4.0 AFFECTED ENVIRONMENT

4.1 INTRODUCTION

The proposed LRT system for Hennepin County has the potential to both directly and indirectly affect the social, economic and physical conditions of Hennepin County. Chapter 4 will outline the existing environmental conditions which will be used as a base to evaluate the location and magnitude of anticipated environmental impacts associated with the proposed action.

4.2 REGIONAL SETTING

The proposed Light Rail Transit System Project is located in Hennepin County (Figure 4.1). Hennepin County is part of the seven-county Twin Cities Metropolitan Area located in east-central Minnesota. Also included in the Metro Area are the counties of: Anoka, Carver, Dakota, Ramsey, Scott and Washington. This metropolitan area covers 3,000 square miles and includes the two central cities of Minneapolis and Saint Paul. Within this region are 951 lakes and three major rivers: the Minnesota, Saint Croix and Mississippi. The area has a glacial terrain, is rich in natural resources, and includes an extensive regional park system. This region experiences four distinct seasons, which can include rather severe weather during the winter months, creating difficult driving conditions.

The population in the seven-county metropolitan area in 1980 was 1,985,873. By the Year 2000, the population is expected to increase by six percent to a figure of 2,260,000. It is anticipated that the projected increase will take place primarily in the second and third ring suburban areas. Along with the projected population increase, the total number of households in the region is expected to increase from 721,000 in 1980 to 935,000 by the Year 2000.

The geographical setting of the metropolitan area is a major determinant of its economic environment and development patterns. Because of its location on the Mississippi River, the area (particularly Minneapolis and Saint Paul) became a major trading center. Agricultural exports and national agribusiness firms are primary components of the region's economy. Additionally, railroad companies, high technology

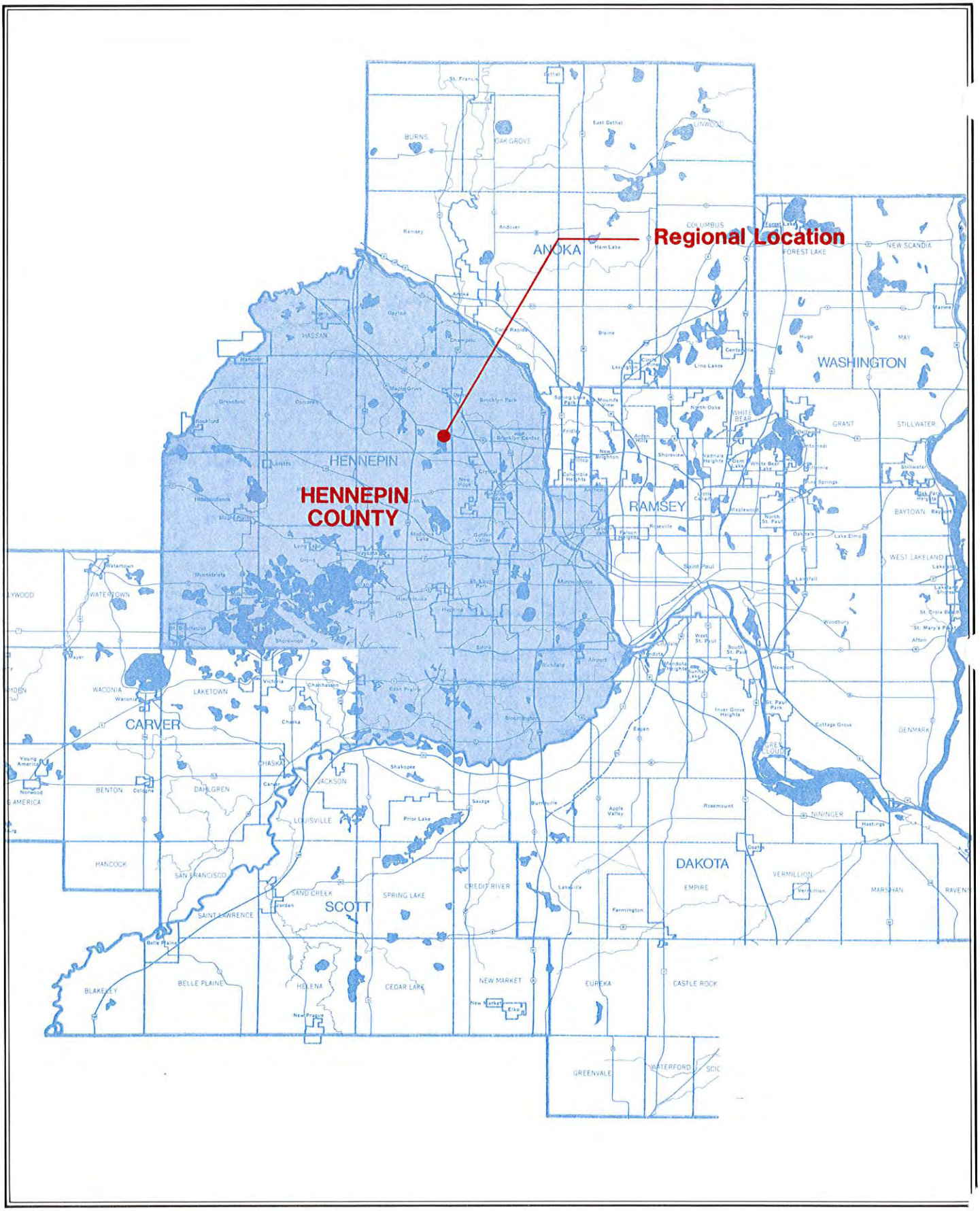


Figure 4.1

Regional Site Location

HCRRA Hennepin County Regional Railroad Authority

LRT System

Environmental Impact Statement

BRW

No Scale

North

electronics industries, banking and insurance companies, transportation and management services, a diversity of wholesale firms, a major airline, an extensive medical system, and a variety of successful small businesses contribute to the economic diversity of the region. The cities of Minneapolis and Saint Paul are also home to the University of Minnesota (East Bank, West Bank and Saint Paul Campuses), with a student population of approximately 46,000; and numerous smaller private colleges.

The development patterns and economic prosperity of the region have also been positively influenced because the metropolitan area is highly accessible by a variety of travel modes. The region has an extensive highway and major arterial roadway system. Major highways which service the area include: I-35, I-94, I-394, I-494 and I-694. Regional, interstate and international travel can be accommodated at the Minneapolis-St. Paul International Airport.

The 1980 metropolitan region employment was 1,075,000, with the Metropolitan Council forecasting an employment increase of greater than 20 percent to 1,400,000 by the Year 2000. The highest employment concentrations are found in the Minneapolis and Saint Paul central business district areas (Figure 4.2). The unemployment rate in the Metro area is consistently below the national average. The median family income ranks 4th among the 25 largest metro areas (based on 1980 figures).

Regional Transportation System

Metropolitan Highway System:

The 2010 Metropolitan Highway System Plan shown in Figure 4.3, illustrates the system of major roadways needed to support the transportation plan adopted by the Metropolitan Council. The Highway Plan is designed to provide accessibility standards adopted by the Metropolitan Council, to provide the means for through travel to pass through the Metropolitan area and to provide corridors for the transit routes.

Chapter 2 (Section 2.4) outlines the specific transportation related needs and potential problems facing the Metropolitan area.

Transit System:

Regular Route

Currently, the largest fixed route transit service provider in the metropolitan region is the Metropolitan

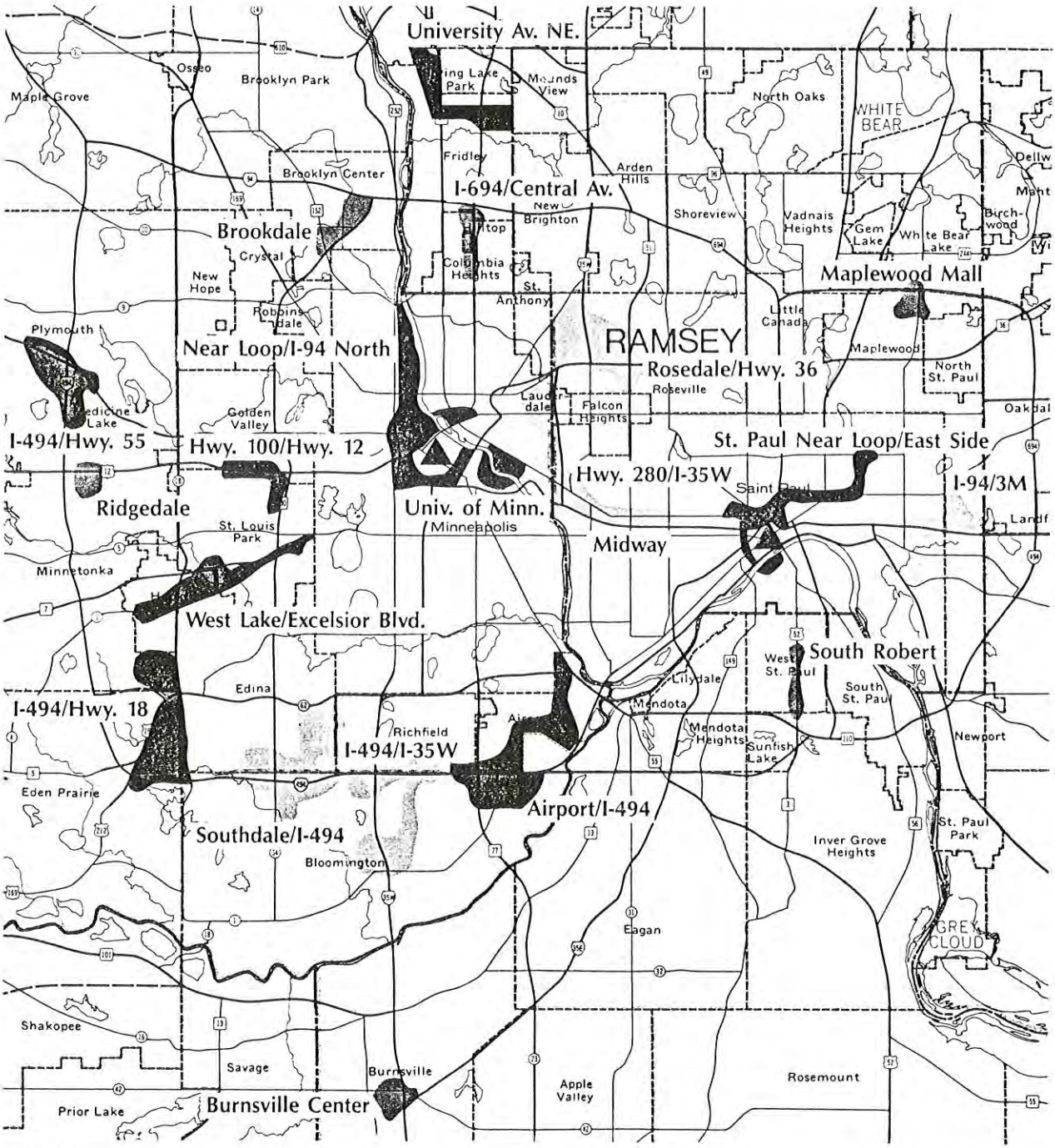


Figure 4.2

Regional Business Concentrations

Source: Transportation Development Guide/Policy Plan, Metropolitan Council, February, 1989.

HCRRA Hennepin County Regional Railroad Authority

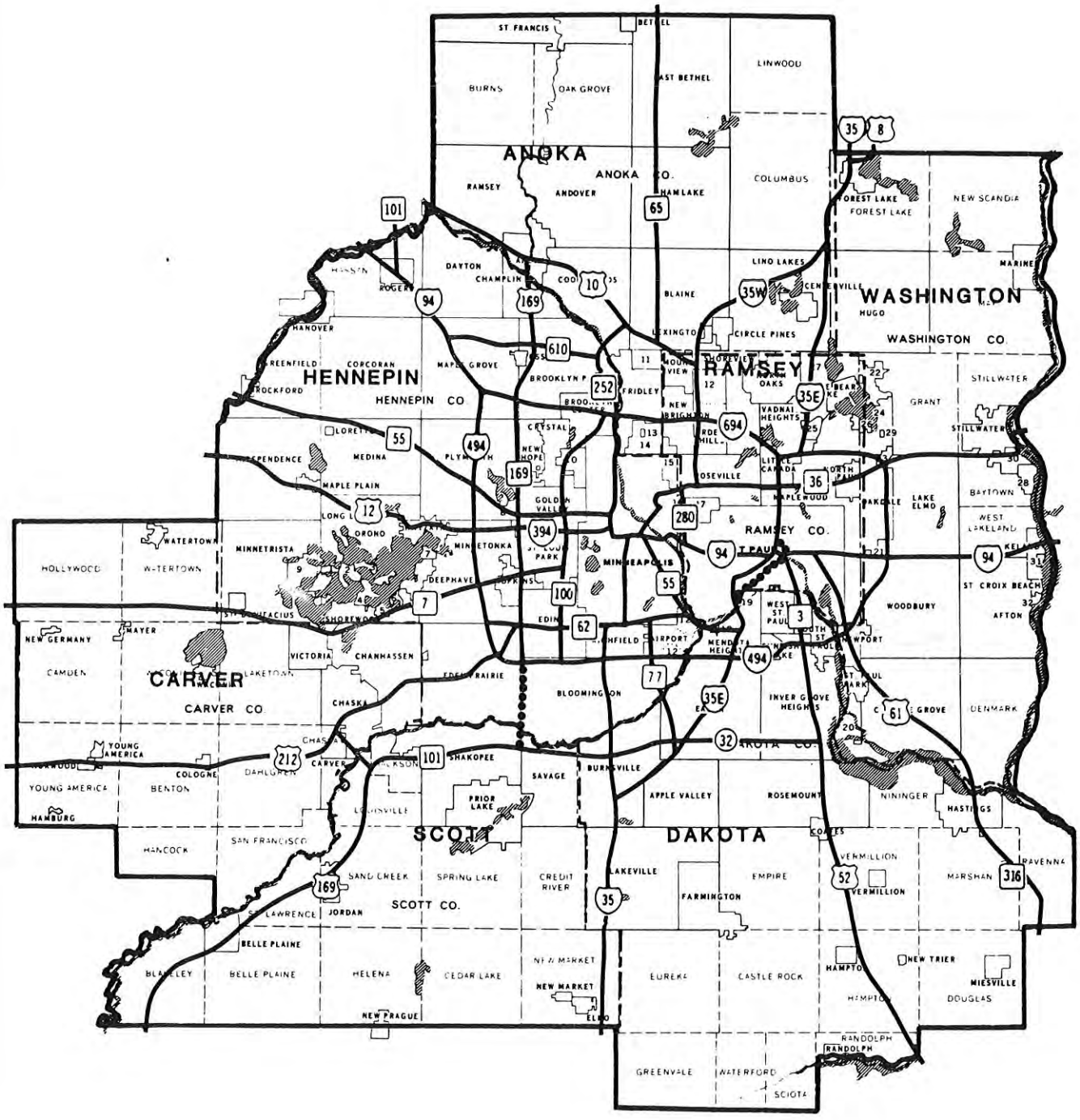
LRT System

Environmental Impact Statement

BRW

No Scale

North



HCRRA
Hennepin County Regional Railroad Authority

LRT System

Environmental Impact Statement

Figure 4.3

BRW

0 5 Miles North

Recommended Metropolitan Highway System, 2010

Source: Transportation Development Guide/Policy Plan, Metropolitan Council, February, 1989.

Transit Commission (MTC), which services an area of approximately 2,000 square miles, providing both local and express route service.

There are private operators which provide regular route service in the area. They include: Medicine Lake Lines, North Suburban Lines, Valley Transit, Southwest Metro Transit, Airport Limousine Service and Saint Paul and Suburban Bus Company.

The Medicine Lake Lines (MLL) currently provide service in the light rail corridor study areas. More specifically, MLL operations include: the Metrolink service in Plymouth, the University of Minnesota intercampus service and regular route service between northwest Hennepin County suburbs and downtown Minneapolis/ University of Minnesota.

The Southwest Metropolitan Transit Commission services the Cities of Chaska, Chanhassen and Eden Prairie. Transit service is provided in the form of express routes, in-commute, shuttle, local and dial-a-ride. Although the primary focus of this transit commission is to provide service to the above mentioned cities, it is designed to connect with MTC routes which service downtown Minneapolis. Total ridership in October 1987 was 12,823.

Paratransit Service

Along with the regular route service providers, there are several paratransit programs in the metropolitan area. Paratransit service differs from regular fixed route service because it is usually demand-responsive, offering a greater degree of flexibility for the rider. The Metro Mobility service is the largest paratransit program in the Twin Cities, with yearly ridership levels of approximately 1.3 million. Other paratransit service programs in the region include: Minnesota Rideshare, operated by the MTC; Eden Prairie Rideshare Program; University of Minnesota Carpool Services; Private Employer Rideshare Programs; County and Community Programs (e.g., elderly transportation); and Social Service and Private Non-Profit Agency Programs. Combined, these paratransit service programs (excluding Metro Mobility) service approximately 500,000 people per year.

Park-and-Ride

Park-and-ride facilities are an important element of the regional transit system. Currently there are 126 individual park-and-ride facilities, with a total of

4,306 park-and-ride spaces in the Twin Cities region. Park-and-ride lots allow individuals to park their vehicle and transfer to either a bus or carpool network. The majority of park-and-ride facilities provide the anchor for many express routes and are therefore located along such lines.

Park-and-ride lots are used primarily by work oriented patrons; therefore, the majority of park-and-ride related patronage takes place during the peak hours.

The use of the park-and-ride facilities is most attractive when the patron, by using the service, improves his/her travel time, parking cost and level of congestion experienced. Studies which have been conducted in the past indicate that park-and-ride users are willing to travel a distance of up to five to six miles to reach a park-and-ride facility.

4.2.1 Hennepin County Demographics

Observed and forecasted data for Hennepin County for the 1980 to 2010 period indicates the following:

- Population is forecast to increase from 941,411 in 1980 to 1,118,000 in 2010, representing a 19 percent increase and an annual growth rate of 0.57 percent.

- The number of households is forecast to increase from 365,536 in 1980 to 478,000 in 2010. This represents a 31 percent increase and an annual growth rate of 0.90 percent.

- The average number of persons per household in 1980 was observed to be 2.51. The 2010 forecast is 2.28. This represents a 9 percent decrease in the number of persons per household and an annual rate of decline of 0.32 percent.

- Average household income is forecast to increase from $45,500 in 1980 to $60,600 in 2010, representing a 33 percent increase and an annual growth rate of 0.96 percent.

4.3 ENVIRONMENTAL SETTING OVERVIEW

This section introduces the environmental issue areas, which are the components of the existing environment, for each of the four LRT corridors and the Central Area. The general description for each of the issue areas will include, as appropriate, the following: study methodology which was applied on a system-wide basis, scope of study, and necessary background information covering issue area specific standards, definitions, and regulations.

This overview of the required environmental issue areas is provided to avoid unnecessary repetition in each of the corridors. Sections 4.4 to 4.8 provide specific information regarding the existing conditions present in each corridor. The affected environment setting provides a base to determine the level of impact the LRT would have on the existing environment.

4.3.1 Demographics

Scope of Analysis/Methodology

Traffic analysis zone (TAZ) data prepared by the Metropolitan Council of the Twin Cities was used in the analysis of demographic conditions. TAZs within each of the corridor (study area) boundaries were examined for 1980, 1988, and 2010 time periods for the following variables:

- o Population
- o Households
- o Persons Per Household
- o Average Annual Household Income
- o Employment

Additionally, corridor-level demographic conditions were compared to demographic conditions for Hennepin County. This level of analysis was conducted to provide an understanding of how demographic trends within Hennepin County as a whole compare to those of each corridor. Section 4.2.1 outlines the relevant demographic statistics for Hennepin County.

This section also identifies the level of the transit dependent population in each of the LRT corridors. These figures reveal areas within the Metropolitan Region where transit service is vital to people who have no other, or limited means of transportation. Transit dependent population figures were developed based on 1980 Census Tract figures.

4.3.2 Community and Neighborhood Boundaries

Scope of Analysis/Methodology

Comprehensive and Land Use Plans for each of the cities potentially affected by the proposed LRT system were referenced to determine the existing city, planning district and neighborhood boundaries within one-half mile of the proposed LRT alignment. Information presented in this section will provide a base to determine if the proposed LRT system would impact existing neighborhood or community boundaries.

4.3.3 Community Facilities and Services

Scope of Analysis/Methodology

Comprehensive plans for each of the cities potentially affected by the proposed LRT system were referenced to determine the location of: police and fire stations, public libraries, post offices, community centers, religious institutions, hospitals, and educational institutions within one-half mile on either side of the proposed LRT alignment. Field surveys were also conducted to confirm the location and present use of several facilities. The data collected will be used to assess the potential impacts the LRT system would have on existing community facility service areas and patterns of circulation, which are both considered components of community cohesion.

4.3.4 Land Use and Zoning

Land Use

Background

The purpose of this section is to provide the framework to accurately identify and evaluate potential areas of development opportunity.

Scope of Analysis/Methodology

Generalized land use maps, covering an area of 1/2 mile on either of the proposed LRT alignment, were prepared for each corridor and the Central Area. The maps were developed through the use of air photos, municipality land use maps and field checking.

Existing and planned land use, particularly in the vicinity of the proposed station sites, could affect the potential for LRT related economic development.

Zoning

Scope of Analysis/Methodology

Zoning maps for each of the cities included in the study area were referenced. Because each city uses its own zoning identification system, it was necessary to devise a standardized zoning format that could be consistently applied to all cities. Table 4.1 provides a comprehensive description of the zoning format developed.

TABLE 4.1
LRT SYSTEM-WIDE CORRIDOR ZONING SUMMARY

	R (residential)	C (commercial)	I (industrial)	O (other)
Minneapolis	R1, R2, R3, R4, R5, R6	B1, B2, B3, B4	M1, M2, M3	--
Golden Valley	R, R-2, M-1, M-2, M-3, M-4	B and P, C	LI, I, RR	I-1, I-2, I-3, I-4, I-5, PUD
Robbinsdale	R1, R2, R3, RB	B1, B2, B3, B4, BW, NG	--	PF
Crystal	R-1, R-2, R-3, R-4, RO	B-1, B-1-A, B-2, B-3, B-4	I-1, I-2	PUD, P-1, P-2
Brooklyn Center	R1, R2, R3, R4, R5, R6, R7	C1, C1A, C2	I1, I2	O1, O2
New Hope	R-1, R-2, R-3, R-4, R-5, R-O	B-1, B-2, B-3, B-4	I-1, I-2	W
Brooklyn Park	R-1, R-2, R-3, R-4, R-4A, R-5, R-6	B-1, B-2, B-3	I-1, I-2	CD, PCDD
Osseo	R-1, R-2	C-1, C-2	M	--
Maple Grove	R-A, R-1, R-2, R-2-B, R-3, R-4, R-5, R-B	B-1, B-2, B-2V, B-3, B-4, B-5, B-W	I-1, I-2	PUD, MXD, MXD-VC
St. Louis Park	R-1, R-2, R-3, R-4, R-B	B-1, B-2, B-3	I-1, I-2, I-3	PUD, DPD
Hopkins	R-1-A, R-1-B, R-1-C, R-1-D, R-1-E, R-2, R-3, R-4, R-5, R-6	B-1, B-2, B-3	I-1, I-2	--
Edina	R-1, R-2, PRD-1, PRD-2, PRD-3, PRD-4, PRD-5, PSR-4	PCD-1, PCD-2, PCD-3, PCD-4, POD-1, POD-2, RMD	PID	HPD, APD
Bloomington	R-1, RS-1, R-4, R-5, RM-12, RM-24, RM-50, RO-50	B-1, B-2, B-3, FD-1, FD-2, CB, CO-1, CR-1, CS-1	I-1, I-2, I-3	IN-1, SC, PD, CX-2

4.3.5 Traffic

Background

Existing regional traffic conditions are discussed in Sections 2.4 and 4.2.

Scope of Analysis

Average daily traffic volumes on roadways running parallel and in close proximity to each of the proposed LRT lines are identified.

4.3.6 Transit Service

Scope/Methodology

To accurately assess the impact that the proposed LRT system could have on the existing transit system, an inventory of existing routes, orientation of service, daily bus miles traveled and daily passengers per route was compiled for each of the corridors. Consideration was also given to special transit services in the area. Both the Metropolitan Transit Commission and the Medicine Lake Lines, a private operator, were consulted to confirm the accuracy of the transit data. The transit service discussion for each of the LRT corridors identifies existing routes which service a particular corridor area, along with daily bus miles traveled and the number of daily passengers (per route).

Figure 4.4, identifies the existing bus routes operating in the LRT System Study Area.

4.3.7 Air Quality

Background/System-Wide Findings

Meteorology

The Twin Cities area has a continental climate with annual temperatures ranging from -30 degrees to over 100 degrees Fahrenheit. Average monthly temperatures range from 11.2 degrees in January to 73.1 degrees in July.[1/]

1/ Local Climatological Data 1988 Annual Summary with Comparative Data, Minneapolis-St. Paul, Minnesota, National Oceanic and Atmospheric Administration.

Normal annual precipitation is 26.36 inches. There are an average of 115 days per year with .01 inches or more of precipitation. There are an average of 14.9 days per year with 1.0 inches or more of snowfall.[2]

Prevailing winds are from the northwest in the winter and from the south to southeast in the summer. During the winter, strong northwesterly winds are common. In spring, winds are lighter and more variable. In the summer, strong southeasterly winds are common. During the fall, both northwesterly and southeasterly winds are common.[1], [2]

The level to rolling terrain of the Twin Cities allows air masses to move easily over the region. As a result, long-term air pollution episodes resulting from stagnant air masses are uncommon. Air pollution episodes in the Twin Cities are often associated with light winds and low level temperature inversions which may form during the night. Localized air pollution problems can also occur as a result of microclimatological effects such as wind flow around buildings.[3]

Transportation Related Pollutants

Motor vehicles are a primary source of air pollution in the Twin Cities metropolitan area. Motor vehicles emit a variety of pollutants including carbon monoxide (CO), hydrocarbons, nitrogen oxides, particulates, and lead. The state and federal ambient air quality standards for these pollutants are shown in Table 4.2.

The primary transportation related pollutant of concern is CO. Transportation sources account for approximately eighty percent of the CO emitted in the metropolitan area.[3] As indicated by the standards, health effects can occur with relatively low CO concentrations for relatively short exposure periods.

