically.

Economic Implications

Inflation is a major problem confronting any long-range capital investment today and all indications are that inflation will clip along at a 10%-12% pace if not worse. The transportation industries will have to compete with other economic sectors in a decreasing money market.

In addition, a demographic shift towards a higher percentage of retired persons in the U.S. population will require a greater production output per worker. To attain this rate of higher productivity, substantial investments will have to be made in automated equipment, resulting in an even tighter squeeze on the money market.

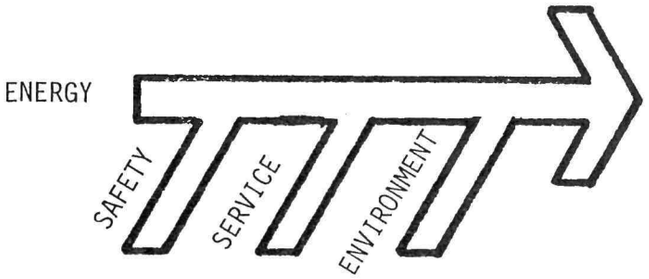
Transportation-Telecommunications Tradeoff

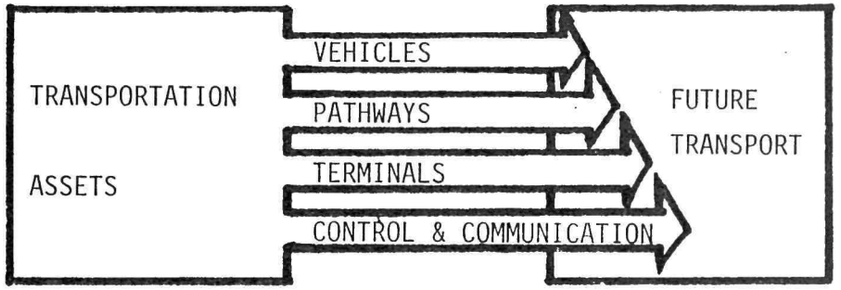
Telecommunications are likely to have a major impact on the transportation market, in the near future. Evidence of this is already occurring with the introduction of home computer systems. In the future, jobs dealing with information processes alone, could be performed at home by means of a home computer tied into a computer network. If the socialization element of working is too critical to ignor, centralized work centers may come into existances, shortening transportation distances and time, and shifting transportation modes.

The eventual effects of a telecommunications boom may be one of these two:

1. A total decrease in business related transportation needs due to increased efficiency in person-to-person communications.

2. An increase in recreational transportation due to an increase in leisure time provided by the greater efficiency of business communications.





Brief History of American Intercity Transportation
(17:13-74)(18:1-41)

Before 1840, the major inland highways in the U.S. were wagon roads, rivers and canals. In these areas America lagged far behind European transportation systems. This was primarily due to the newness, and the size of the U.S., and the lack of capital available for constructing these systems.

In the 1700's, local governments were responsible for the construction of roads, but with population growth and business growth, this system became grossly inadequate. Private individuals began forming corporations for the construction of roads for which customers would pay a toll for the usage of the road. These roads were called turnpikes, because access to the road was usually controlled by a pole of pikes and was hung to turn on a post, hence the word turnpike.

Construction of these turnpikes began around 1790, and the turnpike companies usually received a charter from the state government to construct the road. Before 1840, Pennsylvania had a total of 102 turnpike companies operating 2,380 miles of road. Generally, the turnpike companies throughout the U.S. ran at a loss, but the turnpikes were necessary for transportation and most eventually became free highways. The greatest of all toll roads was built with U.S. funds, the Cumberland Road or the "National Pike". Begun in 1806, it started in Cumberland, Maryland and passed through Wheeling, West Virginia; Columbus, Ohio and when construction ended twenty-one years later, the road terminated at Vandalia, Illinois.

Canals also played an important part of American transportation history. In 1825, the Erie Canal was completed, connecting the Hudson River and Lake Erie. Canal building also flourished for a period of time in Pennsylvania and Maryland.

Between 1830 and 1850, Ohio, Indiana, and Illinois had completed canal projects, but canal projects rapidly diminished after 1840 due to financial problems and the inability of canals to compete with the railroad.

The Growth of the Railroad Industry
(Ref. 16)(Ref. 17)

The predecessor of the railroad was the tramway, which was a fixed track for guiding cars pulled by horses.

These tramways were usually intended for the hauling of heavy freight, such as coal or other minerals, roads not being substantial enough to handle these heavy loads. The rails of these early tramways usually consisted of an iron strap running the length of a wooden beam.

The first successful locomotive, the Rocket, was constructed in 1829 by Robert Stephenson and attained a speed of 29½ miles an hour. The first steam railroad was started in 1830, the Liverpool & Manchester Road, in England and was completed in 1835.

The Stourbridge Lion, was the first steam locomotive in the U.S. It was purchased in England and arrived in New York, May 13, 1829. The Stourbridge Lion was not a great success because it weighed over seven tons, while the track it was to run on was designed for a load of only three tons. The Stourbridge Lion was scrapped after its first run.

The first American constructed locomotive was the Tom Thumb, constructed by Peter Cooper in 1830. This experimental locomotive raced a horse-drawn car on the Baltimore and Ohio Railroad line, at that time a tramway, and lost after a breakdown. Despite the loss, the steam locomotive had left its mark and the tiny locomotive began operations on a 14 mile stretch of Baltimore & Ohio track in 1830.

The first major steam railroad was the Charleston & Hamburg Railroad of South Carolina which operated a steam locomotive, the West Point over 136 miles of track and began regular service in 1831. Other early steam railroads included the Mohawk & Hudson Railroad which operated the DeWitt Clinton locomotive over 16 miles of track in New York and the Camden & Amboy Railroad which operated the "John Bull" in New Jersey in 1831.

The pace of railroad construction increased rapidly in the 1830's as the advantages of railroads became apparent. In 1830, there was only a modest 23 miles of track in the U.S., but by 1840 there was a total of 2,818 miles of track. By 1850 the railroads no longer had to compete with canals for money and the railroads had expanded to 9,021 miles.

By 1850, American tracks had become standardized in guage and construction and the "t" shaped rail still used today was also a standard item.

Passenger accomodations were pretty primitive in the

early days. Early passenger coaches were simply stage coaches with some slight modifications necessary for rail travel. A major improvement was the addition of swiveling wheel tracks in both the fore and aft ends of the coach. This enabled the coaches to handle curved tracks more easily. Better ventilation in the cars was achieved by raising the central half of the car roof and inserting deck lights. Loose coupling of cars was a major cause of jolting but automatic coupling has alleviated this problem.

The sleeping car was originated by George Pullman in 1864. The sleeping car was soon followed by other specialized cars such as buffet, dining, and coach cars. Vestibules started appearing at the ends of cars to act as a buffer zone between the passengers and outside noise as other passengers passed from car to car. By 1886, passenger cars closely resembled the passenger cars today in their physical configurations.

For many years, rail travel was the major mode of transportation in the U.S. and did not face any competing transportation modes until the 1900's. The railroad was a major factor in the settlement of the American West. As the railroad went, so did the arrival of civilization. On November 10, 1864, President Abraham Lincoln approved the construction of the first trans-continental railroad and on May 10, 1869, it was completed when the gold spike was driven at Promontory, Utah.

Passenger rail service continued to increase until about 1920. Passenger trains could no longer compete with the automobile for short distance trips, so the rail companies abandoned many of short distance lines during the 30's and 40's and placed greater emphasis on long distance lines. Passenger rail service hit a peak during WWII, when gas rationing and the massive movement of troops provided a renewed use of the trains.

But the passenger rail service met it's most serious challenge in the 1950's, and the railroads lost. Improved highways and automobiles made the automobile the major competitor for long distance travel, bus fares were cheaper than train fares, and commercial air service could provide much faster service at prices lower than in previous years. The railroads held no economic advantages over any of it's competitiors, and as a result, the railroads began pruning services. By the 1960's, the pruning process had become a wholesale amputation of major long distance lines, and many cities lost their passenger rail service. Finally, on May 10, 1971, AMTRAK, the National Railroad Passenger Corporation began operations and a new era in passenger rail service had begun.

The Growth of Intercity Bus Transportation
(19:5-27)(20:9-33)

Most people think of motor bus transportation as a relative newcomer to the transportation field. The modern motor bus had it's earliest beginning with the horseless carriage invented by Nicholas Cugnot. Cugnot's invention was powered by steam but the extreme weight and lack of manueverability made usage of the steam carriage unlikely.

Several people tried to adapt Cugnot's steam carriage for commercial applications, especially in England. In 1801, Richard Trevithick constructed a motor bus which could travel six miles per hour. Goldsmith Gurney constructed a small fleet of steam buses that logged nearly four thousand miles. Walter Hancock also constructed a fleet of steam buses, carrying over 12,000 passengers for four thousand miles. The firm of Summers and Ogle constructed two sixteen passenger coaches capable of speeds up to thirty miles per hour. But in 1840, regulations were passed limiting steam carriage speeds to three miles per hour. This effectively ended the steam carriage age.

In 1860, a couple of Germans, Gottlieb Daimler and Carl Benz and an American, George Selden began experimenting with internal combustion engines fueled by gasoline. The Germans developed the first gas powered auto, the Daimler-Benz automobile. The impact of this development was not felt until much later.

Many major bus companies can trace their early beginnings back to the stagecoach days. Stagecoach lines, such as the famous Wells-Fargo Overland Stage Company, were necessary to fill the voids not serviced by the rail companies.

As rail service increased, stage lines had to concentrate on short distance runs. This trend continued until the early 1900's when the gas automobile finally came into vogue. Jitney service became very popular for a period of time, but jitney service was very unreliable and at times it was even dangerous.

Stage lines and some jitney operators converted automobiles for hauling up to twelve passengers. The first real bus was constructed by the Fraegol Brothers in 1920, and after this development bus service literally exploded all over the country. During these early days of bussing, the lack of regulation led to cut-throat competition and fights over routes. This led to state bus regulations being passed in many states to control this situation and eventually the Interstate Commerce

Commission began regulation of the bus industry in 1933.

During the 1920's and 1930's many railroad companies began bus operations to keep non-rail bus lines from cutting into rail profits, but the rail companies found that bus service was so popular and economical that many of their rail runs had to be eliminated.

The 1920's and 1930's also saw the consolidation of many small bus lines into larger bus lines. It was in this manner that Greyhound Lines was formed. Greyhound was started in 1912 in Hibbing Minnesota by Eric Wickman. From a small twelve passenger bus, Greyhound has become the largest interstate bus line in the United States. Merger activity led to the incorporation of Greyhound in 1926, stretching from the Atlantic to the Pacific. Trailways System was established in 1936 in merger activity similar to Greyhound.

Early bus lines mimicked the rail companies in their operations. This mimicry went to the extent of incorporating sleeping berths, kitchens, stewards, chefs and observation decks into one single bus. This type of operation did not prove economical and it was obvious that the bus lines would have to establish their own operation procedures. This was a very smart move considering the condition of the railroads today.

With improvements in bus technology, and new and improved highways, especially the Interstate Highway System, a dramatic increase in passenger ridership has occurred.

Trends and Future Patterns

Intercity Transportation

(Ref.16)

In general, there are only two different modes of transportation extensively used in intercity transportation, those being the private automobile and commercial air carriers. Combined, these two mode of transportation account for 93% of all intercity transportation. Rail and bus transportation are the two other major transportation modes currently in usage today.

Intercity Bus Systems

The intercity bus industry has the greatest potential for future growth. This is due to the buses efficient use of energy and the capability of using existing highways and flexible routing.

Intercity bus systems currently serve more than 15,000 communities throughout the U.S., more than any other commercial carrier. Buses are the most fuel efficient of any transportation mode yet the bus industry is suffering from declining ridership except for a brief period during the 1974 fuel crisis. The private automobile is clearly the bus industry's major competitor. AMTRACK and air carrier offer the bus industry competition in certain market areas

especially in the heavily travelled Northeast Corridor.

Bus passengers consist for the most part of low income and non-professional groups, the relatively young, the elderly, students and military personnel. Most trips taken on buses are non-business related and are for relatively short distances,

Greyhound Lines and Trailways have dominated the intercity bus industry for many years. Passenger revenues account for almost 66% of total receipts, while charter services and package express account for 16.3% and 15.2% of total revenue funds respectively. The package express market is becoming the most profitable portion of the bus industry and often the revenues acquired from package express on certain routes, subsidezes the passenger route. It is expected that package express service will increase even more in the future.

User complaints received at the Interstate Commerce Commission concerning the intercity bus industry usually focus on baggage problems and shady charter operators.

Financial subsidies from state governments are relatively few and are usually aimed at improving commuter service rather than intercity service. The state of Michigan began a subsidy program, which proved so successful, that the routes were still economically viable after government subsidies were halted.

Bus technology is focused primarily on improving fuel efficiency. There has been some experimentation with turbine powered buses, but these are still in the developmental stage.

Recent studies done in the past few years show that fare reductions provide little incentive in attracting riders and the basic problem in attracting new riders is the "lower class" image of the bus industry as a whole.

The bus industry is currently at a crossroads, declining ridership, the increased cost of capital investments, and soaring interest rates, complicate the future market picture. The fact that the bus industry serves many communities not serviced by any other commercial carrier, and a dependent ridership, the "transport disadvantaged", will maintain a certain level of ridership, no matter the economic condition. The decrease in ridership has made it difficult to raise the capital to purchase new equipment and to build and relocate terminals. A major change in marketing policies is indicated, but the lack of substantial research in the field makes it difficult to determine a new policy direction. The great flexibility and fuel efficiency of bus systems indicate that there is great potential for future growth.

Areas of the bus industry which need re-evaluation are "costing and pricing knowledge, marketing strategy, and

Service capabilities and facilities for meeting present and potential ridership needs in today's economic and social market. (21:V)

Market research has shown that bus patronage is responsibe to the level of service to the extent that ridership increases by 1% for each 1% increase in service (frequency). This result implies that the level of service is an important factor in determining future ridership. Another fact uncovered through research is that a 1% decrease in fares results in a ridership increase of only 0.5%. There is a lack of competition with AMTRACK in the total transportation market but not so in specific markets, and that bus ridership has been found to be inversely related to automobile ownership.

Another major concern of the busing industry could be the future deregulation of the industry by the Interstate Commerce Commission. Many people feel that regugulation would result in price increases, decreased ridership and difficulties in transferring from one bus line to another. It is also conceivable that many of the smaller companies may be forced out of business due to increased competition and the intrusion of larger companies into their markets.

A recent survey of attitudes towards transportation conducted nationwide ranked intercity buses as the least popular mode of transportation. Only 5% of surveyed respondants thought the service was excellent, 20% ranked it good, 18% fair, 20% as poor and 34% had no response. Only 11% of the population have used buses in the past year but 54% of the persons surveyed thought government should spend more money on intercity buses.

This seeming contradiction, the lack of usage versus the perceived need for more expenditure, may reflect the veiw that intercity public transportation will be needed in the future due to energy and economic problems. Another interpretation could be the concern of American society to provide for the transportation needs of the elderly and handicapped.

Survey results indicate that a need for increased dependability in bus service is needed as well as a need for more routes and stops particularly in rural areas. Comfort in travel was regarded only as a secondary problem.

Intercity Rail Systems

Intercity rail transportation after a long period of declining ridership, has stabilized to a fairly constant level since AMTRACK has been in operation in 1971.

It's been found that intercity rail systems tend to be most profitable when utilized on high passenger density runs of medium length (200 miles to 400 miles). This is due to the fact that the rail industry is fairly inflexible to changes of transportation patterns due to the fixed nature of rail facilities and regulatory contraints.

Another major problem is the fact that passenger rail shares tracks with the freight rail industry. Passenger trains which must operate at speeds in excess of fifty miles per hour are in constant conflict with freight trains which typically run at twenty miles per hour. The heavy tonnage associated with freight trains results in deterioation of tracks and roadbed conditions, often making the track unusable for highspeed travel. The cost of track repair and maintainance is extremely high. For example, the 465 miles of track between Washington D.C. and Boston, Massachusetts is estimated to need $2.5 billion in repairs. A partial solution to this problem would be to separate passenger and rail track. While this option may be the least expensive in the long run, initial capital outlays would be very high.

Another solution to the problem of deteriorated track would be the "Advanced Passenger Train" (APT) currently being developed in England. The APT would have a specially developed suspension system which would allow the APT to travel at speeds up to 100 miles per hour over poor track.

Passenger rail service may become the prime mode of intercity transportation should the cost of petroleum fuels make other transportation modes economically prohibitive. Many passenger trains are currently run by electricity and conversion to electric power on other lines could be easily done if the need arises.

Recent surveys show that only 11% of the American population have used intercity rail transportation in the previous five years. Those most likely to use trains are those who live in the Eastern suburbs, professional, executives and white collar workers. The median income of rail passengers is nearly $18,000.

Other survey results show that 6% rate passenger rail service positively and 15% rate it negatively. These survey responses are rather inconclusive because of the large amount of

respondents, 57%, who said they had no basis to judge rail service. Amongst rail riders, 18% thought more service was necessary, 14% thought we had enough and 43% were not sure. Only 37% of all traintrips were longer than 300 miles. (21:172)

Track Leviated Vehicles

Track leviated vehicles (TLV) are currently being developed in several countries throughout the world, including the U.S. TLV'S are basically a monorail type system with an air cushion suspension system, capable of high speeds (150mph-300mph).

Propulsion for TLV's would probably be a linear induction motor which would receive electricity from collectors in the track. Turbo-jet propulsion may be an alternative power source but it has serious environmental drawbacks.

Due to high cost of track, $7.0 million/mile, TLV's could only be profitable along high density corridors. It is expected that TLV lines may be in operation by 1995.

Secondary Clients

AMTRAK (Ref:24)

The National Railroad Passenger Corporation, better known as AMTRAK was created on October 30, 1970, when President Nixon signed the Rail Passenger Act. The Rail Passenger Act authorized AMTRAK to manage the intercity rail networks which were under contracts with private railroads.

The decline of the railroads as previously mentioned, was the general reason why AMTRAK was organized, but the specific reason was that in 1970, more than 100 petitions had been filed by the railroad companies for the discontinuation of rail service. It was obvious that passenger rail service would soon come to an abrupt end unless action was taken. However, AMTRAK was not organized soley with the intent of saving passenger rail service but also to maintain a balance of public intercity transportation. Air traffic had grown to a huge 73% slice of the intercity passenger market and the only other competitor, the bus industry was loosing ground. Meanwhile the automobile was accounting for 88% of all intercity traffic. AMTRAK is viewed primarily as a safety outlet and to maintain a better balance of transportation modes.

On May 1, 1970, AMTRAK began rail operations operating passenger service between cities designated by Transportation Secretary Volpe. The majority of all railroad companies operating passenger service contracted with AMTRAK with the exception of the Southern R.R., Rock Island R.R., Rio Grande R.R., Chicago South Shore and South Bend R.R., Georgia R.R., Reading R.R. and the Central of New Jersey R.R. Some of these railroads still continue to operate passenger service.

AMTRAK has been given full authority for the selection of passenger routes, a privelege the private companies did not have. Rail service has been discontinued to some cities since the original routes were designated in 1970 but overall the extent of AMTRAK service has increased. In addition, AMTRAK was authorized in 1972 to begin international operations and service was soon inaugerated to Montreal and Vancouver.

AMTRAK also began a major publicity compaign by means of newspapers, radio and TV as well as sending out units of new equipment on publicity tours. This approach was never seriously undertaken by the railroads previously.

By late 1972, some positive results began to appear. A Louis Harris poll indicated that a majority of persons requested more passenger rail service and the third quarter revenues for 1972 had increased by 13.2% over the previous year. As a result, AMTRAK ordered some new equipment, AMTRAK's first major equipment order.

AMTRAK had been operating a fleet of ancient cars, mostly constructed in the late 1930's and 1940's which it had bought from the private rail companies when operations first began. Despite refurbishment, it was obvious that new equipment was needed if the quality of service was to improve.

In 1973, AMTRAK asked the transportation manufacturing concerns to develop a new fleet of equipment incorporating present technologies, with the maximum saleable space, high quality rides at speeds of 120 miles per hour which had flexible interiors to accomodate fashion and functional changes. The Budd Company was awarded the contract and an order for 100 new passenger cars was placed.

Another major change needed was the problem of train reservations and in 1973, a computer reservation system began operating capable of handling AMTRAK's 360,000 possible fare possibilities as well as many as 16,000 daily reservations.

By early 1974, things were looking up for AMTRAK. The purchase of 1400 cars from the railroads had been completed and most of the cars were refurbished and the majority of a 150 new 3000 horsepower locomotive fleet had been received as well as 50 older locomotives which had been rebuilt. Orders were released for 57 AMFLEET cars as well as for 26 electric locomotives, and passenger ridership for the summer of 1974 was up 40% as compared to the previous year mostly as a result of the gas crisis. Another 200 AMFLEET cars was ordered from the Budd Company as well as six five car highspeed turbine trains ordered from France. This new equipment would raise seating capacity by 22,816 seats, a 40% increase to the 57,000 seats in service in 1974, and another 25 diesel locomotives were ordered.

The AMFLEET equipment built by the Budd Company was designed primarily for short to medium distance hauls. It was obvious that new equipment was soon needed on long distance runs. A fleet of double decker cars for long distance service was developed by the Pullman Company and in 1975 an order for 235 of these new cars was placed with Pullman and an additional 200 AMFLEET cars was placed with the Budd Company. Although these new orders would increase the AMTRAK fleet by only 12%, seating and sleeping space will be increased by 84%.

With equipment problems taken car of for the time being, attention was turned towards the improvement of track facilities, and in 1975 a proposal for $700 million for track improvement was approved, targeted primarily for Conrail lines in Pennsylvania and New York. Other facility improvements included the renovation of many old stations and the construction of new passenger stations. In addition, AMTRAK has purchased maintenance facilities and rennovated them as well.

By 1976, more than 200 of the new AMFLEET cars were put into service, and for the first time in it's short history, AMTRAK was able to accomodate the Easter Holiday surge.

Also in 1976, AMTRAK came under attack from the bus industry as well as the Department of Transportation and a major campaign against AMTRAK was started. The bus industry cites the use of government subsidized passenger fares as an unfair advantage, yet AMTRAK President Paul Reistrup charged that the bus industry and other motor carriers are also subsidized because only $283 billion have been recovered in user charges for a $427 billion highway system, leaving the motor carrier industry $150 billion short. However, this fear of AMTRAK by the bus industry may mean that AMTRAK is becoming a real transportation competition though Amtrak is really attempting to divert traffic from the private automobile rather than from other means of public transportation.

In order to divert traffic from the private automobile, it is necessary that AMTRAK and the bus industry cooperate with each other and on June 24, 1976, an intermodal agreement between AMTRAK and Greyhound for operations in the New England area was signed. This agreement allows for the traveler to buy tickets to New England destinations, transferring from bus to train as the trip dictates. Also a Bus/Trak, intermodal service, operating along the same lines has been put into operation in Michigan.

On September 19, 1979, another positive step was taken. For the first time in AMTRAK's history, it was granted a multi-year budget by Congress. A major problem plaguing AMTRAK, was the inability to make long term plans due to a year-to-year budget. Congress has approved $912 million for operating expenses in 1980, escalating to over $1 billion for 1983, but in 1983 the subject of AMTRAK funding will once more be debated in Congress(Ref. 24)

As in the gas crisis of 1974, the gas crisis of 1979 had a positive result on AMTRAK ridership with a 24.6% increase in ridership in June. More than 2 million passengers rode AMTRAK in June 1979 but planners estimate that 75% of these new riders will stop using trains once the gas supply eases up. Yet, AMTRAK has now twice proven it's worth during a transportation crisis.

AMTRAK is still plagued by equipment problems due to late equipment orders and the disappearance of American firms which supplied parts for AMTRAK's aging fleet. This means that a substantial improvement in AMTRAK service is not possible before 1983 forcing AMTRAK's new President, Alan S. Boyd to say "It boggles the mind that we're supposed to get people out of 1979 automobiles with 1947 equipment." (Ref. 25)

AMTRAK's present system requires 1300 cars to operate and AMTRAK has a fleet of over 2,000 cars, but at any given time 400 cars are in the shop. To meet summer peak loads, AMTRAK must utilize 100 cars which were slated to be scrapped because they lacked heating systems.

In 1979, AMTRAK received the first 47 of the double-decker "Super-Liners" from the Pullman Company, originally scheduled for service in 1977. The first of the Superliners have begun service between Chicago and Seattle and have been well received by passengers.

Despite all of the clamoring about government subsidies to AMTRAK, anytime a line is to be discontinued, AMTRAK is in for a fight. California has sued the Department of Transportation and AMTRAK over service cutbacks and as a result, California will now subsidize these services at 20% rising to 50% in 1982. Six other states, including Texas are now subsidizing 16 AMTRAK trains.

The passenger provides approximately 35% of the cost of running AMTRAK today but President Boyd can see this figure rising to 50% within a short period of time. (Ref. 25)

AMTRAK Service In Lubbock

As of the present time, AMTRAK service is not available in the Lubbock area. The AMTRAK system has been expanding annually by establishing one new experimental route each year. Lubbock is currently the 23rd largest Standard Metropolitan Statistical Area, AMSA, without AMTRAK service. This fact, combined with a proposed application for AMTRAK service by the Lubbock Chamber of Commerce, and the obvious need of a West or northwest route from the Dallas-Fort Worth Area may make AMTRAK service in Lubbock a reality.

AMTRAK itself, doens't publicize future route information since the routing of new service is a controversial matter and all new routes are subject to Congressional approval. However much research into future service needs has been done by private groups such as the National Association of Rail Passengers and also by private individuals.

The National Association of Rail Passengers (NARP), has released a map of priority ans secondary passenger route needs. This study shows two new routes out of Dallas-Fort Worth, but neither route passes through Lubbock. It shows a need for a Dallas-El Paso route and also a Dallas-Amarillo-Denver route. (Ref. 24:174)

In another study by Ronald Sheck, AMTRAK 80, Lubbock would serve as an intermediate stop for a Dallas-Abilene-Clovis-Albequerque run. This would be a daily route with service once a day from Lubbock to Clovis and two or three daily trains to Abilene. Connecting service would be available to most major Texas cities as well as to Oklahoma City, Denver, Wichita, Little Rock, and New Orleans. (26:38)

According to the Rail Planning Guide, by the Federal Railroad Administration, the following formula may be used for calculation of passenger loads:

$$MR = e^{3.01}\ PP^{0.577}\ AT^{-0.698}\ AF^{0.969}\ C/RS^{3.071}$$

MR= Monthly AMTRAK ridership

PP= Population Product (billions)of originating and terminating SMSA Cities

AT= AMTRAK time

AF= AMTRAK frequency

C/RS= Ratio of car cost (20¢/mile in 1980) to AMTRAK coach fare

In addition it is suggested that the results from using the formula be reduced by 40% in areas other than the North East Corridor.

By using the above formula, it was calculated that Lubbock would have 15,760 monthly AMTRAK riders which could peak out

at 22,064 monthly riders should some future development raise utilization levels to that of the North East Corridor.

INTRASTATE PASSENGERS
(Originating in Lubbock)

DESTINATION	HIGHWAY MILEAGE	AUTO COSTS @ $0.20/MILE	RAIL MILEAGE	RAIL FARE ASSUME $0.084/MILE	AUTO COSTS / RAIL FARE	AMTRAK TIME (@50 MPH)	AMTRAK TIME .698	POPULATION (1,000's)	PP .577 (3)	AMTRAK FREQUENCY	AMTRAK FREQUENCY·969	EXISTING SERVICE	FUTURE SERVICE	MONTHLY PASSENGERS	ROUTING
ABILENE	167	$33.40	180	$15.20	10.78	3.6	0.41	131	6.59	2	1.96		X	695	Abilene
AMARILLO (1)	122	24.40	183	15.37	4.04	3.7	0.40	158	7.33	1	1.00		X	144	Clovis
AMARILLO (2)	122	24.40	121	10.16	14.09	2.4	0.54	158	7.33	2	1.96		X	1330	Amarillo
AUSTIN	390	78.80	535	44.94	5.29	10.7	0.19	474	13.84	1	1.00	X		169	Abilene
BROWNSVILLE	679	135.80	775	65.10	9.21	15.5	0.15	177	7.82	1	1.00		X	131	Abilene
BEAUMONT	598	119.60	731	61.40	7.49	14.6	0.15	364	11.87	1	1.00	X		162	Abilene
BRYAN	417	83.40	553	46.45	5.85	11.1	0.19	77	4.86	1	1.00		X	66	Abilene
CORPUS CRISTI	548	109.60	610	51.24	9.94	12.2	0.17	303	20.69	1	1.00	X		219	Abilene
EL PASO	339	67.80	513	43.09	3.93	10.3	0.20	435	13.16	1	1.00	X		126	Abilene
GALVESTON	561	112.20	701	58.84	7.01	14.0	0.16	195	8.29	1	1.00		X	113	Abilene
DALLAS-FT.WORTH	325	65.00	334	28.05	12.66	6.7	0.27	2,673	37.53	2	1.96	X		3059	Abilene
HOUSTON	499	99.80	649	54.51	6.21	13.0	0.17	2,512	36.21	1	1.00	X		465	Abilene
LAREDO	508	101.60	768	64.51	3.94	15.4	0.15	85	5.13	1	1.00	X		37	Abilene
EDINBURG	709	141.80	795	66.78	9.73	15.9	0.15	232	9.17	1	1.00		X	163	Abilene
LONGVIEW	464	92.80	461	38.72	14.04	9.2	0.21	131	6.59	1	1.00	X		236	Abilene
MIDLAND	116	23.20	216	18.14	2.10	4.3	0.36	73	4.68	1	1.00		X	43	Abilene
ODESSA	138	27.60	236	19.82	2.72	4.7	0.33	103	5.74	1	1.00		X	63	Abilene
SAN ANTONIO	403	80.60	615	51.66	3.83	12.3	0.17	1,024	21.58	1	1.00	X		171	Abilene
TEXARKANA	480	96.00	551	46.28	9.06	11.0	0.19	119	6.22	1	1.00	X		130	Abilene
WACO	355	71.00	423	35.33	8.09	8.5	0.22	162	7.43	1	1.00		X	161	Abilene
WICHITA FALLS	206	41.20	449	37.71	1.31	9.0	0.21	132	6.60	1	1.00		X	22	Abilene

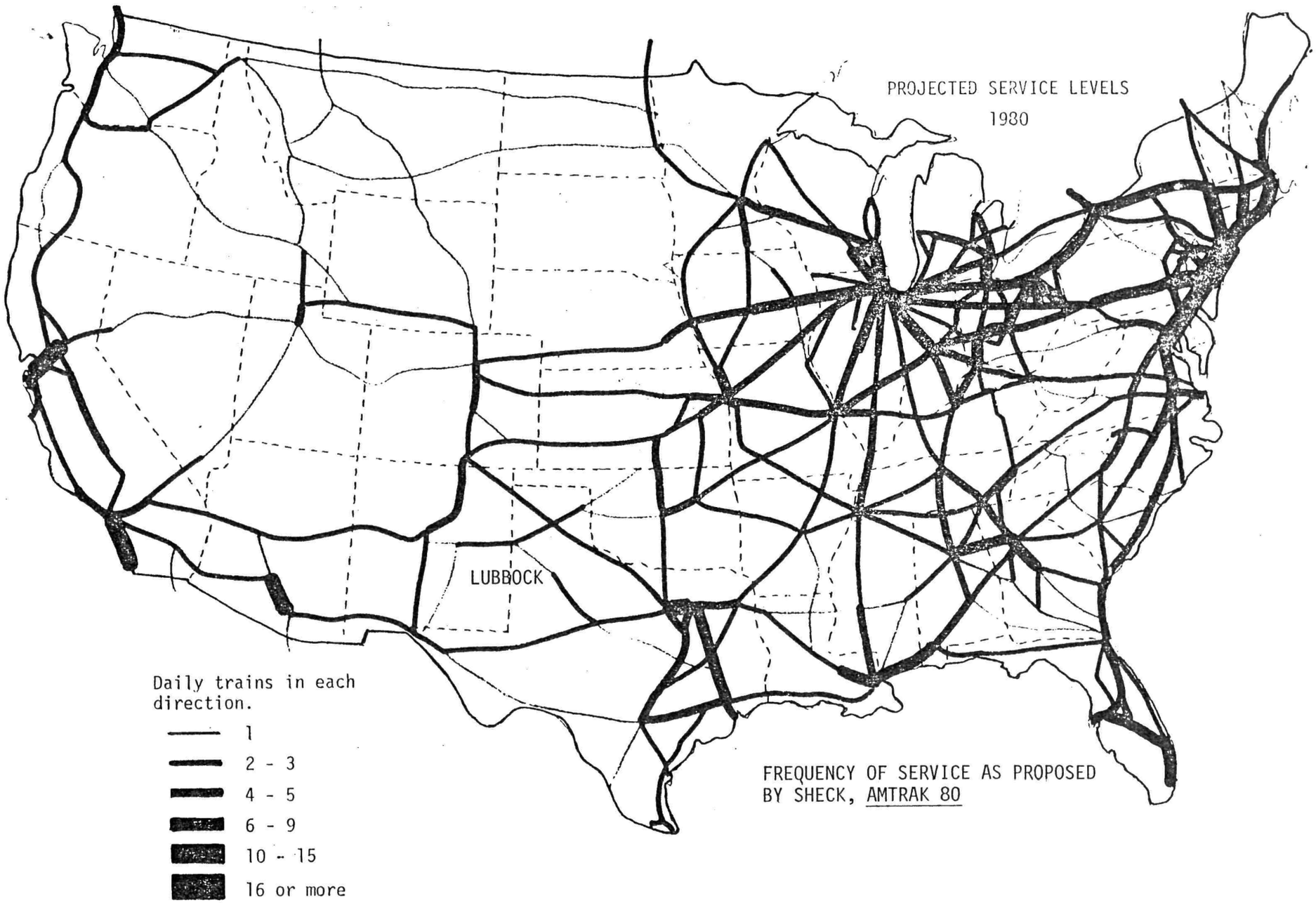
TOTAL MONTHLY PASSENGERS 7,705 Intrastate

(1) Clovis routing as proposed by AMTRAK 80.
(2) Direct routing
(3) (Product of Origin-Destination) $^{.577}$

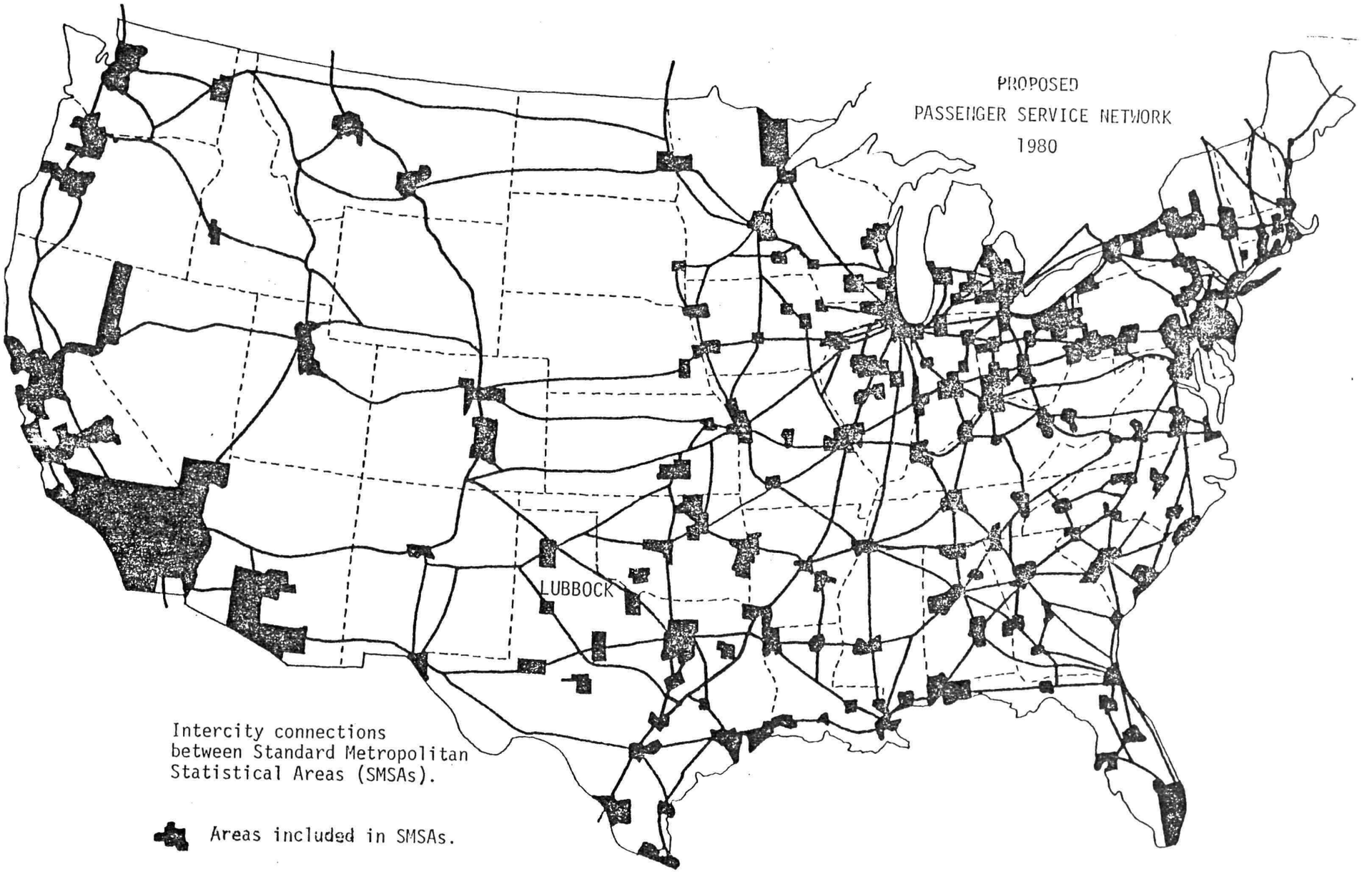
INTERSTATE PASSENGERS
(Originating in Lubbock)

DESTINATION	HIGHWAY MILEAGE	AUTO COSTS @ $0.20/MILE	RAIL MILEAGE	RAIL FARE @ $0.084/MILE	AUTO COSTS / RAIL FARE 3.071	AMTRAK TIME	AMTRAK TIME .698	POPULATION (1000's)	PP .577 (1)	EXISTING SERVICE	MONTHLY PASSENGERS	ROUTING
ALBUQUERQUE	317	$63.40	331	$27.80	12.57	6.62	0.26	393	12.4	X	506	Clovis
ATLANTA	1104	220.80	1531	128.60	5.11	30.62	0.09	1085	22.3	X	124	Abilene
BOSTON	1988	397.60	2311	194.12	8.72	46.22	0.07	2862	39.0	X	280	Amarillo/Abilene
CHICAGO	1134	226.80	1352	113.56	8.08	27.04	0.10	6993	65.4	X	642	Amarillo/Abilene
CLEVELAND	1376	275.20	1475	123.90	11.14	29.50	0.09	1967	31.4	X	382	Amarillo/Abilene
CLOVIS	101	20.20	101	8.48	13.76	2.02	0.61	30	2.8		286	Clovis
COLORADO SPRINGS	474	94.80	642	53.92	5.49	12.84	0.17	284	10.2		115	Clovis
DENVER	543	108.60	709	59.55	6.14	14.18	0.16	1438	26.2	X	307	Clovis
DETROIT	1360	272.00	1586	133.22	8.60	31.72	0.09	4406	50.1	X	466	Amarillo
KANSAS CITY	667	133.40	884	74.25	5.87	17.68	0.13	1281	24.5	X	235	Amarillo
MIAMI	1621	324.00	1938	162.79	7.99	38.76	0.08	1450	26.3	X	201	Abilene
MINNEAPOLIS/ST.PAUL	1095	219.00	1770	148.68	3.22	35.40	0.08	2171	32.2	X	103	Amarillo
LITTLE ROCK	615	123.00	726	60.98	8.32	14.52	0.15	364	11.9	X	185	Abilene
LOS ANGELES	1098	219.60	1420	119.28	6.32	28.40	0.10	6997	65.4	X	486	Clovis
NEW ORLEANS	1137	227.40	1011	84.92	19.60	20.22	0.12	1137	22.9	X	668	Abilene
NEW YORK	1705	359.00	2093	175.11	8.64	35.90	0.08	9509	78.0	X	673	Amarillo/Abilene
OKLAHOMA CITY	347	69.40	535	44.90	3.72	10.70	0.19	762	18.2		156	Abilene
PHILADELPHIA	1715	343.00	2200	184.80	6.47	44.00	0.07	4803	52.6	X	269	Amarillo
PHOENIX	709	141.80	721	60.56	13.06	15.40	0.14	1224	23.9	X	562	Clovis
PITTSBURG	1435	287.00	1823	153.10	6.67	36.00	0.08	2303	34.3	X	223	Amarillo/Abilene
SALT LAKE CITY	921	184.20	1335	112.14	4.47	26.70	0.10	800	18.6	X	102	Clovis
SAN FRANCISCO	1432	286.40	1879	157.83	6.05	37.58	0.08	3154	41.3	X	241	Clovis
ST. LOUIS	847	169.40	1037	87.10	7.46	20.74	0.12	2384	35.1	X	383	Amarillo/Abilene
TULSA	452	90.40	625	52.50	5.16	12.50	0.17	598	15.8		169	Abilene
WICHITA, KANSAS	470	94.00	650	54.60	5.16	13.00	0.17	391	12.4		129	Amarillo
WASHINGTON, D.C.	1620	324.00	2304	193.00	4.78	46.08	0.07	3037	40.4	X	162	Amarillo/Abilene
							TOTAL MONTHLY PASSENGERS				8,055	Interstate

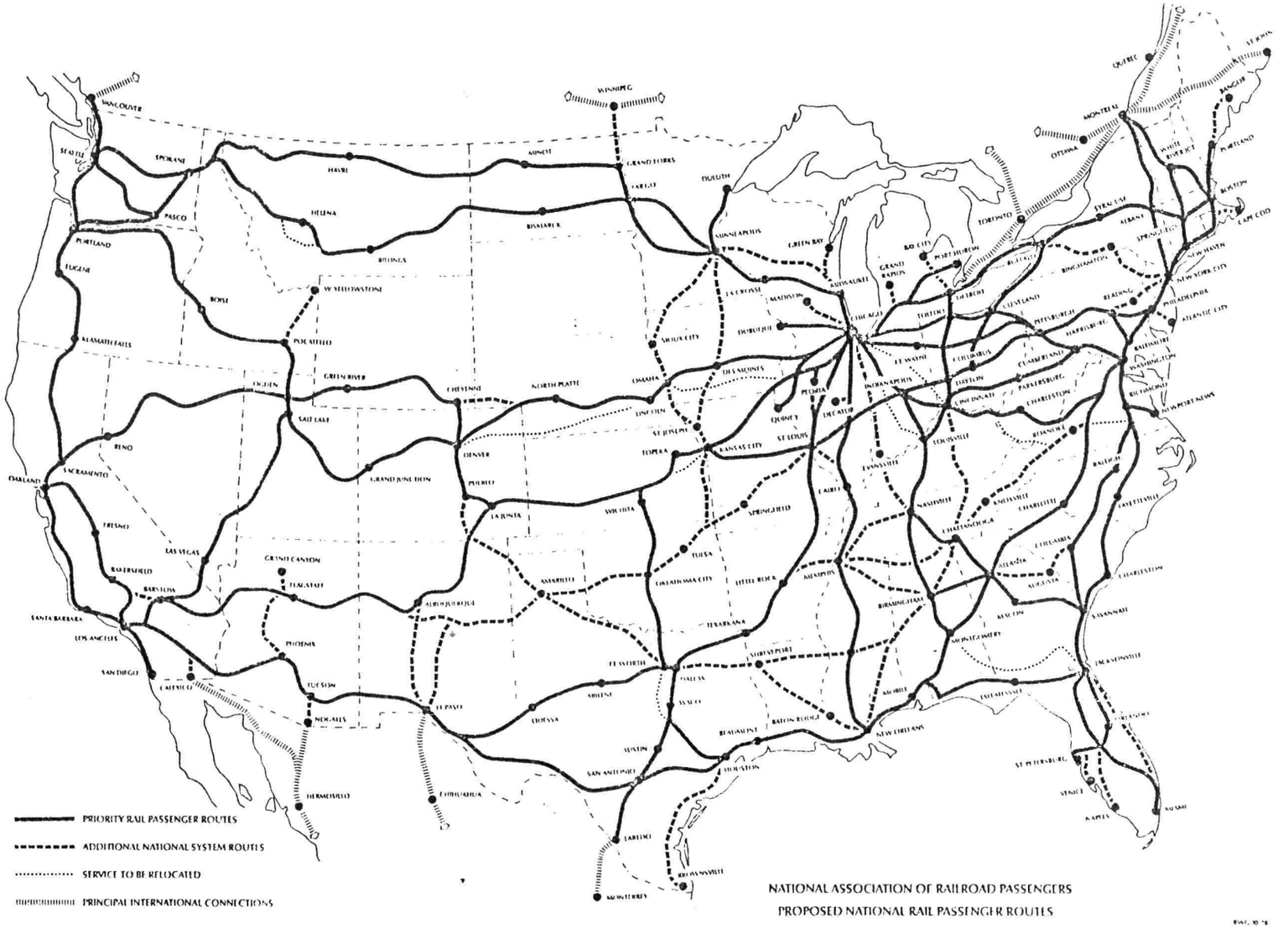
(1) (Product of Origin and Destination (Billions))$^{.577}$



FREQUENCY OF SERVICE AS PROPOSED BY SHECK, AMTRAK 80



PROPOSED LEVEL OF AMTRAK LEVEL BY SHECK, AMTRAK '80



RAIL SERVICE PROPOSED BY THE NATIONAL ASSOCIATION OF RAILRAOD PASSENGERS

Source : (24:174)

Texas, New Mexico and Oklahoma Coaches, Inc. (TNM&O)

History (2:407-8)

TNM&O began operations in 1939 as a result of a merger between McMakin Motor Coaches, Inc. and South Plains Motor Coaches, Inc. McMakin Motor Coaches, Inc. was founded in 1937 as a result of a merger between McMakin Motor Coaches Co. and the Red Star Coaches. South Plains Motor Coaches, Inc. was the oldest system, organized in the early twenties and providing service between Lubbock, Sweetwater and Bledsoe. By 1928, buses going in and out of the Lubbock Union Bus Terminal had schedules of 6,782 miles daily. These buslines provided service to Big Spring, Sweetwater, San Angelo, Clovis, Leveland, Morton, Amarillo, Witchita Falls, Vernon, Floydada, Odessa, Hobbs and Carlsbad.

TNM&O began operations from the Hotel Lubbock building until 1947 when a move was made to 13th Street. In 1956, a new terminal was built at 13th Street at a cost of $300,000.

Organization and Operations (Ref. 27)

TNM&O is for all practical purposes, a subsidiary operation of Greyhound Lines, Inc. Greyhound owns 59% of the company stock and Trailways Systems owns another 39%. There are five members on the board of directors, two from Greyhound and two from Trailways while Bob Greenhill, the President and General Manager of the Company is the fifth member of the Board. Due to Trailways' ownership of TNM&O stock, no future establishment of Trailways service is anticipated in the Lubbock area.

TNM&O has a fleet of forty buses. Twenty of these buses seat forty-three passengers and are intended for scheduled service and the remaining twenty buses seat forty-seven passengers and are intended primarily for charter service. The Company takes great pride in it's fleet. The oldest bus is only six years old and the fleet is very well maintained.

Bus ridership has been on the decline for many years, a trend which is confronting the bus industry from coast to coast. In 1976, there were 110,000 annual passengers, substantially down from the 490,000 annual passengers, in 1958. As with most bus companies, TNM&O has turned to package express and charter services to offset the decline in passengers.

TNM&O currently has twenty-five arrivals and twenty-five departures daily. Service is provided to all major

surrounding towns and cities as shown on the map. There are no major changes in scheduling and service anticipated in the near future.

TNM&O Terminal (Ref. 27)

The existing terminal is more than adequate as far as utilization is concerned. Constructed in 1956 for 500,000 annual passengers, there were only 110,000 passengers in 1976. The package express area needs expansion due to the great increase in this service in recent years. Another problem caused by the increase in package express is that there is a circulation conflict between passengers boarding buses and express packages being loaded onto the buses.

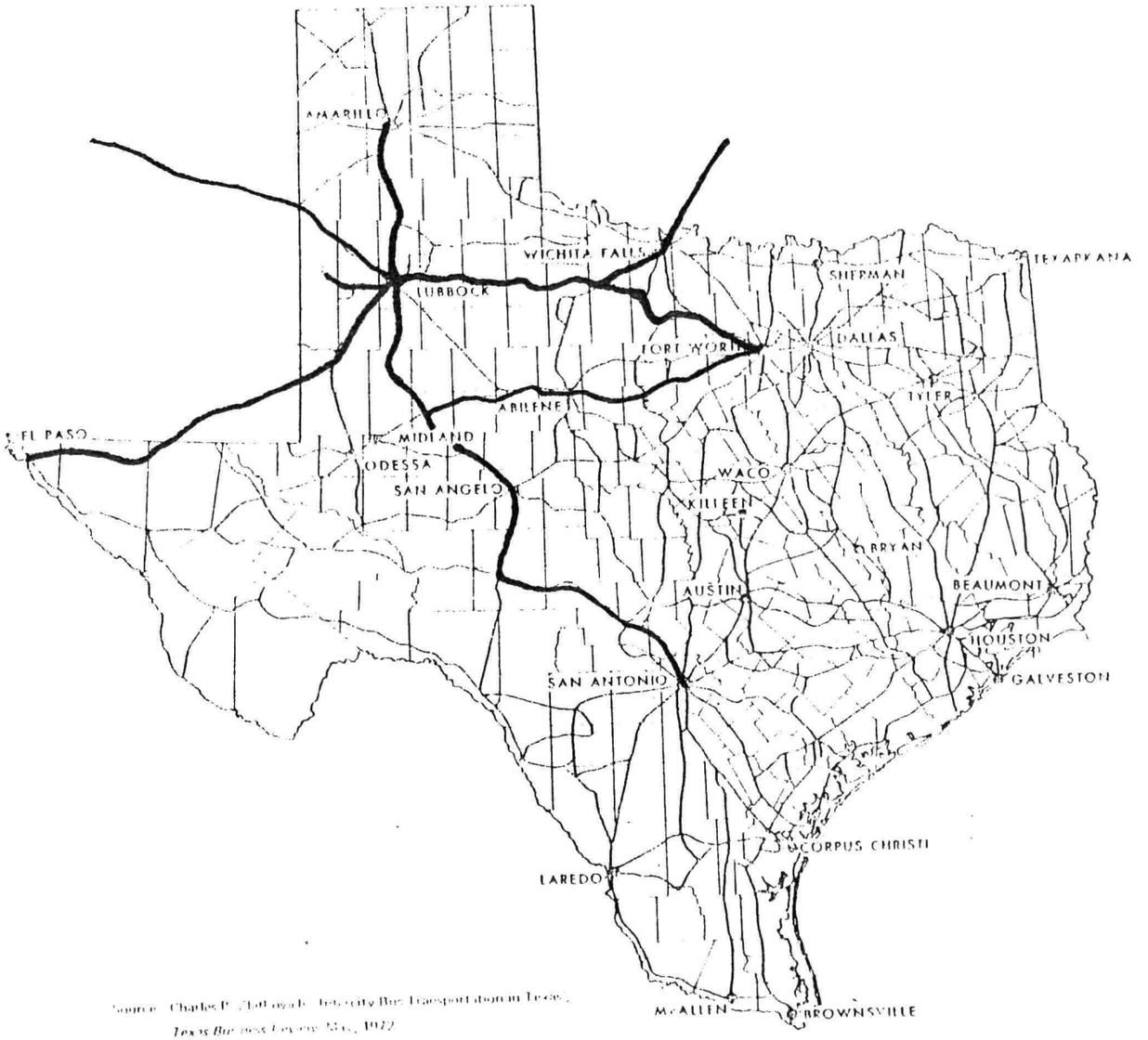
There are presently two ticket agents and it is felt that this should be adequate for future needs, but an information desk would be helpful in handling peak load situations. It would be desirable to have the ticket agents check the baggage as is done in most airports today.

A cafeteria service or franchised fast-food operation is needed to provide dining facilities for the passengers

It is necessary for TNM&O offices to be located within the facility. The existing shop and storage lot are quite adequate for today's needs. There is no real need to duplicate these facilities unless the distance from the new terminal to these facilities cuts into the thirty minute time allotted to service buses.

TNM&O feels quite strongly about having the facility remain within the CBD, and feels that cleanliness and security of a terminal are of the prime importance.

SCHEDULED INTERCITY BUS SERVICE



Source: Charles P. Zlotkowski, Intercity Bus Transportation in Texas, *Texas Business Review*, May, 1972

TNM&O Bus Routes

Source: Texas Atlas, University of Texas

Small City and Rural Transportation
(Ref. 16)

Lubbock is the major transportation center for a large rural area, and some understanding of rural transportation systems is necessary to deal with the entire transportation system of the Lubbock area.

Transportation systems in rural areas are centered on the transportation-disadvantaged, which in the rural areas is defined as anyone without access to a private automobile. The transportation disadvantaged are considered to be the young, elderly, poor, and handicapped elements of society.

Because of the extremely low population density of rural areas, the private automobile remains the most efficient mode of transportation. A full 80% of rural populations have direct access to a private automobile. The problem begins with the 20% who do not have this transportation access.

For the most part, the transportation disadvantaged must depend on the charity of friends and neighbors to fulfill their transportation needs. Unfortunately, most elements of transportation disadvantaged have the highest transportation needs. These elements include elderly, handicapped or poor who must often travel to various social and welfare offices to receive assistance.

A large dispute occurs in the area of rural transportation, centering on the economics involved. A great proportion of society believes that there is no responsibility to provide transportation to the transportation disadvantaged in rural areas. This segment of citizens believes that the transportation disadvantaged should move closer to urban areas where existing transportation systems can fulfill their transportation needs. The extreme opposite view is held by many persons. These people believe that all members of society are entitled to transportation access. Hopefully, this conflict can be resolved in the near future.

Basically, there are five types of transportation systems which can operate in the rural context.

1. Fixed Route Minibuses

These buses run a defined route once or twice a week. Riders simply wave the bus down when they wish to board.

2. Demand Responsive Buses

In this type of rural transportation system, the users must call in advance to make their bus reservations.

All rider data is fed into a computer and a daily bus route is plotted to meet user demands.

3. Existing Urban Systems

These systems could be extended into rural areas to provide transportation in these areas. A thorough demand analysis is required to make this system profitable.

4. Ride Sharing Systems

These systems can be developed by the pooling together of buses and vans, both privately and publicly owned. A system similar to this is already in operation in the Knoxville, Tennessee area.

5. School Buses

These could be utilized during their off-duty hours to provide public transportation in rural areas. The capital investment has already been made for the equipment which is the major advantage of this system.

Any of these five transportation systems could be used singularly or in conjunction with each other to meet each rural areas specific needs and resources.

History of Urban Transportation
(Ref. 28)

Public transportation in the cities had it's early beginnings in Paris, France in 1819. A line of coaches was established which carried passengers for five sous apiece. These early coaches were not entirely satisfactory and in 1825, George Shillibeer designed a new type of coach which was pulled by three horses and could carry eighteen passengers. Shillibeer's new coach had a closed passenger compartment and passengers entered through a door located in the back of the coach.

The idea of the "omnibus" soon caught on in other countries and cities and in 1827, Abraham Brower established a passenger line in New York City with a coach called the "Accomodation". In 1829, Brower purchased another coach, the "Sociable", which was patterned after George Shillibeer's design. Also in 1829, Ephraim Dodge started up passenger coach in Boston. The idea of the omnibus was slow to develop in other U.S. cities, but by 1835 there were more than a hundred omnibuses in service in New York City. Other cities with established omnibuses were Philadelphia and Baltimore, and for over twenty-five years omnibuses were the major transportation mode within U.S. cities.

In 1831, John Mason started the "New York and Harlaem Railroad Company" with the conviction that the steam locomotive railroad would be the answer to urban transportation needs. Mason decided to power his railroad with horses for a period of time and in 1832 his railroad initiated horse-drawn omnibus serviced over a one mile stretch of double track. Track was extended to over four miles in 1834. In New Orleans, in 1834, a street railway system was established modeled after that of the New York and Harlaem Railroad. The ride of street railways was much superior to that of the omnibus, but the idea did not become popular until the 1850's. The next street railroad construction did not occur until 1856 in Boston and then two years later in Philadelphia. The idea had finally caught on and in 1859 street railways were initiated in Cincinnati, Pittsburg, and Chicago. By the 1880's there were more than 18,000 horse cars in the United States operating over more than 3,000 miles of track, but by the 1890's, the horse-drawn railroad had two new competitors for the urban transportation market.

In 1873, Andrew Halladie invented the cable car in San Francisco. Halladie's major motivation for inventing the cable car was the fact that horses had a hard time contending with the steep hills of San Francisco. Halladie's system was extremely simple, a stationary

steam engine would operate a long cable loop in a conduit located beneath the city streets. The cable cars could engage and disengage themselves from the cable at will by means of a device known as a gripper and the cars would be equipped with brakes to halt the cars after they had disengaged from the cable. Another obvious advantage of the cable car was that no horses were required and also that greater speeds could be attained with this system.

Though San Francisco was the birthplace of the cablecar, it was the establishment of cable car service in Chicago in 1882 that made cable car service popular. By 1894 more than eighty-six miles of track had been constructed in Chicago and the Chicago cable car system was viewed by many horse-car company managers as a viable alternative to horse-drawn systems.

Philadelphia was next to construct a cable car system in 1883, and in a short period of time, cable car systems were constructed in New York, St. Louis, Oakland, Denver, Washington, Kansas City, Cleveland, Providence, Seattle, and Baltimore.

Yet the cable car left as swiftly as it came. In 1902, cable car track had been reduced by 50% of the total just ten years before. The age of electricity had arrived.

In 1885, just three years after the invention of the cable car, the first successful electric system was constructed in Montgomery, Alabama. The Montgomery system consisted of eighteen cars running on fifteen miles of track. The major problem with the system was the connection with the overhead power cable. A small two-wheeled carriage called a "monkey" rode the overhead cable and supplied power to the car by means of a flexible cable, but the "monkey" often jumped the cable and had trouble in maneuvering.

Electric car systems were constructed in which the power supply was in an underground conduit, but this system was prone to short circuiting. It was not until the development of the swiveling trolley by Frank Sprague in 1888 that a safe, economical means of supplying electrical power to the electric cars was attained. Within a two year period, trolley car systems had been installed in Minneapolis, St. Paul, Cleveland, St. Louis, Pittsburg, and Tacoma.

Street congestion had become a major problem in many U.S. cities by the mid-1800's and new transportation

systems were being demanded which would alleviate congestion in the streets. The elevated railroad was a response to this demand and in 1868, Charles Harvey had developed and constructed a one-half mile demonstration track in New York City. The demonstration was successful, but the operation was plagued by financial difficulties. Eventually the New York elevated railroad became successful and elevated railroads were eventually constructed in Chicago in 1892 and later in Boston in 1895. The elevated railroad never attained great popularity and only the Chicago system could be deemed a great success.

Subways, another solution to relieving street congestion, were first constructed in London, England and operations began in 1863. A major problem with the early subways was that coal-fired locomotives powered early subway trains, creating a serious accumulation of fumes, soot, and smoke within the subway tunnels. This problem delayed the development of subway systems until the 1880's when electrical locomotion first became practical and in 1897, the first American subway became operational in Boston. It was not until 1904 that New York's first subway system became operational, and in 1908 a combination elevated-subway system became operational. Subway systems were capable of much higher speeds than existing surface transportation, and for this reason they became very popular where they were constructed, but the high cost of subway tunnel construction severely limits the building of subways.

Meanwhile, surface transportation was dominated by the electric trolley car and trolley car configurations of all sorts were running through American cities. By 1902, there were more than 22,000 miles of cable car track in the U.S. and cable cars had virtually been eliminated from competition. By 1917, there were more than 45,000 miles of track, and if a person desired, he could travel the entire distance from Boston to New York on trolley car lines. But after 1923, trolley car patronage began to decline as motor buses and trolley buses became more popular.

The development of the gas-powered automobile as a major transportation mode meant the demise of the trolley car. In Los Angeles in 1914, the jitney appeared. The jitney was simply an automobile which was for public hire for the nominal fee of five cents. The idea of the jitney quickly spread across the country, spreading from city to city. Jitneys would often travel the same routes as trolley car lines. This was not the first competition that the trolley cars received from gas powered vehicles.

In 1905, the Fifth Avenue Coach Company imported a twenty-four passenger bus from France and soon had a fleet of twenty buses. Motorbuses did not immediately become popular. By 1920, there were only 60 buses in operation in the U.S.

In 1920, the first bus designed primarily for the sole purpose of passenger conveyance was designed by Frank and William Fageol. After this development, motor buses became extremely successful. The mere 60 motor-buses operating in 1920 had risen to 7,000 buses in 1925 and over 13,000 in 1930. Eventually, more and more transportation companies switched over to buses. The trolley bus was a compromise solution by many trolley companies to compete with the motor bus, but the trolley bus could not compete with the flexibility of the motor bus.

World War II saw a major resurgance in the patronage of urban transportation, yet this was only a temporary trend. After WW II, the private automobile dominated the transportation market in almost all types of transportation demands. Trolley cars have vanished from the American scene and so has the trolley bus. The motor bus remains the major mode of public transportation, yet motor bus systems achieve only a marginal existance in most American cities.

Trends and Future Patterns of Urban Transportation (Ref. 15)

The requirements for urban public transportation vary as greatly as do the different urban environmental settlings. Transportation requirements for a spread out, low density urban environment, such as Lubbock, will differ greatly from dense urban centers such as Manhattan. Urban futures will have to be studied carefully to determine future transportation needs. Some possible urban futures include:

A. Urban Decline

During recent years, the trend has been a marked de-emphasis of urban centers with the major attention focused on the suburbs and their associated activity centers. If this trend is irreversible, it's not inconceivable to imagine the urban structure of the future to consist of a ring of suburban activity centers surrounding a decaying urban center. This outlook is unlikely because it would mean the demise of the central fixed facilities associated with the urban centers.

B. Urban Re-utilization

Many urban planners consider the decline of urban centers to be irreversibles, yet with concerned government leaders, incentives could be made to make the CBD an attractive area for development. If this trend were to occur, the urban centers would experience a dramatic rise in population densities.

C. Continued Current Trends

The most likely occurrence will be the current trend of simultaneous urban center decline and revitalization of the urban center. As the city governments seek to revitalize their urban centers, major growth will continue to occur in the fringe areas of the city. People will view the urban core as a major activity center, requiring transportation to and from the area.

D. Urban De-Centralization

Another option in urban trends will be the growth of small and medium sized cities, especially in the urban areas. This would result in a compaction in major urban areas, but would lead to an overall decrease in population density. This trend would require more medium distance transport networks, and an increased reliance on telecommunications networks to restrict business trips.

All four of these future urban trends are likely to occur in different localities throughout the U.S.

Urban Systems Options

a. Paratransit Systems

The term, "paratransit" covers the range of vehicles

between taxicabs and full size buses (40 to 50 passengers). Included in this classification are car pools, shared-ride taxis, jitneys, subscription buses, and demand responsive buses.
There are three major application for paratransit systems in the urban context:

1. Dial-a-ride or demand responsive buses can extend transit services to the urban areas of lower population densities. These buses, running flexible routes of high demand are far more economical than conventional buses in this transportation area.

2. Paratransit systems can provide circulation in dense urban areas due to their ease of maneuverability. These buses will be small in size and could be hailed by passengers from any point along their route.

3. Paratransit vehicles can provide transit services for the handicapped and elderly. Vans and buses with modified doors and steps would be utilized to perform this service. Operators should be trained in the problems of the mobility-limited persons.

Paratransit vehicles could be tied into a computer network which would link and define areas of demand. Paratransit systems should act as a feeder system for main-haul buses and regional trains. Smaller paratransit systems need not be computer oriented, 2-way radio communications shoud suffice.

b. Line-Haul Buses
The conventional bus of 40-50 passengers will continue to dominate urban transportation for some time. With a complete network of highway systems already in existance, the bus has complete flexibility to travel to virtually any spot in the city. In some downtown areas, passenger capacities can run as high as 10,000 passengers an hour or 25,000 passengers an hour using bus express lanes.

At low demand rates, it is un-economical to run large capacity buses and when the demand rates drop, a switchover a minibus/paratransit system is advised. Studies have determined that this switchover should occur when travel density falls below one hundred passengers per square mile.

The connection between line-haul buses and paratransit vehicles is extremely critical. With proper development, the flow between the two systems should act as a single unit.

There may be a trend towards larger buses in the future. Double-decker buses, such as those used in London,

could be one alternative, but low street clearances in many U.S. cities would restrict their usage. Super-buses, which are double length buses with a flexible mid-section have been developed and are currently being used in Washington, D.C., and some other cities.

c. Light Rail Systems

For higher capacity systems, light rail systems should fulfill the need. These systems are the descendents of the "old" trolley car and can be run on the road surface or be grade separated. Most transit designers prefer the grade separated design because it decreases traffic congestion. Light rail systems are electrically powered and usually manually controlled. If a higher passenger capacity is needed in the future, these systems can be converted into a heavey rail system with some modifications.

d. Rapid Transit or Heavy Rail

Rapid transit can handle the heaviest commuter loads, up to 40,000 passengers per line per hour. The Rapid rail systems can be designed to operate in a pattern similar to line-haul buses. A grid network with closely placed stations, should be utilized in small dense areas, but transit speeds would be low due to the closeness of the stations. This type of system was used in the design of Washington, D.C.'s METRO rail service.

Another design approach utilizes radial lines extended along high density corridors. This type of design is more commuter oriented and was the design base for San Francisco's BART system.

The linkages between rapid rail systems and feeder transport systems must be carefully analyzed to assure the success of rapid rail systems.

e. Horizontal Elevators

Horizontal elevators, also known as people movers, are a new transport mode. People movers may be able to provide very high passenger capacities, yet have the personalized service not evident in most urban transport systems.

There are three basic types of horizontal elevators varying in sophistication and usage.

The simplest system is the Shuttle and Loop System (SLT). Multiple passenger vehicles run along a closed loop which has several passenger stations. Few branch lines or switches are available in this type of system. Systems of this sort could be used in large airports or urban activity modes.

The GRT, Group Rapid Transit, is the next type of people

mover. This system utilizes medium sized cars carrying twelve to seventy passengers each. Spur and branch lines can be utilized in GRT's. Usage of spurs for passenger loading and unloading can decrease headway time, the time spacing in between cars, from three to sixty seconds. Monorail systems cannot be utilized in this system because of the difficulties in switching tracks. A GRT system is currently in use at the Dallas-Fort Worth Airport, shuttling passengers from terminal to terminal.

Personal Rapid Transit (PRT) is the highest degree of sophistication in people movers, utilizing more passenger cars and sophisticated switching. In this system, a user would simply call up a car, and punch his destination into the car's computer and the railed car would proceed to take the passenger to his destination. The principal cost of this system would be the construction of the guideways, which would comprise 50%-70% of the total system cost.

The Department of Transportation has provided monies to several urban sites for the development and construction of Downtown People Movers (DPM). These systems will be based on the simple SLT system. In addition, a similar project has been proposed for Tokyo, Japan.

2. Systems Integration

There are three basic types of transportation needs which must be dealt with in the context of urban transportation:

1. Circulation traffic - the movement of large numbers of people relatively short distances (less than 1 mile), in and around major activity centers.

2. Line-haul traffic - moving large numbers of people longer distances (5-10 miles), on a regional basis.

3. Collection/distribution traffic - moving people to access line-haul modes or getting them a short distance to their destination after a line-haul trip.

There is no single mode of transportation which can adequately meet all urban transportation needs. Rapid rail can serve the needs of high density areas, but is extremely un-economical in light density areas. The private automobile functions quite well in low density areas, but become impractical in high density areas due to the large amount of space (streets, parking, service, etc.) required.

A mixture of various transportation modes is obviously required for the urban setting and though the major emphasis may seem to be diversions from the private automobile, the private automobile will continue to dominate the transportation scene.

Citibus
(2:408)(Ref. 29)

Citibus, the municipally owned bus transit system has been in operation since 1976. Prior to this time, Lubbock's mass transit systems had been privately owned.

Municipal bus service began in September 1925 when a franchise was granted to R.C. Bowen and Associates. In the very beginning, the bus service was predominantly used by Texas Tech students. The bus system never quite caught on and increased auto ownership by both citizens and Tech students caused an evergrowing decline in ridership. Services were trimmed back until 1959, when the Lubbock Bus Company announced that services would be discontinued. Lubbock citizens appealed to the Company to continue operations until a new operator could be found. On June 1, 1960, the American Transit Company of St. Louis, Missouri, assumed the operation.

The American Transit Company did not fare much better than its predeccessors. A Mass Transit Study (1974) for Lubbock concluded that it was virtually impossible for a privately owned city bus system to survive in Lubbock. If the city became the owner of the bus system, city and federal funds could be utilized to defray operating expenses for the system. As a result of this study, Citibus came into existence.

One of the major problems facing Citibus was the need of new buses. Many of the older buses dated back to the '50's and needed constant repair. Yet, the city was not willing to spend a huge sum of money on quality buses because there were no assurances that even a city-operated bus system could operate for more than a few years. It was decided to buy a fleet of "throw away" buses, which had an expected service life of not much more than five years. These are the brightly colored Citibuses which Lubbock residents are familiar with today. (Ref. 30)

Despite a new fleet of buses and an intensive advertisement campaign, Citibus failed to show any increase in ridership during it's first year of operation. Complaints about poor bus routing were widely heard and the young company ran into financial problems mostly as a result of inflation destroying the budget.

The "Tax Revolt" struck Lubbock in 1978 and the city owned bus system came under much scruitiny. Many citizens questioned the need for public transportation in Lubbock, yet Citibus survived. Eliminating Citibus

would leave it's dependent customers without means of transportation and the ever increasing likelihood of a serious energy/fuel problem in the near future were major issues in deciding the fate of Citibus.

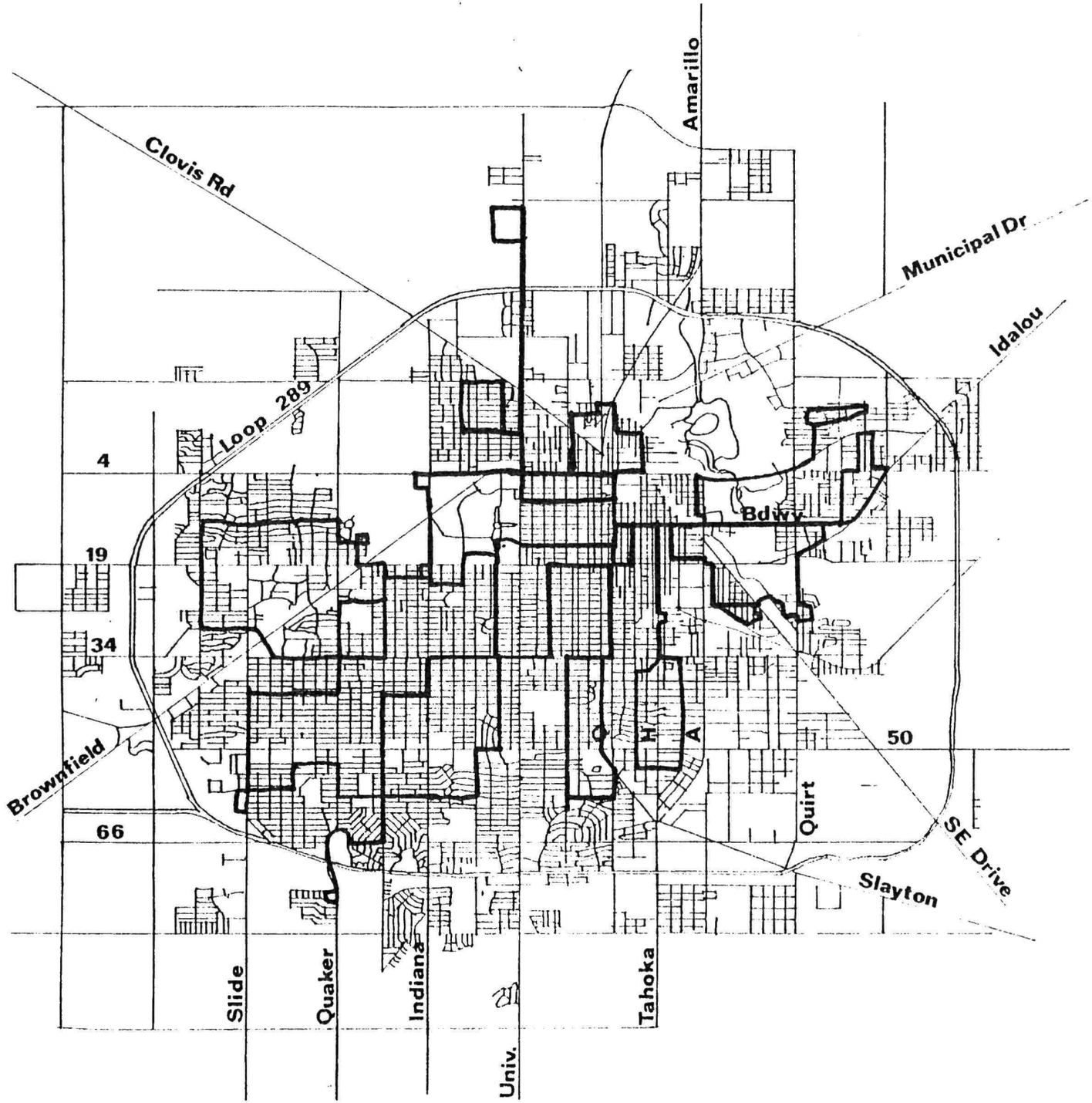
The problems that Citibus faces here in Lubbock are extremely difficult to deal with. Lubbock has an extremely low population density. The typical service area in a city of 100,000 to 250,000 persons is approximately 40 square miles, whereas the service area of Lubbock is over 82 square miles. This spread-out nature of the city makes it difficult to plan routes. It is desirable for bus routes to be within easy walking distance in all portions of the city, but to accomplish this goal without acquiring a huge fleet of buses is extremely difficult. Another problem facing Citibus is the fact that public transportation has always been under-utilized, especially since the automobile became a major element on the urban transportation scene. Lubbock citizens are not likely to flock to Citibuses until a major change in automobile usage occurs. The price of fuel is usually counted on to provide this change, but only a few short years ago, many people said they would change their driving habits when gasoline would hit $1.00 per gallon, yet now with the prospect of $2.00 per gallon gasoline looming in the near future, no real change in driving habits is apparent.