Elevated CO concentrations generally occur in the vicinity of intersections where vehicles are accelerating, decelerating, and idling. Motor vehicles emit less CO per unit

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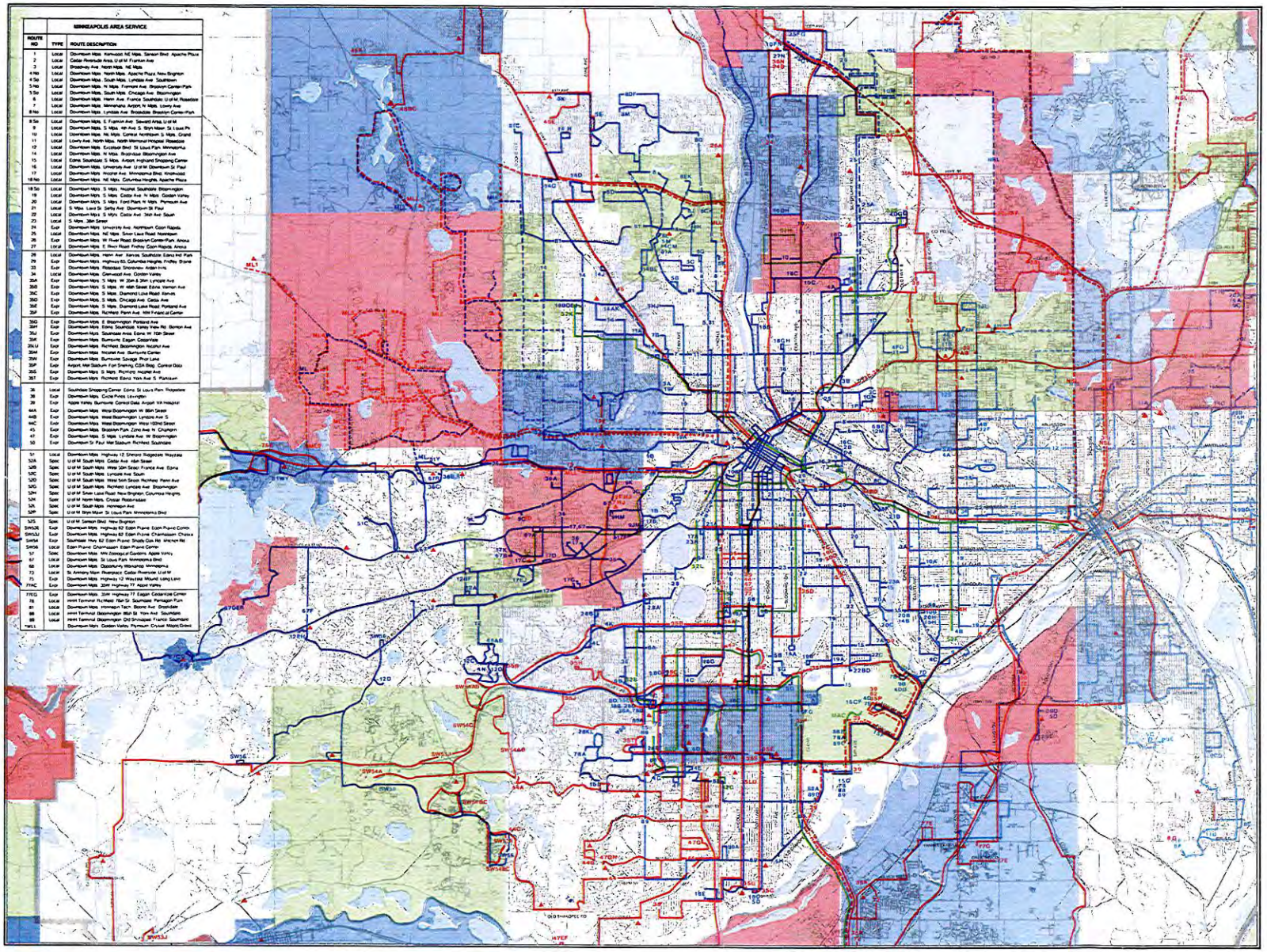
[2] Baseline Environmental Inventory Twin Cities Metropolitan Area, Metropolitan Waste Control Commission, December 1977.

[3] Air Quality Control Plan for Transportation, Supplement Number 2 to the Transportation Guide/Policy Plan, Metropolitan Council, January 1980.



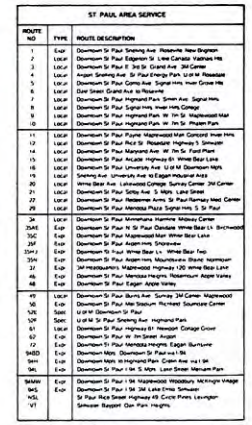
Twin Cities Metropolitan Area Transit System Map

Figure 4.4

0 1 Mile 2 Miles North

Legend

- MTC LOCAL ROUTES
- PRIVATE LOCAL ROUTES
- MTC EXPRESS ROUTES
- PRIVATE EXPRESS ROUTES
- SPECIAL ROUTES
- PARK AND RIDE LOTS
- METROPOLITAN TRANSIT TAXING DISTRICT



Source: Regional Transit Board, January, 1988

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TABLE 4.2
AMBIENT AIR QUALITY STANDARDS

POLLUTANT/ AIR CONTAMINANT	STATE STANDARD			FEDERAL STANDARD
	PRIMARY STANDARD	SECONDARY STANDARD	REMARKS	
Carbon Monoxide	9 PPM by Volume (10 Milligrams per Cubic Meter)	9 PPM by Volume (10 Milligrams per Cubic Meter)	Maximum 8-hr. Concentration not to be exceeded more than once per year	Same as State
Carbon Monoxide	30 PPM by Volume (35 Milligrams per Cubic Meter)	30 PPM by Volume (35 Milligrams per Cubic Meter)	Maximum 1-hr. Concentration not to be exceeded more than once per year	35 PPM by Volume (40 Milligrams per Cubic Meter)
Hydro-Carbons	0.24 PPM by Volume (160 Micrograms per Cubic Meter)	0.24 PPM by Volume (160 Micrograms per Cubic Meter)	Maximum 3-hr. Concentration (6:00 to 9:00 A.M.) not to be exceeded more than once per year, Corrected for Methane	Same as State
Particulate Matter	75 Micrograms per Cubic Meter	60 Micrograms per Cubic Meter	Maximum Annual Geometric Mean	Same as State
	260 Micrograms per Cubic Meter	150 Micrograms per Cubic Meter	Maximum 24 hr. Concentration not to be exceeded more than once per year	Same as State
Nitrogen Dioxides	0.05 PPM by Volume (100 Micrograms per Cubic Meter)	0.05 PPM by Volume (100 Micrograms per Cubic Meter)	Maximum Annual Arithmetic Mean	Same as State
Lead	NA	NA	Maximum Arithmetic Mean Averaged Over a Calendar Quarter	1.5 Micrograms per Cubic Meter

Source: Minnesota Rules Parts 7005.0010 to 7005.0080.

Environmental Protection Agency Regulations on National Primary and Secondary Ambient Air Quality Standards, 40 CFR 50; 36 FR 22384, November 25, 1971, as amended.

distance under free-flow conditions at steady operating speeds. CO impacts are localized, with higher concentrations generally occurring within approximately 100 meters of the road.[1/] In the Twin Cities, CO concentrations approaching the state air quality standards are generally found in the vicinity of high volume intersections operating at a low level of service (LOS D or less).

The Minnesota Pollution Control Agency (MPCA) has identified a number of locations in the metropolitan area where the eight-hour CO standard is or is likely to be exceeded.[2/] The locations identified include the twenty highest volume, at-grade intersections in the metropolitan area. In response to this situation, in 1988, the state legislature passed a bill requiring a vehicle inspection and maintenance (I/M) program to be implemented in 1990. This program will require periodic inspections of most vehicles in the metropolitan area. If vehicle emissions are outside of specified limits, vehicle maintenance procedures will be required. Implementation of the I/M program could reduce average CO emission rates by about twenty-five percent. The MPCA is currently developing specific elements of the I/M program including the emission standards, testing procedures, and maintenance requirements.

Pollutants Associated with Electrical Power Generation

The proposed Hennepin County LRT system will be electrically powered and for this reason has the potential to effect pollutant emissions associated with electrical power generation.

Electrical power for the LRT system will likely be provided by Northern States Power Company (NSP). At the present time, NSP has a power generating capacity of approximately 6,745 megawatts (MW).[3/] Approximately one-half of this system capacity comes from coal-fired generating plants. The remainder comes from nuclear, hydroelectric, and oil-fired facilities. Because of the relative fuel costs, the

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1/ Highway Air Quality Impact Appraisals, Vol. I. Introduction to Air Quality Analysis, Federal Highway Administration, Report No. FHWA-RD-78-99, June 1978.

2/ Draft Vehicle Inspection/Maintenance Legislative Proposal, Minnesota Pollution Control Agency, Division of Air Quality, Program Development and Air Analysis Section, January 25, 1988.

3/ Northern States Power Company Financial and Statistical Information, A Supplement to the 1988 Annual Report, March 1989.

nuclear and hydro facilities are operated first, followed by coal-fired generating facilities. Oil-fired capacity is held in reserve for periods of peak demand or system emergencies.[1/]

The peak 1988 power demand was 6,923 MW. When electrical power demand exceeds NSP's generating capability, NSP satisfies the excess demand by purchasing power from the Manitoba Hydro Electric Board. This capacity exchange agreement allows NSP to purchase additional power during the peak summer demand period and sell excess power during the winter.

The construction and operation of coal-fired power generating facilities is subject to both state and federal air pollution regulation. Coal-fired power plants emit sulfur dioxide (SO2), nitrogen oxides (NOX) and particulates. Particulate emissions include a variety of trace elements. SO2 and NOX emissions are likely to contribute to acid deposition. Pollutant emissions are required to be controlled using air pollution control systems and controls on the combustion process. The type and effectiveness of emission control systems in use depends on the age, design, and regulatory requirements affecting each generating facility. Table 4.3 outlines 1986 NSP power output and pollutant emissions from each generating facility. In 1986, NSP generated 23,354.7 million kwh. For purposes of comparison, in 1988 NSP generated a total of 31,304.6 million kwh. Total NSP energy sales in 1988 was 34,796 million kwh.

4.3.8 Noise

Background

Noise Standards and Guidelines

Noise impacts from the proposed LRT project are assessed by comparing predicted future noise levels to federal agency and industry guidelines, state and appropriate local standards, and existing noise levels. An impact occurs when the standards or industry guidelines are exceeded or when future noise levels are significantly greater than existing noise levels.

Local Noise Ordinances: Generally, most of the communities potentially affected by LRT noise have adopted the state noise standards. The local standards for each

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1/ Application for Modification of Certificate of Need, Sherburne County Generating Facility (SHERCO Unit 3), Northern States Power Company, June 1981.

TABLE 4.3
1986 NSP POWER OUTPUT AND POLLUTANT EMISSIONS

POWER PLANT	1986 OUTPUT (MILLION) KWH)[1/]	SOx EMISSIONS (TONS PER YEAR)[2/]	NOx EMISSIONS (TONS PER YEAR)[2/]	PARTICULATE EMISSIONS (TONS PER YEAR)[2/]
Sherburne County Unit 1	3,546.0	6,188	22,920	903
Sherburne County Unit 2	3,142.3	5,539	20,515	902
Allen S. King	2,941.6	34,944	30,039	697
Black Dog	403.5	6,883	2,958	109
High Bridge	295.9	5,776	3,275	102
Riverside	654.5	3,207	6,959	3
Other Fossil Fuel	184.6	54	39	4
Prairie Island Unit 1	3,819.6	1	0	0
Prairie Island Unit 2	3,860.1	1	0	0
Monticello	3,375.3	0	0	0
Other Thermal Plants	18.7	0	0	0
Hydro Plants	1,112.6	0	0	0
TOTAL	23,354.7	62,593	86,705	2,720
Tons per million kwh		2.68	3.71	0.12

1/ Northern States Power Company Financial and Statistical Information A Supplement to the 1986 Annual Report, March 1987.

2/ Air Pollutant Emissions Inventory Reports for 1986, prepared by NSP and submitted to the MPCA.

of the municipalities included in the study area are documented in Table 4.4. In addition, specific activity noise standards, which may apply to LRT construction and operation are documented.

State Standards: The state noise standards (Table 4.5) are expressed in terms of L10 and L50 descriptors. The L10 level is the noise level exceeded ten percent of the time, or six minutes out of an hour. The L50 level is the noise level exceeded fifty percent of the time, or 30 minutes out of an hour. Based on the short duration (five to ten seconds) during which an LRV would be audible and the frequency of passbys at a single point in an hour (generally eight in any given peak hour), the effects of LRT noise on state standard descriptors would be minimal. Specifically, the proposed LRT system would impact the ambient noise level for less than one and a half minutes in the peak hour. In off-peak periods, the frequency of service would be reduced, and the total impact time would be significantly less. Using these calculations, it can be concluded that LRT would not likely cause a noise impact in terms of the state standards.

While LRT may not create the potential for a significant change in the state standard descriptor noise levels, it does not necessarily mean that a significant impact would not occur. The L10 and L50 descriptors do not accurately reflect the potential impacts of a recurring, short-duration noise source such as LRT. This is because it would require an impact period of almost six minutes -- ten percent of an hour -- to result in a significant change in the L10 level. An even greater impact duration would be required to impact the L50 level. Thus, it can be concluded that the state L10 and L50 noise standard descriptors are inappropriate measures for evaluating LRV noise impacts.

Federal Noise Abatement Criteria: Noise abatement criteria established by the Federal Highway Administration (FHWA) (Table 4.5) are expressed using the Leq descriptor. The Leq is the equivalent steady-state sound level which over a specific period of time contains the same acoustic energy as the time-varying sound level during the same period. Generally, in evaluating the potential for a noise impact from a proposed development, the Leq is established for the peak traffic hour. The proposed LRT system would increase noise levels of adjacent receivers for at most 1.5 minutes in the peak hour, or 2.5 percent of the time period. Because of the short exposure time, it is unlikely that the proposed system would have an impact on the Leq criteria level. Thus, use of the Leq descriptor as an evaluation criteria would not accurately represent the potential for a noise impact.

TABLE 4.4
LOCAL NOISE ORDINANCES

CITY	ORDINANCE STANDARDS (dBA) DAYTIME L10	DAYTIME L50	NIGHTTIME L10	NIGHTTIME L50	COMMENTS
Brooklyn Park	No specific ordinance standards were identified in City noise ordinance				Loudspeakers are prohibited if intended to attract persons' attention to commercial establishment
Bloomington					
Residential	60	NA	50	NA	Regulations exclude motor vehicles on public roadways, locomotives, railroad cars and construction equipment on a construction site
Commercial	65	NA	65	NA	
Industrial	70	NA	70	NA	Construction equipment maximum emission level at 50 feet is 85 dBA
					Construction noise limited to hours of 7:00AM - 10:00PM weekdays and 9:00AM - 9:00PM Saturday
Crystal					
Residential	65	60	55	50	Use of power equipment at a construction site is limited to hours of 7:00AM - 10:00PM
Commercial	70	65	70	65	
Industrial	80	75	80	75	Loudspeakers are prohibited if intended to attract persons' attention to commercial establishment
Golden Valley	No specific ordinance standards were identified in City noise ordinance				
Hopkins	No specific ordinance standards were identified in City noise ordinance				

TABLE 4.4
LOCAL NOISE ORDINANCES
(CONTINUED)

CITY	ORDINANCE STANDARDS (dBA) DAYTIME L10	DAYTIME L50	NIGHTTIME L10	NIGHTTIME L50	COMMENTS
New Hope	No specific ordinance standards were identified in City noise ordinance				Paging system noise level must not disturb the peace, quiet and comfort of any nearby person Noise level can not be plainly audible at the property line from 10:00PM-7:00AM Have adopted MPCA vehicle noise emission standards Construction activities requiring electric, gas or diesel powered equipment are limited to the hours of 7:00AM-10:00PM weekdays and 9:00AM-9:00PM weekends and holidays
Richfield					
Residential	60	NA	50	NA	Construction activities involving power equipment generating less than 85 dBA at 50 feet, are limited to 7:00AM - 10:00PM daily. Activities generating more than 85 dBA at 50 feet, are limited to 7:00AM - 10:00PM weekdays and 8:00AM - 10:00PM weekends Must obtain a license to operate a loudspeaker system
Neighborhood Comm.	60	NA	60	NA	
Commercial	65	NA	65	NA	
Industrial	70	NA	70	NA	
Robbinsdale					
R1-R3,NG Zones	65	60	55	50	Regulations listed apply with the following exemptions: o Safety signals and warning devices o Noise from transient sources such as roadways and railroads o Construction activities from 7:00 AM-9:00 PM
RB,B1-B4 Zones	70	65	70	65	
BW Zone	80	75	80	75	

TABLE 4.4
LOCAL NOISE ORDINANCES
(CONTINUED)

CITY	ORDINANCE STANDARDS (dBA) DAYTIME L10	DAYTIME L50	NIGHTTIME L10	NIGHTTIME L50	COMMENTS
St. Louis Park					
R1-R4, Rb Zones	65	60	55	50	Railroad noise is exempt from regulations
B1-B3, I1, I2 Zones	70	65	70	65	
I1 Zones	80	75	80	75	Bells/horns cannot be sounded further than 1,320 feet from an at-grade crossing or unless there is imminent danger
					Regulations apply to the area of 'human activity' or to the property line if the activity area is ill-defined

Minneapolis

DURATION OF SOUND	TIME PERIOD 7:00AM-6:00PM ALL DISTRICT	6:00PM-10:00PM RESIDENTIAL 6:00PM-7:00AM ALL OTHERS	10:00PM-7:00AM RESIDENTIAL	COMMENTS
Less Than 10 Minutes	75	70	60	10:00PM-7:00AM levels apply all day Sunday and on all holidays
10 Minutes-2 Hours	70	60	50	
More Than 2 Hours	60	50	50	Vehicle noise from roadways is exempt
				Construction noise limited to 7:00AM-6:00PM weekdays and is prohibited on weekends and holidays unless a permit has been granted

Note: NA - Not Applicable. L50 descriptor standard has not been defined.

TABLE 4.5
APPLICABLE STATE AND FEDERAL LRT NOISE STANDARDS AND GUIDELINES

GOVERNMENT LEVEL	AGENCY	LAND USE	PERIOD OF THE DAY	APPLICABLE STANDARD TYPE LEVEL	(dBA)	COMMENTS
State[1/]	MPCA	Residential	7:00AM-10:00PM	L10	65	All NAC-1 uses
State[1/]	MPCA	Residential	7:00AM-10:00PM	L50	60	All NAC-1 uses
State[1/]	MPCA	Residential	10:00PM-7:00AM	L10	55	Includes all locations intended for overnight sleeping
State[1/]	MPCA	Residential	10:00PM-7:00AM	L50	50	Includes all locations intended for overnight sleeping
State[1/]	MPCA	Commercial	All Hours	L10	70	All NAC-2 uses
State[1/]	MPCA	Commercial	All Hours	L50	65	All NAC-2 uses
State[1/]	MPCA	Industrial	All Hours	L10	80	All NAC-3 uses
State[1/]	MPCA	Industrial	All Hours	L50	75	All NAC-3 uses
Federal[2/]	UMTA	All	12:00AM-12:00PM	Leq	>3	The change from existing which is considered significant
Industry[3/]	APTA	Low-density res.	10:00PM-7:00AM	Lmax	70	Maximum passby level in a single-family res. area
Industry[3/]	APTA	Residential	10:00PM-7:00AM	Lmax	75	Maximum passby level in a residential area
Industry[3/]	APTA	Commercial	All Hours	Lmax	80	Maximum passby level in a commercial area
Industry[3/]	APTA	Industrial	All Hours	Lmax	85	Maximum passby level in an industrial area
Federal[4/]	FHWA	Category 2	All Hours	Leq	67	Guideline for highway noise abatement
Federal[4/]	FHWA	Category 2	All Hours	L10	70	Guideline for highway noise abatement
Federal[4/]	FHWA	Category 3	All Hours	Leq	72	Guideline for highway noise abatement
Federal[4/]	FHWA	Category 3	All Hours	L10	75	Guideline for highway noise abatement

1/ Minnesota Rules 1987, Chapter 7010.0040

2/ Guidelines for Preparing Environmental Assessments, UMTA C5620.1

3/ Guidelines for Design of Rapid Transit Facilities, American Public Transit Association, 1981

4/ Title 23 Code of Federal Regulations, Chapter I, Part 772

The noise impact criteria established by the Urban Mass Transportation Association (UMTA) takes a different approach than the absolute noise level criteria used by the FHWA. UMTA regulations define a significant noise impact as an increase in the no-build Leq noise level of more than three decibels.

Environmental analyses completed for the light rail systems in Portland, Sacramento, Baltimore, San Jose and San Diego concluded that LRT typically has no significant impact on the Leq descriptor. Generally, the light rail system proposed in each of the areas surveyed was predicted to be responsible for raising the Leq noise level by 1 to 2 decibels (dBA). An increase of this magnitude is within the limits of a 'not significant increase' as determined by UMTA. Typically, the smallest change in existing noise levels which can be discerned by the average person is three decibels.

Industry Guidelines:

The APTA Lmax descriptor refers to the average maximum noise level associated with an LRT train passby. The guidelines, shown in Table 4.5, are set at levels which would be acceptable to communities potentially affected by the additional transient noise.

In addition to establishing maximum noise guidelines for various general land uses, the APTA has established maximum passby noise guidelines for specific types of building uses which are more susceptible to adverse impacts at lower noise levels (Table 4.6).

Scope of Analysis/Methodology

The APTA Guidelines previously identified will be used to determine if there is a significant noise impact associated with the LRT train passby. The noise impact will be considered significant if predicted LRV noise levels at the receiver sites exceed the guidelines established by APTA.

Within each of the proposed LRT corridors, a detailed land use inventory has been completed. This inventory served two purposes in the LRT noise evaluation process. First, it facilitated location of potential noise monitoring areas within each of the proposed LRT corridors. Second, it aided in identification and delineation of the boundaries of differing land uses adjacent to each of the corridors. This identification is required for determining which noise standards and/or guidelines apply along segments of each LRT line.

TABLE 4.6
CRITERIA FOR MAXIMUM AIRBORNE NOISE FROM TRAIN OPERATIONS NEAR SPECIFIC TYPES OF BUILDINGS*

BUILDING OR OCCUPANCY TYPE	MAXIMUM SINGLE EVENT NOISE LEVEL
Amphitheatres	60 dBA
"Quiet" Outdoor Recreation Areas	65 dBA
Concert Halls, Radio and TV Studios	70 dBA
Churches, Theatres, Schools, Hospitals, Museums, Libraries	75 dBA

* These criteria are generally applicable at the nearside of the nearest dwelling or occupied building under consideration, or at 50 feet from the track centerline, whichever is closer.

Source: 1981 Guidelines for Design of Rapid Transit Facilities. American Public Transit Association, Washington, DC.

The existing noise environment within each of the light rail transit corridors has been quantified and characterized through a noise monitoring program. The monitoring sites selected represent the most sensitive areas in close proximity to the proposed LRT track. Generally, the sites are residential dwellings and open park space. The noise monitoring program results are documented by corridor. Representative noise level monitoring sites were selected on the basis of:

- Accessibility for monitoring. The sites must be easily accessible for the field monitoring crew. Priority was given to public lands which would not require special permission to access.
- Proximity to the proposed light rail line.
- Proximity to excessive "near field" influences. In selecting a noise monitoring site, an effort was made to locate the site away from excessive noise sources such as high-volume roadways, airport runways and noisy heavy industrial uses.

A total of 24 receiver sites were located adjacent to the proposed light rail transit system.

Noise level monitoring data was collected using a Metrosonics dB-308 sound level analyzer. This measuring device meets the Minnesota Pollution Control Agency's (MPCA) requirements of a Type II noise monitor, which is required for non-impulse source monitoring.

System-Wide Findings

Within and around Hennepin County, there are a significant number of major transportation-related noise sources. Included in this category are the interstate highways, the principal arterial roadways, the Minneapolis-St. Paul International Airport and the smaller regional airports. Noise from each of these sources combines with other local noise sources to create the total noise level experienced in the area. The location within the region of the major transportation noise sources is displayed in Figure 4.5.

As the figure shows, most areas where the LRT lines are proposed to be located presently experience noise from many sources.

4.3.9 Ground-Borne Vibration

Background

To provide a basis for accurately assessing the potential impacts of the LRT system (Chapter 5), a brief description of the vibration sensitive uses and guideline uses for evaluation of potential impacts is necessary.

The effects of LRT ground-borne vibration are generally perceived in two forms:

- Floor vertical vibration which could be felt in adjacent buildings
- A rumbling noise within adjacent buildings which could be heard

Adjacent to at-grade sections, vertical vibration of interior floors is the dominant effect. In contrast, adjacent to tunnel sections, the ground-borne noise is the dominant effect. A majority of the proposed Hennepin County LRT trackage, which lies next to more sensitive residential uses, is at-grade. Thus, the potential for ground-borne vibration impacts would likely be more significant than ground-borne noise. Guideline levels for evaluating the potential for a significant impact have been established for each of these vibration effects.

American Public Transit Association (APTA) guidelines for ground-borne vibration are limited to the effect of ground-borne noise.

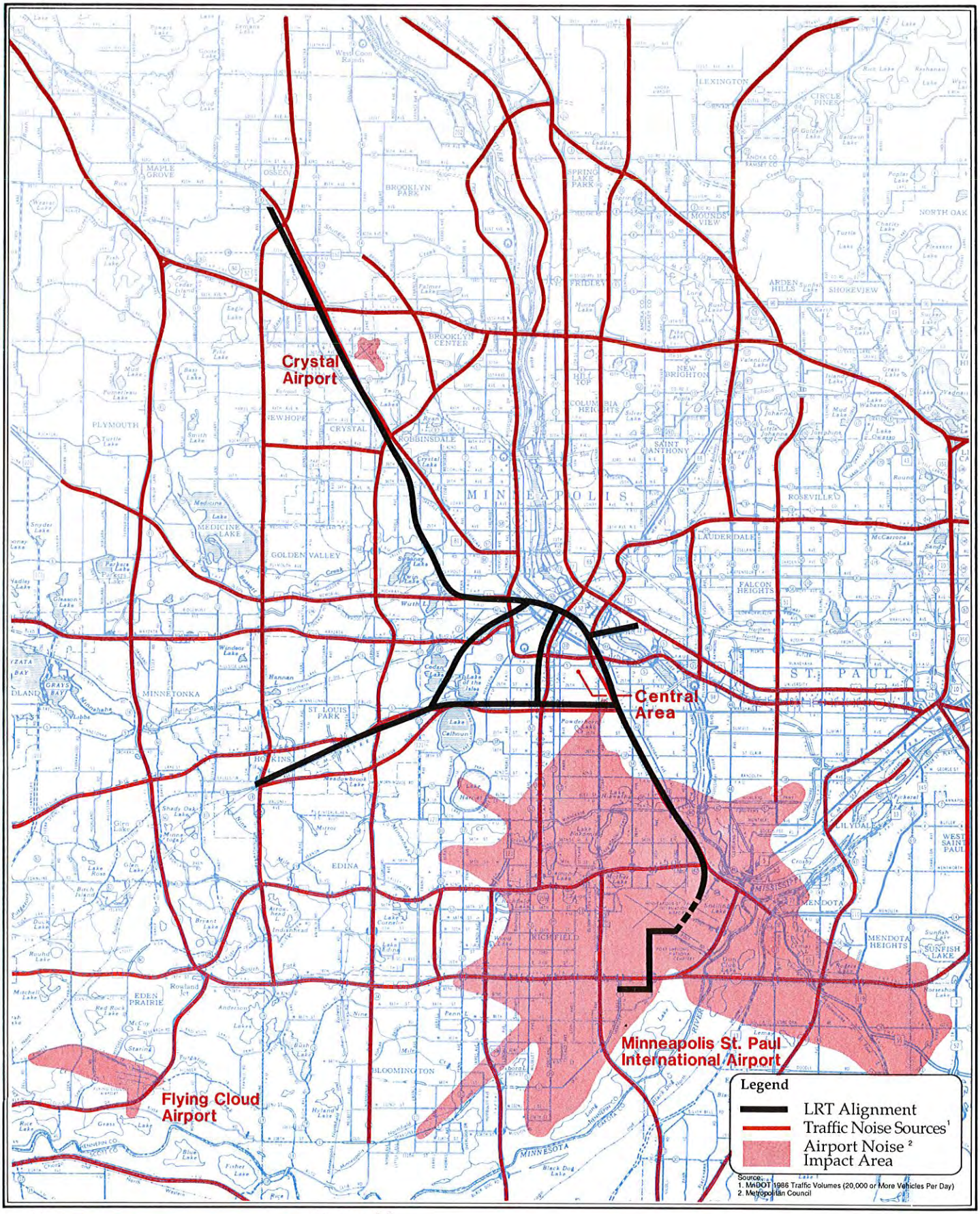

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Figure 4.5

Major Regional Transportation Noise Sources

BRW

0' 7,500' North

A substantial amount of research into the transmission of LRT ground-borne vibration has been completed by Wilson Ihrig and Associates. Through this research, guidelines for acceptable levels of interior floor vibration have been established. It has been stated in numerous LRT environmental assessment documents that the established guidelines are not intended for design of a system that is imperceptible, but rather a system which would emit vibration levels sufficiently low so that no significant intrusion or annoyance would occur (San Diego East Urban Corridor Alternatives Analysis/Environmental Impact Statement Technical Report: Noise and Vibration, Wilson Ihrig and Associates, April 1984). The established guidelines for LRT ground-borne noise and vibration are documented in Tables 4.7 and 4.8.

TABLE 4.7
GUIDELINES FOR MAXIMUM GROUND-BORNE NOISE FROM TRAIN OPERATIONS

Community Area Category		Maximum Single Event Ground-borne Noise Level Design Goal		
		Single-Family Dwellings	Multi-Family Dwellings	Hotel/Motel Buildings
I	Low Density Residential	30 dBA	35 dBA	40 dBA
II	Average Residential	35	40	45
III	High Density Residential	35	40	45
IV	Commercial	40	45	50
V	Industrial/ Highway	40	45	55

Source: 1981 Guideline for Design of Rapid Transit Facilities APTA, Washington, DC, 1981

As with LRT-generated air-borne noise, supplemental maximum ground-borne noise and vibration guidelines for a number of specific vibration sensitive non-residential uses have been established. The average maximum LRT pass-by vibration criteria for these sensitive uses are documented in Table 4.9.

TABLE 4.8
CRITERIA FOR MAXIMUM GROUND-BORNE VIBRATION
FROM TRAIN OPERATIONS

Community Area Category	Maximum Single Event Vibration Velocity (dB)		
	Single-Family Dwelling	Multi-Family Dwelling	Hotel/Motel
Low-Density Residential	70 dB	70 dB	70 dB
Average Residential	70 dB	70 dB	75 dB
High-Density Residential	70 dB	75 dB	75 dB
Commercial	70 dB	75 dB	75 dB
Industrial/ Highway	75 dB	75 dB	75 dB

Note: Criteria apply to vertical vibration of floor surfaces within the buildings. Vertical vibration RE: 1.0 micro inch per second.

Source: Wilson Ihrig and Associates, Inc., Technical Memorandum, Acoustical Study Guadalupe Corridor, 1983.

The community area categories identified in the tables are defined using the same set of criteria described in the airborne noise guideline section.

The threshold for perception of vibration resulting from an LRT passby varies based on the frequency of the shock wave. As the frequency increases in the range between four and 31.5 Hz, a person's sensitivity to ground vertical vibration becomes more acute. For frequencies greater than 31.5 Hz, a person's sensitivity to various frequency ranges remains relatively constant. Thus, generation of vibration in the upper frequency ranges should be avoided if it is possible to substitute vibration levels in the lower ranges.

The vibration acceptability criteria were established based on information documented in the International Standards Organization Document 2631 and in "Guidelines for Preparing Environmental Impact Statements on Noise." From the data

and standards presented in these documents, criteria for the evaluation of human perception of various vibration velocities and frequencies were established. The degree of perception of LRT generated ground-borne vibration, by frequency band, is displayed in Figure 4.6. The figure shows that if predicted levels of ground-borne vibration from the proposed LRT system do not exceed approximately 72 dB over most frequency bands, re: 1.0 micro inch per second, the level would be barely perceptible. In addition, if the predicted vibration level falls below 67 dB over most of the frequency bands, ground-borne vibration from the proposed LRT would likely be imperceptible.

TABLE 4.9
SPECIFIC BUILDING USE MAXIMUM GROUND-BORNE VIBRATION CRITERIA FROM TRAIN OPERATIONS

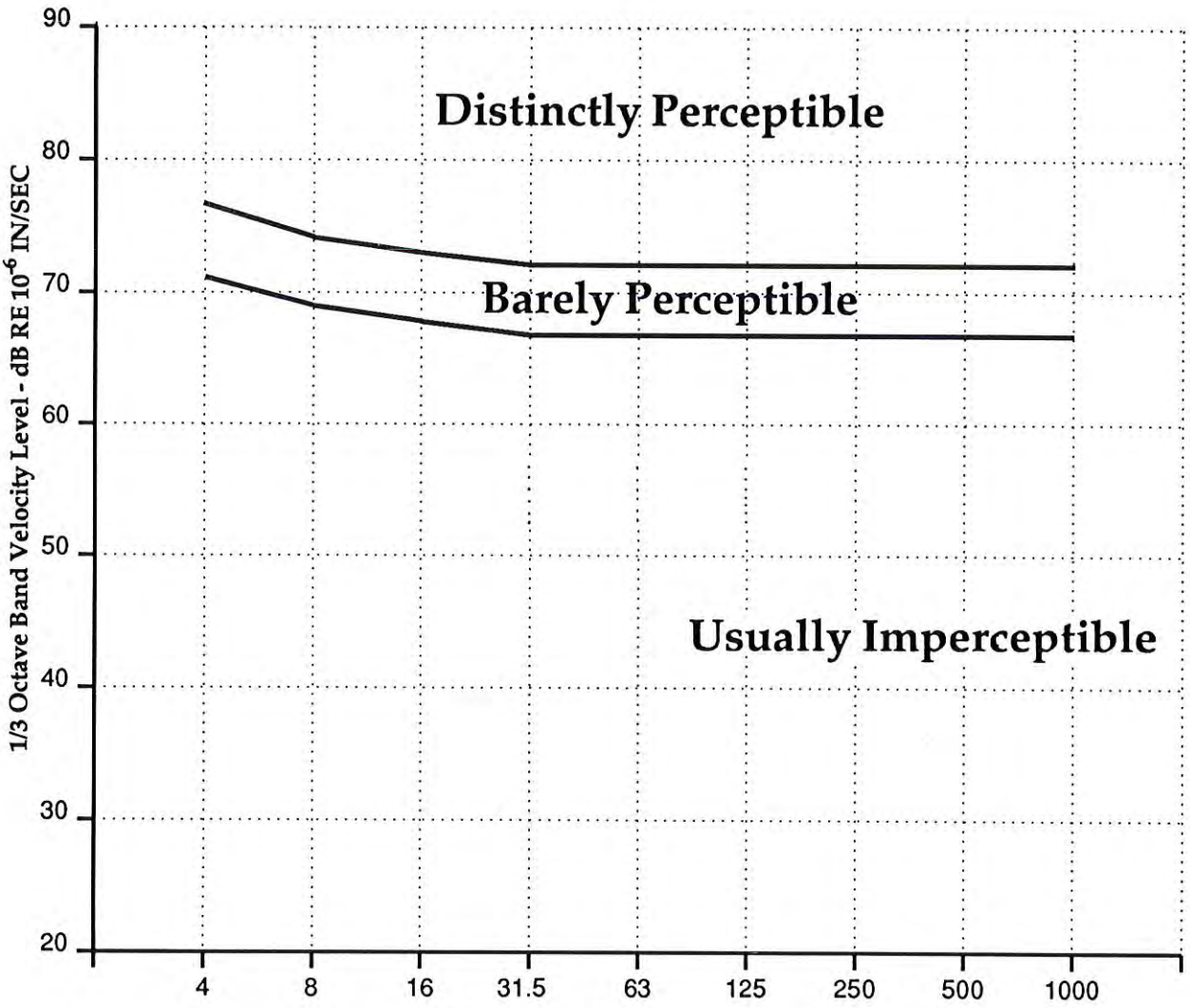
Type of Building or Room	Maximum Single Event Vibration Velocity (dB)	Maximum Single Event Ground-Borne Noise Level (dBA)
Concert Hall/TV Studio	65 dB	25 dBA
Auditorium/Music Room	70 dB	30 dBA
Church/Theater	70 dB	35 dBA
Hospital Sleeping Room	75 dB	35-40 dBA
Courtrooms	75 dB	35 dBA
Schools/Library	75 dB	40 dBA
University Building	75-80 dB	35-40 dBA
Office	75-80 dB	35-45 dBA
Commercial/Industrial	75-85 dB	35-45 dBA
Vibration Sensitive Research Laboratory	60-70 dB	--

Note: Criteria apply to vertical vibration of floor surfaces within the buildings. Vertical vibration re: 1.0 micro inch per second.

Sources: Wilson Ihrig and Associates, Inc., Technical Memorandum, Acoustical Study Guadalupe Corridor, 1983.

1981 Guidelines for Design of Rapid Transit Facilities, APTA, Washington, DC, 1981.

To more easily facilitate comparisons of vibration levels from various sources, an overall vibration level can be determined from the octave band information. Generally, a vibration source which contributes less than 69 dB to overall vibration levels at a receiver site would likely be



Vertical Vibration RE: 1 Micro Inch Per Second

Source: San Diego East Urban Corridor Alternatives Analysis EIS Technical Report: Noise & Vibration, 1984.

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Figure 4.6

Level of Perception of Normalized Ground Surface Vibration at 50 Feet

considered "barely perceptible" or "usually imperceptible." Thus, there would not likely be the potential for a significant impact on nearby sensitive receiver sites.

Table 4.10 documents overall vibration levels of monitored locations adjacent to LRT lines in San Diego. The distance from the LRT line to the receiver sites is approximately 50 feet.

TABLE 4.10
OVERALL NORMALIZED GROUND SURFACE VIBRATION

LOCATION	DISTANCE FROM LRT (FT)	VIBRATION LEVEL
1	50'	69
2	50'	66
3	50'	65
4	50'	62

These threshold of perception guidelines generally follow the guidelines established for APTA residential land use categories. As can be observed through comparing the guidelines in Table 4.8 to the criteria in Table 4.10, the overall threshold level for perception is similar to the maximum passby vibration criteria.

4.3.10 Wetlands, Vegetation and Wildlife

Background

Because the proposed LRT system would be located in existing roadway and railroad right-of-way, the majority of land being crossed by these corridors has been previously disturbed to a large extent by grading, landscaping or filling. However, in some of the less disturbed areas prairie grasses were able to become established with the help of wildfires sparked by trains. The station sites, on the other hand, lie outside of these rights-of-way and may contain wetlands, wooded areas and/or residential and commercial developments.

Scope of Analysis/Methodology

Wetlands

For the purpose of this report, wetlands have been defined as areas of poor drainage, indicated by the vegetation and soils present. Wetland indicator species include cattails,

reed canary grass, giant reed grass, and pinkweed. A field survey was conducted along each corridor to determine if any of these species were present. Wetland soils are represented by muck and peat. The soils were determined using the Hennepin County Soil Survey (1974). There are several locations within the study area that include cattails or canary grass, but are not natural wetlands. They are usually a product of disrupted drainage patterns because of construction or another type of physical disturbance such as drainage ditches and right-of-way ditches. These areas usually lie completely within the railroad right-of-way. Because these areas are not natural wetlands--therefore not meeting required hydrologic and soil criteria--they will not be included in this analysis.

All DNR protected wetlands are subject to state regulatory jurisdiction; all other wetlands are subject to regulatory jurisdiction by the U.S. Army Corps of Engineers.

Vegetation

Native prairie grasses were also determined to be significant vegetation. Indicator species include Big Bluestem, Little Bluestem, and Indian Grass. Each corridor was initially surveyed during late winter and early spring. Because the snow depth made the identification of true prairie communities difficult, a second survey was conducted in July 1989, to identify any additional prairie species present (Table 4.11).

Wildlife

The presence of wildlife greatly depends on the vegetation in the particular area. As stated earlier, much of the study area has previously been disturbed in some way. The dominant vegetation, when vegetation is present, typically consists of Kentucky Blue Grass and ornamental trees and shrubs. The species of wildlife that occur in such areas are typical "backyard" species, which include a variety of song birds, grey squirrels, cottontail rabbits, crows, owls and raccoons. In less disturbed areas near open fields or heavy brush, species such as white-tailed deer, woodchucks, red fox, and ring-necked pheasants may also occur. Wetland areas will also provide habitat for ducks, geese, and muskrats in addition to those species already mentioned. Signs of wildlife and appropriate habitat were noted during each field survey.

TABLE 4.11
INVENTORY OF PRAIRIE PLANT SPECIES IN NORTHWEST AND SOUTHWEST CORRIDORS

Latin Name (Genus/Species)	Common Name
Agastache foeniculum	Blue Giant Hyssop
Amorpha canescens *	Leadplant
Andropogon gerardi	Big Bluestem
Apocynum androsaemifolium	Spreading Dogbane
Asclepias syriaca	Common Milkweed
Aster spp.	Asters
Berteroa incana **	Hoary Alyssum
Bromus inermus	Smooth Brome
Cirsium spp.	Thistles
Convolvulus arvensis	Field Bindweed
Euphorbia corollata	Flowering Spurge
Euphorbia esula	Leafy Spurge
Helianthus spp.	Sunflowers
Loepedeza violacea	Bush-clover
Lilium tig rinum	Tiger Lily
Linaria vulgaris	Butter and Eggs
Lotus corniculatus	Birdfoot Trefoil
Monarda fistulosa	Wild Bergamot
Nepeta cataria **	Catnip
Oenothera biennis	Common Evening-Primrose
Petalostemum cf occidentale	Prairie-clover
Phlox spp.	Phlox
Ratibida pinnata	Grey-headed Coneflower
Rhus radicans	Poison Ivy
Rosa spp.	Rose
Rudbeckia hirta	Black-eyed Susan
Rumex crispus **	Curled Dock
Saponaria officinalis	Bouncing Bet
Solanum dulcamara **	Nightshade
Solidago spp.	Goldenrods
Spartina pectinata **	Prairie Cord-grass
Urtica dioica	Stinging Nettle
Verbascum thapsus	Mullein
Veronicastrum virginicum	Culver's Root
Vitis spp.	Grape

* found in Northwest Corridor only
** found in Southwest Corridor only

4.3.11 Water Resources

Runoff and Receiving Waters

Scope of Analysis

Watershed Districts (Figure 4.7) and specific receiving bodies of water in the LRT system study area which could be affected by increased storm water runoff are identified.

Floodplains

Scope of Analysis/Methodology

To obtain the most up-to-date information regarding floodplain boundaries, the appropriate Watershed Management Districts were contacted. They include: Bassett Creek Watershed District, Shingle Creek Watershed District, Minnehaha Creek Watershed District, Mississippi River Watershed District, and the Richfield-Bloomington Watershed District.

In addition to Watershed District maps, Flood Insurance Rate maps were referenced to define specific floodplain boundaries.

Shoreland Zoning

Background

The Minnesota Department of Natural Resources requires that cities and townships adopt zoning regulations to protect the environmental qualities of surface waters and the natural and economic values of shoreland areas, and to provide for the wise utilization of such waters. Locally-adopted regulations follow a model ordinance which classifies water bodies by type, establishes minimum setbacks of new structures from the high water line, controls grading and filling, minimizes cutting of vegetation, restricts development on steep slopes, and requires setbacks from the edge of the bluff, among other regulations.

Such regulations are applied in addition to the existing zoning controls. All uses permitted in the underlying zoning continue to be allowed subject to any modifications or restrictions imposed by the shoreland zoning overlay district.

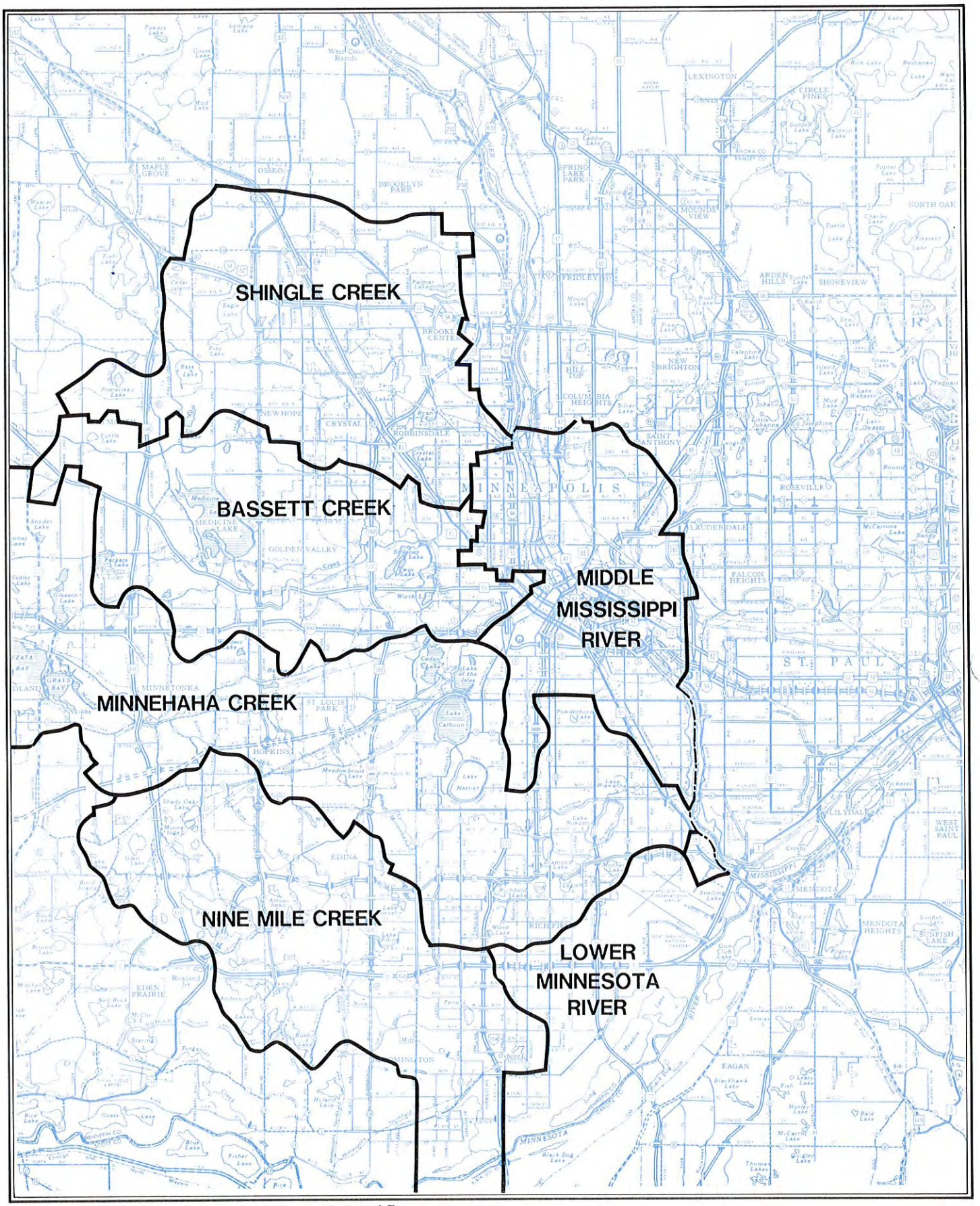

Figure 4.7

Watershed Districts

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Mississippi River Critical Area

Background

In 1976 the State of Minnesota declared the Mississippi River corridor through the Metropolitan Area to be a Critical Area, requiring each municipality to develop plans and regulations for its protection. The corridor is to be managed as a multiple-purpose public resource by continuing use of the river channel for transportation, by conserving the scenic, environmental, recreational, mineral, economic, cultural, and historic resources and functions of the river corridor, and by providing for the continuation of development of a variety of urban uses within the river corridor.

Scope of Analysis

The Mississippi River Critical Area boundaries are included in the Hiawatha Corridor, University Corridor and Central Area.

Water Quality

Scope of Analysis/Methodology

The use classification of waters included in the LRT system study area are identified. Where available, the most recent water quality analysis data for a particular body of water will also be referenced.

Groundwater

Scope of Analysis/Methodology

The existing groundwater conditions for the proposed central and airport tunnel areas (Hiawatha Corridor) will be addressed.

4.3.12 Soil Conditions

General Conditions

Scope of Analysis/Methodology

The 1974 U.S. Department of Agriculture, Hennepin County Soil Survey was referenced to determine generalized soil types at the proposed LRT station sites. Because the data contained in the soil survey is limited to undeveloped areas, information regarding the soil conditions at the proposed station sites for the majority of the LRT system is not available from this source. General soil data is, however, available for portions of the Central Area and Hiawatha Corridor where additional geological studies were conducted in the vicinity of the proposed tunnel alignments.

Contaminated Soil Sites

Background

Since the LRT system lies within an urban area, there is some probability of finding contaminated soils along parts of the system as a result of previous land uses.

Scope of Analysis/Methodology

The Minnesota Pollution Control Agency (MPCA) was requested to conduct a review of their database for contaminated and/or potentially contaminated areas within one-half mile of each of the LRT corridors. The intent of this review is to provide a preliminary identification of contaminated sites that may be present within the project area.

The MPCA's review consisted of an evaluation of ten different lists. A brief description of information contained in each list is provided in Table 4.12.

The sites identified in the MPCA lists should not be considered complete or comprehensive, and they do not ensure that areas which are not referenced are free of any hazardous substances or contaminants.

In addition to soil contamination sites identified in the MPCA's records, a search of engineering borings was conducted to identify potential contaminated soils in the LRT System Study area. Readily available engineering borings from several sources were examined for any mention of petroleum, fuel oil or other suspicious odors or indications. With the exception of the yard and shop site, environmental investigation reports were unavailable for examination.

Limitations inherent to borings include:

- Odors detected in the field will often be volatized before the sample is examined in the lab, hence the potential contamination may be missed or disregarded when preparing the borehole logs.
- Older investigations are frequently not shown on maps, so they are missed in the search.
- A site may become contaminated after an investigation was performed.
- The boreholes may miss contaminated areas.

TABLE 4.12: MINNESOTA POLLUTION CONTROL AGENCY LIST DEFINITIONS

1. National Priorities List (NPL) - A national listing of hazardous waste sites which represent a significant threat to public health or the environment and are priorities for remedial action. The sites are eligible for federal Superfund monies. The NPL is usually updated on an annual basis.

2. Comprehensive Environmental Response, Compensation, and Liability Information System (CERCILIS) - EPA's database of sites which have had or are in need of federal Superfund investigations. The database is updated periodically as new sites are discovered.

3. Permanent List of Priorities (PLP) - A state listing of verified hazardous waste sites which represent a significant threat to public health or the environment and are priorities for remedial action. These sites are eligible for state Superfund monies. The PLP is updated at least annually.

4. Regulatory Compliance, Hazardous Waste Enforcement Log - A listing of facilities which are currently receiving elevated levels of enforcement activities by the MPCA Hazardous Waste Program, i.e., Stipulation Agreement, Notice of Violation, Administrative Penalty Order, etc. Inclusion on this list may be due to administrative ("paperwork") violations as well as those applying to waste storage or disposal. The Hazardous Waste Enforcement Log is updated monthly.

5. List of Permitted Solid Waste Facilities - A listing of those facilities or areas in the state which have been issued permits for the handling or disposal of solid waste. This list is updated periodically as additional information becomes available.

6. Hazardous Waste Permit Unit Project Identification List - A listing of facilities which have received or are in the process of receiving a permit for treatment, storage, and/or disposal of hazardous waste. The most common permit is for storage and is required for facilities which store their hazardous waste on-site for longer than 90 days. This list is updated semi-annually.

7. 1980 Metropolitan Area Waste Disposal Site Inventory - U.S. Geological Survey topographic maps and Hudson's street maps which show the location of abandoned dumps, demolition sites, tree disposal sites, fly ash sites, foundry sand and slap sites, surface impoundments, and some additional types of dumps within the Twin Cities metropolitan area. This inventory was compiled in 1980 through various different sources, the most common of which were visual observation and file review. Because the majority of these sites were discovered prior to the creation of the MPCA and its regulatory authority to deal with open dumps, detailed information regarding the status of these sites is not available.

8. 1980 Statewide Open Dump Inventory - Lists and maps which show the locations of municipal waste disposal facilities, industrial surface impoundments, and closed municipal dump sites. This inventory was conducted and compiled in 1980.

9. Underground Storage Tank List - This list contains site information about leaking underground storage tanks.

10. Spill Site List - A list of hazardous substance and/or petroleum product spills that have been reported in Brooklyn Park, Robbinsdale, Golden Valley, St. Louis Park, Hopkins, Minneapolis and Bloomington.

4.3.13 Geological Conditions

Scope of Analysis

Existing geological conditions in the vicinity of both the proposed Central Area and airport tunnels (in the Hiawatha Corridor) will be addressed.

4.3.14 Utilities

Scope of Analysis

Existing utilities in the vicinity of both the proposed Central Area and airport tunnels (in the Hiawatha Corridor) will be addressed.

4.3.15 Steep Slopes

Scope of Analysis

The steep slope analysis identifies areas where existing conditions would warrant additional supportive structures to accommodate the LRT facilities. Specific conditions would include a slope which is generally greater than approximately two horizontal to one vertical (2:1). Several locations in the study area include existing slopes that are approximately 1:1, and approaching the natural soil angle of repose. This generally occurs where existing railroad beds have been constructed in cut or fill sections, as opposed to areas where the rail bed has been installed on-grade in flat terrain.