But Citibus is here to stay. Citibus is currently in the process of exchanging their five-year old "throw away" buses with a fleet of deluxe diesel buses. These new buses with a passenger capacity of 37 passengers as compared with the small capacity of 21 passengers of the old buses will make their first appearances in the fall of 1980 on the Tech campus bus routes. These new buses will greatly improve the image of Citibus and hopefully draw new customers.

The current Citibus system operates 15 bus routes with 7 hookups*. The bus routes are located so that no area of the city is more than a quarter mile from a bus route with major areas of route concentrations occuring at the CBD, Texas Tech, and at South Plains Mall. Approximately 60,000 riders are carried each month and the route system requires 18 buses to maintain schedules, not including the buses required to operate the Tech Campus bus system.

A survey conducted by Citibus of bus riders in June of 1978 showed that the typical bus passenger was black,

* A hookup is when single bus services two routes creating in fact one large continuous looped route.



Citibus

Legend:

Citibus Routes

1" = 1.5 Miles

female, 16-34 years of age, rode the bus 10-14 times per week and had an income between $4,000 and $9,000. The principle purpose of the ride was usually travelling to and from work. Citibus attempts to attract white collar and shopping riders, but have not been particularly successful. (29:4)

Citibus plans to raise fares in the near future to 25¢ per passenger and is expected to use an exact change system as a deterrent to robbers. Another new program to be implimented soon is a new multi-fare ticket which would be based on a certain number of bus rides rather than for the weekly bus pass currently used. It is hoped that these new bus passes will be sold at various locations throughout the city and a special discount bus pass for students will be offered and will only be availabe for purchase from the schools; this includes Texas Tech. (Ref. 30)

The Impact of Rapid Transit Stations on Land Use (Ref. 31)

There are several issues and misconceptions about the impacts of rapid transit systems and stations on land usage.

Major rapid transit improvements can provide an inducement for economic and population growth but only when the major change is supported by the favorable conditions as shown in the diagram.

It has been found that a major improvement in heavy rail transit has lead to an intensification of land use patterns desirable to mass transit especially around station areas. Study results are inconclusive for light rail or bus transit systems, but one cannot assume that there is no impact.

Recent experiences show that major improvements in transportation systems do not lead to an overall increase in an area's population or economic growth. However, major shifts of population and economic growth from one city sector to another.

It's been discovered that the total impact of transit stations on surrounding land uses varies directly with the amount of investment capital available to developers at that period of time.

Usually, land use patterns adjacent to rapid transit stations do change, but quite often zoning regulations must be altered before any significant changes are to occur. Major transit changes can be the inducement for the redevelopment of growth, depending on many variables.

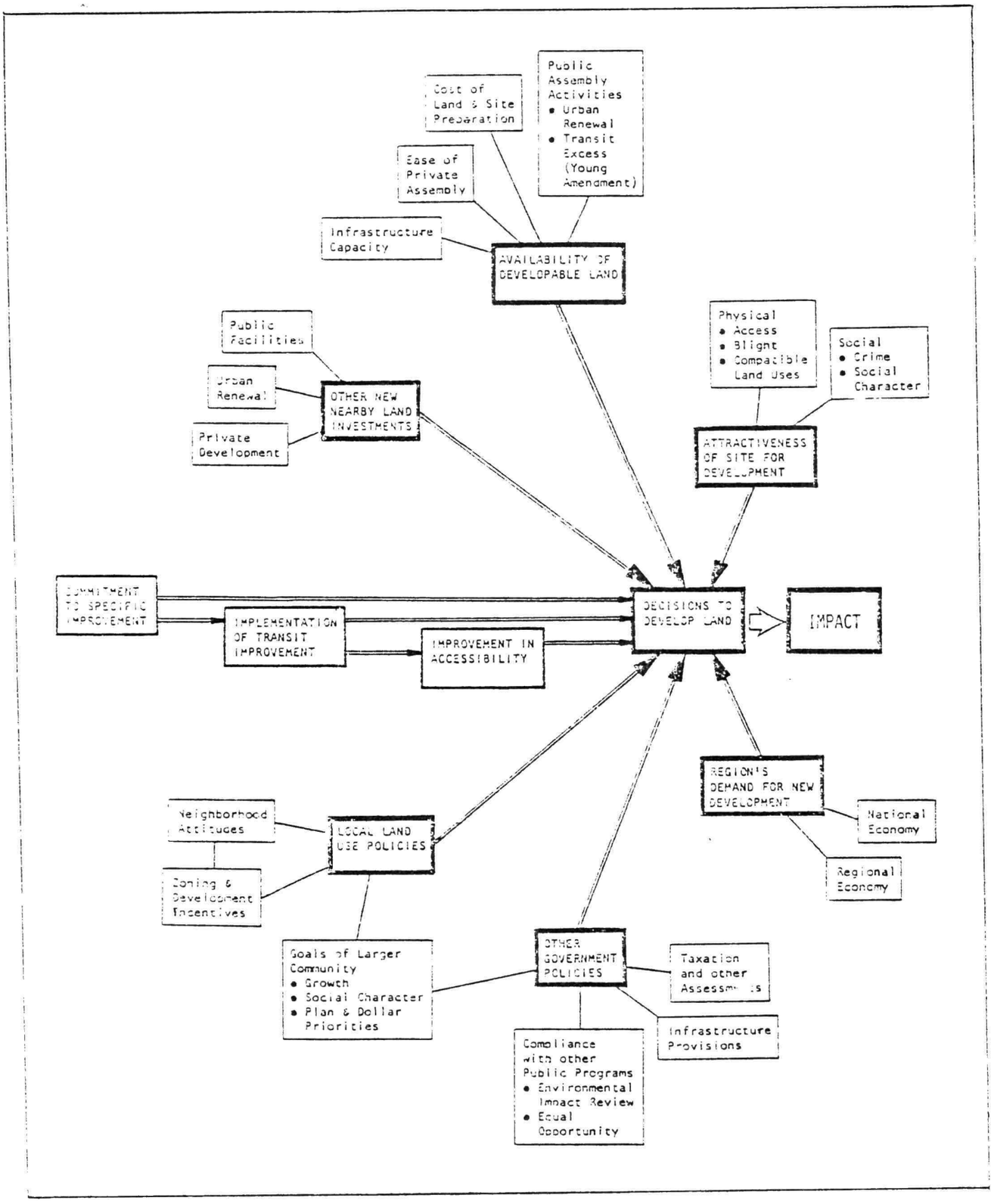


Figure 7.1
FACTORS INFLUENCING LAND USE IMPACT

Source 31:204

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A PATTERN LANGUAGE

Chris Alexander's, A Pattern Language, forms the starting point for this activity analysis. Only 48 of the 253 patterns are mentioned in this activity analysis, which doesn't mean that the omitted patterns are of no consequence, but to stress and identify some of the major activity problems which must be dealt with in the design of a Transit Facility.

Each of the patterns describes a problem which is commonly encountered in activity design. Such patterns such as a FOOD STAND or SMALL PUBLIC SQUARES may not seem relevant to a Transit Facility, but then again, a coffee bar could be likened to a FOOD STAND and a waiting room to a SMALL PUBLIC SQUARE.

The patterns used in this analysis should not be interpreted as iron-clad rules, but can form the basis for understanding the activities and issues involved. Another problem with a Pattern Language, is that quite often, the statements made represent Alexander's opinion and have no documented data to support the data.

USER/DESIGNER ACTIVITY \ ACTIVITY PATTERN	1. INTERCHANGE	2. ACTIVITY NODES	3. WORK COMMUNITY	4. PROMENADES	5. MAIN GATEWAYS	6. GREEN STREETS	7. BUS STOPS	8. SMALL PUBLIC SQUARES	9. NETWORK OF PATHS & CARS	10. ROAD CROSSING	11. RAISED WALKS	12. ACCESSIBLE GREEN	13. COMMON LAND	14. PUBLIC OUTDOOR ROOM	15. SELF-GOVERNING WORKSHOP	16. SMALL SERVICES W/O REDTAPE	17. OFFICE CONNECTIONS	18. INDIVIDUALLY OWNED SHOPS	19. STREET CAFE	20. BEER HALL	21. TRAVELLER'S INN	22. FOOD STANDS	23. SLEEPING IN PUBLIC	24. BUILDING COMPLEX	25. NUMBER OF STORIES	26. SHIELDED PARKING	27. CIRCULATION REALMS	28. MAIN BUILDING	29. PEDESTRIAN STREET	30. BUILDING THOROUGHFARE	31. FAMILY OF ENTRANCES	32. SITE REPAIR	33. SOUTH FACING OUTDOORS	34. POSITIVE OUTDOOR SPACE	35. WINGS OF LIGHT	36. CONNECTED BUILDINGS	37. MAIN ENTRANCE	38. HIERARCHY OF OPEN SPACE	39. COURTYARDS WHICH LIVE	40. ARCADES	41. PATHS AND GOALS	42. PEDESTRIAN DENSITY	43. ACTIVITY POCKETS	44. THE FLOW THROUGH ROOMS	45. FLEXIBLE OFFICE SPACE	46. SMALL WORK GROUPS	47. A PLACE TO WAIT	48. WORK SHOP ENCLOSURE
A. SITE LOCATION	●	●	●		●		●																			●	●		●			●	●														
B. EXTERIOR CIRCULATION	●	●	●	●	●	●	●	●	●	●	●	●	●	●					●			●		●		●	●	●	●	●				●			●	●	●		●	●	●				
C. INTERIOR CIRCULATION	●							●							●	●	●			●	●	●		●			●	●	●	●	●			●		●	●	●	●		●	●	●	●	●	●	●
D. FACILITY LAYOUT			●		●		●	●	●			●	●	●	●	●	●	●	●			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
E. OFF-SITE CONNECTIONS	●		●	●	●	●	●	●	●	●	●	●	●	●					●			●		●		●	●	●	●	●							●	●	●		●						
F. INTERIOR CONNECTIONS								●							●	●	●	●	●	●	●	●		●			●	●	●	●	●			●	●	●	●	●	●		●			●	●	●	●	●
G. TRANSIT	●	●		●			●		●												●	●																										
H. EATING							●												●	●	●	●																				●						
I. WAITING							●	●													●																	●				●				●		
J. SALES																		●					●																			●						
K. OFFICE WORK			●												●	●	●																											●	●		●
L. SOCIALIZATION		●	●	●				●					●	●	●	●	●		●	●	●		●																●			●		●	●	●	●
M. PRIVACY			●										●		●		●				●		●																					●	●	●	●
N. ORIENTATION					●		●	●																			●	●	●	●	●		●				●	●			●			●			
O. PSYCHOLOGICAL COMFORT			●	●	●	●			●	●	●	●	●	●	●	●	●		●	●	●		●	●	●		●		●	●	●								●	●	●	●			●	●	●	●

ACTIVITY PATTERN / ACTIVITY RELATIONSHIPS

1. INTERCHANGE (1:183-186)

Any transportation facility acts as an interchange between transportation modes, and the effectiveness of the interchange, determines the success of not only the facility, but the systems of transportation as well. For evidence of this, one does not have to look far. The failure of passenger rail service was due to the view by the rail industry, that the automobile was simply another form of transportation that they could beat. As a result, no interchanges or accomodations were made with the private automobile, and the passenger rail service was doomed.

Interchanges complete the WEB OF PUBLIC TRANSPORTATION between local TRANSPORT AREAS. As the WEB OF PUBLIC TRANSPORTATION of Lubbock has already been defined by current usages and patterns, special care must be made to fit the interchange into the existing transportation systems, and to supplement them as to encourage their usage by the public.

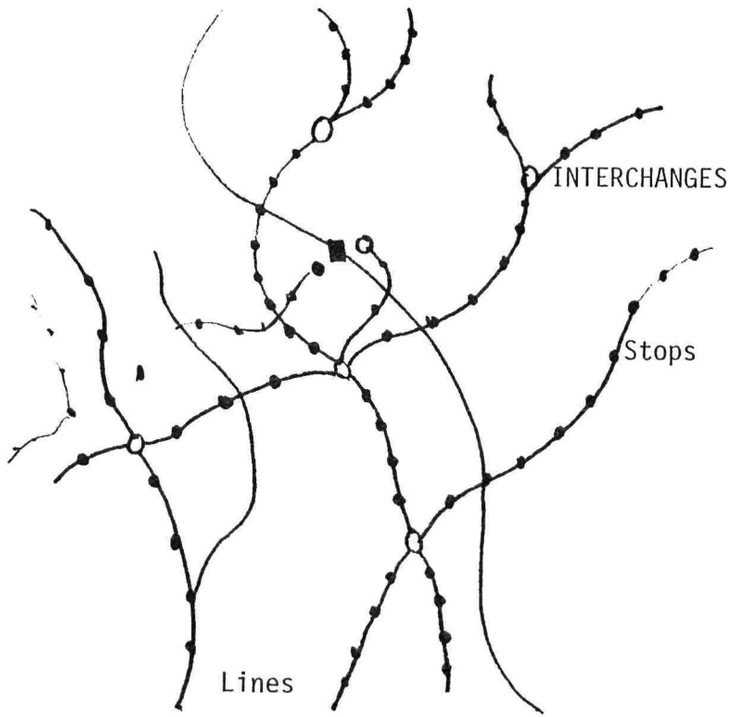
Special incentives must be made to encourage the transportation analysts of the various modes of transportation to utilize interchanges. Local citizens must also have some control over the transportation systems which utilize the interchange. To accomplish this, the Lubbock City Government will have the ownership of the facility rather than the transportation companies themselves.

But no transportation facility can exist unto itself. For the interchange to succeed, it must be surrounded by work places or residential areas which can utilize the transportation modes. It is also important for the interchange facility to link up with surrounding pedestrian paths to encourage use of the facilities, especially where public transportation is concerned.

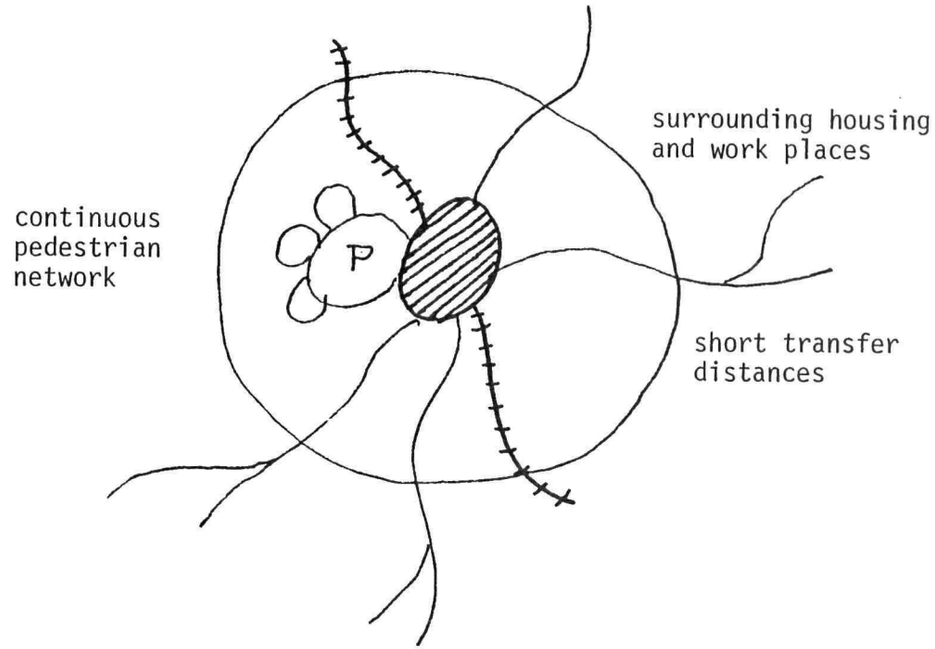
The existence of public transportation systems, and therefore interchange facilities, depends on the steady customer. Interchange facilities must be located adjacent to the areas of elderly and poor concentrations of the community as well as the commuter.

In addition, the distances between transfer areas must be kept to a minimum. 600 feet is suggested as the maximum between transfer zones. The distance between bus-to-bus transfers should be held to a maximum of 1000 feet. A maximum of 200 feet between bus and rapid rail transit is suggested.

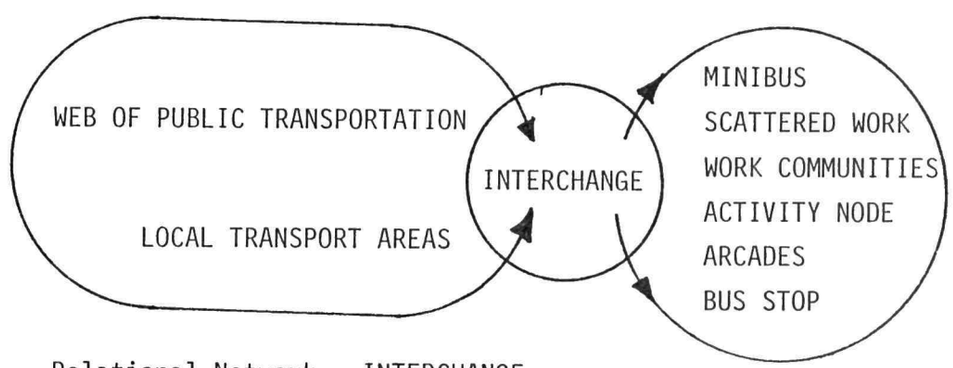
Just as local transport areas and the transportation network generate interchanges, interchanges generate activity nodes and work communities and help define bus stops and MINIBUS networks. The exterior of the interchange should be treated as an ACTIVITY NODE, and ARCADES can be used to link different modes of transport.



Critical Elements- WEB OF PUBLIC TRANSPORTATION (1:95)



Critical Elements - INTERCHANGE (1:186)



Relational Network - INTERCHANGE

2. ACTIVITY NODES (1:163-167)

Areas of transport are closely associated with ACTIVITY NODES, and each in their own way provides life to a neighborhood. Activity nodes will define or be defined by IDENTIFIABLE NEIGHBORHOODS, PROMENADES, the NETWORK OF PATHS AND CARS and PEDESTRIAN STREETS.

Activity nodes generate the public life for a community, an element which is almost entirely missing from downtown Lubbock. Community facilities should be densely grouped around small public squares, which should function as activity nodes with the majority of pedestrian activity, generated from the neighborhood chanelled through them. In order to develop activity nodes which are not simply dead open areas, four major properties are required.

First of all, the node must act as a funnel for the major paths from the surrounding area. This is difficult to deal with in an existing community and requires the analysis of existing city paths and movements or the potential for generating such activities.

The second requirement of activity nodes, is to keep the activity level dense. Keep the public squares small, about 45 x 60 feet is adequate to handle most situations. By packing activity densities tightly, a greater variety and richness of activities can occur within the activity node.

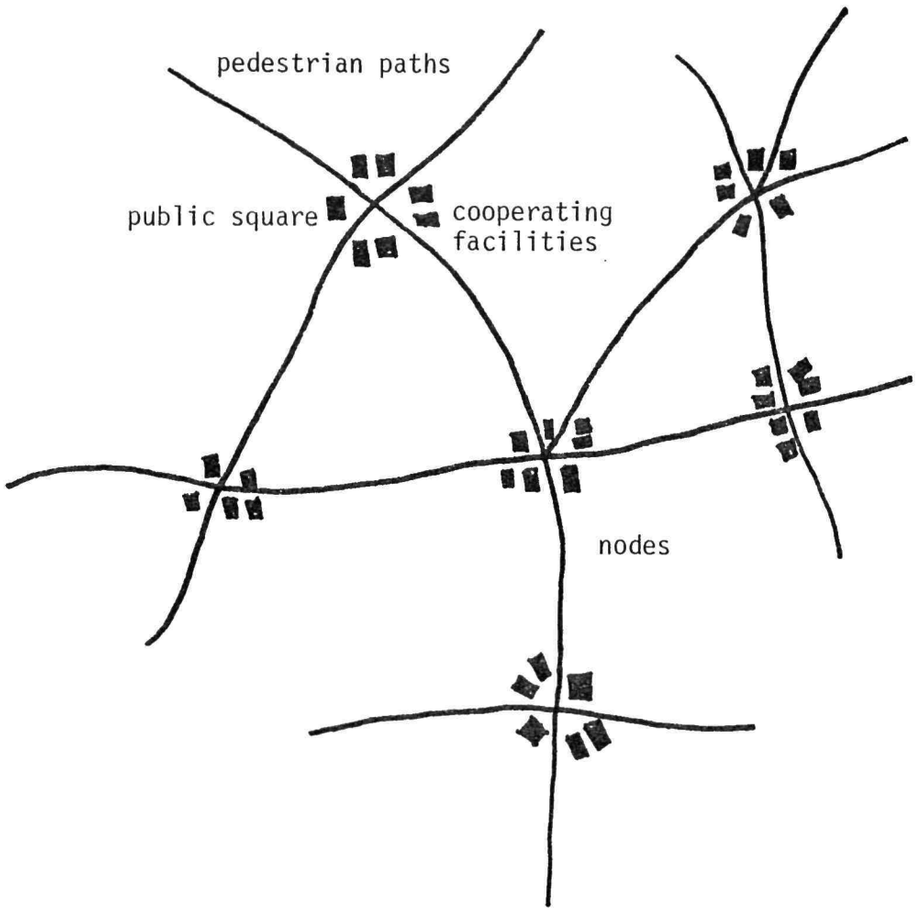
The third necessity of activity nodes is that the facilities placed around the activity node should be similar or supportive of each other.

The last requirement necessary for activity nodes is that they should be evenly distributed throughout so that no residential area or workplace is more than a few hundred yards from the activity node.

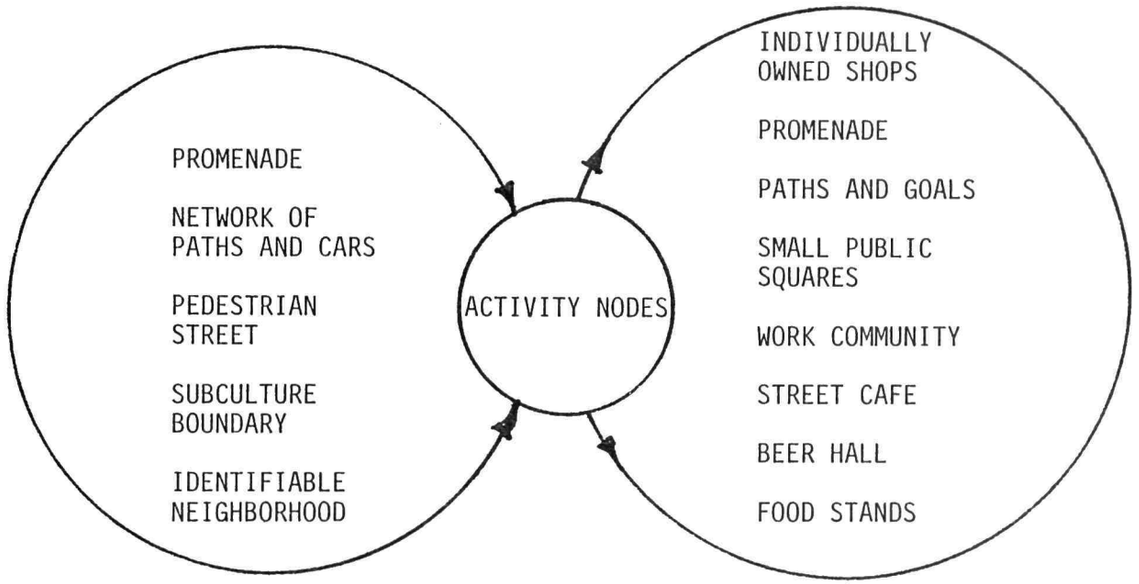
The plan of action for creating a successful activity node within an existing urban area is to identify existing spots within the community where public activity occurs, and to reroute paths so they will pass through the activity node.

Connections between adjacent activity nodes where a high public activity density occurs, can be connected by means of a PROMENADE. The problem of pedestrian paths must be analyzed as PATHS AND GOALS. Differentation between the different degrees of path usage is covered in DEGREES OF PUBLICNESS and the very heart of the activity node should contain a SMALL PUBLIC SQUARE. Possible

surrounding activities around the square include WORK COMMUNITY, LOCAL TOWN HALL, INDIVIDUALLY OWNED SHOPS, STREET CAFE, BEER HALL, AND FOOD STANDS.



Critical Elements : ACTIVITY NODES (1:167)



Inter-relationships: ACTIVITY NODES

3. WORK COMMUNITIES (1:223-226)

The WORK COMMUNITY is a very crucial element in the Lubbock Transit Center, for not only is the Center surrounded by work communities, it in itself is a self-contained world community.

It's interesting that the place where one works eight hours a day is usually perceived by many as a hostile environment. This is especially true today, when more and more companies locate their operations in the suburbs or out skirts of town. The result is many small islands of work places, removed from the rest of society, a world of their own. This is detrimental in two respects. Workers need a temporary change of atmosphere or break from their work environment during breaks, lunch, etc. It is almost impossible for most workers to receive this change of atmosphere as isolated as most work places are from the rest of the world. The second, probably more damaging effect is that on the surrounding communities. These self-serving pockets of work offer few benefits to the community as a whole, and after working hours, these places simply become dead, sterile space.

The work place should operate as a community, and to operate as such five criteria must be met.

Work places must not be too scattered nor too dense. A work community will function well if between 10-20 work places are contained within it. With a small work community of 10-20 work places, people get to know each other, at least by sight if not personally, thereby creating a sense of community identity.

This number of work places is large enough to provide customers for lunch counters, news stands and the like. The approximate number of support facilities within the work community would be between 8 and 20.

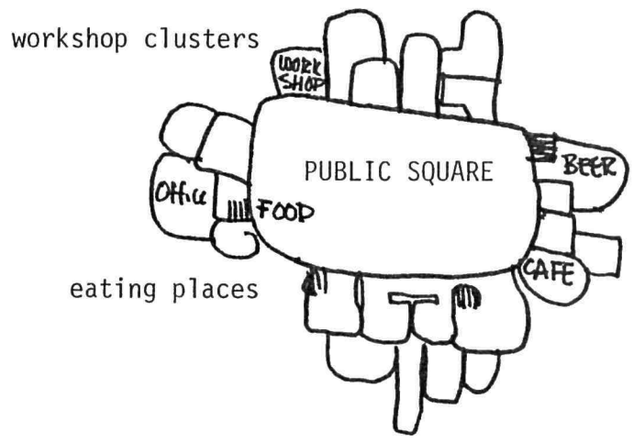
A work community should contain a good mixture of various types of work; desk jobs, retail sales, craft jobs, etc. Today could be termed "the age of the specialist" and the specialists all tend to flock together. This results in specialized areas of town, medical centers, warehouses, car sales, etc. As a result, these areas of specialization have no contact with persons of other professions, leading to a lack of communication and understanding between people.

The third major element of a work community is that the work places share a common piece of land. The common area is a place where members of the work community can interact with each other. Streets can do this to some extent, but seldom beyond one's immediate neighbors.

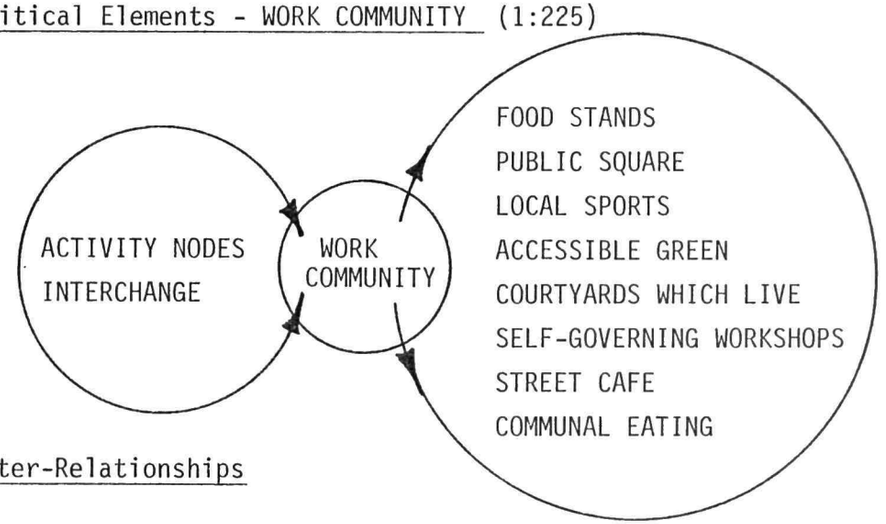
The work community must be tied into the community as a whole; it does not function well isolated. In this manner, both the community and the work community can benefit as a result of increased interaction, and shared facilities.

The last necessity for a work community is that the common land must operate at two diffenent levels. This is because some of the support facilities such as small recreational areas operate best at a small scale, while operations such as lunch counters require customers from outside of the work community to survive financially.

The PUBLIC SQUARE is the focal point of the work community. Some provisions should be made for LOCAL SPORTS and an ACCESSIBLE GREEN should be within a three minute walk from the work community. The square should be broken into more intimate spaces, COURTYARDS WHICH LIVE and workshops should be kept small, SELF-GOVERNING WORKSHOPS. COMMUNAL EATING is a common event in small workshops, but STREET CAFES and FOOD STANDS are also other elements to consider.



Critical Elements - WORK COMMUNITY (1:225)



Inter-Relationships

4. PROMENADES (1:168-173)

A promenade should serve as the back bone of a community forming ACTIVITY NODE along its length. The promenade is the activity region where people can intermingle with other people, establishing a sense of community. The promenade is not a common element within American cities, but in many ways the indoor shopping mall functions as an interior promenade.

People who are within a twenty minute walking distance of a promenade are those most likely to use it. Beyond a twenty minute walking distance, usage of the promenade drops dramatically.

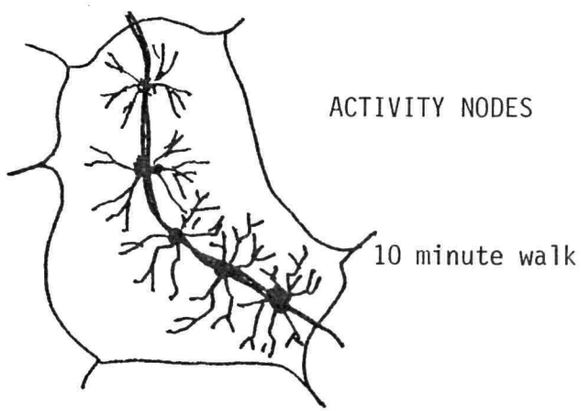
Pedestrian density is a critical item which must be analyzed carefully in planning a promenade. Pedestrian densities must be more than one person to 150 to 300 square feet of pedestrian area if the promenade is to come alive.

If one assumes that the average person can walk 150 feet per minute, and the average length of the promenade to be ten minutes walking, the promenade should be approximately 1500 feet long to be effective. People from an area 1500 feet from the promenade are the persons most likely to use the promenade and if the population density is known, some estimations can be made of the proper size of the promenade.

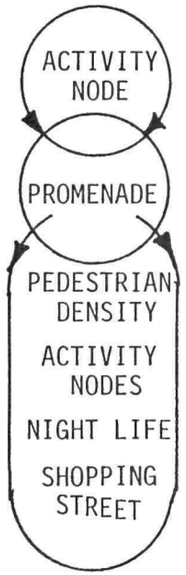
The promenade must not be made too wide, less than twenty feet preferably and a wide range of activities and facilities must occur along the length of the promenade to generate interest.

It is necessary to provide people with goals to walk, but if they are spread apart, more than 150 feet, dead spaces will occur in between the activity goals.

The promenade is brought to life with a high level of pedestrian density and areas of intense activity, ACTIVITY NODES must occur along its route. The character of the promenade will be defined by PEDESTRIAN STREET and path shape.



Critical Elements (1:173)



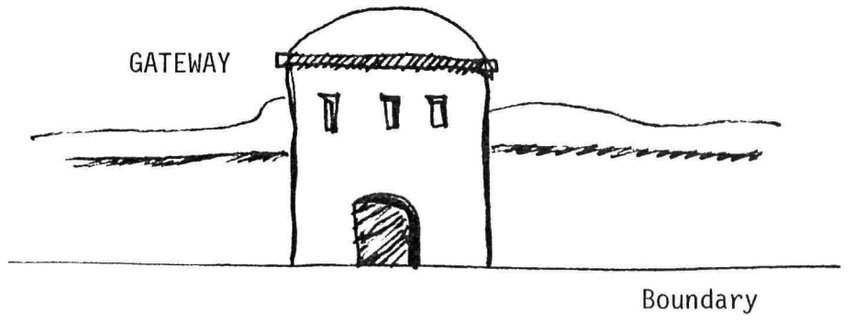
5. MAIN GATEWAYS (1:276-279)

WORK COMMUNITIES, IDENTIFIABLE NEIGHBORHOODS, BUILDING COMPLEXES, and CIRCULATION REALMS can receive identity by the usage of gateways.

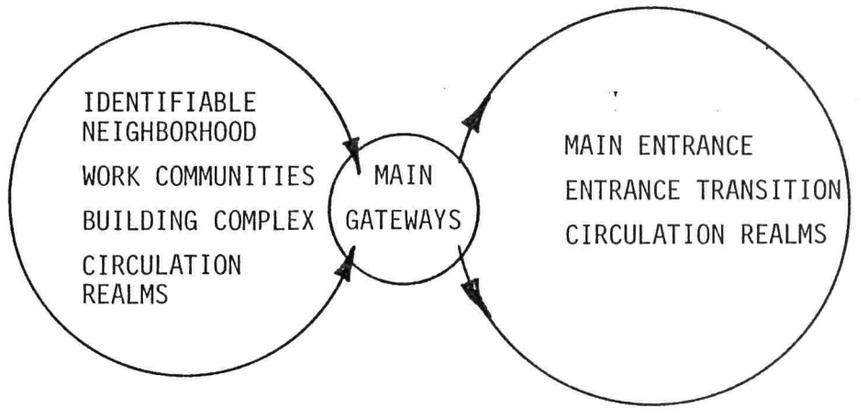
Parts of towns are often imagined as having boundaries around them, a characteristic of mental mapping. These boundaries denote differences from different types of activities and characteristics. The boundary to important areas are most critical at the points where paths cross the boundary. If the crossing of the boundary is not well defined, it creates an ambiguous boundary in the mental-map-making process. If the path-boundary connection is marked by a gateway, it provides a greater sense of identity for the neighborhoods involved.

Gateways can be of many types; bridges, trees, narrow passage ways, are just a few examples in which gateways can be identified. It is crucial that the gateway be solid in nature, concretely identifying the boundary.

Gateways must be treated as MAIN ENTRANCES on a larger scale allowing for ENTRANCE TRANSITION and act as a starting point for CIRCULATION REALMS.



Critical Elements - MAIN GATEWAYS (1:279)



Inter- relational Diagram

5. MAIN GATEWAYS (1:276-279)

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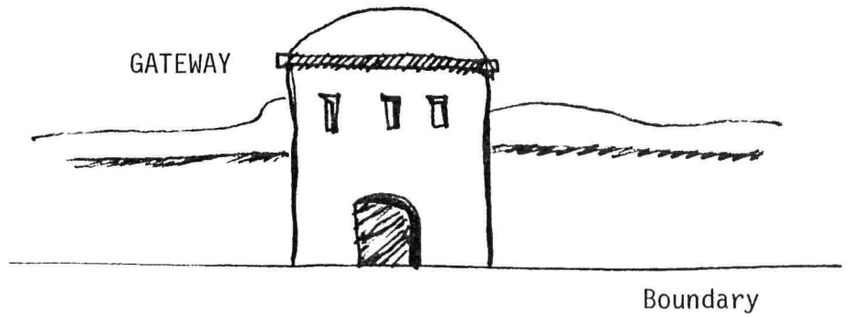
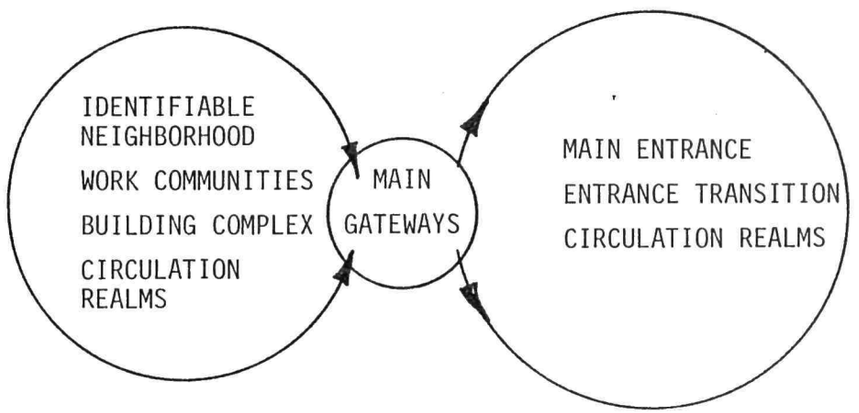


Critical Elements - MAIN GATEWAYS (1:279)



Inter- relational Diagram

6. GREEN STREETS (1:266-275)
Green streets should have a close relationship to existing COMMON LAND areas.

The average American community has more than 50% of the land covered with concrete or asphalt. In Lubbock, 24% of all developed land is used for streets and this does not include parking lots and spaces.

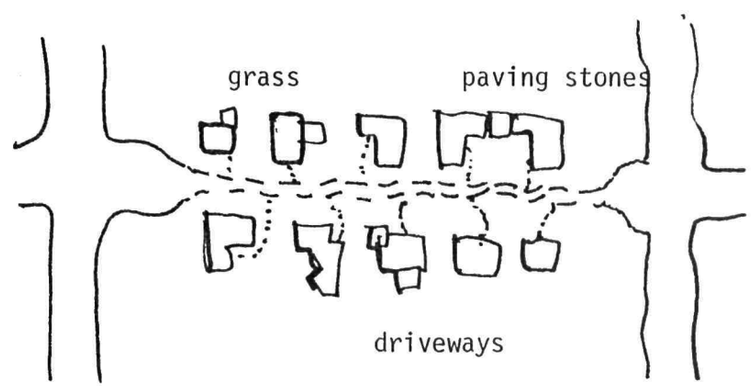
Asphalt and concrete have a terrible effect on climate, both macro and micro. The solar energy absorbed by concrete and asphalt in the city can raise the air temperature within a city as much as $5F^{o}$ as compared to surrounding areas. In the spring and summer, the rising heat from city streets in Lubbock is enough to generate thunderstorms. Lubbock is a major generator of thunderstorms, the clouds develop over the city and drift off to the north and the east ot release their energy.

The effect on the microclimate is even more severe. Plants and animals are destroyed, natural drainage patterns are disturbed and the concrete and asphalt is anything but esthetically pleasing.

The usage of concrete and asphalt is best suited for high speed roads, but not necessary for local roads.

On local streets, where traffic densities are low, a grassy surface could be utilized, bringing a more coherent characteristic to the street and surrounding areas. The easiest solution to this is a field of grass with paving stones set into it. Temperatures over green streets are 10 to 14 degrees cooler than over an asphalt road.

Green streets naturally attract activity and become COMMON LAND. Small lanes and paths could meet the green street at right angles as in the NETWORK OF CARS AND PATHS. Provide SMALL PARKING LOTS to cut down on the wear and tear. Other elements which could be included are fruit trees, raised flowers, a paving with cracks in between the stones.



Critical Elements - GREEN STREETS (1:269)

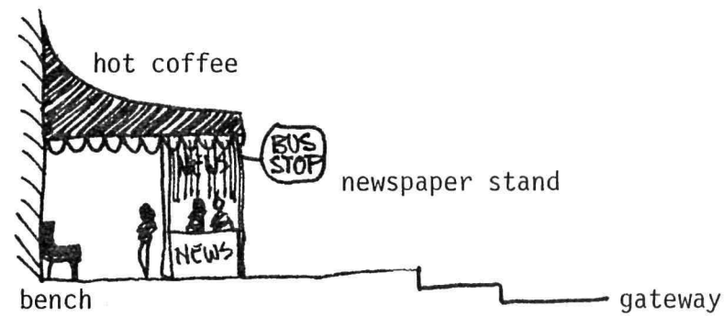
7. BUS STOPS (1:451-453)

The city bus stop, though somewhat smaller in scale than the proposed Lubbock Transit Center, still offers valuable insight to human behavior and usage of public transit.

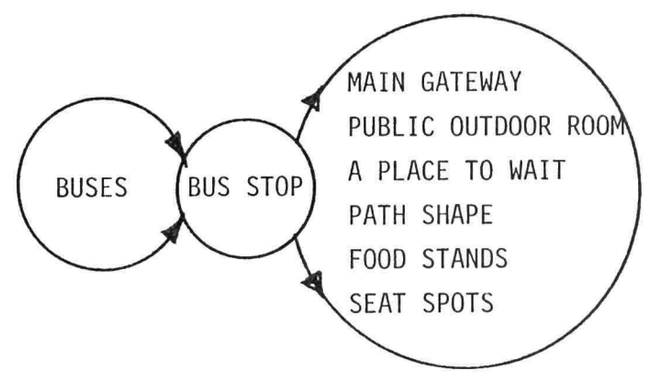
Many bus stops are placed indiscriminantly, say every 500 yards or on a street corner. Evidence for this can be found here in Lubbock. There are many bus stops, marked by "Citibus" benches, sitting forlornly on a street corner, on the edge of some trashed out parking lot under the hot summer sun. You would have to be a masochist to sit there for ten minutes waiting for a bus.

It doesn't take much to humanize a bus stop. A little shade, a comfortable seat, and a newsstand or some other small operation all reinforce each other to create a human experience. The bus stop should act as a magnet, attractive to people who are even just passing by. Bus stops should at least have outdoor shelter, various seats and have a close association with a small business operation, a coffee stand, a small store or something to that effect.

The bus stop should have a close association with a neighborhood gateway, MAIN GATEWAY and the bus stop functions as a PUBLIC OUTDOOR ROOM and defined by PATH SHAPES. Bus stops are a place to wait, access to a FOOD STAND are desirable. The seats should be carefully placed - SEAT SPOTS.



Critical Elements - BUS STOP (1:453)



Inter-Relationships - BUS STOP

8. SMALL PUBLIC SQUARES (1:310-314)

Small public squares have already been mentioned in INTERCHANGES, ACTIVITY NODES, AND WORK COMMUNITIES. They can help to generate a PROMENADE and help to establish an IDENTIFIABLE NEIGHBORHOOD.

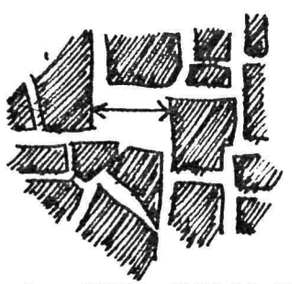
Small public squares provide an arena for the various attributes of human socialization. They are the gathering place for small crowds, festivities, public gatherings, and human interaction.

Great care must be taken not to make the public square too large. Many of our American cities have been victimized by large empty plazas. As a general rule, public squares should be 60 to 70 feet in diameter. The reason for the attractiveness of small squares is that pedestrian densities of more than 300 square feet per pedestrian creates a vacant, cold image.

Using this 300 square feet per pedestrian figure, a 100 x 100 foot square will require 33 persons before it becomes alive. A 50 x 50 foot square will only require eight people before this vacant feeling can be overcome.

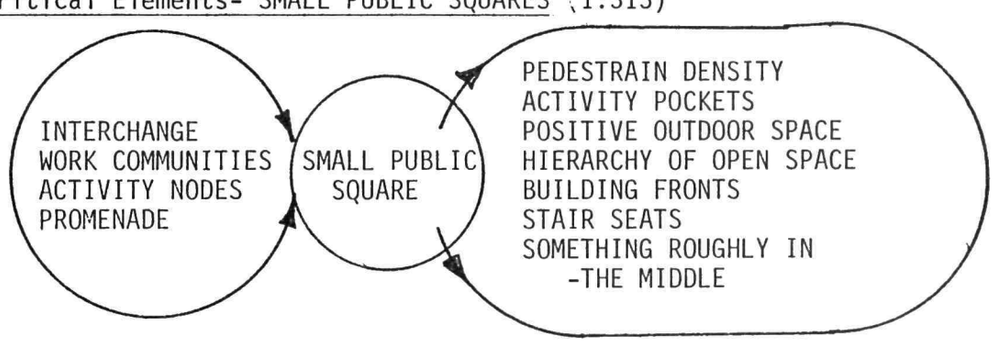
Other substantiating data for small public squares is that a loud voice is audible for distances up to 70 feet and a person's face can also be recognized at a distance of 70 feet. Being able to half hear voices and recognize faces creates a loose-knit relationship between the persons in the square.

PEDESTRIAN DENSITY is closely linked to the pattern of small public squares, and the square should incorporate POCKETS OF ACTIVITY. The small public square is shaped by surrounding buildings - POSITIVE OUTDOOR SPACE and linked to HIERARCHY OF OPEN SPACE, BUILDING FRONTS, and STAIR SEATS. Since it is a natural tendency of man to gather next to walls, place SOMETHING ROUGHLY IN THE MIDDLE.



45 to 70 feet across

Critical Elements- SMALL PUBLIC SQUARES (1:313)



PUBLIC SQUARE - Inter-relationships

9. NETWORK OF PATHS AND CARS (1:270-275)
Major paths will be shaped and formed by ACTIVITY NODES, PROMENADES, and PATHS AND GOALS.

In recent years, there has been a tendency to separate cars and pedestrians. This is done basically for pedestrian safety, but this planning practice fails to take into account that much activity occurs between the pedestrian and the automobile.

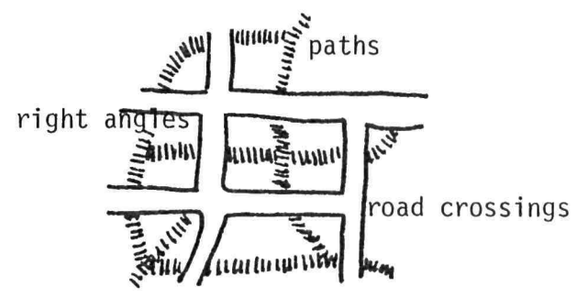
This area of car pedestrian linkage can be developed into a very viable space in both residential and commercial areas. But, the need for pedestrian safety must take precedence.

It is necessary to develop a system where cars and pedestrians are separated but meet frequently. These areas where pedestrian and car should be treated as focal points. One solution to this problem would be to use two orthogonal networks, one for cars and one for paths. These two networks are interrelated and cross often. The paths should cross at right angles to the road.

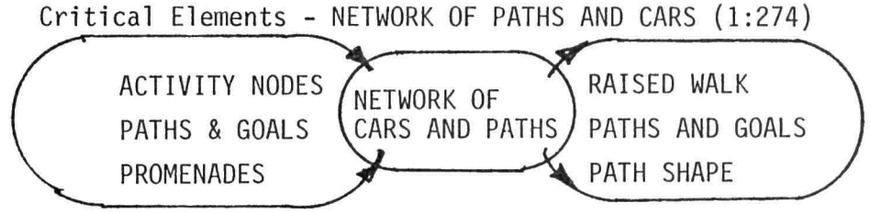
For an existing urban setting, a similar pattern can be developed by closing off alternating city to automobile traffic. The problem could also be achieved by running paths at right angles to the street through the blocks. A path here and a path there, a true path system could develop in time.

Where path must run parallel to auto circulation a raised walk may be the solution.

If paths must run alongside roads, make them 18 inches higher than the road, a RAISED WALK. Plan the paths according to PATHS AND GOALS and give them form with PATH SHAPE. A very critical item is the issue of RAISED WALKS.



Critical Elements - NETWORK OF PATHS AND CARS (1:274)



NETWORK OF PATHS AND CARS - Inter-relationships

10. ROAD CROSSING (1:280-284)

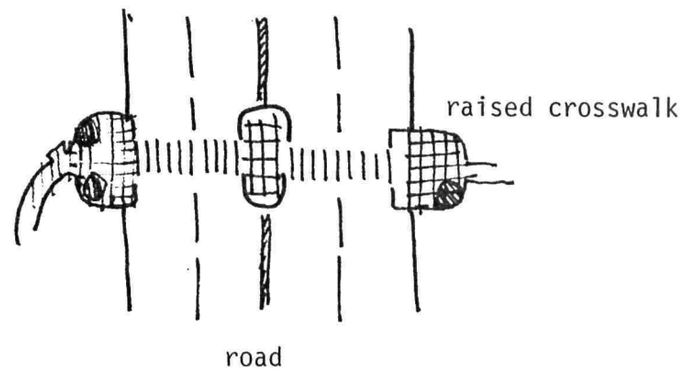
If one implements the pattern NETWORK OF PATHS AND CARS, pedestrian paths will develop at right angles to streets, rather than along them. This will require a new approach to the problems of road crossings.

Where paths cross roads, the car has all of the advantages over the pedestrian. The pedestrian crossing the street is entering the domain of the automobile, implying that the automobile has the right of way over the slow moving and vulnerable pedestrian.

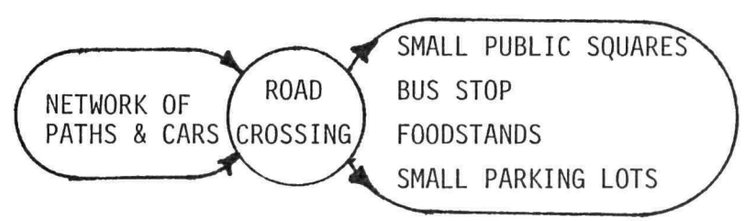
Pedestrians feel less vulnerable to cars if they are approximately 18 inches above them as in a raised walk and this pattern can be utilized in road crossings. The pedestrian must be made more visible to the automobile and it is necessary to slow cars down as they approach the road crossing. By raising road crossings 10 to 12 inches above the crosswalk and sloping the roadway up to the crosswalk, this can be done. A slope of 1 in 6 is adequate to slow cars down, yet do no damage to the car. To establish the pedestrian's right of way, the pedestrian path could be marked by a canopy at the sides of the road.

If it is not possible to construct road crossings of this type, the placement of islands in between lanes of traffic will afford the pedestrian some safety.

At either end of the road crossing, place SMALL PUBLIC SQUARES with a BUS STOP and FOOD STANDS and provide SMALL PARKING LOTS in close proximity. The ends of the road crossing could be marked by a TRELLISED WALK or CANVAS ROOFS.



Critical Elements - ROAD CROSSING (1:284)



Inter-relationships - ROAD CROSSING

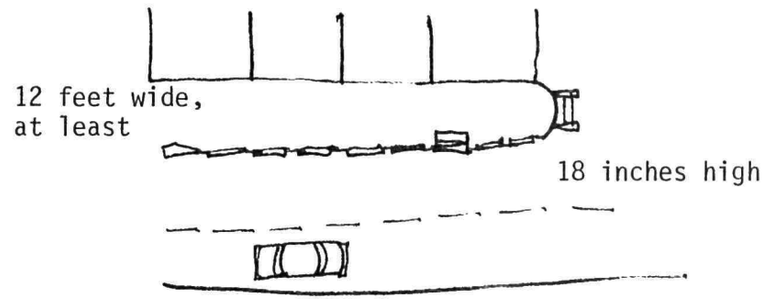
11. RAISED WALKS (1:285-288)
Raised walks complete THE NETWORK OF CARS AND PATHS and ROAD CROSSINGS. It is often impossible to have paths anywhere but parallel to roads.

The problem of constructing paths next to roads is a problem of scale. A 150 pound pedestrian traveling at three miles per hour can feel pretty defenseless and insignificant standing three feet away from 3000 pounds of steel traveling at speeds of up to 60 miles per hour.

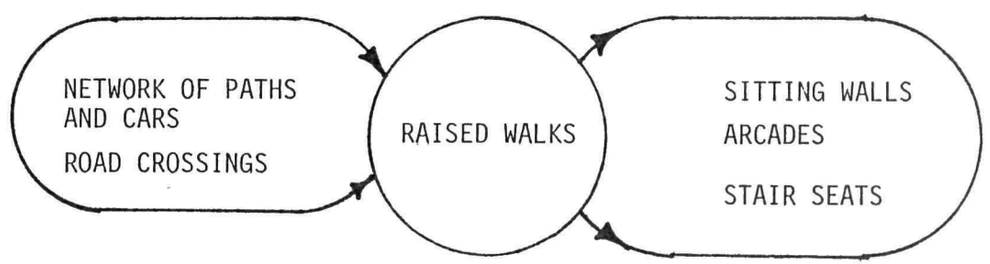
If sidewalks were wider, say greater than 12 feet, pedestrians would feel more relaxed and separated from the automobile. This great increase in sidewalk width could be compensated for by only having sidewalks on one side of the street. Another solution would be to place sidewalks further away from the streets.

The height of the sidewalk should also be raised higher than the four to eight inches above street level, typical in most American cities today. Cars can easily jump an eight inch curb, but if the curb height were raised to ten to fifteen inches, this could not be easily done. By raising the sidewalk to eighteen inches, the pedestrian would have a better view of automobile circualtion and feel more in command of the situation.

An ARCADE could be built over the raised walk and SITTING WALL could provide greater separation between cars and pedestrians. Stair seats could be provided where car-pedestrian interaction is needed.



Critical Elements - RAISED WALKS (1:288)



Inter-relationships- RAISED WALK

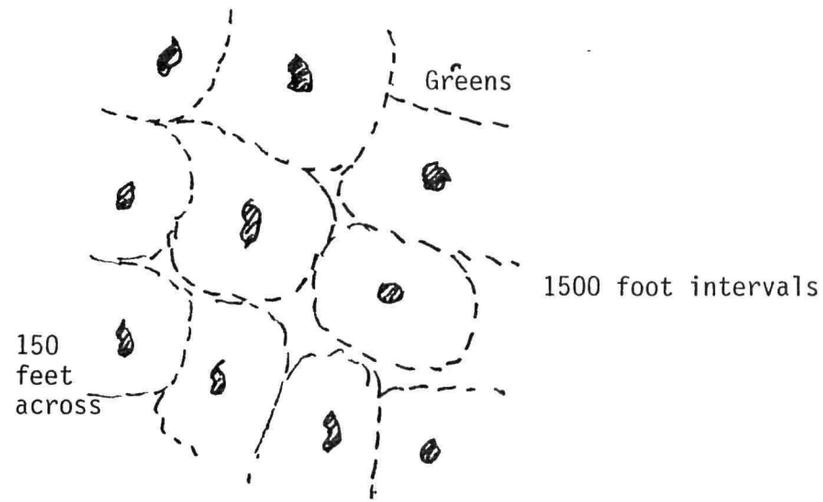
12. ACCESSIBLE GREEN (1:304-310)

Accessible greens should be located in close proximity to WORK COMMUNITIES and identifiable NEIGHBORHOODS and be used to create boundaries between neighborhoods. People need access to open green areas, but usually these areas are located too far away to make a substantial contribution to people's lives.

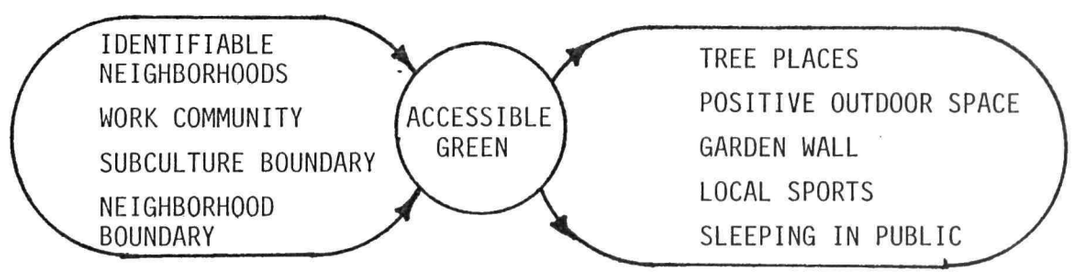
City planners usually develop parks to serve the need for green areas, but parks tend to be large and thinly spread throughout cities. The only people who use these parks are those who live within three minutes walking distance of them, a distance of 750 feet.

The obvious solution is to have many small green areas evenly dispersed throughout the city. These green areas must be large enough to provide a sense of nature within them. A suggested size is approximately 60,000 and about 150 feet in width.

Special care should be given to trees - TREE PLACES, surround the greens with things of nature, POSITIVE OUTDOOR SPACE and set aside areas for LOCAL SPORTS and SLEEPING IN PUBLIC.



Critical Elements - ACCESSIBLE GREEN (1:309)



Inter-relationships: ACCESSIBLE GREEN

13. COMMON LAND (1:336-340)

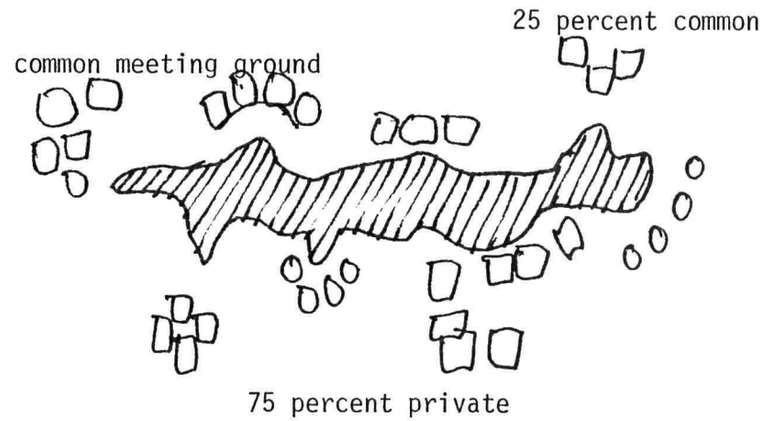
Just as the ACCESSIBLE GREEN provides open space for the neighborhood, common land provides smaller open spaces for clusters of buildings.

Before the development of the automobile and transit systems, streets operated as common land between adjacent buildings. Streets with heavy traffic cannot function as common lands, and as a result, buildings are isolated from one another.

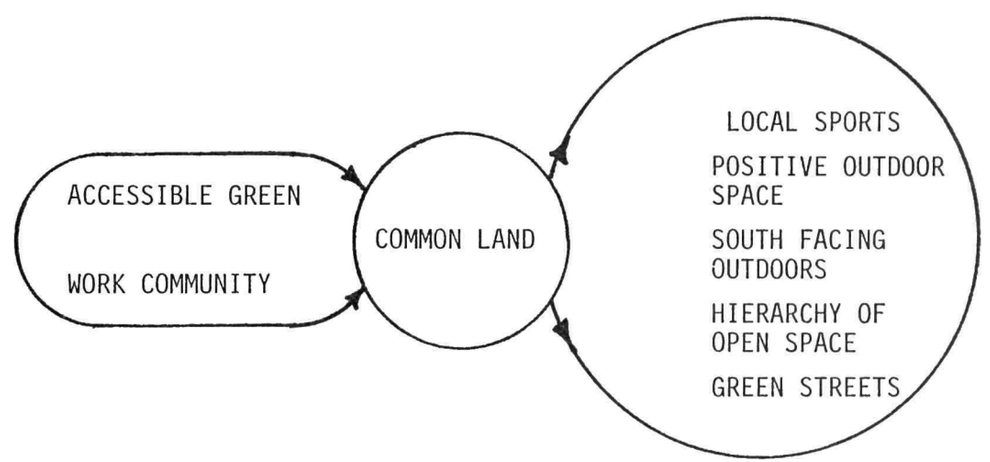
Common land is important in two major aspects. The common land functions as a transitional zone between public and private territory, and secondly common land can serve as a place for people to socialize.

Approximately 25% of the land area is necessary to function as common land between buildings and under no circumstances should automobiles be allowed to enter the space.

The common land should have both enclosed areas and good sunlight - SOUTH FACING OUTDOORS and POSITIVE OUTDOOR SPACE. Levels of privacy should be provided for HIERARCHY OF OPEN SPACE and should have some community functions, LOCAL SPORTS and PUBLIC OUTDOOR ROOM. GREEN STREETS can be utilized as common land.



Critical Elements - COMMON LAND (1:340)



Inter-relationsips: COMMON LAND

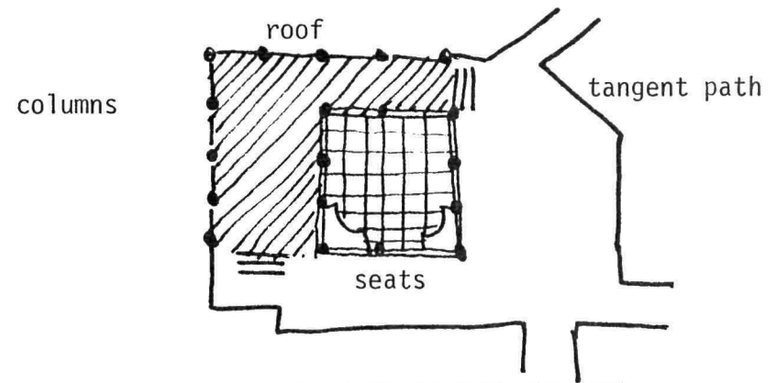
14. PUBLIC OUTDOOR ROOM (1:348-352)
MAIN GATEWAYS, ACCESSIBLE GREENS, SMALL PUBLIC SQUARES, COMMON LAND, PEDESTRIAN STREET, and PATHS AND GOALS all require a collection area for persons to congregate. It is necessary to define this area more elaborately than the surrounding public areas.

Every segment of society needs a place where they can hang out. Men seek corner bars, young children need sand boxes and the like. For a business commuter it could be a place to drink coffee before work. Because of the diversity of these types of activities, they require a space which is neither too well defined or not defined well enough.

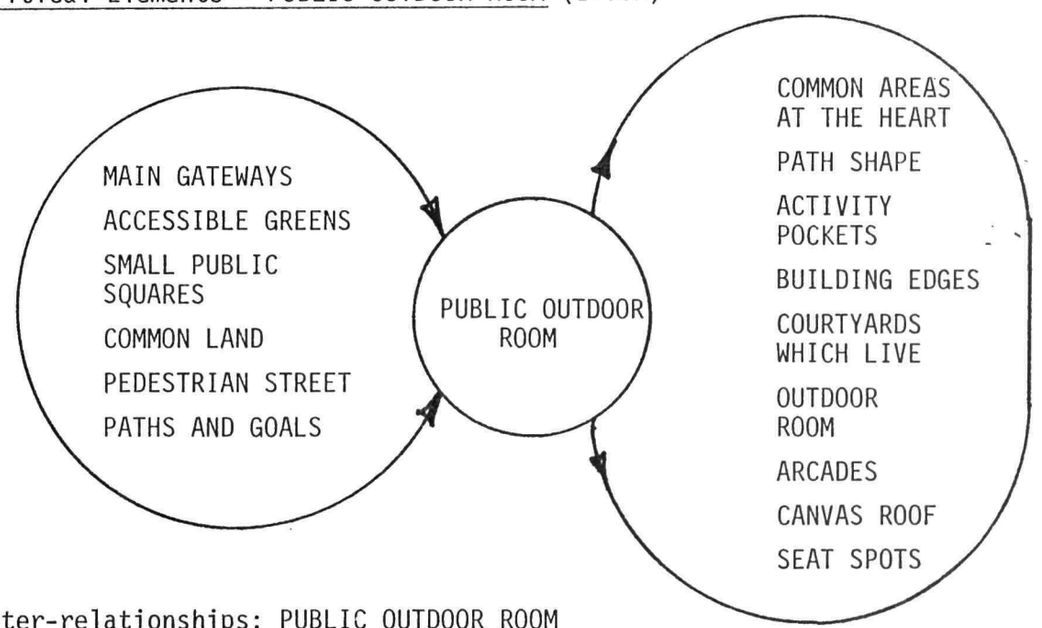
What is needed is just the bare minimum of structure, just defined enough so that people tend to stop, it will attract people to spend some time there. A small open space, roofed and supported with columns should create an environment suitable for these kinds of activities. The structure should be located on common ground and placed alonside paths for access and life.

The public outdoor room should be placed where paths are tangent to it with COMMON AREAS AT THE HEART, around a path - PATH SHAPE, or around an ACTIVY POCKET.

It is also related to BUILDING EDGES, COURTYARDS THAT LIVE, OUTDOOR ROOM and ARCADES. It could be covered with a CANVAS ROOF and SEAT SPOTS are an item of importance.



Critical Elements - PUBLIC OUTDOOR ROOM (1:352)



Inter-relationships: PUBLIC OUTDOOR ROOM

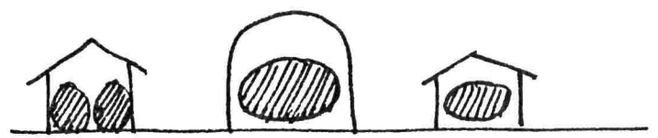
15. SELF-GOVERNING WORKSHOPS AND OFFICES (1:398-403)
Self-governing workshops are the basic element on which the WORK COMMUNITY is based.

For a man to enjoy his work, he must understand the role it plays with in the work organization and must be made to feel that his work plays an important part in the work organization. This is important because working is part of living and to de-humanize and demean the work one does is to de-humanize and demean the person.

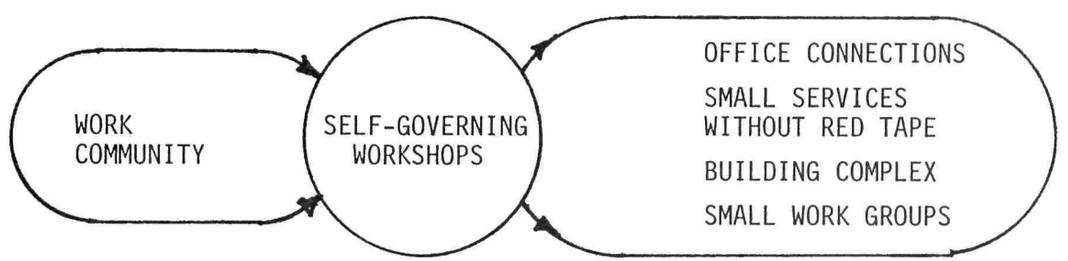
Unfortunately, since the advent of the industrial revolution, the trend has been towards larger and larger companies, where the individual can't help but feel he is making no significant contribution. As a result, both the man's ego and the work he performs suffer serious declines. To reverse this process, work must become more personal and self regulated and the worker should have input as to how his job is to be performed.

The goal should be to create small self-governing offices consisting of 5-20 persons. The individual work groups should be responsible for establishing their own work schedules, performance criteria, and the way to perform it's functions and each worker should have some input into decision making processes. Where the work product requires the input of many workers, the work could be broken down into small work groups, with all of the groups coordinating their efforts.

Each work group should have a place to call their own with OFFICE CONNECTIONS in a BUILDING COMPLEX. If the work group performs public services, it should be broken down into groups of no more than 12 persons, SMALL SERVICES WITHOUT RED TAPE. Another important pattern is SMALL WORK GROUPS.



Critical Elements - SELF-GOVERNING WORKSHOPS (1:403)



Inter-relationships: SELF-GOVERNING WORKSHOPS AND OFFICES

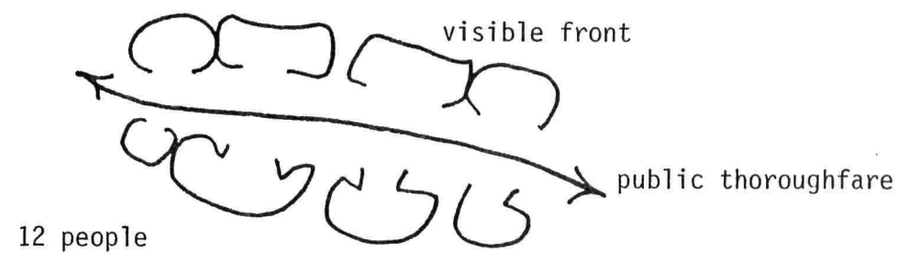
16. SMALL SERVICES WITHOUT RED TAPE (1:404-407)
The offices of a WORK COMMUNITY which performs a public service need special departments suited for dealing with the public.

Red tape and bureaucracy, originally intended to make office management easier do little but confuse and frustrate members of the public. The larger the institution and the greater the distance between the people who make policies and the people who carry out the policy, the more likely policies will be carried out blindly and narrowly.

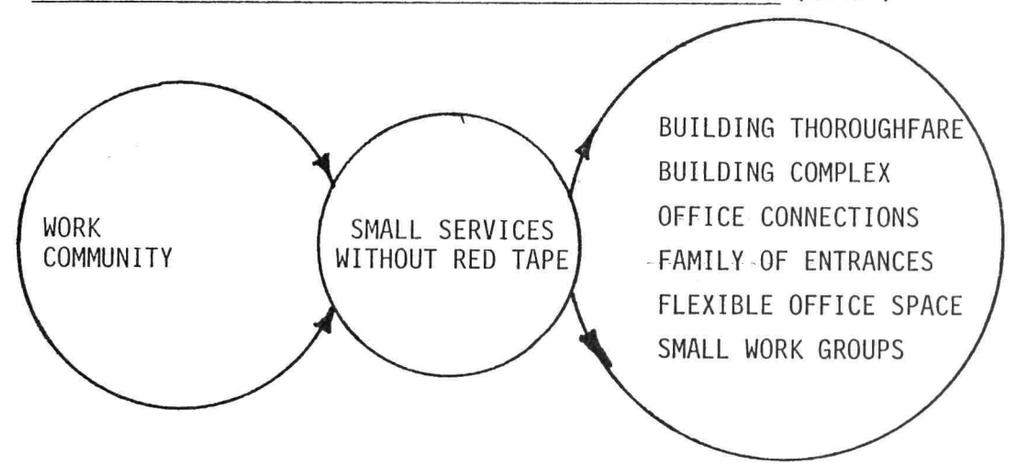
Every service should be limited to twelve persons for this seems to be the largest number with which a person can have a face-to-face discussion. Smaller staff numbers will be even more likely to work well. Each public service group should operate under a few basic guidelines from their parent organization and be able to make some judgements and decisions themselves. Although these guidelines are intended more for governmental social institutions, there may be some relevance as far as other operations which perform public services.

Other elements to provide for are that each department be given an identifiable part of the building and that each department is given direct access to a public thoroughfare.

These departments should be arranged according to the OFFICE CONNECTIONS and BUILDING COMPLEX. Other related patterns are BUILDING THOROUGHFARE, FAMILY OF ENTRANCES, FLEXIBLE OFFICE SPACE, and SMALL WORK GROUPS.