4.3.16 Parklands

Scope of Analysis/Methodology

An inventory of public park and recreation areas was conducted for the entire LRT system study area. Comprehensive and land use plans for each of the municipalities were referenced to obtain park data for areas within one-half mile of the proposed LRT alignments. Field checking was also conducted to confirm several of the park locations and recreational facilities available. This data will be used to assess impact issues such as park access, user safety, visual and noise impacts and projected proximate development.

4.3.17 Visual and Aesthetics

Scope of Analysis/Methodology

The existing visual and aesthetic character of proposed rights-of-way will be addressed. The elements studied are

those which comprise the three-dimensional structure of the community included in the study area. Visual elements indicating uniformity and variety in three-dimensional forms as well as monotonous and chaotic forms are noted. Size, shape, density, land use and the scale of the street or corridor spaces all contribute to the character of the area. Unique views in the vicinity of the project site are identified. Views of landmarks or other locally-valued vistas such as historic structures, urban open spaces and natural amenities are also noted.

4.3.18 Historic and Cultural Resources

Scope of Analysis/Methodology

The Hennepin County LRT System was reviewed by the State Historic Preservation Office (SHPO) pursuant to the responsibilities given by the National Historic Preservation Advisory Act of 1966 and the Procedure of the National Advisory Council of Historic Preservation (36 CFR 800). The SHPO response is documented in Chapter 8 (Section 8.3). SHPO reserves the right to re-review the project upon completion of a final design.

4.4 HIAWATHA CORRIDOR

4.4.1 Demographics

Through the forecast period, the population of the Hiawatha Corridor will continue to decrease slightly (Table 4.13). The number of households will increase slightly, and household size will decrease. Employment in the corridor will increase by more than 5,000 jobs. Household income is also expected to rise.

Table 4.14 demonstrates the Hiawatha Corridor's contribution to the region's demography for 1980, 1988, and 2010.

Transit Dependent Statistics:

1980 Census Tract data found that approximately 12,500 transit dependent people reside in the Hiawatha Corridor area. The majority of transit dependents are in the City of Minneapolis portion of the study area. Within Minneapolis, the Longfellow-Hiawatha area has a relatively high number of youth and elderly.

TABLE 4.13
DEMOGRAPHIC TRENDS AND FORECASTS
HIAWATHA CORRIDOR

YEAR	POPULATION	HOUSEHOLDS	PERSONS PER HOUSEHOLD	HOUSEHOLD INCOME*	EMPLOYMENT
1980	72,840	31,700	2.30	$ 29,400	51,700
1988	71,900	32,460	2.22	30,700	55,900
2010	66,900	32,800	2.04	41,000	57,000
Hiawatha Corridor					
Percent Change 1980-2010	-8%	3%	-11%	39%	10%
Annual Rate of Change 1980-2010	-.3%	.1%	-.4%	1.1%	.3%
Hennepin County					
Percent Change 1980-2010	19%	31%	-9%	33%	34%
Annual Rate of Change 1980-2010	.6%	.9%	-.3%	1%	1%

* 1987 Dollars

Source: Metropolitan Council of the Twin Cities

TABLE 4.14
HIAWATHA CORRIDOR AS A
PERCENTAGE OF HENNEPIN COUNTY

YEAR	POPULATION	HOUSEHOLDS	TOTAL INCOME	EMPLOYMENT
1980	7.7%	8.7%	5.6%	8.4%
1988	7.2%	7.8%	5.1%	7.8%
2010	6.0%	6.9%	4.6%	6.9%

Source: Metropolitan Council of the Twin Cities

A Metropolitan Council study[1/] refined the 1980 Census statistics and estimated the density of persons expected to have an increased tendency to use transit services in the Hiawatha Corridor.

- o Elderly (ages 65 to 74), one to two per acre
- o Elderly (ages 75+), one to 1.5 per acre
- o Youth (ages 11 to 18), approximately one per acre
- o Low-income households, one to three per acre
- o Zero car households, one to three per acre
- o Persons in group quarters, less than one per acre

Relative to the rest of the LRT System Study Area, the Hiawatha Corridor ranks high in the level of low-income and zero car households.

4.4.2 Community and Neighborhood Boundaries

The Cities of Minneapolis and Bloomington are included in the Hiawatha study area (Figures 4.8A-B). Federal land, including the Veterans Administration Hospital and the Fort Snelling National Cemetery and Military Reservation, is also included in the study area. Land occupied by the Minneapolis/St. Paul International Airport is under the jurisdiction of the Metropolitan Airports Commission.

City of Bloomington:

The Airport South Planning District land uses are oriented toward hospitality and transportation (airport) related activities.

Though residential land uses within the Airport South Planning District are outside the corridor study area, two residential areas are reasonably close and should be identified. The first is a small enclave of low density residential uses on the northeast corner of Old Shakopee Road and Killebrew Drive East. The second (medium density residential uses) is located on the southeast and southwest corners of 24th Avenue South and Killebrew Drive East. Undeveloped lands (also outside the corridor study area) are adjacent to the two residential areas.

1/ Technical Memorandum: Transit Dependent Analysis; February 1988.

City of Minneapolis:

Within the City of Minneapolis, the Hiawatha Corridor is divided into the Longfellow, Phillips, Nokomis and Powderhorn Planning Districts. Figures 4.8A-B identify the neighborhoods within each of the Planning Districts.

The Planning Districts and neighborhoods have been identified by the City of Minneapolis to facilitate comprehensive planning and to encourage local input in the planning process. The neighborhoods generally conform to the boundaries that are perceived by local residents.

Existing railroad tracks and TH 55 constitute ragged edges for these Planning Districts and neighborhoods. With its high traffic volumes, noise, poor visual image, lack of identifiable pedestrian corridors, and many industrial uses, TH 55 presents a real and perceived division between Planning Districts and Neighborhoods. In many areas this division was reinforced by the clearing of homes along TH 55 for planned highway construction. The land is still vacant, and the problems attributable to TH 55 penetrate the adjacent neighborhoods for several blocks.

4.4.3 Community Facilities and Services

The locations of community facilities and services within the City of Minneapolis portion of the Hiawatha Corridor are illustrated on Figures 4.9A-B.

The Bloomington portion of the corridor, with its strong emphasis on commercial/industrial uses, does not contain community-oriented facilities and services. The fire station that serves the study area is located at 22nd Avenue South/East 86th Street.

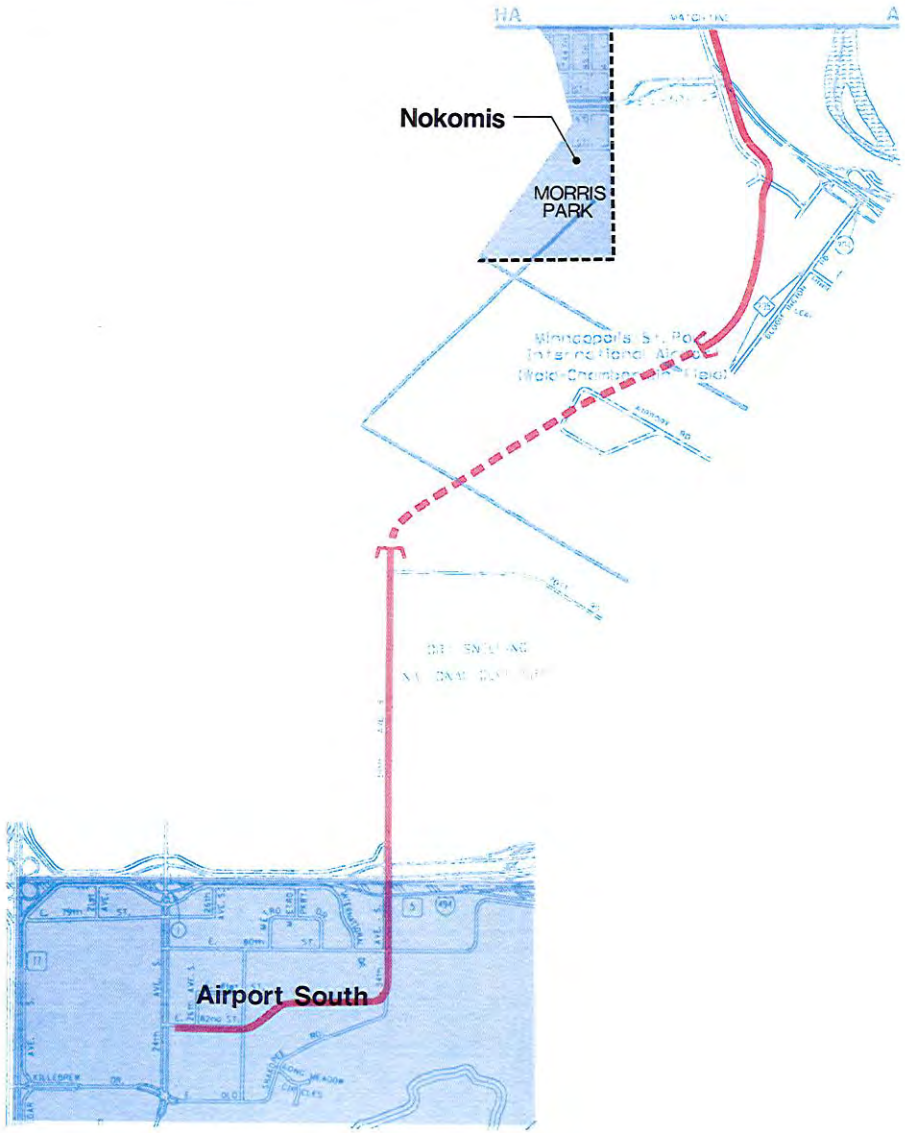
Minneapolis Community Facilities and Services:

Police and Fire Protection: Police protection is provided mostly by the Third Precinct located at 26th and Minnehaha Avenue. The Third Precinct serves most of the study area south of I-94.

Fire Stations No. 7 and No. 21 serve the study area. Fire Station No. 7 is located at 20th Avenue South/East Franklin Avenue. Fire Station No. 21 is located at Snelling Avenue/East 38th Street.

As with the police precincts, Hiawatha Avenue provides principal access to the study area.

Public Libraries: There are three public libraries in the study area.



Planning Districts and Neighborhood Boundaries

Figure 4.8A

Hiawatha Corridor

Legend

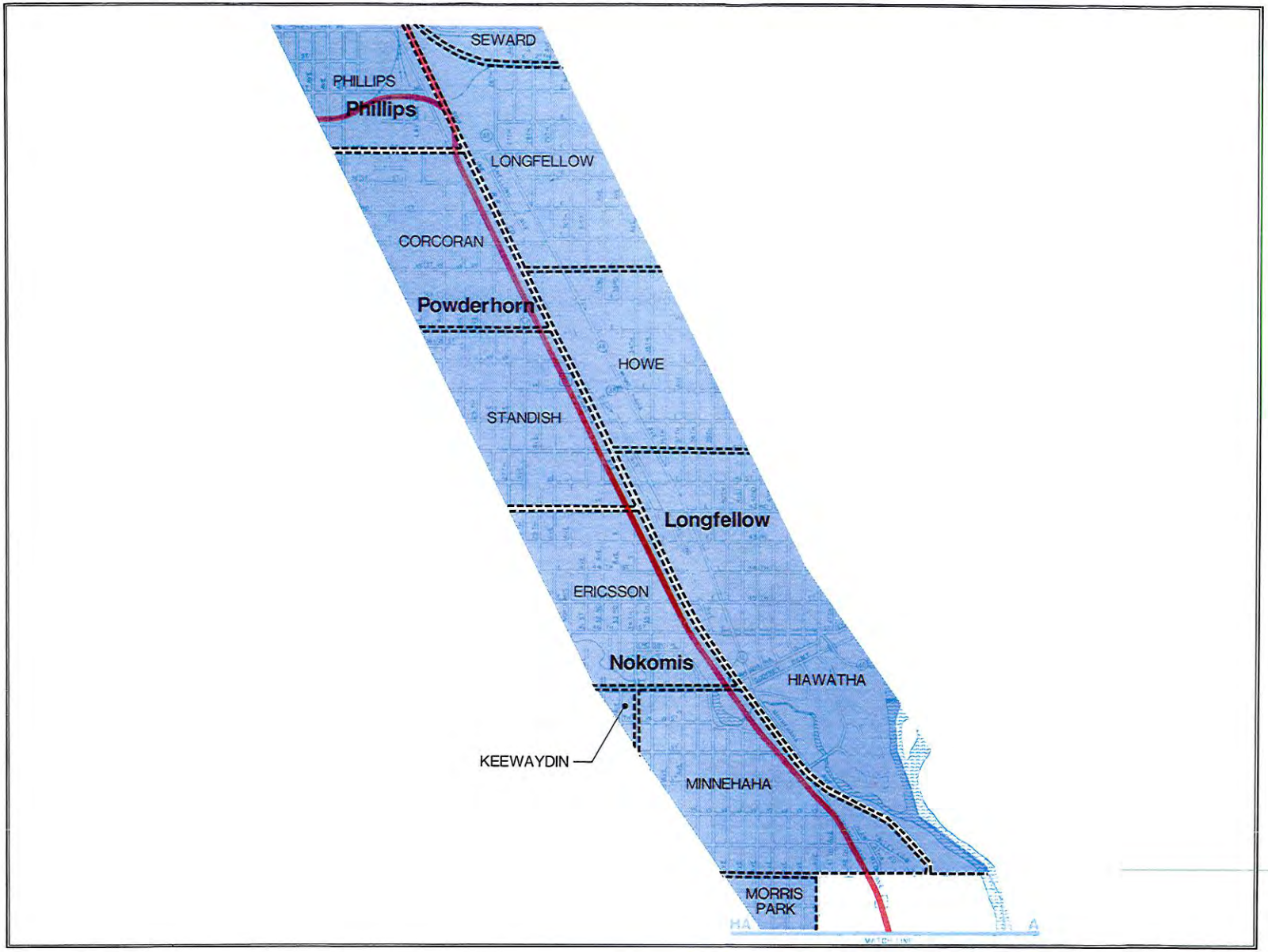
- LRT Alignment
- Planning Districts
- Neighborhoods

Note: Unlabeled map areas do not have defined Planning Districts and/or Neighborhoods

HCRRA

LRT System

Environmental Impact Statement



Planning Districts and Neighborhood Boundaries

Figure 4.8B

Hiawatha Corridor

Legend

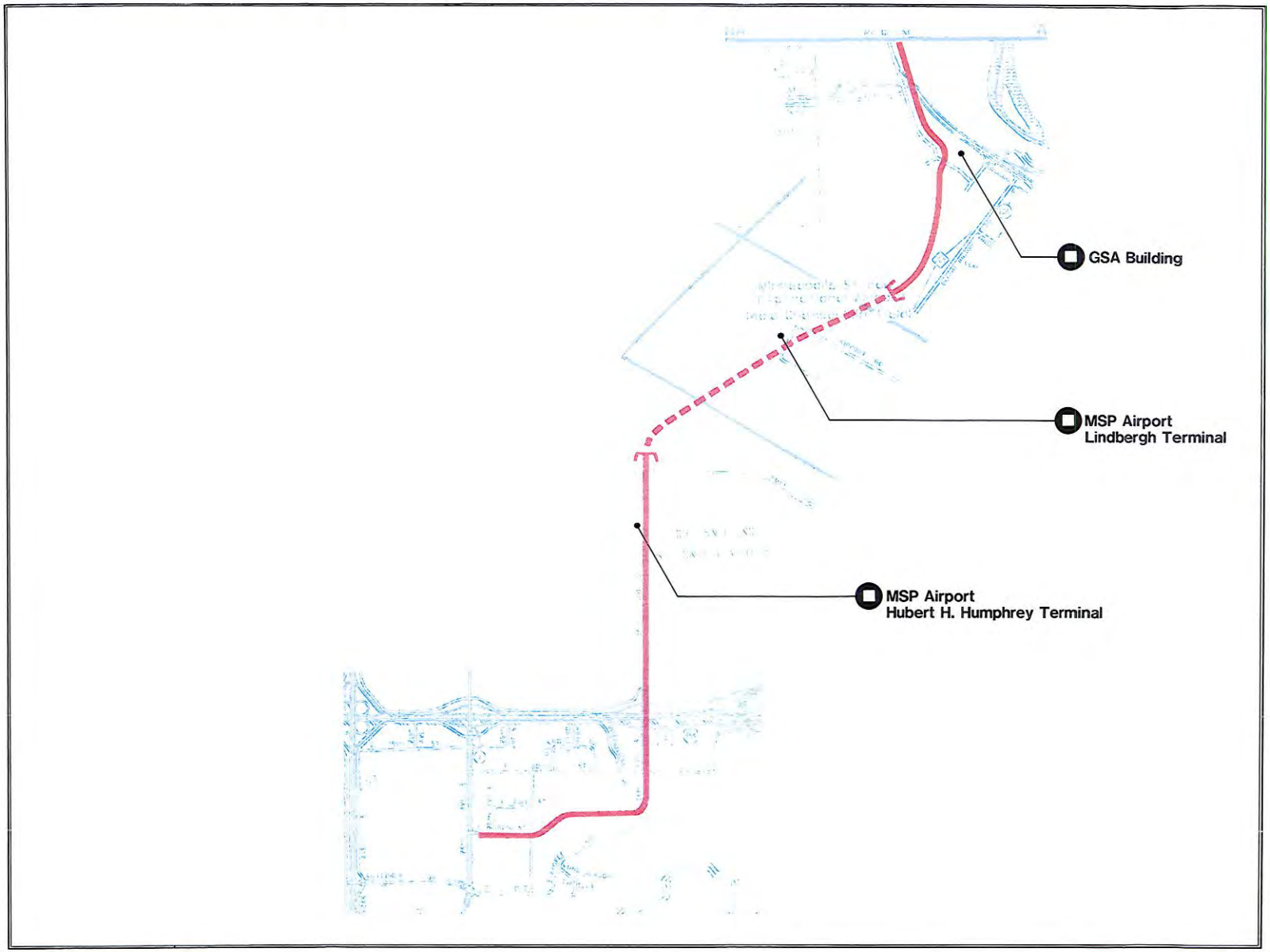
- LRT Alignment
- Planning Districts
- Neighborhoods

Note: Unlabeled map areas do not have defined Planning Districts and/or Neighborhoods

HCRRA

LRT System

Environmental Impact Statement



Community and Educational Facilities

Figure 4.9A

Hiawatha Corridor

Legend

- LRT Alignment
- Hospital
- School
- Church
- Public :
  - Library
  - Post Office
  - Police Station
  - Fire Station

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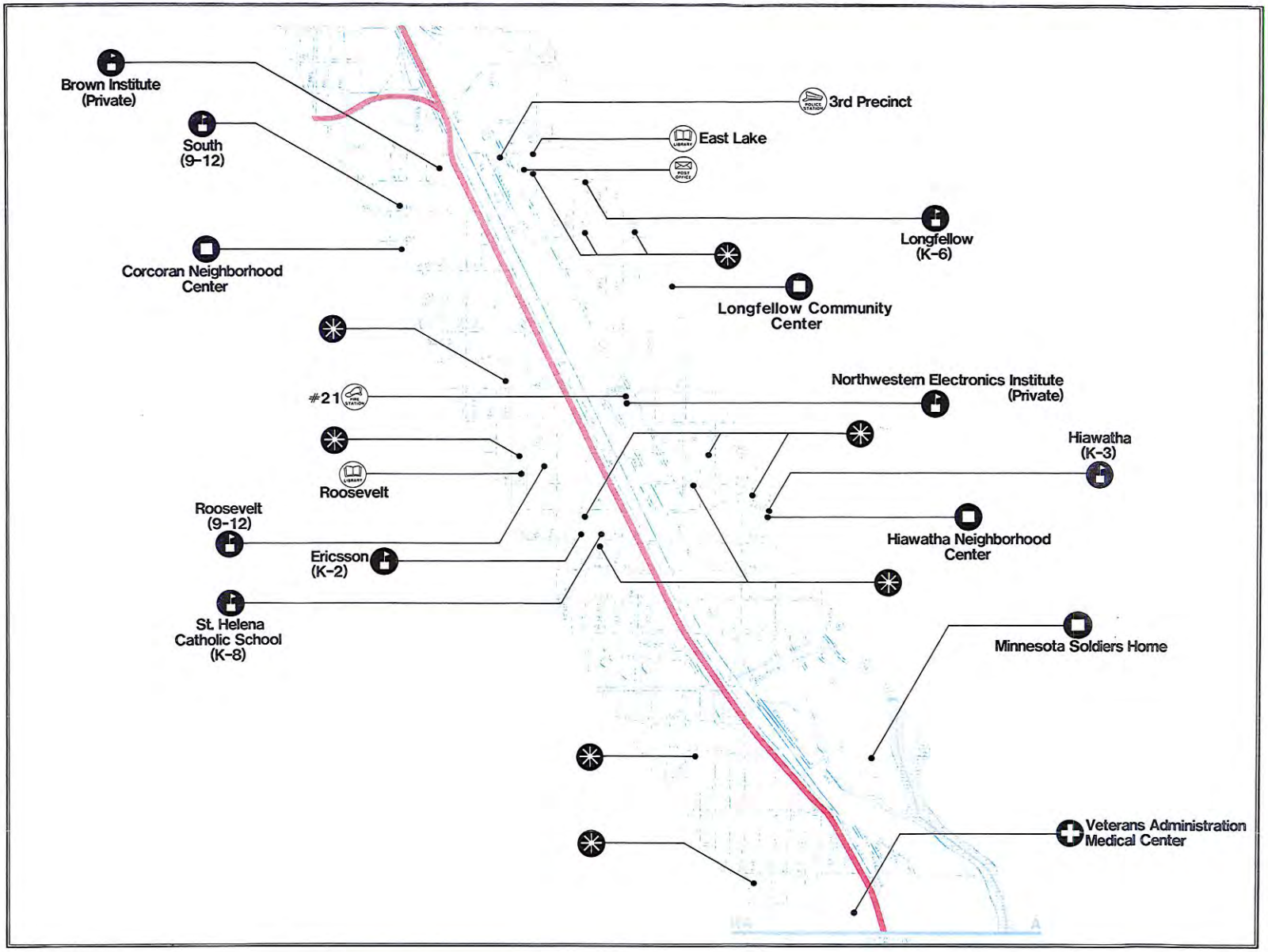

Community and Educational Facilities

Figure 4.9B

Hiawatha Corridor

Legend

- LRT Alignment
- Hospital
- School
- Church
- Public :
  - Library
  - Post Office
  - Police Station
  - Fire Station

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Community Centers: There are four community centers located in the Minneapolis portion of the Hiawatha Corridor study area.

Religious Institutions: As shown on Figures 4.9A-B, a large number of religious institutions are located within the study area.

Hospitals: The Veterans Administration Hospital is located at 54th Street and Hiawatha Avenue.

TH 55 is the only direct route between the emergency medical facilities (located north of the Lake Street, outside the study area) and the corridor. The airport and surrounding highways are potential sites of accidents which could result in a high demand for emergency medical services.

Educational Facilities: Twelve public and three private educational institutions are located within the Hiawatha Corridor study area.

4.4.4 Land Use and Zoning

Land Use

The Hiawatha Corridor, extending from the Mall of America site in Bloomington to Hiawatha Avenue and 29th Street in Minneapolis, contains a variety of land uses (Figures 4.10A-B).

From the proposed Mall of America site to I-494 in Bloomington, commercial and industrial uses are most common. Major developments include the Control Data Corporation, Appletree Square Office Complex and several large hotels. The dominant land uses from I-494 to the Main Terminal at the Minneapolis-Saint Paul International Airport include Fort Snelling National Cemetery, the Hubert H. Humphrey Charter Terminal, and various air service companies.

The area between the Minneapolis-Saint Paul International Airport's main terminal and the Minneapolis city limits includes the Fort Snelling Military Reservation, the G.S.A. Building, the U.S. Bureau of Mines and the Veterans Administration Medical Center.

From the Minneapolis city limits to 46th Street, Minnehaha Park dominates land use east of Hiawatha Avenue, while single-family residential neighborhoods are dominant to the west.

From 46th Street to Lake Street, industrial uses line the rail spur east of Hiawatha. Adjacent to these industrial uses, multiple- and single-family residential neighborhoods dominate land use. To the west, vacant land cleared for highway right-of-way separates Hiawatha from single-family residential neighborhoods. Commercial uses are centered on Lake Street and 38th Street.

Zoning

The existing zoning within the Hiawatha Corridor is generally consistent with prevailing land use patterns (Figures 4.11A-B). However, a detailed inspection of the zoning and land use figures reveals land use conflicts south of Lake Street on the east side of Hiawatha Avenue. Many of the industrial districts contain housing or are in close proximity to residential districts. In addition, the Airport South District has commercial districts which contain pockets of industrial uses.

4.4.5 Traffic

Hiawatha Avenue is the major roadway which runs parallel to the proposed Hiawatha LRT line, from Lake Street to Crosstown Highway 62. Traffic counts conducted for the TH 55 (Hiawatha Avenue) Indirect Source Permit Application, March 1988, indicated an existing average weekday traffic volume of approximately 22,500 just north of 50th Street, and 25,500 just south of 33rd Street.

Year 2010 traffic forecasts for the TH 55 Corridor project an average daily traffic volume (ADT) of 75,600 vehicles per day (VPD) just south of Franklin Avenue, 55,600 VPD just south of 33rd Street, and 39,800 VPD just north of 50th Street.[1/]

South of the south airport tunnel, the LRT would run parallel, and adjacent to 34th Avenue. 1986 Traffic Volumes indicate average weekday traffic volumes of approximately 11,000.

4.4.6 Transit Service

Transit service in the Hiawatha Corridor is generally oriented to downtown Minneapolis (Figure 4.4). The routes serving the corridor are identified in Table 4.15. Corridor

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1/ Traffic Forecasts in the Hiawatha Avenue Corridor, Minnesota Department of Transportation, February 1988.