Critical Elements - SMALL SERVICES WITHOUT RED TAPE (1:406)



Inter-relationships: SMALL SERVICES WITHOUT RED TAPE

17. OFFICE CONNECTIONS (1:408-411)

In any WORK COMMUNITY there is always a division into smaller work groups and the placement of these groups inside a building con be very difficult. The pattern OFFICE CONNECTIONS completes the pattern of WORK COMMUNITIES, SELF-GOVERNING WORKSHOPS and SMALL SERVICES WITHOUT REDTAPE.

The current method of arranging functional relationships uses a relational matrix, a means of grouping related groups together, and eliminating the time consuming process of walking excessive distances. The ultimate realization of this system, would to make it unnecessary for the worker to ever leave his chair. This system fails to take into account that it is human nature to leave his seat for a short period of time just for a change of environment.

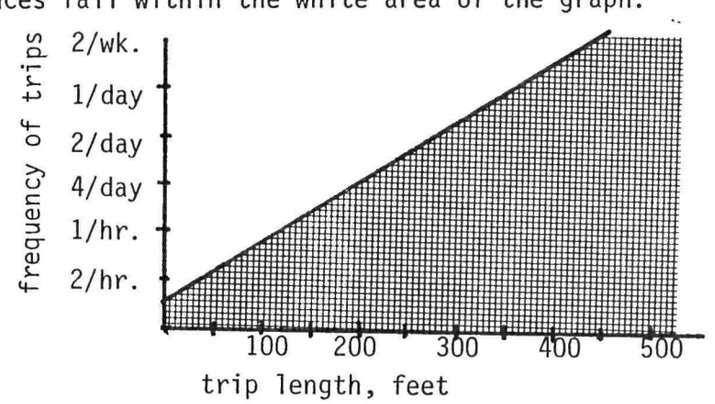
The opposite extreme occurs as a result of bad planning, in which functions which should have been placed closely together are far apart. As a reult, necessary walks between the various functions become a nuisance and a loss of valuable time occurs.

The problem can be further complicated when dealing with multi-story buildings. It is not unusual to find that when two groups are sepated by more than two floors, that little if any personal contact will occur between the two groups.

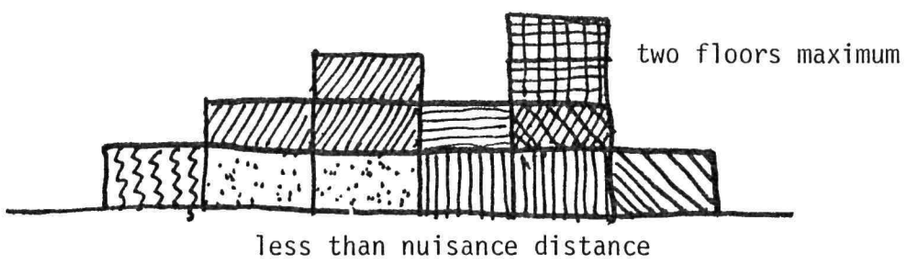
One flight of stairs is roughly equivalent to one hundred feet of horizontal separation, whereas two flights of stairs are roughly equivalent to three hundred feet of horizontal separtion.

It is suggested that buildings be held to a FOUR STORY LIMIT, and the building shape is derived from the BUILDING COMPLEX. If possible, five eacj of the upper stories a connection to the PEDESTRIAN STREET by means of an OPEN STAIR. All building corridors should conform to BUILDING THOROUGHFARE and each department entrance should be well marked as in A FAMILY OF ENTRANCES.

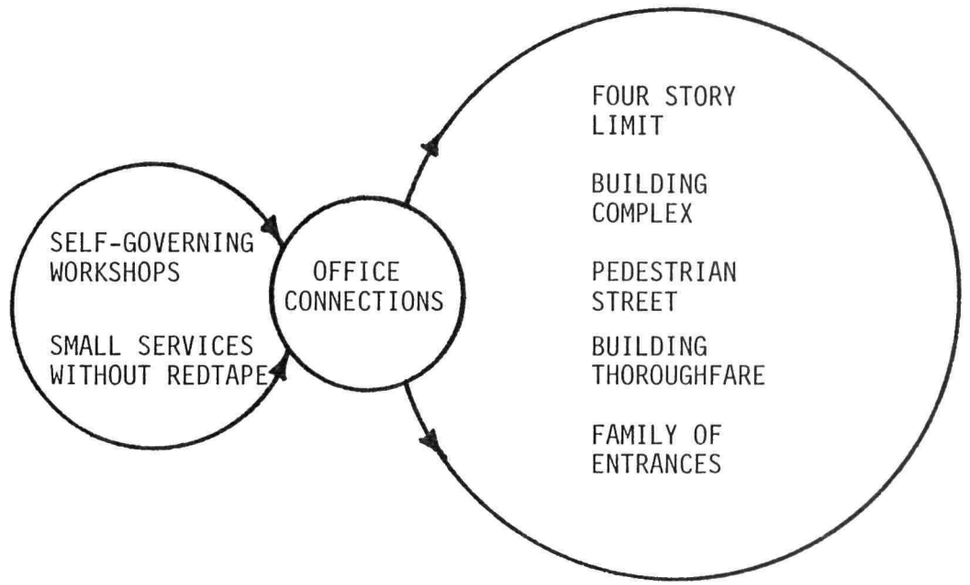
In planning the office connections, the following chart which relates travel distances and the frequency of travel, should prove helpful. All trips which fall within the nuisance area of the graph would be considered a nuisance by 50% of those making the trips. The happy medium is reached where walking distances fall within the white area of the graph.



NUISANCE DISTANCES (1:409)



Critical Elements: OFFICE CONNECTIONS (1:411)



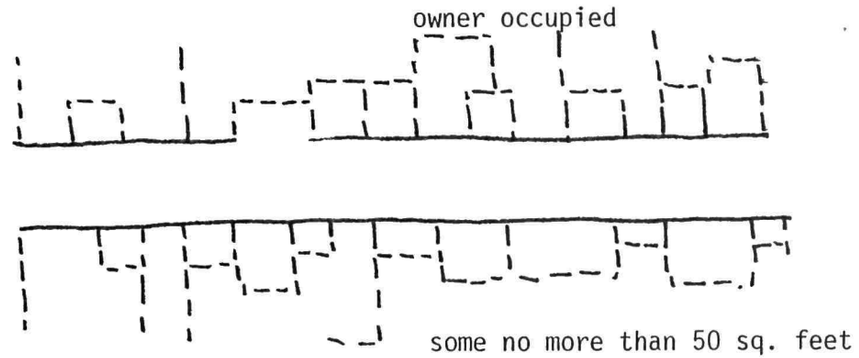
Inter-relationships: OFFICE CONNECTIONS

18. INDIVIDUALLY OWNED SHOPS (1:432-435)

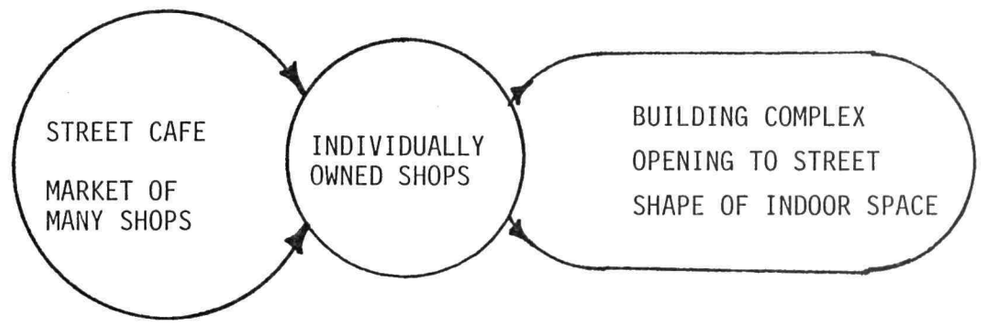
Shops of sort may be included in the concessions area, so some attention should be given to them. America is being covered from coast to coast by franchise operations of all sorts. A person doesn't even have to step foot into a shopping mall to know what stores are there. There is no charm, personality or life in franchise operations but people use them because they are convenient and they know exactly what they'll find there.

Cities should encourage and support the growth of the privately owned shop to bring personality and pride back into trade. A small area is all that is necessary for the small beginning business, usually no more than 50 square feet.

Each shop should be an identifiable part of a building complex with an OPENING ON THE STREET. The interior of the shop should emphasize the display of goods. Also, see SHAPE OF INDOOR SPACE.



Critical Elements - INDIVIDUALLY OWNED SHOPS (1:434)



Inter-relationships: INDIVIDUALLY OWNED SHOPS

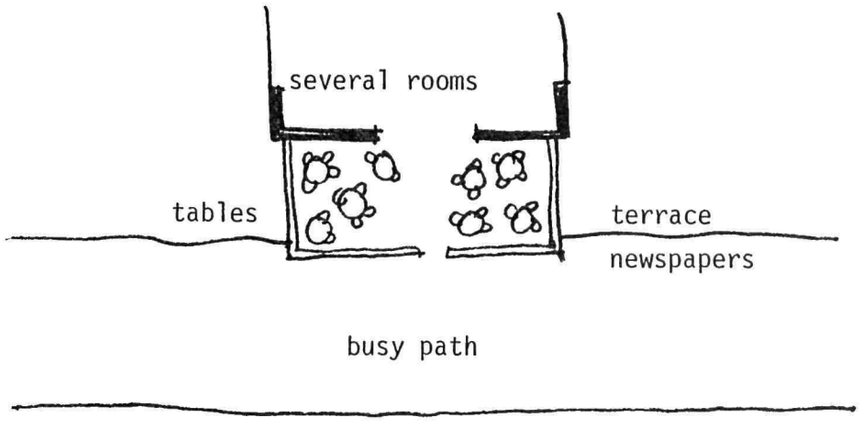
19. STREET CAFE (1:436-439)

The street cafe, a basically European tradition, has much to offer. It provides a place for people to sit and enjoy and watch street activities without strolling or loitering and remain in the view of the public. It also brings about a sense of suspense since you never know who you'll meet at a street cafe. So in this way, the street cafe fulfills several human needs. They have a club-like atmosphere, steady customers can recognize each other at a glance, yet a newcomer will not feel uncomfortable there.

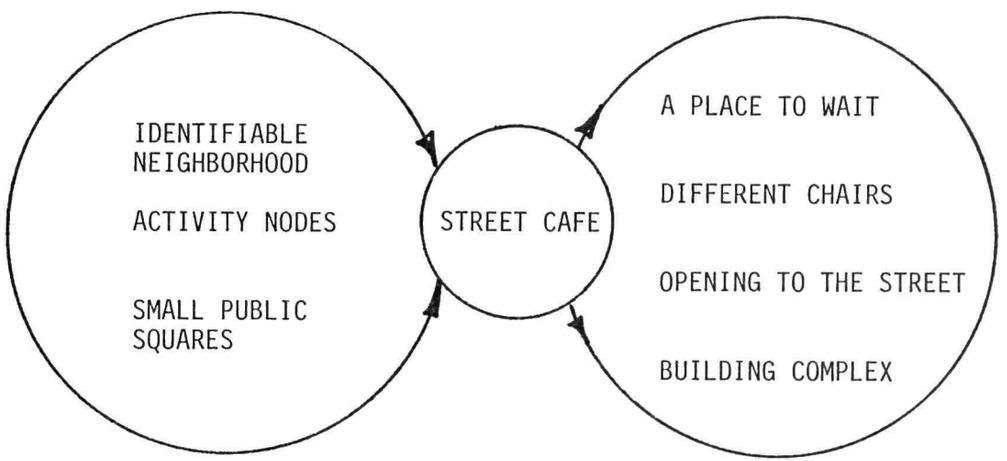
There are several necessary ingredients for a street cafe: 1. There must be an established clientele; 2. In addition to the space which opens out into the street, there must be a variety of other spaces to attract persons of different inclination; 3. The cafe serves simple foods and drinks. Drinks could be alcoholic, but not a bar.

With these three elements met, the street cafe can become successful.

The street cafe should have an OPENING TO THE STREET and the terrace could double as A PLACE TO WAIT. DIFFERENT CHAIRS should be provided, and the shape determined by the way it belongs to the BUILDING COMPLEX.



Critical Elements - STREET CAFE (1:439)



Inter-relationships: STREET CAFE

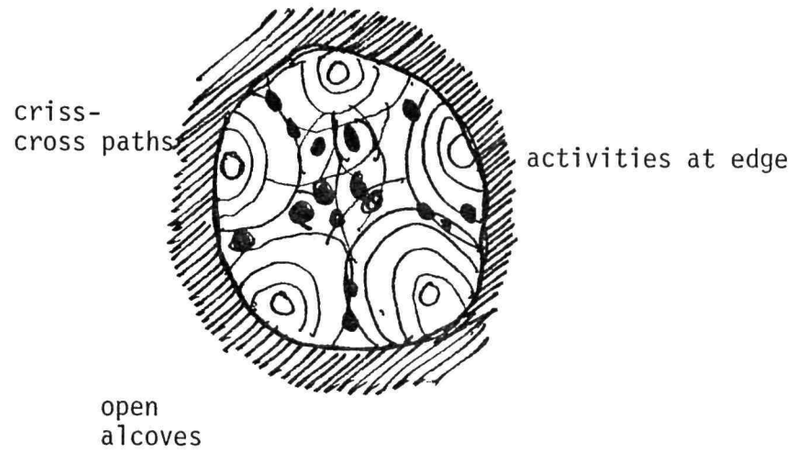
20. BEER HALL (1:444-447)

Occasionally there is need for a place more lively than the street cafe. A drinking house is the natural part of any large community, but these often degenerate into bars for lonely people.

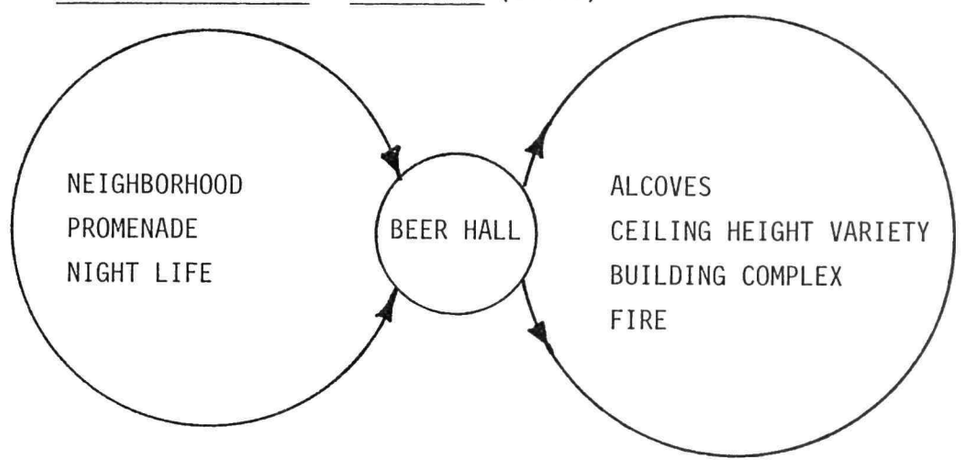
Drinking helps people to relax and become more open to socialization but only when the setting is right.

Two criteria to provide the catalyst for relaxation and socialization are that: a)there are enough activities and the crowd is lively enough, therefore creating a greater intermingling between people. and b) That the seating arrangement is flexible enough to accomodate small groups of people without pinning anyone against the wall or getting stuck in a situation from which they can't escape; open alcoves usually will work.

The ALCOVES should be roomy enough for people to pass through. A FIRE can be a major activity area. The roof should relate to different settings, CEILING HEIGHT VARIETY and should be incorporated into a building complex.



Critical Elements - BEER HALL (1:446)



Inter-relationships; BEER HALL

21. TRAVELER'S INN (1:448-450)

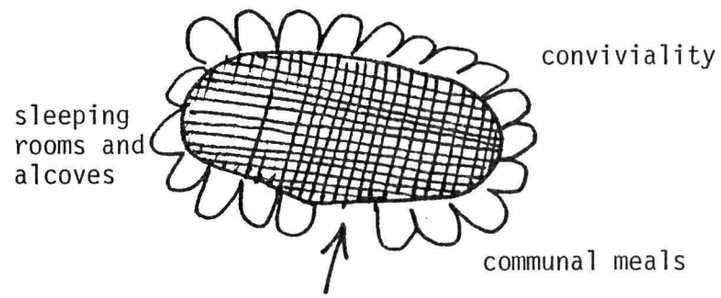
Any person traveling through a strange town needs to feel that he is a member of the human community.

In the past, the traveler's inn was a place where people gathered to drink, eat, tell stories and talk to other travelers. This has been replaced by the cold antiseptic motel where the traveler hides in his room until the morning.

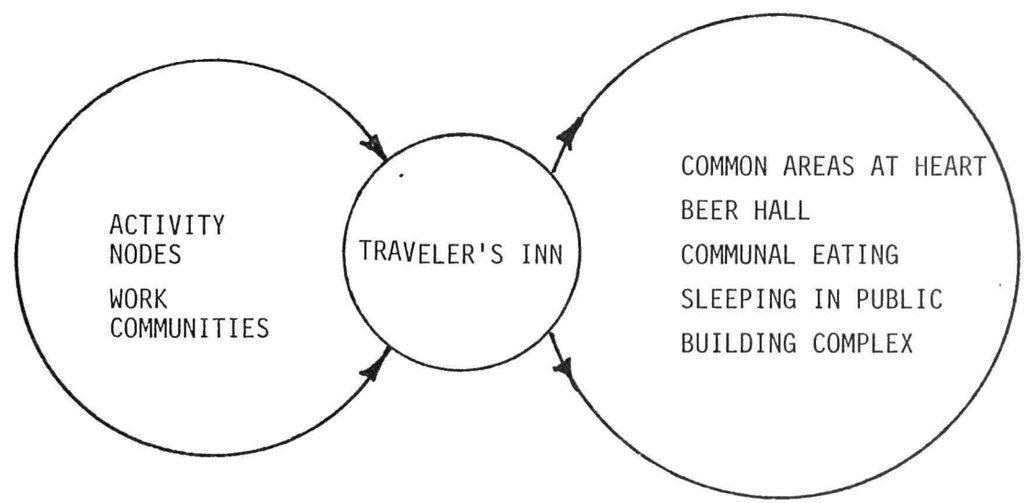
But man has a great need for human company especially when in a strange area. It would be the business of the inn to fulfill this need.

Size is a crucial element. The inn should be a family sized operation which cannot serve more than thirty rooms.

COMMON AREAS AT THE HEART should be centrally located to encourage socialization and proximity to a BEER HALL would also help. COMMUNAL EATING will foster a feeling of friendship. Provide areas for SLEEPING IN PUBLIC and COMMUNAL SLEEPING. The building shape is derived from BUILDING COMPLEX.



Critical Elements - TRAVELER'S INN (1:450)



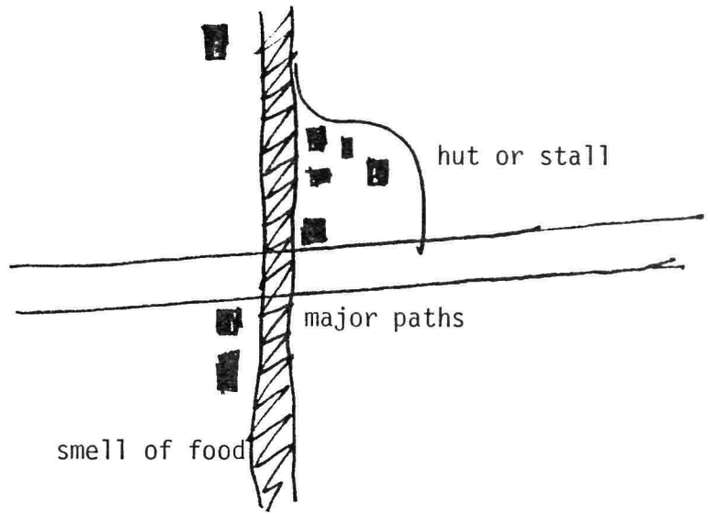
Inter-relationships: TRAVELER'S INN

22. FOOD STANDS (1:454-456)

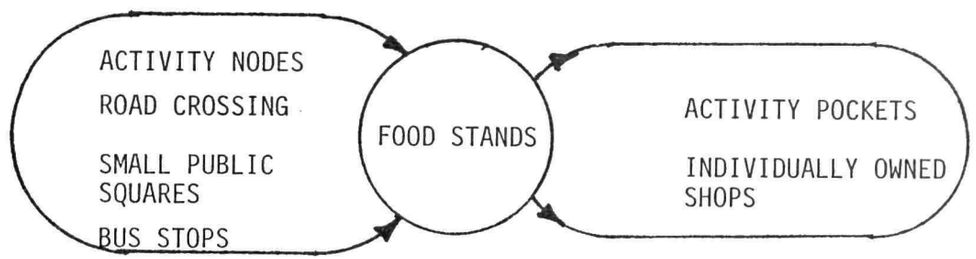
Food stands, once a common sight, are quickly being replaced by franchise operation, foreigners to the local community. They have little to offer the local community, but the mass-produced food they offer and quite often the only interaction that occurs in these places is througn a telephone or intercom, another testimony to the mechanical nature of these places.

Food stands should be more than a place to grab a bite of tasteless food, they should add to the overall quality of life in the community.

Food stands should be concentrated near road crossings and visible from cars and the stands should be free to acquire a character compatible with the surrounding area. The smell of the food should drift down the street and the food stands should never be plate glass enclosures. The operators of the stand should be the owners, proud of the quality of their food and free to use their own ideas and recipes.



Critical Elements - FOOD STANDS (1:456)



Inter-relationships: FOOD STANDS

23. SLEEPING IN PUBLIC (1:456-459)

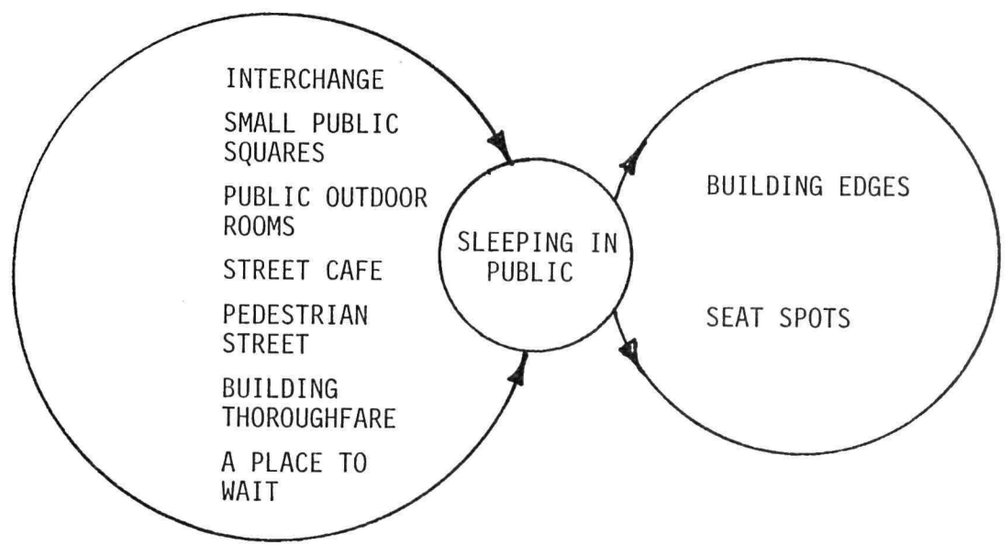
The pattern SLEEPING IN PUBLIC is a necessary element of INTERCHANGE, SMALL PUBLIC SQUARES, PUBLIC OUTDOOR ROOM, STREET CAFE, PEDESTRIAN STREET, BUILDING THOROUGHFARE, and A PLACE TO WAIT. Sleeping in public can be a measure of success in terms of humaness and creating security.

Sleeping in public is not a common experience in the U.S. because society frowns upon it and the environment discourages it. But outside the U.S., it is not uncommon to see people sleeping in public and the people who do sleep outside are not the stereotyped image of the "dead beat" Americans have of people who engage in this practice. The frequency of it's occurance implies that it fulfills a human need.

To foster sleeping in public, fill the environment with ample benches, or other comfortable places to sit or lie. These areas must be sheltered both from climate and major circulation paths.

Good places for sleeping in public are along BUILDING EDGES and SEAT SPOTS. Success will hinge on the ability to create an atmosphere of trust so that people have no fear of sleeping in public, and so that people have no fear of those who sleep in public.

Critical Elements - SLEEPING IN PUBLIC (1:459)



Inter-relationships: SLEEPING IN PUBLIC

24. BUILDING COMPLEX (1:468-472)
Buildings should be reflective of the organizations and processes that occur within. Since all social groups and institutions are made of smaller groups and organizations, buildings should be designed to show these subdivisions of the larger organization. By doing this the building will become a more human building.

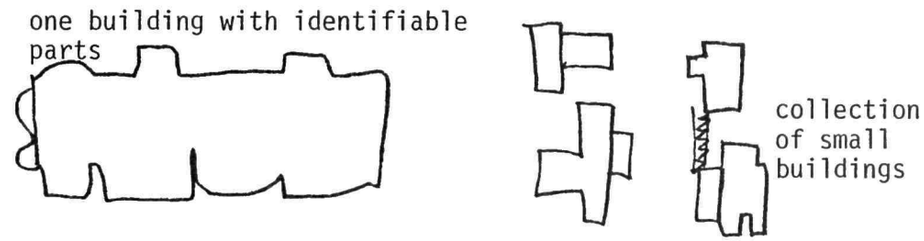
A survey comparing persons reactions to similar organizations housed in differently designed buildings, has shown this to be important.

The more monolithic a building is, the more it is perceived as being a huge mechanical, non-human space. The opposite has been found true also. The more differentiated the exterior of a building, the more often it is perceived as a friendly, more personal place.

A building should be broken down into the components and functions it houses. In this manner, persons can identify with the building and its inhabitants. A complex of small buildings could be designed connected by arcades, bridges, paths, shared gardens and walls.

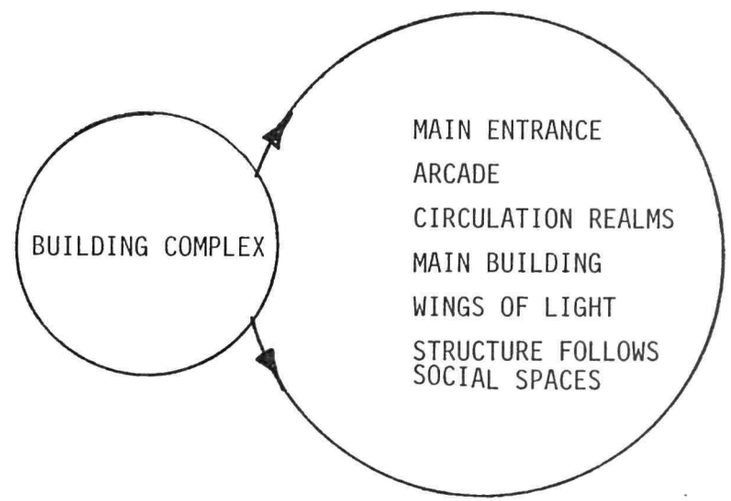
Arrange the building complex according to "circulation realms" and build one building as the "main building".

Special care must be paid to the MAIN ENTRANCE and ARCADES could be used to connect various building components. Also, see "structure follows social spaces", and "wings of light".



social components

Critical Elements - BUILDING COMPLEX (1:472)



Inter-relationships: BUILDING COMPLEX

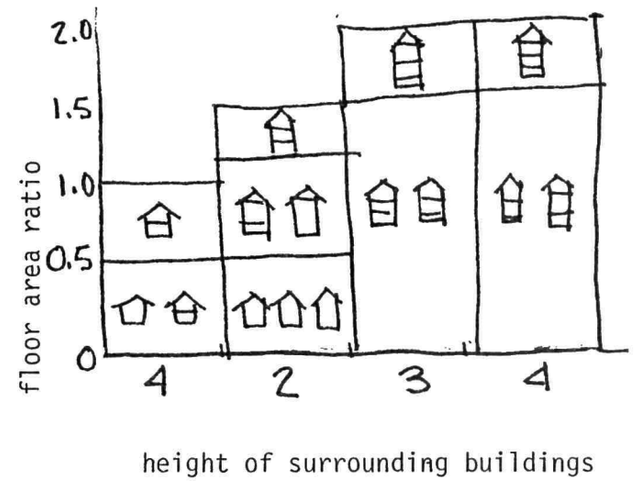
25. NUMBER OF STORIES (1:473-476)

The number of stories in a building is important because buildings must be kept low to be compatible with the human scale, but the building should be in keeping with the height of surrounding buildings to preserve the urban fabric. There are several rules of thumb for determining building heights.

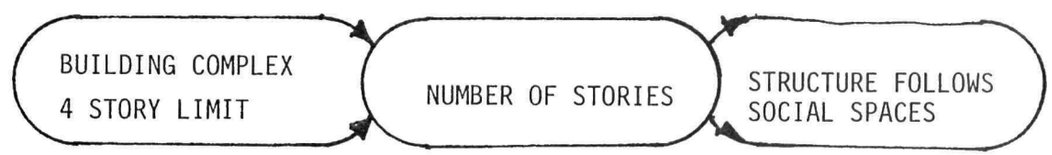
1. Set a four story limit on the site to keep the building at a human scale.

2. Do not let the ground area covered by buildings account for more than 50% of the site. This limit of 50% is to ensure that the external human amenities can be adequately dealt with.

3. Do not let the height of the buildings vary greatly from surrounding building heights.



Critical Elements - NUMBER OF STORIES (1:476)



Inter-relationships: NUMBER OF STORIES

26. SHIELDED PARKING (1:477-479)

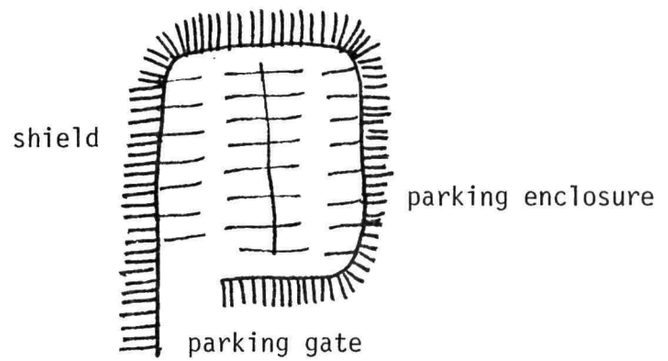
There are some areas which, because of their very nature require a large number of parking places. Where a large amount of parking is necessary, it is important that parking is dealt with early so that it does not interfere with human related design elements.

The environment must be protected from the effects of parking structures for they produce visual, noise, and air pollution. The large parking area must be shielded if it is not to intrude into human spaces. Parking can be shielded by shops, houses, hills of earth, walls, or buildings of any type.

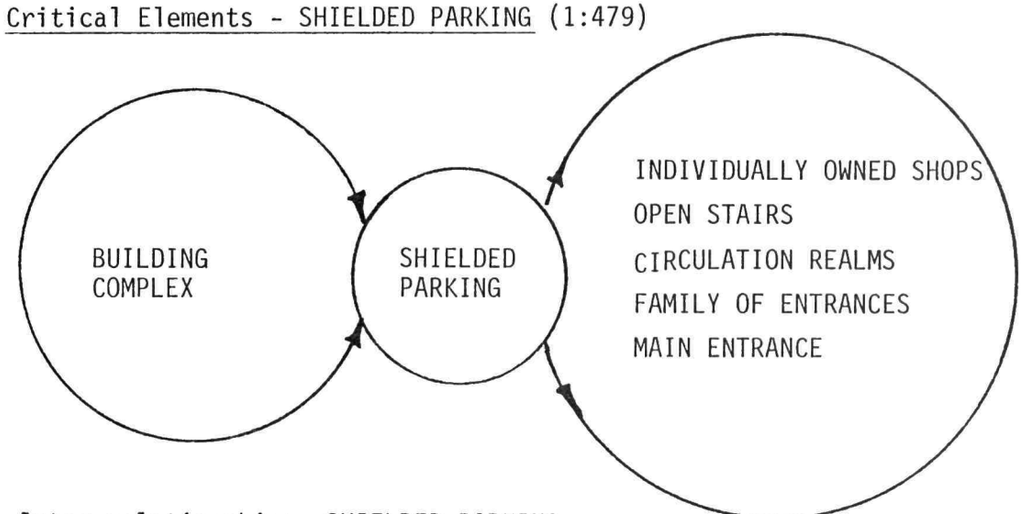
Besides the shielding of such parking areas, there is an equal need for the driver to be able to spot the parking structure quickly and once he is in the parking area, he must be able to spot his pedestrian goal quickly.

Parking should be specifically marked from the directions of approach. The entrance to the parking facility should be spotted by the driver at about the same time he spots the building.

For parking shields, INDIVIDUALLY OWNED SHOPS or OPEN STAIRS might be utilized. One of the most economical means of shielding a parking area could be CANVAS ROOFS. To layout parking entrances, utilize "circulation realms", FAMILY OF ENTRANCES and MAIN ENTRANCES.



Critical Elements - SHIELDED PARKING (1:479)



Inter-relationships: SHIELDED PARKING

27. CIRCULATION REALMS (1:480-484)

The major problem in the pattern of circulation realms is that of orientation. Orientation is an important part of the process of mental map making which is used to find one's way to or through a space. Ideally, a person should be able to direct a stranger to any address within a building complex in a single sentence. If this is possible for a given building complex, the problem of orientation has been satisfied.

The problem of orientation is not limited to strangers. However, evidence has shown that a poorly laid out building has as much a damaging psychological effect on a person familiar with the building as that of a stranger. Therefore, a good environment has an easily understandable layout.

For the maximum clarity, a building layout should follow three guidelines:

1. It should be possible for the user to be able to identify a nested system of realms in the layout, the largest of these realms being the building complex.

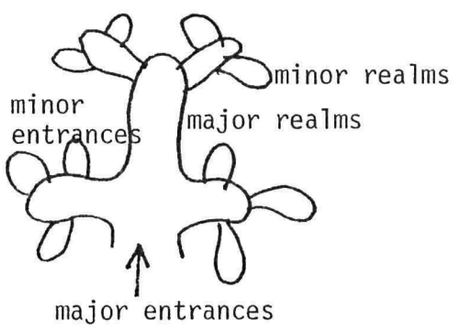
2. Each realm should have a circulation space opening directly from the entrances to that realm.

3. The entrances of any realm should open directly from the circulation space of the next higher realm.

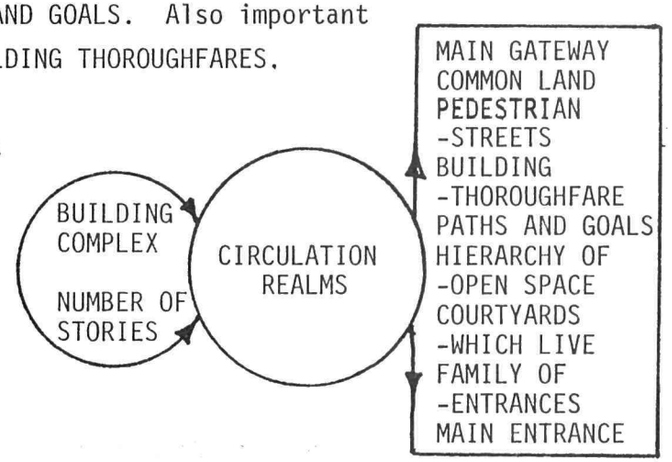
The realms at each level should have names, which implies that they are distinctly defined so that a person knows where one realm ends and the next one begins.

One should layout large buildings and complexes so that a person reaches a point inside by passing through a series of realms becoming smaller and smaller. Gateways of some sort should mark the passing of one realm to another.

Treat main entrances and MAIN GATEWAYS and the major realms can be treated as COMMON LAND or PEDESTRIAN STREETS. Mark the entrances to minor realms as in FAMILY OF ENTRANCES and MAIN ENTRANCE and the layout of paths should follow PATHS AND GOALS. Also important are the MAIN BUILDING and BUILDING THOROUGHFARES.



CIRCULATION REALMS (1:484)



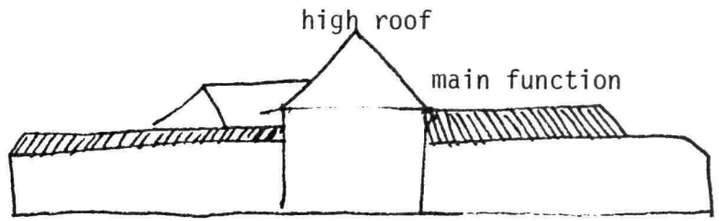
28. MAIN BUILDING (1:485-487)

The mental map making process requires a reference point from which the rest of the map can be completed. This reference point should be obvious and positioned so that all other parts of the complex can refer to it. The reference point should be the main building which should contain the most important functional elements of the complex.

For the users of the complex, a greater sense of community is enhanced when one building or portion of a building can be singled out as the main building.

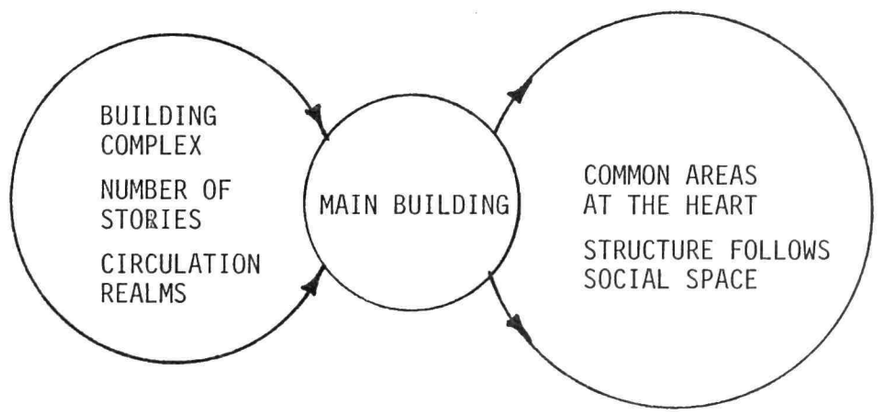
Great care should be taken when choosing the proper functions for the main building, a mistake here could ruin the entire layout of the complex.

All major paths within the complex should be tangent to the main building with COMMON AREAS AT THE HEART. And make sure that STRUCTURE FOLLOWS SOCIAL SPACE.



central position

Critical Elements - MAIN BUILDING (1:487)



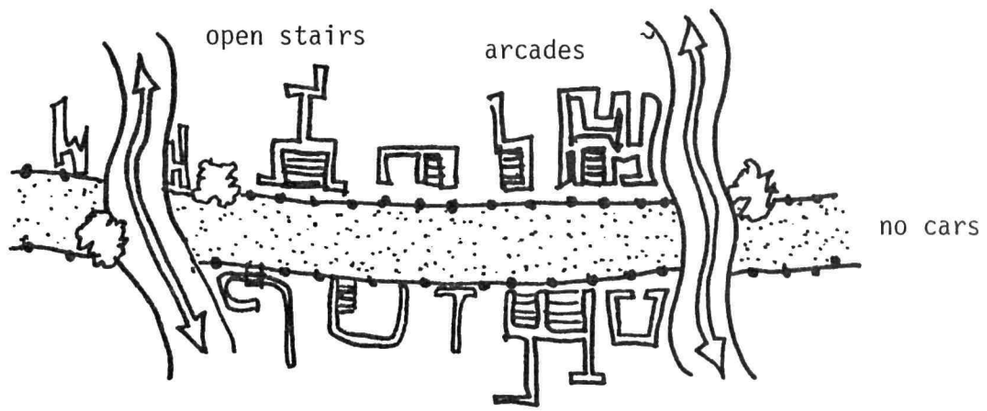
Inter-relationships: MAIN BUILDING

29. PEDESTRIAN STREET (1:488-491)

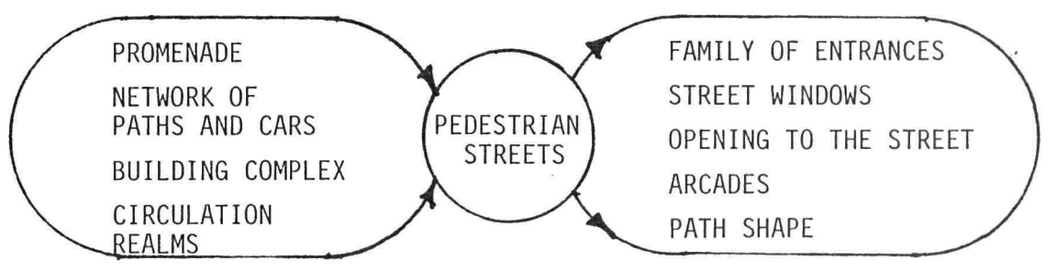
The pedestrian steet is the key element in PROMENADES, NETWORK OF PATHS AND CARS, BUILDING COMPLEX and CIRCULATION REALMS. People need the simple social intercourse created by rubbing shoulders with the public, but in today's society, there are fewer and fewer places where this can occur. Streets have become dominated by the automoblie, and corridor systems within buildings are too private and have too light a pedestrian density to promote this necessary interaction of persons.

To recreate the experience of social intercourse as one walks, it will be necessary to create major circulation paths between rooms, offices, departments, and buildings, outdoors, under sheltered walks, arcades, paths which are public and separated from automobile traffic. These pedestrian streets are places to walk along as well as places to pass through. Buildings along these pedestrian streets should be designed so that nearly all interior stair, hall and corridor activity be moved outside and occur along and across the pedestrian street. Finally, the optimum width of pedestrian streets should be narrower than the height of surrounding buildings.

The street will not function unless there is the pedestrian density to support it. The many building entrances should function as a FAMILY OF ENTRANCES with many OPEN STAIRS on the street. There should also be STREET WINDOWS, OPENING TO THE STREET, GALLERY ARCADES and PATH SHAPE.



Critical Elements- PEDESTRIAN STREET (1: 491)



Inter-relationships: PEDESTRIAN STREETS

30. BUILDING THOROUGHFARE (1:492-498)

There are situations where it is not feasible to make the major circulation paths function outside of the building complex, due to problems of climate of the density of the building complex on the site. Where internal circulation is necessary, the traditional building corridor is not the answer. Building corridors, because they are located internally, are isolated from the mainstream of activity which occurs outside. Because of this isolation, building corridors are sterile spaces in which significant human activity cannot occur. Also, the main function of building corridors is to move people from point to point, the actual space within the corridor has no specific functions besides this.

There are five major elements which should be considered to avoid the building corridor syndrome:

1. Shortcut

Public places should be designed to encourage loitering. Loitering is frowned upon by many people in the U.S. but there seems to be no real basis for the case against loitering and it seems that loitering is a basic human activity. This anti-loitering attitude must be reversed to make building thoroughfares more interesting places.

To overcome this problem it must be realized that most persons won't enter a public place if they have to go out of their way to use it, must check in with a receptionist or clerk, or must enter the public space through doors, corridors, or level changes.

Public places which have overcome these problems have usually incorporated an exterior thoroughfare into and through the building interior, and locate areas conducive to loitering along this building thoroughfare.

2. Width

The interior width of an indoor street must be wide enough so that people feel comfortable enough to walk and stop in the thoroughfare. The street width should be at least eleven feet for circulation needs and another five feet added to either or both sides of the building thoroughfare will be necessary to encourage stopping or seating along the building thoroughfare.

3. Height

The ceiling height of a space should correspond directly to the horizontal social distance required for different social interactions. A distance of twelve to sixteen feet has found to be the proper distance at which the details of facial features can be discerned and yet maintain the proper social distance between strangers. Therefore, the ceiling height over the circulation portion

of a building thoroughfare should be in the twelve to sixteen foot range.

Where a more intimate social contact occurs, the social distance is about seven feet, which should be the approximate ceiling height along building thoroughfare edges where stopping and seating will occur.

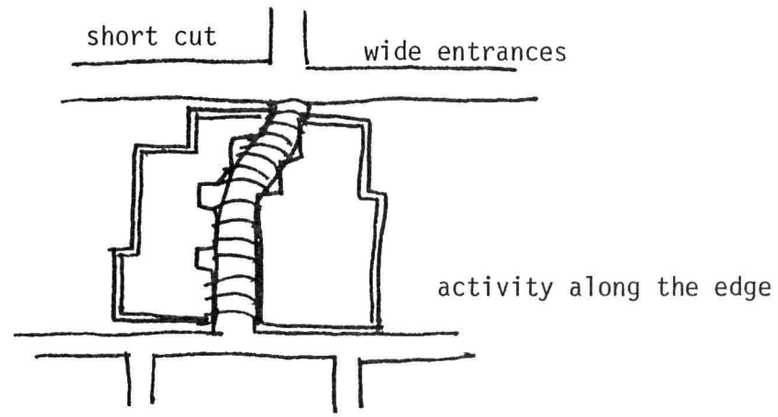
4. Wide Entrance

The entrance to the building thoroughfare should be a continuation of the exterior circulation and the entrance to the building should be treated more as a gateway than an entrance. The entrance should be at least fifteen feet wide.

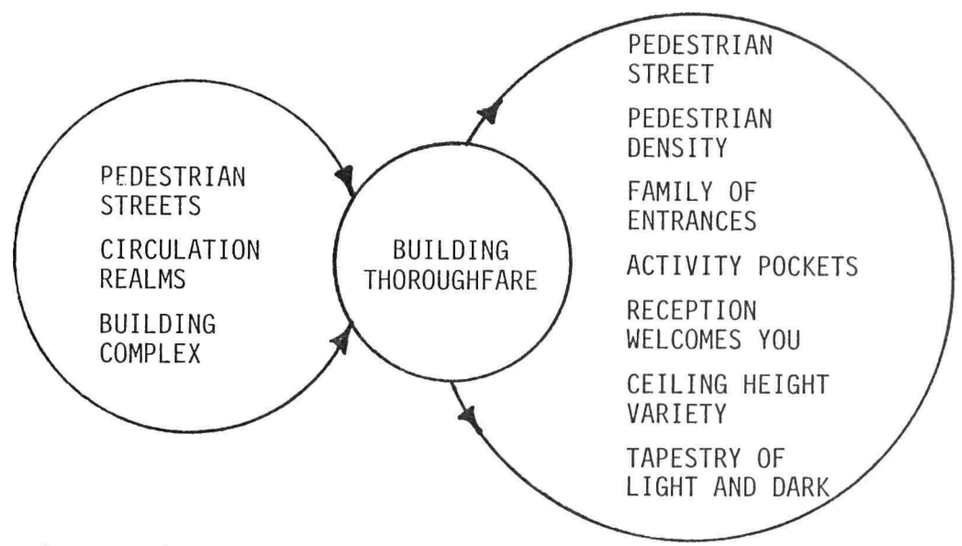
5. Involvements Along the Edge

Newspaper stands, coffee stands, exhibits and the like could be located along the edge of the building corridor, creating activity. Where office entrances come off the building throughfare, buffers should be placed to control noise.

The thoroughfare should be treated as a PEDESTRIAN STREET with PEDESTRIAN DENSITY determining proper sizing. Other important patterns are FAMILY OF ENTRANCES, ACTIVITY POCKETS, RECEPTION WELCOMES YOU, CEILING HEIGHT VARIATION, and TAPESTRY OF LIGHT AND DARK.



Critical Elements - BUILDING THOROUGHFARE (1:498)

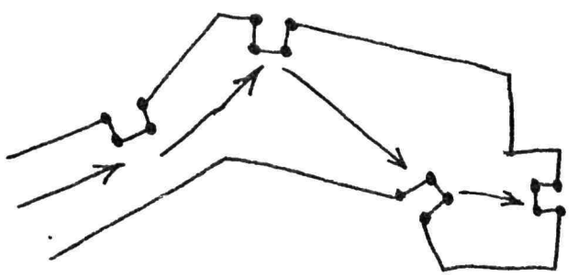


Inter-relationships: BUILDING THOROUGHFARE

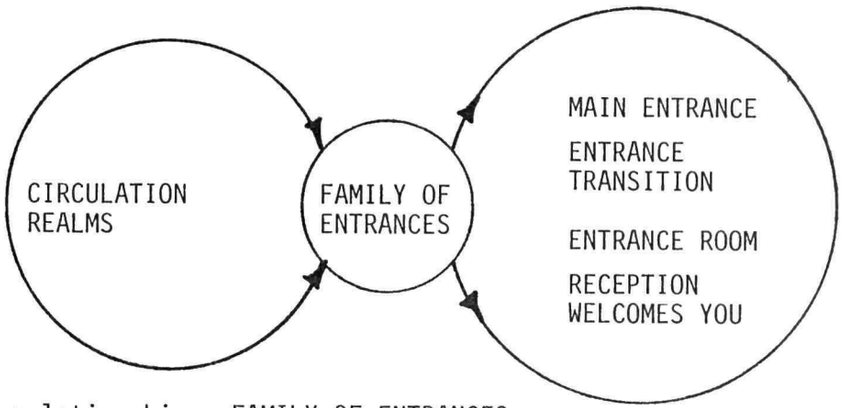
31. FAMILY OF ENTRANCES (1:499-502)

This pattern is an aspect of CIRCULATION REALMS and plays a part in the mental map making process. Quite often a stranger to a complex of offices will experience confusion unless all of the entrances are laid out before him and he can see the entrance to the place he is going.

A means of identifying individual entrances is helpful to the mental map making process. The entrance could be identified by color or plants so that a verbal direction to the entrance can be easily given, but it is important that the whole collection of entrances be laid out before the building visitor.



FAMILY OF ENTRANCES (1:502)



Inter-relationships: FAMILY OF ENTRANCES

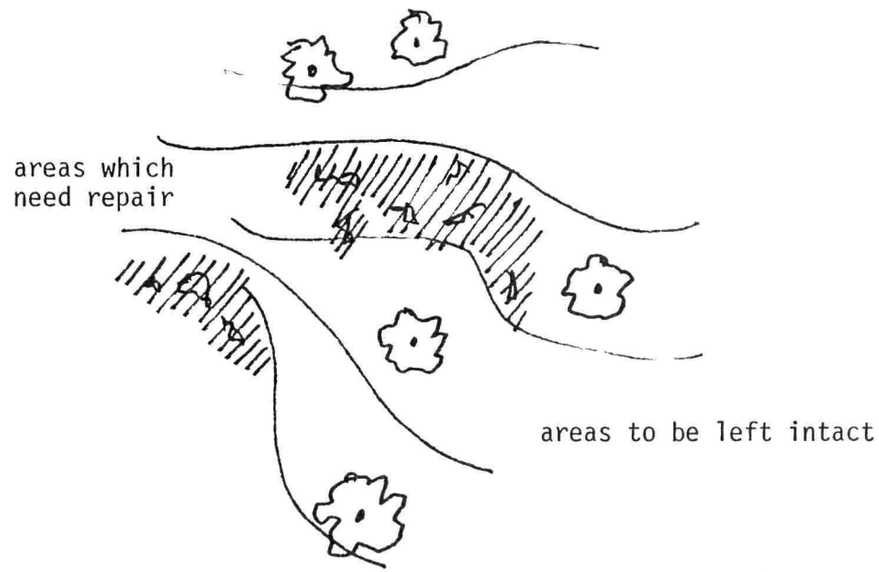
32. SITE REPAIR (1:508-512)

It has been human nature to seek the best conditions on a piece of land to place buildings. This has occurred on both small and large lots, but in continuing this practice, man has destroyed the best land by placing buildings on them, while the land surrounding the buildings is often undesirable for any exterior activities.

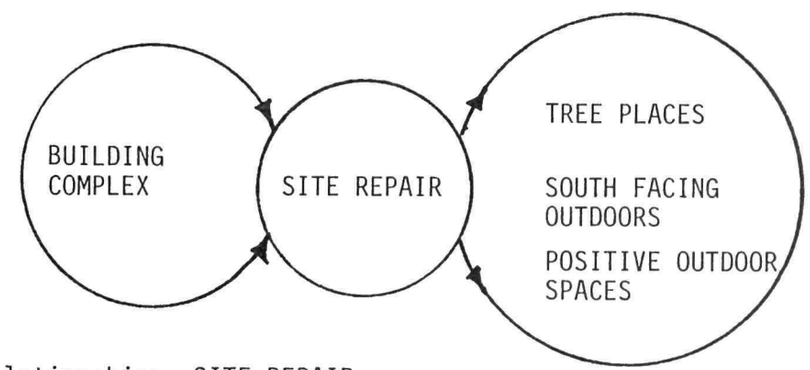
People often justify the destruction they've caused by rationalizing that they can replace what they've destroyed. Unfortunately, this process of replacement takes a long period of time and if the preservation of positive site aspects were practiced more, the process of replacement could be eliminated.

Therefore, buildings should be located on those portions of the site which need the greatest repair, so that the best portions of the site can be used for human activities.

TREE PLACES should be left undisturbed and exterior spaces should be located south of buildings, SOUTH FACING OUTDOORS. Create POSITIVE OUTDOOR SPACES.



Critical Elements - SITE REPAIR (1:511)

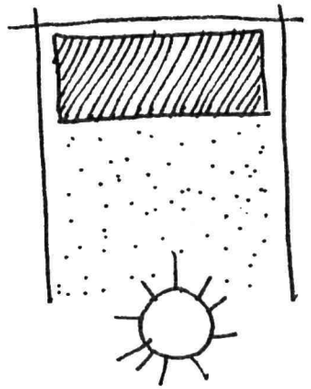


Inter-relationships: SITE REPAIR

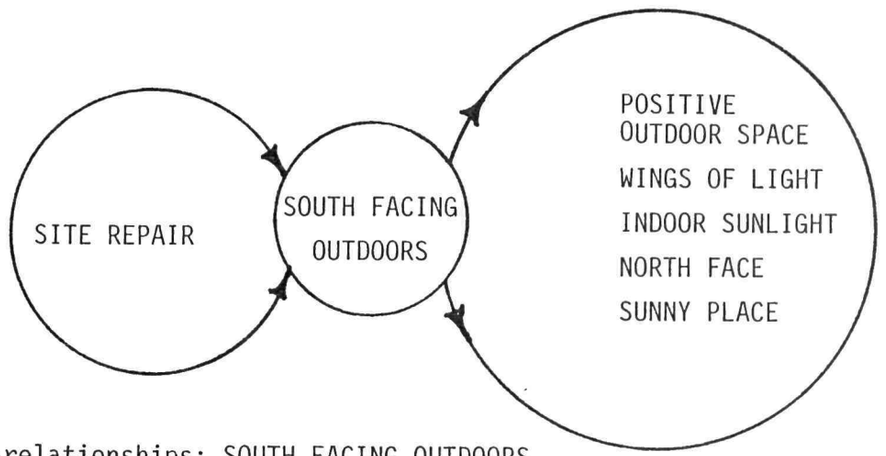
33. SOUTH FACING OUTDOORS (1:531-534)

The placement of a building on a site should take into account the location of exterior space development on the site. Studies have shown that in all areas except desert climates, people will only use open spaces which are sunny. Surveys of houseowners have shown that those with backyards on the northside of the house, seldom use their backyards for more than storing junk. Survey results have also shown that sunny areas won't even be used if access to the sunny area passes through a band of shade.

In northern latitudes, this pattern is extremely important, but in desert climates, people seem to prefer a balance of sunny and shady areas.



Critical Elements - SOUTH FACING OUTDOORS (1:516)



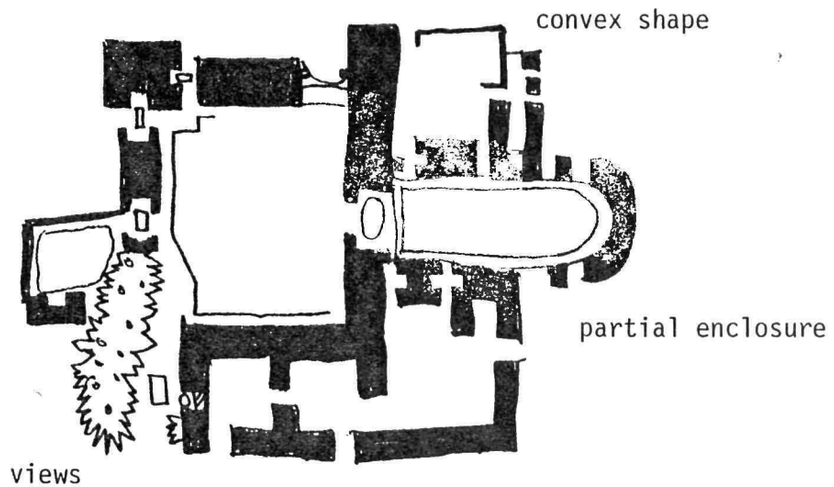
Inter-relationships: SOUTH FACING OUTDOORS

34. POSITIVE OUTDOOR SPACE (1:517-522)

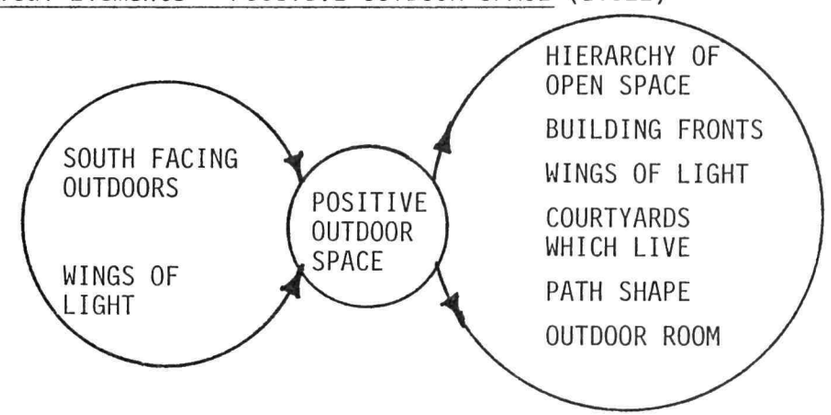
There are two basic types of exterior space. Negative spaces are those spaces which are essentially the shapeless spaces left behind after the erection of buildings. Positive spaces have distinct shapes and the shape of the space is as important as that of surrounding buildings.

It's been shown that negative exterior spaces will be unused, whereas positive exterior spaces become the centers for a wide range of activities. It seems that people need exterior spaces which are partially enclosed, but too much enclosure may have detrimental effects on levels of human activities.

Make sure that a HIERARCHY OF OPEN SPACE is developed so that no space becomes too enclosed. The outdoor spaces can be shaped by BUILDING FRONTS and WINGS OF LIGHT. Focus attention on the BUILDING EDGE. other important patterns are COURTYARDS THAT LIVE, PATH SHAPE, and OUTDOOR ROOM.



Critical Elements - POSITIVE OUTDOOR SPACE (1:522)



Inter-relationships: POSITIVE OUTDOOR SPACE

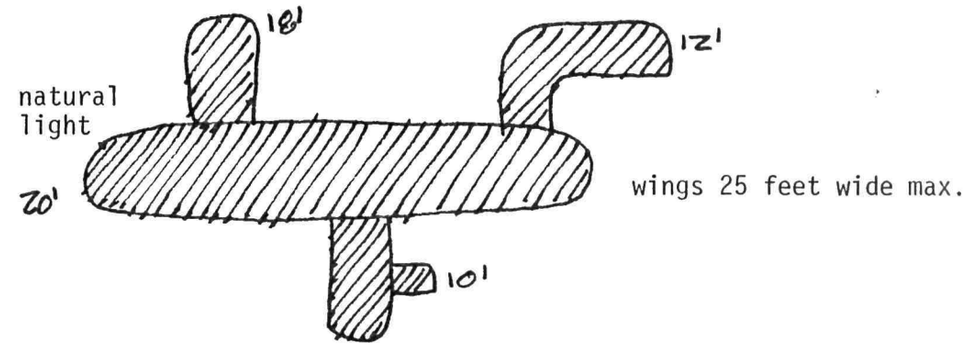
35. WINGS OF LIGHT (1:524-530)

The basic problem of WINGS OF LIGHT is that of providing natural light inside of buildings. Since the advent of artificial lighting, there has been a tendency to rely on artificial light rather than natural light. As a result, many buildings have spaces where there are no windows.

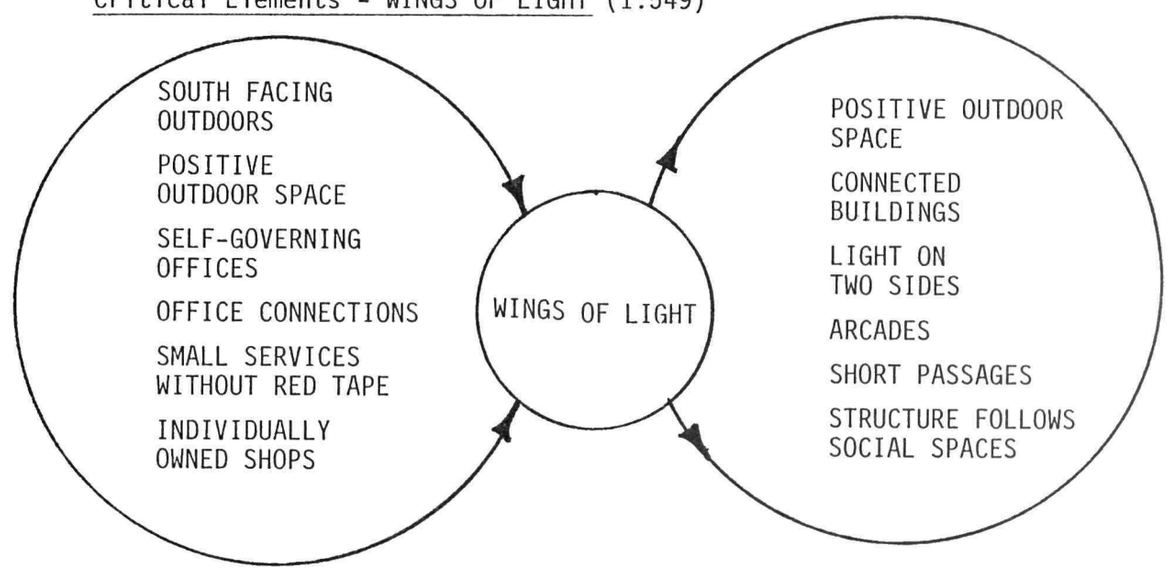
The lack of windows, especially in a living or working environment can lead to depression, rebellion, or a strong dislike of the spatial conditions.

There also seems that there is a strong need for sunlight by man's physiology. The daily solar cycle is closely linked to man's physiological clock, but this relation has been broken by the dependence on artificial light.

To have a greater dependency on natural lighting, rooms should be fifteen feet wide with rooms one deep. This width of fifteen feet is needed so that the farthest point from the window receives 50% of its lighting from natural sources.



Critical Elements - WINGS OF LIGHT (1:549)



Inter-relationships: WINGS OF LIGHT

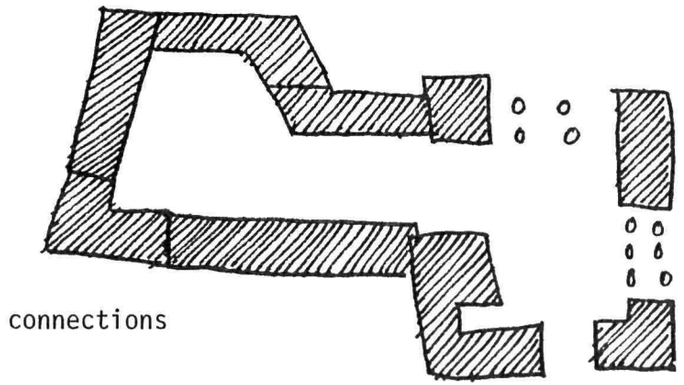
36. CONNECTED BUILDINGS (1:531-534)

It is the custom to build individual buildings, isolated from each other. This not only creates useless pieces of land between the buildings, but implies that the inhabitants of the buildings are isolated from their neighbors. It is impossible to create a sense of community where people are isolated from one another.

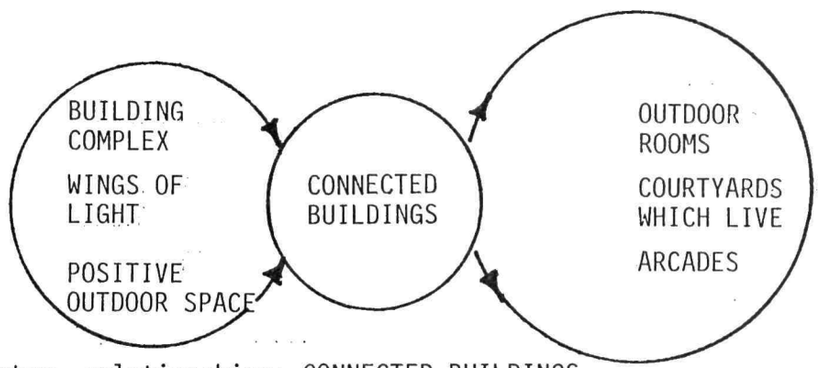
By comparison, where buildings physically butt up against each other, it forces neighbors to acknowledge each other, work out common problems and adapt to the realities of life outside the building.

So wherever possible, connect new buildings to existing buildings.

Buildings can be connected by OUTDOOR ROOMS, COURTYARDS WHICH LIVE and ARCADES.



Critical Elements - CONNECTED BUILDINGS (1:534)



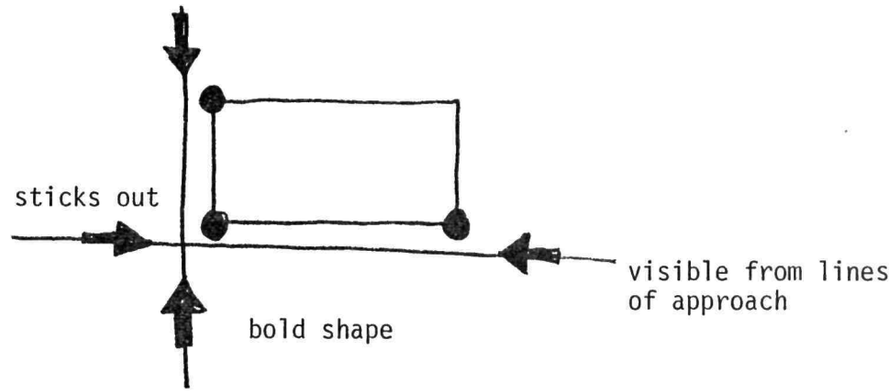
Inter- relationships: CONNECTED BUILDINGS

37. MAIN ENTRANCE (1:540-544)

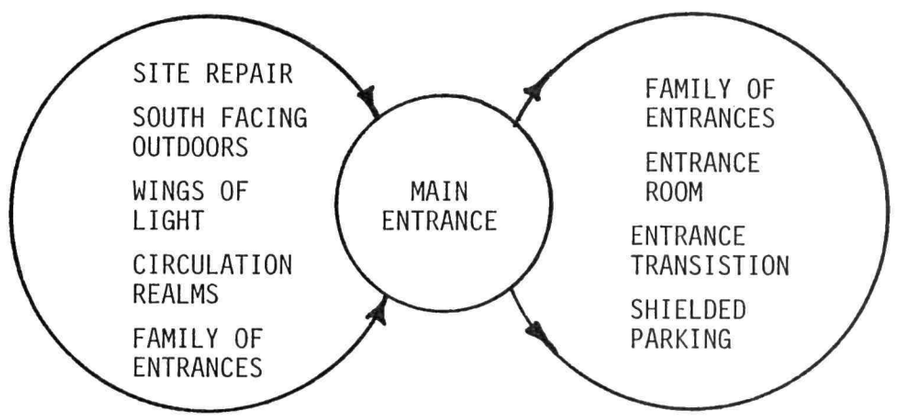
The location of the main entrance, determines to a great deal, the interior layout of a building. An improperly located main entrance will result in a circulation layout which will never feel right. Therefore, the initial location of the main entrance is critical.

It is also crucial that the main entrance communicate as the main entrance. People should be able to locate the main entrance immediately as they approach the building. People find it annoying to walk around a building searching for the entrance, but to prevent this problem, two key factors must be understood.

The entrance should be positioned so that it is on the main approaches to the building. The second factor is to shape the main entrance to attract attention to it. Project the main entrance out from the building face or the building should be made higher over the entrance.



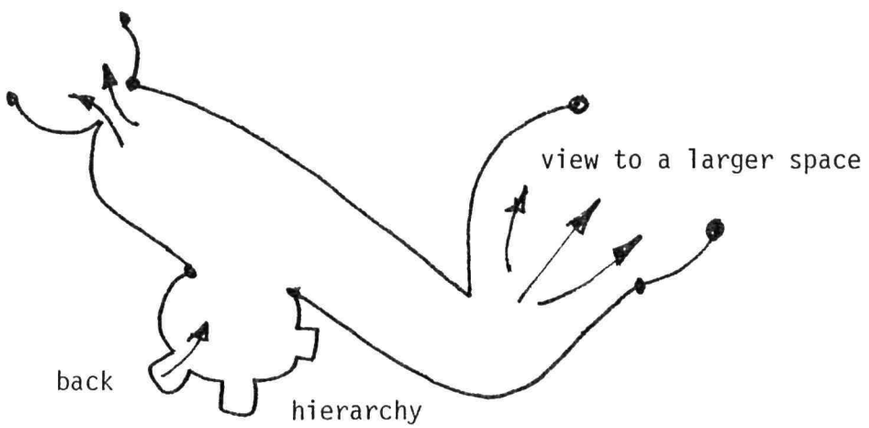
Critical Elements - MAIN ENTRANCE (1:544)



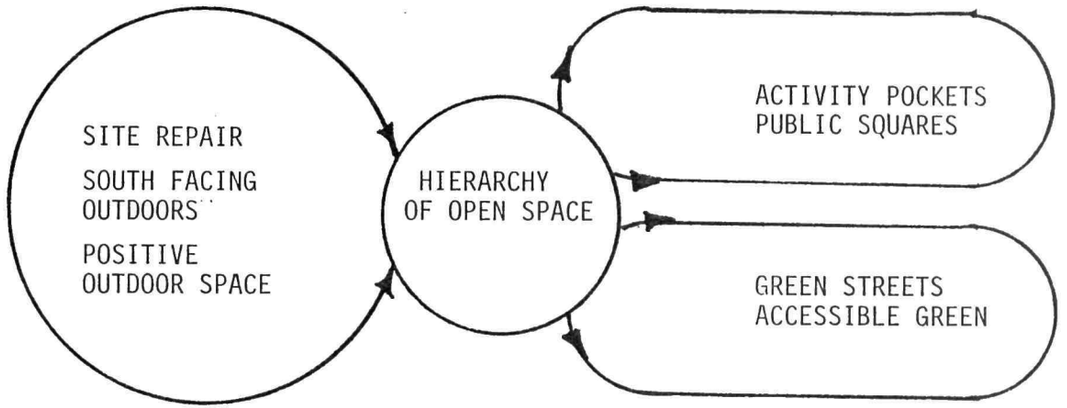
Inter-relationships: MAIN ENTRANCE

38. HIERARCHY OF OPEN SPACE (1:557-560)
Outdoors, people have a tendency to sit with their backs protected, against a wall, tree or bench. It is also necessary that a view be provided outside of the space they're in. People do not sit facing blank walls.

Examples would be ACTIVITY POCKETS opening into PUBLIC SQUARES, and GREEN STREETS opening to ACCESSIBLE GREENS.



Critical Elements - HIERARCHY OF OPEN SPACE (1:560)



Inter-relationships: HIERARCHY OF OPEN SPACE

39. COURTYARDS WHICH LIVE (1:561-564)

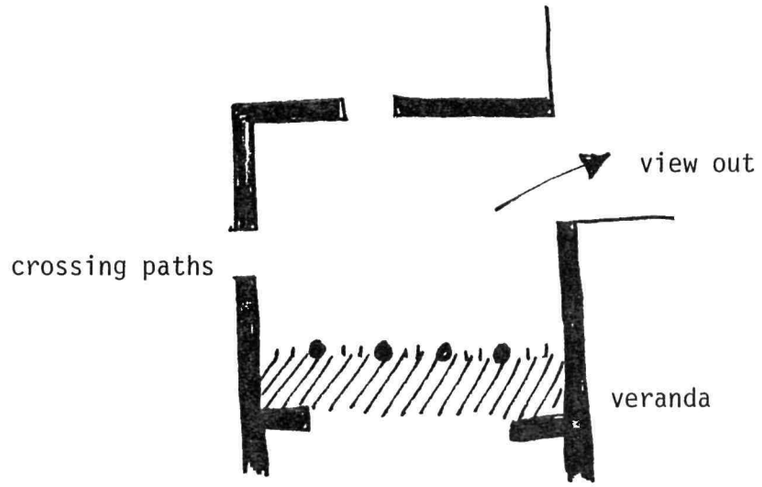
In dealing with small courtyards, with widths of less than forty feet, special care must be taken to ensure that these do not become dead spaces.