Land Use

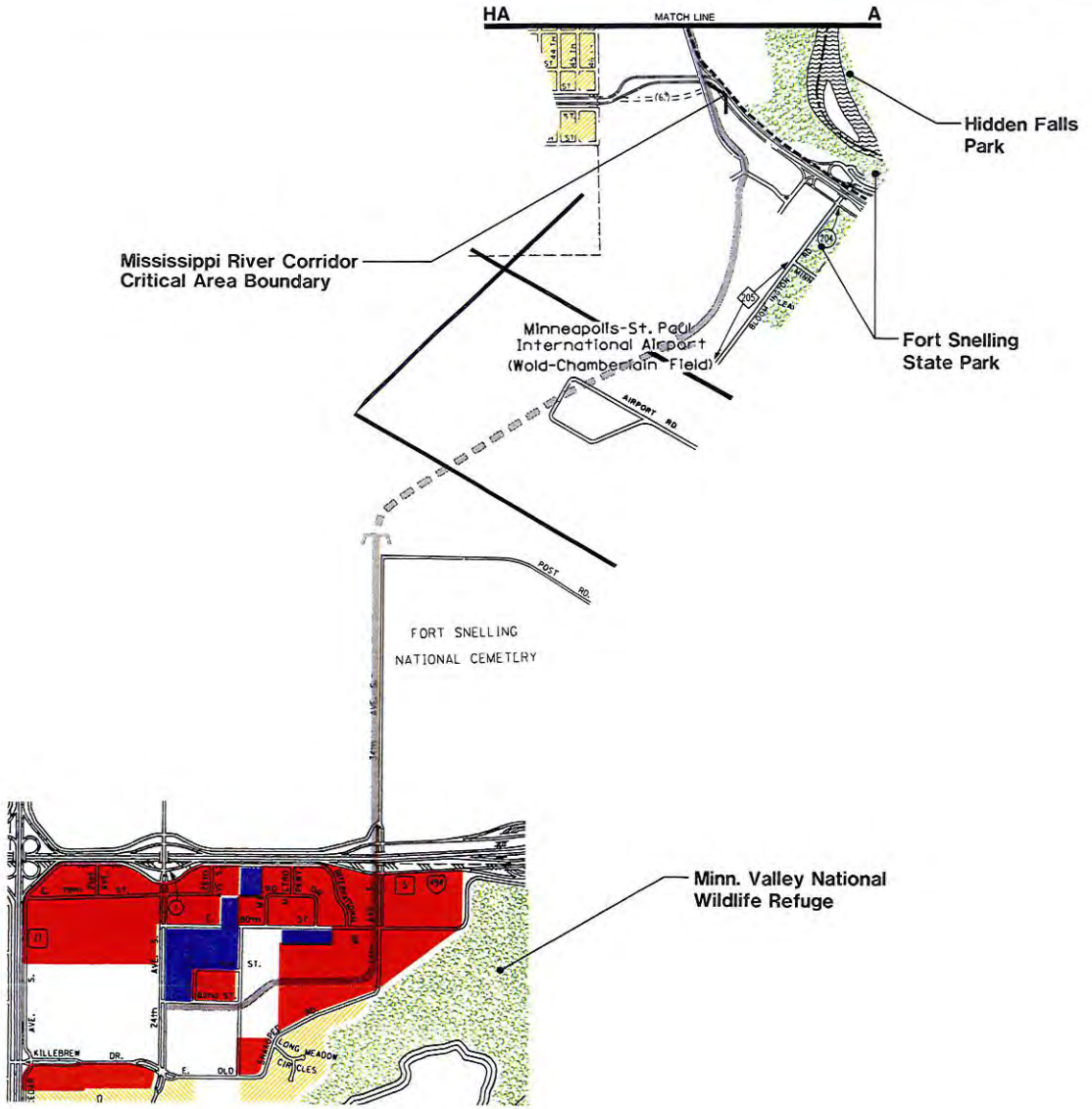

Figure 4.10A

Hiawatha Corridor

0' 1,000' 2,000' North

Legend

- LRT Alignment
- Multiple Residential
- Single Residential
- Multiple-Single Mix
- Industrial
- Commercial
- Parks
- Other: open, institutional, public/semi-public

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Land Use

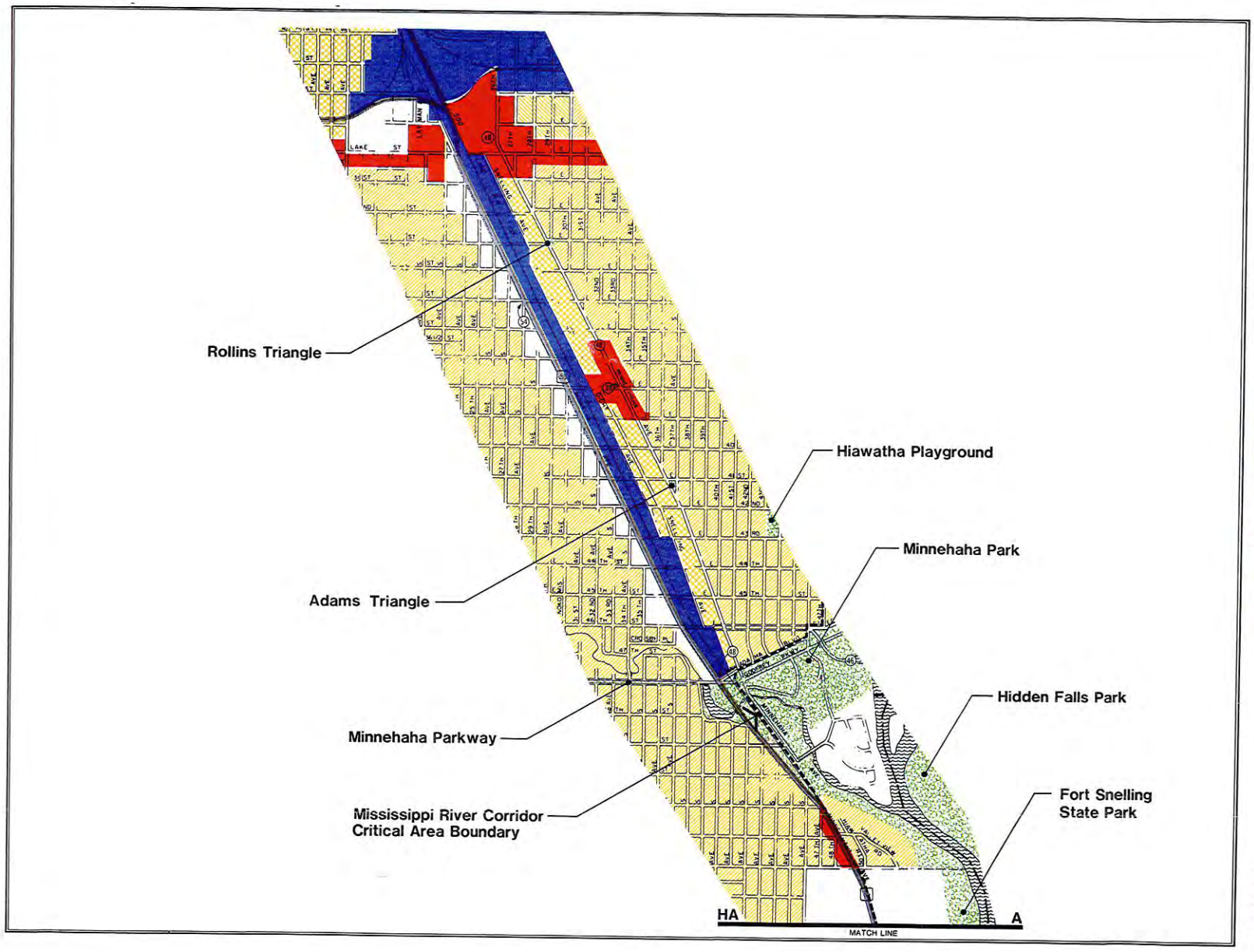

Figure 4.10B
Hiawatha Corridor

0' 1,000' 2,000' North

Legend

- LRT Alignment
- Multiple Residential
- Single Residential
- Multiple-Single Mix
- Industrial
- Commercial
- Parks
- Other: open, institutional, public/semi-public

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LRT System

Environmental Impact Statement

Corridor Zoning

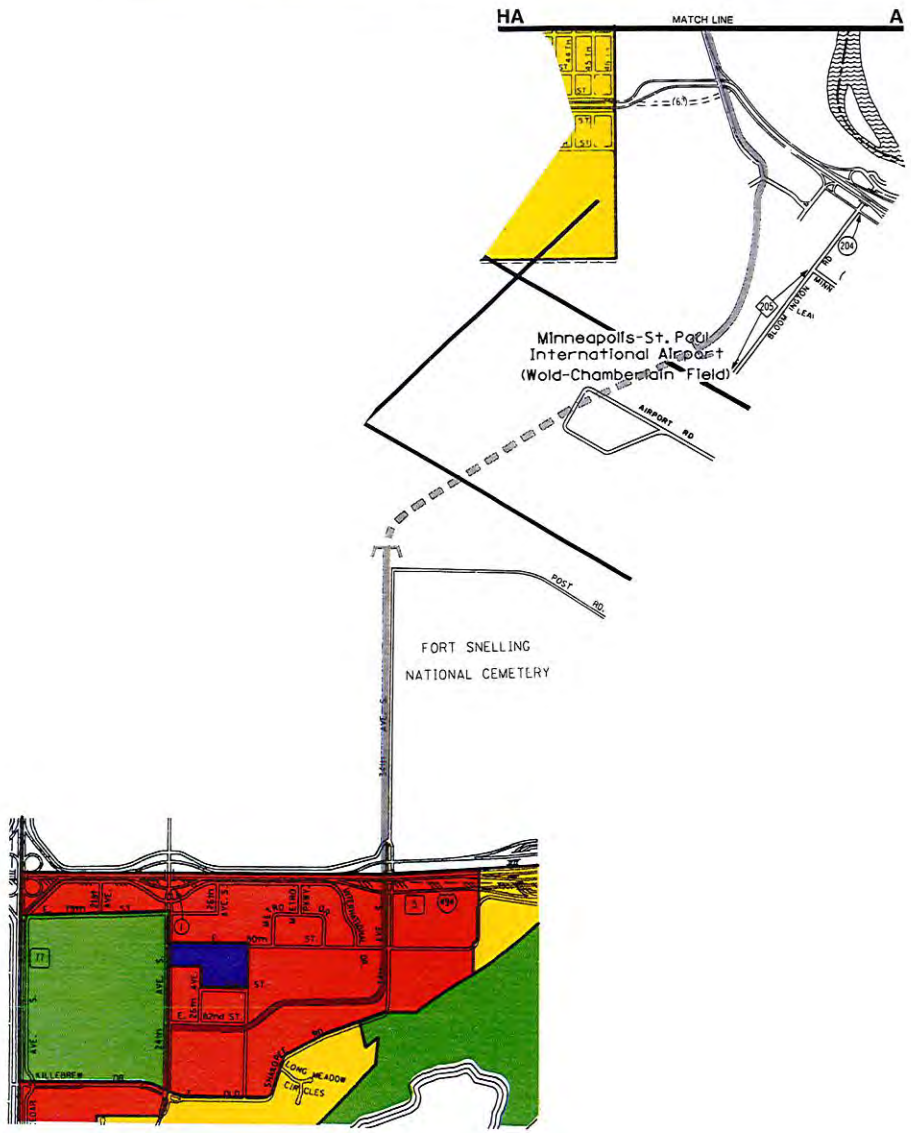

Figure 4.11A

Hiawatha Corridor

RRW

0' 1,000' 2,000' North

Legend

- LRT Alignment
- Residential
- Commercial
- Industrial
- Other :
  (open, institutional, public/semi-public, planned development)

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Environmental Impact Statement

Corridor Zoning

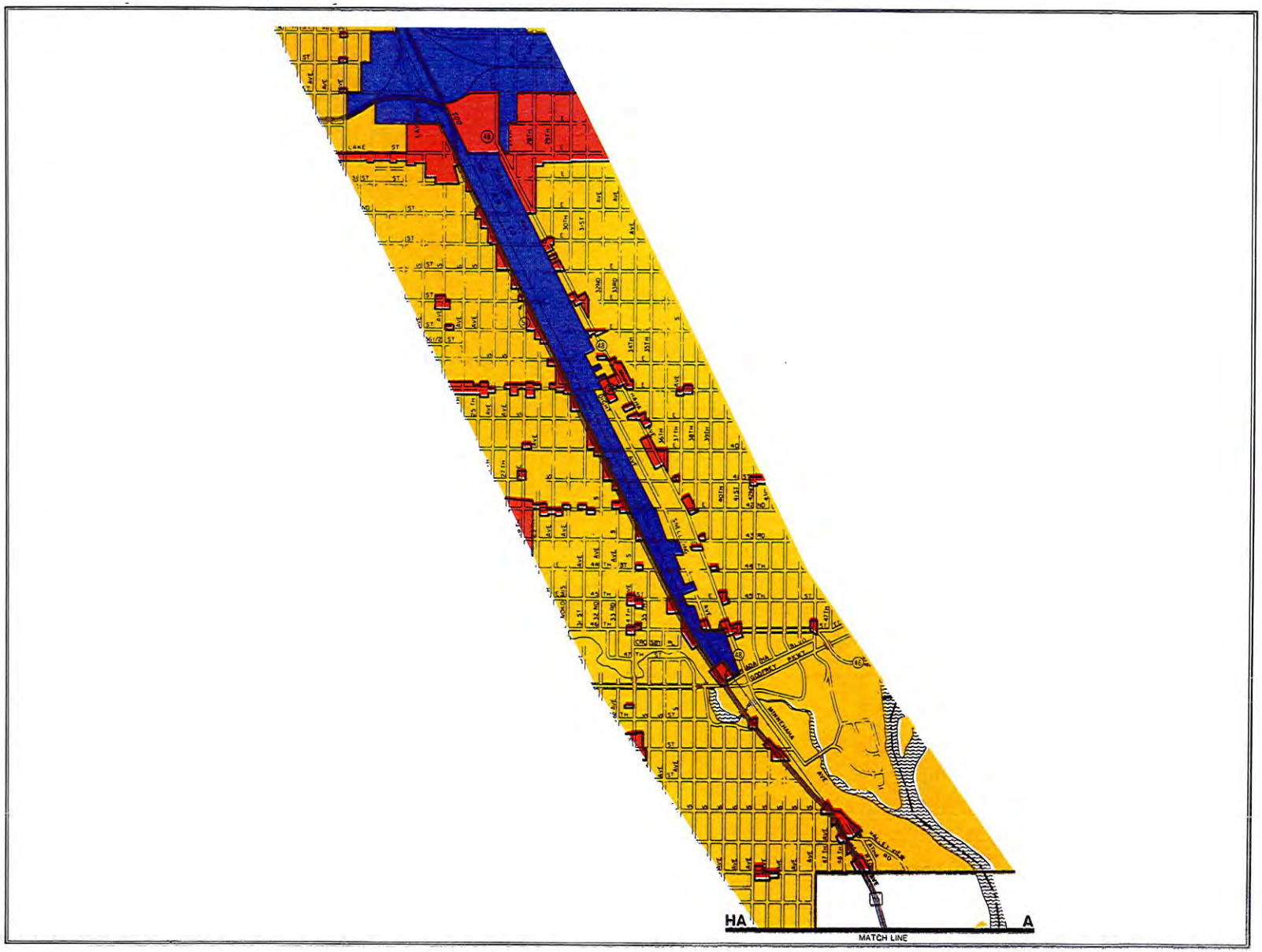

Figure 4.11B
Hiawatha Corridor

BRW
0' 1,000' 2,000' North

Legend

- LRT Alignment
- Residential
- Commercial
- Industrial
- Other :
  (open, institutional, public/semi-public, planned development)

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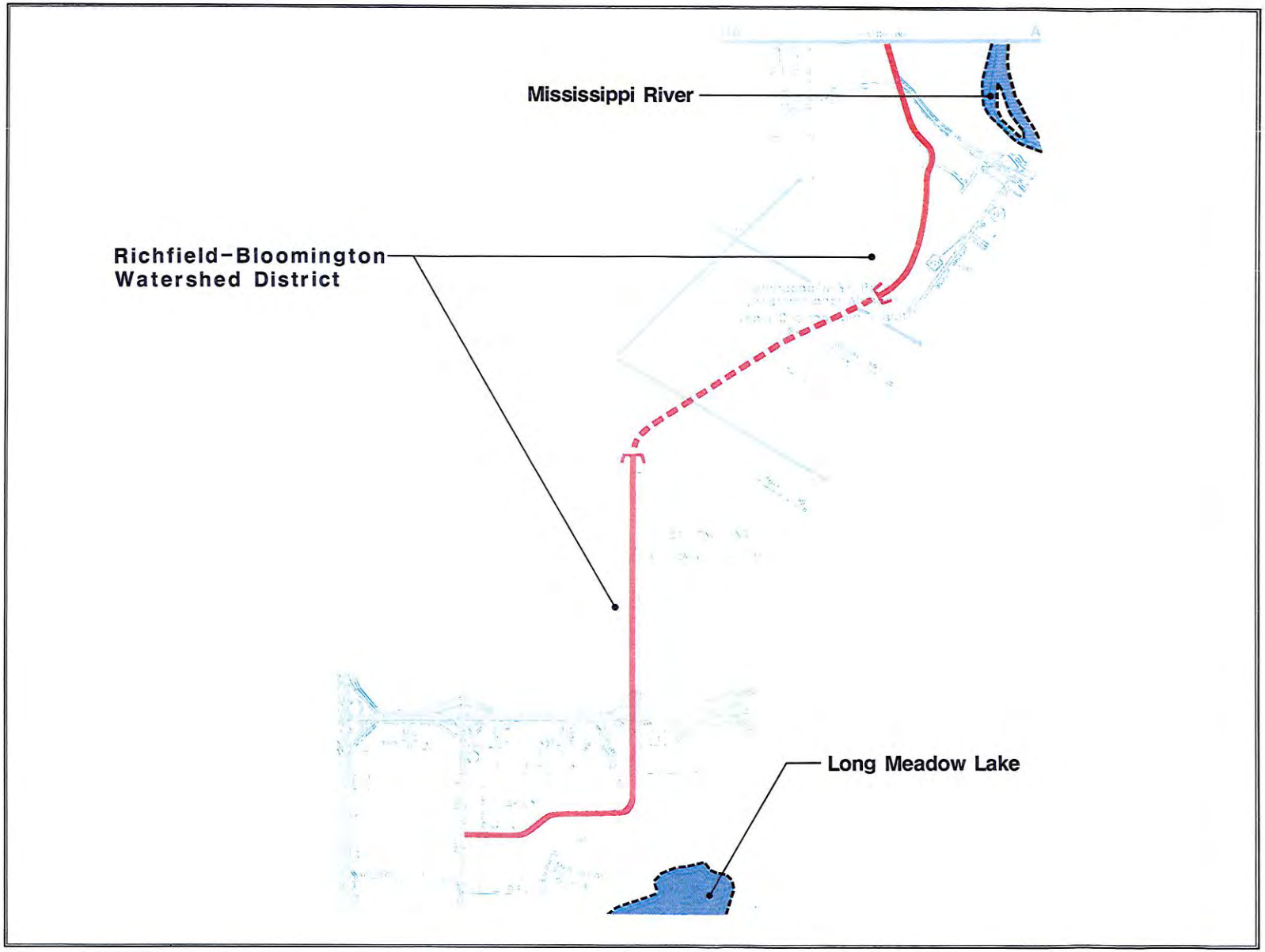
LRT System
Environmental Impact Statement



Floodplains and Watershed Districts

Figure 4.14A

Hiawatha Corridor

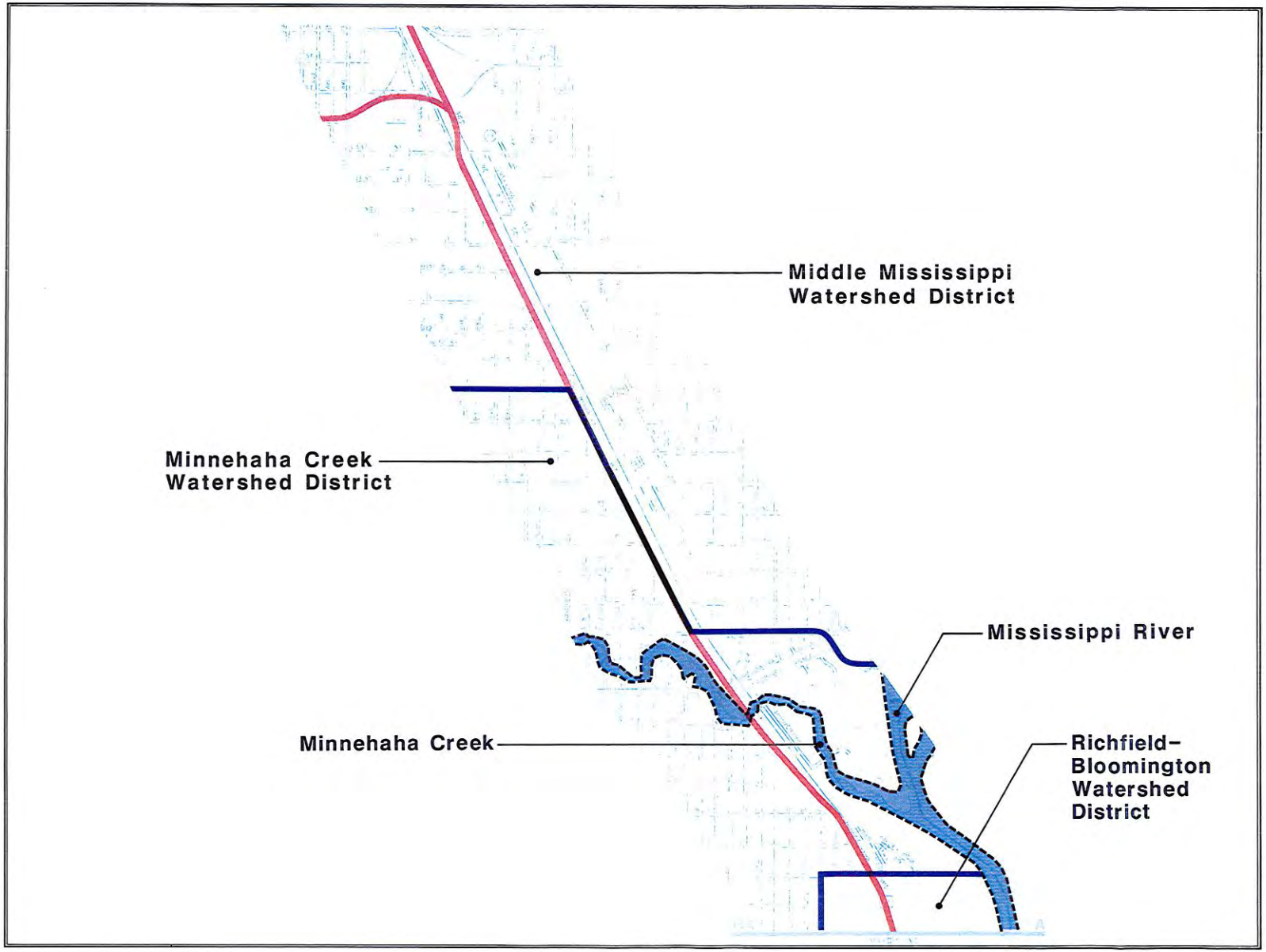
Legend

Floodplain

HCRRA

LRT System

Environmental Impact Statement



Floodplains and Watershed Districts

Figure 4.14B

Hiawatha Corridor

Legend

Floodplain

Watershed District Boundary

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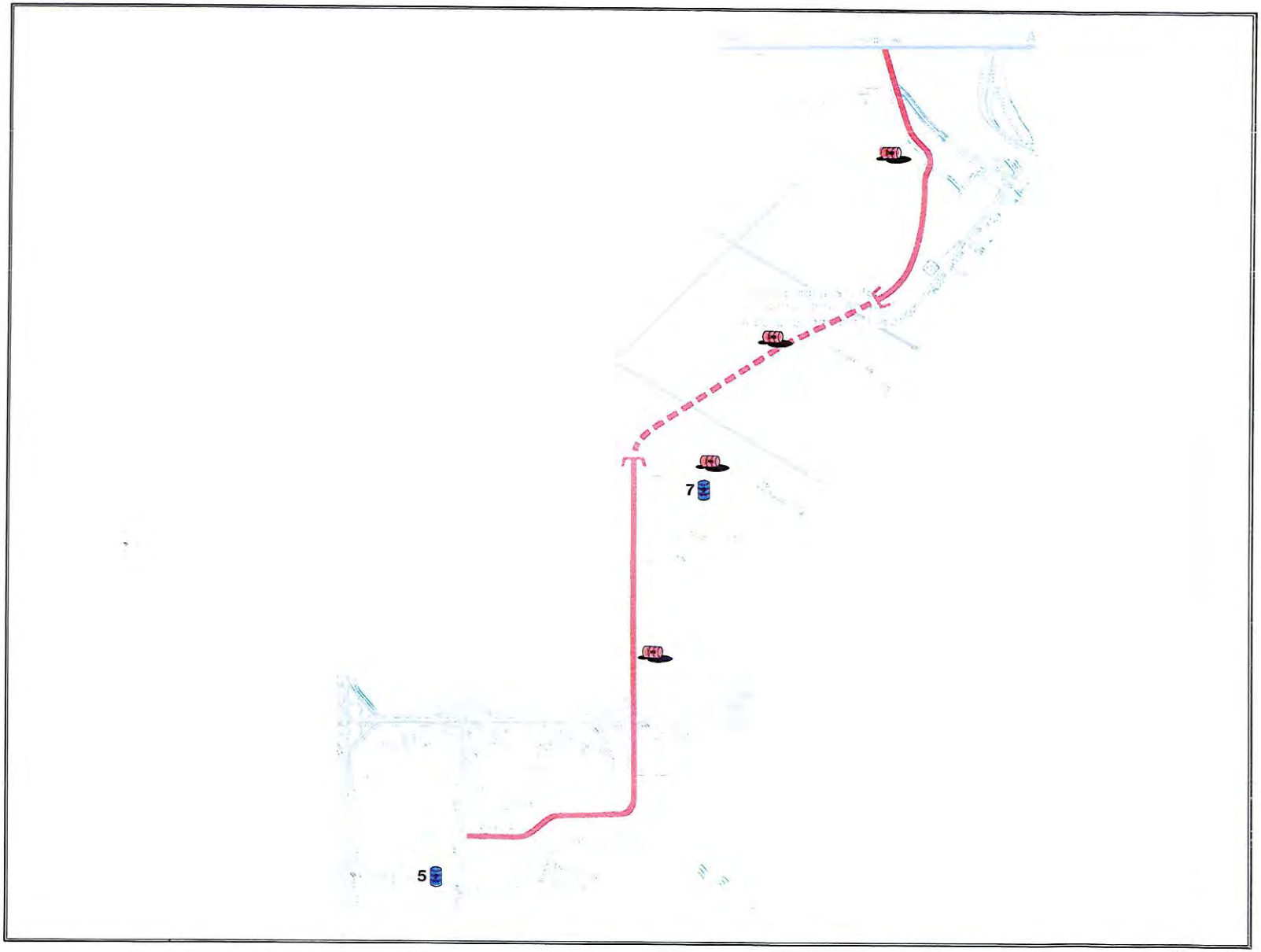
Environmental Impact Statement



Locations of Possible Soil Contamination

Figure 4.15A

Hiawatha Corridor

Legend

LRT Alignment

Minnesota Pollution Control Agency:

Reported Leak Sites

Listed Sites

1. National Priorities List (NPL)
2. Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS)
3. Permanent List of Priorities (PLP)
4. Regulatory Compliance, Hazardous Waste Enforcement Log
5. List of Permitted Solid Waste Facilities
6. Hazardous Waste Permit Unit Project Identification List
7. 1980 Metropolitan Area Waste Disposal Site Inventory
8. 1980 Statewide Open Dump Inventory

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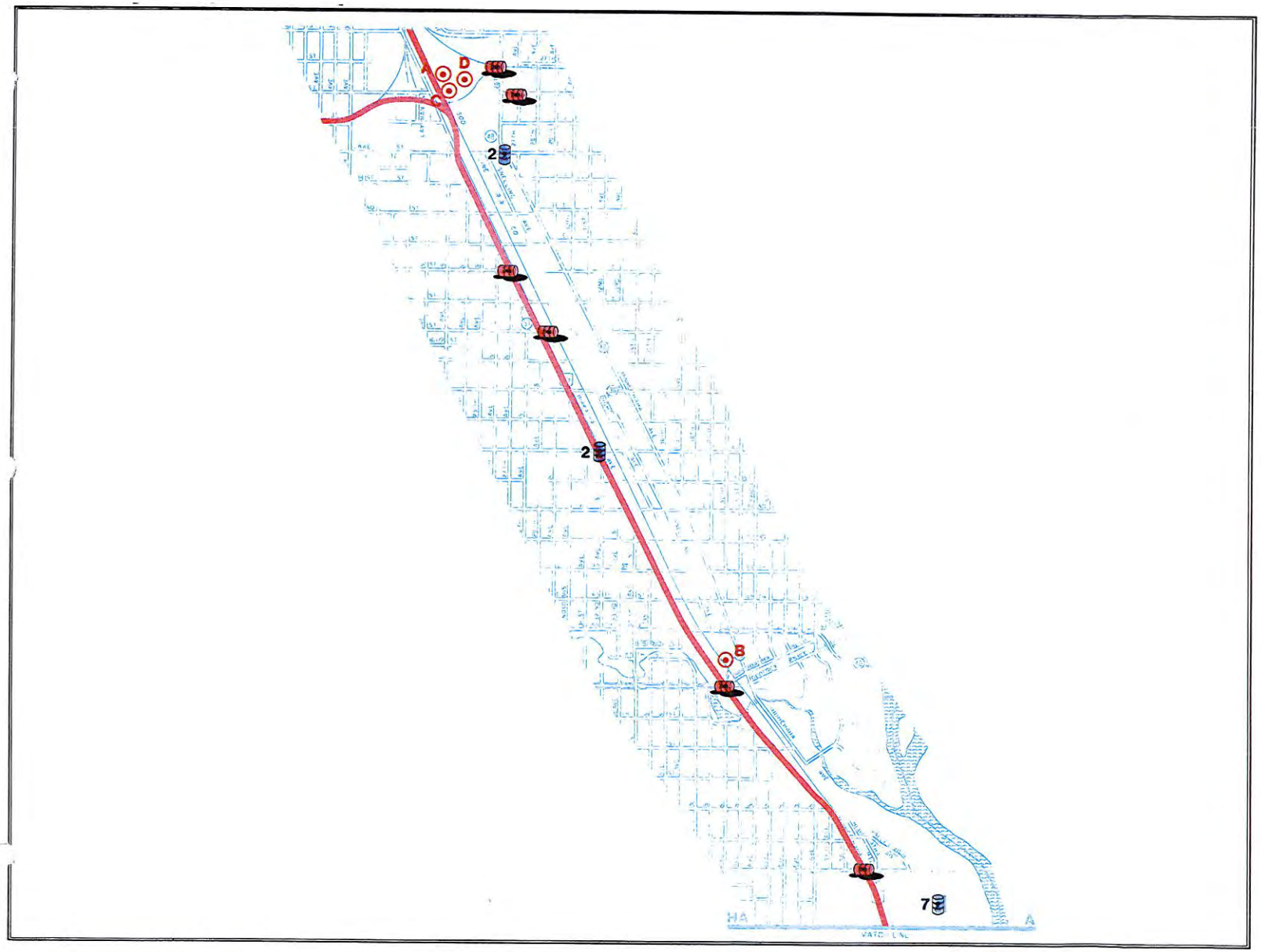
LRT System

Environmental Impact Statement



Locations of Possible Soil Contamination

Figure 4.15B

Hiawatha Corridor

BRW

Legend

- LRT Alignment
- **Contaminated Sites Identified in Soil Boring Logs**
- **Minnesota Pollution Control Agency:**
- Reported Leak Sites
- Listed Sites

1. National Priorities List (NPL)
2. Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS)
3. Permanent List of Priorities (PLP)
4. Regulatory Compliance, Hazardous Waste Enforcement Log
5. List of Permitted Solid Waste Facilities
6. Hazardous Waste Permit Unit Project Identification List
7. 1980 Metropolitan Area Waste Disposal Site Inventory
8. 1980 Statewide Open Dump Inventory

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service includes seven local and five express routes to downtown Minneapolis. Four crosstown routes also operate in the corridor, providing access to downtown Saint Paul, the University of Minnesota, Southdale, and Highland Shopping Center. One of the express routes effectively operates as a peak hour crosstown connecting Richfield and Bloomington to the Airport, Control Data, Northwest Airlines, General Services Administration (GSA), and Veterans Administration Hospital. This route also offers reverse commute opportunities from downtown Minneapolis to the same destinations.

Two special transit services also operate in the corridor. The Metropolitan Airport Commission (MAC) shuttle connects the airport terminals and remote parking areas. A University of Minnesota route provides direct service for University students traveling to and from the campus.

TABLE 4.15
HIAWATHA CORRIDOR TRANSIT SERVICE (1988)

ROUTE	TYPE	OPERATOR	DAILY BUS MILES[1/]	DAILY PASSENGERS
2	Crosstown	MTC	488.8	2,375
7	Local	MTC	1,276.6	3,400
8	Local	MTC	642.9	1,255
9	Local	MTC	171.6	525
15	Crosstown	MTC	855.0	855
19	Local/Express	MTC	1,136.0	3,050
20	Local/Express	MTC	710.8	1,900
21	Local	MTC	1,339.0	4,000
22	Local/Express	MTC	530.0	3,800
23	Crosstown	MTC	590.0	1,550
30	Airport Shuttle	MAC	328.6	NA
35P	Express	MTC	311.3	340
94H	Express	MTC	372.8	975
TOTAL			8,753.4	24,025

[1/] Daily bus miles includes non-revenue miles.

As noted in the Hiawatha Avenue DEIS, the Hiawatha Avenue area has historically experienced a very high level of transit ridership.

4.4.7 Noise

In the southern segment of the Hiawatha Corridor area, the Minneapolis-St. Paul International Airport contributes significantly to the existing noise environment. In the Hiawatha Corridor, the area south of 40th Street falls within the moderate to severe noise impact area of the airport (Figure 4.12). The four exposure areas shown in the Figure include:

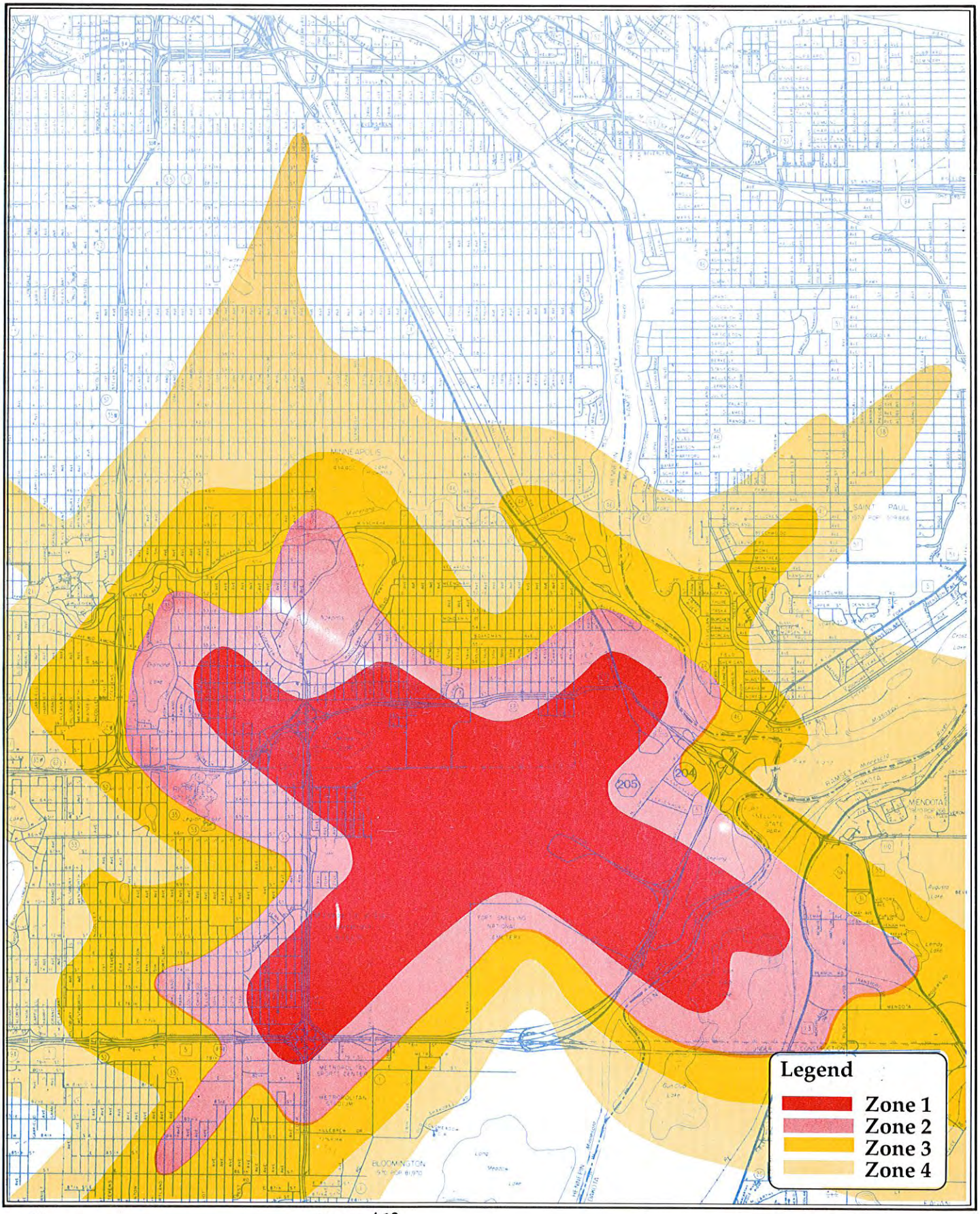
- Zone 1 - Noise exposure in this area is considered severe and permanent. The area is affected by both takeoffs and landings.
- Zone 2 - Noise exposure is considered serious and generally sustained. The area is affected by takeoffs and, to a slightly lesser degree, landings.
- Zone 3 - The intensity of aircraft noise within this area is significant and generally sustained.
- Zone 4 - Aircraft noise exposure is moderate. Noise is related mainly to takeoffs.

While aircraft noise is present in other corridors, its impact is not as severe as in the southern portion of the Hiawatha Corridor.

The noise environment for the northern segment of the Hiawatha Corridor, from 46th Street to Lake Street South, is dominated by traffic-generated noise. A large number of medium and heavy trucks use Hiawatha Avenue to access industries in the corridor and because Hiawatha Avenue is designated a truck route. This traffic noise impacts the sensitive residential receivers found along the entire west side of Hiawatha Avenue.

A total of eight noise monitoring receiver sites were located in single- and multi-family residential areas adjacent to the proposed Hiawatha light rail transit line (Figure 4.13). Because the noise standards and guidelines for industrial and commercial areas are less strict than for residential uses, noise monitoring in these areas was not conducted.

The location, predominant land use and monitored noise level at each of the selected representative noise receivers are documented in Table 4.16.



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Hennepin County Regional Railroad Authority

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Figure 4.12
Hiawatha Corridor

BRW
0 1/2 Mile North

Aircraft Noise Zones Minneapolis-St. Paul International Airport

Source: Metropolitan Council Guidelines for Land Use Compatibility with Aircraft Noise, 1983.

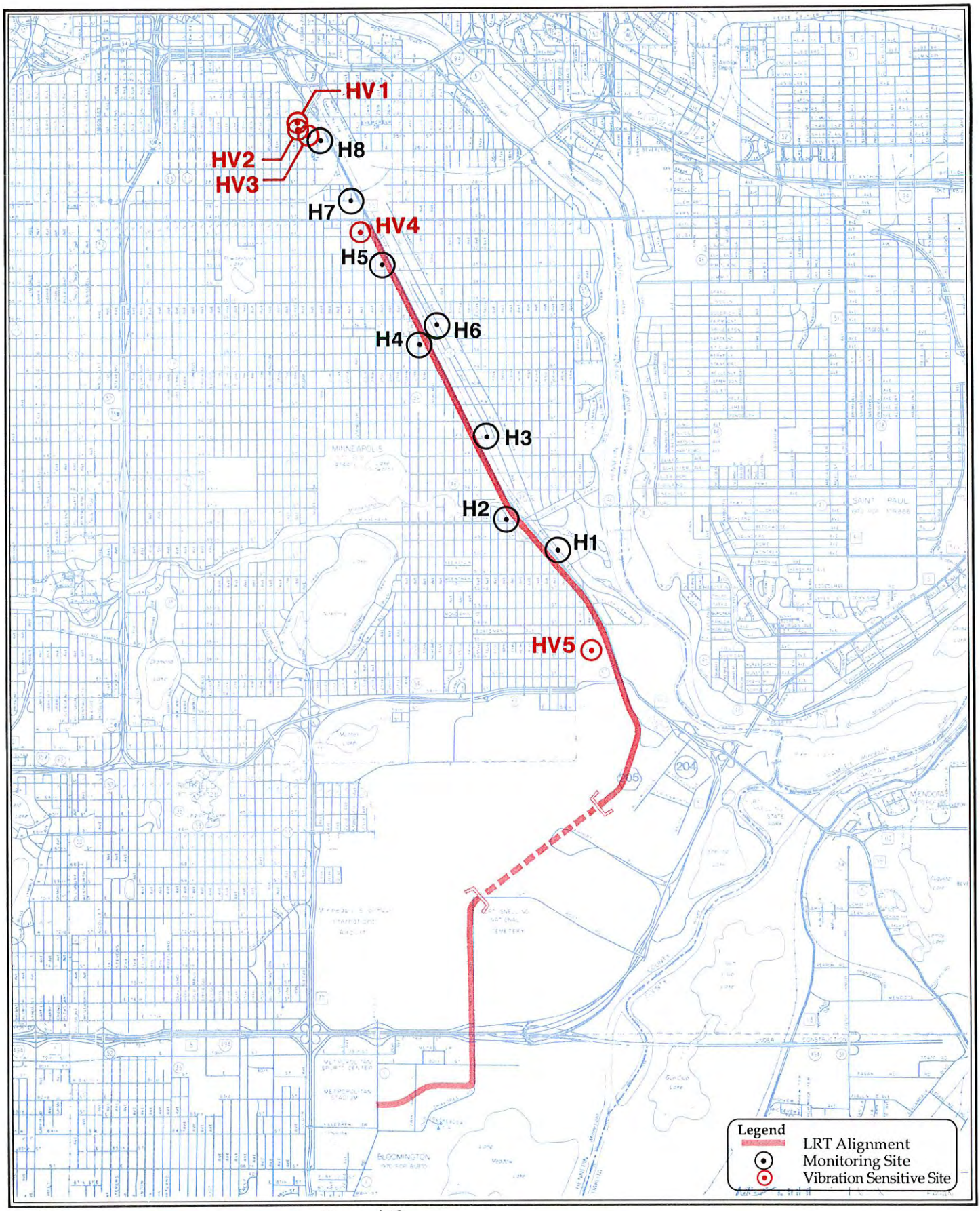

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Figure 4.13

Hiawatha Corridor

BRW

0 1/2 Mile North

Noise Monitoring and Vibration Sensitive Use Locations

TABLE 4.16
MONITORED NOISE LEVELS

Hiawatha Corridor

MONITORING SITE	LOCATION	DATE	MONITORING PERIOD	MONITORED LEVEL (dBA) L10	L50	COMMENTS
H1	E. of Minnehaha Ave & 130' S. of old Train Depot	5/13/80	4:00PM-5:00PM	66	61	
		8/19/87	4:00PM-5:00PM	61	55	Minnehaha Ave closed after 1980
H2	E. of 38th St & N. of Minnehaha Pkwy	5/12/80	3:00PM-4:00PM	61	54	Aircraft Flyover
		8/19/87	3:00PM-4:00PM	58	53	
H3	E. of Dight Ave & S. of E. 43rd Street	6/19/80	4:00PM-5:00PM	60	50	
		6/20/80	6:00AM-7:00AM	56	48	
H4	W. of Hiawatha Ave & S. of E. 37th St	5/14/80	4:30PM-5:30PM	62	59	Train Whistle and Fire
		8/26/87	6:00AM-7:00AM	61	60	Grain Elevator Fans
H5	W. of Hiawatha & S. of E. 32nd St	5/22/80	4:30PM-5:30PM	63	58	
H6	E. of Dight Ave & S. of E. 36th St	6/3/80	4:30PM-5:30PM	62	56	
H7	W. of Hiawatha Ave & N. of E. 29th St	5/21/80	4:30PM-5:30PM	65	59	Train
H8	W. of Hiawatha Ave & N. of 25 1/2 St	5/20/80	3:30PM-4:30PM	66	60	Train
		8/27/87	4:00PM-5:00PM	67	61	Train Yard Noise

Source: TH 55 (Hiawatha Avenue) Draft EIS, 1982
TH 55 (Hiawatha Avenue) Noise Technical Report Update, 1988

4.4.8 Vibration

Within the Hiawatha Corridor there are existing sources of vibration. Specifically, vibration is being generated by vehicular traffic on Hiawatha Avenue, and from grain storage and processing operations along the west side of Hiawatha Avenue north of 38th Street.

As the guidelines in Table 4.9 document, a number of non-residential uses particularly susceptible to vibration impacts at relatively low exposure levels are located in the Hiawatha Corridor.

The location of the vibration sensitive uses in the Hiawatha Corridor are shown in Figure 4.13 and documented in Table 4.17.

TABLE 4.17
VIBRATION SENSITIVE LAND USES

SITE	LOCATION	LAND USE	APPLICABLE GUIDELINE (dB)
HV1	South of 54th Street West of Hiawatha Avenue	U.S. Veterans Administration Medical Center	60-75
HV2	South of Lake Street West of Hiawatha Avenue	Brown Institute	75
HV3	South of 25th Street West of Hiawatha	Little Earth of Nations Community Center	70
HV4	South of 24th Street East of 18th Avenue	Holy Rosary School	75
HV5	South of 24th Street East of 18th Avenue	Church	70

4.4.9 Wetlands/Vegetation and Wildlife

The proposed Hiawatha corridor was surveyed in 1981-82 for the TH 55 (Hiawatha Avenue) Draft EIS. The DEIS was reviewed and then compared to 1985 aerial photos to identify any changes in the landscape. Neither the Hiawatha DEIS nor the aerial photos show wetland vegetation within the study area. The preliminary studies for the Hiawatha DEIS did

identify some small patches of prairie grasses in the vicinity of Crosstown (62) and Hiawatha Avenue (Highway 55). However, these prairies were in very poor condition in 1981 and were not included in that DEIS. The prairie survey conducted in 1989 found that the areas are very disturbed and degraded. Woody vegetation and weedy species have invaded these areas, and prairie forbs were mostly absent. The only prairie that would be affected by the LRT system would be at the VA Hospital station site. This oak savanna area has been sprayed in the past for brush, which also has eliminated many of the prairie forb species.

The existing conditions in the Minnehaha Creek park area are covered in detail in the TH 55 (Hiawatha Avenue) Draft EIS (Section 6.0).

Much of the highway right-of-way between Lake Street and 46th Street has been recently disturbed by the Highway 55 improvement project. The four proposed station sites for this section also have been disturbed by this construction.

4.4.10 Water Resources

The Hiawatha Corridor occurs within the middle Mississippi River, Minnehaha Creek and Bloomington-Richfield Watershed Districts. Figures 4.14A-B identify the affected floodplains and Watershed District boundaries in the Hiawatha Corridor Study Area.

The major surface water bodies include Minnehaha Creek, and the Mississippi River which receives all of the area's storm water runoff. Long Meadow Lake is located in the southeast section of the study area.

Shoreland Zoning

A Shoreland Zoning District boundary lies 300 feet from the edge of Minnehaha Creek in Minneapolis.

Water Quality

Minnehaha Creek is classified as a recreational use stream, and its water quality is generally acceptable for this classification.

The Mississippi River in this vicinity is classified as an industrial class stream. The Metropolitan Waste Control Commission (MWCC) currently monitors the Mississippi River at eleven stations from Anoka, to Lock and Dam No. 3 above

Red Wing. The MWCC incorporates a water quality index developed by the National Sanitation Foundation (NSF) to summarize relative water quality. Parameters incorporated into this index include: dissolved oxygen, temperature, fecal coliforms, pH, biochemical oxygen demand, nitrates, phosphorus, turbidity and solids.

Based on studies completed by the MWCC, the Mississippi River, above Lock and Dam No. 1 has been of good water quality since 1986 (Appendix). High fecal coliform bacteria counts are the primary problem in the Mississippi River upstream of the Metropolitan Waste Water Treatment Plant.[1/]

Mississippi River Critical Area

Figures 4.10A-B (Land Use) identify the critical area boundaries included in the Hiawatha Corridor study area.

Groundwater

Geological investigations completed to date in the vicinity of the airport tunnel indicate the following:

- o There are no significant groundwater tables in the five to ten feet of soil overlying the Platteville limestone.
- o There is potentially a groundwater table in the limestone between 802 and 804 feet MSL.
- o The groundwater table in the sandstone is determined by the nearby river elevation, which is approximately 690 feet MSL.

4.4.11 Soils

Contaminated Soil Sites

Figures 4.15A-B identify the sites in the Hiawatha Corridor which are included in the Minnesota Pollution Control Agency (MPCA) files that indicate there has been a release or threatened release of a hazardous substance, pollutant or contaminant. The sites are labeled according to the appropriate list which they are included in (List 1-8 defined in Table 4.12). Specific addresses for each of these sites are included in the MPCA letter, Chapter 8.3. Also included in the figures are ten sites where leaking

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1/ 1987 River Quality Summary Report, Metropolitan Waste Control Commission, September 1988.

underground storage tanks have been reported to the MPCA (specific addresses are listed in Appendix). Included in the Underground Storage Tank Information Data Base, but not illustrated in the figure because of incomplete location information, is the list of hazardous substance and/or petroleum product spills. A complete listing of these sites can be found in the Appendix. As noted in Table 4.12, this list is not broken down by zip code, but rather by city. The number of potential spill sites identified in Bloomington totals 86 and in Minneapolis, 363.

In addition to the data obtained from the MPCA, available soil boring logs pertaining to the Hiawatha Study Area were reviewed. The results are documented in Table 4.18 and illustrated in Figures 4.15A-B.

TABLE 4.18
SOIL CONTAMINATION SITES (SOURCE: SOIL BORING RECORDS)

REFERENCE ON MAP	LOCATION	CONTAMINATION
A	28th - 26th St. on Chicago, Milwaukee, St. Paul & Pacific	Heavy metals exceed drinking water standards, petroleum, coal tar derivatives, chloroform - see yard & shop description in text
B	Minnehaha Parkway & Hiawatha NE corner of intersection on east side of tracks	Petroleum odors in soil
C	Same as (A)	Petroleum odors in soil
D	Same as (A)	PNA's (Polynuclear aromatic hydrocarbons), heavy metals, petroleum in groundwater

4.4.12 Steep Slopes

Steep slope conditions are not a factor in the Hiawatha Corridor.

4.4.13 Tunnel Area Geological Conditions

The airport area is located on a finger of Platteville limestone bounded on the north by the Mississippi River, the Minnesota River to the southeast and an ancient buried river

valley to the west. Figure 4.16 shows the thickness and depth of soil and rock layers. Local variations in the bedrock surface result from erosional channels, boulders and glacial scouring. The top two to four feet of the Platteville limestone layer is generally weatherized, reducing the average twenty-foot limestone thickness to sixteen to eighteen feet of unweathered rock.

A significant feature of the geology in the airport area is the erosional channel located near the Gold Concourse extension and original parking ramp. Bedrock elevations in this area reveal that the channel has incised the limestone and penetrated thirty feet into the underlying sandstone.

4.4.14 Tunnel Area Utilities

Surface utilities consist of shallow drainage structures and water, electricity and natural gas utilities. There are no deep utilities known to exist in the limestone or sandstone along the proposed alignment. The vehicular tunnel under runway 29L penetrates into the limestone but is not near the proposed airport tunnel.

4.4.15 Parklands

The parks which are adjacent or close to the proposed Hiawatha LRT track are identified in Figures 4.10A-B (Land Use) and briefly described below.

- Minnesota Valley National Wildlife Refuge and Recreation Area (Department of the Interior, Fish and Wildlife Service):

  This area includes major wooded and grassy areas, the Minnesota River and its many backwaters, trails, observation posts, an interpretative center, ponds and wetlands, natural springs, scenic overlooks, and fish hatchery ponds.

  The Refuge-Recreation Area complex is the result of the combined efforts of federal, state, and local units of government to provide a network of cooperatively managed natural interpretative recreational units and wildlife protection land.