There are three major areas in which small courtyards can fail to provide positive human responses:

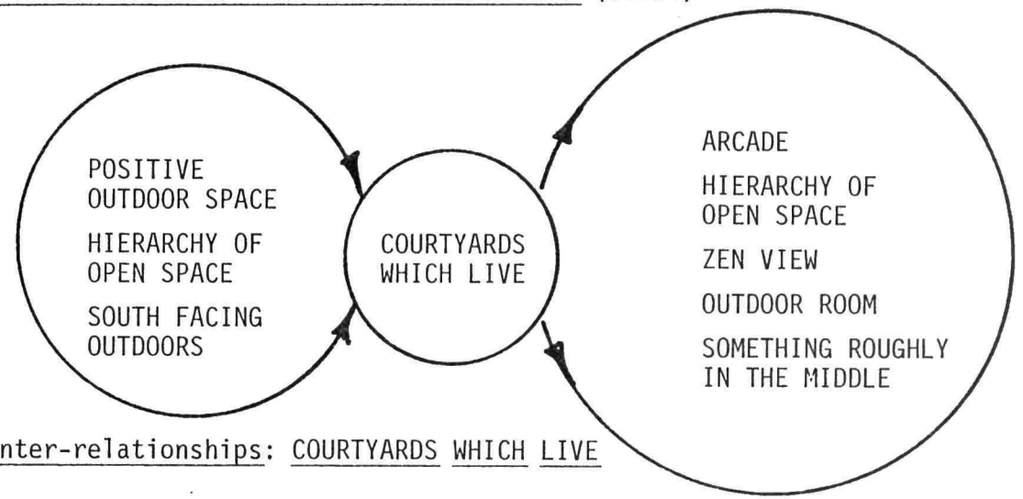
1. If the change from the interior space leading into the exterior space is too abrupt, the courtyard will fail because people need a transitional zone such as a veranda or arcade between the interior and exterior spaces.

2. If there are not enough entrances into the courtyard, the courtyard will lack life. Courtyards should have a minimum of two entrances, located at opposite sides.

3. If the courtyards are too enclosed, they become claustrophobic. A view into a larger area is needed.



Critical Elements - COURTYARDS WHICH LIVE (1:564)



Inter-relationships: COURTYARDS WHICH LIVE

40. ARCADES (1:580-584)

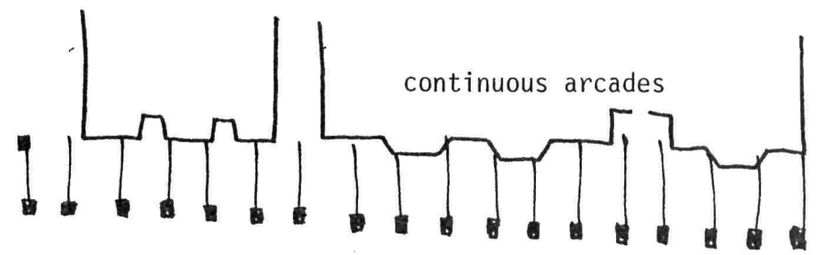
Many buildings appear isolated and removed from public activity. Part of the problem is the abrupt change from interior to exterior spaces. This abrupt change has a tendency to scare people from entering the building.

A transitional zone along the building edge, a space which is both public and private is needed. Arcades can fulfill this function as a transitional zone, but they must posess the following qualities to function properly.

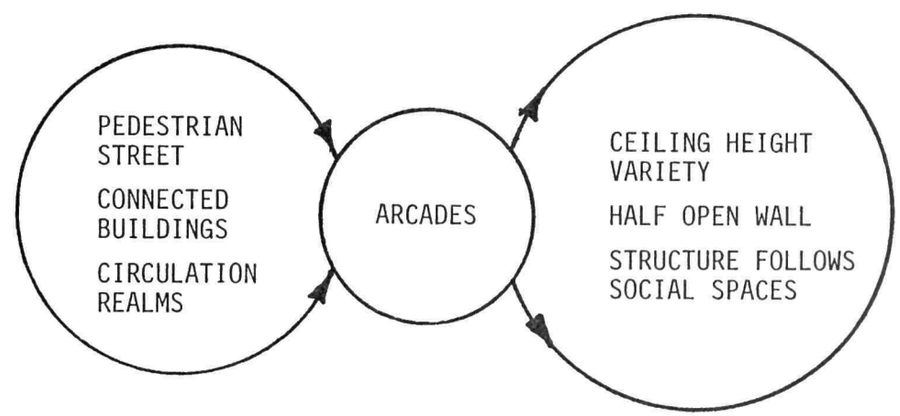
It is necessary that there is a path along the building edge to make the arcade an active place, to draw pedestrians to the building.

Arcades will not function properly if the ceiling height is too high, keep ceilings low.

The effect of the arcade is increased if public paths pass directly through the building.



ARCADES (1:583)



Inter-relationshps: ARCADES

41. PATHS AND GOALS (1:585-588)

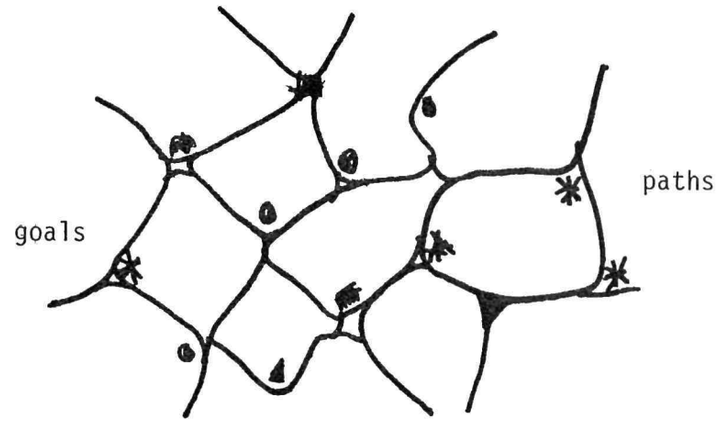
In laying out paths and circulation systems, there are three processes which must be accomodated:

1. As people walk along a path, they direct themselves towards intermediate destinations which are in the general direction of their goal. People will usually seek the shortest route towards the intermediate destination.

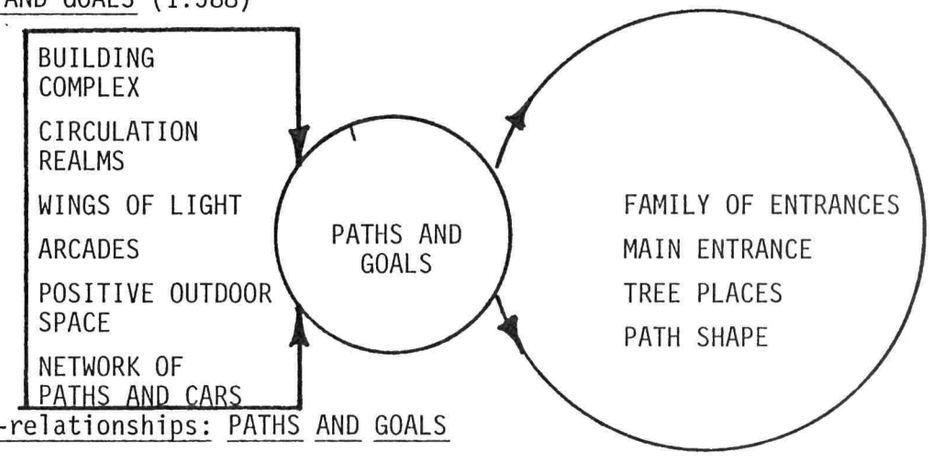
2. As the person approaches the initial intermediate destination, a new intermediate destination is chosen resulting in a curved rather than a segmented path.

3. The reason why people direct themselves towards these intermediate goals is so that they will not have to constantly think about which direction they should be walking, leaving them free to daydream, observe things, etc.

Goals should be placed at natural points of interest and these goals should be connected by paths. Goals should not be placed more than a few hundred feet apart. Goals do not have to be of major importance, simply a landmark to steer by.



PATHS AND GOALS (1:588)



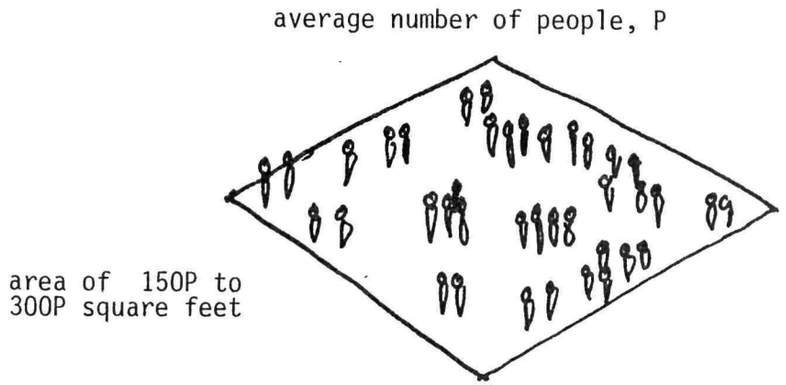
Inter-relationships: PATHS AND GOALS

42. PEDESTRIAN DENSITY (1:596-602)

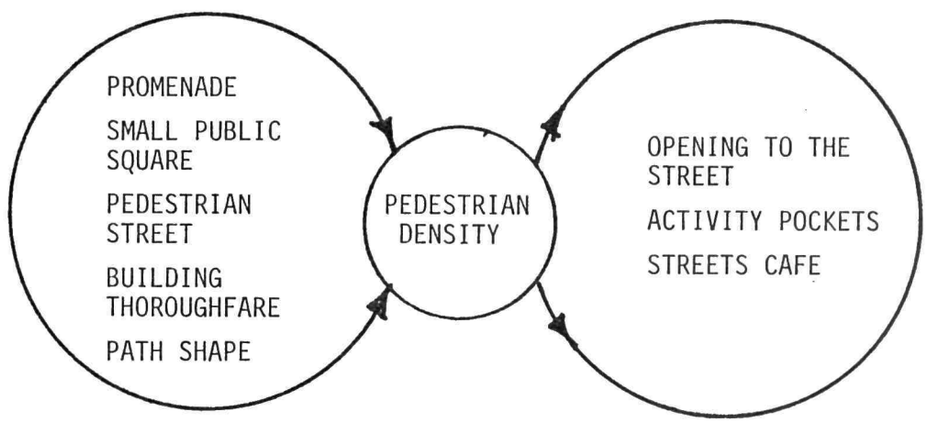
PEDESTRIAN DENSITY is a critical element to any area either enclosed or in the open, where people tend to congregate. Time and time again, large parcels of area are intended to be used as a lively plaza, a center of activity, but appear to be dead and lifeless.

Some of this character is largely determined by the type of activities surrounding these areas, but it can also be attributed to the pedestrian density of these areas. In Alexander's subjective estimate, any space which alots more than 500 square feet per person begins to lack vitality and the average pedestrian density should be between 150 to 300 square feet per person, if the space is to maintain it's vitality.

To further enhance the feeling of vitality in the area, ACTIVITY POCKETS, STREET CAFES, and other similar activities, should be placed around the edges of spaces where people tend to gather informally.



PEDESTRIAN DENSITY (1:598)



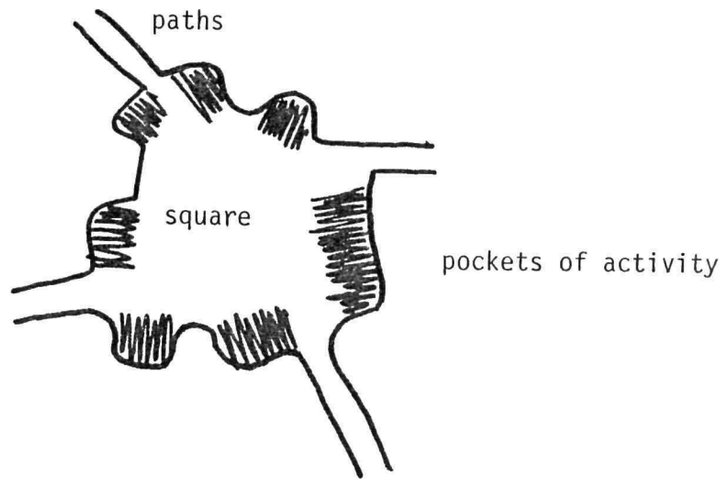
Inter-relationships: PEDESTRIAN DENSITY

43. ACTIVITY POCKETS (1:599-602)

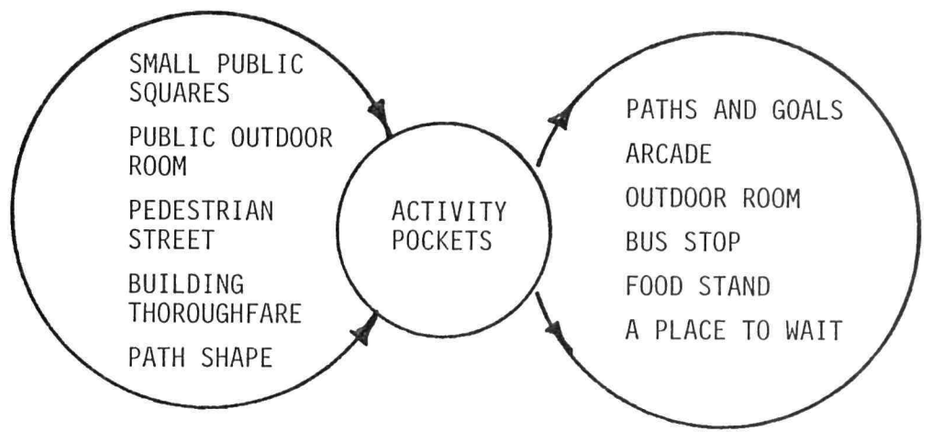
In public areas such as PEDESTRIAN STREETS, BUILDING THOROUGHFARES, and PUBLIC SQUARES, the activity which occurs along the edges of these areas will affect the vitality of these areas as strongly as the PEDESTRIAN DENSITY.

The edges of public areas should be occupied by such activities as shops, stands, news stands, displays, etc. These activities provide the opportunity for persons to linger which in turn makes the public area a place to stop, rather than simply a space to walk through. The activity pockets should not simply be lined along the edge of the public spaces, but should project and jut into the public space. Paths of circulation should be laid out across the public space and the activity pockets be allowed to occupy the areas between the paths of circulation.

Other patterns which could occupy the activity pockets could be BUS STOPS, FOOD STANDS, STREET CAFES, and a PLACE TO WAIT.



ACTIVITY POCKETS (1:602)



Inter-relationships: ACTIVITY POCKETS

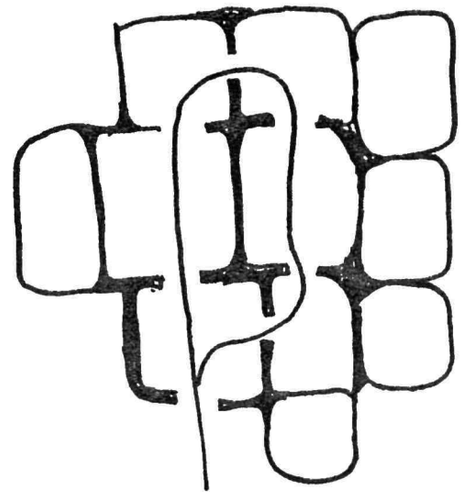
44. THE FLOW THROUGH ROOMS (1:627-631)

The circulation or movement between rooms is a very important element in the layout of a building. If connections between the various rooms or areas are viewed as no more than a connection, it inhibits the social interaction which may be required between the various areas. The connections should provide an environment for social interaction, a function a long dead corridor can hardly perform.

If corridors were eliminated entirely, a sequence of rooms, opening into each other, would occur providing the necessary atmosphere for social interaction. The use of corridors should be avoided if possible. Instead, public and common rooms should be used for circulation and these areas should form a chain or loop so that it is possible to walk from room to room, with private rooms opening off the public areas.

If corridors are unavoidable, they should be placed so that they could be filled with natural light, with ample room for circulation.

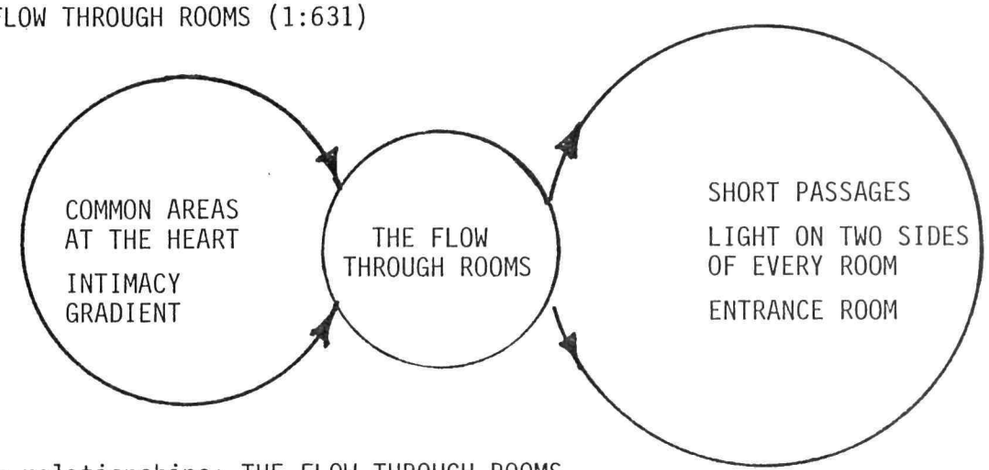
loops through rooms



wide doors

generosity of movement

THE FLOW THROUGH ROOMS (1:631)



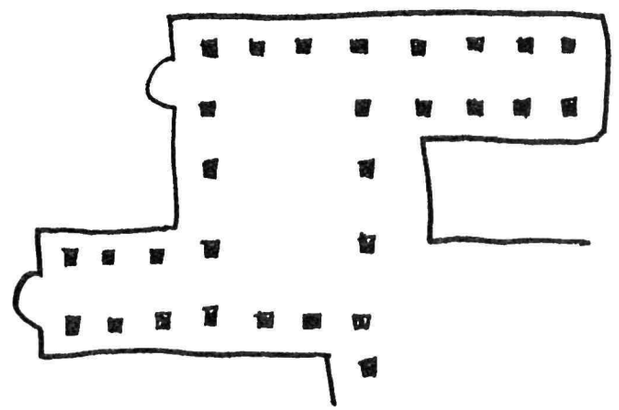
Inter-relationships: THE FLOW THROUGH ROOMS

45. FLEXIBLE OFFICE SPACE (1:689-695)
Office organizations just as any other social organization are subject to a great deal of change. To accomodate this high rate of change, it is obvious that office spaces be made as flexible as possible. There are two usual approaches to this problem of flexibility: movable partitions and office landscaping.

Movable partitions usually do not provide enough accoustical isolation, and if they do, they often are expensive. Another problem with movable partitions is that it very seldom happens than an office space needing expansion is located next to an office area requiring a reduction in space. What results is a general rearrangement of the entire office complex, which in turn often results in a major disruption in the office routine.

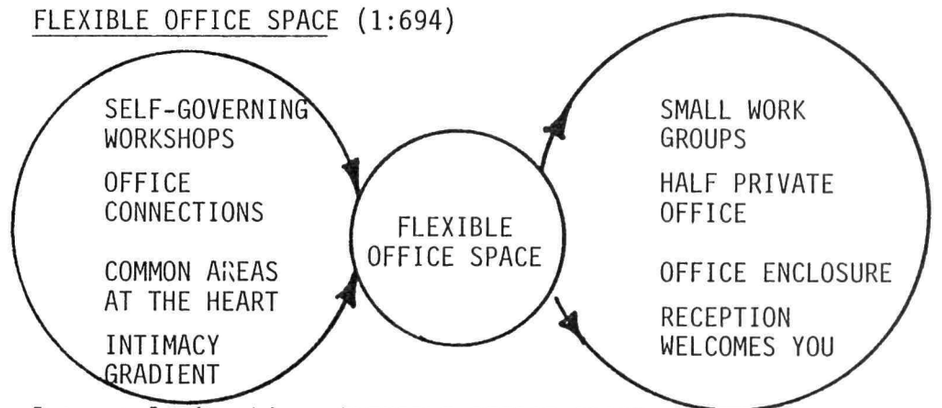
Office landscaping, which usually consists of office furniture simply placed in a large open space, provide the utmost in office flexibility, yet privacy and individualism have been almost entirely eliminated. People would prefer to work in small offices.

The office areas should be laid out as an open space with free standing columns around the edges so that they define private and common spaces opening into each other. Enough columns should be placed so that a huge variety of spaces can be provided, tailor-made for particular office needs.



possibility of many different sized rooms

FLEXIBLE OFFICE SPACE (1:694)



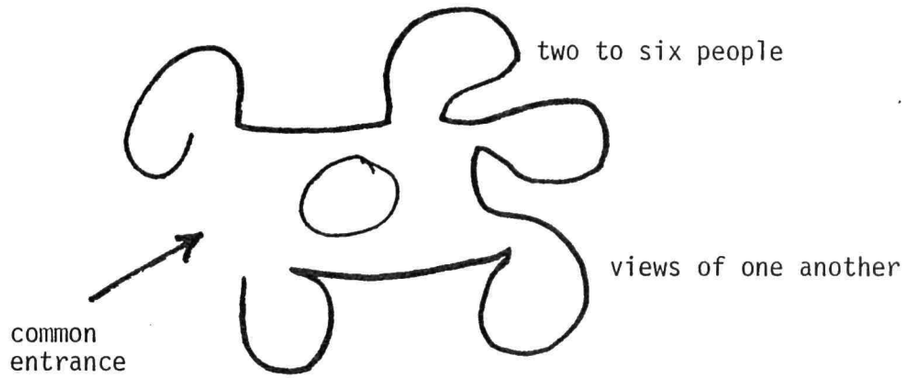
Inter-relationships: FLEXIBLE OFFICE SPACE

46. SMALL WORK GROUPS (1:701-704)

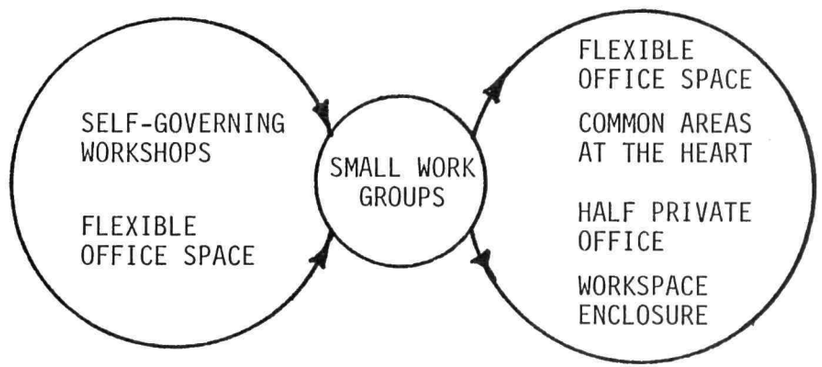
When more than six persons work in the same office, they should not be forced to work in a single undifferentiated space, but be allowed the freedom to divide their workshops up and form smaller groups.

According to surveys done by the Pilkington Research Unit (Office Design: A Study of Environment, ed. Peter Manning, Department of Building Science, University of Liverpool, 1965, pp 104-128), "There is an uncomfortable feeling of being watched all the time" and "The larger offices make one feel relatively unimportant". People consistantly chose work groups offering the smallest group. Other studies performed by Alexander, suggest that people prefer to work in a group of two to six persons.

Therefore, arrange office spaces into identifiable work groups, of two to six persons each. The work groups should be arranged so that each individual has some visual contact with other members of his group, and groups should be arranged so that they may share common facilities.



SMALL WORK GROUPS (1:704)



Inter-relationships: SMALL WORK GROUPS

47. A PLACE TO WAIT (1:707-711)

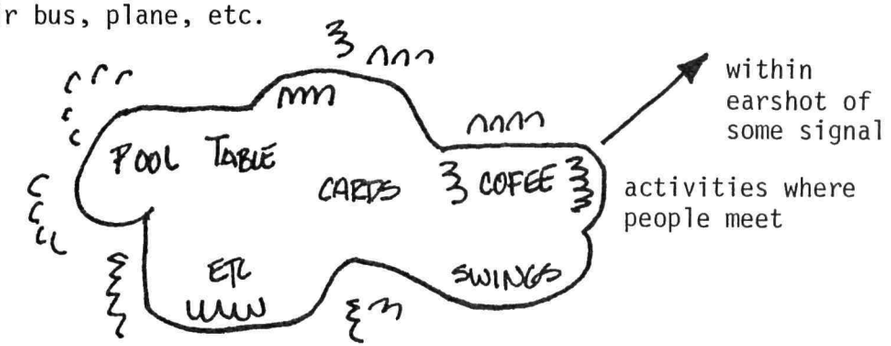
The activity known as waiting can be a very trying and tiring affair in many situations, characterized for the most part by non-activity.

Waiting areas are often dull, dingy rooms, in which strangers are thrust together. Without any real diversions, boredom quickly sets in, making time appear to almost stand still. The boredom process can further complicate when those persons waiting are experiencing anxiety or stress.

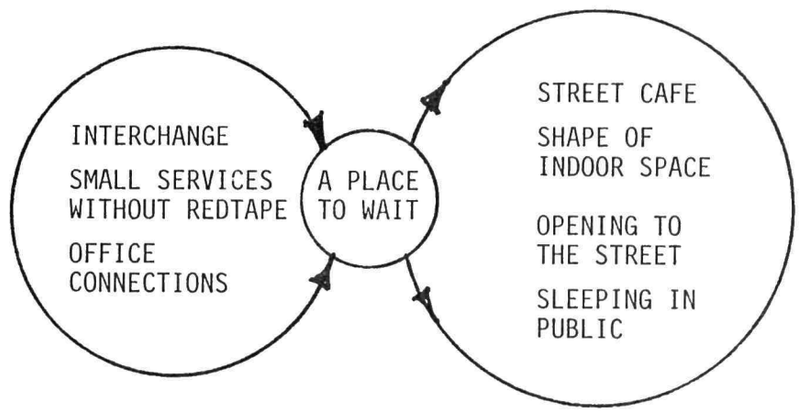
This situation can best be dealt with when the waiting is combined with other activities which draw non-waiting persons into the facility. These activities can include cafes and shops which are located so that those persons waiting will not miss the signal calling them to their appointment, or whatever.

Spaces just the opposite in atmosphere, can be just as helpful in dealing with waiting. A quiet, somewhat secluded area, can relax those persons waiting. These spaces should be provided far enough from busy circulation paths so that the relaxing atmosphere is not disturbed by circulation noises and visual distractions.

In short, a waiting area should allow persons to do things they want to do, without the fear of missing their bus, plane, etc.



A PLACE TO MEET (1:711)

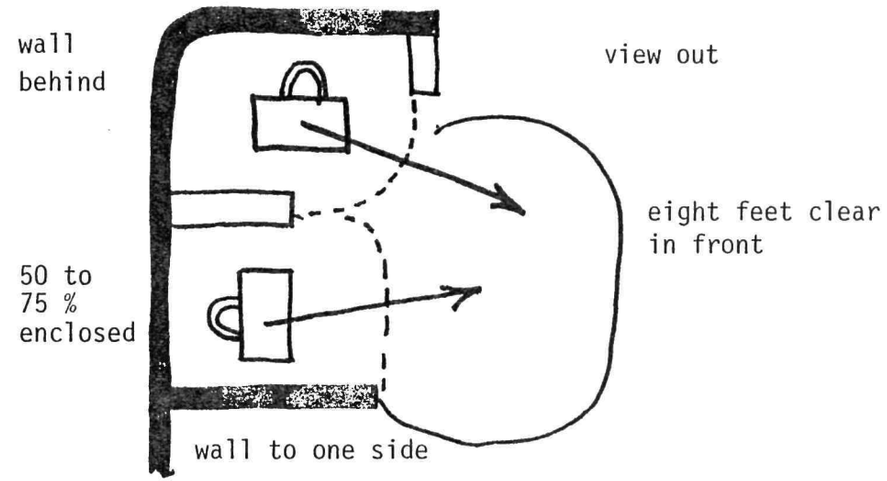


Inter-relationships: A PLACE TO WAIT

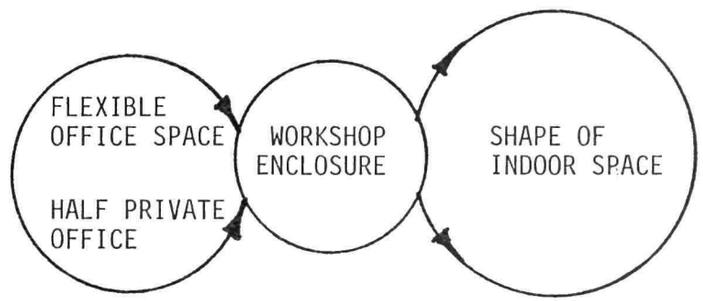
48. WORKSHOP ENCLOSURE (1:846-852)

A survey performed by Alexander found 9 critical elements in the design of a workshop enclosure.

1. People feel more comfortable with a wall behind them.
2. People feel more comfortable with a wall beside them also.
3. There should be no blank wall closer than eight feet in front of the work area.
4. Workspaces should have a minimum area of 60 square feet.
5. A workspace should be 50 to 75 percent enclosed by walls or windows.
6. Every workspace should be given a view to the outside.
7. No person should be closer than eight feet from another person for audio separation.
8. People should be aware of at least 2 other persons, yet no more than eight persons.
9. The workspace should not be exposed to noises inconsistant with the type of work being performed such as subjecting office spaces to manufacturing noises.



WORKSPACE ENCLOSURE (1:851)



Inter-relationships: WORKSHOP ENCLOSURE

CIRCULATION SYSTEMS

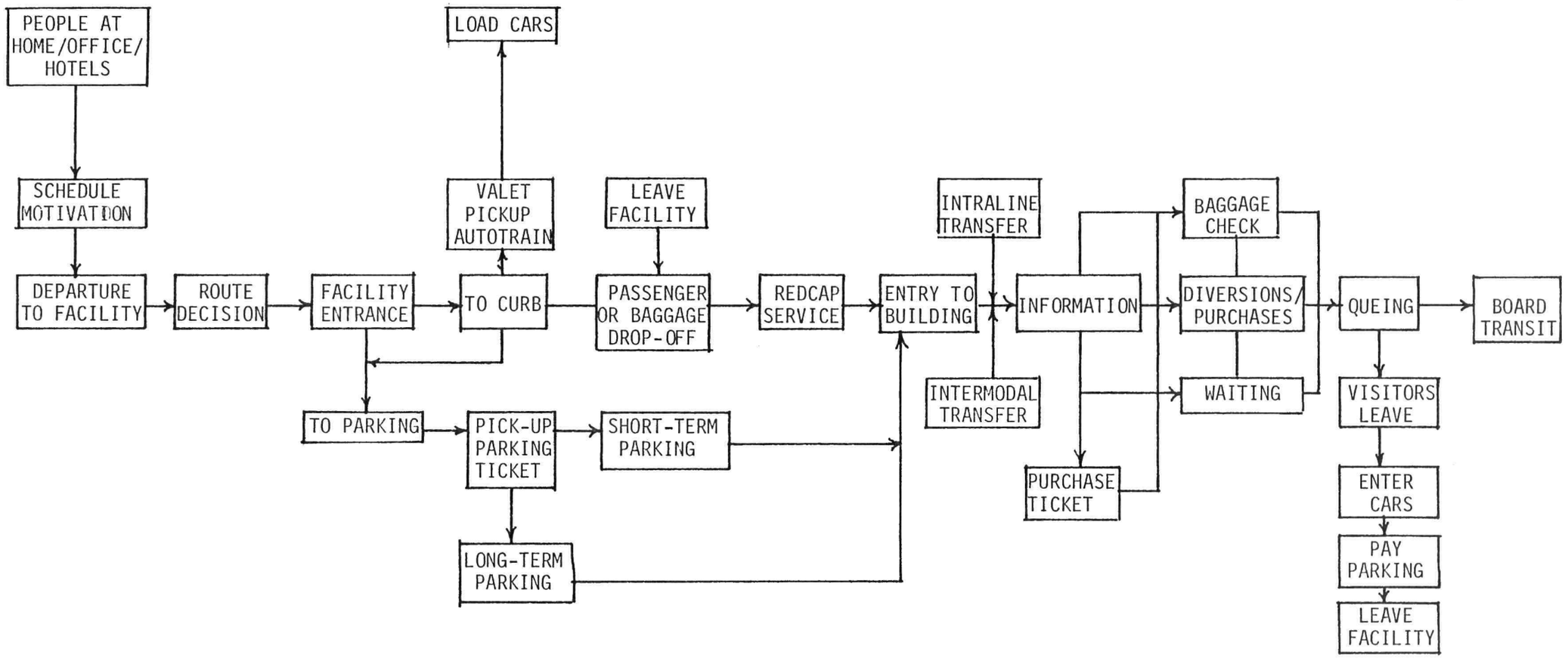
From the information gathered in the "Case Study" of this program, and the information gathered from Chris Alexander's, A Pattern Language, the major function of a transit oriented facility is to provide an organized system of circulation, so that the transfer from one transit mode to another can be done with a minimum amount of confusion, and a high degree of study.

So far, this Activity Analysis of the Transit Center has dealt with circulation problems in only a physiological and psychological manner. What is lacking is the complex series and systems of activities which occur in a transit center.

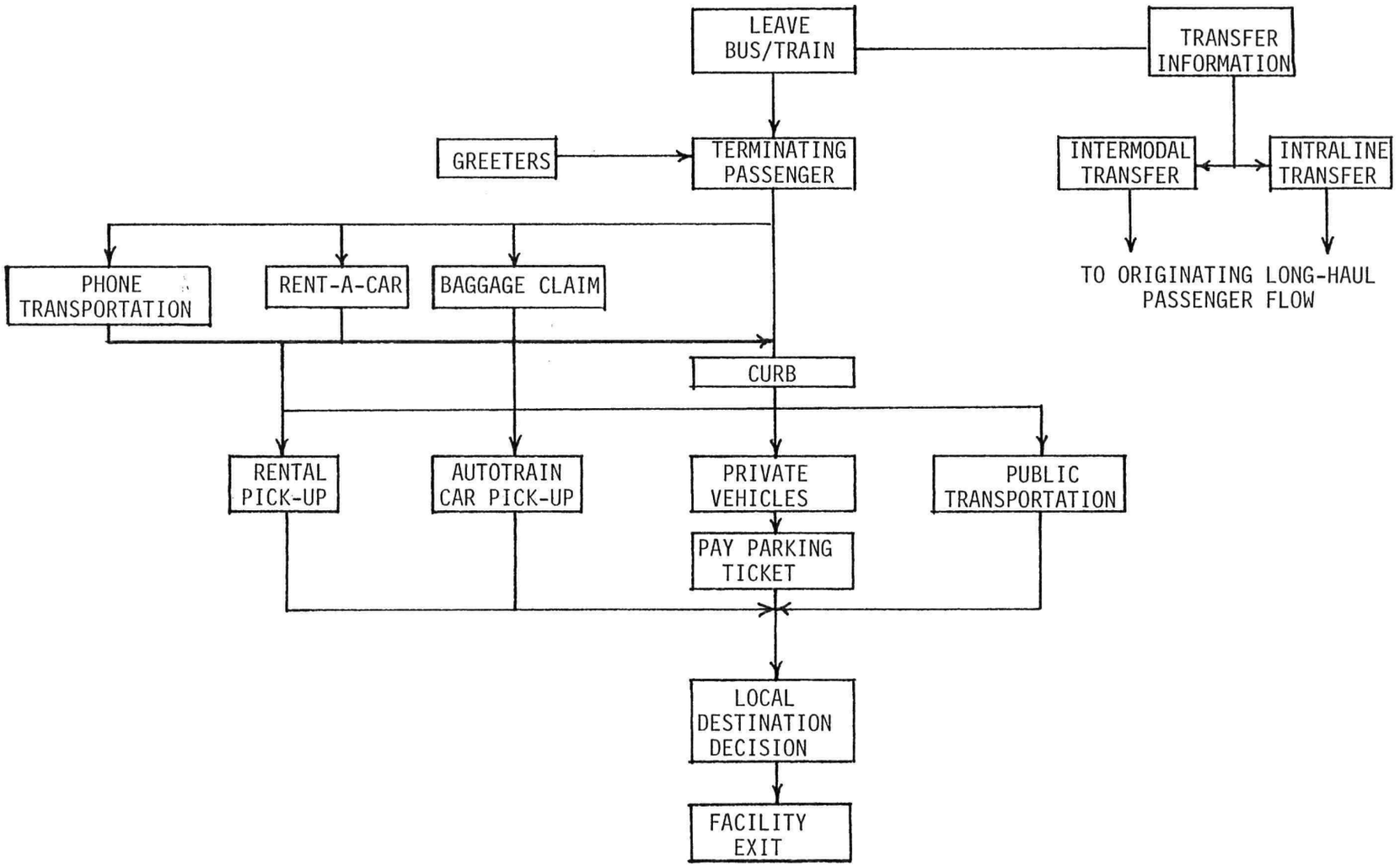
The activities of an originating passenger are the most crucial in terms of clarity of circulation patterns, for if a passenger is running a little late, the time lost in looking for a place to purchase a ticket, schedule information, etc.,may mean the difference as to whether or not the late passenger will make his intended transit connection.
As determined in the Case Study of this program, user orientation and the minimzation of circulation conflicts are the critical issues from the user's point of view.
These areas of concern are just as great for the transferring passenger.

The problems encountered by the terminating passenger are not as critical as those for the originating/ transferring passenger, for the terminating passenger has more time to perform his needed activities. In addition, the terminating passenger has fewer activities to go through in the process of leaving the facility.

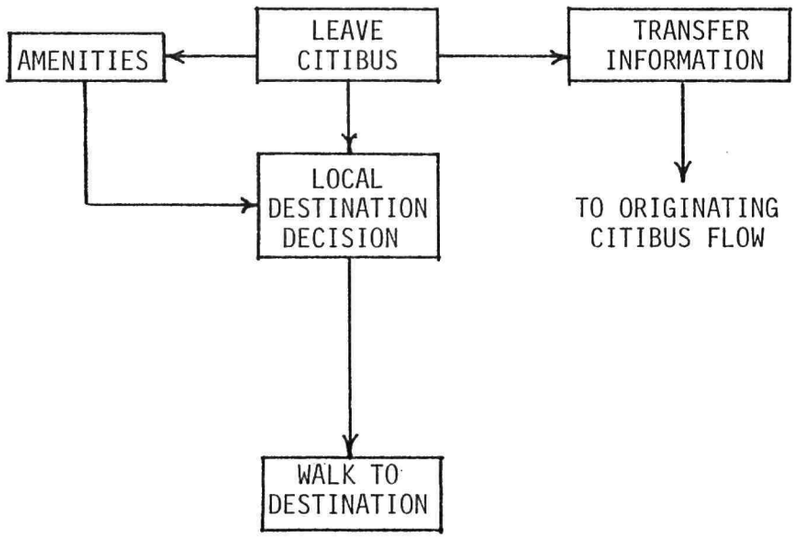
In the next four pages, the activity patterns of originating, terminating and trasferring passengers are analyzed, as well as the activity paths of both freight and passenger baggage. This information was distilled from De Chiara and Callender's, Time Saver Standards for Building Types, (Ref. 2), using the data for passenger airports (2:775-780), and adapted for use on the Lubbock Transit Center, incorporating data for the circulation systems of train, intercity bus, and intracity bus passengers and freight.



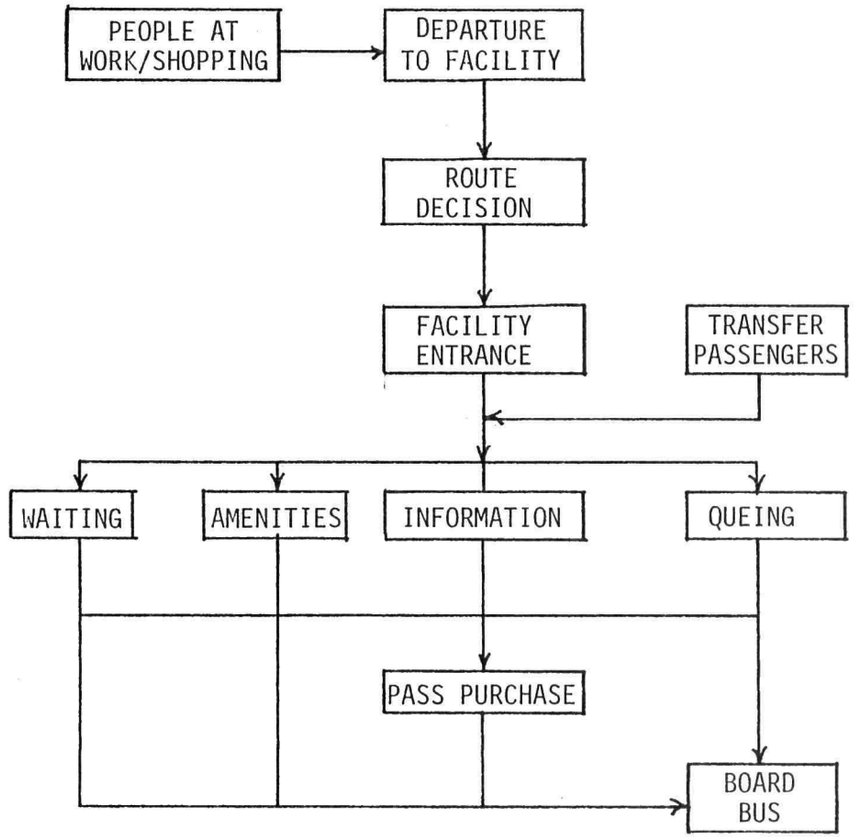
Flow of Originating Long Haul Passengers



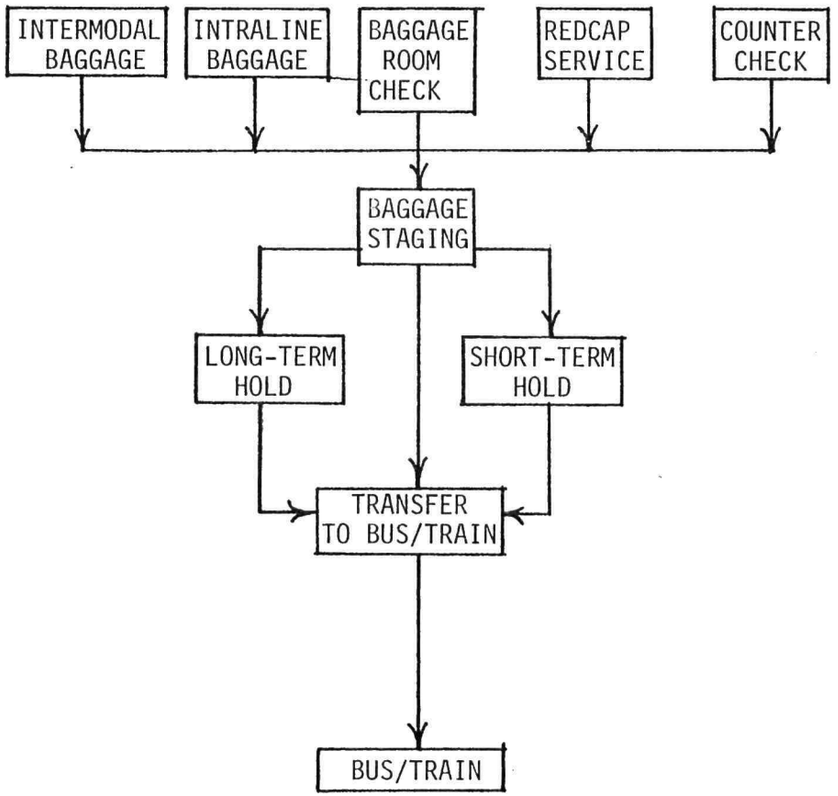
Terminating/Transfer Long-Haul Passenger Flow



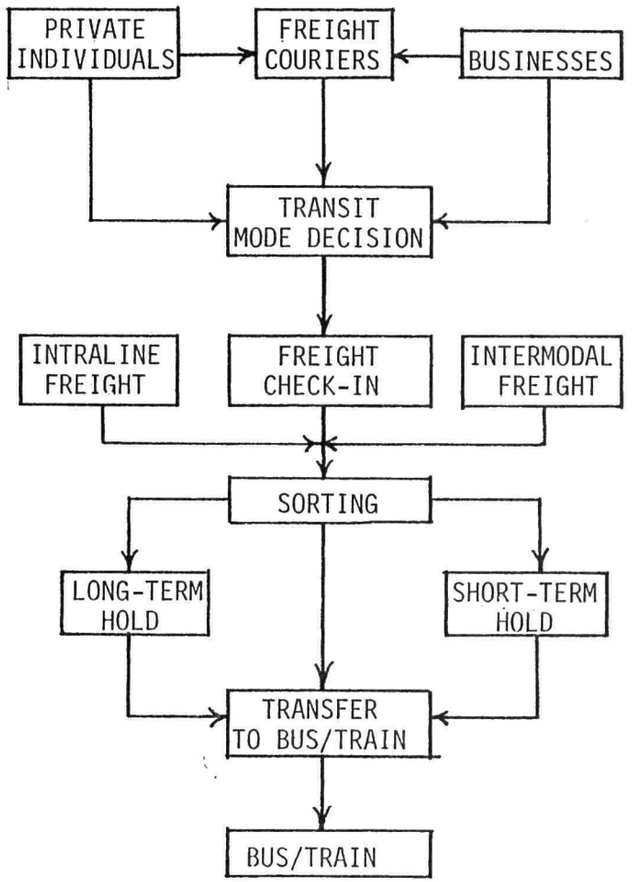
Terminating Citibus Passenger Flow



Originating/Transfer Citibus Passenger Flow



Outgoing Baggage Flow



Outgoing Freight Flow

LIST OF REFERENCES

1. Alexander,Christopher, et. al.; A Pattern Language; Oxford University Press; New York; 1977.

2. DeChiara and Calleder; Time Savers Standards for Building Types; McGraw-Hill Co.; New York; 1973.

CASE STUDIES OF TRANSPORTATION FACILITIES

Case studies should give valuable insight to design considerations, and the critical issues involved in a particular building type. It is important that the various designs be of a similar nature as to their exact function, so that a direct comparison may be drawn between them and their design attributes can be evaluated against a set of specific criteria.

In a study done by Griffiths, Hoel, and Demetsky, for the Department of Transportation, such a case study has been performed. What they have done, is to develope five alternative renovation designs from a specific set of goals and objectives, and then the effectiveness of each design for meeting these goals and objectives was evaluated.

The study involved the renovation of the 68th Street Terminal in Philadelphia, Pennsylvania, a facility which has deteriorated through neglect and vandalism, and was lacking some basic safety and security features. This facility serves 50,000 persons daily, incorporating facilities for three different transportation modes, functioning primarily as a commuter station.

The following objectives were given for the terminal renovation, and the potential for improvement rated for the present facility.

Improvement Potential (1:51)

Goal or Objective	Improvement Potential
1. Minimize Crowding	
-on links	Fair
-in queues	Poor
-on platforms	Fair
2. Minimize Travel Impedances	
-for walking	Good
-for waiting	Good
3. Minimize Conflicts	Good
4. Minimize Disorientation	Good
5. Maximize Safety	Fair
6. Maximize Reliability	Poor
7. Provide for Efficient Fare Collection and Entry	Poor
8. Minimize Level Changes	Fair
9. Minimize Physical Barriers	Good
10. Provide for Emergencies	
-evacuation time	Good
-service interuption	Good
11. Provide Comfortable Ambient Environment	Fair
12. Provide Adequate Lighting	Fair
13. Provide for Personal Comfort	Good

Improvement Potential (Continued)

Goal Or Objective	Improvement Potential
14. Provide Aesthetic Quality	Fair
15. Provide Supplementary Services	Fair
16. Provide Weather Protection	Fair
17. Provide Adequate Security	Fair
18. Minimize Costs (Operating)	Poor
19. Maximize Net Income	Fair
20. Utilize Energy Efficiently	?
21. Provide Design Flexibility	Fair

Alternative Design Descriptions (1:66,69,72)

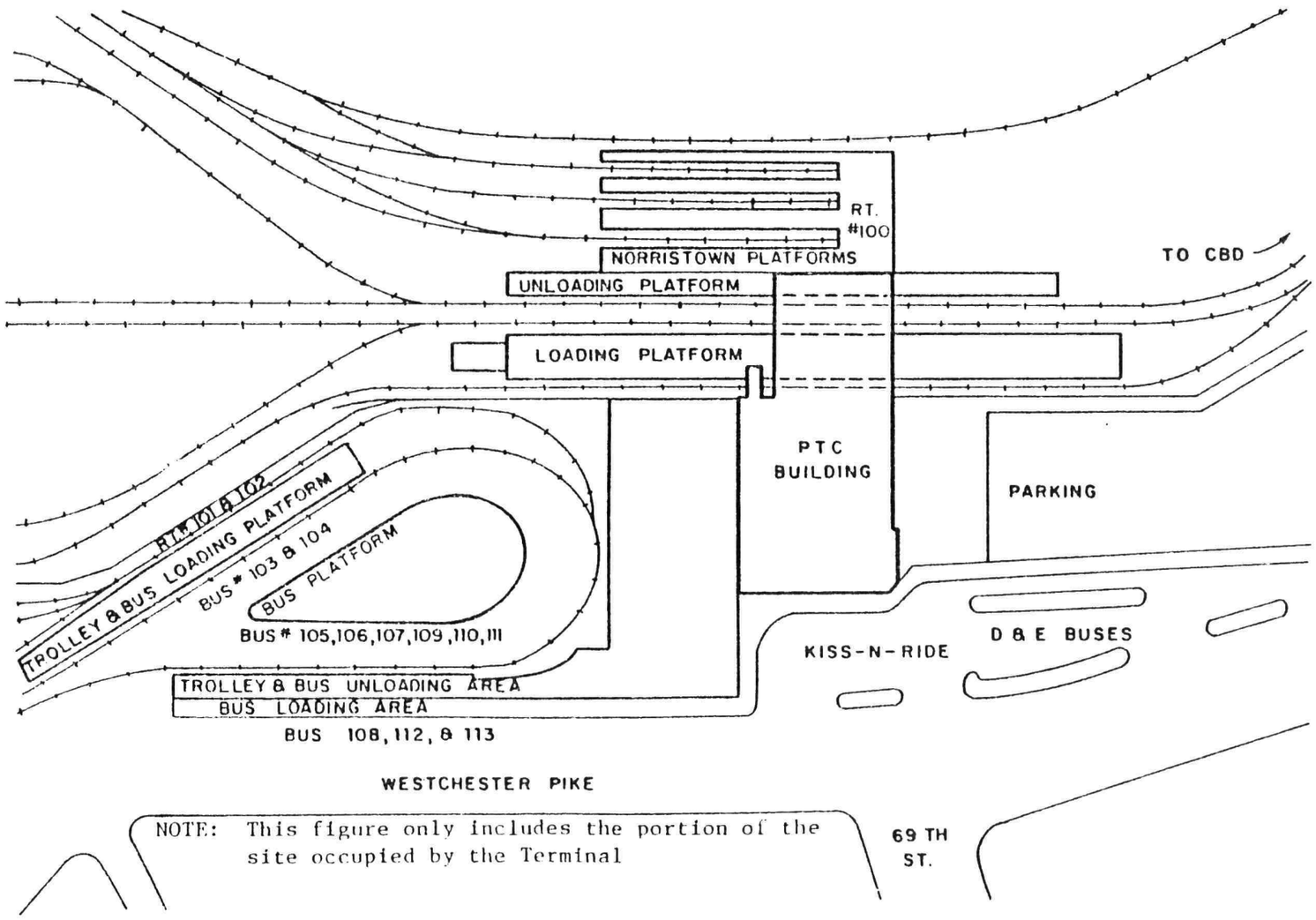
Alternative 1. ($3.1 Million Construction)
Alternative 1 provides little change in the present facility but involves minor modifications of the city bus platforms, taxi areas, and would involve cosmetic renovation of the existing facility primarialy.

Alternative 2. ($2.4 Million Construction)
This alternative would also present little change in the existing facility. A rampleading from the West Chester Pike bus platform would be removed and a corridor running from this platform to the main lobby would be constructed eliminating two level changes.

Alternative 3. ($1.9 Million Construction)
This plan calls for the elimination of the present bus circles where all but two of the buses would load in front of the present facility. The "kiss 'n ride" area would be relocated between the subway elevated building and the parking area.

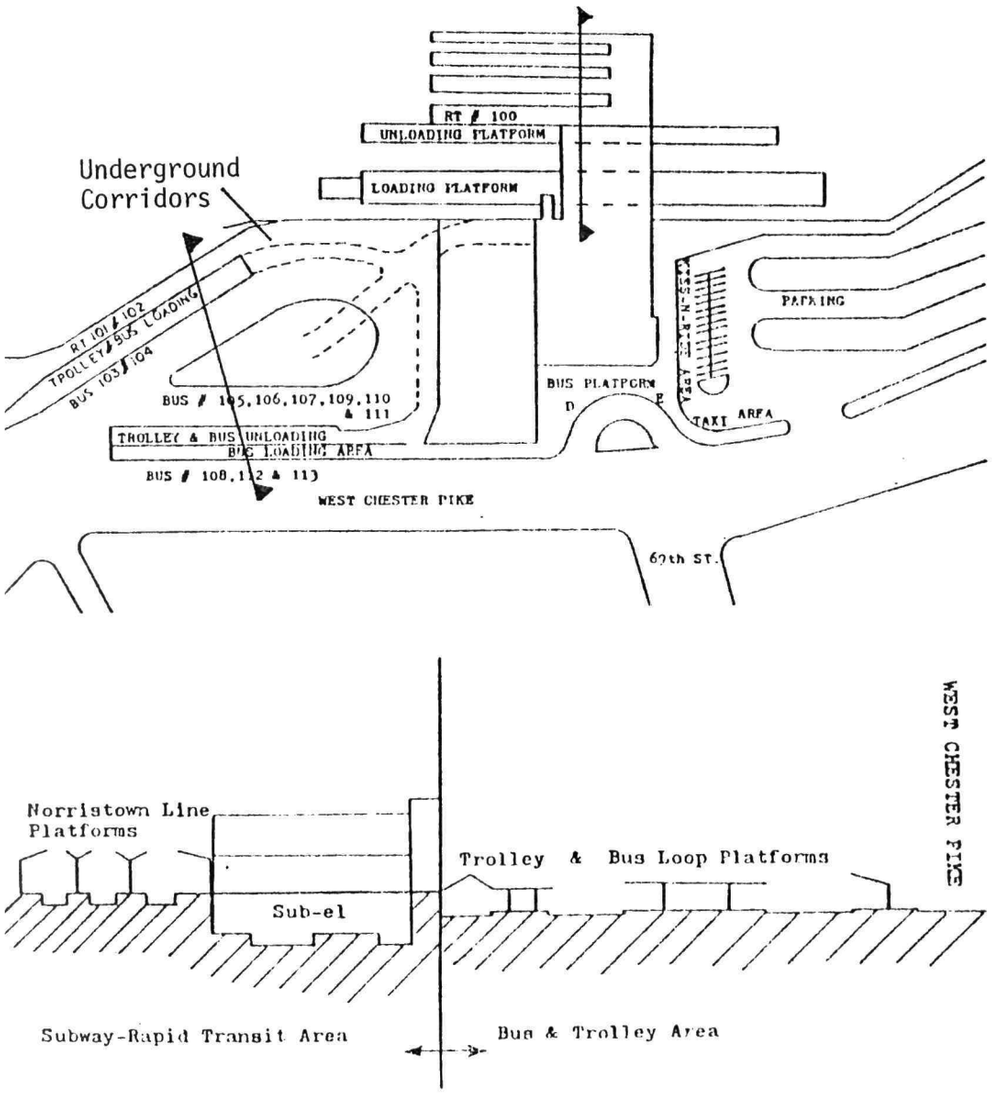
Alternative 4. ($2.9 Million Construction)
This plan would call for the demolition of most of the present facility. Elevated corridors running above the vehicular circulation would serve the bus platforms. A major change in the configuration of the "kiss 'n ride" area, parking and taxi areas would be required.

Alternative 5. ($4.4 Million Construction)
This alternative would require that all trolley lines be removed from the ground level to the subway-elevated platform level located below grade. All above ground circulation would service the bus and automobile transportation. In addition, an elevated corridor similar to that of Alternative 4, would permit pedestrian circulation over the vehicular traffic, leading to the bus platforms.

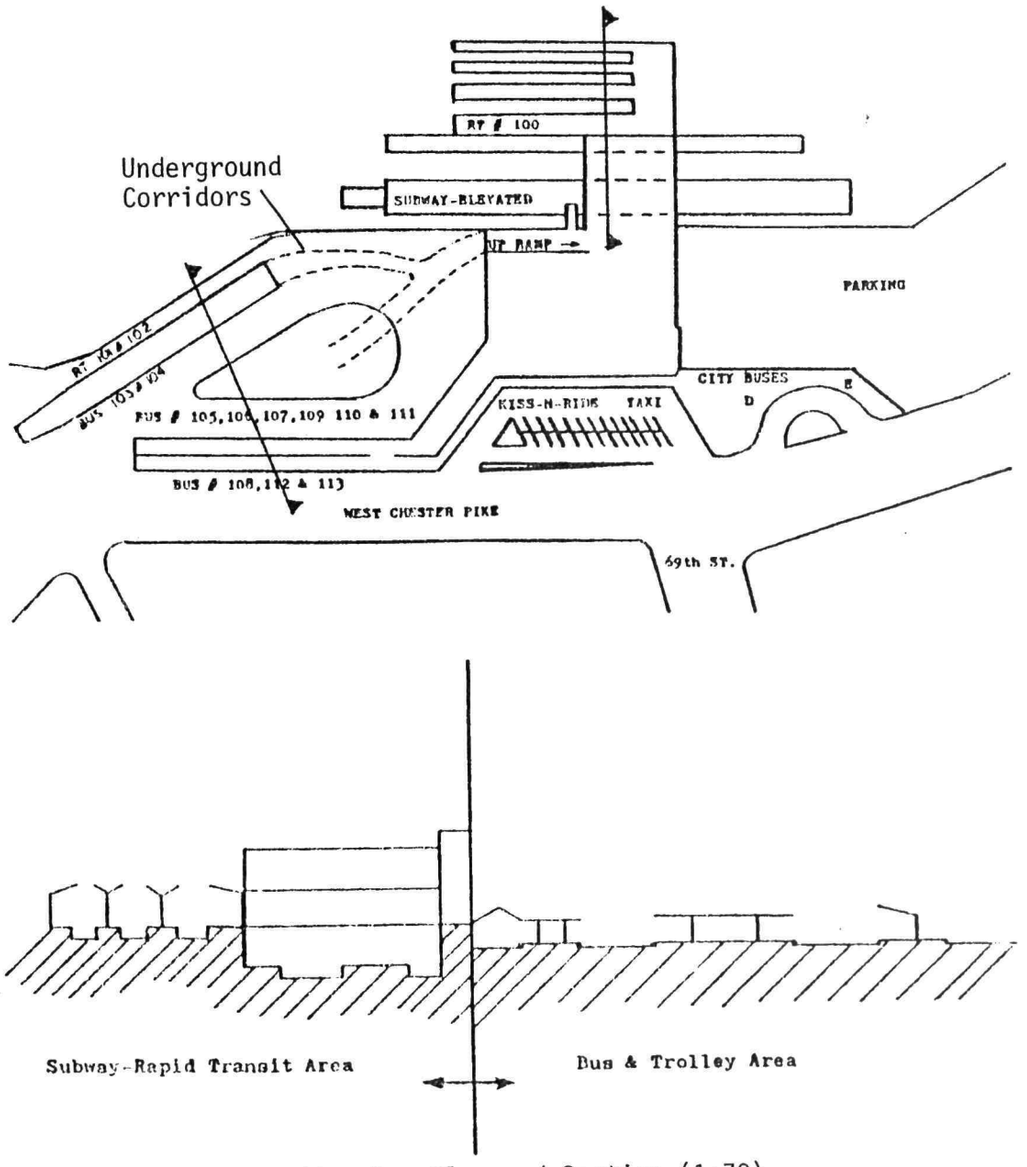


NOTE: This figure only includes the portion of the site occupied by the Terminal

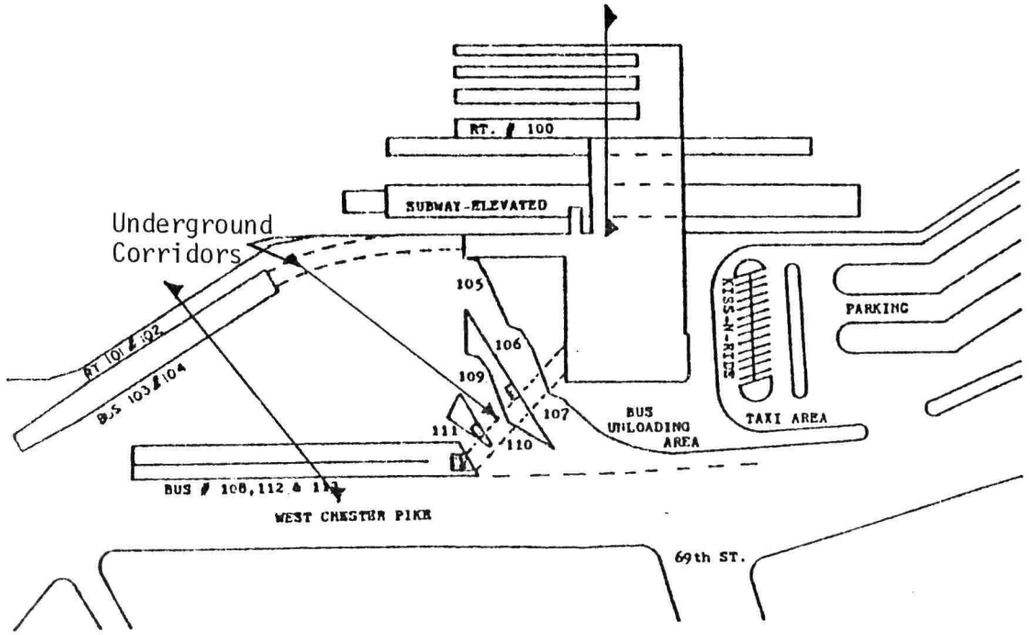
Existing Terminal Facilities
(1:24)

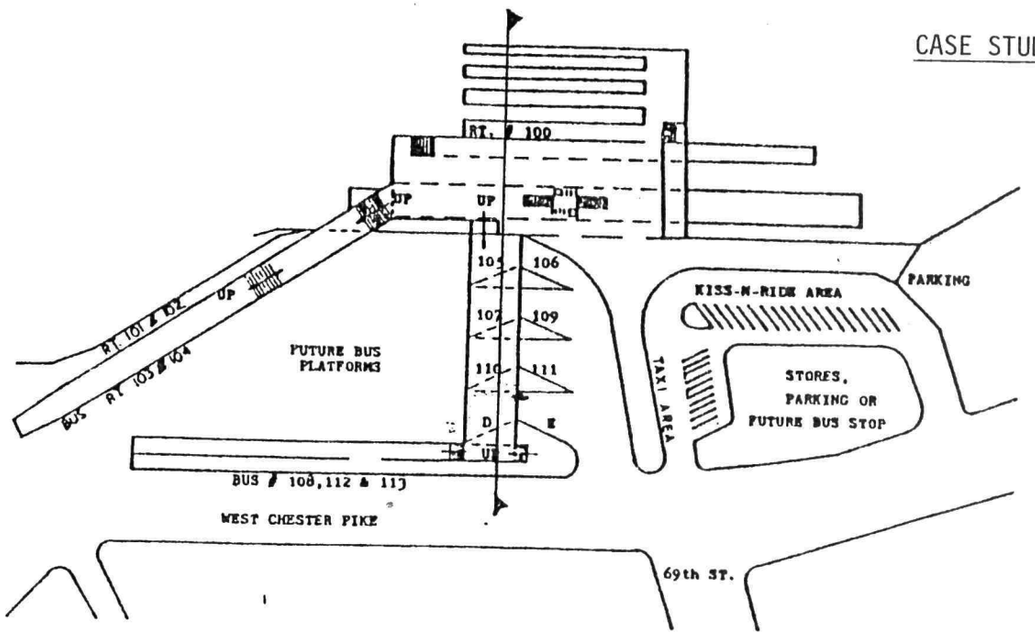


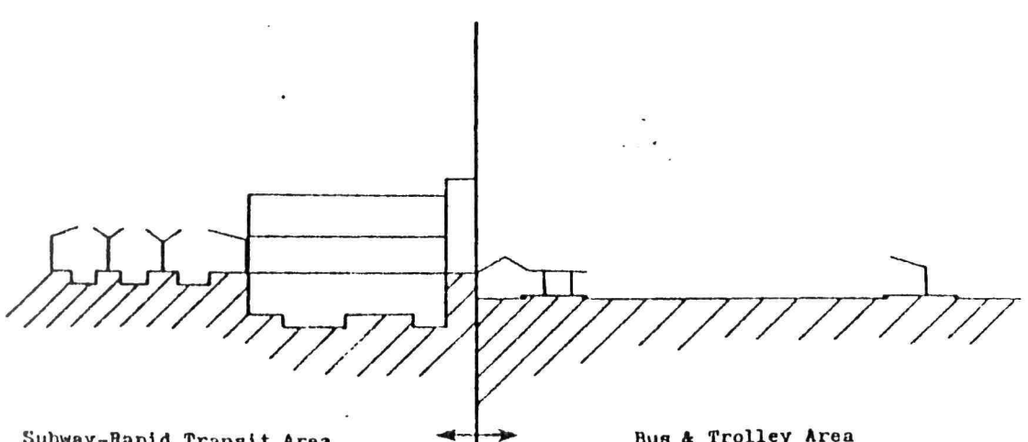
Alternative 1. Plan and Section (1:69)



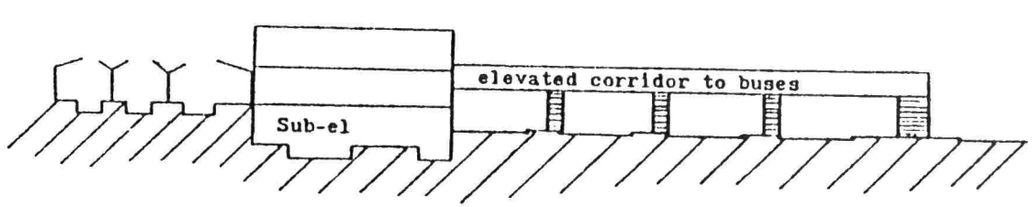
Alternative 2. Plan and Section (1:70)



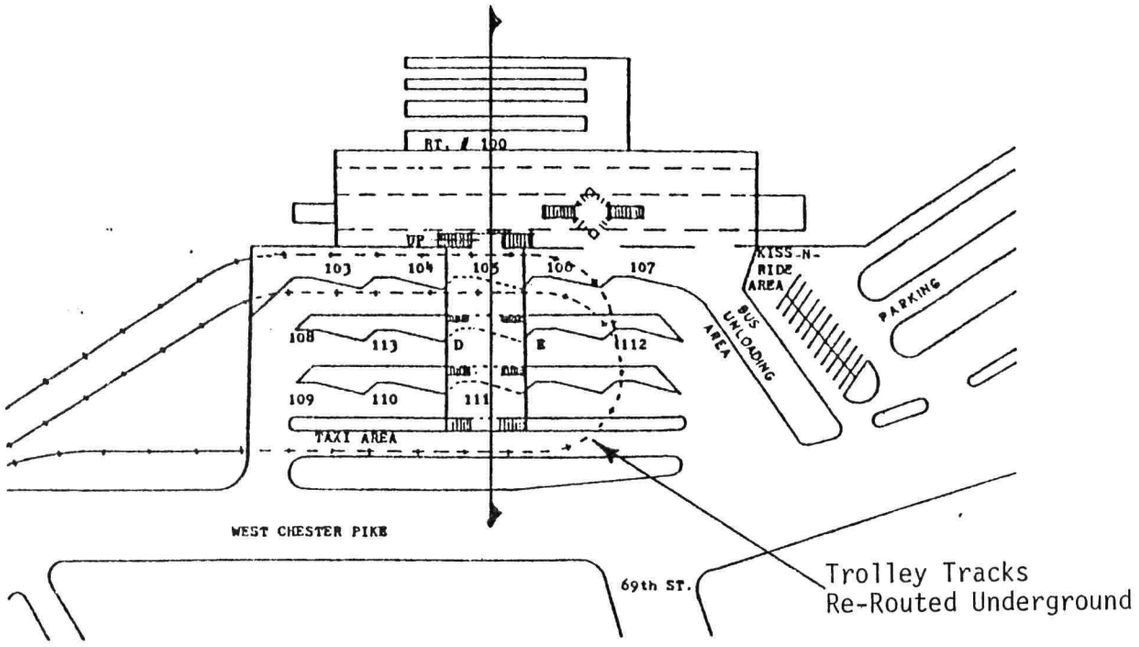


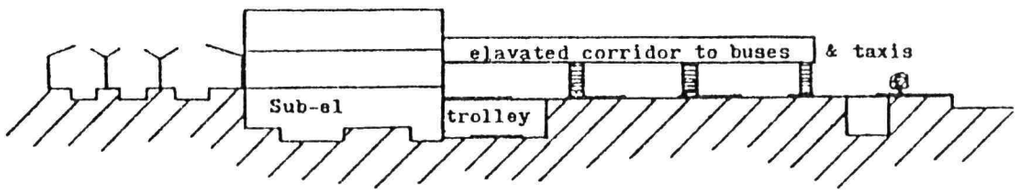


Alternative 3. Plan and Section (1:71)



Alternative 4. Plan and Section (1:72)





Alternative 5. Plan and Section (1:73)

Evaluation of Alternatives

The alternatives were all compared to each other, using the list of design objectives and goals, and evaluated for each point of view; user, special user (handicapped), and the non-user (community).

For the user, Alternative 5 was the clear winner. Aggregate walking times, calculated from a link-node network, showed that this alternative resulted in the lowest aggregate walk time of all the five alternatives. Circulation conflicts were the lowest, and by having all of the facilities sharing a common waiting area, aesthetic quality and user orientatation were the greatest. In addition, there were the fewest number of level changes.

The least favorable design, from the viewpoint of the user, was Alternative 1. The only advantage that this design had over any of the other alternatives was that it provided a greater selection of supplementary services.

Special User Evaluation

The greatest concern of the special user is the number of level changes found in a design. In this category Alternative 5 has the clearest advantage since it has the fewest number of level changes. Alternative 1 had the greatest number of level changes and would be considered unacceptable to most special users.

Operator Evaluation

According to Griffiths, Hoel and Demetsky, the bottom line for operator evaluation was the cost of renovation and on this count Alternative 3 had the advantage. Although Alternative 4 would provide space for joint development ventures, and had a greater flexibility as far as the reduction or expansion of bus service, it would cost $1 million more than Alternative 3, making it unacceptable.

Non-User Evaluation

Once again, the bottom line for non-user evaluation was the cost of renovation, where, as before, Alternative 3 would have the clear advantage. Although Alternatives 4 and 5 were judged to be more conducive to community growth, local patterns and more aesthetic, they were axed in favor of saving $1 million.

Design Selection

Though Alternative 5 was the clear choice for both the user and special user, their needs were over ruled in favor of economy, and Alternative 3 was selected as the most favorable design, due primarialy to the cost savings in the construction of the facility. Alternative 1 was rated the least favorably, while Alternative 2 and 3 were rated about even.

Conclusions

It is interesting to note that all five of the design alternatives provided pedestrian access to the bus platforms on a different level, either above or below the level of bus circulation. This would seem to indicate that pedestrian and vehicular separation is of prime concern to the designer. It is more cost effective to change levels at which user access occcurs by means of tunnels or overhead corridors, rather than elevation of lowering of the transportation levels, due to the excavation and structural costs.

The cost of the facility becomes a major factor, especially when public funds are utilized in the funding of the facility. Negative public opinion about facility costs and funding can jepardize the project, so costs must be kept to a minimum while providing the maximum service possible.

AN EVALUATION OF TRANSIT FACILITIES

It should prove valuable to apply the methodology developed by Hoel, Griffiths, and Demetsky to other transit facilities. It was the aim of this study to find three or more facilities that were more or less alike, so that direct comparisons could be drawn between all of the facilities for all of the categories of facility evaluation. Unfortunately, this was not possible, and the following three facilities were selected, primarily on the amount of detailed information available on the designs of the facilities.

Evry Station; Evry, France (2:87-88)

This transportation facility is the only intermodal transit facility on which any details were available on the design. It will serve both bus and fixed rail transit, and will function primarily as a suburban commuter station. In this facility both train and bus platforms are served by a common waiting area, with bus service occurring on the ground level, and the train service occurring on a mezanine level. Though attractive in appearance, the layout of the facility is difficult to comprehend due to the separation and non-intervisibility of the various spaces within the facility.

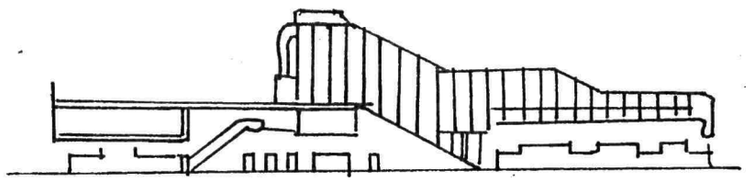
Downtown Airline Bus Terminal; San Francisco, California (3:132-133)

This facility is designed to accomodate buses taking passengers to and from the downtown area and the San Francisco Airport. It is designed for high volume usage, handling 2,400 persons every three minutes at peak capacity.

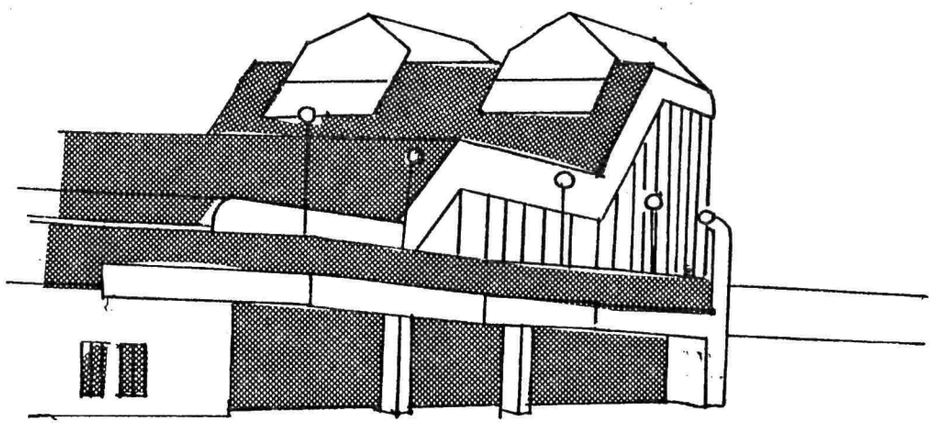
Circulation and pedestrian protection are very well laid out, and circulation conflicts appear to be non-existant. Bus platforms are served by the two overhead concourses, one for arriving passengers and one for departing passengers, with the ticket facilities on the upper level which controls direct access to the concourse areas. Taxi and passenger dropoff also occur on the second level, while parking for automobiles occurs on the ground level as do the bus platforms and areas for bus circulation.

Metropolitan Transporation Center; Buffalo, New York (4:137-140)

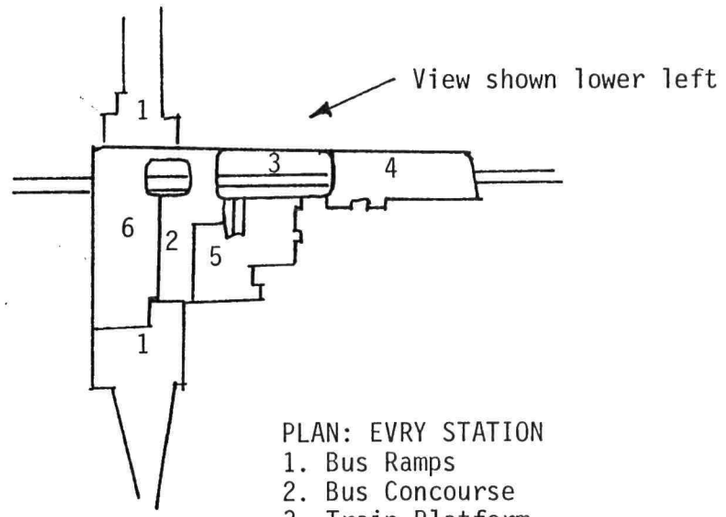
This facility serves both the inter-urban and mass transit buses for the city and is a one level design. Designed to operate at a capacity of 800,000 passengers per year, both inter-urban and mass transit services share a common waiting



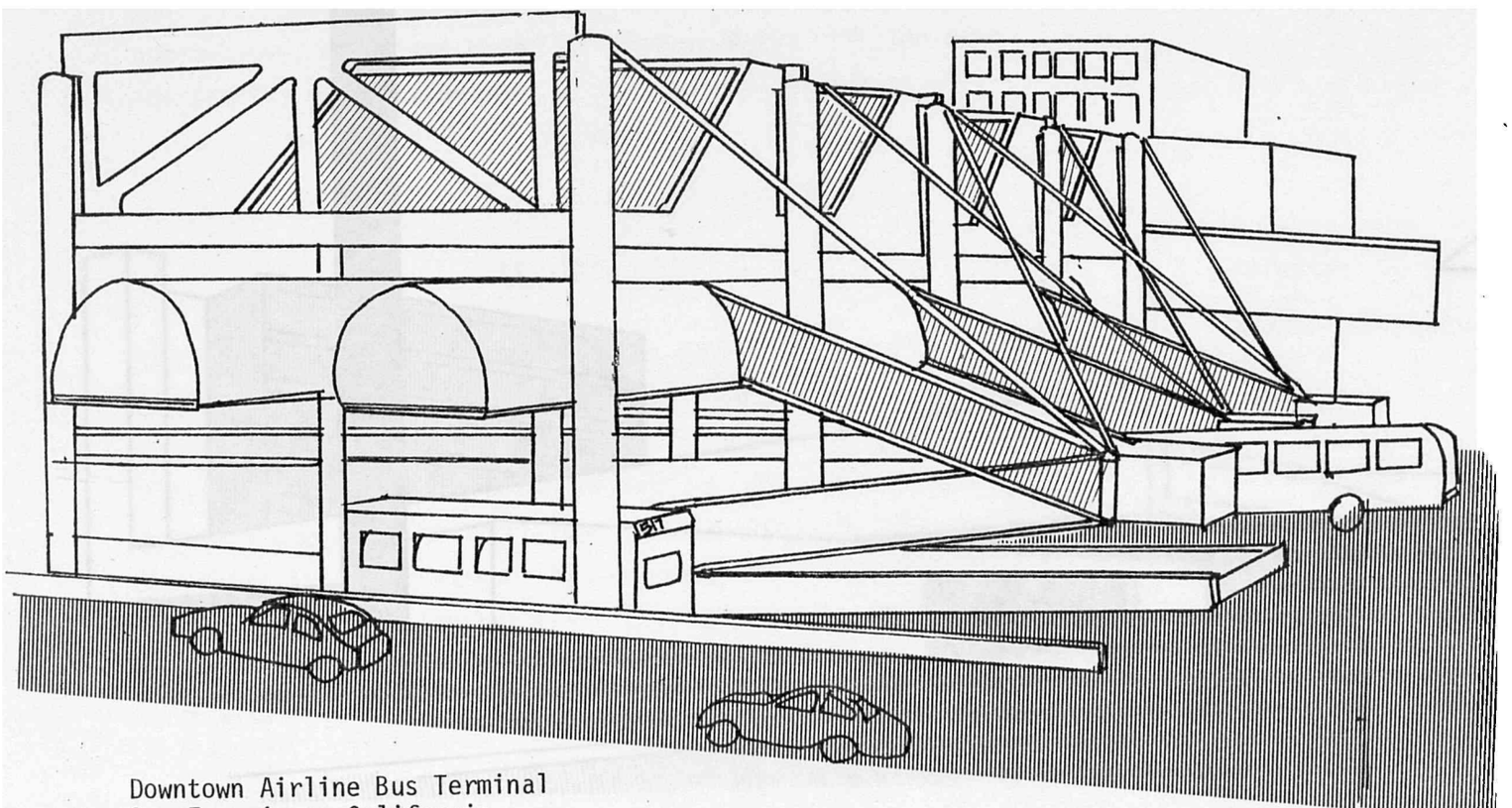
Section Through Station



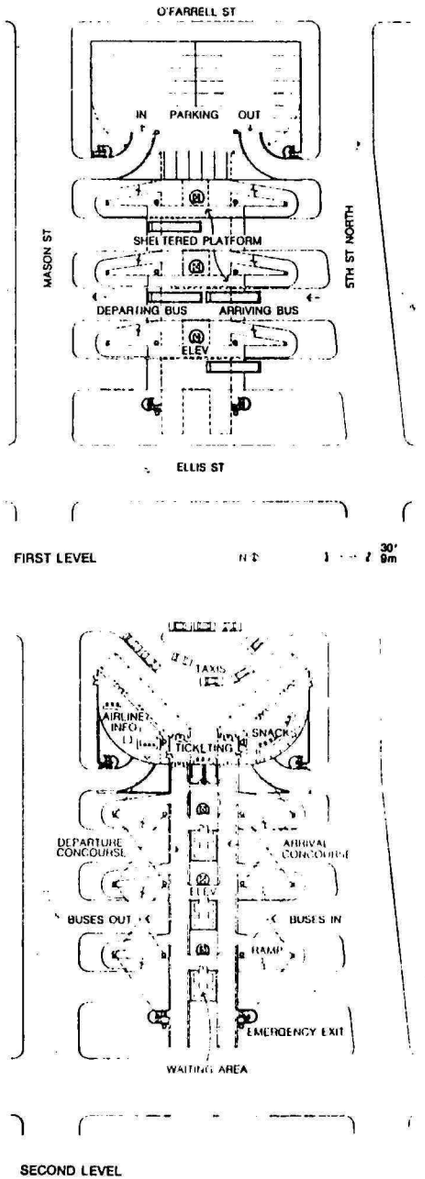
EVRY STATION



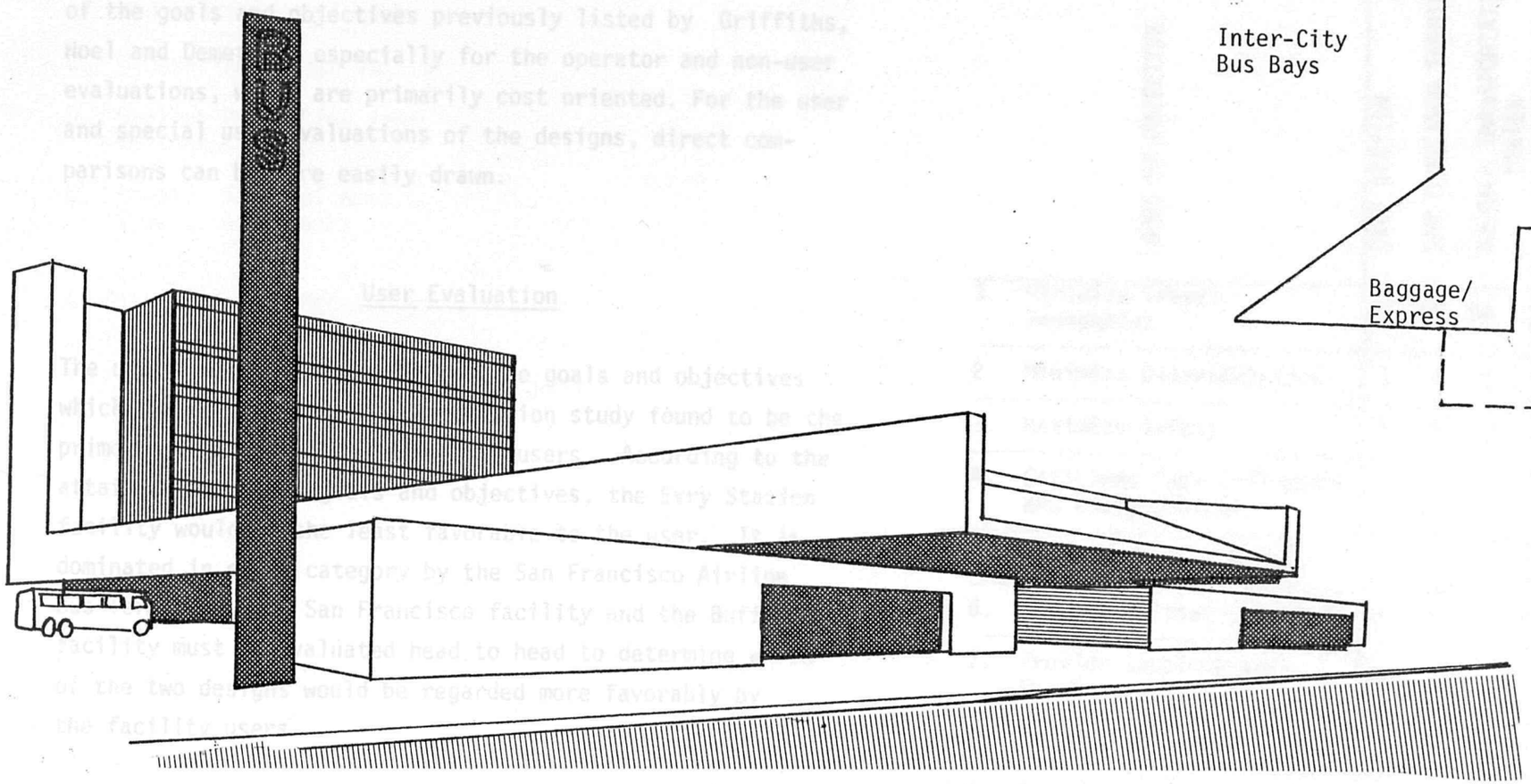
PLAN: EVRY STATION
1. Bus Ramps
2. Bus Concourse
3. Train Platform
4. Office (over tracks)
5. Waiting Room
6. Bus Platforms

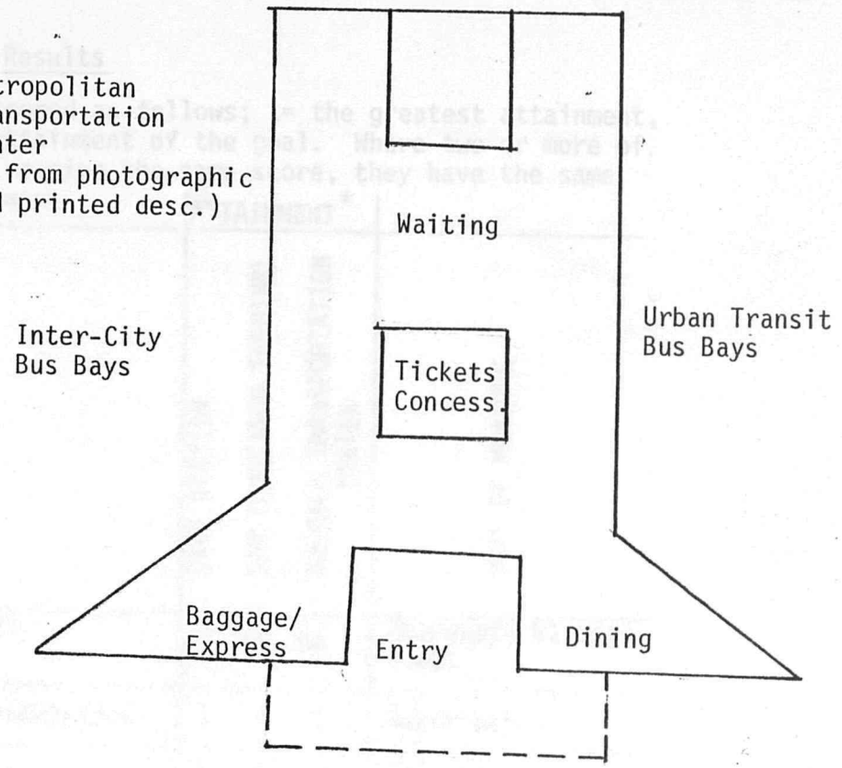


Downtown Airline Bus Terminal
San Francisco, California



Terminal Plans





BUFFALO METROPOLITAN TRANSPORTATION CENTER

room. Though circulation occurs on one level only, circulation conflicts are held to a minimum since the concourse area occupies only one side of the facility.

Due to the dissimilarities in designs, scales, and services provided, it is difficult to make direct comparisons for some of the goals and objectives previously listed by Griffiths, Hoel and Demetsky, especially for the operator and non-user evaluations, which are primarily cost oriented. For the user and special user evaluations of the designs, direct comparisons can be more easily drawn.

User Evaluation

The user evaluation is based on nine goals and objectives which the Department of Transportation study found to be the prime concerns of transit facility users. According to the attainment of these goals and objectives, the Evry Station facility would be the least favorable to the user. It is dominated in every category by the San Francisco Airline Bus Terminal. The San Francisco facility and the Buffalo facility must be evaluated head to head to determine which of the two designs would be regarded more favorably by the facility users.

User Evaluation Results

*Attainment is scored as follows; 1= the greatest attainment, 3 = the least attainment of the goal. Where two or more of the facilities receive the same score, they have the same level of attainment.

GOAL OR OBJECTIVE	ATTAINMENT* EVRY STATION	SAN FRANCISCO TERMINAL	BUFFALO TRANSPORTATION CENTER	UNIT OF MEASURE
1. Minimize Travel Impedances	NA	NA	NA	Aggregate Walking Times
2. Minimize Disorientation	3	1	2	Descriptive
3. Maximize Safety	1	1	1	Descriptive
4. Efficient Fare Collection and Entry Control	2	1	2	Descriptive
5. Minimize Level Changes	2	2	1	#Changes/Path
6. Provide Aesthetic Quality	3	1	2	Descriptive
7. Provide Supplementary Services	1	1	1	Descriptive
8. Provide Weather Protection	2	1	1	%age Enclosed
9. Provide Adequate Security	2	1	2	%age of Area in View of Attendants
AGGREGATE SCORE	16	9	12	

In a head-to-head evaluation of the San Francisco and Buffalo terminals, the advantages of each design are as follows:

San Francisco Terminal	Buffalo Terminal
A. Ease of User Orientation	A. Minimize Level Changes
B. Efficient Fare Collection and Entry Control	
C. Greater Aesthetic Quality	
D. Greater Protection from Weather Elements	
E. Greater %-age of Area in View of Attendants	

As far as user preference goes, the San Francisco Terminal would be preferred by the majority of the users, while the Buffalo Terminal would be almost as well received. The Evry Station facility would not be well regarded by many users, the greatest problem being that of user orientation.

Special User Evaluation

The special user evaluation has but one objective, that being to minimize the number of level changes in the facility design. Of course this is not the only concern of the special user, but the remainder of their needs would be typified by that of the general public.

In the special user evaluation, the Buffalo Terminal would be the most favorable design since all user facilities are on a single level. Both the San Francisco Terminal and the Evry Station are rated even, both of them being two level designs.

Operator Evaluation

Since the prime criteria for an operator evaluation is the cost of the facility, and these three designs are so widely varied as to the nature of their function, no direct comparican be drawn between them.

Non-User Evaluation

Non-user evaluation of these three facilities is also nearly impossible since the prime criteria is cost. Other matters of non-user evaluation would be aesthetic quality, impact on local traffic and the promotion of local growth.

Design Selection

If all three of these facility designs were being considered as design alternatives for construction of a facility, the San Francisco Terminal would more than likely be the design selected. The basis for this selection is the well planned layout of the terminal, ease of orientation and the separation of vehicular and pedestrian circulation. This is not surprising since this facility was designed to carry a much heavier peak load (2,400 persons/3 minutes) than the other two facilities.

SUMMARY

Through the investigations of this study and the findings from the study performed by Griffiths, Hoel, and Demetsky for the D.O.T., the following critical issues in transit facility design have been found:

1. Construction Costs (Especially if project is to be public funded)
2. Separation of vehicular-pedestrian circulation by by means of layout, tunnels or elevated corridors.
3. Minimization of walking time/distances and circulation conflicts.
4. Special User Access
5. Design Flexibility

These five critical issues heavily outweigh any other design considerations which may be encountered in the design process, and the success or failure of the design will determined by the successfullness of dealing with these issues.

LIST OF REFERNCES

1. Griffiths, John R.,Hoel, Lester A., and Demetsky, Michael J.; Transit Station Renovation; A Case Study of Planning and Design Procedures; U.S. Department of Transportation; GPO; Washington,D.C.; 1979.

2. Hamburger.B.; "Central Station/Evry New Town"; Architectural Design; No. 8-9 1979; pp 87-88.

3. "First Impressions, Downtown Airline Bus Terminal, San Francisco"; Progressive Architiecture; 4:1979; pp 132-3.

4. "Buffalo's New Bus Stop"; Architectural Record; January 1979; pp 137-140.

ESTIMATION OF PEAK LOADS

The estimation of peak loads for the Lubbock Transit Center are difficult to determine. While the peak loads generated by TNM&O are fairly well established, the load potential for AMTRAK and Citibus are more nebulous in nature. The problem with estimating loads for AMTRAK is simply because this service is not presently offered in Lubbock. In the determination of peak loads for Citibus, the problem lies in the fluctuating passenger loads currently encountered by Citibus and it's sometimes uncertain future.

AMTRAK

There are several scenarios which could develope as far as determining the depot load which would be generated by AMTRAK or other passenger rail developments. However, the different scenarios which may develope will not have a serious effect on determining the number of train platforms required as current railroad policy is to assign a single track and platform for each directional possibility. For Lubbock, this would require that the Transit Center have three platforms/tracks because Clovis, Abilene and Amarillo are the only major rail routes out of Lubbock.

Scenario I

This is the lowest level of service frequency and would involve two through trains and two originating-terminating trains daily, with Clovis and Abilene serving as the primary destinations.

Service	Daily Passengers*
Abilene to Lubbock to Clovis	147 Persons
Clovis to Lubbock to Abilene	147 Persons
Abilene to Lubbock	102 Persons
Lubbock to Abilene	102 Persons
Possible Peak Load	294 Persons

*Daily passengers derived from figures presented in the Background Study.

In Scenario I, the highest possible peak service would occur should both the Abilene to Clovis trains arrive at the same time, resulting in 294 boarding and departing passengers within the same time period. However, if rail usage in Lubbock should rise to the level of the Northeast Rail Corridor, due to energy related developments, passenger loading could increase by as much as 40%, resulting in a peak passenger load of 411 boarding and departing passengers.

Scenario II

Scenario II would open up direct service to Amarillo and would involve daily service by four through trains.

Service	Daily Passengers
Abilene to Lubbock to Clovis	106 Persons
Clovis to Lubbock to Abilene	106 Persons
Abilene to Lubbock to Amarillo	156 Persons
Amarillo to Lubbock to Abilene	156 Persons
Possible Peak Load	512 Persons

This is the most efficient level of service because all trains are through trains resulting in a more efficient usage of rolling stock. An increase in user utilization comparable to the Northeast Rail Corridor would result in a possible peak load of 390 daily arrivals and departures during the same time period.

Scenario III

In this situation the level of service would be raised by the addition of additional service to Amarillo. A total of four daily through trains, one originating and one terminating train would be utilized if this level of service were attained.

Service	Daily Passengers
Abilene to Lubbock to Clovis	106 Persons
Clovis to Lubbock to Abilene	106 Persons
Amarillo to Lubbock to Abilene	113 Persons
Abilene to Lubbock to Amarillo	113 Persons
Amarillo to Lubbock	44 Persons
Lubbock to Amarillo	44 Persons
Possible Peak Load	226 Persons

Peak service would occur should the two Amarillo to Abilene trains arrive in Lubbock simultaneously. An increase in user utilization comparable to that of the Northeast Rail Corridor the expected peak load could be expected to reach 282 arrivals and departures simultaneously.

	Through	Originating	Terminating	Possible Peak	+40%	Daily
I	2 trains	1 train	1 train	294	411	498
II	4 trains	----	----	312	390	524
III	4 trains	1 train	1 train	226	282	526

A Comparison of Scenarios

It is interesting to note that as the level of service increases the possible peak conditions would actually decline. This is due to a more dispersed and frequent level of service.

The most severe peaking conditions would occur at the inition of AMTRAK service. For design purposes a peak loading condition of 300 simultaneous passenger departures and arrivals will be used. This level of peaking conditions will adequately cover Scenarios I and II and it is not likely that Scenario III could be attained without reaching Northeast corridor levels, therefore neccessatating peak load condition of 282 arriving and departing passengers simultaneously which would be adequately served by the design assumption of 300 passengers under peak conditions.

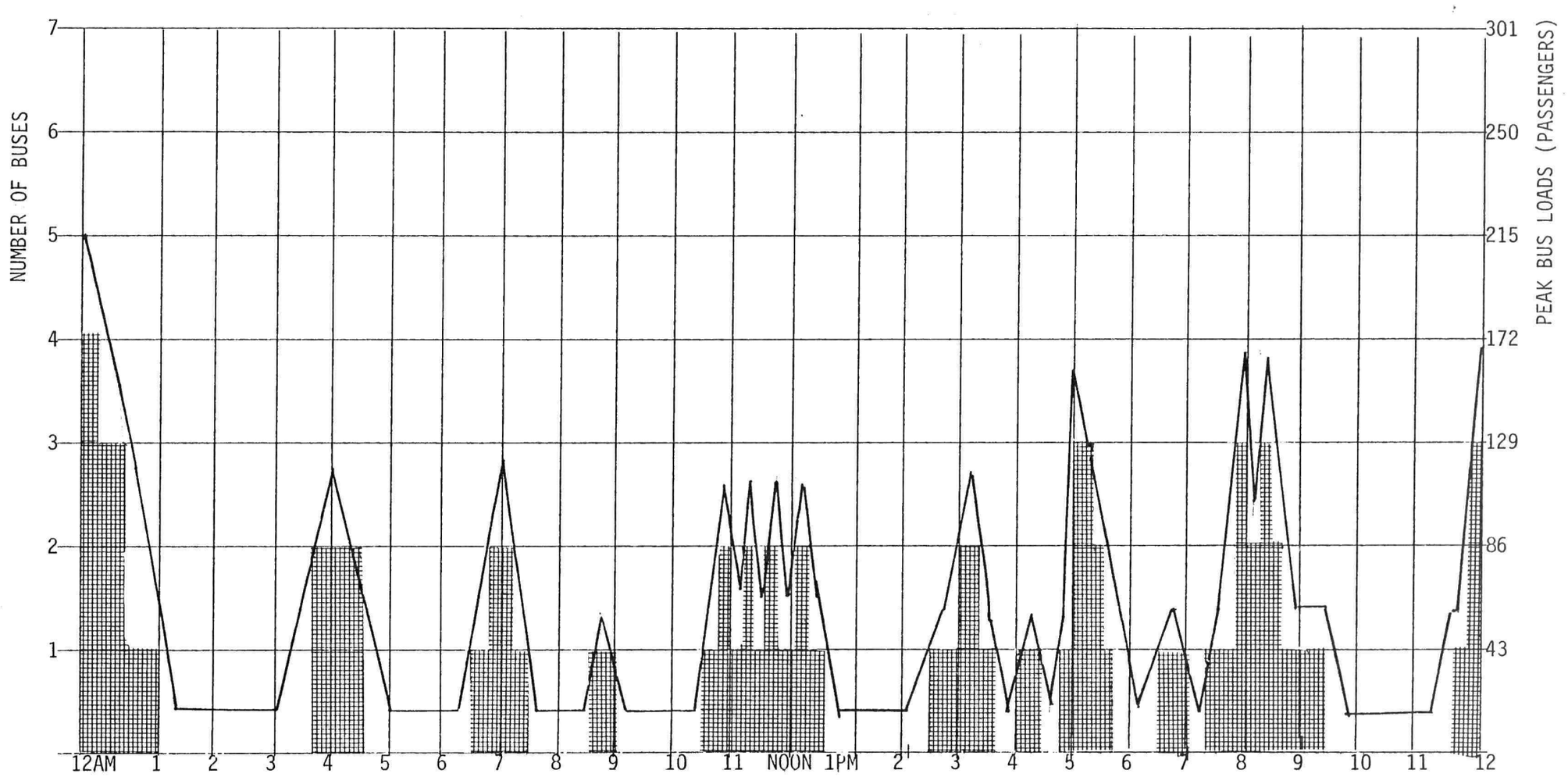
TNM&O Bus Lines

In determining peak conditions caused by intercity bus transportation, things become a bit more complicated than determining loading conditions for AMTRAK service. Through passengers on buses, unlike those on trains, must get off the bus and wait in the station while the bus is being serviced. On the average there are 305 passengers originating and terminating at Lubbock daily, but because of through passengers which must leave the bus, actual utilization of the station would be much higher.

TNM&O has five primary destinations: Clovis; Amarillo; El Paso; San Angelo and Wichita Falls. In addition daily service is provided to and from Morton, Texas. The highest possible peak in service would occur should all of the buses arrive and depart simultaneously which would neccessitate 11 bus bays in the Transportation Center. Although the likelyhood of 11 buses arriving and departing simultaneously would seem rather remote, a quick glance at the current usage distribution shows that it would only take a small change in schedules to produce this situation. Although it is unlikely that TNM&O would initiate such a schedule change on it's own, outside influences such as a need to make connection with non-TNM&O service could prompt this action.

As previously mentioned, the Transportation Center would need eleven bus bays to accomodate peak loading conditions (The current facility has nine bus bays). If an average of 37 passengers is assumed as the normal bus load, this would result in 407 through and departing passengers using the facilities at peak conditions. To this figure must be added originating passengers awaiting to board the bus and persons accompanying departing and arriving passengers. The 305 daily originating and departing passengers is divided by 25 (the number of daily through, originating and terminating buses), an average of 12.2 passengers per bus will originate or terminate at Lubbock.

Peak Terminal Usage TNM&O 1980 - Daily



Source: 1980 TNM&O Schedule

Half of this number would be originating passengers, 6.1 passengers per bus. This number of originating passengers per bus, times eleven (the maximum number of departing buses), results in an additional 67 passengers which must be added to peak loading conditions resulting in a total of 474 passengers at peak loading conditions.

If it is assumed that one person (non-passenger) accompanies each originating and departing passenger, the highest level of simultaneous usage could be expected to be 596 persons.

Citibus

The estimation of peak loads generated by Citibus is extremely difficult due to the fluctuations in bus utilization and insufficient data. To properly estimate the passenger demand on the Transit Center would necessitate a study beyond the scope of this program. An attempt at peak load estimation must be based on the available data and some assumptions.

Perhaps the easiest thing to estimate is the number of bus spaces which would be required for the Citibus facilities. Citibus currently runs fifteen daily bus routes, of which thirteen of them pass over the CBD portion of Broadway. These thirteen routes are, in reality, six different bus runs occurring in each direction, and future bus service projections currently call for a maximum of eight bus runs in each direction. (1:17) Based on this projection, the maximum number of buses which could be expected at the Transit Center would be sixteen. This condition would occur should all buses arrive at approximately the same time, a condition not infrequent in urban transportation systems where service frequency is high. Therefore, Citibus would require eight bus spaces for east-bound routes and an additional eight spaces for the west-bound routes. This number of bus routes operating through the CBD will probably hold true for many years due to the high saturation of routes presently serving the area. Service improvements in the CBD would probably be in the form of more frequent service rather than more routes. Current studies for Citibus route expansion place all new routes outside of the CBD boundaries.

To estimate the passenger loads generated by Citibus on the Transit Center, many assumptions and factors must be considered. In March 1980, Citibus served an average of 3,475 passenger trips daily (2). If one assumes that every person rides the bus twice, to and from the original destination, this means that there was an average of 1,737 passengers daily, a figure representative of 0.91% of Lubbock's population. The three year goal for Citibus is to service 2.5% of Lubbock's population by 1983 (1:142). The D.O.T. has said on many occasions that a gas-rationing/shortage situation would result in 10% of the total population turning to public transportation, and it further forecasts

that 14% of the total population will utilize public transportation in the year 2000 (1:142). These figures are fine for estimation of future tranportation needs but more data is needed to estimate the future demands on the Transit Center.

According to Clyde Shannon, Transit Planner for the City of Lubbock, an estimated 2,200 passengers transfer, originate, or terminate on Broadway between Avenues "K" and "L". This means that approximately 63.3% of all passenger trips involve getting on or off the bus on Broadway. This figure represents the base on which to estimate peak load demands on the Transit Center.

The greatest demand placed on the Transit Center will be those persons waiting for buses and transfer passengers awaiting buses. This figure should be one half of the 63.3% of the passenger trips which transfer, orignate or terminate in the CBD. This results in the following formula which results in the average daily passengers using the facility:

$$\text{Average Daily Pass. @Transit Center} = (\text{Service Level})(\text{Population})(.6331)(2)$$

To determine the peakloads, some assumptions must be made. Assume that 60% of all passenger trips occur during the rush hour period and that the rush hour period is 2.5 hours long. This 2.5 hour perid is divided by two, assuming that the rush hour periods are evenly divided between the morning and afternoon rush periods.

Another variable which must be considered is the service frequency. Present service frequencey is two buses/hour, and future plans will raise this figure to three buses/hour. In determining the service frequency at some time "X" in the future when the service level approaches 10%, some frequency must be selected that will not load the bus at more than 63.3% (the percentage originating or terminating downtown) so that the system will not be overloaded. The final formula for determing the peak passenger load evolves into the following:

$$\text{Peak Pass. Load @ Trans. Center} = \frac{(\text{Service Level})(\text{Population})(.6331)(.6)(.2)}{(2)(2.5\ \text{hours})(\text{Frequency/Hour})}$$

Which results in the following estimations of passenger loads:

Passenger Load Projections

*Denotes year 2000 est.

	1980 Level	1983 Level	X Level
Service Level	0.0091	0.025	0.10
City Pop.	190,100	213,800	235,000*
CBD Passenger -Trips/Day	2,190	6,767	29,755
Peak Passenger -Trips/Hour	263	812	3,570
Service Freq.	2Buses/Hour	3Buses/Hour	10Buses/Hour
Peak Pass. @ Transit Center	131 Pass/Hr	270 Pass/Hr	357 Pass/Hr

From this data it would seem that as the level of service frequency increases, the peak demand at the Transit Center would also increase. This is not the case, for after closer examination the maximum peak which could occur at the facility will occur as a function of the service frequency, the number of persons originating and terminating at the facility, bus capacity and the maximum number of buses which could be serviced by facility simultaneously. Therefore:

$$\text{Peak Demand} = \frac{(63.31\%)(\text{Bus Capacity})(\text{Maximum No. Buses})}{100}$$

Since the maximum number of buses which could be serviced by the facility at one time would be eighteen buses and the present and future bus capacities are 21 and 37 passengers respectivelly, it is now a simple matter to determine the actual peak loading conditions. The 1980 projections utilizing the 21 passenger bus would result in a peak load of 353 passengers. After 1982, when the 37 passenger buses will go into operation, the peak demand would be raised to 421 passengers using the facility simultaneously. These figures would hold true no matter what the future service frequency would be. If, for example, Citibus was successful of attaining it's 1983 service level goal of 2.5% of the Lubbock population but could only provide a service frequency of two buses/hour/route, the peak demand generated at the Transit Center would be 406 passengers per hour. Therefore, this peak demand load of 421 passengers doesn't seem all that unreasonable.

AS far as the actual spaces which would be required by Citibus patrons, it would be unpractical to provide them with a waiting room, since the majority of the passengers would be waiting for their bus for a period less than fifteen minutes. It would be more practical to have the Citibus patrons wait in a concourse area shared by TNM&O patrons, resulting in a more efficient usage of this area. If this is not possible for some reason, Citibus patrons should be provided with a sheltered bus platform to protect them from the weather elements as they wait for their buses.

SPACE DESIGNATION - ACTIVITIES CORRELATION

Shared Areas

1. Waiting Room

User Activities: Sitting, walking, reading, conversation sleeping, eating, drinking, playing, smoking, killing time.

Operator Activities: Maintenance, observation of area, security.

2. Concourse Area

User Activities: Standing, sitting, conversation, smoking.

Operator Activities: Crowd control, ticket collection, security.

3. Ticket Counter

User Activities: Orientation, standing, conversation, baggage handling.

Operator Activities: Ticket sales, conversation, writing, standing, sitting, observation, security.

4. Information

User Activities: Orientation, standing, conversation.

Operator Activities: Conversation, phones, standing, sitting.

5. Food Service

User Activities: Eating, sitting, conversation, reading, killing time.

Operator Activities: Food preparation, clean-up, eating, conversation, sales.

6. Concessions

User Activities: Purchases, browsing, walking, killing time, conversation.

Operator Activities: Sales, security, conversation.

7. News Stand

User Activities: Purchases, browsing, walking, killing time, conversation.

Operator Activities: Sales, security, conversation.

8. Vending

User Activities: Eating, standing, sitting, conversation, purchases, killing time.

Operator Activities: Service and stocking.

9. Phone Area

User Activities: Conversation, standing, sitting.

Operator Activities: Service.

SPACE DESIGNATION-ACTIVITIES
CORRELATION
(Continued)

10. Rest Rooms

User Activities: Clean and freshen up, the obvious, clothes changing.

Operator Activities: The obvious.

11. First Aid Area

User Activities: Life and death emergencies, minor injuries, illnesses, waiting, rapid access, privacy.

Operator Activities: First aid administration, passenger aid.

12. Mobility Assistance

User Activities: Communications, persons in wheel chairs, those on crutches, orientation, information, visual and hearing assistance.

Operator Activities: Physical assistance, information, communications skills, phones.

13. Baggage Room

User Activities: Leave and pick up luggage, waiting, standing, conversation.

13. Baggage Room
(Continued)

Operator Activities: Transfer of baggage from user to operator, baggage insurance, storage, organization.

14. Express Room

User Activities: Leave and pick up packages, information, purchase of service conversation, standing.

Operator Activities: Transfer of packages from customer to operator, storage, fill out forms, organization and sorting of packages, phones.

15. Safety and Claims

User Activities: Venting anger and frustration, information, conversation, standing, sitting, pick up of baggage and lost articles.

Operator Activities: Dealing with dissatisfied customers, paper work, phones, waiting, luggage and article storage.

16. Luggage Lockers

User Activities: Handling and storage of baggage, purchase of service.

Operator Activities: Maintenance, locker inspection, lost keys.

SPACE DESIGNATION-ACTIVITIES
CORRELATION
(Continued)

17. Station Manager Office

User Activities: Information assistance, complaints.

Operator Activities: Coordination of facility activities, office work, security and station safety.

18. Car Rental Counter

User Activities: Information, payment of bills, filling forms, key pick up, standing, conversation.

Operator Activities: Storage of rental cars, security.

19. Car Rental Pick up-Drop off

User Activities: Exit station and pick up car, city orientation, pick up car, enter station and make payment.

Operator Activities: Storage of rental cars, security.

20. Kiss'N'Ride Area

User Activities: Pick up or drop off passenger from automobile, exit facility or enter short or long term parking. Baggage handling.

Operator Activities: Maintain safety and security, non-toll area.

21. Short Term Parking

User Activities: Enter or exit facility, park car for periods less than 24 hours, pick up parking ticket, pay parking fee, station and city orientation.

Operator Activities: Maintain safety and security, collection of parking fees, issue parking tickets.

22. Long Term Parking

User Activities: Enter or exit facility, park cars for periods greater than 24 hours, pay parking fee, pick up parking ticket, station and city orientation.

Operator Activities: Maintain safety and security, collection of parking fees, issue parking tickets.

23. Storage/Stock Rooms

User Activities: None

Operator Activities: Storage of misc., supplies.

SPACE DESIGNATION-ACTIVITIES
CORRELATION
(Continued)

24. Facilities Maintenance

User Activities: None

Operator Activities: Janitorial work, storage of janitorial supplies, minor tool area for some building repairs, storage of landscaping maintenance equipment.

25. Mechanical Room(s)

User Activities: None

Operator Activities: Service and maintain facilities physical plant.

26. Staff Parking

User Activities: None

Operator Activities: Staff entrance and exit from facility.

27. Service Entrance

User Activities: None

Operator Activites: Material handling, goods deliveries.

28. Waste Disposal

User Activities: None

Operator Activities: Refuse storage and handling.

TNM&O

1. Tours Office

User Activities: Information, conversation, sitting, paperwork, purchase of service.

Operator Activities: Dispense information, sitting, paperwork, phoning, collection of payments.

2. Ticket Stockroom

User Activities: None

Operator Activities: Security and storage, inventory control.

3. Conference Room

User Activities: Little

Operator Activites: Work conferences and discussions, transfer of information both video and audio, sitting, conversation.

SPACE DESIGNATION-ACTIVITIES CORRELATION (Continued)

3. General Office

User Activity: None

Operator Activity: Phone purchasing of supplies and materials, record keeping, typing, filing and conversation.

4. Auditor's Office

User Activity: None

Operator Activity: Accounting and book keeping of Company cashflow, paperwork, typing, filing, security of essential records, phoning, sitting, conversation.

5. Auditor-Revenue Acc'ts

User Activity: None

Operator Activity: Accounting and book keeping, paperwork, typing, filing, security of essential records, phoning, sitting, conversation.

6. Cashier's Office

User Activity: None

Operator Activity: Reciept of cash, issuance of payments, security of funds, paperwork, record keeping, sitting, phoning, conversation.

7. Traffic Manager's Office

User Activities: None

Operator Activities: Planning of schedules, maintenance, rolling stock, driver supervision, typing, filing, conversation, record keeping.

8. President & General Manager's Office

User Activities: Interview Activities

Operator Activities: Administration, paperwork, planning, interviews and public relations, small meetings, standing, sitting, conversation, reading, phoning.

9. Receptionist

User Activity: Some information seeking, waiting.

Operator Activity: Secretarial functions for President, filing, typing, greets visitors, standing, sitting, conversation, phoning.

10. Controller's Office

User Activity: None

Operator Activity: Reading, paperwork, phoning, filing, sitting, conversation, phoning.

11. Stockroom

User Activity: None
Operator Activity: Storage of office supplies.

SPACE DESIGNATION-ACTIVITIES CORRELATION (Continued)

12. Driver's Lounge

User Activities: None

Operator Activities: Change clothes, wash up, relaxation, eating, coffee drinking, smoking, paperwork, conversation.

13. Bus Docks

User Activities; Get on and of buses, travel between bus and terminal area, some baggage handling.

Operator Activities: Transfer of materials from bus and terminal facilities, control of bus access, security control for passenger and baggage safety and security.

Citibus

1. Office for Special Programs

User Activities: Seek information, conversation, standing, sitting, paperwork, recieve special passes, pictures taken.

User Activities; Photos for passes, make passes, give information and assistance, standing, sitting, typing, paperwork, conversation, phoning.

AMTRAK Facilities

1. Station Manager's Office

User Activities: Information seeking, job interviews.

Operator Activities: Coordination of AMTRAK ticket agents, train service, train and passenger safety, and supervision of all AMTRAK employees, public relations, interviews, standing, sitting, waiting, conversation, typing, filing, phoning.

2. Train Platforms

User Activities; Boarding and alighting from the trains, baggage handling.

Operator Activities: Service and baggage access, inspection of trains, clean up of terminating or originating trains, maintain passenger and materials safety and security.

3. Car Loading Platform

User Activities: Drop off car and enter station, pick up car and depart from Transit Center

Operator Activities: Load and unload automobiles to and from rail cars, maintain vehicle and passenger safety and security.

SPACE DESIGNATION-ACTIVITIES

CORRELATION
(Continued)

4. Communications Room

User Activity: Possible group tours ?

Operator Activities: Communications between Transit Center and trains and railroad facilities, direct communications with inspectors and service operators, sitting, conversations, phoning, radio-phone and walkie-talkie communications, paperwork.

5. Crew Room

User Activities: None

Operator Activities: Relaxation, visual check with station authorities, filing reports.

6. Train Service Department

User Activities: None

Operator Activities: Storage of goods and foodstuffs for on-train consumption, simple train repairs, storage of tools and "mules" or other material handling devices.

FUNCTIONAL RELATIONSHIPS

FUNCTION/PROPERTY / SPATIAL DESIGNATION	1. Waiting Room	2. Concourse	3. Ticket Counter	4. Information	5. Food Service	6. Concessions	7. News Stand	8. Vending Area	9. Phone Area	10. Rest Rooms	11. First Aid Area	12. Mobility Assist.	13. Baggage Room	14. Express Room	15. Safety & Claims	16. Luggage Lockers	17. Station Manager	18. Car Rental Area	19. "Kiss 'n Ride" Area	20. Short Term Parking	21. Long Term Parking	22. Storage/Stockrooms	23. Facilities Maint.	24. Mechanical Room(s)	TNM&O FACILITIES	1. Tours Office	2. Ticket Stockroom	3. Conference Room
A. PUBLIC ACCESS	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●					●		○
B. CONTROLLED ACCESS													●	●								●	●	●			●	
C. MONEY HANDLING			●	●	●	●	●	●	●					●		●		●		●	●					●		
D. INFORMATION			●						○			●	○	●	●		○	●								●		
E. ADMINISTRATION																	●											●
F. SUPPORT FACILITIES																						●	●	●			○	
G. REVENUE PRODUCING			●	○	●	●	●	●	●				○	○		●		●		●	●					●	●	●
H. JOINT USAGE POSS.	●	●		○	●	●	●	●	●	●	●	●				●		●	●	●	●	○	●	●				
I. EXTERIOR ACCESS	●	●			●	○	○				●	○	●	●				○	●	●	●	○	●	●				
J. ORIENTATION	●	●	●	●								●							●	●	●							
K. BAGGAGE/MATERIAL HANDLING	●	●	●		○	○	○	○				○	●	●	○	●			○	○	○							
L. SAFETY PROBLEM																			○	●	●		○	○				
M. SECURITY PROBLEM	●	●	●		○	○	○	○	○	○			●	●	○	○	○			○	○	○	○	○		○	●	

FUNCTIONAL RELATIONSHIPS
(Continued)

	TNM&O FACILITIES (Continued)	4. Auditor	5. Auditor Rev. Accts	6. Cashier's Office	7. Traffic Manager	8. President	9. Receptionist	10. Controller	11. Stockroom	12. Driver's Lounge	13. Bus Docks	CITIBUS FACILITIES	1. Special Programs	2. Bus Docks	AMTRAK FACILITIES	1. Amtrak Sta. M'gr.	2. Train Platforms	3. Car Loading Platforms	4. Communications	5. Crew Room	6. Train Service
A. PUBLIC ACCESS					○	○	○				●		●	●		●	○				
B. CONTROLLED ACCESS									●								○	●	●	●	●
C. MONEY HANDLING				●									○								
D. INFORMATION																					
E. ADMINISTRATION		●	●	●	●	●	●	●					●			●			●	●	
F. SUPPORT FACILITIES									●		●			●			●	●	●	●	●
G. REVENUE PRODUCING		●	●	●	●	●	●	●	●	●			○			●			●	●	●
H. JOINT USAGE POSS.											●			●			●	○	○		
I. EXTERIOR ACCESS											●			●			●	●	○	●	●
J. ORIENTATION											●		○	●			●				
K. BAGGAGE/MATERIAL HANDLING											●						●				●
L. SAFETY PROBLEM											●			●			●	●			●
M. SECURITY PROBLEM		○	○	●	○	○	○	○	○		●		○	●		○	○	●	○	○	●

SQUARE FOOTAGE ALLOTMENTS

The total peak load which could be expected at the Transit Center would be approximately 1,304 passengers, which must be accomodated in the public areas of the facility. The Uniform Building Code stipulates that fifteen square feet per occupant must be provided for in assembly areas, which is the classification of most of the public oriented areas of the Transit Center. However, as much as fifty square feet per occupant must be provided for in retail areas above grade and thirty square feet per occupant are required at retail areas located on the ground level.

Assuming that the concession areas are located on the ground floor and function primarily as retail areas, and accomodate 15% of the total public area, an initial space allotment of 5,868 square feet would be required for the concessions area. The remainder of the public areas would require 16,626 square feet to accomodate the remainder of the occupant load based upon the UBC requirement of fifteen square feet per occupant. This results in a total of 22,494 square feet to support the public areas of the Transit Center. These figures are only preliminary estimates as the concessions area is a major revenue producer for the facility and a change in these square footage estimates may be needed to make the project cost feasible.

Non-Retail Public Areas		
AMTRAK Waiting Area		
TNM&O Waiting Area		
Citibus Queueing Area		
Concourse Areas	(.85)(1304 persons)(15 sq. ft./person)	
Restroom Areas		
Phone Area		
Luggage Locker Area		
Subtotal		16,626 sq. feet
Retail Oriented Public Areas		
Food Service Areas		
Concessions	(.15)(1304 persons)(30 sq. ft./person)	
News Stand(s)		
Subtotal		5,868 sq. feet
TOTAL SQ. FOOTAGE IN PUBLIC AREAS		22,494 sq. feet

Counter Stations

The counter stations form the link between the public and the administrative portions of the facility but are more public oriented than administrative oriented. Sixty square feet per counter station should be adequate to meet the area requirements for the typical counter station. The First Aid/ Mobility Assistance Counter is included in this category but it will require 200 sq. feet rather than sixty sq. feet.

Counter Stations	Qty.	Sq. Footage
AMTRAK Ticket Counter	3	180 sq. ft.
AMTRAK Information	1	60 sq. ft.
TNM&O Ticket Counter	4	240 sq. ft.
TNM&O Information	1	60 sq. ft.
Citibus Ticket/Info.	2	120 sq. ft.
First Aid/Mobility Assist.	1	200 sq. ft.
Car Rental Counter	2	120 sq. ft.
TOTAL COUNTER SQUARE FOOTAGE		980 sq. ft.

Administrative and Offices

The Uniform Building Code's recommended square footage allowance for office spaces is 100 square feet per office occupant. With this guideline it is fairly simple to determine the square footage requirements for the administrative and office areas of the Transit Center.

There are several offices which do not conform to the UBC guideline. These areas include the TNM&O President, Traffic Manager and Receptionist, which exceed the guideline due to their more prestigious natures. Also, an allotment of fifteen square feet per occupant was used for the twentyfive occupant TNM&O Conference Room.

Office Area	No. Occupants	Sq. Footage
Traffic Manager (TNM&O)*	1 Person	200 sq. ft.
Station Manager	3 Persons	300 sq. ft.
Security Station	2 Persons	200 sq. ft.
Safety and Claims	2 Persons	200 sq. ft.
Tours Office (TNM&O)	3 Persons	300 sq. ft.
Conference Room (TNM&O)*	25 Persons	375 sq. ft.
General Office (TNM&O)	11 Persons	1100 sq. ft.
Auditor's Office (TNM&O)	1 Persons	100 sq. ft.
Auditor-Rev. Accounts (TNM&O)	1 Person	100 sq. ft.
President's Office (TNM&O)*	1 Persons	300 sq. ft.
Receptionist (TNM&O)*	1 Person	150 sq. ft.
Controller (TNM&O)	1 Persons	100 sq. ft.
Citibus - Special Programs	2 Persons	200 sq. ft.
Passenger Agent (AMTRAK)	3 Persons	300 sq. ft.
Office (AMTRAK)	2 Persons	200 sq. ft.
Communications (AMTRAK)	1 Person	100 sq. ft.
TOTAL OFFICE SQUARE FOOTAGE		4,375 sq. ft.

*Denotes those areas which do not adhere to the recommended guideline of 100 square feet per occupant.

Miscellaneous Areas

A general rule of thumb used in the sizing of baggage rooms is to allow 10% of the area dedicated to public functions as a babbage area. The Transit Center has 22,494 square feet of public area and this results in 2,250 square feet of baggage rooms for both AMTRAK and TNM&O. Since AMTRAK occupies approximately one third of the public areas, the AMTRAK baggage room should be 750 square feet. TNM&O, which occupies the remaining two thirds would require a baggage room of 1500 square feet. The TNM&O Express Room should occupy approximately 800 square feet, the size of the existing facility.

Miscellaneous Areas	Sq. Footage
Baggage Room (AMTRAK)	750 sq. ft.
Baggage Room (TNM&O)	1500 sq. ft.
Express Room (TNM&O)	800 sq. ft.
Ticket Stockroom (TNM&O)	80 sq. ft.
Stockroom (TNM&O)	80 sq. ft.
Stockroom (AMTRAK)	100 sq. ft.
Stockroom (Citibus)	100 sq. ft.
Driver's Lounge (TNM&O)	150 sq. ft.
Crew Room (AMTRAK)	100 sq. ft.
Train Service (AMTRAK)	750 sq. ft.
Misc. Storage & Stock	500 sq. ft.
Facilities Maintenance	400 sq. ft.
Waste Disposal	300 sq. ft.
Janitor's Closets (X3)	240 sq. ft.
TOTAL SQUARE FOOTAGE MISC. AREAS	5,800 sq. ft.

Exterior Areas

Transit facilities by their very nature have a tendancy to require large amounts of exterior areas, which often dwarve the areas needed for the interior spaces.
The dimensions of the vehicles usually dictate the size of these exterior spaces, and vehicles such as trains and buses will require huge amounts of space due to their size. For automobile parking, ten feet by twenty feet plus 50% for circulation is required for each parking space. This results in a total of 325 square feet for each parking space. Buses will require an area of eleven feet by forty feet plus 50% for circulation for each bus berth, resulting in an area of 660 square feet per bus berth. The train platforms will require an area of fourteen feet by six-hundred and eighty feet per platform, resulting in an area of 9,520 square feet per platform.

Exterior Areas	No. Required	Sq. Footage
Short Term Parking	165 Spaces	53,625 sq. ft.
Long Term Parking	100 Spaces	32,500 sq. ft.
Kiss 'n Park Area	10 Spaces	3,250 sq. ft.
Car Rental Drop-off	10 Spaces	3,250 sq. ft.
Bus Berths	27 Spaces	17,820 sq. ft.
Train Platforms	3 Spaces	28,560 sq. ft.
Car-loading Platform	1 Space	4,760 sq. ft.
Staff Parking	60 Spaces	18,000 sq. ft.
TOTAL EXTERIOR SPACES		161,765 sq. ft.

Summary of Square Footages

Interior Spaces	Sq. Footage
Non-Retail Public Areas	16,626 sq. ft.
Retail Public Areas	5,868 sq. ft.
Counter Stations	980 sq. ft.
Office Areas	4,375 sq. ft.
Miscellaneous Areas	5,800 sq. ft.
TOTAL NET SQUARE FOOTAGE	32,639 sq. ft.
Mechanical Space @ 8% net	3,091 sq. ft.
+ 20% Circulation, etc.	6,528 sq. ft.
TOTAL GROSS SQUARE FOOTAGE	42,258 sq. ft.

Exterior Spaces	Sq. Footage
Automobile Parking	110,625 sq. ft.
Bus Berths	17,820 sq. ft.
Train Platforms	33,320 sq. ft.
GROSS SQUARE FOOTAGE EXTERIOR SPACES	161,765 sq. ft.
TOTAL DEVELOPMENT SQUARE FOOTAGE	204,023 SQ. FT.

LIST OF REFERNCES

(In Order of Usage)

1. Transit Department; CITIBUS Technical Study; City of Lubbock Texas; September, 1979.

2. Interview with Clyde Shannon, Transit Planner, City of Lubbock, Spring 1980.

SITE SELECTION PROCEDURE

The location of the Transit Center is very critical to the successful integration of the various transportation modes. A preliminary site selection was the present location of the Santa Fe Railroad Freight Terminal and the old Santa Fe Passenger Terminal. Through the course of this study it has been recognized that the financial situation of railroads today is very delicate. By locating the Transit Center where the present Freight Terminal is located, the relationship between railroad freight and the associated warehousing facilities would be broken, jeopardizing both Santa Fe Railroad and the warehouse owners. It would probably be beneficial if the Transit Center worked in conjunction with the Santa Fe Freight Terminal rather than against it, creating a true Transportation District downtown.

Selection of a new site began with the designation of a site target area, located roughly from 8th Street to 14th Street and within an area 300 feet west of the Santa Fe Railroad right of way. Through the course of this program, the following criteria became the basis of the new site location:

1. Within 5 minute walking distance from the "heart" of the CBD.
2. Adjacency with existing Citibus routes.
3. Within 5 minutes driving distance from TNM&O's Maintenance Facility at 14th and "L".
4. Adjacency to railroad lines.
5. Land vacancy or availability.

A map study showed that no portion of the target area fell within a five minute walking distance from the "heart" of the CBD, so that area within the area of the nearest CBD Heart-Rail adjacency was used as a new criterion for site selection.

Only two relatively small areas were found to meet all five of the selection criteria. These were located within Blocks 139 and 132 of the target area. Substantial portions of Blocks 121,122,138 and 139 were found to meet four criteria as well as the portion of Broadway between Blocks 122 and 139. Many areas scored on three criteria but lacked the essential rail adjacency criteria.

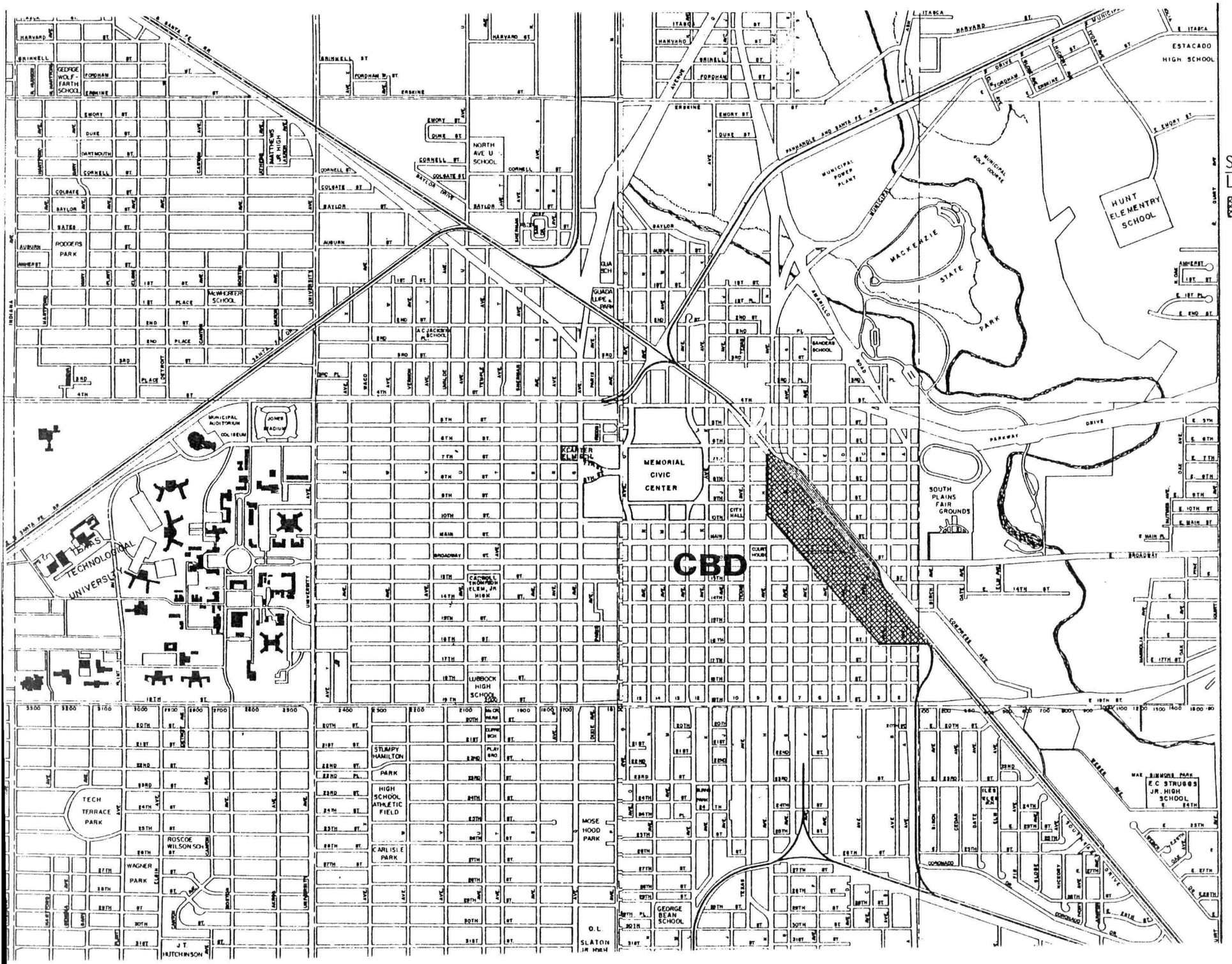
It was estimated that the total required square footage for the Transit Center would be approximately 158,000 square feet. If an additional 50% is added for exterior development the land required for the facility would be approximately 238,000 square feet. Another deciding factor in the selection of the site would be the extreme length of the train platforms. The typical AMTRAK long

distance train consists of eight cars, an average of 85 feet in length. Therefore, train platforms would be a minimum of 680 feet in length.

Using the above data as additional site selection criteria, the best possible location for the Transit Center would involve the purchase of Block 138,139, Lots 6 through 14 of Block 122 and the purchase of Santa Fe Railroad Right of Way shown in the map. This would require the purchase of 227,050 square feet of land, not including existing City right of ways which would bring the entire area up to approximately 280,000 square feet, meeting the minimum land requirements for the Transit Center. It would also provide almost exactly 680 feet fronting the rail line meeting the requirements for train platform length. An option to buy up to an additional 38,000 square feet of Santa Fe Right of Way may be excercised should the platform lengths and rail routing become too tight.

In addition, the site location would make possible the exploitation of air rights over Broadway for design development.

SITE ANALYSIS

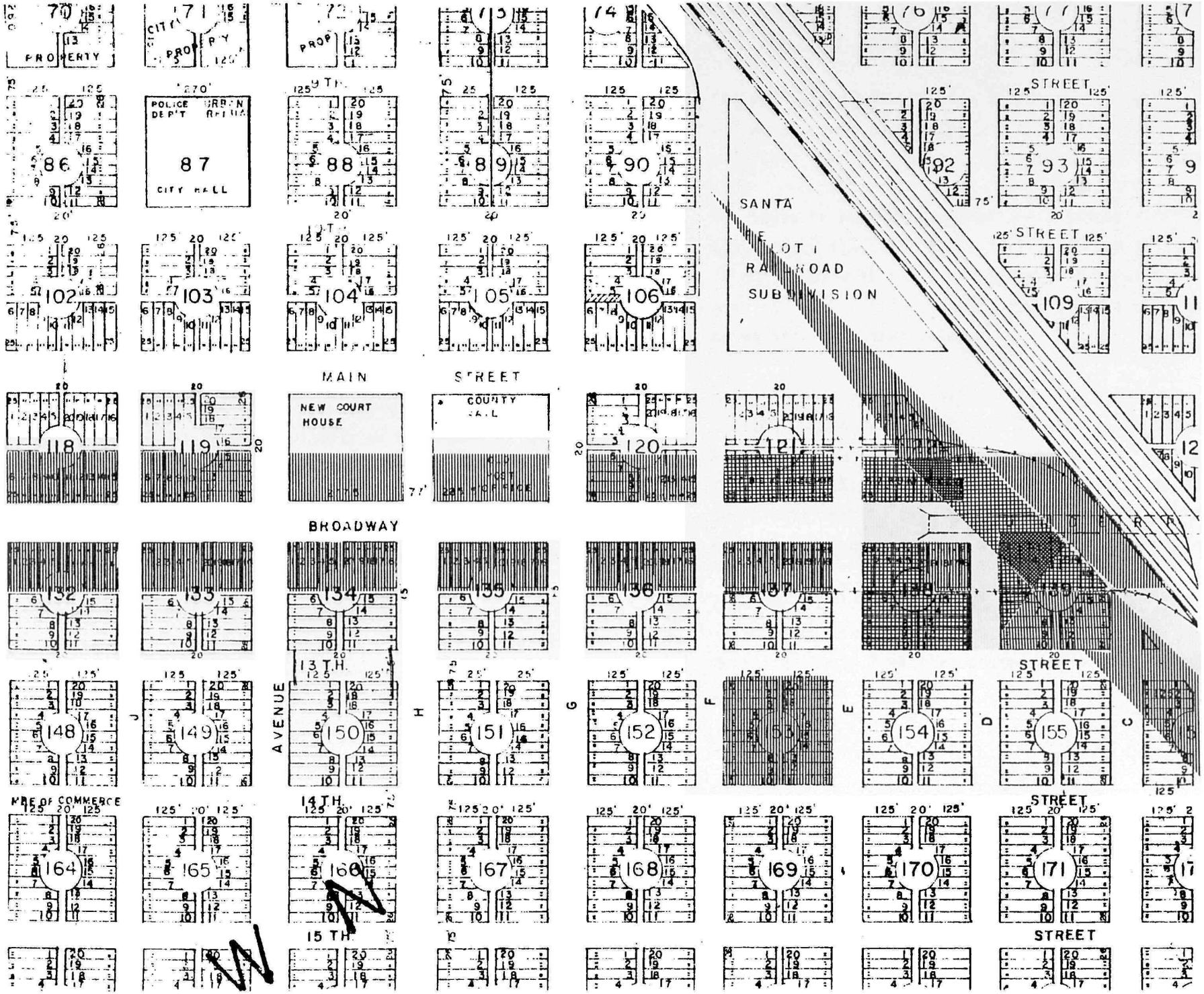


Site Selection Legend:

Site Target Area

1" = 2000'-0"

SITE ANALYSIS



Site Selection

Legend:

- Score = 5
- Score = 4
- Score = 3

1" = 300'

Final Site Selection

Legend:

Final Site Location

1" = 300'

EXISTING SITE CONDITIONS

Area Context

The site is located on the edge of a depressed, basically undeveloped sector of the City. Typical of most city areas which vorder railroad right of ways, much of the surrounding activities are manufacturing and warehousing concerns. A large portion of the land to the south and west of the site are almost totally vacant. The majority of existing structures in this area are delapidated and beyond repair. Given the proximity of the heart of the Business District (the County and Federal Courthouses are four blocks west of the site), future development of this area should occur, with the Transit Center functioning as a stimulus and activity node for this future development.

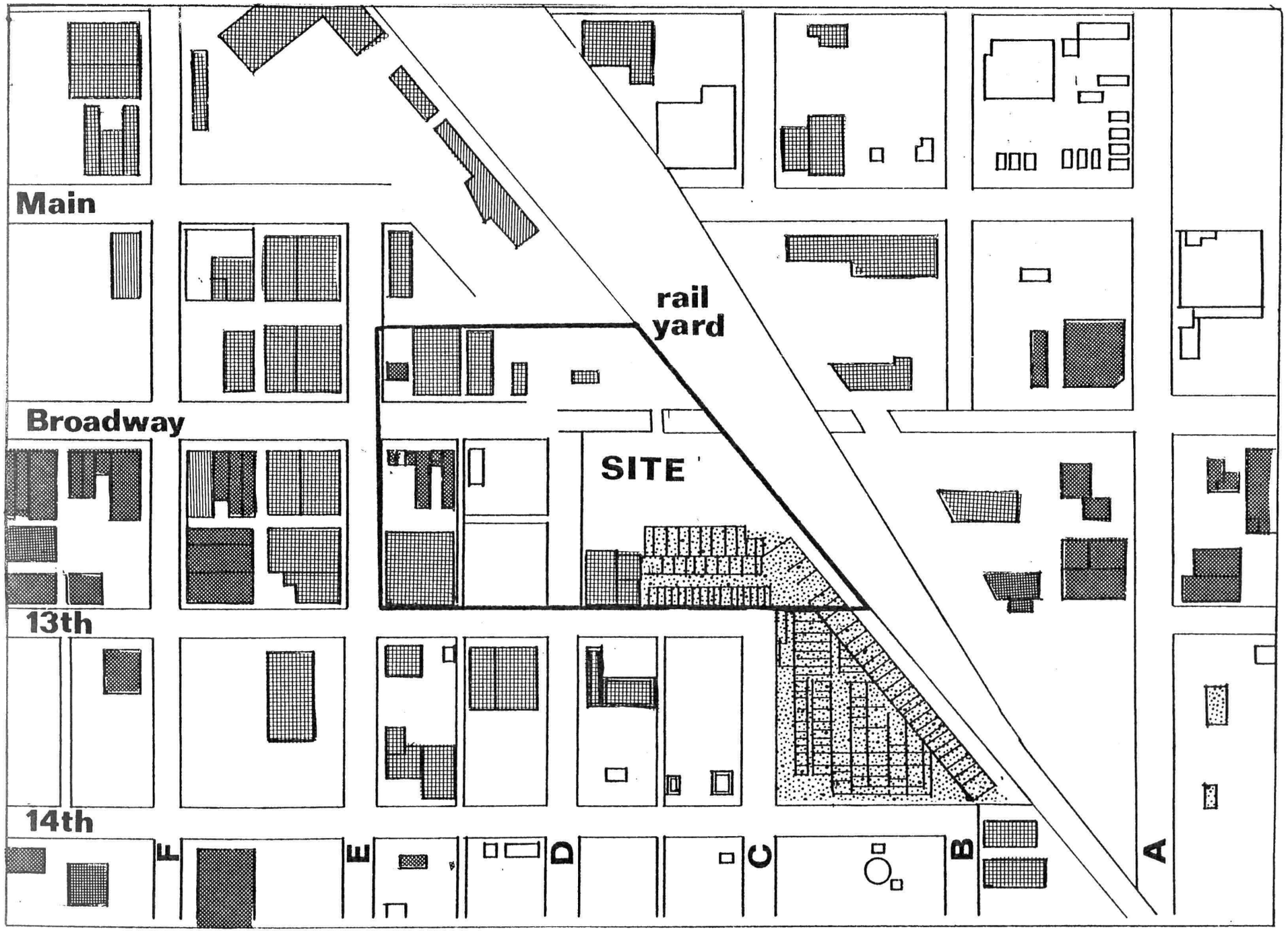
The most significant land use adjacent to the site is of course the Santa Fe Railyard which can be considered as a point of interest or an eyesore, depending upon individual tastes. Regardless of a person's visual point of view, the railyard is a definite source of loud noise. The unexpected and sudden noise caused by freight cars slamming together is enough to make most people jump if caught unaware.

The railyard also acts as a boundary. It restricts the eastward growth of the CBD and the Broadway/Railyard underpass functions as a gateway in and out of the CBD.

The Santa Fe Freight Terminal and Engineer's Office are adjacent to the site on the north. Though this facility is concerned with the transferrance of materials, but even so, the facility is well maintained and is not a point of visual irritation.

Other significant activities occurring around the site are the Lighthouse for the Blind, and the Department of Public Welfare, located on opposite corners of Avenue "F" and Main Street. The new County Jail is located two blocks west of the project site, and the County and Federal Court Houses are four blocks west of the site.

The County Fair Grounds are located just three blocks east of the site, and the major park in the City, Mackenzie State Park, is located adjacent to the Fair Grounds.

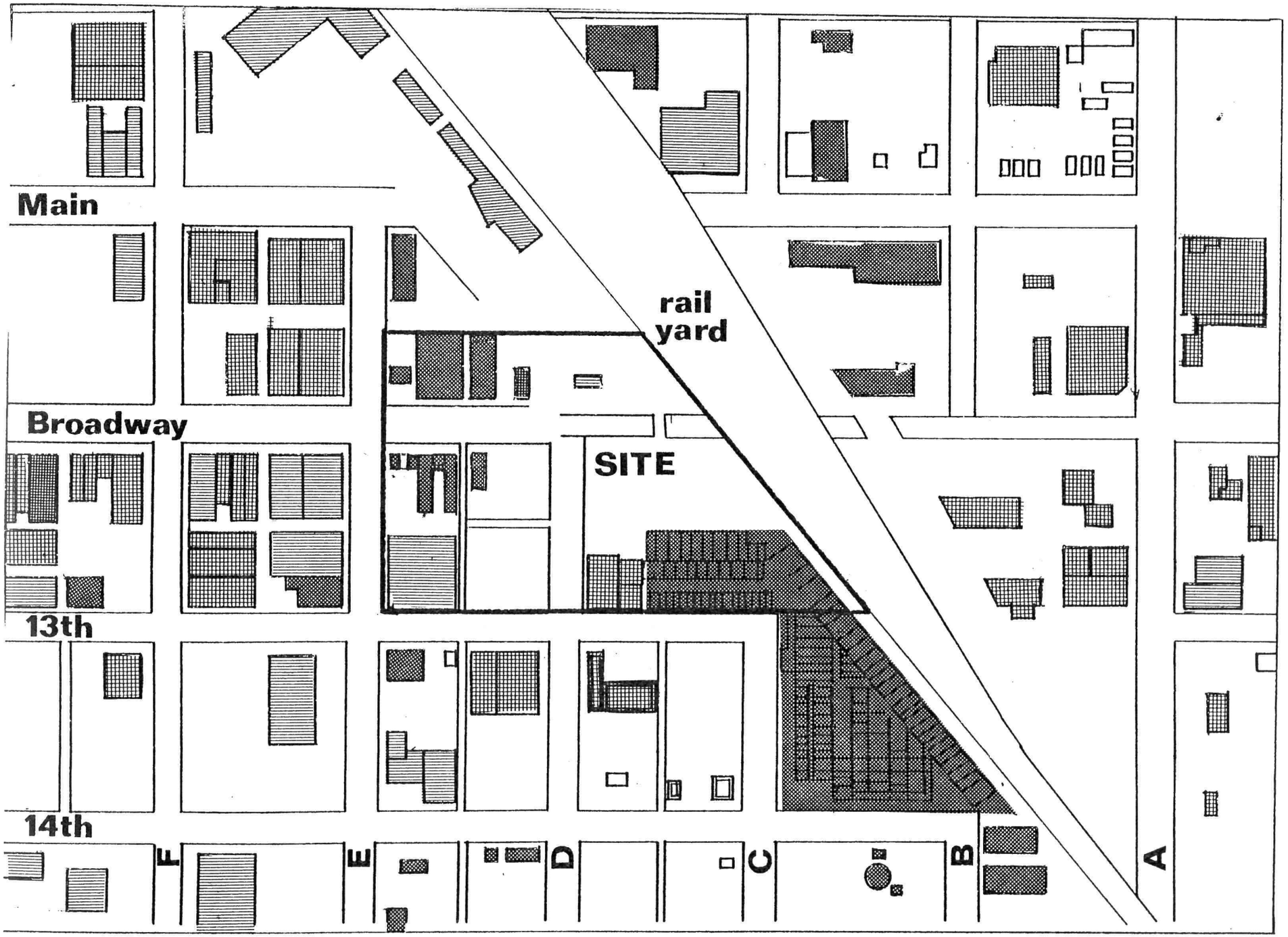


AREA CONTEXT:
Existing Building
Usage

LEGEND:

- OFFICE
- WAREHOUSE
- RETAIL
- AGRICULTURAL

1' = 200'



AREA CONTEXT:
Existing Building
Conditions

LEGEND:

GOOD

FAIR

POOR/DELAPIDATED

1' = 200'

Significant Features

The most important man-made feature of the site is the Broadway/Railyard underpass. The underpass was constructed in 1928 by the Santa Fe Railroad. Expansion of the underpass will become necessary should the Avenue "A" Expressway be constructed. A copy of the underpass drawings is on file at the State Highway Department, but they are too old and brittle to make a photocopy of them. In addition to the railyard overpass, there is an automobile/truck overpass which serves no apparent function today.