- Fort Snelling State Park (Minnesota Department of Natural Resources):

  Fort Snelling State Park is a 3,265-acre park consisting of Mississippi River bluff land, Minnesota River Valley bluff land and bottomland, and Historic Fort Snelling. This natural and historic area provides opportunities for a variety of recreational activities

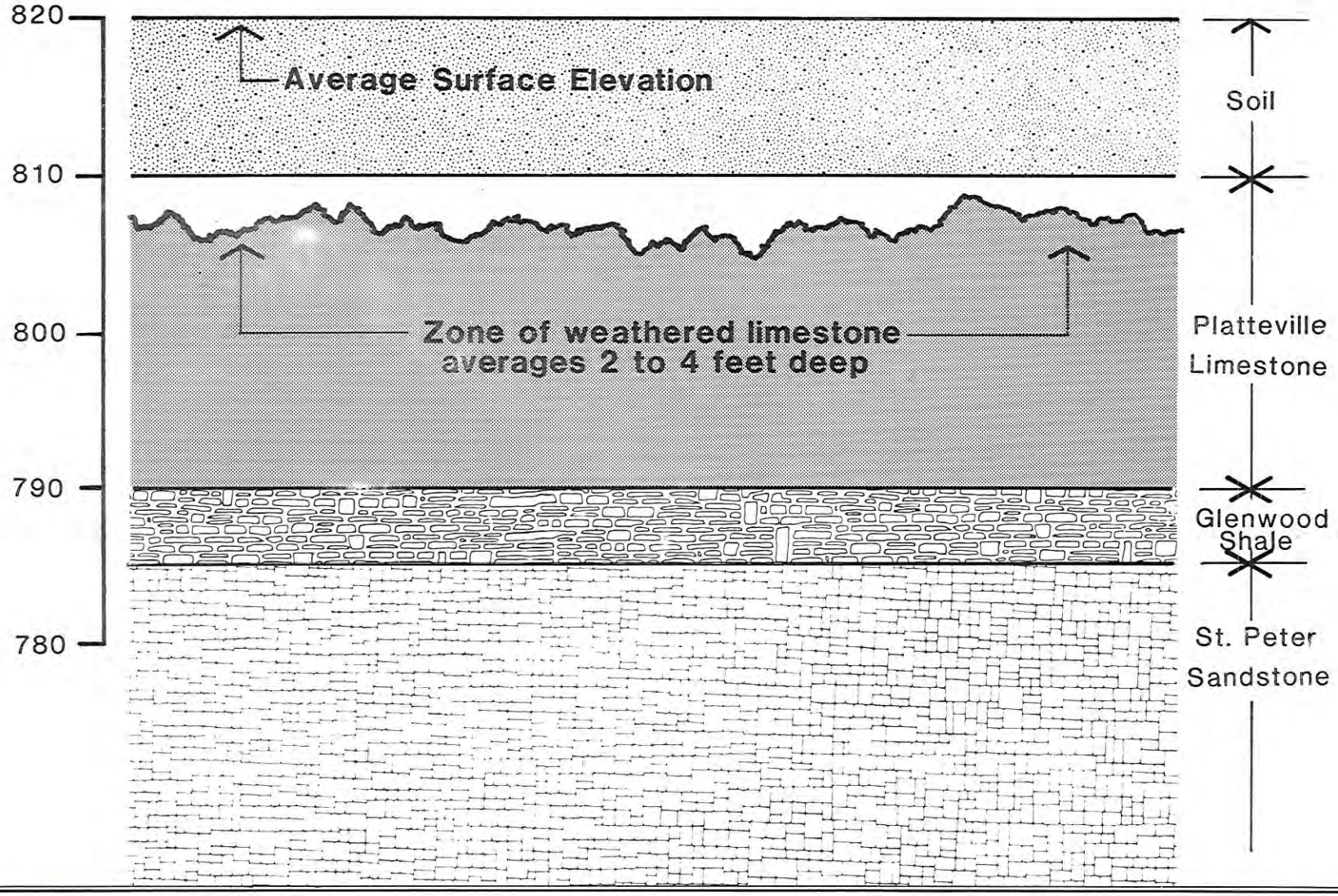

Figure 4.16

Geologic Section: Airport Tunnel

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including hiking, bicycling, fishing, boating, swimming, picnicing, nature and historic interpretation, cross-country skiing, and horseback riding. Trails in this park connect to the Minneapolis Parkway system to the north and the Minnesota Valley National Wildlife Refuge and Recreation Area to the west.

Historic Fort Snelling includes many well-preserved military buildings from the early 1800s. A major interpretative center and the Minnesota Historical Society are located at this site. This area is designated a National Historic District.

- Wenonah Triangle (Minneapolis Park Board):

  Landscaped open space (0.1 acre) which primarily serves a local purpose. One bench is situated on East 42nd Avenue for use by MTC bus patrons.

- Minnehaha Regional Park (Minneapolis Park Board):

  Minnehaha Park is part of the Regional Park system. The estimated number of visitors from Memorial Day to Labor Day is in excess of one-quarter million.

  The park includes Minnehaha Creek, Minnehaha Falls--picnic facilities, trails, historic Minnehaha Depot, statues of Minnehaha, Hiawatha, and Ole Bull, historic John H. Stevens House, tennis courts, bandstand, ballfields, football/soccer fields, refectory (including rest rooms, picnic shelter, and park police offices), and natural and historic interpretative facilities. Size: 171 acres.

  Minnehaha Park serves as the link to the West River Parkway bicyclist and pedestrian trails; the Minnehaha Parkway trails; the trails down into the river gorge and along Minnehaha Creek to the Mississippi River; and the trail system being developed within Fort Snelling State Park.

  Primary access to the Minnehaha Park recreation complex is provided by Minnehaha Avenue from the south, by Hiawatha and Minnehaha Avenues from the north, Minnehaha Parkway from the west, and Godfrey Road from the east. The primary entrance to Minnehaha Park is between 42nd Avenue and Godfrey Road. A second entrance to the park exists on the east side of the park off Godfrey Road. Pedestrian and bicyclist access is provided by the connection of Godfrey Road to West River Parkway.

- Minnehaha Parkway (Minneapolis Park Board):

  Minnehaha Parkway is part of the Regional Park and Trail System and the Minneapolis Parkway System. The Parkway, which is primarily a grassy open space, includes Minnehaha Creek, bicycle and pedestrian trails.

- Longfellow Gardens (Minneapolis Park Board):

  The Longfellow Gardens area is characterized by grassy open space and mature trees, a statue of Henry Wadsworth Longfellow, and the historic R.F. Jones House. Longfellow Gardens is part of Minnehaha Park and the Minnehaha Parkway network.

4.4.16 Visual and Aesthetics

The photographs in Figures 4.17A-B illustrate the visual and aesthetic environment of the Hiawatha Corridor Area.

- 24th Avenue/Killebrew Drive to 34th Avenue/I-494:

  The character of this segment is primarily office and commercial with hotels serving the airport. Building heights vary from one- and two-story office and commercial, to twelve-story office buildings and hotels.

  The visual character includes open vistas, and numerous parcels of open and unbuilt sites alternating with singular large structures. The segment is characterized by overhead wires, highway signs close to I-494, and open surface parking lots.

- I-494 to South Airport Portal:

  Airport-oriented businesses are located to the west of I-494, with Fort Snelling National Cemetery to the east. The two- and three-story aviation structures which are set well back from the existing street, along with the low scale of the cemetery fencing, combine to open up a long-range view of the corridor. There are also two-story structures north of Post Road and east of 34th Avenue.

  The visual images are comprised of a rhythmic pattern of fencing and landscape along the perimeter of the cemetery, contrasting with the random placement of the aviation structures. Overhead wires exist along the west side of 34th Avenue.

- Main Terminal Area:

  The primary elements of this segment are the hangers, main terminal, parking structures, and the flat open vista of the runways.

- Main Airport Terminal to 62nd Crosstown:

  This segment of the Hiawatha LRT track would run between existing one- and two-story structures. As the corridor approaches the Crosstown, the vista opens up to include views of the river valley.

  The view is characterized by the open expanse of the airport area, historic Fort Snelling buildings, old and modern government structures.

- Crosstown Highway 62 to 54th:

  Crossing CSAH 62, the corridor area is characterized by the Veterans Administration (VA) Hospital to the west and VA-operated residences to the east. All of these structures are set well back from the roadway. This site is tree-lined with brick and iron or wood fencing surrounding the hospital complex.

  The visual aspect of this segment includes a wide boulevard with good vegetative cover. The most rigid element is the iron fencing, adding a definitive linear image to the west side.

- 54th to 46th Street:

  Overhead wires run on the east side of Hiawatha Avenue from 52nd to 46th and commercial areas are dotted with signs and auto parking areas. The Minnehaha Parkway to 46th Street area is characterized by a natural vista of Minnehaha Park, including the creek and recreational trail area.

- 46th Street to 29th Street:

  The general character of this segment is open land with industrial uses to the east and residential uses to the west. Between Hiawatha and Minnehaha Avenues there is a mix of industrial uses, located primarily along a rail spur line, as well as some residential uses. The industrial areas vary in quality and condition and contain a number of vacant or underutilized structures. The residential uses are also of mixed quality, with density varying from block to block. In general, the

Photo/Visual Aesthetics

Figure 4.17A
Hiawatha Corridor

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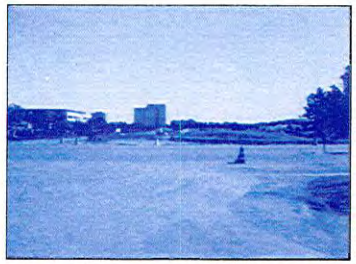
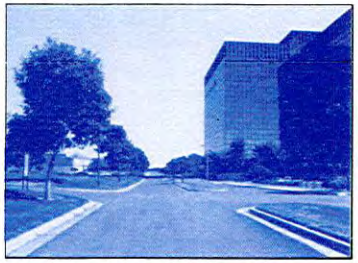


Mall of America Site Looking East Along 82nd Street

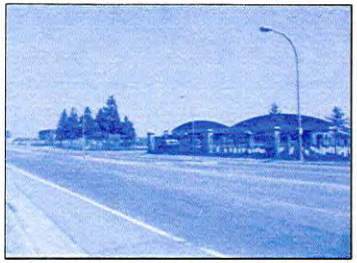
Looking East from 82nd Street at 28th Avenue to Control Data Complex



Looking East Past Control Data to 34th Avenue

Looking Across International Drive to 34th Avenue and Appletree Complex

34th Avenue Looking South to I-494



Looking North Along 34th Avenue Toward Lindbergh Terminal Area

MSP Lindbergh Terminal

Looking West at Army Reserves Structure, Alignment Between Trees & Buildings

Looking South Along Minnehaha Avenue Past GSA Building

Minnehaha Avenue Looking North Toward County Road 62

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Photo/Visual Aesthetics

Figure 4.17B
Hiawatha Corridor

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56th Street Looking North

Veterans Administration Medical Center Area Looking Southwest

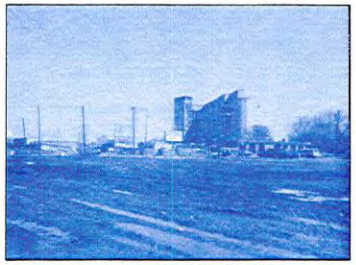
53rd Street Looking North Toward Commercial Node

52nd Street Area Looking North at Commercial Node

51st Street Looking North Along Minnehaha Park

Minnehaha Park Looking Southeast Toward Hiawatha Avenue

46th Street Looking Southeast at Commercial Node



43rd Street Looking North to Industrial Strip

38th Street Looking North Toward Grain Elevators

Lake Street Looking West Across Hiawatha Avenue

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area is in poor condition and has a number of under-utilized stores, and vacant land which was originally cleared to allow for construction of a limited access highway.

The area is visually confusing with business signs, adjacent industrial uses, the rail yard, and overhead wires along the right-of-way.

4.4.17 Historic and Cultural Resources

Numerous historic, and possibly archaeologically significant sites are located in the vicinity of the Hiawatha Corridor. Most of these sites were previously identified in the 1982 TH 55 (Hiawatha Avenue) Draft Environmental Impact Statement (Section 7.0). Of particular significance is the Minnehaha Historic District, which includes the Minnehaha Falls and Glen, Minnehaha Park, Minnehaha Depot, R.F. Jones House, and John H. Stevens House.

The Fort Snelling Historic District, part of which is listed as a National Historic Landmark, is located south of the intersection or Crosstown Highway 62 and TH 55. Historic Fort Snelling, constructed in the early 1800s, was utilized as a strategic military command post. Use of the fort declined after WW II. The historic fort was restored by the Minnesota Historical Society and is currently used for public interpretive programs.

Two potential archaeological sites are associated with the historic fort. One is a field area near the junction of CSAH 62 and TH 55. It is suspected that these fields may have been used for military training grounds and/or space for Indian encampments, as well as other fort-related activities. Therefore, there is a good possibility that archaeological artifacts may be present on the site. The other area of concern regarding archaeological remains is the airport property located along the south end of Taylor Avenue. The U.S. Army Department of the Dakota buildings were originally located at this site, but have been demolished for construction of the existing runway.

The Fort Snelling National Cemetery is located directly southwest of the airport and is historically significant. The proposed LRT alignment follows along the western (34th Avenue South) border of the cemetery.

4.5 SOUTHWEST CORRIDOR

4.5.1 Demographics

Table 4.19 presents findings from an analysis of Southwest Corridor demographic data.

TABLE 4.19
DEMOGRAPHIC TRENDS AND FORECASTS
SOUTHWEST CORRIDOR

YEAR	POPULATION	HOUSEHOLDS	PERSONS PER HOUSEHOLD	HOUSEHOLD INCOME*	EMPLOYMENT
1980	70,364	30,000	2.31	$ 53,100	52,650
1988	70,700	31,500	2.21	56,600	52,150
2010	71,800	35,500	1.99	70,900	50,700
Southwest Corridor					
Percent Change 1980-2010	2%	18%	-14%	34%	-4%
Annual Rate of Change 1980-2010	.1%	.6%	-.5%	10%	-.1%
Hennepin County					
Percent Change 1980-2010	19%	31%	-9%	33%	34%
Annual Rate of Change 1980-2010	.6%	.9%	-.3%	1%	1%

* 1987 Dollars

Source: Metropolitan Council of the Twin Cities

Table 4.20 reflects the Southwest Corridor's contribution to Hennepin County's demography for 1980, 1988 and 2010.

TABLE 4.20
SOUTHWEST CORRIDOR AS A
PERCENTAGE OF HENNEPIN COUNTY

YEAR	POPULATION	HOUSEHOLDS	TOTAL INCOME	EMPLOYMENT
1980	7.5%	8.2%	9.6%	8.5%
1988	7.1%	7.6%	9.1%	7.3%
2010	6.4%	7.4%	8.7%	6.1%

Source: Metropolitan Council of the Twin Cities

The data on population, households, and persons per household suggest that growth within the study area has stabilized and the families that comprise the households are established.

Transit Dependent Statistics:

Based on 1980 census tract data, approximately 8,300 people in the Southwest Corridor area could be considered transit dependent.

A Metropolitan Council study[1/] refined the transit dependent statistics to include densities of persons who are anticipated to have an increased tendency to use transit services in the Southwest Corridor area.

- Elderly (ages 65 to 74), approximately one per acre
- Elderly (ages 75+), less than one per acre
- Youth (ages 11 to 18), approximately 1.5 per acre
- Low-income households, less than one per acre
- Zero car households, less than one per acre
- Persons in group quarters, less than one per acre

From these statistics it can be concluded that the Southwest Corridor contains a relatively low concentration of transit dependent individuals.

1/ Technical Memorandum: Transit Dependent Analysis; February 1988

4.5.2 Community and Neighborhood Boundaries

Cities in the Southwest Corridor study area are:

- o Hopkins
- o Edina
- o Saint Louis Park
- o Minneapolis

Figure 4.18 illustrates planning district and neighborhood boundaries in the Southwest Corridor study area.

City of Hopkins:

The City of Hopkins is not divided into distinct planning districts. The existing railroad tracks divide the city into northern and southern halves.

City of Edina:

The corridor study area, in the extreme northwest corner, includes the Northwest Planning District and its neighborhoods.

City of St. Louis Park:

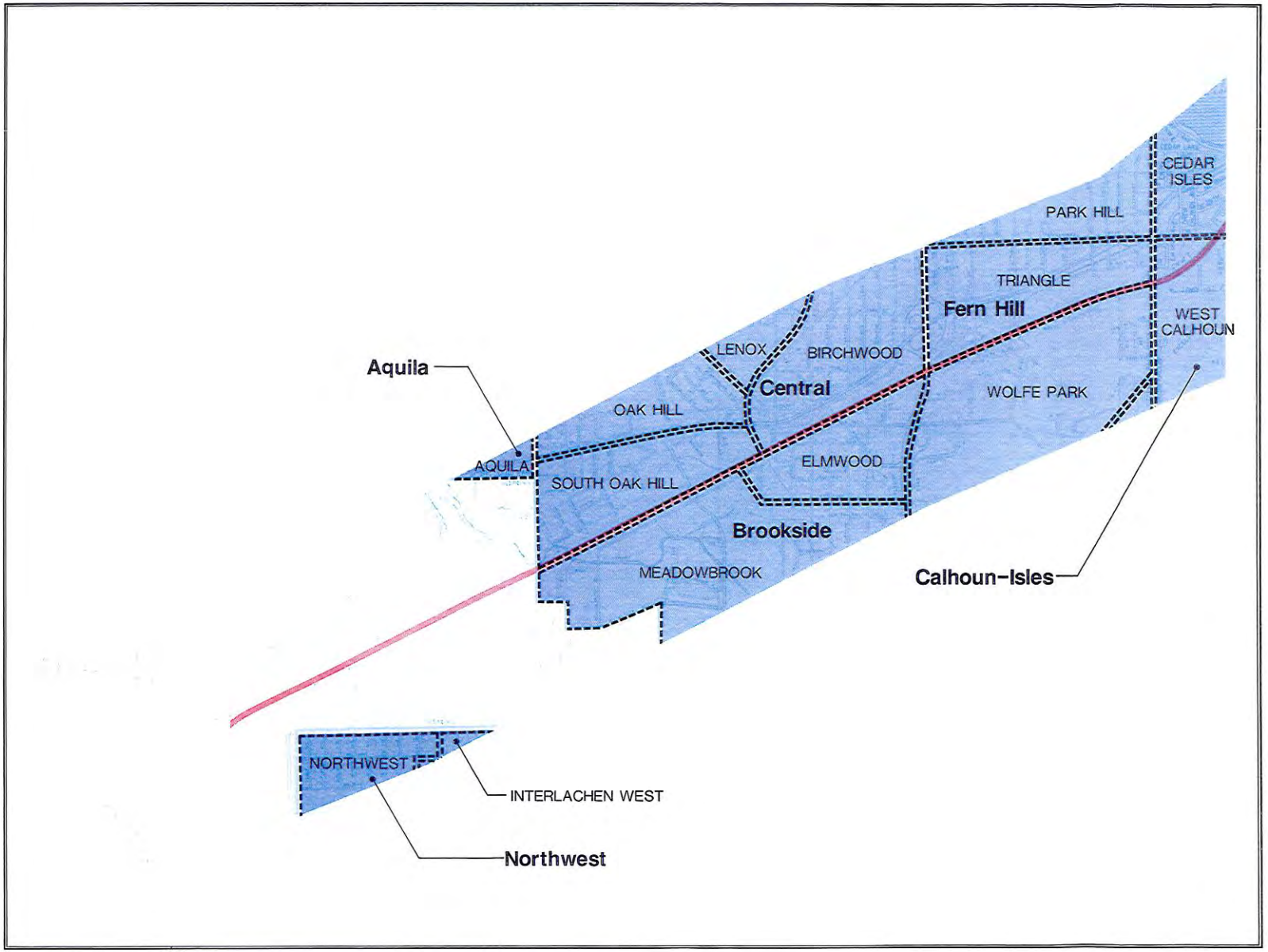
The Fernhill, Brookside, Central and Aquila Planning Districts are included in the St. Louis Park portion of the corridor. Ten neighborhoods are included within the planning districts.

The existing railroad right-of-way serves as a border between the northern and southern planning areas. The major land use within the planning areas is residential, with higher intensity land uses located adjacent to the high capacity roadways.

City of Minneapolis:

The portion of the study area within the City of Minneapolis includes the Calhoun-Isles Neighborhood Planning District. Cedar-Isles-Dean, and West Calhoun Neighborhoods are included in this planning district.

The Calhoun-Isles Neighborhood Planning District is predominantly residential in character, and West Lake Street and Excelsior Boulevards (north and south of the actual rail alignment, respectively) are the two major traffic arteries in the area.



Planning Districts and Neighborhood Boundaries

Figure 4.18

Legend

- LRT Alignment
- Planning Districts
- Neighborhoods

Note: Unlabeled map areas do not have defined Planning Districts and/or Neighborhoods

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4.5.3 Community Facilities and Services

The locations of community facilities and services within the Southwest Corridor study area are presented on Figure 4.19.

No community facilities are located within the Minneapolis portion of the corridor.

Police and Fire Protection:

Hopkins: The Hopkins police and fire station are both located within the municipal building at 11th Avenue North and 2nd Street South. Principal access to and from these facilities is provided by Excelsior Boulevard and 5th Avenue North. Several north-south streets (in addition to 5th Avenue North) could also accommodate police and fire emergency operations.

St. Louis Park: The police station is located within the City Hall building at Raleigh Avenue/Minnetonka Boulevard. Streets providing access to and from the police station and the Planning Areas identified earlier will not be impacted by the proposed project.

The St. Louis Park fire station that falls within the study area is located at Wooddale/Goodrich Avenues. This facility serves the Brookside Neighborhood Planning Area, which is south of the proposed alignment. Another fire station serves the areas north of the proposed alignment.

In the event the Wooddale/Goodrich Avenue fire station is required to support the northern station, access across the alignment can be gained via Highway 100, Brunswick Avenue or Wooddale Avenue. Highway 100 is bridged over by the proposed alignment, and Brunswick Avenue and Wooddale Avenue cross the proposed alignment at-grade.

Post Office: Two post offices are located in the corridor.

City Offices: The Saint Louis Park City Hall is located within the corridor study area.

Library: One library, in Hopkins, is located within the corridor study area.

Community Centers: Four community centers are located within the corridor; two in Hopkins and two in Saint Louis Park.

Religious Facilities: Eight religious institutions are located within the corridor; two in Hopkins and six in Saint Louis Park.

Hospitals: Methodist Hospital is located in the Saint Louis Park portion of the corridor.

Educational Facilities: Six educational facilities are located within the corridor, two in Hopkins and four in Saint Louis Park.

4.5.4 Land Use and Zoning

Land Use (Figure 4.20)

Hopkins:

In Hopkins, a mix of single- and multiple-family residential and commercial uses are located west of Highway 169. To the east, industrial uses begin to dominate adjacent land use with residential uses set back. Major developments include the Knollwood Mall/Blake Road area, downtown Hopkins and Honeywell.

Saint Louis Park:

In Saint Louis Park, industry dominates land use along the route, particularly in the Oxford Street and Park Glen Road areas. The exception to this is in the western portion of the city where single-family residences border, and Minnehaha Creek passes beneath the proposed line. The area set back from the track is a broad mixture of single- and multiple-family residential and commercial uses.

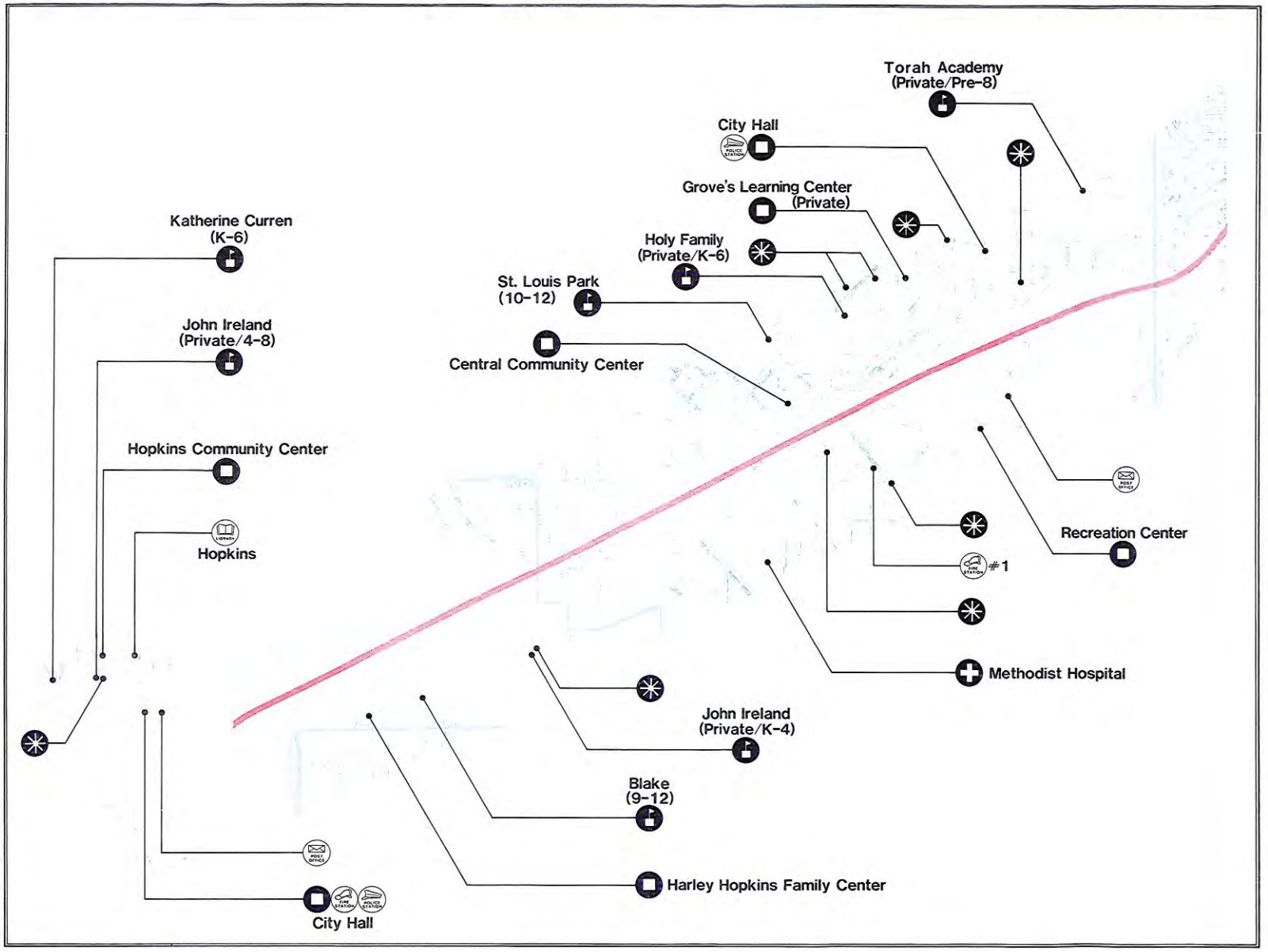
Zoning (Figure 4.21)

The existing zoning within the corridor is generally consistent with the prevailing land use patterns. However, as revealed by the zoning and land use figures, two areas have conflicting uses. On Powell Road, north of Excelsior Boulevard a residential district contains industrial development. Also, in downtown Hopkins, an intermixing of commercial and residential uses occurs on a small scale.

4.5.5 Traffic

Trunk Highway (TH) 7 and Excelsior Boulevard are the major east/west roadways in the Southwest Corridor Study area.

Table 4.21 outlines the 1986 average daily traffic volumes on several segments of TH 7 and Excelsior Boulevard.



Community and Educational Facilities

Figure 4.19

Legend

- LRT Alignment
- Hospital
- School
- Church
- Public :
  - Library
  - Post Office
  - Police Station
  - Fire Station

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Land Use

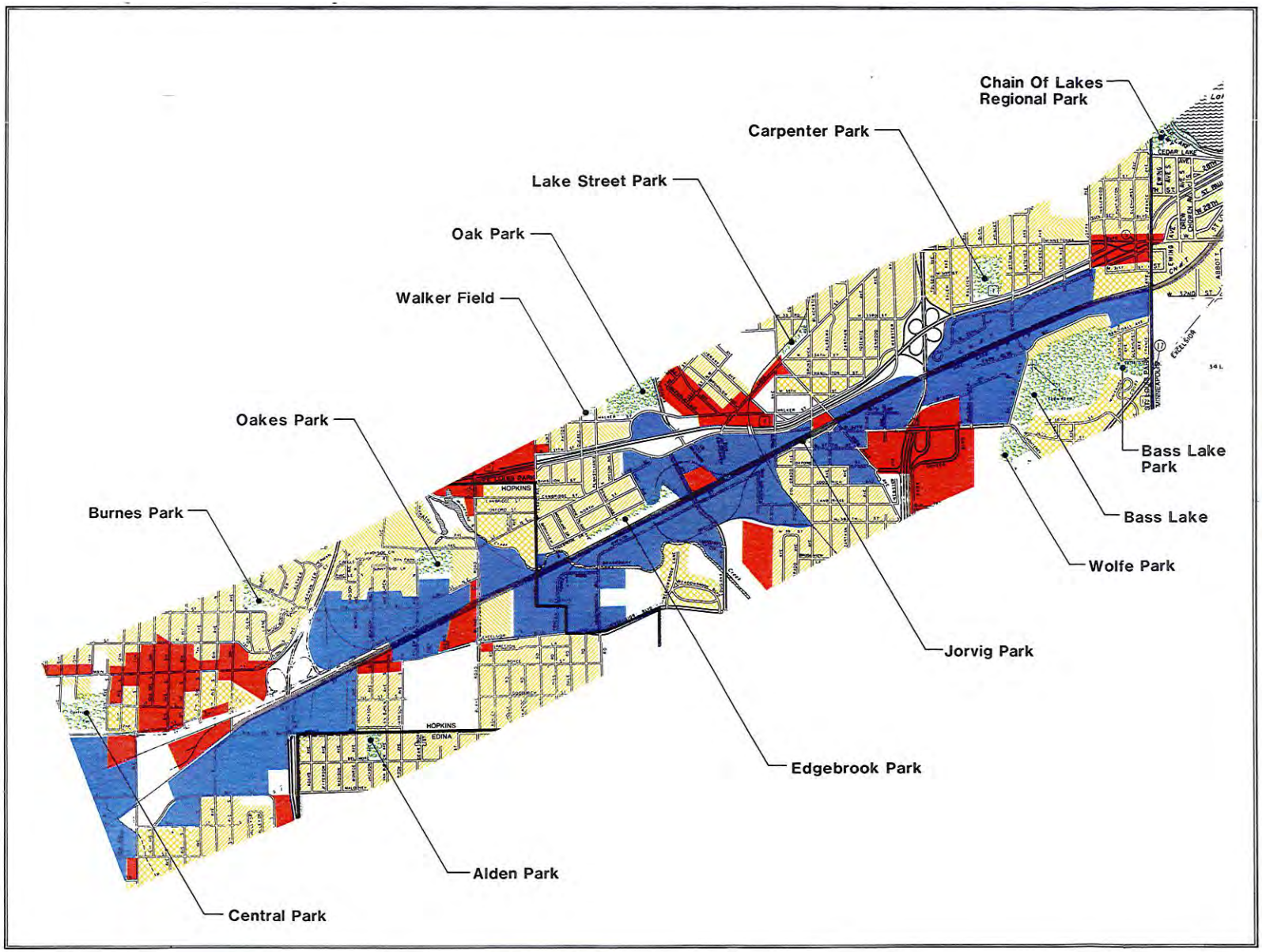

Figure 4.20

Southwest Corridor

Legend

- LRT Alignment
- Multiple Residential
- Single Residential
- Multiple-Single Mix
- Industrial
- Commercial
- Parks
- Other: open, institutional, public/semi-public

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Corridor Zoning

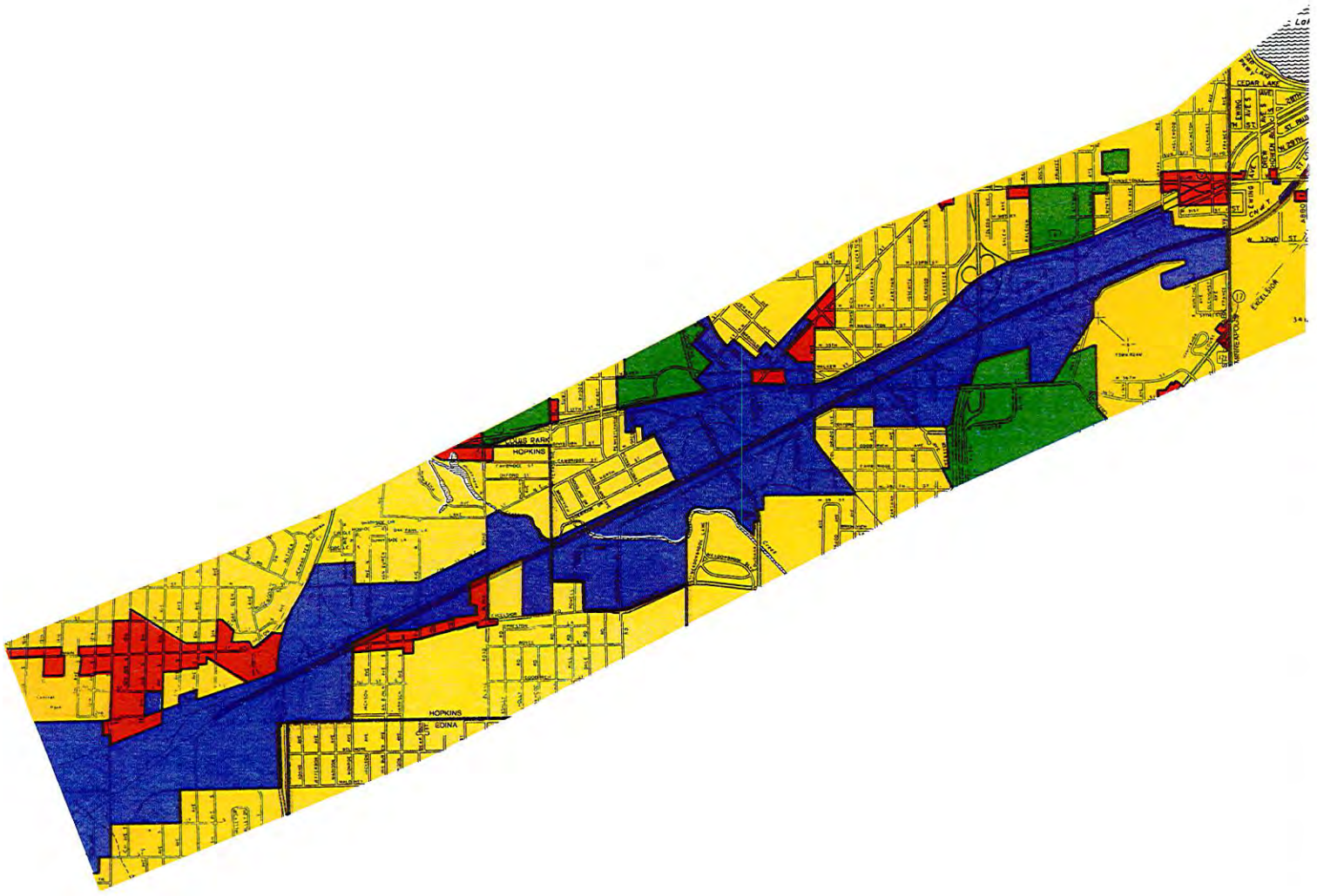

Figure 4.21

Southwest Corridor

0' 1,000' 2,000' North

Legend

- LRT Alignment
- Residential
- Commercial
- Industrial
- Other :
  (open, institutional, public/semi-public, planned development)

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TABLE 4.21
AVERAGE DAILY TRAFFIC VOLUMES

Segment		Roadway	
		Trunk Highway 7	Excelsior Boulevard
From	To		
Minnetonka Boulevard	TH 100	22,500	17,100-22,600
TH 100	Blake Road	32,000-32,500	25,400-20,500
Blake Road	TH 169	31,700-36,500	19,900-26,500

4.5.6 Transit Service

Southwest Corridor transit service focuses upon downtown Minneapolis (Figure 4.4). Seven local routes and one express route radiate from downtown into the corridor. A single crosstown route provides service to both Ridgedale and Southdale. Knollwood Plaza currently serves as a minor transit hub in Saint Louis Park. Table 4.22 summarizes the characteristics of each route.

TABLE 4.22
SOUTHWEST CORRIDOR TRANSIT SERVICE (1988)

ROUTE	TYPE	OPERATOR	DAILY MILES	DAILY PASSENGERS
6B	Local	MTC	139.3	460
9	Local	MTC	88.3	270
10	Local	MTC	546.0	1,800[1/]
12	Local	MTC	1,656.6	3,750
17	Local	MTC	856.7	4,000
18	Local	MTC	2,496.0	9,900[1/]
35B	Express	MTC	26.8	55
36	Crosstown	MTC	395.4	205
67	Local	MTC	813.2	1,020
TOTAL			7,018.3	21,460

1/ MTC routes 10 and 18 are included in the Nicollet at-grade (Option A) and tunnel option study area.

2/ Daily bus miles includes non-revenue miles.

As indicated in the Regional Transit Board's 1987 Transit Service Needs Assessment, the Cities of Edina, Hopkins and Saint Louis Park are provided with good local and express route service. However, east of France Avenue, buses experience delays during peak hours because of traffic congestion.

4.5.7 Noise

The dominant noise sources in this corridor are traffic-generated noise on the major roadways and noise from commerical and industrial uses located adjacent to portions of the corridor. Existing train travel (at low frequencies) also contributes to the existing noise environment.

In the area west of Monroe Avenue in Hopkins, the dominant noise sources are U.S. Highway 169 and CSAH 3.

In the area east of Monroe Avenue to approximately Dakota Avenue in St. Louis Park, the corridor is located away from major roadways.

In this area the major noise sources are vehicles traveling on local roadways and other urban noise sources. East of Dakota Avenue, the dominant noise source is roadway noise from TH 100 and TH 7.

Monitored noise levels at representative receivers throughout the corridor are documented in Table 4.23. Existing noise levels at each of the monitoring sites did not exceed the State Daytime Noise Standards. The location of the monitoring sites within the corridor are displayed in Figure 4.22.

4.5.8 Vibration

Within the Southwest Corridor there are existing sources of vibration. Specifically, freight trains which operate on the rail right-of-way cause ground-borne vibration at adjacent receivers during passby.

Vibration sensitive uses within the Southwest Corridor consist of single- and multi-family residential units located adjacent to the line. No non-residential vibration-sensitive receiver sites were monitored because of their setback from the LRT line.

TABLE 4.23
MONITORED NOISE LEVELS

Southwest Corridor

MONITORING SITE	LOCATION	DATE	MONITORING PERIOD	MONITORED LEVEL (dBA) L10	L50	COMMENTS
SW1	S. of TH 7 & E. of Natchez Ave	5/23/89	4:15PM-5:15PM	53	49	Flyovers
SW2	N. of 37th St & E. of Colorado Ave	3/28/89	3:00PM-4:00PM	57	53	Industrial use noise is major noise source. TH 7 is secondary source
SW3	S. of Edgebrook St & E. of Pennsylvania Ave	6/01/89	3:30PM-4:30PM	56	50	Local roadway traffic is greatest noise source
SW4	N. of TH 7 & W. of 7th Ave N	5/2/89	3:30PM-4:30PM	63	58	Excelsior Boulevard traffic is greatest noise source

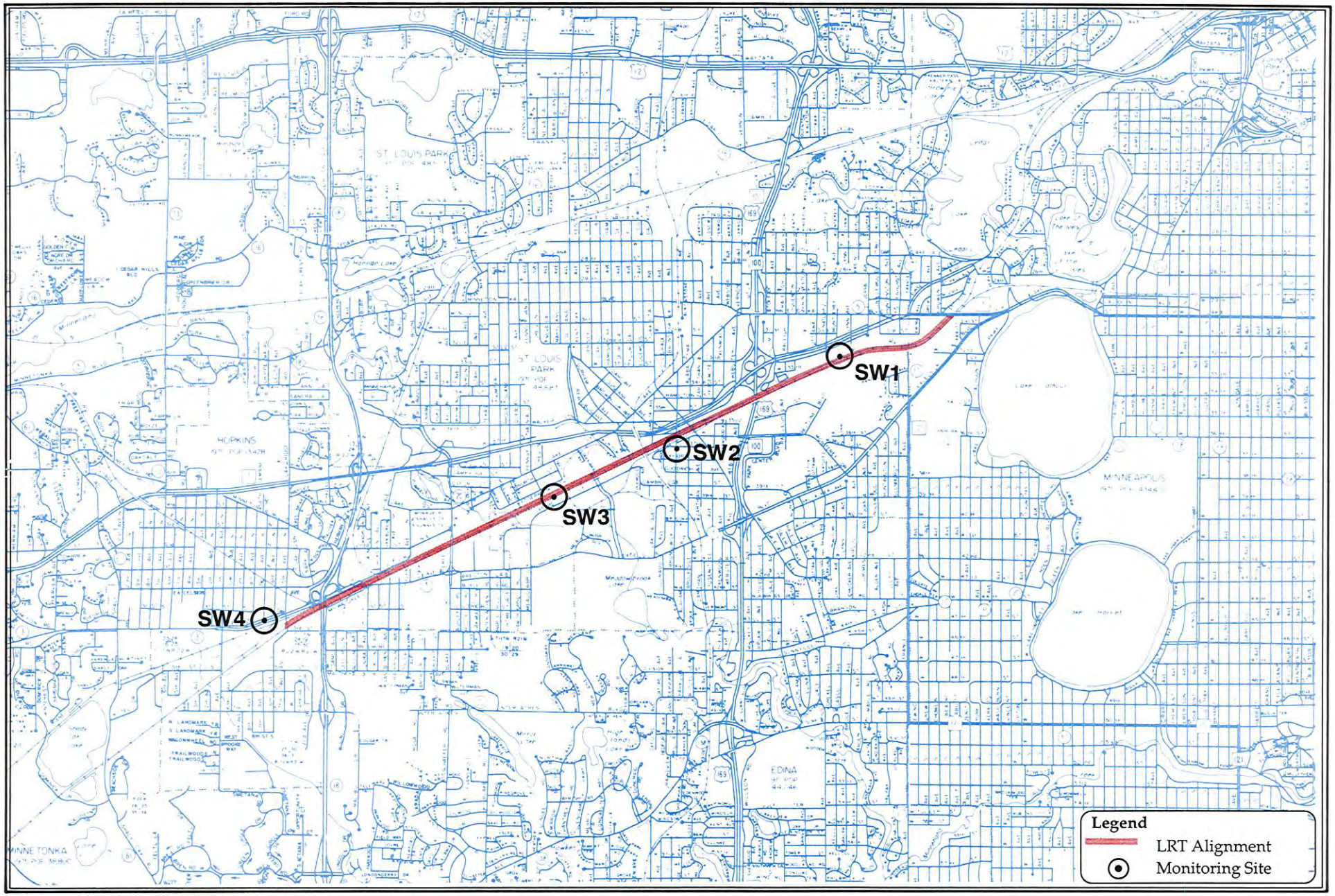

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Figure 4.22
Southwest Corridor

BRW
0' 2,000' North

Noise Monitoring and Vibration Sensitive Use Locations

4.5.9 Wetlands, Vegetation and Wildlife

The field surveys for this corridor covered an area of approximately 50 feet on both sides of the centerline of the existing railroad. Areas in the Southwest Corridor which include wetlands and wetland prairie indicator species are outlined in Figure 4.23, and quantified in Table 4.24.

TABLE 4.24
SOUTHWEST CORRIDOR WETLAND AND PRAIRIE INVENTORY

Area	Prairie Total Area (feet) North	Prairie Total Area (feet) South	Wetland Total Area (acres) North	Wetland Total Area (acres) South
A	600 x 20	600 x 5	--	--
B	600 x 20	600 x 5	--	--
C	200 x 10	200 x 5	--	--
D	--	--	6.5	0.03
E	1,800 x 25	1,800 x 5	--	--
F	--	--	--	--
G	700 x 5	700 x 5	--	--
H	300 x 3	300 x 2	--	--

Big Bluestem was patchy throughout the corridor but was found in highest concentration in areas A, B, C, E, G and H shown in Figure 4.23. The preliminary vegetation survey in March identified these areas as potential prairies because of the presence of Big Bluestem. A second survey of these areas was conducted in July to identify any additional prairie species present. Only a few native prairie plants were found; including prairie clover, cone-flowers, asters and goldenrods. Other forbs included common wayside species, such as bouncing bet, leafy spurge, birdfoot trefoil, and poison ivy. In many areas woody vegetation (e.g., sumas, oak and elm seedling and various shrubs) was also found along the railroad grade.

These areas contain some native prairie vegetation; however, the quantity of prairie is small and the quality of the prairie is low because of a lack of species diversity. Many of the native prairie species have been lost because of disturbance and invasion of non-native and wood vegetation.

The wildlife in this corridor are typical backyard species and those species that are more tolerant to urban disturbances, as described in Section 4.3.10.

Stations:

Because the proposed station sites (including park-and-ride lots) could potentially cover an area outside the existing railroad right-of-way, an inventory of each of the sites was conducted and briefly described below.

The Hopkins, Tyler Avenue/Blake Road, Louisiana Avenue, and Wooddale Avenue stations all currently have several buildings located on the existing property. Each site has been landscaped, to some degree, and contains no wetland or prairie vegetation. The Beltline Station has been landscaped and contains no wetland or prairie vegetation.

4.5.10 Water Resources

The Southwest Corridor occurs within the Minnehaha Creek Watershed District. Minnehaha Creek is located in the Western portion of the study area and is classified by the State as a 2B, 3B, 4A, 4B, 5 and 6 class water.

Figure 4.24 identifies the affected floodplain boundaries and bodies of water in the Southwest Corridor.

Shoreland Zoning

There are no Shoreland Zoning Districts in the Southwest Corridor Study Area.

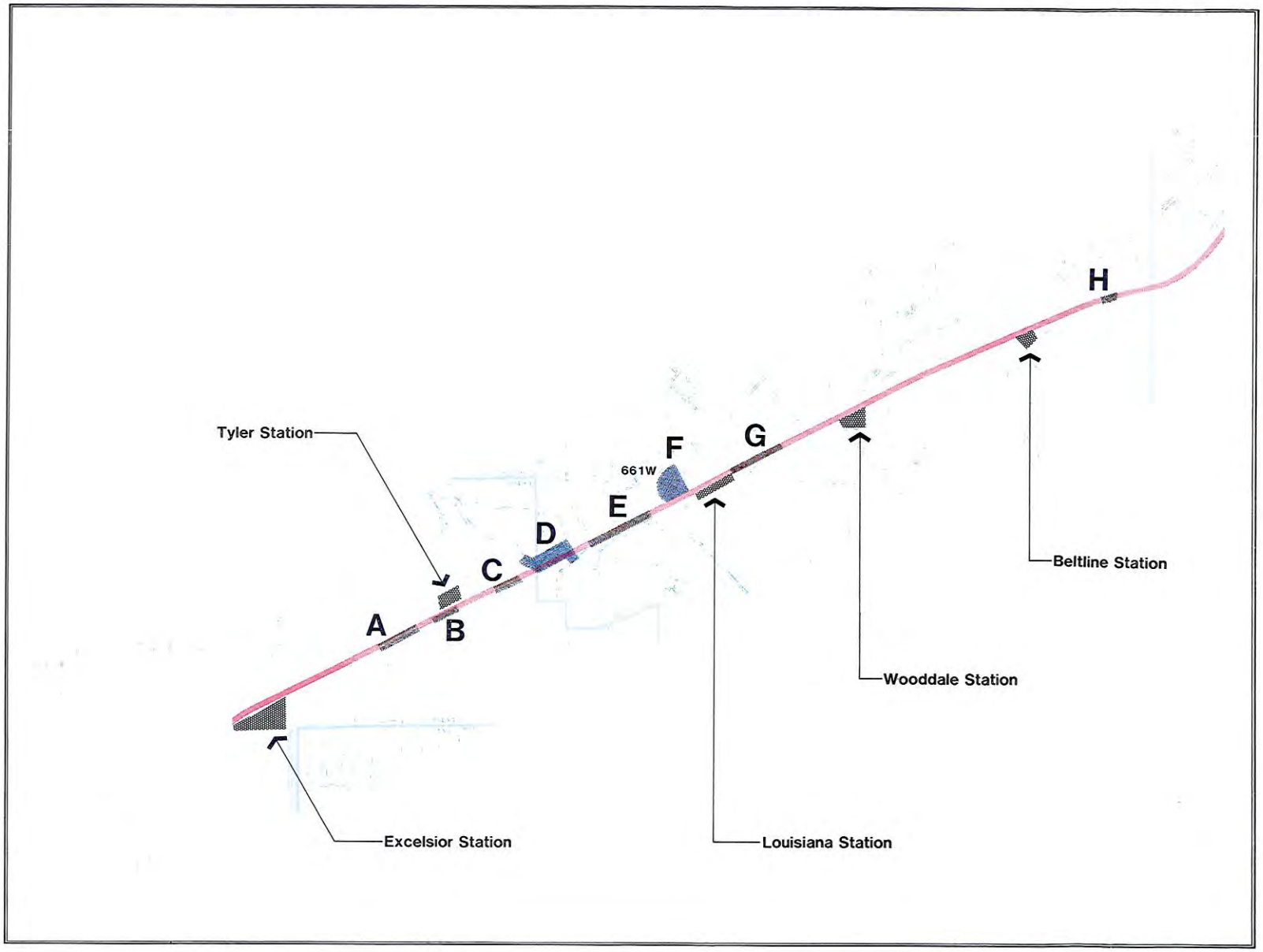
4.5.11 Soil Conditions

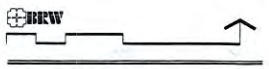
Contaminated Soil Sites

Figure 4.25 identifies the sites in the Southwest Corridor which are included in the Minnesota Pollution Control Agency (MPCA) files that indicate there has been a release or threatened release of a hazardous substance, pollutant, or contaminant. The sites are labeled according to the appropriate list on which they are included (List 1-8 defined in Table 4.12). The MPCA letter in Chapter 8.3 lists the corresponding address for each site. Also included in the figure are four sites where leaking underground storage tanks have been reported (addresses are listed in Appendix). Included in the Underground Storage Tank Information Data Base, but not illustrated in the figure because of incomplete location information, is the list of hazardous substance and/or petroleum product spills. A complete listing of sites can be found in the Appendix. As noted in Table 4.12, this particular list is not broken

Wetland and Prairie Vegetation

Figure 4.23





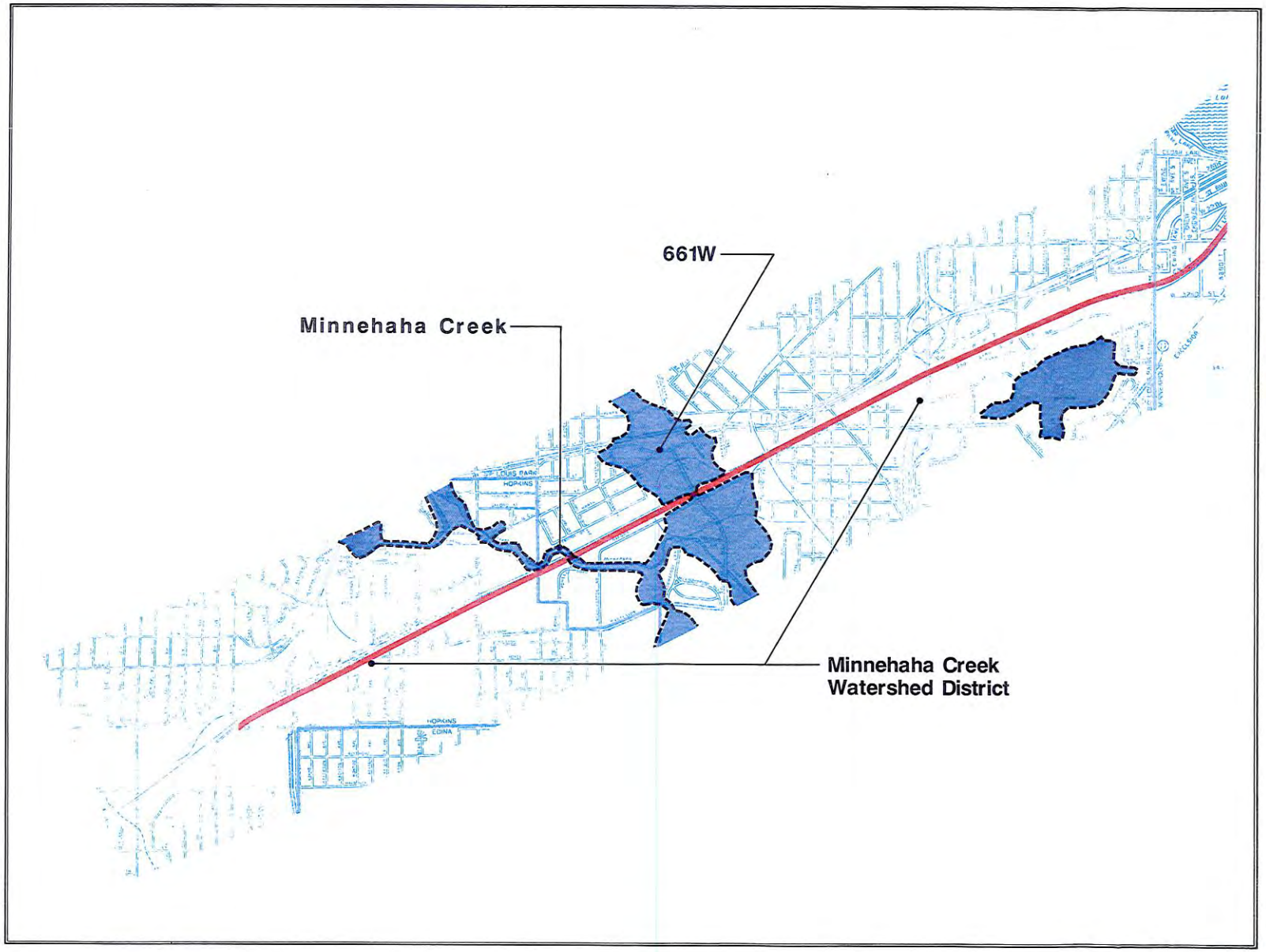
Legend

- LRT Alignment
- Station Sites
- Wetlands
  Indicator Species:
  Cattails, Reed Canary Grass,Giant Reed Grass, and Pinkweed
- Prairie
  Indicator Species:
  Big Bluestem, Little Bluestem and Indian Grass
- 747W DNR Wetland ID Number

HCRRA

LRT System

Environmental Impact Statement



Floodplains and Watershed Districts

Figure 4.24

Southwest Corridor

Legend