The most costly facility on the site is the Sun Lines Warehouse, located on the southwest corner of 13th Street and Avenue "E". It is a fairly new facility, constructed within the past 15 years and is approximately 35,000 square feet in area.

Four small buildings in various states of disrepair front Broadway on the south and currently function as storage facilities for a salvage company. Located on the northeastern corner of 13th Street and Avenue "D" is an old cinder block building which is presently occupied by a small business and immediately to the east of this building is a delapidated stockyard.

On the northern side of Broadway is a small 12footx20foot cinder block garage owned by Santa Fe and two large and very delapidated warehouses which are presently vacant. A small used furniture store is located on the northeast corner of Broadway and Avenue "E".

Additional man-made features include a rail siding which services the vacant warehouses north of Broadway, an additional rail siding is indicated on all city maps on the southside of Broadway, but is no longer in place. A stretch of utility lines runs along the present boundary of the Santa Fe R.O.W. and two light poles are located opposite each other along the sides of the underpass.

The only significant natural feature of the site are some elm trees, located for the most part on the southside of Broadway. Usually, any trees appearing on a site should be preserved if at all possible, but the appearance of Dutch Elm Disease in Lubbock has caused elm trees to be useless as far as future development is concerned. There is practically no existing ground cover on the site except for a few weeds.

Feature	Sq.Footage/Cond.	Action
Sunlines Warehouse	35,000/Good	Demolish
Building Salvage	11,000/Good to poor	Demolish
White Cinderblock Bldg.	10,000/Good	Demolish
Garage Building	2,400/Good	Demolish
2 Warehouses	17,600/Poor	Demolish
Used Furniture	2,000/Poor	Demolish
Rail siding	---	Remove
Elm trees	---	Replace
Underpass	---	Expand to Four Lanes
Utility Lines	---	Relocate
Light poles	---	Relocate

Sensory Data

Noise

A great deal of noise is generated in the areas adjacent to the site. Railyard activity and passing trains to the east of the site is the major noise generator in the area. This activity continues through most hours of the day, though the majority of the railyard activity will occur during daylight hours.

The noise generated by trucks serving the Freight Terminal and the surrounding warehousing activities will generate a substantial amount of noise during the business hours primarily.

Traffic noise along Broadway, especially in the underpass where the noise is reflected off the underpass walls, will generate noise 24 hours a day, although the majority of this noise will be generated during rush hour traffic.

Smell

There are no major sources of smell in the area. Occasionally, fumes can be detected from passing trains. No smell is readily apparent from automobile traffic along Broadway except for passing diesel powered vehicles. Carbon monoxide and other emissions may have a tendancy to collect in the lower level of the underpass, but the underpass is not of sufficient length to cut off air curculation, so this is a small problem.

Views

In general, views are very restricted in the site area. Long trains of freight cars in the railyard restrict all views east of the site, and the presence of freight cars

would not be viewed as a positive view by most persons. A delapidated grain elevator is located southeast of the site as well as a portion of the stockyard not located within the site boundaries. These elements will hopefully be removed soon if the Transit Center stimulates growth in it's immediate vicinity.

On the north side of the site is the Santa Fe Freight terminal, hardly a point of visual interest but it is not an eyesore either. A rundown warehouse is located adjacent to the site on the north. It too, will hopefully be removed soon.

The only major positive view from the site is looking westward, down Broadway from the overpass, where downtown Lubbock can be well seen, especially since automobile traffic is below eye level, resulting in a fairly unobstructed view.

Site Topography

For all practical purposes, there are no significant topographical features, with the exception of the man-made cut for the Broadway/Railyard underpass.

Drainage patterns on the site are undetectable and those that exist will be altered and determined by site development. Due to the percolation rate of the soil, occasional heavy rains are quickly absorbed by the soil.

Circulation Patterns

Vehicular Circulation

The density of the vehicular circulation in the site area is generally very low. This is due to the low level of land usage in the area and the fact that the Santa Fe Railroad acts as a travel barrier to all east-west traffic. The fact that Broadway is the only street which allows east-west through traffic between 4th and 19th Streets establishes the importance of this street, yet traffic volumes may only be considered moderate with an estimated 8,000 vehicles pass under the Broadway Underpass each work day.

Due to the high incidence of warehousing activities in the surrounding areas, truck traffic is fairly high. All of the streets in the study area are "industrial" streets with the exception of Broadway and Main Street. Industrial streets consist of a 75 foot right of way

allowing for two lanes of traffic in each direction, Main Street and Broadway both hav 100 foot right of ways. Broadway has two lanes of traffic in each direction except in between Avenue "A" and Avenue "D" where there is one lane of traffic through the underpass. Though this would seem to cause a bottleneck condition, no serious problems are caused by this due to the moderate traffic flow. Main Street has one-way traffic except between Avenue "F" and the Santa Fe Depot where two lanes of traffic are allowed in each direction.

Traffic seems to peak during rush hours on the week days. During weekends and non-business hours traffic is extremely light.

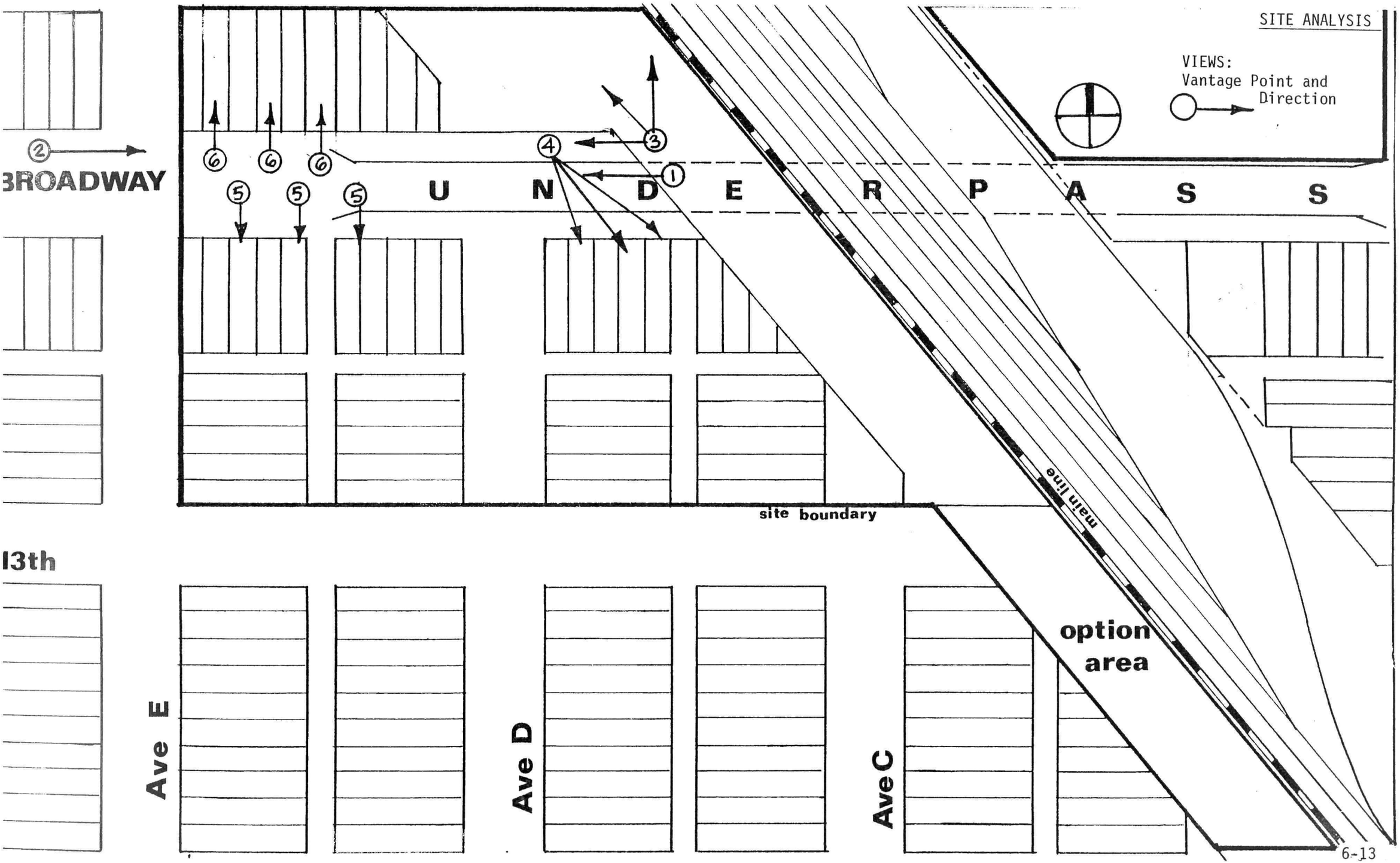
The only operational controlled intersection in the area is the Avenue "A" and Broadway intersection. Although the Broadway and Avenue "F" intersection has traffic lights in place, they are not currently operational.

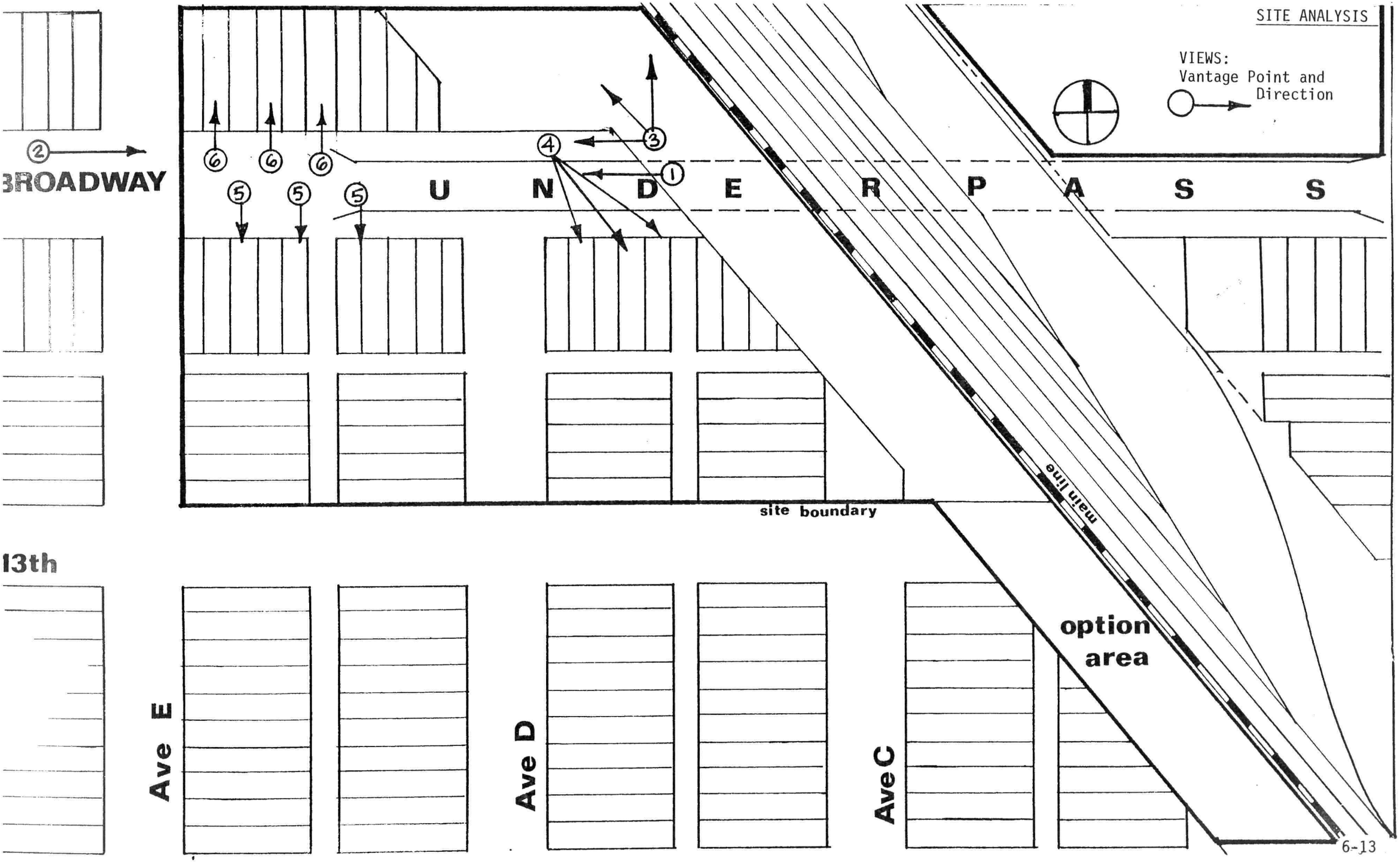
The entire vehicular circulation in the area will be subject to a great deal of change should the Avenue "A" Expressway ever be constructed. Since Broadway would provide direct CBD to Expressway acces, traffic volumes will increase substantially. Should the Avenue "A" Expressway be constructed, plans have been made to expand the present Broadway rail underpass from the present two lanes of traffic to four lanes of traffic. Other significant circulation changes planned for the future is to create a pair of one way streets on Texas Avenue and Avenue "K". Some discussion has been underway to eliminate one way traffic on Main Street and 10th Street.

Pedestrian Circulation

Pedestrian circulation through the site area is almost zero. Most pedestrian activity is along Broadway westward from Avenue "G". There is little pedestrian activity along Broadway east of Avenue "G" primarily because of the lack of pedestrian goals in this area. At the present time there is very little pedestrian traffic across Broadway for the same reasons.

Once the Transit Center becomes operational, it should act as a goal for pedestrian activity though little pedestrian activity is expected to pass through the underpass towards Avenue "A". Also, the Transit Center should generate pedestrian activity across Broadway. If the establishment of a Transit Center results in the development of the areas to the south and west of the project site, a great increase in pedestrian activities and connections will occur in these areas.


SITE ANALYSIS
VIEWS:
Vantage Point and Direction
BROADWAY
13th
UNDERPASS
Ave E
Ave D
Ave C
site boundary
main line
option area
1
2
3
4
5
6


SITE ANALYSIS
VIEWS:
Vantage Point and Direction
BROADWAY
13th
U N D E R P A S S
site boundary
main line
option area
Ave E
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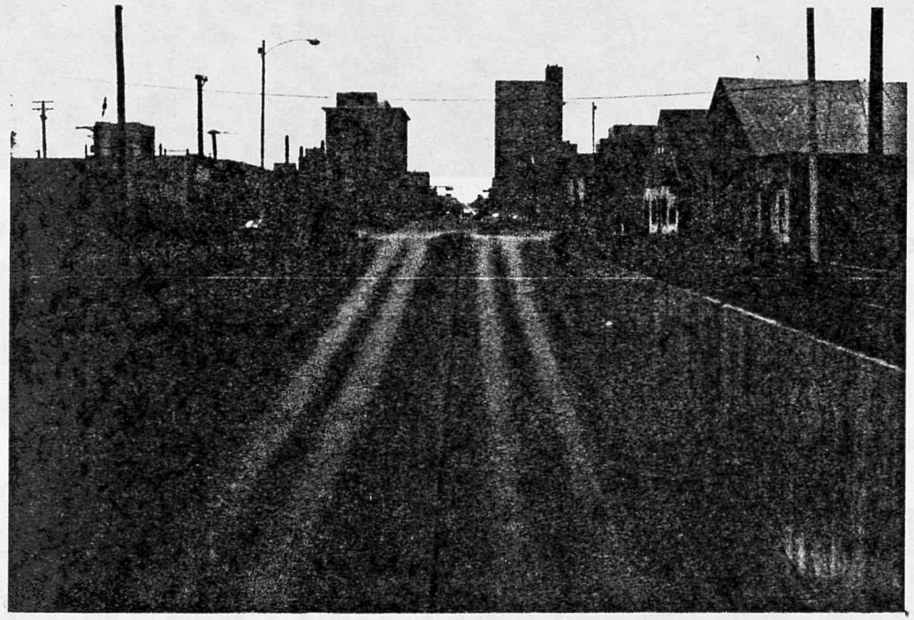
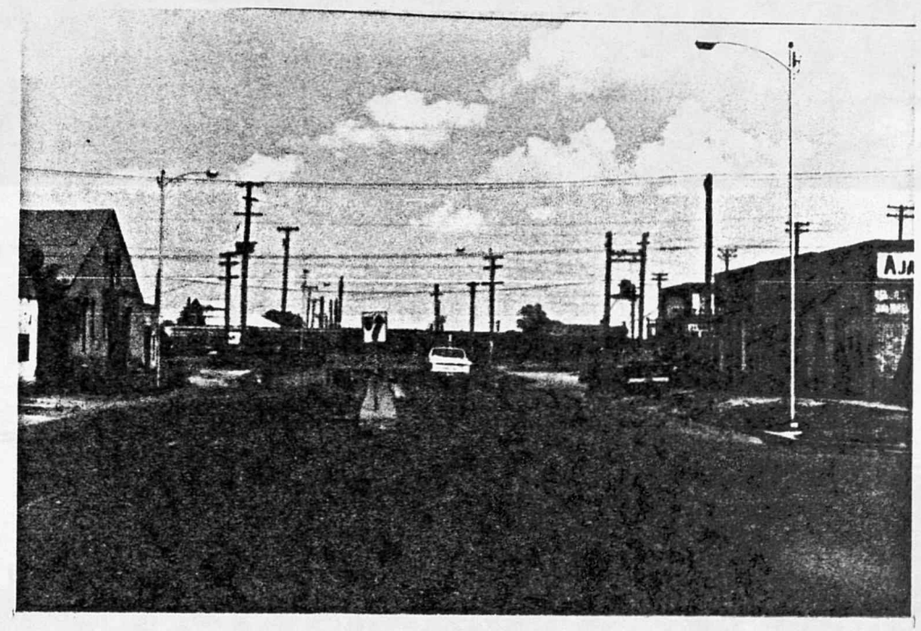


View 1.

From on top the underpass, looking west towards the Lubbock CBD.



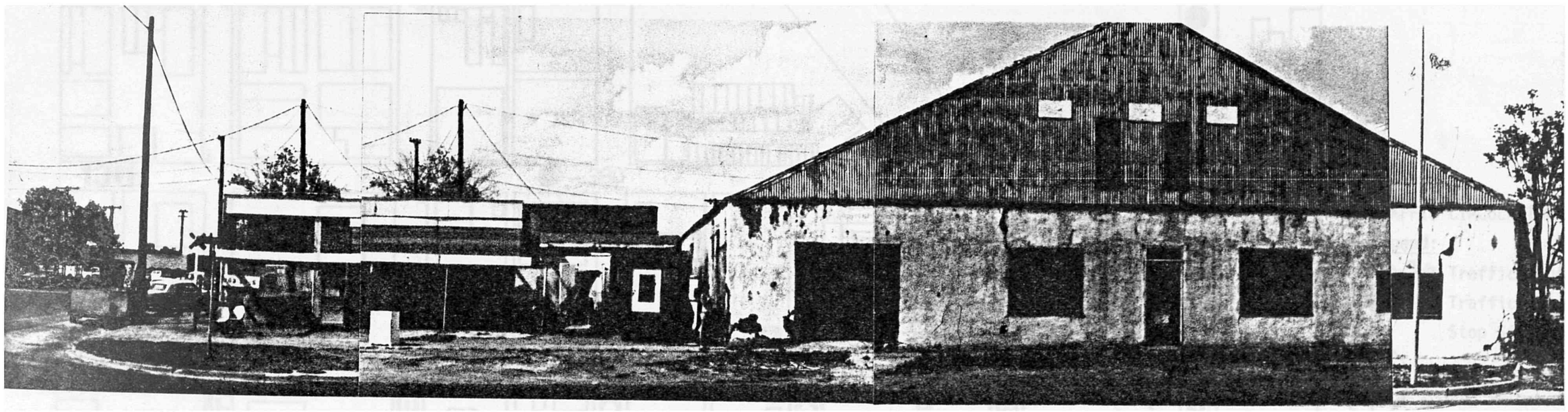
View 2.

From the center of Broadway, looking east towards project site. The site begins at the median strip running down the center of Broadway.

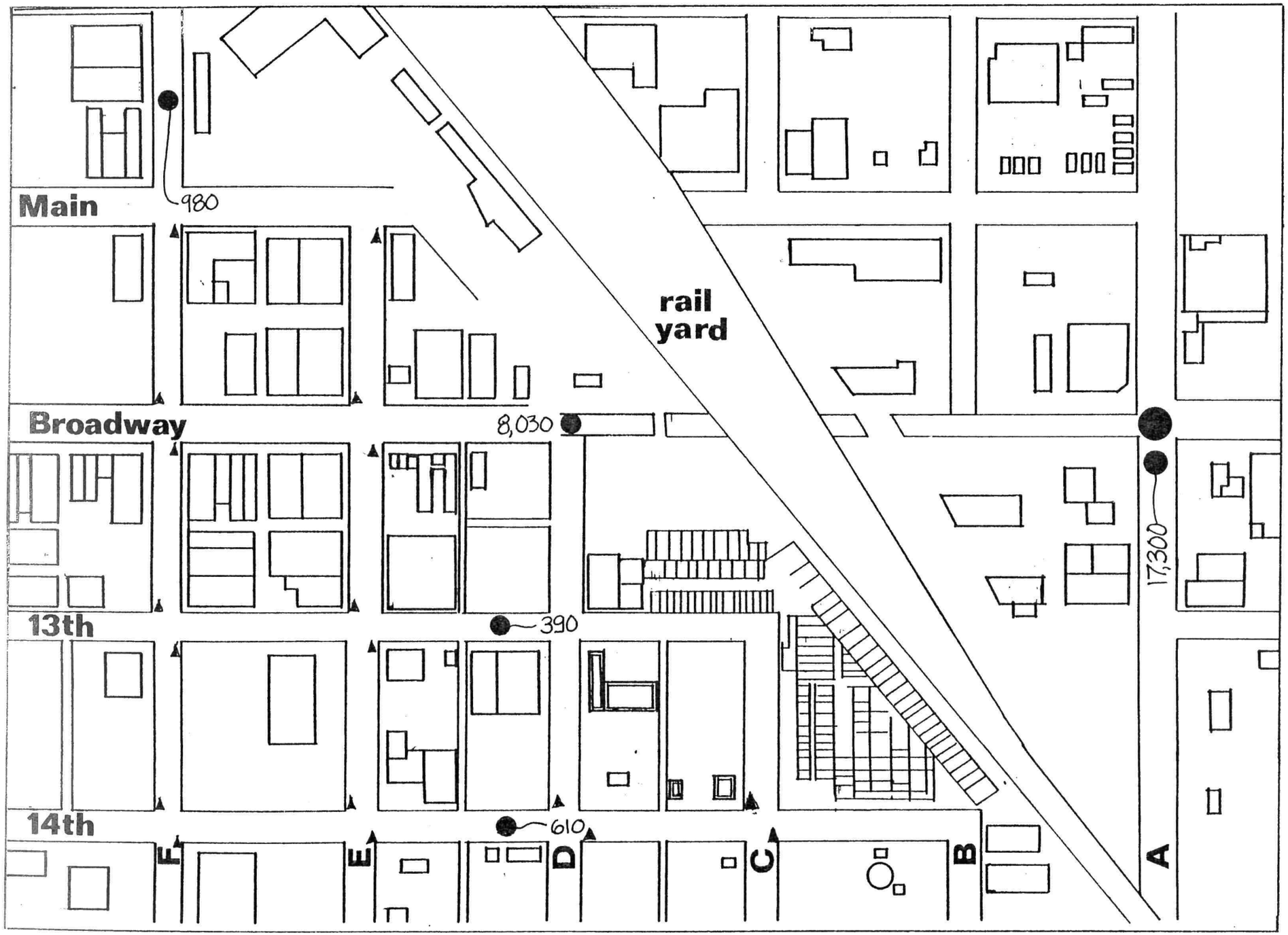
View 3. Panoramic view from site, West to North, showing warehouses and Santa Fe Business Office.

View 4. Panoramic view of site taken from north side of Broadway, showing the eastern section of the site.

View 5. Elevations of buildings on the south side of Broadway.



View 6. Elevations of buildings on the north side of Broadway.



TRAFFIC CIRCULATION

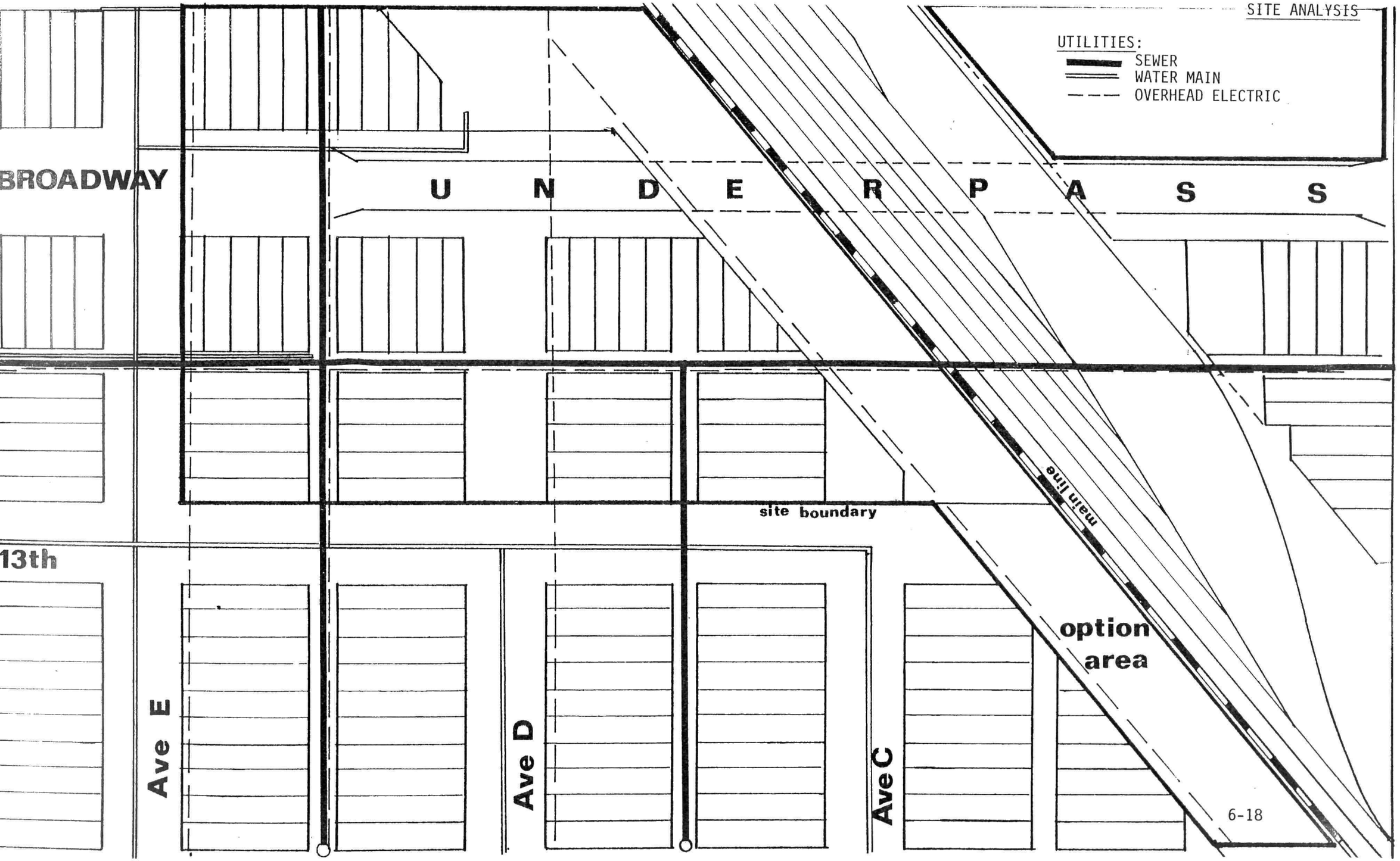
Legend:

316 Traffic Count

Traffic Signal

Stop Signs

1" = 200'


SITE ANALYSIS
UTILITIES:
SEWER
WATER MAIN
OVERHEAD ELECTRIC
BROADWAY
U N D E R P A S S
site boundary
main line
13th
option area
Ave E
Ave D
Ave C

PASSENGER PROCCESSING

Entrance-Exit Facilities
(1:C.2.1)

Capacity

The circulation system should permit the total capacity of a loaded train to exit from the facility in less than four minutes. In order to calculate the capacity of a facilitiy, the following guidelines are to be used. These guidelines refer to obstruction-free space. Structural columns, walls, projections, light standards, kiosks, or free standing signs are all considered as obstructions.

1. Where an obstruction occurs within the path of circulation, the distance between the obstruction and any edge of the circulation path must be greater than four feet in width, to be included as free circulation areas for capacity calculations.

2. Where obstructions occur in a row (e.g., a colonade) forming aisle of circulation, these aisles must be greater than six feet in width to be included as free circulation areas for capacity calculations.

Capacity Guidelines

1. Horizontal Passageways: 25 PFM
2. Stairways and Ramps: 15 PFM
3. Escalators (at a speed of 90 feet per minute):
4. Moving Walks (at a speed of 60 feet per minute): 100 P/M for 36" width and 60 P/M for 24" width
5. Exit Gate: Free swinging, 15 PFM (3'-0" door will give 45 P/M)
6. Exit Doors: 30 P/M
7. Rotogates: 25 P/M
8. Turnstiles (free movement): 30 P/M

PFM = Pedestrians per foot width of walkway per minute.
P/M = Pedestrians per minute.

Note: It is desirable to add 1.5 foot of width to each side of any constrained or enclosed path of circulation above it's calculated capacity.

Number of Exits

There should be no less than two exits from any station area or platform.

Location of Exits

The maximum distance from a platform end to an exit shall not excced 200 feet.

Auxiliary Exits

Where the preceding recommendations for exit width, location and number cannnot be met within the normal circulation system, auxiliary exits shall be provided.

1. Emergency exit stairways or corridors of a minimum width of 44" and a minimum ceiling height of 7'-0"can be provided. Openings into the stair exit or corridor should have a smoke barrier with a twenty minute rating.

Level Change Facilities
(1:C.4.1)

Design Goals

1. Vertical components of a circulation system should be located as a natural extension of the flow of movements, an integral part of the path of circulation.

2. Stairs, ramps, escalators, and elevators should be architecturally articulated so that they are visible from a distance to aid in decision making and should provide views where ever possible of patron destinations. Avoid "cheek" walls around stairways and passages which hide and give no clarification between vertical and horizontal circulation.

3. Where possible stairs, escalators and ramps should be located to maximize employee surveillance. This is particularly crucial in the case of escalators and elevators where control for safety is required.

4. Where possible, stairs, escalators and ramps should be located within and moving through an open space rather than within an enclosed shaft or space.

5. Escalators should be paired with stairs when possible to eliminate confusion due to reversing directions, shutdowns, repairs, etc. All changes in level must have stair access. Non-operating escalators connot be considered as stairs.

6. Escalators are required to be used where vertical circulation dimensions up are over 12' and where vertical dimensions down exceed 24'.

7. The layout for vertical movement should encourage the use of escalators over stairs.

Width

1. Stairways and Ramps

Where circulation paths end in a stair or ramp, the vertical circulation should equal the width of the horizontal path.

The minimum width for any stair or ramp shall be 6'-0".

The required width for any stair or ramp should be calculated in accordance with the section on emergency exiting.

2. Escalators

The minimum width of an escalator should be 32' between the handrails with a 24' tread (4'-0¼" clear opening) and a 48" maximum width between the handrails with a 40" tread (5'-4¼" clear opening). If the esalator must be in a constrained shaft or enclosure, the width of the shaft should be a minimum of 6'-0".

Landings

1. Stairways and Ramps

Landings are required at 8'-0" of vertical rise for a stairway and at intervals not exceeding 30'-0" linear run for a ramp.

The minimum depth for landings in all stairs and ramps shall be equal to the width of the stair or ramp. However, all landings must have a minimum depth of 4'-6".

The minimum width of a landing must be equal to the width of the stairway or ramp.

2. Escalators

An intermediate landing between two escalators should comply with the requirements for run-off.

Run-Off

The distance between a stair, escalator, or ramp and any obstruction or conflicting movement or waiting area in a line is called the run-off.

1. The run-off from a stair or ramp to a solid obstruction such as a wall, kiosk or pier, shall be equal to 1.7 times the width of the stairway or ramp.

2. The run-off from a stair or ramp to the edge of a queuing area shall be at least 10'-0".

3. The run-off between two stairs where the landing must accomodate crossing circulation shoud be a minimum of 20'-0" and preferably 25'-0".

4. The run-off from an escalator to a solid obstruction should be a minimum of 15'-0".

5. The run-off from an escalator to the edge of a queing area should be a minimum of 15'-0".

6. The run-off to another escalator in the same direction shall be a minimum of 15'-0".

7. The run-off between two escalators where the landing must accomodate crossing circulation should be a minimum of 20'-0" and preferably 25'-0".

8. Where a stair and an escalator are in the same well the run-off to the stair/escalator in the same direction should be a minimum of 15'-0".

9. Where a stair and escalator are in the same well, the run-off to a solid obstruction should equal 1.7 times their combined width.

Horizontal Circulation
(1:C.3.1)

Minimum Width of Horizontal Passages

In addition to capacity, the required width of any route is also dependeant upon the nature of the space through which the route passes (tunnel, bridge, open sidewalk). Constrained paths of circulation such as in tunnels, require greater width than above grade walkways for psychological comfort. Therefore, no matter how low the anticipated capacity, paths of circulation should not be planned smaller than the following guidelines.

Minimum Width Requirements		Minimum Width
Unconstrained/ Open:	Sidewalks, walkways and pathways	5'-0"
Constrained/Open:	Bridges, overpasses, elevated walkways	8'-0"
Constrained/Closed:	Tunnels, underpasses concourses, subway passages and corridors	12'-0"

Gradient

The maximum grade allowable for horizontal circulation shall be five percent. Beyond this gradient, rules of vertical circulation will apply.

Doors

Entrance doors and other doors in the path of circulation including all emergency doors and gates shall have a width of 36". Where a two leaf door is used, the clear opening, free of any hardware, shall not be less than 30". Doors shall not impede access by the handicapped and should have a common floor level on either side for a distance of five linear feet.

Height

The minimum height for enclosed or roofed paths of circulation shall be 9'-0" for areas with suspended ceilings and 8'-0" for areas with solid ceilings.

Configuration

Paths of circulation should encourage right hand movement wherever possible. They should provide visual contact with points of destination at the earliest moment and avoid blind cornering, hidden alcoves and circuitous routes.

Travel Distances

(2:85)

Travel distances are to be kept to a minimum. As the hierarchy of transprtation becomes more and more localized, the distances between transfer zones should decrease.

Transfer	Travel Distance
Any	600' Maximum
Bus-Bus	100' Suggested
Bus-Train	300' Suggested

Travel Paths

(3:43)

Major circulation paths should be laid out so that major pedestrian flow conflicts are kept to a minimum, In dealing with bulk arrivals (such as a train disharging passengers on a platform), travel paths will be used at full capacity, so plans should be made accordingly. The same is true of bulk departures.

Station patrons arriving or departing from the station by non-public transportation shall receive the following priorities for convenience and direct routing:(3: 44)

1. Pedestrians
2. Kiss 'n Ride
3. Park 'n Ride

Travel paths should be laid out to provide the maximum measure of safety. The priority of modal separation should be as follows: (3: 44)

1. Between pedestrians and any other mode.
2. Between public and private transit.
3. Between Kiss 'n Ride and Park 'n Ride

The layout of facilities shall be accomplished in a logical manner to provide the greatest ease of movement for the user, handicapped user and the non-user.

PASSENGER ORIENTATION

Passenger orientation is critical in public transit facilities. Lack of orientation can result in "lost" passengers creating delays in circulation systems, not to mention frustrated patrons.

Passenger destinations should be easily visible from most points of the user-access area to aid in user orientation so that the facility layout is readily apparent to the user.

Directional Signs and Maps

Maps shall be located at major facility entrances to promote in passenger orientation. Maps should also be design for tactile reading to aid in the orientation of the visibility-handicapped user. Directional signs should be provided showing the direction to major passenger destinations and should be of a standardized graphic design to aid in the orientation of non-English speaking passengers.

Courtesy Phones

Courtesy phones should be located at key points in the facility to provide orientation assistance and minimize lines at the information booths.

Information Booths

Information booths shall be readily accessible and be so located as to prevent queing problems. Special assistance should be available to those persons who may require handicap assistance.

PHYSICAL ENVIRONMENT

Air Flow Control Devices

Air flow control devices shall provide a filtration system for the elimination of odors which may be unpleasant to occupants and the elimination of suspended aerosols and particulates.

Any mechanically operated ventilation system shall supply a minimum of 5 cfm of outside air and not less than a total of 15 cfm circulated per building occupant. If air velocity at the register exceeds 10 ft/sec, registers shall be placed eight feet above the floor. (6:63)

The total pressure generated by circulating fans shall provide an internal atmospheric pressure greater than exterior conditions to help in preventing air infiltration.

Heating and Air Conditioning
(1:G.21)

Heat shall be provided to all fully enclosed areas where water lines are present. In areas which are usually unoccupied, heat may be provided by therostatically controlled electric heaters which shall provide an interior temperature of not less than 50°F when outside conditions are 0°F.

In all occupied areas which are fully enclosed a heating system shall be provided which will be capable of heating these spaces to a temperature of 70°F when outside conditions are at 0°F, except in waiting areas where a minimum of 65°F may be used should energy situations may deem this necessary.

Where air conditiong is utilized it should be capable of maintaining an interior temperature of 75°F when outside temperature is 90°F.

Heating is not required in open and partially open areas, shelters or platforms, nor in non-occupant equipment rooms where plumbing, electrical or mechanical equipment have no temperature control demands.

Outdoor space heaters are not recommended but utilization of wind screens and shading devices may be used to provide some environmental control of non-enclosed spaces.

Humidity shall be controlled providing a relative humidity of 35% at 75°F interior in the summer, and 50% relative humidity at 70°F interior dry bulb in winter. Moisture barriers shall be used in construction to control condensation and humidity problems.

Weather Protection

All areas of the facility which are intended for human occupation of periods longer than 15 minutes per individual should be full enclosed. This excludes train and bus loading platforms, parking facilities, etc.

In areas which are user oriented except parking facilities, and are not required to be fully enclosed, some provisions should be made to shelter users from weather conditions by means of shading and wind control devices.

Noise
(1:E.7.1)

The following levels of noise limitation are required within the facility.

	Recommended Noise Limit	
1.	Train or bus entering or leaving station	80 dba
2.	Passby noise at 40 mph	87 dba
3.	Wayside noise level 50' from track or road centerline	75 dba

SECURITY AND SAFETY

Security
(4:35)

Facility security is basically a non-quantifiable element in design except in terms of number of crimes/facility user.

The following guide lines are helpful in maintaining facility security.

1. Reduce the numbers of separate, non-intervisible spaces.
2. Sustain passenger volumes.
3. Reduce the number of levels of the station buildings.
4. Use at grade stations.
5. Provision of courtesy or emergency phones.
6. Short distances from station agent's booths.
7. Short distances to major user paths.
8. High degree of user visibility (including direct visual contact, use of visual surveillance devices, and illumination).
9. Provision of security guards. (4:35)
10. Limit numbers of exits.
11. Limit avenues of escape.
12. Alarm systems.

Safety
(4:38-41)

The facility shall be provided with both an audio and visual fire/emergency alarm. Visual emergency alarms shall not be of a strobe-type design.

All portions of the facility shall be capable of being evacuated in 4 minutes or less, including bus and train platforms.

No portion of the facility shall be less than fifty feet from a fire alarm actuating mechanism, and fire extinguishers are to be located in those areas where there is a high risk of fire.

The number of levels and walking distances shall be kept to a minimum to facilitate evacuation times.

All areas which by their very nature are specified as potential hazardous areas as specified by the "Detailed Space Analysis" which shall be designed to minimize the element of risk.

Emergency lighting is required as specified in this section (Systems Performance).

Lights
(1:H.4.1)

Natural lighting shall be used wherever possible but in all areas minimum lighting values shall be provided as specified in the "Detailed Space Analysis" of this report.

In addition, emergency light provisions shall be made in the following areas.

1. In all areas which are fully enclosed public spaces.
2. All tunnels and emergency exits.
3. In all elevated station platforms.
4. In all partially enclosed or fully enclosed stairways, ramps, escalators, passageways and concourse.
5. Where life and safety are involved.
6. Electrical service rooms.
7. Service and utility rooms.

It is required that electrical power for emergency lighting be generated on site by battery or gas/diesel generator. The minimum emergency lighting levels for each area are specified in the "Detailed Space Analysis"

Visual Comfort Criteria
(1:H.5.1)

The surface luminance of any lighting source or surface shall not exceed the follwing Luminance Ratios.

1.	Station Interior, fully enclosed:	
	Wall to floor	3:1
	Wall to ceiling	3:1
	Signs and information panels:	
	Panel to adjacent and background surfaces	5:1
2.	Shelters, canopies, platforms at or above grade:	
	Wall to ceiling	5:1
	Wall to floor	3:1
3.	Luminaire to adjacent surface:	80:1
	(ideally)	20:1

Glare should be avoided to the greatest extent possible. The discomfort glare rating shall not exceed 125% and the visual comfort probability shall not be less than 50% in any public area.

The following reflectance values (1.H.5.2) are recommended for public areas.

1.	Ceilings	80 to 95 percent
2.	Walls	50 to 85 percent
3.	Floors	15 to 55 percent

CONSTRUCTION ELEMENTS

Structural System
(6:141)

The structural system shall be capable of supporting the following uniform and concentrated loads:

	Uniform Load	Concentrated Load
Waiting areas, Fixed seating	50 lb/sf	0
Waiting areas, Movable seating	100 lb/sf	0
Garages, Auto	50 lb/sf	0
Exit facilities, Public	100 lb/sf	0
Offices	50 lb/sf	2000 lbs
Storage, Light	125 lb/sf	0
Sidewalks, Driveways	250 lb/sf	0
Storage, Heavy	250 lb/sf	0
Stores, Retail	75 lb/sf	2000 lbs

Roofs shall be designed with sufficient slope to allow adequate water run off and to support snow loads and minimum roof live loads must be supported as stipulated by Section 2305 of the Uniform Building Code.

Structural system must be capable of allowing flexibility in facility usage and occupancy.

Construction Materials
(4:A.3)

Construction materials should be selected to conform to these properties:

Safety

Incombustible materials
Adequate anchorage
Non-slip floors

Durability

Non-fading
Weather resistant
Strong
Wear resistant
Impact resistant

Maintenance

Dense, non-porous
Acid & alkcali resistant
Replaceable

Accoustical Materials

Accoustical materials to be located on surfaces not accessible to the passenger

Sound Insulating Materials

Non-flamable
Durable
Washable

Energy Conservation Criteria

Walls and roofs should have a minimum "U" value of 0.12.
Where more than 25% of exposed exterior wall is glass, 1/4 of all glass surfaces are to be insulating glass or storm sash.

LIST OF REFERENCES
(in order of usage)

1. Wurman, M.L.; Design Standards Manual; Southeastern Pennsylyvania Transit Authority; Philadelphia, Penn.; 1975.

2. Alexander, Christopher, et. al.; A Pattern Language; Oxford University Press; New York; 1977.

3. Public Structures Inc.; San Francisco Bay Area Rapid Transit District, Manual of Architectural Standards; San Francisco Bay Area Rapid Transit District; San Francisco, California; June 1965.

4. Demetsky, Michael j., Hoel, Lester A., and Virkler, Mark R.; Methodology for the Design of Urban Transportation Facilities; Department of Transportation; Washington, D.C.; 1976.

5. Griffiths, John R., Hoel, Lester A., Demetsky, Michael J., Transit Station Renovation; A Case Study of Planning and Design Procedures; Department of Transportation, Washington, D.C.; 1979.

6. Uniform Building Code; International Conference of Building Officials; Whittier, California; 1976.

7. ASHRAE Handbook, 1977 Fundamentals; American Society of Heating, Refrigeration, and Air conditioning Engineers, Inc.; New York; 1977.

Uniform Building Code
Applicable Sections

General Height and Square footage Requirements

A building used for awaiting transportation where 50+ persons is classified as an assembly building, Sec 402 UBC.

Occupancy B.2 is designated to any assembly building without a stage and an occupancy of 300 or more persons, Sec 701 UBC.

Occupancy of more than 1000 persons type I, II or III construction. 702(b) Where floor area maxes out at Unlimited, 13,500, and 10,100 square feet respectively and height restrictions are Unlimited/Unlimited, 95 feet and four stories and 65 feet and two stories respectively for Construction Types I, II and III. If construction is in Fire Zone No. 3, floor area requirements may be increased by 33 1/3%. (pp 54,55) The total area of all stories in a multi-story building may not exceed twice the area allowed for one-story building, excepting basements and cellars. (504 b)

Exceptions to these restrictions are if each portion of a building is separated by one or more separation walls of four hour - fire resistive construction where the total width of openings does not exceed 25 percent the length of the wall. (504(G)) Where separation from buildings on two sides exceeds 20', floor areas may be increased by one and one fourth percent for each foot exceeding 20' on the separation, not to exceed of 50% increase, where separation from buildings exceeds 20' on three sides an increase of 2½%/foot beyond 20' not to exceed a total increase of 100% and where separation occurs on four sides, an increase at the rate of five percent/foot is allowed not to exceed 100%. (506(a)1)

An additional exception to square footage requirements is allowed if the entire building is provided with an approved automatic fire-extinguishing system. In this case, floor areas may be tripled in one story buildings and doubled in multi-story buildings. (506(c))

Exits, Stairs & Aisles

All group B occupancies must front directly or have access to a public street not less than 20' in width. Access is defined as a 20' right of way, unobstructed, and connecting the building and the street. The main entrance must be located along this street or right-

of-way. (Sec 703)

The fire resistance of exterior walls in Fire Zones 2 & 3 must be 2 hours for less than 10 feet and 1 hour at all other points, and openings in the exterior walls shall not be less than 5 feet and must be protected if less than 10 feet from the adjacent property line or center of the street by a 3/4 hour fire assembly. (Table V-A, Sec 1803)

Every B.2 occupancy shall be provided with a main exit which should be wide enough to accomodate one half the occupant load but not less than the required width of aisles, exit passageways and stairways connecting it. Side exits are required on each side of the building to accomodate 1/3 the total occupant load served. Every exit must be equipped with "panic hardware". (Sec 3316(a))

Stairways must not be less than 44" in width and the rise shall not exceed 7½" and the run shall not be less than 10". Circular stairs are allowed if the minimum run is 10" and the smaller radius is not less than twice the width of the stair. Landings must be equal to the width of the stair not to exceed 4 for straight runs and shall not be located further than 12' apart, measured vertically. When basement stairs and upper story stairs occur within the same stairwell, an approved barrier must be provided to prevent persons from continuing on into the basement. (Sec 1905)

Every building greater than two stories in height shall have one stairway to the roof unless the roof slope is greater than four in 12. The minimum head room clearance in a stairwell shall be 6'6". (Sec 3305)

A ramp may be considered an exit if the width of the ramp is as required for corridors, the slope does not exceed one foot in eight feet, handrails are present, construction is of non-combustible materials and the ramp surface is roughened. (Sec 3307)

All interior stairways, ramps or escalators must be enclosed with the exception of any stairway, ramp or escalator serving one adjacent floor. Enclosure construction must be of a two hour fire-resistive rating in buildings of four stories in height or greater and one hour fire-resistive rating elsewhere. There should be no openings in the enclosure walls except those of exterior walls and exit doorways. In no enclosed exit shall usable space be located under the stairs. (Sec 3308)

All exits shall be illuminated during building occupation and exits shall be noted by exit signs. (Sec 3317)

All portions of a building where seats, equipment, merchandise, etc., are located shall have aisles leading to an exit. The minimum width for an aisle shall be 3'6" and the line of travel by means of an aisle to the nearest adjacent exit shall not be more than 150'. (Sec 3313)

Building capacity is not to be exceeded. Minimum standards for applicable uses are: 7 square feet for assembly areas without fixed seats; 15 square feet per occupant for less concentrated assembly areas, conference rooms, dining rooms and drinking establishments. A minimum of two exits is required for any of the above uses when occupancy exceeds 50 persons. For office space the minimum standard shall be 100 square feet per occupant, 30 square feet per occupant in retail sales areas on the ground floor, and 50 square feet on upper floors. Garage parking requires 200 square feet per occupant. A minimum of two exits per space is required when the number of occupants exceed the following standards: 30 occupants in offices and parking garages, and 50, 10, and 20 occupants for the basement, ground floor and upper floor respectively in retail sales areas. (Sec 3302(a))

The number of exits required for any story where occupancy is between 500 and 999 persons is three and four exits are required when occupancy load for the story exceeds 1000 persons. The total width of the exits in feet shall not be less than the total occupant load divided by 50. (Sec 3302)

All exit doors serving more than 50 persons must swing in the direction of travel, and the minimum dimensions of the exit doors shall be three feet by six feet and eight inches, but no door shall be wider than four feet. (Sec 3303)

Corridors

The minimum width of corridors shall be 44 inches for every corridor serving more than 10 persons and this corridor shall be unobstructed. No dead end corridors are permissable longer than 20 feet in length. Walls of the corridor shall be of a one hour fire-resistive rating and doors opening to the corridor shall have a five hour rating with a maximum of 1200 square inches of glass glazing in the door.

Light, Ventilation & Sanitation

A minimum of an area not less than one eighth the total floor area shall be provided for windows and skylights to provide ventilation and light. One half of these windows shall be operable. Alternatives to this are to provide artificial light and mechanical ventilation. The mechanical ventilation system shall provide a minimum of five cubic feet of air per occupant per minute with a minimum of 15 cfm total ventilation required per occupant.

Walls in toilet facilities shall be of a non-absorbent material and shall be finished to a height of four feet. Floors shall also be finished with a non-absorbent material. Each water closet compartment shall not be less than 30 inches in width and no less than 24 inches clearance in front of each water closet.

Fire-Extinguishing Systems

Every B occupancy regardless of height shall be equipped with one or more wet stand pipes and shall be located so that no portion of the building cannot be reached by a 75 foot hose.

Allowable Types of Construction

Fire-Resistive Requirements
(in hours)

Construction Type	I	II	III
Exterior Bearing Walls	4 Hours	4 Hours	4 Hours
Interior Bearing Walls	3 Hours	1 Hour	1 Hour
Exterior Non-Bearing Walls	4 Hours	4 Hours	4 Hours
Structural Frame	3 Hours	2 Hours	1 or H.T.
Partitions - Permanent	1 Hour	1 Hour	1 or H.T.
Vertical Openings	2 Hours	2 Hours	1 or H.T.
Floors	2 Hours	1 Hour	1 or H.T.
Roofs	2 Hours	1 Hour	1 or H.T.
Exterior Doors and Windows	3/4 Hour	3/4 Hour	3/4 Hour
Construction Materials	Non-Combustible	Non-Combustible	Combustible

H.T. = Heavy Timber

Source U.B.C. Table 17-A

ZONING

The City-owned Transit Center would be classified as a "Special Use" zoning under the zoning laws of Lubbock. With this classification there are no limitations as to usage, lot coverage, building height, etc. However, the site is classified as a C-3 and C-4 zone, a zoning which is compatible with the Transit Center.

COST ANALYSIS

Cost justification of the Transit Center is tricky due primarily to the low rentable space/gross ratio. There are only 15,883 square feet of rentable space in comparison to 42,258 of gross building space, a ratio of only 37.6%. It is obvious, without any calculations, that some additional source of revenue is needed and hopefully parking revenues will provide this source of revenue. Ideally, the parking areas should be in an enclosed parking structure, but if this is not feasible, ground level parking would have to be utilized.

Estimation of Construction Costs

Dodge Multiplier Method

The Dodge Multiplier Method of costing provides an estimation of the actual construction costs of building types. In the March 1980 issue of the Dodge Building Cost Calculator & Valuation Guide, no data was available for rail/bus facilities, so the data for air terminal facilities was used. March 1982 was selected as the mid-point of construction for the facility, assuming construction start-up in March 1981 and project completion in March of 1983.

	Terminal Facility	Parking Structure	Surface Parking
Dodge Multiplier	$26.50	$ 9.60	---
Lubbock Multiplier	2.108	2.108	---
$/Sq. Ft. March 1980	$55.86	$20.23	$0.98
$/Sq. Ft. March 1982 (+29.0%)	$72.10 per sq ft.	$26.11 per sq ft.	$1.26 per sq ft.

Estimation of Project Value and Derived Building Costs

Terminal Facility

The estimation of the project value is based upon rentable space if one uses the "Gross Income Multiplier" method of market justified cost analysis. The total rentable space of the Transit Center is 15,883 square feet which excludes such areas as waiting rooms, restrooms, etc. which are used by the facility as a whole and could not be charged out. These figures also include such areas as the mechanical room, circulation spaces, the station manager's and security offices. The rent per square foot is $15.00, which is high in comparison to typical office and retail spaces, but which can be justified by the large amount of support facilities and the comparative high construction costs of transportation

facilities in comparison to the average construction cost of office and retail establishments.

Gross Income Multiplier Method Calculations for the Transit Facility

Rent/Space Unit	$ 15.00/sq ft
Proposed Number of Rental Units	x 15,883 sq ft
Potential Gross Income	$ 238,245
Potential Gross Income	$ 238,245
Gross Income Multiplier	x7
Total Project Value	$1,667,715
Total Project Value	$1,667,715
Carrying Charges	- 113,417
Builders Profit	- 45,862
Fees and Permits	- 75,047
Site Work	- 116,740
Land Value	- 238,137
Building Budget	$1,058,512
Gross Square Footage	÷ 42,258 sq ft
Building Cost/Sq Ft	$ 25.04/sq ft
vs. Actual Building Cost	$ 72.10/sq ft
Difference	- 47.06/sq ft

The derived building costs fall short of the actual building costs by a substantial amount. Further calculations showed that the rent/space unit would have to approach $33/sq ft, a figure which is much too high.

Conversion of waiting areas into retail areas, from a ratio of 15/85 up to 35/65 failed to bring about any substantial decrease in the rent/space unit. This is due to the fact that due to occupancy and square footage requirements, each square foot of waiting area converted into two feet of rentable space. Though this increased the amount of rentable space, it also increased the gross square footage of the facility, practically negating any advantage in this conversion process. If the Transit Center is to be feasible, additional revenues must be raised by parking areas, requiring no substantial change in the existing program, or the addition of surplus retail or office space.

Parking Structure

A total of 110,625 square feet of parking are required for the facility which breaks down to 33,000 square feet of short term parking and 22,000 square feet of long term parking. The rental per square unit for short term parking is $7.20 which is derived from $.40/hour, 12 hours a day, and 25 days/month. Rental/square unit for long term parking is determined to be $6.00 based upon $4/day, 25 days/month.

Calculations:

	Rental Units	Rent/Sq ft		
Short Term Parking	33,000 sq ft x	$7.20	=	$ 237,600
Long Term Parking	22,000 sq ft x	$6.00	=	132,000
	Projected Project Value			$ 369,600

Projected Project Value	$ 369,600
Gross Income Multiplier	x7
Total Project Value	$2,587,200

Total Project Value	$2,587,200
Carrying Charges	- 206,976
Builder's Profit	71,148
Fees and Permits	116,424
Land Value	Paid
Site Work	Paid
Building Budget	$2,192,652

Building Budget	$2,192,652
Gross Area (sq ft)	÷ 107,375
Building Cost/Sq Ft	$20.42/sq ft
vs.	
Actual Building Cost	$26.09/sq ft
Difference	-5.67/sq ft

If a parking structure is used, rental rates would have to be raised if the project is to be feasible. Yet, even if parking rates were doubled to $.80/hour and $12.00/day, a fairly high rate, not enough revenue could be generated to make the project feasible.

The only alternative is to utilize on-grade parking rather than a parking structure to generate the needed revenues.

On-Grade Parking

$1.26/sq ft is the projected cost of on-grade parking spaces and if the rental rates remain the same as those used in the parking structure analysis, a substantial amount of surplus funds will be generated.

Building Budget	$2,192,652
Gross Area	÷107,375
Building Cost/sq ft	$ 20.42
Actual Building Cost	1.26
Difference	+$ 19.16

Feasibility

If the surplus building budget of the on-grade parking is added to the building budget of the Transit Facility the feasibility of the project becomes known.

Parking Building Budget	$2,192,652
Actual Parking Construction	-(107,375)(1.26)
Surplus Parking Budget	$2,057,359

Feasibility (continued)

Surplus Parking Budget	$2,057,359
Transit Facility Building Budget	1,058,512
Building Budget Available to Transit Facility	$3,115,871
Building Budget Available to Transit Facility	$3,115,871
Transit Facility Gross Sq Ft	÷ 42,258
Building Cost/Sq Ft	$73.73/sq ft
Actual Building Cost	72.10/sq ft
Difference	+$ 1.63/sq ft

Conclusions

The Lubbock Transit Center can be financially feasible if on-grade parking is utilized rather than a parking structure. The rental/sq foot would be prohibitively high if parking revenues were not available and the conversion of some waiting space into rentable retail space did not alter the picture significantly.

Implementation

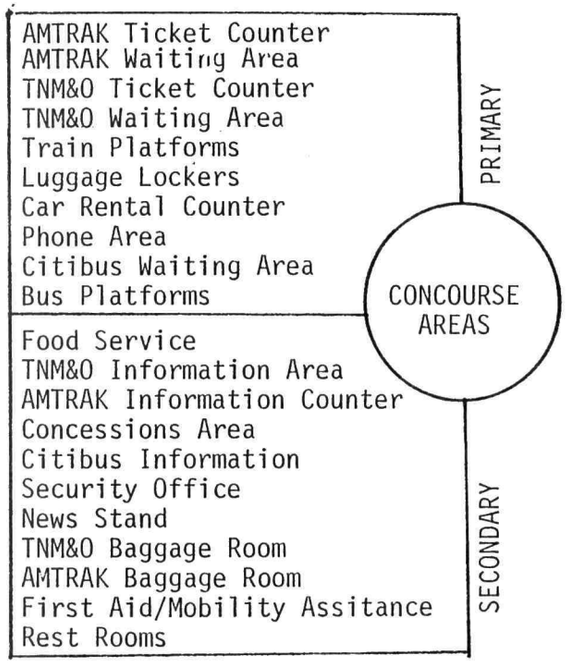
Under existing conditions, the Transit Center would not be eligible for funds from the Federal Railroad Administration which is currently pumping funds into the North East Corridor Improvement Project. Nor would it receive funding from AMTRAK which has funding projects for the rehabilitation of existing projects only.(1:4-53) If any Federal Funding is available it would come from the Department of Transportation and funded as a special research program for the development of intermodal transportation.

State funds could be made available from revenues generated by the Motor Fuel Tax or other sources of State Revenue but would require a bill passed by the State Legislature for this to occur. This would only be a partial funding more than likely, the remainder of the funds would have to be raised locally through the sale of city bonds and/or local tax revenues.

LIST OF REFERENCES

1. Rail Planning Guide; Federal Railroad Administration; Washing ton,D.C.; 1977.

CONCOURSE AREA



4. Floor materials should be especially durable since passengers often push their baggage along the floor as the lines forward.
5. Transform the concourse doors into gateways so that the psychological gateway becomes a physical gateway.

ACTIVITIES:
Standing, sitting, conversation.

The concourse area functions primarily as a queing area. Passengers line up in the concourse area as they prepare to board the bus or train. Tickets are collected for the TNM&O passengers at the doors leading from the concourse area to the bus docks. This activity will not occur for AMTRAK passengers, whose tickets are collected on board the train, nor for Citibus passengers whose tickets are issued on the buses. As passengers pass through the concourse doors, their trip has begun. The concourse doors function as a psychological boundary between non-movement and movement. For incoming passengers, the concourse will be their first view of the facility interior. It is critical that orientation aids be located in this area so that they may find their destinations quickly. For passengers waiting to start on their journeys, the transition from the station to their mode of transportation should be made comfortable and relaxing so that their trip may begin on a positive note, a difficult task for those who hate to stand in lines.

DESIGN REQUIREMENTS:
1. Allow enough length so that waiting lines do not interrupt lanes of circulation.
2. Provide orientation devices so that incoming passengers can find their destinations quickly.
3. By ropes, barriers or floor markings, mark the waiting area into lanes so that there is no confusion as to which line is for what bus.

GENERAL REQUIREMENTS:
1. Number of Occupants: 596
2. Minimum Sq. Ft./Occupant: 15 sq.ft.
3. Minimum Area: 8,940 sq.ft.
4. Minimum No. of Exits: 3
5. Minimum Clear Ceiling Ht.: 10'-0"
6. Degree of Enclosure: Full
7. Partitions: NA
8. Accoustics: Controlled
9. Degree of Facility Maintenance: High
10. Degree of Security Control: High
11. Degree of Visual Permeability: High
12. Degree of Safety Control: Medium

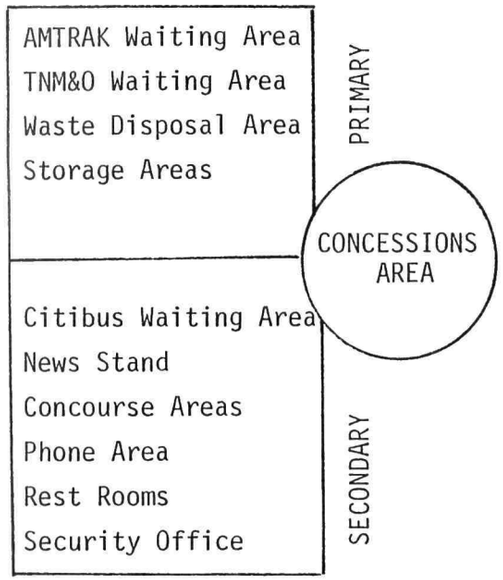
MATERIAL FINISH:
1. Floors: Resilient Tile
2. Walls: Vinyl or other washable
3. Ceilings: Accoustical Drop

MECHANICAL/ELECTRICAL
1. Heating: 65 deg. at 0 deg. exterior
2. Cooling: 75 deg. at 90 deg. exterior
3. Fresh Air: 3000 cfm
4. Circulation: 9000 cfm
5. Water Supply: Cold
6. Plumbing Fixtures: Water Fountain
7. Gas Service: NA
8. Electrical: 120VAC
9. Lighting Levels: 20 fc
10. Emergency Lighting: 1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: PA
2. Office Equipment: NA
3. Seating: NA
4. Work Surfaces: NA
5. Storage Equipment: NA
6. Special Equipment: Clock

SPECIAL NOTES:

CONCESSIONS AREA



ACTIVITIES:
Purchasing, killing time, browsing, walking, conversation, security.

The concessions area offers either the first or last opportunity for travelers to buy essential items, especially toiletries and over the counter drugs (aspirin, cough syrups, motion sickness pills, etc). The concessions area also offers persons the last opportunity to buy someone a farewell gift, a welcome gift, or a gift promised for children. The concessions area should also have a wide enough selection of items to encourage persons to browse through the area, for browsing is another means travelers use to kill time. Ideally, there should be several different concessionaires operating in this area offering a wide selection of items, from a small flower shop to a toiletries shop; from a gift shop to possibly a small drug store. A small food shop specializing in take-out food could also be included so that people can buy food to eat on the bus or train or even buy a box lunch there before they head for the office in the morning. Partitions, electrical service and HVAC should be fairly flexible in this area to accomodate a wide range of uses.

DESIGN REQUIREMENTS:
1. The concessions area should be located next to the waiting area so that travelers waiting on transportation can divert themselves by browsing through the area.
2. Flexible partitions, electrical service and HVAC in this area are required to accomodate a wide range of uses.

GENERAL REQUIREMENTS:
1. Number of Occupants: 200
2. Minimum Sq. Ft./Occupant: 30 sq. ft.
3. Minimum Area: 6000 sq. ft.
4. Minimum No. of Exits: 2
5. Minimum Clear Ceiling Ht.: 10'-0"
6. Degree of Enclosure: Full
7. Partitions: Movable
8. Accoustics: Controlled
9. Degree of Facility Maintenance: High
10. Degree of Security Control: High
11. Degree of Visual Permeability: High
12. Degree of Safety Control: Low

MATERIAL FINISH:
1. Floors: Carpet/Floor Tile
2. Walls: Durable, washable
3. Ceilings: Accoustic Drop

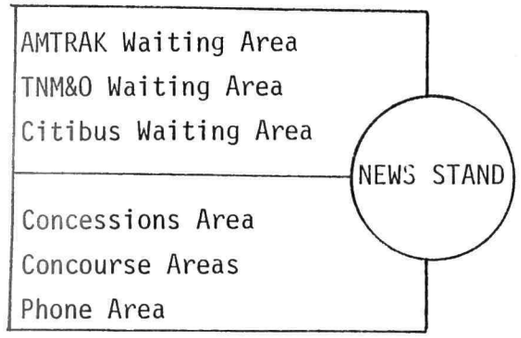
MECHANICAL/ELECTRICAL
1. Heating: 65 deg. at 0 deg. exterior
2. Cooling: 75 deg. at 90 deg. exterior
3. Fresh Air: 1000 cfm
4. Circulation: 3000 cfm
5. Water Supply: Hot and Cold
6. Plumbing Fixtures: Varies
7. Gas Service: Possible
8. Electrical: 120/220 VAC
9. Lighting Levels: 30 fc.
10. Emergency Lighting: 1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: PA
2. Office Equipment: Varies
3. Seating: Varies
4. Work Surfaces: Varies
5. Storage Equipment: Varies
6. Special Equipment: Varies

SPECIAL NOTES: Mechanical, electrical and HVAC must be flexible to accomodate a wide range of uses.

NEWS STAND

PRIMARY



SECONDARY

The news stand has always been a major center of activity in transit facilities. The availability of reading materials is important as people begin their journeys, or grab a paper before they head towards the office in the morning. The news stand should be conspicuously located in the waiting area and in close proximity to the concourse area. The reading materials should be attractively displayed and enough space should be allotted to allow a wide selection of material types. A large area of the display area should be allowed for out-of-town newspapers which would allow visitors to Lubbock to touch base with what is happening in their home towns.

DESIGN REQUIREMENTS:
1. The newsstand should occupy a conspicuous location, so that it is easily seen.
2. The newsstand should be located in the waiting room area, adjacent to the concourse areas and should front on a major path of circulation.
3. Ample space should be allotted for the newsstand so that materials can be attactively displayed, with a large amount of space to be occupied by news papers.

ACTIVITIES:
Purchasees, browsing, walking, standing, killing time, conversation.

GENERAL REQUIREMENTS:
1. Number of Occupants: 20
2. Minimum Sq. Ft./Occupant: 30sq.ft.
3. Minimum Area: 600 sq.ft.
4. Minimum No. of Exits:1
5. Minimum Clear Ceiling Ht.:8'-0"
6. Degree of Enclosure: Full
7. Partitions:Flexible
8. Accoustics:Controlled
9. Degree of Facility Maintenance: Medium
10. Degree of Security Control:Medium
11. Degree of Visual Permeability: High
12. Degree of Safety Control:Low

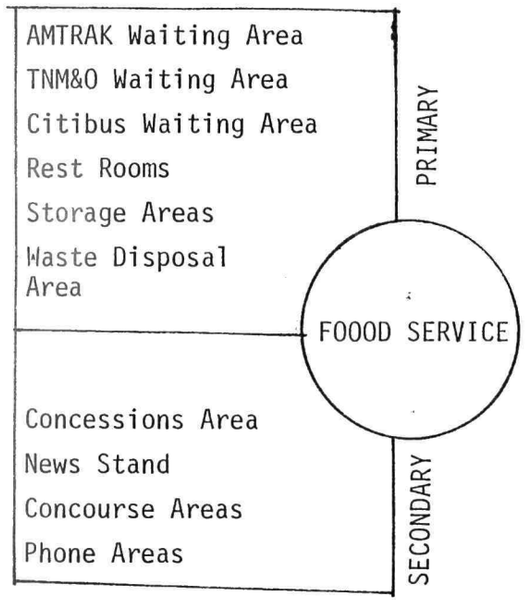
MATERIAL FINISH:
1. Floors: Carpet/Resilient Tile
2. Walls: Painted/Vinyl Covered
3. Ceilings:Accoustical Drop

MECHANICAL/ELECTRICAL
1. Heating: 65 deg. at 0 deg. exterior
2. Cooling: 75 deg. at 90 deg. exterior
3. Fresh Air:100 cfm
4. Circulation:300 cfm
5. Water Supply: NA
6. Plumbing Fixtures:NA
7. Gas Service:NA
8. Electrical:120 VAC
9. Lighting Levels:30 fc
10. Emergency Lighting: 1 fc

EQUIPMENT/FURNISHINGS:
1. Communications:1 Phone
2. Office Equipment:NA
3. Seating: NA
4. Work Surfaces:Sales Counter
5. Storage Equipment:Small stockroom
6. Special Equipment: Magazine/newspaper displays

SPECIAL NOTES:

FOOD SERVICE



ACTIVITIES:
Eating, sitting, conversation, reading, killing time, food preparation, cleanup, sales.

Food service areas in transit facilities are perhaps the favorite place for travelers to kill time. It somehow makes time to pass faster in a coffee bar with a cup of coffee or two, especially if a passenger has a long layover in the early morning hours. The lighting and accoustics are important in these areas. The designer should avoid the use of harsh lighting, reflective services and the clatter of kitchen noises should not spill over into the public area. Another high demand for this area will occur in the morning, as commuters arrive at the facility and decide to have a cup of coffee before they leave for work. Ample space should be provided so that people can read newspapers, etc., without violating another person's personal space. The overall mood of food service areas should be quiet and relaxing, for these areas are usually seen as a haven of relief from the hustle and bustle of long distance travel. Eating and drinking represent a return to normal, familiar activities for these travelers.

DESIGN REQUIREMENTS:
1. The food service area should provide a quiet and restful atmosphere for travelers.
2. Ample space should be provided so that persons can easily read newspapers or stretch their legs out.
3. Avoid the use of harsh lighting, highly reflective surfaces and careful control of accoustics are required.

GENERAL REQUIREMENTS:
1. Number of Occupants: 60 diners/6 staff
2. Minimum Sq. Ft./Occupant: 15 sq.ft.
3. Minimum Area: 1500sq. ft.
4. Minimum No. of Exits: 2
5. Minimum Clear Ceiling Ht.: 10'-0"
6. Degree of Enclosure: Full
7. Partitions: Flexible
8. Accoustics: Controlled-Isolated
9. Degree of Facility Maintenance: High
10. Degree of Security Control: Medium
11. Degree of Visual Permeability: High
12. Degree of Safety Control: Low

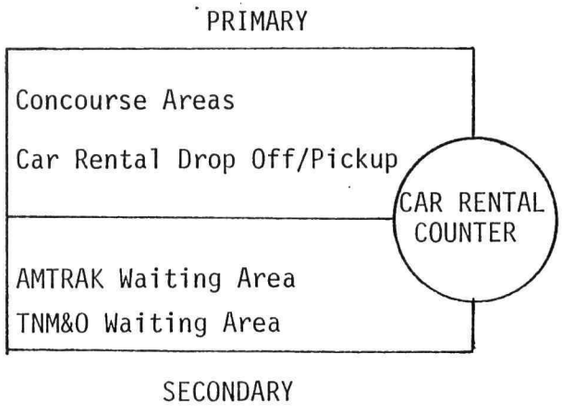
MATERIAL FINISH:
1. Floors: Carpet/Tiled
2. Walls: Washable Vinyl
3. Ceilings: Accoustical Drop

MECHANICAL/ELECTRICAL
1. Heating: 70 deg. at 0 deg. exterior
2. Cooling: 70 deg. at 90 deg. exterior
3. Fresh Air: 300 cfm
4. Circulation: 900 cfm
5. Water Supply: Hot and Cold
6. Plumbing Fixtures: Lavatory, Service Sink
7. Gas Service: Yes
8. Electrical: 120/220 VAC
9. Lighting Levels: 30 fc
10. Emergency Lighting: 1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: PA
2. Office Equipment: Cash Register
3. Seating: Seating for 60
4. Work Surfaces: Register counter, tables for 60
5. Storage Equipment: Foodstuffs, cleaning supplies
6. Special Equipment: Walk-in, ovens, fryers, grill, preparation table, dishwasher.

SPECIAL NOTES:

CAR RENTAL COUNTER



The car rental area should be plainly visible from the concourse area as this area will be a major destination for arriving passengers. It should be located along the major path of circulation leading from the main entrance to the concourse area to assure that persons returning cars have a short and unobstructed walk in case they arrive at the Transit Center late and are returning a car. Some provisions should be made so the leasee of the space can modify the counter to their own needs such as computer terminals, advertising signs, etc.

DESIGN REQUIREMENTS:
1. Car rental counter should have a high degree of visibility from the concourse area.
2. The car rental should be located on the path leading from the car drop-off point to the concourse.

ACTIVITIES:
Information, payments, paperwork, key pickup, standing, conversation.

GENERAL REQUIREMENTS:
1. Number of Occupants: 2
2. Minimum Sq. Ft./Occupant: 60 sq. ft.
3. Minimum Area: 120 sq. ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 8'-0"
6. Degree of Enclosure: Full
7. Partitions: Flexible
8. Accoustics: Controlled
9. Degree of Facility Maintenance: Low
10. Degree of Security Control: Medium
11. Degree of Visual Permeability: High
12. Degree of Safety Control: Low

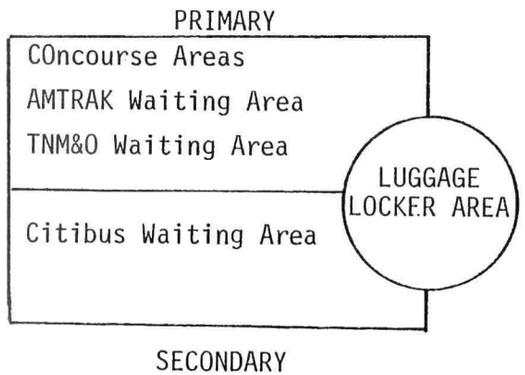
MATERIAL FINISH:
1. Floors: Carpet
2. Walls: Vinyl or Paint
3. Ceilings: Accoustic Drop

MECHANICAL/ELECTRICAL
1. Heating: 70 deg. at 0 deg. exterior
2. Cooling: 70 deg. at 90 deg. exterior
3. Fresh Air: 10 cfm
4. Circulation: 30cfm
5. Water Supply: NA
6. Plumbing Fixtures: NA
7. Gas Service: NA
8. Electrical: 120 VAC
9. Lighting Levels: 40 fc/100 fc at work surfaces
10. Emergency Lighting: 1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: 2 Computer Terminals, Phone, PA
2. Office Equipment: Cash Register
3. Seating: 2 Stools
4. Work Surfaces: Counter
5. Storage Equipment: Under Counter
6. Special Equipment: Credit Card Machine

SPECIAL NOTES:

LUGGAGE LOCKER AREA



The luggage locker area is one area that is not fully understood in the design phase. It is simply not enough to poke a hole in a waiting room wall and shove the lockers into it. What usually happens when this is done, is that major paths of circulation are blocked as people place into or remove luggage from the locker. It is better if the luggage locker area is placed in a small alcove or in a wall where it does not interfere with paths of circulation. The luggage locker area should be located off the waiting area and should be easily seen for the purpose of security surveillance. It is also helpful to have a table or counter located nearby so that people can open up their luggage to remove some object from it before they place their luggage in the locker.

DESIGN REQUIREMENTS:
1. The luggage locker area should be so situated so that it doesn't obstruct paths of circulation.
2. The locker area should have a high degree of visibility, not only to aid patrons to locate the area, but also for purposes of security surveillance.
3. Provide a small table or counter which patrons could open their luggage on.

ACTIVITIES:
Handling and storage of luggage, purchase of service.

GENERAL REQUIREMENTS:
1. Number of Occupants: 100 Lockers
2. Minimum Sq. Ft./Occupant: 3 sq. ft./ 4 locker unit
3. Minimum Area: 75 sq. ft.
4. Minimum No. of Exits:1
5. Minimum Clear Ceiling Ht.:8'-0"
6. Degree of Enclosure: Full
7. Partitions:Flexible
8. Accoustics: NA
9. Degree of Facility Maintenance:Medium
10. Degree of Security Control: Medium
11. Degree of Visual Permeability:High
12. Degree of Safety Control:Low

MATERIAL FINISH:
1. Floors: Hard Tile
2. Walls: Impact resistant
3. Ceilings:Accoustical Drop

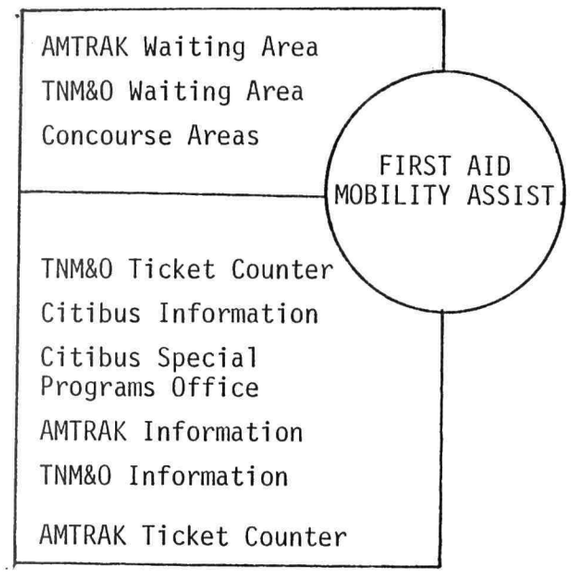
MECHANICAL/ELECTRICAL
1. Heating:65 deg. @ 0deg. Exterior
2. Cooling:75 deg. @ 90 deg. Exterior
3. Fresh Air:10 cfm
4. Circulation:30 cfm
5. Water Supply:NA
6. Plumbing Fixtures:NA
7. Gas Service: NA
8. Electrical:120 VAC
9. Lighting Levels: 20 fc
10. Emergency Lighting:1 fc

EQUIPMENT/FURNISHINGS:
1. Communications:PA
2. Office Equipment: NA
3. Seating: NA
4. Work Surfaces:Waist-high Counter for Luggage
5. Storage Equipment: NA
6. Special Equipment:25- 4 Unit Lockers

SPECIAL NOTES: NA

FIRST AID/MOBILITY ASSISTANCE AREA

PRIMARY



SECONDARY

DESIGN REQUIREMENTS:

1. The first aid/mobility assistance area should be conspicuously located in the waiting room, and should, if possible, command a view of both the main entrance and concourse entrances.
2. A portion of the area should be an enclosed room with a bed to isolate emergency victims from public on lookers. A lavatory and a w.c. should also be located in these areas.

ACTIVITIES:

Communications, special user assistance, emergency and health assistance, paper work.

This area would operate primarily as a mobility assistance area rather than as a first aid center. Hopefully, the design of the facility would keep accidents to a minimum, yet there will always be the problem of medical emergencies in a facility which would handle loads of up to 1,300 persons/hour. The first aid area would act more as a holding room until medical assistance arrives, though attendants should be trained in the fundamentals of first aid, CPR, etc. A portion of the area should include an enclosed room with a bed to isolate the person from curious on lookers. Another function of this room could be to give persons suffering from travel fatigue, which can often occur with the elderly, a place to rest until their bus/train leaves. Functioning primarily as a mobility assistance area, attendants will give aid to those with mobility, visibility or communication problems. Wheelchairs should be available in this area and the attendants should be specially trained to deal with the problems of the handicapped. As the first aid/mobility assistance area, it should be conspicuously located in the waiting room area so that those persons requiring assistance could easily locate the area. The area in turn, should have a good view of the major entrance and concourse areas, so that attendants can readily recognize those persons with disabilities and offer them assistance.

GENERAL REQUIREMENTS:

1. Number of Occupants: 1
2. Minimum Sq. Ft./Occupant: 100 sq. ft.
3. Minimum Area:100 sq. ft.
4. Minimum No. of Exits:1
5. Minimum Clear Ceiling Ht.: 8'-0"
6. Degree of Enclosure: Full
7. Partitions: Flexible
8. Accoustics:None/ Isolated
9. Degree of Facility Maintenance:Low
10. Degree of Security Control: Low
11. Degree of Visual Permeability: High/Low
12. Degree of Safety Control:Low

MATERIAL FINISH:

1. Floors: Carpet/Resilient Tile
2. Walls: Vinyl Covered
3. Ceilings:Accoustic Drop

MECHANICAL/ELECTRICAL

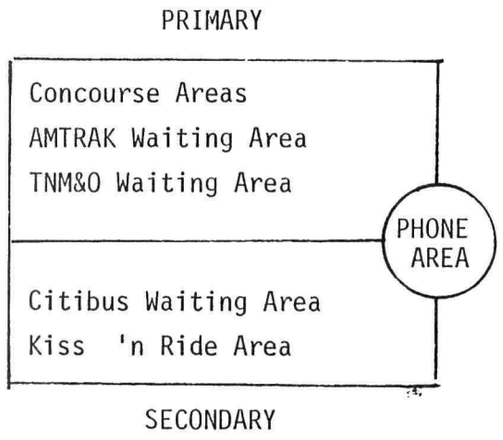
1. Heating:70 deg. @ 0 deg. Exterior
2. Cooling:70 deg. @ 90 deg. Exterior
3. Fresh Air: 5 cfm
4. Circulation: 15 cfm
5. Water Supply: Hot and Cold
6. Plumbing Fixtures: Lav. and W.C.
7. Gas Service: NA
8. Electrical: 120 VAC
9. Lighting Levels: 40 fc/100 fc @ work surfaces
10. Emergency Lighting: 2 fc

EQUIPMENT/FURNISHINGS:

1. Communications: Phone, Teletype
2. Office Equipment: NA
3. Seating: 2 Chairs
4. Work Surfaces:Counter
5. Storage Equipment: Wheel chair, crutches, linen
6. Special Equipment: First Aid Cabinet, Bed

SPECIAL NOTES:

PHONE AREAS



As intercity passengers arrive at the station, either by rail or by bus, many of them will require access to a phone to notify someone to pick them up. Many of these incoming passengers will need a taxi, so a taxi-service courtesy phone should be located in the phone area. The phone area should be located so that it is immediately visible from the concourse area. Carefull consideration should be given to the type of phone booths which are used in the phone area. Fully enclosed phone booths do not allow people to have their baggage near by them, and many people, especially newcomers to town would feel uncomfortable to be separated from their baggage. This also creates a security problem, especially if the phone area is located near an exterior exit, for it opens up the opportunity of baggage theft. Another problem with enclosed phone booths occurs for those persons traveling with children. Children will often wander off while their parent is inside a phone booth.

DESIGN REQUIREMENTS:
1. The phone area should be visible from the concourse area.
2. Phone booths should be of an open type design to allow passengers to carry baggage with them, while they talk on the phone.
3. Phone areas should be located away from exterior exits to discourage would-be thieves.
4. The accoustics in the phone area should be isolated so that a normal conversation may be had.

ACTIVITIES:
Conversation, standing, sitting.

GENERAL REQUIREMENTS:
1. Number of Occupants: 10
2. Minimum Sq. Ft./Occupant: 8 sq.ft.
3. Minimum Area: 80 sq.ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 8'-0"
6. Degree of Enclosure: Full
7. Partitions: Flexible
8. Accoustics: Isolated
9. Degree of Facility Maintenance: Medium
10. Degree of Security Control: Low
11. Degree of Visual Permeability: High
12. Degree of Safety Control: Low

MATERIAL FINISH:
1. Floors: Carpeted/Resilient Tile
2. Walls: Non-pourous Surface
3. Ceilings: Accoustical Drop

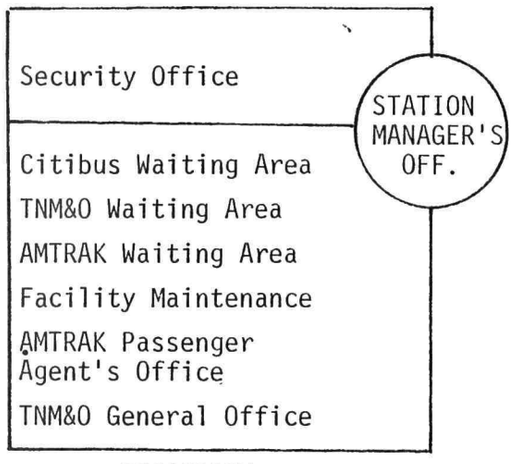
MECHANICAL/ELECTRICAL
1. Heating: 65 deg. at 0 deg. exterior
2. Cooling: 75 deg. at 90 deg. exterior
3. Fresh Air: 50 cfm
4. Circulation: 150 cfm
5. Water Supply: NA
6. Plumbing Fixtures: NA
7. Gas Service: NA
8. Electrical: 120 VAC
9. Lighting Levels: 30 fc
10. Emergency Lighting: 1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: Open Phone Booths (10)
2. Office Equipment: NA
3. Seating: NA
4. Work Surfaces: NA
5. Storage Equipment: NA
6. Special Equipment: NA

SPECIAL NOTES:
NA

STATION MANAGER'S OFFICE

PRIMARY



SECONDARY

The station manager's office is the administrative center for the operation of the Transit Center. It would supervise maintenance and security of the facility and be the agent through which leasing arrangements are made for the concessions and food service areas, as well as for office and counter leasing by the secondary clients. The manager is to have a private office which is served by two clerical workers whose work areas are included in this space. Though some public access is desirable, it's entrance should not open into the waiting or concourse areas, nor should it open into a major path of user circulation. As this is a government office, furnishings should be fairly simple and functional. Natural lighting is desirable in the office space and it should be accoustically isolated from public spaces.

DESIGN REQUIREMENTS:
1. Provide a private office for the manager, separated from his two clerical workers.
2. Office entrance should not open directly into the waiting areas or into paths of major user circulation.
3. Provide natural lighting if at all possible into the office areas.

ACTIVITIES:
Information, office work, conversation.

GENERAL REQUIREMENTS:
1. Number of Occupants: 3
2. Minimum Sq. Ft./Occupant: 100 square feet
3. Minimum Area: 300 square feet
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 8'
6. Degree of Enclosure: Full
7. Partitions: Flexible
8. Accoustics: Isolated
9. Degree of Facility Maintenance: Low
10. Degree of Security Control: Low
11. Degree of Visual Permeability: Variable
12. Degree of Safety Control: Low

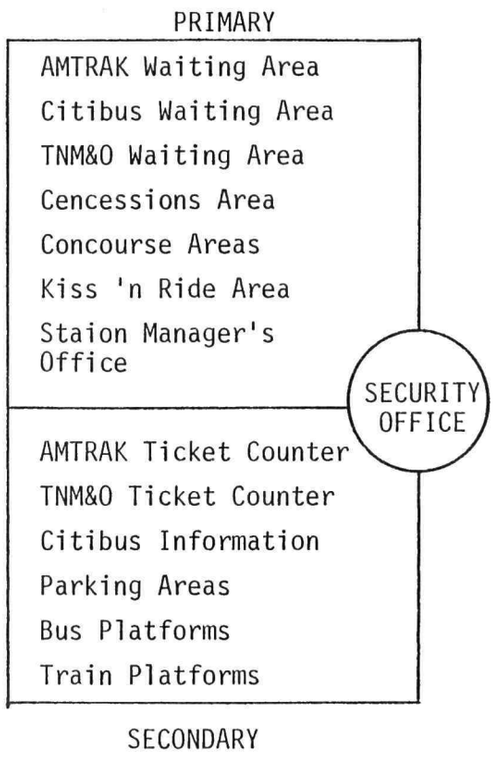
MATERIAL FINISH: Variable
1. Floors: Carpeted
2. Walls: Vinyl covered or painted
3. Ceilings: Accoustical Drop

MECHANICAL/ELECTRICAL
1. Heating: 70° F @ 0°
2. Cooling: 70° @ 90°
3. Fresh Air: 15 cfm
4. Circulation: 45 cfm
5. Water Supply: None
6. Plumbing Fixtures: None
7. Gas Service: None
8. Electrical: 117 VAC
9. Lighting Levels: 40fc/100fc @ work surface
10. Emergency Lighting: 1fc

EQUIPMENT/FURNISHINGS:
1. Communications: 3 phones
2. Office Equipment: 2 typewriters, dictation
3. Seating: 3 office, 5 visitors
4. Work Surfaces: 1 executive, 2 secretarial
5. Storage Equipment: 12 legal files, book shelves,
6. Special Equipment: office supplies.

SPECIAL NOTES:

SECURITY OFFICE



The security office should be highly visible from the public areas of the Transit Center. The purpose for this is to maintain some measure of direct surveillance of the public areas, even if TV surveillance is used. Also, the high visibility of the security office would act as a deterrent to any persons comtemplating criminal activities within the facility. The security office should also be on the same level at which most of the public activities occur so that rapid access is gained into these areas by the security officers. If the station layout requires the use of TV surveillance because direct surveillance is not possible, windows should not be placed in the security office to minimize reflective glare on the monitor screens. Close access is desired to both the station manager's office and the safety and claims office.

DESIGN REQUIREMENTS:
1. High visibility of the security office from the public areas of the facility is desired to permit direct surveillance.
2. The security office should be located on the same level as the major public areas.
3. No windows in the security office if TV surveillance is utilized.
4. Direct access is desirable to both the Safety and Claims Office as well as the Station Manager's Office.

ACTIVITIES:
Observation of TV monitors, conversation, seating.

GENERAL REQUIREMENTS:
1. Number of Occupants: 2
2. Minimum Sq. Ft./Occupant: 100 sq. ft.
3. Minimum Area: 200 sq. ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 8'-0"
6. Degree of Enclosure: Full
7. Partitions: Flexible
8. Accoustics: Isolated
9. Degree of Facility Maintenance: Low
10. Degree of Security Control: NA
11. Degree of Visual Permeability: Low
12. Degree of Safety Control: Low

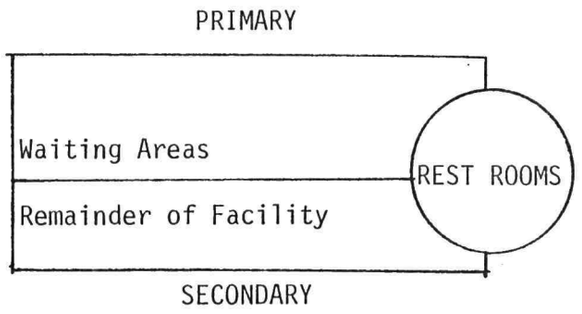
MATERIAL FINISH:
1. Floors: Carpet
2. Walls: Plaster/ Painted or Vinyl Covered
3. Ceilings: Accoustic Drop

MECHANICAL/ELECTRICAL
1. Heating: 70 deg. at 0 deg. Exterior
2. Cooling: 70 deg. at 90 deg. Exterior
3. Fresh Air: 10 cfm
4. Circulation: 30 cfm
5. Water Supply: NA
6. Plumbing Fixtures: NA
7. Gas Service: NA
8. Electrical: 120 VAC
9. Lighting Levels: 40 fc/100 fc @ work surface
10. Emergency Lighting: 2 fc

EQUIPMENT/FURNISHINGS:
1. Communications: Surveillance Monitors, Radio Base Phone
2. Office Equipment:
3. Seating: 2 Desk
4. Work Surfaces: 2 Work desks
5. Storage Equipment: Gun Locker
6. Special Equipment:

SPECIAL NOTES: NA

REST ROOMS



Restrooms serve another purpose not usually encountered in typical buildings because of the very nature of a transit facility. For poeple who have been traveling a great while, it offers them an opportunity to perform types of personal hygiene which cannot be performed in the cramped quarter of a bus or train washroom. For men this usually incldes shaving and for women make-up and fixing hair. It is necessary to provide some counter space along the lavatories in the rest rooms. In addition, many transit facilities often include a small lounge area before one enters the women's room. This small lounge usually includes soft chairs or couches, and plenty of mirrors and counter space. Vandalism is a major problem encountered in restroom areas and this should be taken into account when selecting the fixtures, surface finishes, and furnishings of the restrooms.

DESIGN REQUIREMENTS:
1. Allow more lavatories than usual with plenty of counter space and provide electrical outlets for small appliances such as electric razors, curling irons, etc.
2. Provide the women's room with a small lounge, furnished with soft chairs, lots of mirrors, counter space and electrical outlets.

ACTIVITIES:
The obvious, washing, personal hygiene, changing clothes.

GENERAL REQUIREMENTS:
1. Number of Occupants: NA
2. Minimum Sq. Ft./Occupant: NA
3. Minimum Area: 175sq.ft. Men 225 sq.ft. Women
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 10 feet
6. Degree of Enclosure: Full
7. Partitions: Wall Hung
8. Accoustics: Controlled
9. Degree of Facility Maintenance: High
10. Degree of Security Control: Low-Medium
11. Degree of Visual Permeability: None
12. Degree of Safety Control: Low

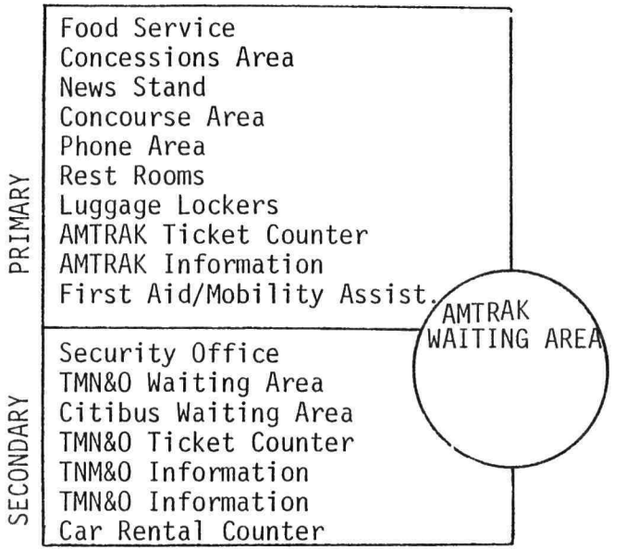
MATERIAL FINISH:
1. Floors: Non-Slip Tile, Durable
2. Walls: Waterproof, Graffiti Proof
3. Ceilings: Accoustical Drop

MECHANICAL/ELECTRICAL
1. Heating: 65 deg @ 0 deg. exterior
2. Cooling: 75 deg. @ 90 deg. exterior
3. Fresh Air: 50 cfm (no return)
4. Circulation: 150 cfm (no return)
5. Water Supply: Hot and Cold
6. Plumbing Fixtures: Men: 3wc,5 lav,3 ur, Women; 4 wc, 5 lav.
7. Gas Service: NA
8. Electrical: 120 VAC
9. Lighting Levels: 40fc
10. Emergency Lighting: 1fc

EQUIPMENT/FURNISHINGS:
1. Communications: PA System
2. Office Equipment: NA
3. Seating: Chairs, Couches in Women's Lounge
4. Work Surfaces: Counter at Lavatories
5. Storage Equipment:
6. Special Equipment:

SPECIAL NOTES:

AMTRAK WAITING AREA



2. Provide a place for baggage in close proximity to the patron's seat.
3. Utilize seating cluster rather than linear and face-to-face seating.
4. Keep the patrons informed as to the status of his train by giving a direct view of concourse and platform areas, and/or TV monitors, and public address systems.

ACTIVITIES:
Waiting, sitting, standing, smoking, reading, eating sleeping, playing.

The AMTRAK waiting area should be incorporated with the TNM&O waiting area to create a more efficient use of these areas. A major problem which occurs in waiting areas is what to do with the baggage while one is sitting in the waiting area. Quite often, there are no provisions for baggage in the waiting areas and as a result, baggage ends up in or in front of vacant seats, depriving others of seating. The problem is quite acute when face-to-face seating is used, where the aisles between seats become obstacle courses full of baggage. Another problem occurring in the waiting area is that of seating arrangements. Too often the seating in waiting areas consists of rows of face-to-face seating. This form of seating does not encourage conversation except with one's immediate neighbor and often brings about an uncomfortable face-to-face confrontation with a complete stranger. Cluster seating would encourage conversation among family groups, etc. and would eliminate the problems of face-to-face seating. Another problem confronting the traveler in waiting areas is the fear of missing one's ride. This problem is eliminated by giving the waiting areas a direct view of the concourse and loading platforms, adequate public address systems, and/or locating TV monitors with the status of incoming and outgoing transportation.

DESIGN REQUIREMENTS:
1. Layout paths of circulation that are easily recognized leading to the major areas of passenger concern.

GENERAL REQUIREMENTS:
1. Number of Occupants: 100
2. Minimum Sq. Ft./Occupant: 20 sq. ft.
3. Minimum Area: 2000 sq. ft.
4. Minimum No. of Exits: 2
5. Minimum Clear Ceiling Ht.: 10'-0" at Circulation Paths
6. Degree of Enclosure: Full
7. Partitions: Flexible
8. Accoustics: Controlled
9. Degree of Facility Maintenance: High
10. Degree of Security Control: High
11. Degree of Visual Permeability: High
12. Degree of Safety Control: Low

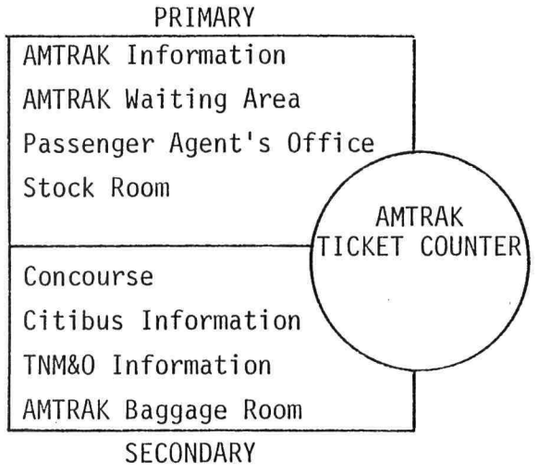
MATERIAL FINISH:
1. Floors: Carpet (Seating)/ tile (Circulation Paths)
2. Walls: Vinyl or other washable
3. Ceilings: Varies

MECHANICAL/ELECTRICAL
1. Heating: 65 deg. at 0 deg. exterior
2. Cooling: 75 deg. at 90 deg. exterior
3. Fresh Air: 500 cfm
4. Circulation: 1500 cfm
5. Water Supply: Cold
6. Plumbing Fixtures: Water Fountain
7. Gas Service: NA
8. Electrical: 120 VAC, 220 VAC
9. Lighting Levels: 40 fc/100 fc for reading
10. Emergency Lighting: 1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: PA, Courtesy Phones
2. Office Equipment: NA
3. Seating: Clustered Seating for 100
4. Work Surfaces: NA
5. Storage Equipment: NA
6. Special Equipment: NA

SPECIAL NOTES:

AMTRAK TICKET COUNTER



The AMTRAK reservation system (the majority of AMTRAK trains feature all reserved seating) is a very sophisticated computer system, which delivers information and reservations, and prints tickets by means of computer terminals. A terminal will service each counter station. This reliance on the computer terminals eliminates the need for large amounts of material storage and work-surfaces in the ticket counter area. The ticket counter should have a high degree of visibility from the waiting area so the area is quickly found by persons arriving at the facility. Rail ticket agents do not handle baggage, so no provisions for baggage handling are required here. Due to the large amount of counter stations in the facility, it is important that the AMTRAK ticket counter be well identified so that it will not be confused with the other ticket counters. Waiting lines at these ticket counters tend to get quite long before a train comes in, so enough space must be allowed so that the lines do not spill over into paths of circulation.

DESIGN REQUIREMENTS:
1. Identification of the ticket counter should be highly visible and recognizable.
2. Waiting lines should not spill over into paths of circulation.
3. The ticket counter should be seen from the entrance into the transit facility.

ACTIVITIES:
Orientation, conversation, money exchange, paperwork.

GENERAL REQUIREMENTS:
1. Number of Occupants: 3
2. Minimum Sq. Ft./Occupant: 60 sq. ft.
3. Minimum Area: 180 sq. ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 8'-0"
6. Degree of Enclosure: Full
7. Partitions: Flexible
8. Accoustics: Contrilled/Isolated
9. Degree of Facility Maintenance: Medium
10. Degree of Security Control: Medium
11. Degree of Visual Permeability: High
12. Degree of Safety Control: Low

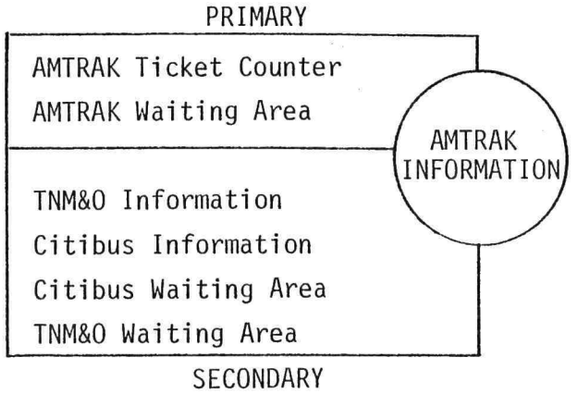
MATERIAL FINISH:
1. Floors: Carpeted
2. Walls: Paint or Vinyl covered
3. Ceilings: Accoustic Drop

MECHANICAL/ELECTRICAL
1. Heating: 70 deg. at 0 deg. exterior
2. Cooling: 70 deg. at 90 deg. exterior
3. Fresh Air: 20 cfm
4. Circulation: 60 cfm
5. Water Supply: NA
6. Plumbing Fixtures: NA
7. Gas Service: NA
8. Electrical: 120 VAC
9. Lighting Levels: 40 fc/100 fc at work surfaces
10. Emergency Lighting: 1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: 3 Computer Terminals, 3 Phones PA Mike
2. Office Equipment: NA
3. Seating: 3 Stools
4. Work Surfaces: 1 Ticket Counter
5. Storage Equipment: Under counter
6. Special Equipment: NA

SPECIAL NOTES:

AMTRAK INFORMATION COUNTER



The information counter should be easily identifiable and should be easily distinguishable from the AMTRAK ticket counter. The information counter will not sell tickets, but deal only with information, diverting some of the load from the ticket counters during peak activity. The information counter would still require a computer terminal for such activities as making and verifying ticket reservations. Waiting lines at the information counter should not be allowed to interrupt paths of circulation.

DESIGN REQUIREMENTS:
1. The information counter should be easily distinguished from the ticket counter.
2. The information counter will be located in the waiting room.
3. Waiting lines should not obstruct paths of circualtion in the facility.

ACTIVITIES:
Orientation, standing, conversation.

GENERAL REQUIREMENTS:
1. Number of Occupants: 1
2. Minimum Sq. Ft./Occupant: 60 sq.ft
3. Minimum Area: 60 sq.ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 8'-0"
6. Degree of Enclosure: Full
7. Partitions: Flexible
8. Accoustics: NA
9. Degree of Facility Maintenance: Medium
10. Degree of Security Control: Medium
11. Degree of Visual Permeability: High
12. Degree of Safety Control: Low

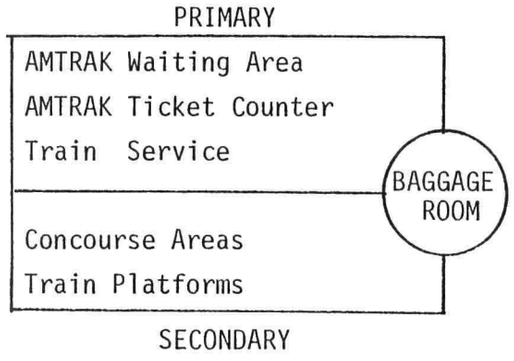
MATERIAL FINISH:
1. Floors: Carpet
2. Walls: Vinyl covered or Equiv.
3. Ceilings: Accoustic Drop

MECHANICAL/ELECTRICAL
1. Heating: 70 deg. at 0 deg. exterior
2. Cooling: 70 deg. at 90 deg. exterior
3. Fresh Air: 5 cfm
4. Circulation: 15 cfm
5. Water Supply: NA
6. Plumbing Fixtures: NA
7. Gas Service: NA
8. Electrical: 120 VAC
9. Lighting Levels: 40 fc/ 100 fc at work surface
10. Emergency Lighting: 1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: PA Mike
2. Office Equipment: NA
3. Seating: 1 Stool
4. Work Surfaces: Counter
5. Storage Equipment: NA
6. Special Equipment: Amtrak Computer Terminal

SPECIAL NOTES:

AMTRAK BAGGAGE ROOM



The AMTRAK baggage room should be located in approximately the same area as the AMTRAK ticket counter, so that passengers may check their baggage after they purchase their tickets. An area inside the baggage room should be set aside for each of the primary destinations (Clovis, Abilene, and Amarillo) so that baggage may be easily sorted. Another area will be required for the storage of baggage unloaded from the train. The baggage room should be easily visible from the concourse area so that passengers have no difficulty in finding where to pick their baggage up. Since the actual transfer of baggage to and from the train will be performed by the train service department, this adjacency is strongly needed.

DESIGN REQUIREMENTS:
1. Adjacency to the train service department is needed to facilitate the transfer of baggage to and from the baggage room.
2. The baggage room should be visible from both the ticket counter and the concourse area.
3. The AMTRAK baggage room should be easily distinguished from the TNM&O baggage room.
4. Provide a sorting space with an area dedicated to each primary destination as well as an area for baggage awaiting pick up.

ACTIVITIES:
Transferrence of baggage, sorting.

GENERAL REQUIREMENTS:
1. Number of Occupants: 2
2. Minimum Sq. Ft./Occupant: -
3. Minimum Area: 750 square feet
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 10'
6. Degree of Enclosure: Full
7. Partitions: -
8. Accoustics: Controlled
9. Degree of Facility Maintenance: Low
10. Degree of Security Control: High
11. Degree of Visual Permeability: Low
12. Degree of Safety Control: Low

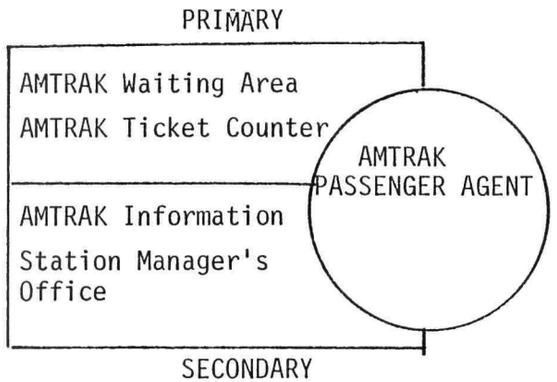
MATERIAL FINISH:
1. Floors: Concrete finish
2. Walls: Impact resistant
3. Ceilings: Accoustical Drop ceiling

MECHANICAL/ELECTRICAL
1. Heating: 70° @ 0° EXT
2. Cooling: 70° @ 90° EXT
3. Fresh Air: 10 cfm
4. Circulation: 30 cfm
5. Water Supply: None
6. Plumbing Fixtures: None
7. Gas Service: None
8. Electrical: 117 VAC
9. Lighting Levels: 40 fc
10. Emergency Lighting: 1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: Phones
2. Office Equipment: -
3. Seating: -
4. Work Surfaces: counter
5. Storage Equipment: luggage racks 300 sq. ft.
6. Special Equipment: 4 luggage trailers

SPECIAL NOTES:

AMTRAK PASSENGER AGENT'S OFFICE



The AMTRAK Passenger Agent oversees the operation of AMTRAK employees and operations at the facilities. The Passenger Agent will require his own private office supported by two clerical workers. Some public access to the office will be required, mostly passengers with reservation problems or other complaints and problems. The office will work closely with the AMTRAK ticket counter. The office will not be that directly involved in train operations which would be handled by the communications and train service departments, though it may handle the paperwork for the ordering of train consumable items, etc.

DESIGN REQUIREMENTS:
1. A close association with the AMTRAK ticket counter is required.
2. There will be need of some public access, but perhaps handled through the Ticket Counter.
3. Natural lighting is desired in the office area.

ACTIVITIES:
Coordination of AMTRAK Services, paperwork.

GENERAL REQUIREMENTS:
1. Number of Occupants: 3
2. Minimum Sq. Ft./Occupant: 100 sq. ft.
3. Minimum Area:300 sq. ft.
4. Minimum No. of Exits:1
5. Minimum Clear Ceiling Ht.: 8'0"
6. Degree of Enclosure: Open to Enclosed
7. Partitions:Movable
8. Accoustics: Isolated
9. Degree of Facility Maintenance: Low
10. Degree of Security Control: Medium
11. Degree of Visual Permeability: Open
12. Degree of Safety Control: Low

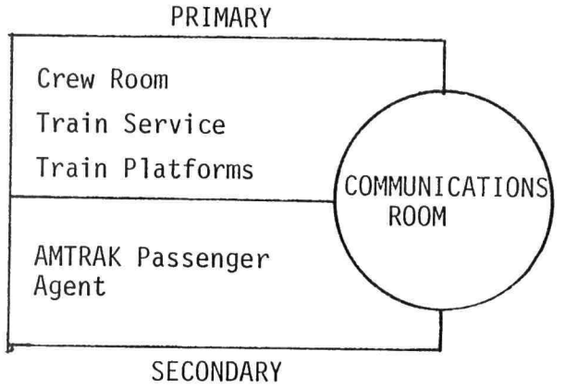
MATERIAL FINISH:
1. Floors: Carpeted
2. Walls: Plaster/Painted or Vinyl Covered
3. Ceilings:Accoustical Drop

MECHANICAL/ELECTRICAL
1. Heating: 70° @ 0° Exterior
2. Cooling: 70° @ 90° Exterior
3. Fresh Air: 15 cfm
4. Circulation: 45 cfm
5. Water Supply: NA
6. Plumbing Fixtures: NA
7. Gas Service:NA
8. Electrical: 117 VAC
9. Lighting Levels: 40 fc/100 fc @ work surface
10. Emergency Lighting: 1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: 3 Phones, 1 Computer Terminal
2. Office Equipment: 2 typewriters, Dictation Mach.
3. Seating: 3 Desk, 5 Visitor
4. Work Surfaces: 2 Secretarial, 1 Executive
5. Storage Equipment: Office Supplies
6. Special Equipment: NA

SPECIAL NOTES: NA

AMTRAK COMMUNICATIONS ROOM



The communications room is the coordinator for train and train support facilities. It's major task is to make sure that all necessary supplies and equipment are in place as the train arrives at the station. Most of the train routing and road condition communications would be handled by Santa Fe Railroad authorities. The communications room should have a view of the train platform areas in order to fully coordinate these activities. It should have an adjacency with the AMTRAK crew room, separated by a work counter, in order to permit face-to-face communications with the members of the train crews as they fill out requisitions, check on train service, etc.

DESIGN REQUIREMENTS:
1. The communications room should have a view of platform activities.
2. A close adjacency with the AMTRAK crew room is required, the two areas sharing a common work counter.

ACTIVITIES:
Conversation, paper work.

GENERAL REQUIREMENTS:
1. Number of Occupants: 1
2. Minimum Sq. Ft./Occupant: 100 sq.ft.
3. Minimum Area: 100 sq.ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 8'-0"
6. Degree of Enclosure: Full
7. Partitions: Flexible
8. Accoustics: Isolated
9. Degree of Facility Maintenance: Low
10. Degree of Security Control: Low
11. Degree of Visual Permeability: Low
12. Degree of Safety Control: Low

MATERIAL FINISH:
1. Floors: Carpet or floor tile
2. Walls: Painted
3. Ceilings: Accoustical Drop

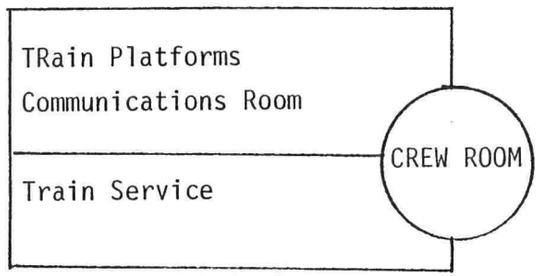
MECHANICAL/ELECTRICAL
1. Heating: 70 deg. at 0 deg. exterior
2. Cooling: 70 deg. at 90 deg. exterior
3. Fresh Air: 5 cfm
4. Circulation: 15 cfm
5. Water Supply: NA
6. Plumbing Fixtures: NA
7. Gas Service: NA
8. Electrical: 120 VAC
9. Lighting Levels: 40 fc/ 100 fc at work surface
10. Emergency Lighting: 2 fc

EQUIPMENT/FURNISHINGS:
1. Communications: Radio Base(VHF), Phones
2. Office Equipment: NA
3. Seating: 1
4. Work Surfaces: 1 desk
5. Storage Equipment: NA
6. Special Equipment: Bulltin Board

SPECIAL NOTES: NA

AMTRAK CREW ROOM

PRIMARY



SECONDARY

The AMTRAK crew room functions quite differently from the TNM&O driver's lounge. The crew room, which is actually a side office to the communications room, gives train crew members a place to perform paper work, make requisitions for supplies further down the line, and find out track conditions, etc. further on down the line. This is necessary since the communications room has a further transmission range than the radio-telephone on board the train.

DESIGN REQUIREMENTS:
1. The crew room should be adjacent to the communications room, the two separated by only a work counter.
2. No public access should be allowed.
3. Direct access from train platforms is required.

ACTIVITIES:
Train crew file incident reports, check with facilities personnel.

GENERAL REQUIREMENTS:
1. Number of Occupants: -
2. Minimum Sq. Ft./Occupant: -
3. Minimum Area: 80 sq. ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 8'-0"
6. Degree of Enclosure: Full
7. Partitions: -
8. Accoustics: Isolated
9. Degree of Facility Maintenance: Low
10. Degree of Security Control: Low
11. Degree of Visual Permeability: Low
12. Degree of Safety Control: Low

MATERIAL FINISH:
1. Floors: Carpet or resilient tile
2. Walls: Plaster/ painted or vinyl covered
3. Ceilings: Accoustical Drop

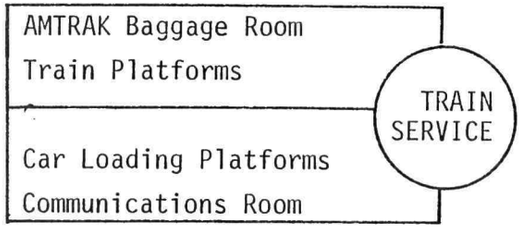
MECHANICAL/ELECTRICAL
1. Heating: 65° @ 0° Exterior
2. Cooling: 75° @ 90° Exterior
3. Fresh Air: 10 cfm
4. Circulation: 30 cfm
5. Water Supply: Cold
6. Plumbing Fixtures: Water Fountain
7. Gas Service: NA
8. Electrical: 117 V.
9. Lighting Levels: 40 fc/ 100 fc. @ work surface
10. Emergency Lighting: 1 fc.

EQUIPMENT/FURNISHINGS:
1. Communications: 1 Phone
2. Office Equipment: NA
3. Seating: 2 Stools
4. Work Surfaces: Waist High Counter
5. Storage Equipment: NA
6. Special Equipment: Bulletin Board

SPECIAL NOTES:

AMTRAK TRAIN SERVICING

PRIMARY



SECONDARY

This space will funcion primarily as a staging and storage area for materials to be placed on board the trains. Access in and out of this space is required by material handling equipment and provisions must be made for storing material handling equipment also, either inside the space itself, or immediately outside the space. Storage must also be provided for hand tools, etc. which would be used to perform minor train repairs while the train is in the station.

DESIGN REQUIREMENTS:
1. Storage of consumable goods, including food, to be placed upon the train.
2. Adjacency to AMTRAK baggage room.
3. Allowance of ample circulation space for material handling equipment.
4. Controlled public access to prevent accidents and theft from occurring in the area.
5. Adequate storage space for tools and material equipment.

ACTIVITIES:
Storage and transfer of consumable goods, and minor train repairs.

GENERAL REQUIREMENTS:
1. Number of Occupants: NA
2. Minimum Sq. Ft./Occupant: NA
3. Minimum Area: 750 sq. ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 12'-0"
6. Degree of Enclosure: Full
7. Partitions: Fixed
8. Accoustics: Isolated
9. Degree of Facility Maintenance: Low
10. Degree of Security Control: High
11. Degree of Visual Permeability: None
12. Degree of Safety Control: Medium

MATERIAL FINISH:
1. Floors: Concrete (smooth)
2. Walls: Impact-Resistant
3. Ceilings: Exposed Struct. or Drop Ceiling

MECHANICAL/ELECTRICAL
1. Heating: 65° @ 0° Exterior
2. Cooling: 75° @ 90° Exterior
3. Fresh Air: NA
4. Circulation: NA
5. Water Supply: NA
6. Plumbing Fixtures: NA
7. Gas Service: NA
8. Electrical: 120 VAC, 220 VAC
9. Lighting Levels: 30 fc
10. Emergency Lighting: 1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: 1 Phone, Walkie-Talkie
2. Office Equipment: Adding Machine
3. Seating: 1 Seat
4. Work Surfaces: 1 Desk
5. Storage Equipment: Heavy duty storage racks
6. Special Equipment: 2 Tractors, 4 Carts, 1 Floor jack, Tool area

SPECIAL NOTES: NA

CITIBUS WAITING AREA

PRIMARY

Food Service
News Stand
Concourse Areas
Rest Rooms
Citibus Information
First Aid/Mobility Assist.
Security Office
Citibus Special Programs Office
Kiss 'n Ride Area
Citibus Bus Platforms

CITIBUS WAITING AREA

AMTRAK Waiting Area
TNM&O Waiting Area
Concessions Area
Phone Area
Station Manager

SECONDARY

The Citibus Waiting area should permit a view of the bus platforms, so that patrons can watch for their buses as they pull up to the platform area. The Citibus area will function somewhat differently than the other waiting areas of the Transit Center since baggage will not be carried and passengers often travel alone rather than in groups. Therefore, a linear seating arrangement could be utilized in this area.

DESIGN REQUIREMENTS:
1. Give waiting passengers a view of their buses at the platforms.
2. Linear seating rather than seating clusters are preferred in this area.
3. The waiting area should have direct access to all Citibus functions.

ACTIVITIES:
Waiting, sitting, conversation.

GENERAL REQUIREMENTS:
1. Number of Occupants: 68
2. Minimum Sq. Ft./Occupant: 15sq. ft.
3. Minimum Area: 1020 sq. ft.
4. Minimum No. of Exits: 2
5. Minimum Clear Ceiling Ht.: 10'-0"
6. Degree of Enclosure: Full
7. Partitions: Flexible
8. Accoustics: Controlled
9. Degree of Facility Maintenance: High
10. Degree of Security Control: High
11. Degree of Visual Permeability: High
12. Degree of Safety Control: Low

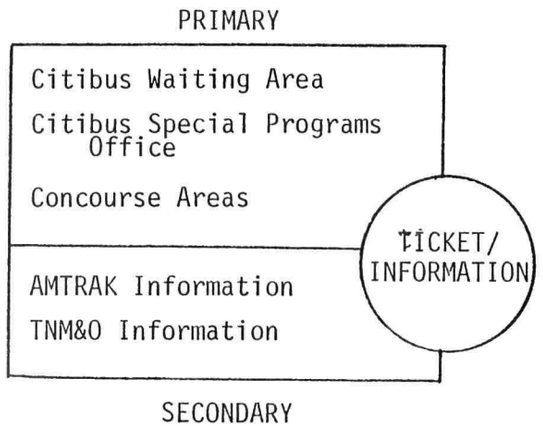
MATERIAL FINISH:
1. Floors: Resilient tile
2. Walls: Durable, washable
3. Ceilings: Accoustic

MECHANICAL/ELECTRICAL
1. Heating: 65o @ 0° Exterior
2. Cooling: 75o @ 90° Exterior
3. Fresh Air:340 cfm
4. Circulation: 1,020 cfm
5. Water Supply: Cold
6. Plumbing Fixtures: Water Fountain
7. Gas Service: NA
8. Electrical: 120 VAC
9. Lighting Levels: 30 fc/100 fc for reading
10. Emergency Lighting: 1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: PA
2. Office Equipment: NA
3. Seating: Seating for 68
4. Work Surfaces: NA
5. Storage Equipment: NA
6. Special Equipment: Large Clock

SPECIAL NOTES:

CITIBUS TICKET/INFORMATION COUNTER



This area would deal mostly with information, explaining to Citibus patrons the operation, scheduling, and routing of bus service, and other aspects encountered in public transit systems. Ticket sales will consist for the most part of multi-ride coupons, with regular bus fares being paid on board the buses. The ticket/information counter will work closely with the Citibus Special Programs office. A large map of bus routes should be mounted in the area, so that bus routing can be easily explained.

DESIGN REQUIREMENTS:
1. The Citibus ticket/information counter should be adjacent to other Citibus areas, especially the waiting area and Special Programs Office.
2. Waiting lines should not interfere with paths of circulation.

ACTIVITIES:
Conversation, standing, paperwork, money exchange.

GENERAL REQUIREMENTS:
1. Number of Occupants: 2
2. Minimum Sq. Ft./Occupant: 60 sq. ft.
3. Minimum Area: 120 sq. ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 8'-0"
6. Degree of Enclosure: Full
7. Partitions: Flexible
8. Accoustics: Controlled-Isolated
9. Degree of Facility Maintenance: Medium
10. Degree of Security Control: High
11. Degree of Visual Permeability: Open
12. Degree of Safety Control: Low

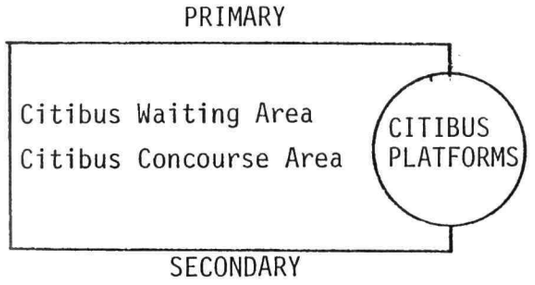
MATERIAL FINISH:
1. Floors: Carpeted
2. Walls:Washable/ Vinyl Covered
3. Ceilings:Accoustical Drop

MECHANICAL/ELECTRICAL
1. Heating: 70° @ 0° Exterior
2. Cooling: 70° @ 90° Exterior
3. Fresh Air:10 cfm
4. Circulation:30 cfm
5. Water Supply:NA
6. Plumbing Fixtures:NA
7. Gas Service:NA
8. Electrical: 120VAC
9. Lighting Levels: 40 fc/ 100 fc @ work surface
10. Emergency Lighting:1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: PA Mike
2. Office Equipment: Cash register
3. Seating: 2 Stools
4. Work Surfaces:Waist-high counter
5. Storage Equipment: Undercounter Storage
6. Special Equipment: NA

SPECIAL NOTES:

CITIBUS BUS PLATFORMS



These bus platforms will operate quite differently than those of TNM&O since there are no requirements for baggage or material handling. Also, the traffic flow would be much different since the Citibuses would be stopped for much shorter periods of time, usually two or three minutes at the most. And a linear rather than docking type of traffic pattern would be required.

DESIGN REQUIREMENTS:
1. Separation of pedestrian and bus circulation realms is a must.
2. Citibus platforms should accomodate buses in a more linear type of traffic flow.

ACTIVITIES:
Loading and unloading of passengers.

GENERAL REQUIREMENTS:
1. Number of Occupants: 16 Buses
2. Minimum Sq. Ft./Occupant: 540 sq. ft.
3. Minimum Area: 8,640 sq. ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 15'-0"
6. Degree of Enclosure: None/Sheltered
7. Partitions: NA
8. Accoustics: Controlled
9. Degree of Facility Maintenance: Medium
10. Degree of Security Control: Medium
11. Degree of Visual Permeability: Open
12. Degree of Safety Control: High

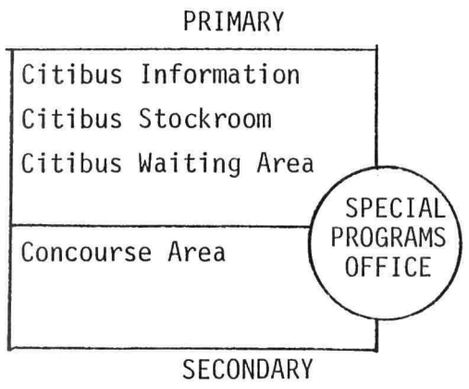
MATERIAL FINISH:
1. Floors: Rough Concrete
2. Walls: NA
3. Ceilings: Concrete, Metal, Glass

MECHANICAL/ELECTRICAL
1. Heating: NA
2. Cooling: NA
3. Fresh Air: NA
4. Circulation: 14,000 cfm/bus if enclosed
5. Water Supply: Cold
6. Plumbing Fixtures: Hose bib, hose
7. Gas Service: NA
8. Electrical: 120 vac
9. Lighting Levels: 15 fc
10. Emergency Lighting: 1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: PA
2. Office Equipment: NA
3. Seating: Benches
4. Work Surfaces: NA
5. Storage Equipment: NA
6. Special Equipment: Clocks

SPECIAL NOTES:

CITIBUS SPECIAL PROGRAM OFFICE



Citibus operates special programs for the elderly and the handicapped members of the community. The major function of this office would be to process applications for these programs and to issue the photographic I.D. cards to the participants of these programs. Two separate work areas are required: one for the processing and paper work involved in approving the application, and another area is needed for the fabrication of the I.D. cards. The special programs office should be located adjacent to the ticket and information counter with direct access to the Citibus waiting areas.

DESIGN REQUIREMENTS:
1. Adjacency with the Citibus ticket/ information counter with direct access to the public Citibus waiting room.
2. Two separate work areas are required, one for paper work, the other for making the photographic I.D. cards for special program participants.

ACTIVITIES:
Photography, paper work, information assistance.

GENERAL REQUIREMENTS:
1. Number of Occupants: 2
2. Minimum Sq. Ft./Occupant: 100 sq. ft.
3. Minimum Area: 200 sq. ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 8'-0"
6. Degree of Enclosure: Full
7. Partitions: --
8. Accoustics: Isolated
9. Degree of Facility Maintenance: Low
10. Degree of Security Control: Low
11. Degree of Visual Permeability: Medium
12. Degree of Safety Control: Low

MATERIAL FINISH:
1. Floors: Carpet
2. Walls: Plaster/ Painted or Vinyl Covered
3. Ceilings:Accoustical Drop

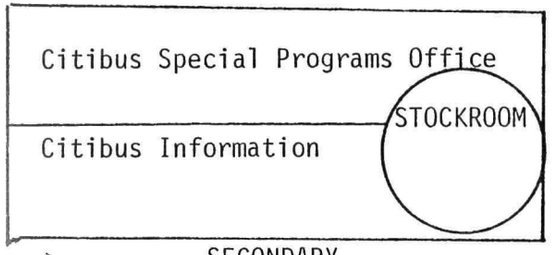
MECHANICAL/ELECTRICAL
1. Heating: 70°@ 0° Exterior
2. Cooling: 70° @ 90° Exterior
3. Fresh Air: 10 cfm
4. Circulation:30 cfm
5. Water Supply: NA
6. Plumbing Fixtures: NA
7. Gas Service: NA
8. Electrical: 117v.
9. Lighting Levels: 40 fc/100fc @ work surface
10. Emergency Lighting:1fc

EQUIPMENT/FURNISHINGS:
1. Communications: 1 Phone
2. Office Equipment:1 Typewriter, adding machine
3. Seating: 2 desk, 3 visitiors
4. Work Surfaces: 2 desks, 1 table
5. Storage Equipment: Office and Photographic
6. Special Equipment: I.D. Camera

SPECIAL NOTES:

CITIBUS STOCKROOM

PRIMARY



SECONDARY

This stockroom will act as a storage space for the entire Citibus area, storing such items as schedules, office supplies, and photographic supplies. If expansion of Citibus office space is required in the future, this space could be utilized for that purpose.

DESIGN REQUIREMENTS:
1. The stockroom should be accessible by both the Ticket/Information Counter, as well as the Office of Special Programs.
2. The space could possibly be converted into an office at some future time.

ACTIVITIES:
Storage

GENERAL REQUIREMENTS:
1. Number of Occupants: NA
2. Minimum Sq. Ft./Occupant: NA
3. Minimum Area: 80 sq. ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 8'-0"
6. Degree of Enclosure: Full
7. Partitions: Flexible
8. Accoustics: NA
9. Degree of Facility Maintenance: Low
10. Degree of Security Control: High
11. Degree of Visual Permeability: Low
12. Degree of Safety Control: Low

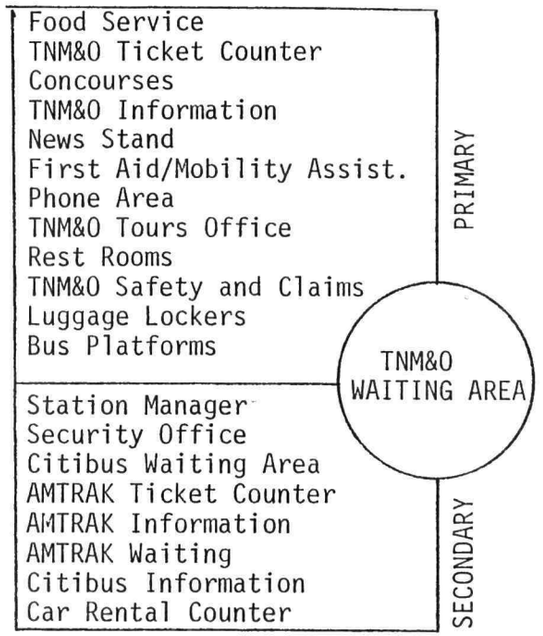
MATERIAL FINISH:
1. Floors: Resilient Tile
2. Walls: Plaster/ Painted
3. Ceilings: Accoustical Drop

MECHANICAL/ELECTRICAL
1. Heating: 65° @ 0° Exterior
2. Cooling: 75° @ 90° Exyerior
3. Fresh Air: 5 cfm
4. Circulation: 15 cfm
5. Water Supply: NA
6. Plumbing Fixtures: NA
7. Gas Service: NA
8. Electrical: 120 VAC
9. Lighting Levels: 20 fc
10. Emergency Lighting: 0.5 fc

EQUIPMENT/FURNISHINGS:
1. Communications: NA
2. Office Equipment: NA
3. Seating: NA
4. Work Surfaces: NA
5. Storage Equipment: Shelves
6. Special Equipment: NA

SPECIAL NOTES:

TNM&O WAITING AREA



2. Provide a place for baggage in close proximity to the patron's seat.
3. Utilize seating clusters rather than linear and face-to-face seating.
4. Keep the patrons informed as to the status of his bus by giving a direct view of concourse and platform areas, and/or TV monitors, and public address systems.

ACTIVITIES:
Sitting, waiting, eating, standing, reading, sleeping, playing, smoking.

The TNM&O waiting area should be incorporated with the AMTRAK waiting area to create a more efficient use of these areas. A major problem which occurs in waiting areas is what to do with the baggage while one is sitting in the waiting area. Quite often, there are no provisions for baggage in the waiting areas and as a result, baggage ends up in or in front of vacant seats, depriving others of seating. The problem is quite acute when face-to-face seating is used, where the aisles between seats become obstacle courses full of baggage. Another problem occurring in the waiting area is that of seating arrangements. Too often the seating in waiting areas consists of rows of face-to-face seating. This form of seating does not encourage conversation except with one's immediate neighbor and often brings about an uncomfortable face-to-face confrontation with a complete stranger. Cluster seating would encourage conversation among family groups, etc. and would eliminate the problems of face-to-face seating. Another problem confronting the traveler in waiting areas is the fear of missing one's ride. This problem is eliminated by giving the waiting areas a direct view of the concourse and loading platforms, adequate public address systems, and/or locating TV monitors with the status of incoming and outgoing transportation.

DESIGN REQUIREMENTS:
1. Layout paths of circulation that are easily recognized leading to the major areas of passenger concern.

GENERAL REQUIREMENTS:
1. Number of Occupants: 200
2. Minimum Sq. Ft./Occupant: 15 sq.ft.
3. Minimum Area: 4000 sq.ft.
4. Minimum No. of Exits: 2
5. Minimum Clear Ceiling Ht.: 10'-0"
6. Degree of Enclosure: Full
7. Partitions: Flexible
8. Accoustics: Controlled
9. Degree of Facility Maintenance: High
10. Degree of Security Control: High
11. Degree of Visual Permeability: High
12. Degree of Safety Control: Low

MATERIAL FINISH:
1. Floors: Some carpet/ some resilient floor tile
2. Walls: Vinyl covered or other washable
3. Ceilings: Accoustic Drop

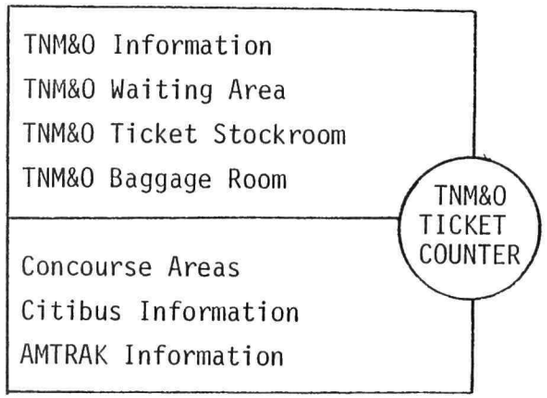
MECHANICAL/ELECTRICAL
1. Heating: 70 deg. at 0 deg. exterior
2. Cooling: 70 deg. at 90 deg. exterior
3. Fresh Air: 1000 cfm
4. Circulation: 3000 cfm
5. Water Supply: Cold
6. Plumbing Fixtures: Water Fountains
7. Gas Service: NA
8. Electrical: 120 VAC
9. Lighting Levels: 40 fc
10. Emergency Lighting: 1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: PA, Courtesy Phones
2. Office Equipment: NA
3. Seating: Seating Clusters for 200 persons
4. Work Surfaces: NA
5. Storage Equipment: NA
6. Special Equipment: Train/bus status monitors, clocks.

SPECIAL NOTES:

TNM&O TICKET COUNTER

PRIMARY



SECONDARY

TNM&O still utilizes a manual ticketing section and as such, large areas of work surfaces will be required for the storage and use of schedule books, fare schedules, etc. The ticket counter should have a high degree of visibility from the waiting area, so the area is quickly found by persons arriving at the facility. TNM&O ticket agents will also check the passenger's baggage. Baggage cuts out in the counter and agents have access to the baggage room by means of a baggage chute/conveyor. Waiting lines at the ticket counters tend to get quite long, so enough space must be allowed so that lines do not spill over into paths of circulation.

DESIGN REQUIREMENTS:

1. Identification of the ticket counter should be highly visible and recognizable.
2. Waiting lines should not spill over into paths of circulation.
3. The ticket counter should be visible from the entrance of the transit facility.

ACTIVITIES:
Money exchange, conversation, luggage handling, paperwork.

GENERAL REQUIREMENTS:
1. Number of Occupants: 4 persons
2. Minimum Sq. Ft./Occupant: 60 square feet
3. Minimum Area: 240 square feet
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 8' 0"
6. Degree of Enclosure: Full
7. Partitions: Flexible
8. Accoustics: None - isolated
9. Degree of Facility Maintenance: Medium
10. Degree of Security Control: High
11. Degree of Visual Permeability: High
12. Degree of Safety Control: Low

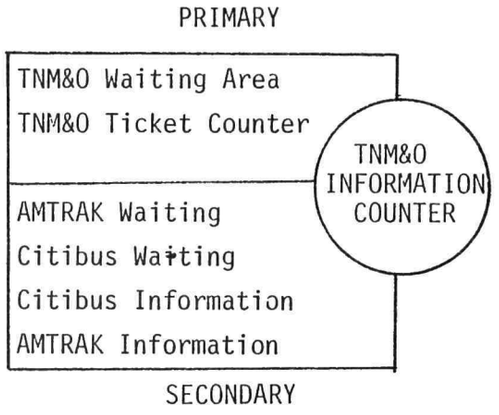
MATERIAL FINISH:
1. Floors: Tile
2. Walls: Washable, impact, resist
3. Ceilings: Plaster or Drop ceiling

MECHANICAL/ELECTRICAL
1. Heating: 70° @ 0° EXT
2. Cooling: 70° @ 90° EXT
3. Fresh Air: 20 cfm
4. Circulation: 60 cfm
5. Water Supply: None
6. Plumbing Fixtures: None
7. Gas Service: None
8. Electrical: 117 VAC
9. Lighting Levels: 40fc/100fc @ W.S.
10. Emergency Lighting: 1fc

EQUIPMENT/FURNISHINGS:
1. Communications: 4 phones, paging system
2. Office Equipment: Adding machine
3. Seating: 4 stools
4. Work Surfaces: Waist-high counter
5. Storage Equipment: 4 book stands
6. Special Equipment: 4 ticket machines, card holder, under counter storage

SPECIAL NOTES:
Cut outs in counter for passage of luggage.

TNM&O INFORMATION COUNTER



The information counter should be easily identifiable and should be easily distinguished from the TNM&O ticket counter. The information counter will not sell tickets, but deal with information only, diverting some of the load from the ticket counters during periods of peak activity. Space should be provided for scheduling books, bus schedules, and fare rates. Waiting lines at the information counter should not be allowed to interrupt paths of circulation.

DESIGN REQUIREMENTS:
1. The information counter should be easily distinguished from the ticket counter.
2. The information counter will be located in the TNM&O waiting area.
3. Waiting lines should not obstruct paths of circulation.

ACTIVITIES:
Conversation, standing , seating.

GENERAL REQUIREMENTS:
1. Number of Occupants: 1
2. Minimum Sq. Ft./Occupant: 60 sq.ft.
3. Minimum Area: 60 sq.ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 8'-0"
6. Degree of Enclosure: Full
7. Partitions: Flexible
8. Accoustics: Controlled
9. Degree of Facility Maintenance: Medium
10. Degree of Security Control: Low
11. Degree of Visual Permeability: High
12. Degree of Safety Control: Low

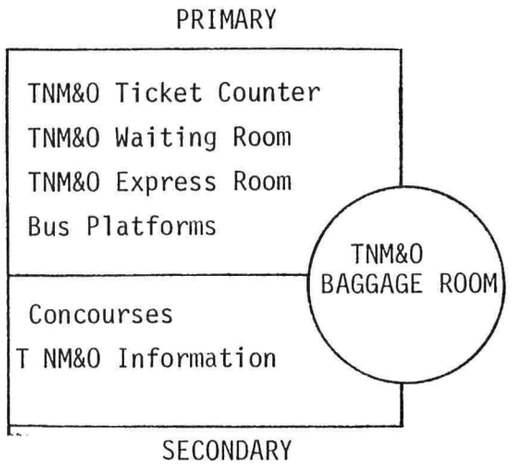
MATERIAL FINISH:
1. Floors: Carpet
2. Walls: Paint or vinyl covered
3. Ceilings: Accoustic Drop

MECHANICAL/ELECTRICAL
1. Heating: 70 deg. at 0 deg. exterior
2. Cooling: 70 deg. at 90 deg. exterior
3. Fresh Air: 5cfm
4. Circulation: 15 cfm
5. Water Supply: NA
6. Plumbing Fixtures: NA
7. Gas Service: NA
8. Electrical: 120 VAC
9. Lighting Levels: 40 fc/100fc at work surfaces
10. Emergency Lighting: 1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: Phone, PA Mike
2. Office Equipment: NA
3. Seating: 1 Stool
4. Work Surfaces: Counter
5. Storage Equipment: Book stand
6. Special Equipment: NA

SPECIAL NOTES:

TNM&O BAGGAGE ROOM



The TNM&O baggage room should be located so that ticket agents can easily place checked baggage in the area. A counter fronting the waiting room would be needed so that passengers could pick up their checked baggage. An area inside the baggage room should be set aside as a sorting area where the baggage would be sorted according to the five primary destinations; Clovis, Amarillo, San Angelo, El Paso, and Wichita Falls, with another area with luggage racks for arriving baggage. The baggage room operations should be shared with the TNM&O Express Office.

DESIGN REQUIREMENTS:
1. Sorting area shared with TNM&O Package Express and Express Office.
2. Direct transfer of baggage from ticket counter to baggage require adjacency or mechanical conveyance.
3. Customer service counter should be highly visible from waiting area.

ACTIVITIES:
Conversation, luggage handling.

GENERAL REQUIREMENTS:
1. Number of Occupants: Varies
2. Minimum Sq. Ft./Occupant: NA
3. Minimum Area: 1,000 sq. ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 10'-0"
6. Degree of Enclosure: Full
7. Partitions: Flexible
8. Accoustics: Controlled
9. Degree of Facility Maintenance: Low
10. Degree of Security Control: High
11. Degree of Visual Permeability: Low
12. Degree of Safety Control: Medium

MATERIAL FINISH:
1. Floors: Concrete or Hard Floor Tile
2. Walls: Impact Resistant
3. Ceilings: Exposed or Accoustical Drop

MECHANICAL/ELECTRICAL
1. Heating: 70 deg. at 0 deg. exterior
2. Cooling: 70 deg. at 90 deg. exterior
3. Fresh Air: 20 cfm
4. Circulation: 60 cfm
5. Water Supply: NA
6. Plumbing Fixtures: NA
7. Gas Service: NA
8. Electrical: 120 VAC
9. Lighting Levels: 40 fc/100 fc at work surfaces
10. Emergency Lighting: 1 fc

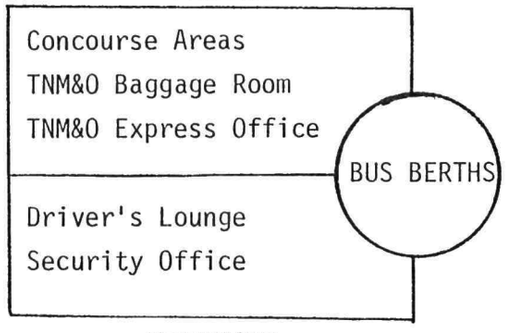
EQUIPMENT/FURNISHINGS:
1. Communications: Phone
2. Office Equipment: NA
3. Seating: NA
4. Work Surfaces: Baggage Counter,
5. Storage Equipment: Luggage racks (300 sq.ft.)
6. Special Equipment: 10 Luggage Carts

SPECIAL NOTES:

BUS BERTHS

(TNM&O)

PRIMARY



SECONDARY

ACTIVITIES:
Loading and unloading of passengers and materials.

This area is the most dynamic area contained within the facility. The incoming and outgoing buses, material handling and passenger activities occur 24 hours a day, every day of the year. Circulation problems and conflicts are often encountered in this area and passenger safety is the prime concern. Lighting levels should be fairly high so that all pedestrian and bus activity can be easily seen at night, and also to allow tickets and luggage checks to be easily read. Cleanliness in this area can be a problem, as the day-in day-out passage of buses can lead to quite an accumulation of dust and soot over a period of time. Finish materials should be fairly smooth and non-porous to help prevent the accumulation of dust and soot and to facilitate in the cleanup of the area. Buses should be oriented so that their destination signs and numbers are readily apparent to on-boarding passengers to avoid confusion as to which bus to board.

DESIGN REQUIREMENTS:
1. Circulation systems and the avoidance of pedestrian/vehicular conflicts as well as pedestrian/material handling conflicts are to be avoided at all costs.
2. This facility will be the center of activity during most hours of the day, operating 24 hours a day.
3. Buses should face towards the concourse areas so that bus and destination identification can be easily made.
4. Finish surfaces should be easily cleaned and of a fairly smooth texture to prevent the accumulation of dirt and soot.

GENERAL REQUIREMENTS:
1. Number of Occupants: 11 Buses
2. Minimum Sq. Ft./Occupant: 540 sq.ft. / Bus
3. Minimum Area: 5940 sq.ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 16'-0"
6. Degree of Enclosure: Sheltered
7. Partitions: NA
8. Accoustics: Controlled
9. Degree of Facility Maintenance: Medium
10. Degree of Security Control: Medium
11. Degree of Visual Permeability: High
12. Degree of Safety Control: High

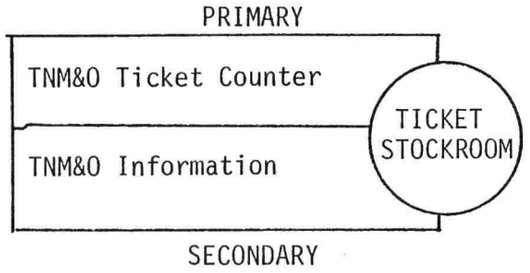
MATERIAL FINISH:
1. Floors: Concrete
2. Walls: Impact resistant, washable
3. Ceilings: Metal, Concrete, Glass

MECHANICAL/ELECTRICAL
1. Heating: NA
2. Cooling: NA
3. Fresh Air: NA
4. Circulation: 14,000 cfm/bus if enclosed
5. Water Supply: Cold
6. Plumbing Fixtures: Hose bib, hose
7. Gas Service: NA
8. Electrical: 120 VAC
9. Lighting Levels: 15 fc
10. Emergency Lighting: 1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: PA
2. Office Equipment: NA
3. Seating: NA
4. Work Surfaces: NA
5. Storage Equipment: NA
6. Special Equipment: NA

SPECIAL NOTES:

TNM&O TICKET STOCKROOM



The ticket stockroom should be located directly behind the ticket counter and should be under lock and key at all times. There should be no windows in this space to eliminate the possibility of forced entry. Humidity control is a critical problem as ticket materials could be damaged by high humidity levels.

DESIGN REQUIREMENTS:
1. Controlled access via ticket counter only.
2. No windows in this space.
3. Humidity levels should be kept low.

ACTIVITIES:
Storage, security.

GENERAL REQUIREMENTS:
1. Number of Occupants: NA
2. Minimum Sq. Ft./Occupant: NA
3. Minimum Area: 80 sq.ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 8'-0"
6. Degree of Enclosure: Full
7. Partitions: Fixed
8. Accoustics: NA
9. Degree of Facility Maintenance: Low
10. Degree of Security Control: High
11. Degree of Visual Permeability: Low
12. Degree of Safety Control: Low

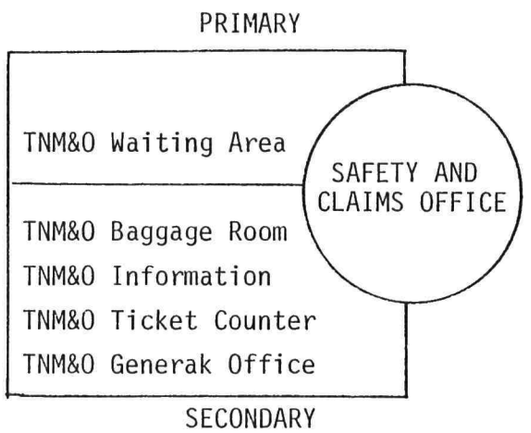
MATERIAL FINISH:
1. Floors: Floor Tile or Concrete
2. Walls: Painted
3. Ceilings: Accoustical Drop

MECHANICAL/ELECTRICAL
1. Heating: 65 deg. at 0 deg. Exterior
2. Cooling: 75 deg. at 90 deg. Exterior
3. Fresh Air: 5 cfm
4. Circulation: 15 cfm
5. Water Supply: NA
6. Plumbing Fixtures: NA
7. Gas Service: NA
8. Electrical: 120 VAC
9. Lighting Levels: 20 fc
10. Emergency Lighting: 0.5 fc

EQUIPMENT/FURNISHINGS:
1. Communications: NA
2. Office Equipment: NA
3. Seating: NA
4. Work Surfaces: NA
5. Storage Equipment: Shelving
6. Special Equipment: NA

SPECIAL NOTES:

TNM&O SAFETY AND CLAIMS OFFICE



The Safety and Claims Office will deal mainly with the public, who would register their complaints and claims for damages and lost baggage here. Since members of the public who have need to utilize the services of this office are more than likely very irate and even angry, the atmosphere in this area should be relaxing and seating should be provided for those persons with complaints. A work surface should be provided for persons to fill out forms and a luggage shelf for the storage of luggage and other lost items should be provided in the space.

DESIGN REQUIREMENTS:
1. Public access is required, and the office should be in close proximity to the ticket counter and baggage rooms.
2. Provide a relaxed atmosphere and seating for customers.

ACTIVITIES:
Conversation, paper work, seating.

GENERAL REQUIREMENTS:
1. Number of Occupants: 2
2. Minimum Sq. Ft./Occupant: 100 sq.ft.
3. Minimum Area: 200 sq.ft.
4. Minimum No. of Exits:1
5. Minimum Clear Ceiling Ht.:8'-0"
6. Degree of Enclosure:Full
7. Partitions:Flexible
8. Accoustics:Isolated
9. Degree of Facility Maintenance:Low
10. Degree of Security Control: Low
11. Degree of Visual Permeability:Medium
12. Degree of Safety Control:Low

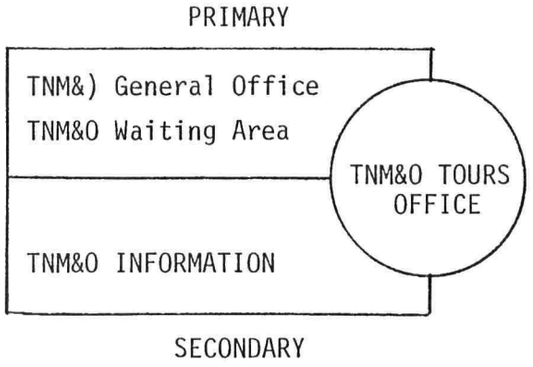
MATERIAL FINISH:
1. Floors:Carpet
2. Walls: Painted or Vinyl Covered
3. Ceilings: Accoustic Drop

MECHANICAL/ELECTRICAL
1. Heating: 70 deg. at 0 deg. exterior
2. Cooling: 70 deg. at 90 deg. exterior
3. Fresh Air:10 cfm
4. Circulation:30 cfm
5. Water Supply:NA
6. Plumbing Fixtures:NA
7. Gas Service:NA
8. Electrical:120 VAC
9. Lighting Levels:40 fc/100 fc at working surfaces
10. Emergency Lighting:1 fc

EQUIPMENT/FURNISHINGS:
1. Communications:1 Phone
2. Office Equipment: I Typewriter
3. Seating: 2 Desk, 3 Visitors
4. Work Surfaces 2 Desks
5. Storage Equipment: Luggage Racks
6. Special Equipment: NA

SPECIAL NOTES:

TNM&O TOURS OFFICE



The Tours Office will make the arrangements for charter services, special programs, and tour packages for TNM&O. The atmosphere of the office resembles that of a travel agents office with brochures and posters prominently displayed in the area. Public access of the area is required and a high level of visibility may encourage the use of TNM&O's special programs.

DESIGN REQUIREMENTS:
1. A high degree of visibility from public areas is desired, where access by the public would be welcomed.
2. Provide ample space for displays and brochures in this area.

ACTIVITIES:
Conversation, paperwork, seating, money exchange.

GENERAL REQUIREMENTS:
1. Number of Occupants: 3
2. Minimum Sq. Ft./Occupant: 100 sq.ft.
3. Minimum Area: 300 sq.ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 8'-0"
6. Degree of Enclosure: Full
7. Partitions: Flexible
8. Accoustics: Isolated
9. Degree of Facility Maintenance: Low
10. Degree of Security Control: Medium
11. Degree of Visual Permeability: Medium
12. Degree of Safety Control: Low

MATERIAL FINISH:
1. Floors: Carpet
2. Walls: Paint or Vinyl Covered
3. Ceilings: Accoustical Drop

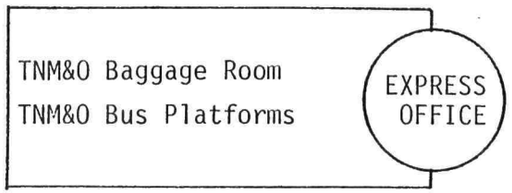
MECHANICAL/ELECTRICAL
1. Heating: 70 deg. at 0 deg. exterior
2. Cooling: 70 deg. at 90 deg. exterior
3. Fresh Air: 15 cfm
4. Circulation: 45 cfm
5. Water Supply: NA
6. Plumbing Fixtures: NA
7. Gas Service: NA
8. Electrical: 120 VAC
9. Lighting Levels: 40 fc/ 100 fc at work surfaces
10. Emergency Lighting: 1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: 1 Phone
2. Office Equipment: 1 Typewriter
3. Seating: 3 Desk, 5 Visitors
4. Work Surfaces: 2 desks, 1 Secretatial Desk
5. Storage Equipment: Office supplies
6. Special Equipment: Brochure displays

SPECIAL NOTES:

TNM&O EXPRESS OFFICE

PRIMARY



The Express Office would share a space with the Baggage Room, and would require a customer service counter separate from the Baggage Room. The Express Office would require a fairly large counter so that customers could prepare their packages for shipping, a scale area, and a counter for paperwork. Racks would be required for storage of incoming freight, while outgoing freight would be sent to the sorting area shared with the Baggage Room. Ideally, the Express Office should have its own exterior entrance and parking area, so that customers would not have to walk through the passenger portion of the Transit Center.

DESIGN REQUIREMENTS:
1. The Express Office will share sorting facilities with the Baggage Room.
2. A large counter with scales is required.
3. A sales area is necessary.
4. If possible, the Express Office should have separate public entrance facilities.

ACTIVITIES:
Conversation, freight handling, paperwork, money exchange.

GENERAL REQUIREMENTS:
1. Number of Occupants: NA
2. Minimum Sq. Ft./Occupant: NA
3. Minimum Area: 800 sq. ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht. 10'-0"
6. Degree of Enclosure: Full
7. Partitions: Flexible
8. Accoustics: Controlled
9. Degree of Facility Maintenance: Low
10. Degree of Security Control: High
11. Degree of Visual Permeability: Low
12. Degree of Safety Control: Medium

MATERIAL FINISH:
1. Floors: Concrete, Hard Floor Tile
2. Walls: Impact Resistant
3. Ceilings: Exposed or Accoustical Drop

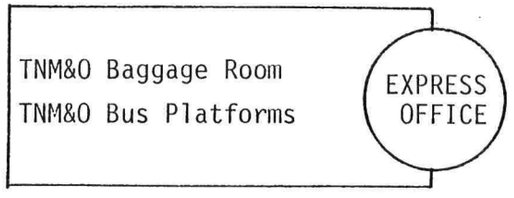
MECHANICAL/ELECTRICAL
1. Heating: 70 deg. at 0 deg. exterior
2. Cooling: 70 deg. at 90 deg. exterior
3. Fresh Air: 20 cfm
4. Circulation: 60 cfm
5. Water Supply: NA
6. Plumbing Fixtures: NA
7. Gas Service: NA
8. Electrical: 120 VAC
9. Lighting Levels: 40 fc/100 fc at work surfaces
10. Emergency Lighting: 1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: 1 Phone
2. Office Equipment: Cash register
3. Seating: 2 Stools
4. Work Surfaces: Package Counter
5. Storage Equipment: Storage racks
6. Special Equipment: Scales

SPECIAL NOTES: NA

TNM&O EXPRESS OFFICE

PRIMARY



The Express Office would share a space with the Baggage Room, and would require a customer service counter separate from the Baggage Room. The Express Office would require a fairly large counter so that customers could prepare their packages for shipping, a scale area, and a counter for paperwork. Racks would be required for storage of incoming freight, while outgoing freight would be sent to the sorting area shared with the Baggage Room. Ideally, the Express Office should have its own exterior entrance and parking area, so that customers would not have to walk through the passenger portion of the Transit Center.

DESIGN REQUIREMENTS:
1. The Express Office will share sorting facilities with the Baggage Room.
2. A large counter with scales is required.
3. A sales area is necessary.
4. If possible, the Express Office should have separate public entrance facilities.

ACTIVITIES:
Conversation, freight handling, paperwork, money exchange.

GENERAL REQUIREMENTS:
1. Number of Occupants: NA
2. Minimum Sq. Ft./Occupant: NA
3. Minimum Area: 800 sq. ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht. 10'-0"
6. Degree of Enclosure: Full
7. Partitions: Flexible
8. Accoustics: Controlled
9. Degree of Facility Maintenance: Low
10. Degree of Security Control: High
11. Degree of Visual Permeability Low
12. Degree of Safety Control: Medium

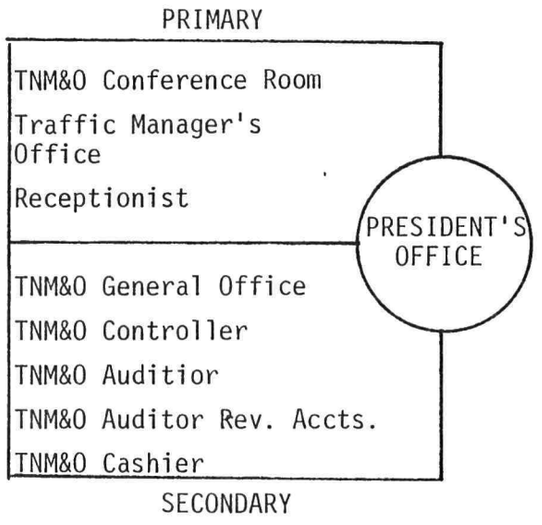
MATERIAL FINISH:
1. Floors: Concrete, Hard Floor Tile
2. Walls: Impact Resistant
3. Ceilings: Exposed or Accoustical Drop

MECHANICAL/ELECTRICAL
1. Heating: 70 deg. at 0 deg. exterior
2. Cooling: 70 deg. at 90 deg. exterior
3. Fresh Air: 20 cfm
4. Circulation: 60 cfm
5. Water Supply: NA
6. Plumbing Fixtures: NA
7. Gas Service: NA
8. Electrical: 120 VAC
9. Lighting Levels: 40 fc/100 fc at work surfaces
10. Emergency Lighting: 1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: 1 Phone
2. Office Equipment: Cash register
3. Seating: 2 Stools
4. Work Surfaces: Package Counter
5. Storage Equipment: Storage racks
6. Special Equipment: Scales

SPECIAL NOTES: NA

TNM&O PRESIDENT'S OFFICE



As the chief executive of TNM&O, the president will always have the need to have personal conferences in his office. To accomodate this, seating and space must be allotted for up to five additional persons in this office. The scale of the office furniture is larger than in other areas and the room should be executive in character. The President will have a close working relationship with the Traffic Manager and the receptionist, making adjacencies with these areas necessary. The receptionist should control access into the room so that distractions can be kept to a minimum.

DESIGN REQUIREMENTS:
1. Adjacency with the receptionist and traffic areas are required, with the receptionist controlling access into the room.
2. The receptionist should control access into the room.
3. Furniture should be of "executive scale".
4. The conference room should be located nearby.

ACTIVITIES:
Paper work, interviews, seating.

GENERAL REQUIREMENTS:
1. Number of Occupants: 1
2. Minimum Sq. Ft./Occupant: NA
3. Minimum Area:300 sq.ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 8'-0"
6. Degree of Enclosure: Full
7. Partitions:Fixed
8. Accoustics: Isolated
9. Degree of Facility Maintenance: Low
10. Degree of Security Control: Low
11. Degree of Visual Permeability: Low
12. Degree of Safety Control: Low

MATERIAL FINISH:
1. Floors: Deep Carpet
2. Walls: Varies
3. Ceilings: Accoustical Drop

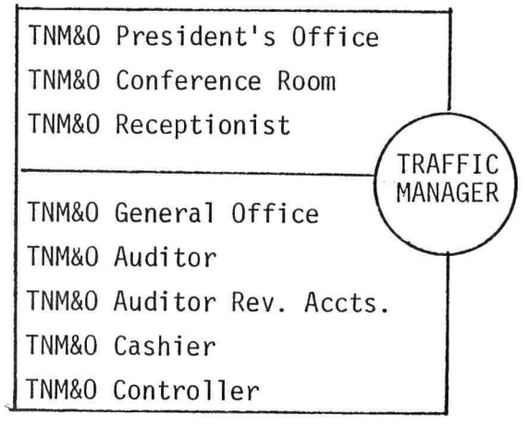
MECHANICAL/ELECTRICAL
1. Heating:70 deg. at 0 deg. exterior
2. Cooling:70 deg. at 90 deg. exterior
3. Fresh Air: 5 cfm
4. Circulation:15 cfm
5. Water Supply: NA
6. Plumbing Fixtures: NA
7. Gas Service: NA
8. Electrical:120 VAC
9. Lighting Levels:40 fc/100 fc at work surfaces
10. Emergency Lighting: 1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: 2 Phones
2. Office Equipment: Dictation Machine
3. Seating: 1 Executive, 5 visitors
4. Work Surfaces: Executive Desk
5. Storage Equipment: Book shelves, Coat Closet
6. Special Equipment: NA

SPECIAL NOTES:

TNM&O TRAFFIC MANAGER'S OFFICE

PRIMARY



SECONDARY

The Traffic Manager is second only to the President in TNM&O's corporate structure and as such, will require a close working relationship with the President. The Traffic Manager's office should be more elaborately furnished than the typical office area, yet not as much as the President's office. Since the Traffic Manager would act in place of the President, his office should have enough space to accomodate visitors.

DESIGN REQUIREMENTS:
1. The office should be located next to the President's office.
2. The office should be more elaborately furnished than the typical office area.
3. Some public access is required.

ACTIVITIES:
Office work, conversation, sitting.

GENERAL REQUIREMENTS:
1. Number of Occupants: 1
2. Minimum Sq. Ft./Occupant: NA
3. Minimum Area: 200 sq.ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 8'-0"
6. Degree of Enclosure: Full
7. Partitions: Flexible
8. Accoustics: Isolated
9. Degree of Facility Maintenance: Low
10. Degree of Security Control: Medium
11. Degree of Visual Permeability: Low
12. Degree of Safety Control: Low

MATERIAL FINISH:
1. Floors: Carpet
2. Walls: Painted or Vinyl Covered
3. Ceilings: Accoustic Drop

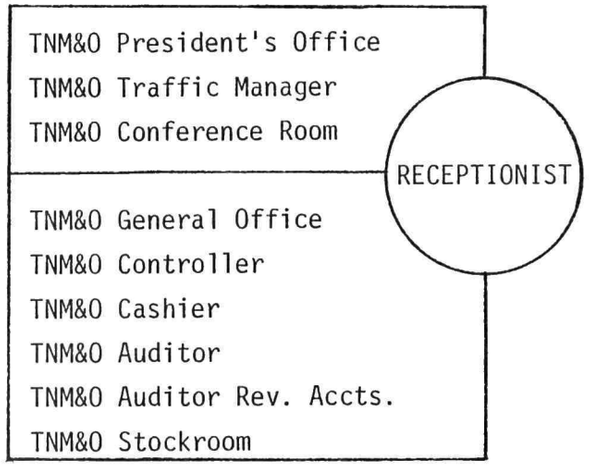
MECHANICAL/ELECTRICAL
1. Heating: 70 deg. at 0 deg. exterior
2. Cooling: 70 deg. at 90 deg. exterior
3. Fresh Air: 5 cfm
4. Circulation: 15 cfm
5. Water Supply: NA
6. Plumbing Fixtures: NA
7. Gas Service: NA
8. Electrical: 120 VAC
9. Lighting Levels: 40 fc/ 100 fc at work surfaces
10. Emergency Lighting: 1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: 1 Phone
2. Office Equipment: Dictation Manchine
3. Seating: 1 Desk, 3 Visitors
4. Work Surfaces: 1 Desk
5. Storage Equipment: 8 file Cabinets
6. Special Equipment: NA

SPECIAL NOTES: NA

TNM&O RECEPTIONIST

PRIMARY



SECONDARY

The receptionist serves as the President's personal secretary, who, along with normal secretarial duties, controls access to the President and the conference rooms. A small waiting area should be provided for visitors, as well as a small coffee bar room and the president's office.

DESIGN REQUIREMENTS:
1. The receptionist controls access to the president's office and the conference room.
2. Areas should be provided for waiting visitors and for a small coffee bar.

ACTIVITIES:
Office work, conversation, sitting.

GENERAL REQUIREMENTS:
1. Number of Occupants: 1
2. Minimum Sq. Ft./Occupant: NA
3. Minimum Area: 160 sq.ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 8'-0"
6. Degree of Enclosure: Full
7. Partitions: Flexible
8. Accoustics: Isolated
9. Degree of Facility Maintenance: Low
10. Degree of Security Control: Low
11. Degree of Visual Permeability: Medium
12. Degree of Safety Control: Low

MATERIAL FINISH:
1. Floors: Carpet
2. Walls: Painted or Vinyl Covered
3. Ceilings: Accoustical Drop

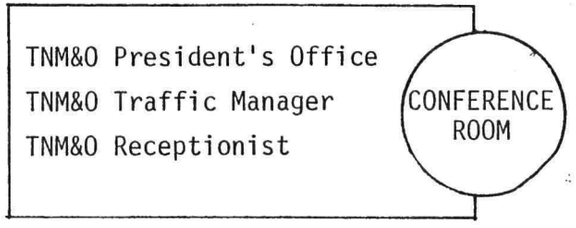
MECHANICAL/ELECTRICAL
1. Heating: 70 deg. at 0 deg. exterior
2. Cooling: 70 deg. at 90 deg. exterior
3. Fresh Air: 5 cfm
4. Circulation: 15 cfm
5. Water Supply: NA
6. Plumbing Fixtures: NA
7. Gas Service: NA
8. Electrical: 120 VAC
9. Lighting Levels: 40 fc/100 fc at work surfaces
10. Emergency Lighting: 1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: 1 Phone
2. Office Equipment: Typewriter, dictation Machine
3. Seating: 1 Secretarial, 5 visitors
4. Work Surfaces: Secretarial Desk
5. Storage Equipment: Six file cabinets
6. Special Equipment: NA

SPECIAL NOTES: NA

TNM&O CONFERENCE ROOM

PRIMARY



The conference room should bear a close relationship to the executive offices of TNM&O (President, Traffic Manager, Receptionist). The major function of the conference room is to aid in the interpersonal communications between groups of people and as such should provide an atmosphere conducive to such communications without irritating distractions. Video aids are being utilized more and more in conference situations and in recognition of this fact, ample space and room configuration should allow the viewing of video materials without shuffling chairs around and drawing shades over windows. A large blackboard is often used in conference room situations to discuss ideas and to make plans.

DESIGN REQUIREMENTS:
1. The conference room should be located near the president's, traffic manager's, and receptionist offices.
2. Room configuration should permit the viewing of a projections screen, without shuffling chairs around.
3. The conference room door should be so located that the receptionist controls access to the room to prevent unwanted distractions.

ACTIVITIES:
Conversation, sitting

GENERAL REQUIREMENTS:
1. Number of Occupants: 25 Persons
2. Minimum Sq. Ft./Occupant: 15 sq. ft.
3. Minimum Area: 375 sq. ft.
4. Minimum No. of Exits: 2
5. Minimum Clear Ceiling Ht.: 8'-0"
6. Degree of Enclosure: Full
7. Partitions: Fixed
8. Accoustics: Isolated
9. Degree of Facility Maintenance: Low
10. Degree of Security Control: Low
11. Degree of Visual Permeability: Low
12. Degree of Safety Control: Low

MATERIAL FINISH:
1. Floors: Carpeted
2. Walls: Vinyl, Paint or Panelled
3. Ceilings: Accoustical Drop

MECHANICAL/ELECTRICAL
1. Heating: 70° @ 0° Exterior
2. Cooling: 70° @ 90° Exterior
3. Fresh Air: 125 cfm
4. Circulation: 375 cfm
5. Water Supply: NA
6. Plumbing Fixtures: NA
7. Gas Service: NA
8. Electrical: 120 VAC
9. Lighting Levels: 40 fc/ 100 fc @ Work Surface
10. Emergency Lighting: 1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: 1 Phone
2. Office Equipment: NA
3. Seating: 25 Executive Chairs
4. Work Surfaces: Conference Table for 25
5. Storage Equipment: Audio/Visual Storage
6. Special Equipment: Blackboard, Projection Screen

SPECIAL NOTES: NA

TNM&O GENERAL OFFICE

PRIMARY

TNM&O Traffic Manager

GENERAL OFFICE

TNM&O Tours Office

TNM&O Safety and Claims

TNM&O Receptionist

SECONDARY

This office takes care of the paperwork and routine record keeping for the company. The office is staffed by ten clerical workers who are under the direction of a supervisor. The supervisor will require a separate office, located in the general office area. The office will require little public access and should be located away from the public areas. The general office should be located near the Traffic Manager's Office.

DESIGN REQUIREMENTS:
1. The General Office should be located away from the public areas and should be adjacent to the Traffic Manager's office.
2. The General Office supervisor will require an enclosed private office located within this space.

ACTIVITIES:
Office work, conversation, seating.

GENERAL REQUIREMENTS:
1. Number of Occupants: 11
2. Minimum Sq. Ft./Occupant: 100 sq.ft.
3. Minimum Area: 1100 sq.ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 8'-0"
6. Degree of Enclosure: Full
7. Partitions: Flexible
8. Accoustics: Isolated/Controlled
9. Degree of Facility Maintenance: Low
10. Degree of Security Control: Medium
11. Degree of Visual Permeability: Low
12. Degree of Safety Control: Low

MATERIAL FINISH:
1. Floors: Carpet
2. Walls: Painted or Vinyl Covered
3. Ceilings: Accoustical Drop

MECHANICAL/ELECTRICAL
1. Heating: 70 deg. at 0 deg. exterior
2. Cooling: 70 deg. at 90 deg. exterior
3. Fresh Air: 55 cfm
4. Circulation: 165 cfm
5. Water Supply: Cold
6. Plumbing Fixtures: Water Cooler
7. Gas Service: NA
8. Electrical: 120 VAC/220 VAC
9. Lighting Levels: 40 fc. / 100 fc at work surfaces
10. Emergency Lighting: 1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: 11 Phone
2. Office Equipment: 6 Typewriters
3. Seating: 11 Desk, 2 visitors
4. Work Surfaces: 6 Secretarial, 5 work
5. Storage Equipment: 40 file cabinets, office sup.
6. Special Equipment: Photocopy Machine

SPECIAL NOTES: NA

TNM&O AUDITOR'S OFFICE

PRIMARY

TNM&O Cashier
TNM&O Controller
TNM&O Auditor Rev. Accts.

AUDITOR

TNM&O Traffic Manager
TNM&O President
TNM&O Receptionist

SECONDARY

The auditor's office should be located in a group with the other accounting offices, the Auditor of Revenue Accounts, Cashier, and Controller areas. Sufficient work surfaces should be in the space to accomodate the large amount of paperwork which would be generated. Sensitive and important records should be placed in a fire proof records vault which would be shared by the other accounting offices.

DESIGN REQUIREMENTS:
1. The TNM&O auditors office should be located with the other accounting offices of TNM&O.
2. Provide ample work space for paper work and access to a fire vault for the storage of critical records.
3. No public access is required in this area.

ACTIVITIES:
Office work, conversation, sitting.

GENERAL REQUIREMENTS:
1. Number of Occupants: 1
2. Minimum Sq. Ft./Occupant: 100 sq.ft.
3. Minimum Area: 100 sq.ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 8'0"
6. Degree of Enclosure: Full
7. Partitions: Flexible
8. Accoustics: Isolated
9. Degree of Facility Maintenance: Low
10. Degree of Security Control: Medium
11. Degree of Visual Permeability: Low
12. Degree of Safety Control: Low

MATERIAL FINISH:
1. Floors: Carpet
2. Walls: Paint/ Vinyl Covered
3. Ceilings: Accoustical Drop

MECHANICAL/ELECTRICAL
1. Heating: 70 deg. at 0 deg. exterior
2. Cooling: 70 deg. at 90 deg. exterior
3. Fresh Air: 5 cfm
4. Circulation: 15 cfm
5. Water Supply: NA
6. Plumbing Fixtures: NA
7. Gas Service: NA
8. Electrical: 120 VAC
9. Lighting Levels: 40 fc/ 100 fc at work surfaces
10. Emergency Lighting: 1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: 1 Phone
2. Office Equipment: Adding Machine
3. Seating: 1 desk, 2 visitors
4. Work Surfaces: 1 accountanat's desk
5. Storage Equipment: 4 file cabinets, book shelves
6. Special Equipment: NA

SPECIAL NOTES:

TNM&O CASHIER'S OFFICE

PRIMARY

TNM&O Cashier
TNM&O Auditor
TNM&O AUDITOR Rev. Accts.

CASHIER

TNM&O Traffic Manager
TNM&O President
TNM&O Receptionist

SECONDARY

This office should be located in a group with the other accounting offices; the Auditor's, Auditor's of Revenue Accounts, and Controller's office. Sufficient work surfaces should be provided to accomodate the large amount of paperwork which would be generated. The cashier's office should control access to the records vault which would be shared by the other accounting offices.

DESIGN REQUIREMENTS:
1. The Cashier's office should control access to the records/security vault.
2. The Cashier's office should be located in a group with the other accounting offices.
3. Public access is not required to this area.

ACTIVITIES:
Office work, conversation, sitting.

GENERAL REQUIREMENTS:
1. Number of Occupants: 1
2. Minimum Sq. Ft./Occupant: 100 sq.ft.
3. Minimum Area: 180 sq.ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 8'-0"
6. Degree of Enclosure: Full
7. Partitions:Flexible
8. Accoustics: Isolated
9. Degree of Facility Maintenance: Low
10. Degree of Security Control: High
11. Degree of Visual Permeability: Low
12. Degree of Safety Control: Low

MATERIAL FINISH:
1. Floors: Carpet
2. Walls: Vinyl or Painted
3. Ceilings: Accoustical Drop

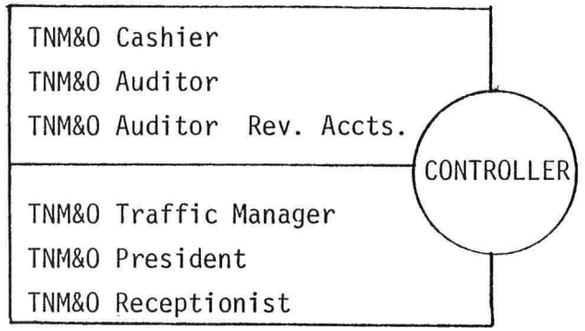
MECHANICAL/ELECTRICAL
1. Heating: 70 deg. at 0 deg. exterior
2. Cooling: 70 deg. at 90 deg. exterior
3. Fresh Air: 5 cfm
4. Circulation: 15 cfm
5. Water Supply: NA
6. Plumbing Fixtures: NA
7. Gas Service: NA
8. Electrical: 120 VAC
9. Lighting Levels:40 fc/ 100 fc at work surfaces
10. Emergency Lighting: 1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: 1 Phone
2. Office Equipment: 1 Adding Machine
3. Seating: 1 Desk, 2 Visitor
4. Work Surfaces: 1 Accountant's Desk
5. Storage Equipment: 4 File Cabinets, Bookshelves
6. Special Equipment: 80 sq.ft. records vault

SPECIAL NOTES:

TNM&O CONTROLLER'S OFFICE

PRIMARY



SECONDARY

The Controller's Office should be located in a group with the other accounting/ financial offices, the Auditor's, Cashier's and Auditor of Revenue accounts. The office requires sufficient work space to accomodate the large amount of paperwork which would be generated. Access to fire proof records vault is required.

DESIGN REQUIREMENTS:
1. The Controller's office should be located with the other financial and accounting offices of TNM&O.
2. Provide ample work space for paper work and access to the fire vault for records storage.
3. No public access is required in this area.

ACTIVITIES:
Office work, seating, conversation.

GENERAL REQUIREMENTS:
1. Number of Occupants: 1
2. Minimum Sq. Ft./Occupant: 100 sq.ft.
3. Minimum Area: 100 sq.ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 8'-0"
6. Degree of Enclosure: Full
7. Partitions: Flexible
8. Accoustics: Isolated
9. Degree of Facility Maintenance:Low
10. Degree of Security Control: Low
11. Degree of Visual Permeability: Low
12. Degree of Safety Control: Low

MATERIAL FINISH:
1. Floors: Carpet
2. Walls:Painted or Vinyl Covered
3. Ceilings:Accoustical Drop

MECHANICAL/ELECTRICAL
1. Heating: 70 deg. at 0 deg. exterior
2. Cooling: 70 deg. at 90 deg. exterior
3. Fresh Air:5 cfm
4. Circulation:15 cfm
5. Water Supply: NA
6. Plumbing Fixtures:NA
7. Gas Service:NA
8. Electrical:120 VAC
9. Lighting Levels:40 fc/100 fc at work surfaces
10. Emergency Lighting:1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: 1 Phone
2. Office Equipment: Adding Machine
3. Seating:1 desk, 2 visitors
4. Work Surfaces:1 accountants desk
5. Storage Equipment: 4 file cabinets, book shelves
6. Special Equipment: NA

SPECIAL NOTES: NA

TNM&O AUDITOR OF REVENUE ACCOUNTS OFFICE

PRIMARY

TNM&O Auditor
TNM&O Cashier
TNM&O Controller

AUDITOR REV. ACCTS.

TNM&O President
TNM&O Traffic Manager
TNM&O Receptionist

SECONDARY

This office should be located in a group with the other accounting offices; the Auditor's, Cashier's, and Controller's offices. Sufficient work surfaces should be located in the space to accomodate the large amounts of paperwork which would be generated. Sensitive and important records should be placed in a fire proof records vault which would be shared by the other accounting offices.

DESIGN REQUIREMENTS:
1. The auditor of revenue accounts office should be located with the other accounting offices of TNM&O.
2. Provide ample work space for paperwork and access to a fire vault for the storage of critical records.

ACTIVITIES:
Office work, conversation, sitting.

GENERAL REQUIREMENTS:
1. Number of Occupants: 1
2. Minimum Sq. Ft./Occupant: 100 sq.ft.
3. Minimum Area: 100 sq.ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 8'-0"
6. Degree of Enclosure: Full
7. Partitions: Flexible
8. Accoustics: Isolated
9. Degree of Facility Maintenance: Low
10. Degree of Security Control: Medium
11. Degree of Visual Permeability: Low
12. Degree of Safety Control: Low

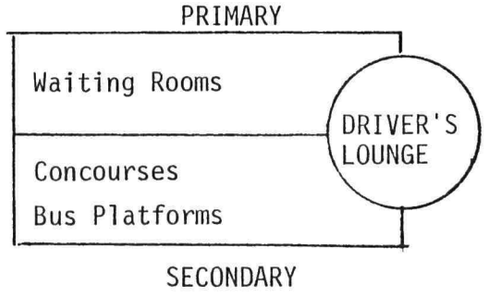
MATERIAL FINISH:
1. Floors: Carpet
2. Walls: Painted or Vinyl Covered
3. Ceilings: Accoustical Drop

MECHANICAL/ELECTRICAL
1. Heating: 70 deg. at 0 deg. exterior
2. Cooling: 70 deg. at 90 deg. exterior
3. Fresh Air: 5 cfm
4. Circulation: 15 cf,
5. Water Supply: NA
6. Plumbing Fixtures: NA
7. Gas Service: NA
8. Electrical: 120 VAC
9. Lighting Levels: 40fc/ 100 fc at work surfaces
10. Emergency Lighting: 1fc

EQUIPMENT/FURNISHINGS:
1. Communications: 1 Phone
2. Office Equipment: Adding Machine
3. Seating: 1 Desk, 2 Visitors
4. Work Surfaces: 1 Accountant's desk
5. Storage Equipment: 4 file cabinets, book shelves
6. Special Equipment: NA

SPECIAL NOTES:

TNM&O DRIVER'S LOUNGE



The Driver's Lounge serves as a multi-purpose room for the bus drivers. It will present the drivers an opportunity to change clothes, wash up and relax before going out on the road for another four hour run. An enclosed changing area with a lavatory is needed in this space with access nearby for the locker area. The relaxation area should be relaxed in atmosphere. A work surface is needed for paperwork. Though a few soft comfortable chairs may be used in the area, some drivers would prefer to stand and stretch their legs after operating a bus for a four hour stretch.

DESIGN REQUIREMENTS:
1. Provide an enclosed clothes change area with a lavatory with lockers located nearby.
2. Provide a relaxation area with some soft chairs, yet provide floor area for those drivers who would rather stand for a while.

ACTIVITIES:
Relax, clothes change, paperwork, conversation.

GENERAL REQUIREMENTS:
1. Number of Occupants: Varies
2. Minimum Sq. Ft./Occupant: NA
3. Minimum Area: 200 sq.ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 8'-0"
6. Degree of Enclosure: Full
7. Partitions: Flexible
8. Accoustics: Isolated
9. Degree of Facility Maintenance: Low
10. Degree of Security Control: Low
11. Degree of Visual Permeability: Low
12. Degree of Safety Control: Low

MATERIAL FINISH:
1. Floors: Resilient Tile/Carpet
2. Walls: Paint/Vinyl Covered
3. Ceilings: Accoustical Drop

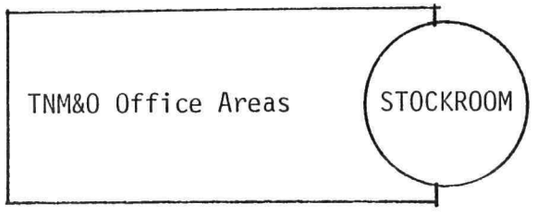
MECHANICAL/ELECTRICAL
1. Heating: 70 deg. at 0 deg. exterior
2. Cooling: 70 deg. at 90 deg. exterior
3. Fresh Air: 15 cfm
4. Circulation: 45 cfm
5. Water Supply: Hot and Cold
6. Plumbing Fixtures: Lavatory
7. Gas Service: NA
8. Electrical: 120 VAC
9. Lighting Levels: 40 fc/ 100 fc at work surfaces
10. Emergency Lighting: 1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: Phone
2. Office Equipment: NA
3. Seating: 2 Easy Chairs
4. Work Surfaces: Desk
5. Storage Equipment: NA
6. Special Equipment: Lockers for Clothes

SPECIAL NOTES:

TNM&O STOCKROOM

PRIMARY



This stockroom will serve as a storage space for office supplies. The area should be located in the TNM&O office area. If expansion of office space is required in the future, this space could be converted into an office area.

DESIGN REQUIREMENTS:
1. The stockroom is to be located in the TNM&O office area.
2. The space could be converted into office space at some future time.

ACTIVITIES:
Storage

GENERAL REQUIREMENTS:
1. Number of Occupants: NA
2. Minimum Sq. Ft./Occupant: NA
3. Minimum Area: 80 sq.ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 8'-0"
6. Degree of Enclosure: Full
7. Partitions: Flexible
8. Accoustics: NA
9. Degree of Facility Maintenance: Low
10. Degree of Security Control: Low
11. Degree of Visual Permeability: Low
12. Degree of Safety Control: Low

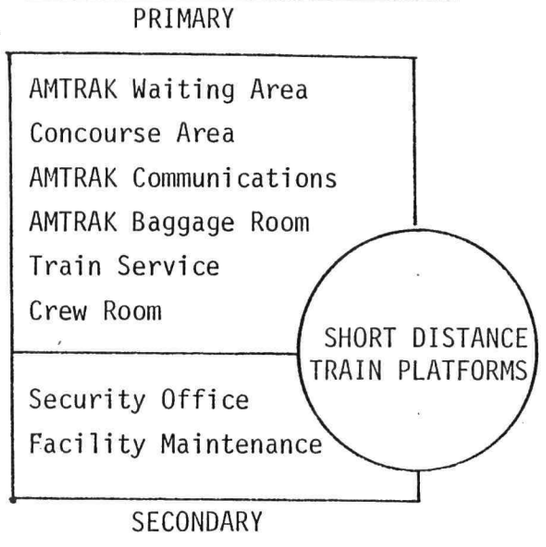
MATERIAL FINISH:
1. Floors: Resilient Floor Tile
2. Walls: Painted
3. Ceilings: exposed or Accoustical Drop

MECHANICAL/ELECTRICAL
1. Heating: 65 deg. at 0 deg. exterior
2. Cooling: 75 deg. at 90 deg. exterior
3. Fresh Air: 5 cfm
4. Circulation: 15 cfm
5. Water Supply: NA
6. Plumbing Fixtures: NA
7. Gas Service: NA
8. Electrical: 120VAC
9. Lighting Levels: 20 fc
10. Emergency Lighting: 0.5 fc

EQUIPMENT/FURNISHINGS:
1. Communications: NA
2. Office Equipment: NA
3. Seating: NA
4. Work Surfaces: NA
5. Storage Equipment: Shelving
6. Special Equipment: NA

SPECIAL NOTES:

SHORT DISTANCE TRAIN PLATFORM



The train platforms, inactive during most of the day, will become centers of frantic activity once a train arrives. Ideally, the public should not be allowed on the platforms as the train arrives, as a safety precaution. The platforms will be dominated by material handling activities before a train arrives, as luggage and train supplies are brought to the platform to be loaded onto the train. The platform area should not be opened to the public until after the arriving passengers have left the train. As train tickets are collected on board the train, there is no problem in allowing visitors and curious on-lookers onto the train platforms. The short distance train platform, intended primarily for the eventuality of a Lubbock-Amarillo direct run, will be almost identical to that of the long distance train platforms. However, the trains would be much shorter, and the trains will possible be parked at the platform for periods of time.

DESIGN REQUIREMENTS:
1. Platform design shold allow the complete evacuation of a loaded train (Approx. 200) and the fully loaded platform in less than four minutes.
2. Passengers should not be allowed to cross tracks.
3. Shelter from weather elements is necessary.
4. Level change equipment, if needed, should accomodate baggage as well as people.

ACTIVITIES:
Loading and unloading of passengers, material and baggage handling, track inspection of the train performed in station.

GENERAL REQUIREMENTS:
1. Number of Occupants: 1 Train
2. Minimum Sq. Ft./Occupant: NA
3. Minimum Area: 1-12' X 440'
4. Minimum No. of Exits: 2
5. Minimum Clear Ceiling Ht.: 18' over track/10' other
6. Degree of Enclosure: Protected
7. Partitions: NA
8. Accoustics: Controlled
9. Degree of Facility Maintenance: High
10. Degree of Security Control: High
11. Degree of Visual Permeability: Open
12. Degree of Safety Control: High

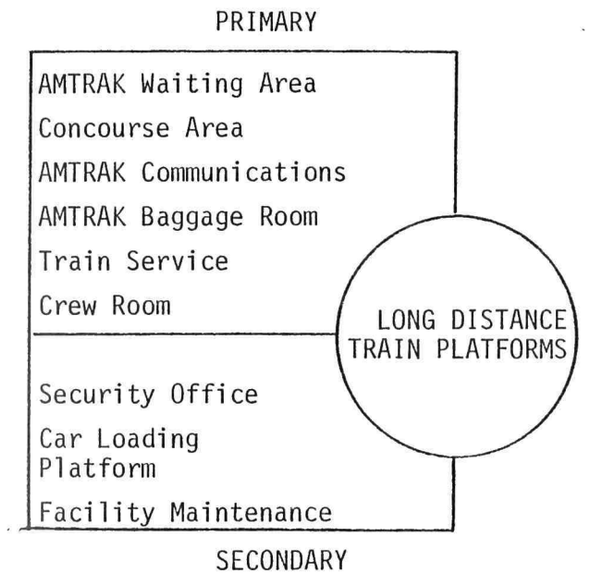
MATERIAL FINISH:
1. Floors: Rough , Non-slip surface, Concrete
2. Walls: Impact, Moisture Resistant
3. Ceilings: Concrete, Glass, Metal

MECHANICAL/ELECTRICAL
1. Heating: NA
2. Cooling: NA
3. Fresh Air: NA
4. Circulation: NA
5. Water Supply: Hot and Cold
6. Plumbing Fixtures: Hose bibs, hose
7. Gas Service: NA
8. Electrical: 120/220 VAC
9. Lighting Levels: 15 fc
10. Emergency Lighting: 1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: PA System
2. Office Equipment: NA
3. Seating: Benches
4. Work Surfaces: NA
5. Storage Equipment: NA
6. Special Equipment: Personal Luggage Carts

SPECIAL NOTES:

LONG DISTANCE TRAIN PLATFORMS



5. Ideally, material handling activities should occur on one side of the train, and passenger activities on the other side.

ACTIVITIES:
Loading and unloading of passengers, material and baggage handling, track inspection of train.

The train platforms, inactive during most of the day, will become centers of frantic activity, once a train arrives. Ideally, the public should not be allowed on the platforms as the train arrives, as a safety precaution. The platforms will be dominated by material handling activities before a train arrives, as luggage and train supplies are brought to the platform to be loaded on the train. It is not until the train unloads that the public is allowed to leave the concourse and enter the platform. As tickets are collected on the train, access to the platform by guests of passengers and curious onlookers is not a problem and no control is necessary. If the concourse is on a different level than the platforms, special care should be taken in selection of level change facilities for not only persons but baggage as well, for many train passengers prefer to handle their own luggage rather than to check it at the baggage room.

DESIGN REQUIREMENTS:
1. Platform design should allow the complete evacuation of loaded train (appox. 300 persons) and the fully loaded platform, in less than four minutes.
2. Passengers should not be allowed to cross tracks.
3. Shelter from weather elements is necessary.
4. Level change equipment, if needed should accomodate baggage as well as people.

GENERAL REQUIREMENTS:
1. Number of Occupants: 2 Trains
2. Minimum Sq. Ft./Occupant: NA
3. Minimum Area: 2- 12' X 680'
4. Minimum No. of Exits: 2
5. Minimum Clear Ceiling Ht.: 18' over track/10' other
6. Degree of Enclosure: Protected
7. Partitions: NA
8. Accoustics: Controlled
9. Degree of Facility Maintenance: High
10. Degree of Security Control: High
11. Degree of Visual Permeability: Open
12. Degree of Safety Control: High

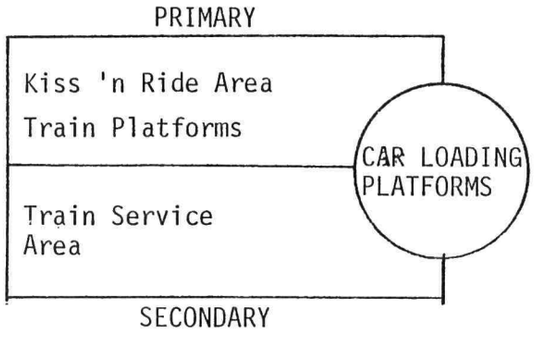
MATERIAL FINISH:
1. Floors: Rough Concrete
2. Walls: Impact/Moisture Resistant
3. Ceilings: Concrete, Glass, Metal

MECHANICAL/ELECTRICAL
1. Heating: NA
2. Cooling: NA
3. Fresh Air: NA
4. Circulation: NA
5. Water Supply: Hot and Cold
6. Plumbing Fixtures: Hose bibs, hose
7. Gas Service: NA
8. Electrical: 120/220 VAC
9. Lighting Levels: 15 fc
10. Emergency Lighting: 1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: PA
2. Office Equipment: NA
3. Seating: Benches
4. Work Surfaces: NA
5. Storage Equipment: NA
6. Special Equipment: Personal Baggage Carts

SPECIAL NOTES: Special safety precautions apply, see appendix for details.

CAR LOADING PLATFORMS



The function of the car loading platform is to load and unload automobiles from rail cars. This activity should occur on a rail siding rather than a through line and will require extensive ramping to accomodate both the bi-level and tri-level rail cars. The car loading platform will require a staging area where autos can be left, before or after they are loaded or unloaded from the railcars. This is not a public area and the activities occurring here could be quite dangerous to the public.

DESIGN REQUIREMENTS:
1. This activity is to occur on a separate siding.
2. Public access is to be denied in this area.
3. Ramps shall accomodate both bi-level and tri-level rail cars.
4. A staging area for up to thirty autos will be needed.

ACTIVITIES:
Loading and unloading of automobiles onto train cars.

GENERAL REQUIREMENTS:
1. Number of Occupants: NA
2. Minimum Sq. Ft./Occupant: NA
3. Minimum Area: NA
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 16'-0"
6. Degree of Enclosure: Open- Sheltered
7. Partitions:NA
8. Accoustics:Controlled
9. Degree of Facility Maintenance:Low
10. Degree of Security Control: Low
11. Degree of Visual Permeability: Low
12. Degree of Safety Control:High

MATERIAL FINISH:
1. Floors: Concrete
2. Walls: NA
3. Ceilings: Concrete, Metal or Glass

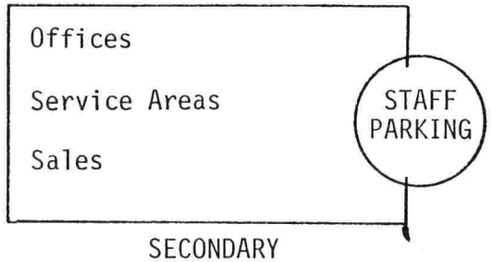
MECHANICAL/ELECTRICAL
1. Heating:NA
2. Cooling:NA
3. Fresh Air:NA
4. Circulation:NA
5. Water Supply:NA
6. Plumbing Fixtures:NA
7. Gas Service:NA
8. Electrical:120 VAC
9. Lighting Levels:15 fc
10. Emergency Lighting:1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: Phone, walkie-talkie
2. Office Equipment: NA
3. Seating: NA
4. Work Surfaces:NA
5. Storage Equipment:NA
6. Special Equipment:NA

SPECIAL NOTES:

STAFF PARKING AREA

PRIMARY



SECONDARY

The staff parking area will be utilized by the employees of the Transit Center. Security of the area is a major issue, since many employees will have to work at the Transit Center through the night. Therefore, the staff parking area should be well lit at night and free of obsacles which would provent the visual surveillance of the area by the security officers. The staff parking area should be located as closely as possible to those areas which have a major concentration of the facility employees.

DESIGN REQUIREMENTS:
1. The area is to be well lit at night and free of obstructions.
2. The area should be in complete view of the security officers or parking attendants (if the staff parking is incorporated into the passenger parking facilities.
3. The staff parking should be closely located to those portions of the facility employing the largest number of staff.

ACTIVITIES:
Parking of cars and small trucks, motor cycles.

GENERAL REQUIREMENTS:
1. Number of Occupants: 60
2. Minimum Sq. Ft./Occupant: 200 sq.ft.
3. Minimum Area: 12,000 sq.ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 14'-0"
6. Degree of Enclosure: None
7. Partitions: NA
8. Accoustics: Controlled
9. Degree of Facility Maintenance: Low
10. Degree of Security Control: Medium
11. Degree of Visual Permeability: High
12. Degree of Safety Control: Medium

MATERIAL FINISH:
1. Floors: Concrete or Asphalt
2. Walls: NA
3. Ceilings:NA

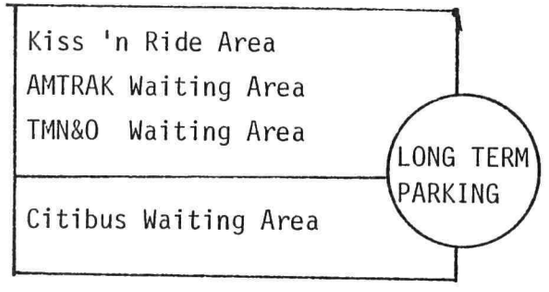
MECHANICAL/ELECTRICAL
1. Heating: NA
2. Cooling: NA
3. Fresh Air: NA
4. Circulation: NA
5. Water Supply: NA
6. Plumbing Fixtures: NA
7. Gas Service: NA
8. Electrical: 120 VAC
9. Lighting Levels: 2 fc
10. Emergency Lighting: NA

EQUIPMENT/FURNISHINGS:
1. Communications: NA
2. Office Equipment: NA
3. Seating:NA
4. Work Surfaces: NA
5. Storage Equipment: NA
6. Special Equipment: NA

SPECIAL NOTES:

LONG TERM PARKING

PRIMARY



SECONDARY

The long term parking area will be utilized by those persons who will wish to leave their cars at the Transit Center for periods longer than half a day. Security is the major issue in this area. The lot should be well lit at night and parking attendants should have a clear view of any activity which occurs in the area.

DESIGN REQUIREMENTS:
1. The area is to be well lit at night and free of obstructions.
2. Area is to be in complete view of the parking attendants.
3. The area should be a short distance away from a Transit Center entrance.

ACTIVITIES:
Parking of cars, small trucks, and motorcycles, pick up of ticket, payment of toll.

GENERAL REQUIREMENTS:
1. Number of Occupants: 100 Cars
2. Minimum Sq. Ft./Occupant: 200 sq. ft.
3. Minimum Area: 20,000 sq. ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 14'-0"
6. Degree of Enclosure: None
7. Partitions: NA
8. Accoustics: Controlled
9. Degree of Facility Maintenance: Medium
10. Degree of Security Control: Medium
11. Degree of Visual Permeability: High
12. Degree of Safety Control: Medium

MATERIAL FINISH:
1. Floors: Concrete or Asphalt
2. Walls: NA
3. Ceilings: NA

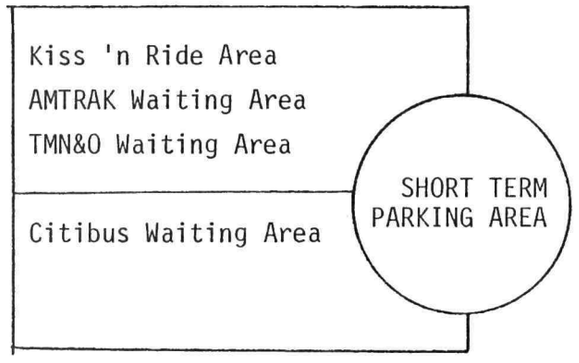
MECHANICAL/ELECTRICAL
1. Heating: NA
2. Cooling: NA
3. Fresh Air: NA
4. Circulation: NA
5. Water Supply: NA
6. Plumbing Fixtures: NA
7. Gas Service: NA
8. Electrical: 120 VAC
9. Lighting Levels: 2 fc
10. Emergency Lighting: NA

EQUIPMENT/FURNISHINGS:
1. Communications: NA
2. Office Equipment: NA
3. Seating: NA
4. Work Surfaces: NA
5. Storage Equipment: NA
6. Special Equipment: NA

SPECIAL NOTES:

SHORT TERM PARKING AREA

PRIMARY



SECONDARY

The short term parking area will be utilized by those persons who will wish to leave their cars at the Transit Center for periods shorter than a half a day. Security is the major issue in this area, the lot should be well lit at night and parking attendants should have a clear view of any activity which occurs in the area.

DESIGN REQUIREMENTS:
1. The area is to be well lit at night and free of obstructions.
2. Area is to be in complete view of the parking attendants.
3. The area should be a short distance away from a Transit Center entrance.

ACTIVITIES:
Parking of cars and small trucks, motorcycles, pick up of ticket, payment of toll.

GENERAL REQUIREMENTS:
1. Number of Occupants: 165 Cars
2. Minimum Sq. Ft./Occupant: 200 sq. ft.
3. Minimum Area: 33,000 sq. f.t
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 14'-0"
6. Degree of Enclosure: None
7. Partitions: NA
8. Accoustics: Controlled
9. Degree of Facility Maintenance: Medium
10. Degree of Security Control: Medium
11. Degree of Visual Permeability: High
12. Degree of Safety Control: Medium

MATERIAL FINISH:
1. Floors: Concrete or Asphalt
2. Walls: NA
3. Ceilings: NA

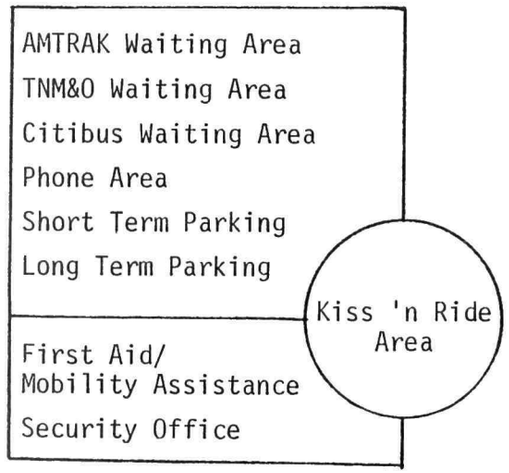
MECHANICAL/ELECTRICAL
1. Heating: NA
2. Cooling: NA
3. Fresh Air: NA
4. Circulation: NA
5. Water Supply: NA
6. Plumbing Fixtures: NA
7. Gas Service: NA
8. Electrical: NA
9. Lighting Levels: 2 fc
10. Emergency Lighting: NA

EQUIPMENT/FURNISHINGS:
1. Communications: NA
2. Office Equipment: NA
3. Seating: NA
4. Work Surfaces: NA
5. Storage Equipment: NA
6. Special Equipment: NA

SPECIAL NOTES:

KISS 'N RIDE AREA

PRIMARY



SECONDARY

ACTIVITIES:
Pick up or drop off of passengers, employees and some supplies.

The kiss 'n ride area will function primarily as a temporary parking area and as a taxi stand. Persons will utilize the area mostly to drop off or pick up baggage and passengers or to wait for personal transportation. This area should have direct access to the parking areas and be located adjacent to the major facility entrance. The area should offer protection from the weather elements so that baggage and passenger transfers can be made in comfort. A major problem with kiss 'n ride areas are those persons who abuse the area and use it for parking of longer than 10 minute periods. The posting of 10 minute parking signs and frequent patrol of the area by police for parking violators are not effective in dealing with this problem, mostly because it creates a drain on the manpower of the city's police department who have more important things to do than to check for parking violators. If direct or TV surveillance of the area is performed by the facility's security office who can keep tabs on offenders in the area and take appropriate action.

DESIGN REQUIREMENTS:
1. The kiss 'n ride area should be located next to the major entrance and should offer some protection from the weather elements.
2. Access to and from the parking areas is desired.
3. Surveillance of the area, either directly or by TV monitors, by the security office and officers is needed to keep the area clear for traffic.

GENERAL REQUIREMENTS:
1. Number of Occupants: 10 Cars
2. Minimum Sq. Ft./Occupant: 200 sq. ft.
3. Minimum Area: 2000 sq. ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 14'-0"
6. Degree of Enclosure: Protected
7. Partitions: NA
8. Accoustics: Controlled
9. Degree of Facility Maintenance: Low
10. Degree of Security Control: Medium
11. Degree of Visual Permeability: High
12. Degree of Safety Control: Medium

MATERIAL FINISH:
1. Floors: Rough Concrete
2. Walls: NA
3. Ceilings: Concrete, Metal or Glass

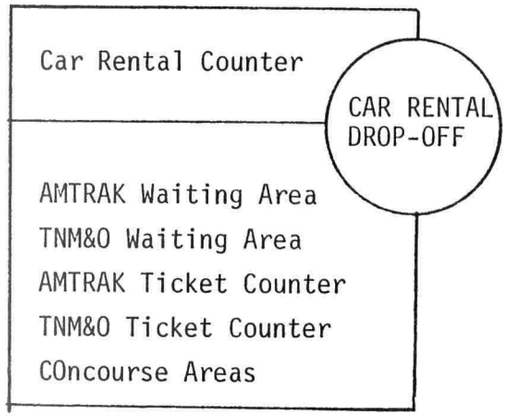
MECHANICAL/ELECTRICAL
1. Heating: NA
2. Cooling: NA
3. Fresh Air: NA
4. Circulation: NA
5. Water Supply: NA
6. Plumbing Fixtures: NA
7. Gas Service: NA
8. Electrical: 120 VAC
9. Lighting Levels: 5 fc
10. Emergency Lighting: NA

EQUIPMENT/FURNISHINGS:
1. Communications: PA, Cab Coutesy Phone
2. Office Equipment: NA
3. Seating: Benches
4. Work Surfaces: NA
5. Storage Equipment: NA
6. Special Equipment: Waste Cans

SPECIAL NOTES: NA

CAR RENTAL DROP OFF

PRIMARY



SECONDARY

This area should be a short distance from the rental counters inside the Transit Center. The area should be well lit for night time security reasons. It is possible to protect the area with some sort of weather shelter.

DESIGN REQUIREMENTS:
1. The area should be easily located from the rental counters.
2. The area should be well lit.
3. Weather protection of the area would be desirable.

ACTIVITIES:
Drop off and pick up of rental cars.

GENERAL REQUIREMENTS:
1. Number of Occupants: 10 Cars
2. Minimum Sq. Ft./Occupant: 200 sq. ft.
3. Minimum Area: 2000 sq. ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 14'-0"
6. Degree of Enclosure: Sheltered/ None
7. Partitions: NA
8. Accoustics: Controlled
9. Degree of Facility Maintenance: Low
10. Degree of Security Control: Medium
11. Degree of Visual Permeability: High
12. Degree of Safety Control: Medium

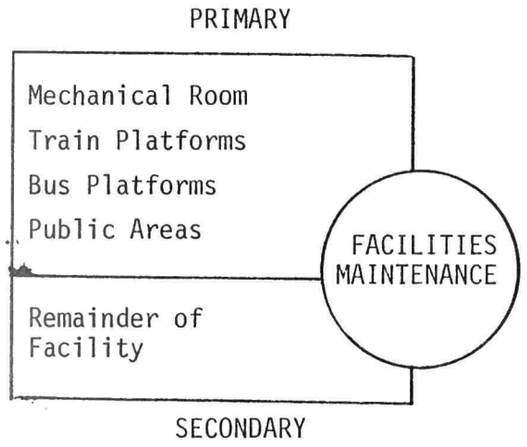
MATERIAL FINISH:
1. Floors: Concrete or Asphalt
2. Walls: NA
3. Ceilings: Concrete, Metal, Glass

MECHANICAL/ELECTRICAL
1. Heating: NA
2. Cooling: NA
3. Fresh Air: NA
4. Circulation: NA
5. Water Supply: NA
6. Plumbing Fixtures: NA
7. Gas Service: NA
8. Electrical: 120 VAC
9. Lighting Levels: 2 fc
10. Emergency Lighting: NA

EQUIPMENT/FURNISHINGS:
1. Communications: NA
2. Office Equipment: NA
3. Seating: NA
4. Work Surfaces: NA
5. Storage Equipment: NA
6. Special Equipment: NA

SPECIAL NOTES:

FACILITIES MAINTENANCE ROOM



In a facility the size of the Transit Center, there will always be a need for repairs to the facility. Though the maintenance rooms are traditionally thought of as a place to store tools and spare parts, it is actually the office and headquarters for the maintenance crew. Provisions should be made for this occurrence. The storage areas, especially those of garden and lawn equipment, should not interfere with the work areas. This is critical since power tools will often be used in the area and safety clearance for circulation is a must. The work bench must be large enough to handle large objects, such as a door and enough space should be allowed so that a portion of the bench can function as a desk for the crew. Direct access to the exterior is a must and an adjacency to the mechanical areas, train and bus platforms would be desirable.

DESIGN REQUIREMENTS:
1. Treat the maintenance room as more than a place of storage. Whether or not it is intended to function as one, it will become a work room.
2. Separate storage areas from the work areas.
3. Provide exterior access with doors and aisles large enough to handle pieces of lawn equipment, ladders, etc.
4. Provide a work bench large enough so that it can function as the center of activity.

ACTIVITIES:
Repair and fabrication of some building components, equipment storage.

GENERAL REQUIREMENTS:
1. Number of Occupants: 2 Occasionally
2. Minimum Sq. Ft./Occupant: NA
3. Minimum Area: 400 sq.ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 12'-0"
6. Degree of Enclosure: Full
7. Partitions: Flexible
8. Accoustics: Controlled
9. Degree of Facility Maintenance: Medium
10. Degree of Security Control: Medium
11. Degree of Visual Permeability: Low
12. Degree of Safety Control: Medium

MATERIAL FINISH:
1. Floors: Concrete
2. Walls: Impact Resistant
3. Ceilings: Exposed Structural

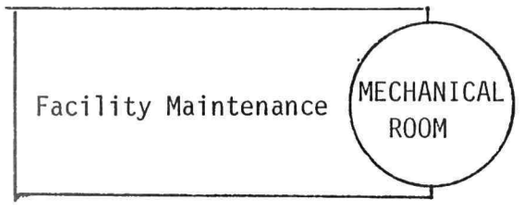
MECHANICAL/ELECTRICAL
1. Heating: 65 deg. at 0 deg. exterior.
2. Cooling: 75 deg. at 90 deg. exterior
3. Fresh Air: 10 cfm
4. Circulation: 30 cfm
5. Water Supply: Hot and Cold
6. Plumbing Fixtures: Lavatory
7. Gas Service: NA
8. Electrical: 120/220 VAC
9. Lighting Levels: 30 fc
10. Emergency Lighting: 0.5 fc

EQUIPMENT/FURNISHINGS:
1. Communications: 1 Phone
2. Office Equipment: NA
3. Seating: 1 Stool
4. Work Surfaces: 1 Work Bench
5. Storage Equipment: Tool and gardening
6. Special Equipment: Table saw, Drill press, Arc welder

SPECIAL NOTES:

MECHANICAL ROOM

PRIMARY



The mechanical room should be given direct access to the outside of the building by means of extra wide doors, usually greater than six feet in width. A central location of the mechanical room results in greater ease and efficiency of laying out heating ducts if an all air system is to be used in the facility. If a water-air system is to be utilized, the location of the mechanical room is not so critical.

DESIGN REQUIREMENTS:
1. Exterior access is necessary, by means of doors no less than six feet in width.
2. A centralized location of the mechanical room is helpful in laying out the duct work of an all air heating system.
3. Entry by the public is to be strictly controlled.

ACTIVITIES:
Environmental control

GENERAL REQUIREMENTS:
1. Number of Occupants: NA
2. Minimum Sq. Ft./Occupant: NA
3. Minimum Area: 3,000 sq.ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 12 feet
6. Degree of Enclosure: Full
7. Partitions: Fixed
8. Accoustics: Controlled
9. Degree of Facility Maintenance: Medium
10. Degree of Security Control: High
11. Degree of Visual Permeability: Low
12. Degree of Safety Control: Medium

MATERIAL FINISH:
1. Floors: Unfinished Concrete
2. Walls: Cheap, durable
3. Ceilings: Exposed Structural

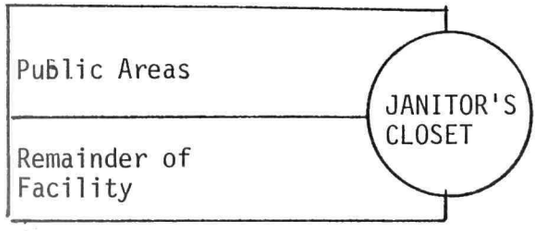
MECHANICAL/ELECTRICAL
1. Heating: 60 deg @ 0 deg exterio
2. Cooling: 80 deg @ 90 deg exterior
3. Fresh Air: NA
4. Circulation: NA
5. Water Supply: Cold
6. Plumbing Fixtures: Water Heater
7. Gas Service: Yes
8. Electrical: 120 VAC/240VAC
9. Lighting Levels: 40 fc
10. Emergency Lighting: 1 fc

EQUIPMENT/FURNISHINGS:
1. Communications: NA
2. Office Equipment: NA
3. Seating: NA
4. Work Surfaces: NA
5. Storage Equipment: Tool
6. Special Equipment: Heating, cooling equipment, Electric Panel, Electric Generator (Diesel Powered)

SPECIAL NOTES:

JANITOR'S CLOSETS

PRIMARY



SECONDARY

The janitor's closets should be located adjacent to those areas requiring the highest degree of janitorial care; these areas being the waiting areas, concourses, and restrooms. Though it should be adjacent to these areas, it should have a low degree of visibility. Adequate space should be allowed for storage of cleaning and restroom supplies. Other janitor closets should be located in the office area and another servicing the food service and concessions area.

DESIGN REQUIREMENTS:
1. Though janitor's closets should be located near areas which are used often, they should be fairly inconspicuous.
2. One janitor's closet is to service the waiting areas, concourse and restrooms, another to service the food service and concessions area, and another for the office areas.
3. Consideration should be given to the storage of equipment and supplies in this area.

ACTIVITIES:
Storage of janitorial supplies

GENERAL REQUIREMENTS:
1. Number of Occupants: NA
2. Minimum Sq. Ft./Occupant: NA
3. Minimum Area: 80 sq. ft.
4. Minimum No. of Exits: 1
5. Minimum Clear Ceiling Ht.: 8'-0"
6. Degree of Enclosure: Full
7. Partitions: Flexible
8. Accoustics: Controlled
9. Degree of Facility Maintenance: Medium
10. Degree of Security Control: Low
11. Degree of Visual Permeability: Low
12. Degree of Safety Control: Low

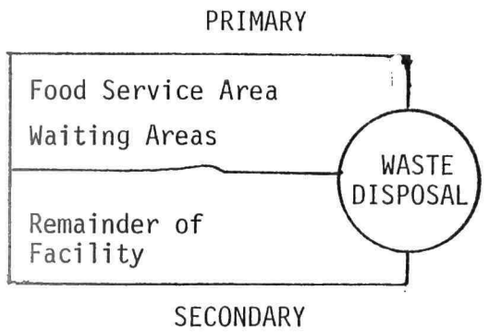
MATERIAL FINISH:
1. Floors: Smooth Concrete or Resilient Tile
2. Walls: Waterproof (Ceramic Tile)
3. Ceilings: Accoustical Drop

MECHANICAL/ELECTRICAL
1. Heating: 65° @ 0° Exterior
2. Cooling: 75° @ 90° Exterior
3. Fresh Air: 5 cfm
4. Circulation: 15 cfm
5. Water Supply: Hot and Cold
6. Plumbing Fixtures: Janitor's Sink
7. Gas Service: NA
8. Electrical: 120 VAC
9. Lighting Levels: 30 fc
10. Emergency Lighting: NA

EQUIPMENT/FURNISHINGS:
1. Communications: NA
2. Office Equipment: NA
3. Seating: NA
4. Work Surfaces: NA
5. Storage Equipment: Shelves
6. Special Equipment: Floor Maintenance Equip.

SPECIAL NOTES: NA

WASTE DISPOSAL AREA



Though this area is often neglected by designers, this area can be one of the most difficult to deal with. The odors and general unsightliness of these areas, along with the necessity of providing service access, make for difficulties in designing waste disposal areas. The interior connection made with the facility itself is also a major problem. Visual and odor buffering are a must for both the interior and exterior, and external surfaces must be of a type to allow easy cleanup of both solid and liquid spills. Plenty of clearance should be allowed for service access, and if a screen is utilized around the dumpster area, it should be of a substantial construction to be able to withstand the impact of a trash dumpster being slammed against it.

DESIGN REQUIREMENTS:
1. Visual and odor buffering are a must for both the exterior areas and the internal linkage of the waste disposal area.
2. Provide more than adequate clearance for refuse pickup.
3. Use easily washable materials to facilitate cleanup of the area.
4. Use strong construction materials capable of withstanding strong impacts in the dumpster screens.

PRIMARY ACTIVITIES:
The collection and pickup of refuse

GENERAL REQUIREMENTS:
1. Number of Occupants: None
2. Minimum Sq. Ft./Occupant: None
3. Minimum Area: 300 sq. ft.
4. Minimum No. of Exits: One
5. Minimum Clear Ceiling Ht.:15ft.
6. Degree of Enclosure: Exterior
7. Partitions: Visual screen
8. Accoustics: Controlled
9. Degree of Facility Maintenance: Medium
10. Degree of Security Control: None
11. Degree of Visual Permeability: Low
12. Degree of Safety Control:Little

MATERIAL FINISH:
1. Floors: Smooth, impact resistant, washable
2. Walls: Smooth, impact resistant, washable
3. Ceilings: None required

MECHANICAL/ELECTRICAL
1. Heating: NA
2. Cooling: NA
3. Fresh Air: NA
4. Circulation: NA
5. Water Supply: Cold
6. Plumbing Fixtures: External Faucet
7. Gas Service: NA
8. Electrical: 117V
9. Lighting Levels: 30 fc.
10. Emergency Lighting: NA

EQUIPMENT/FURNISHINGS:
1. Communications: NA
2. Office Equipment: NA
3. Seating: NA
4. Work Surfaces: NA
5. Storage Equipment: NA
6. Special Equipment: Trash dumpster/Compactor

SPECIAL NOTES: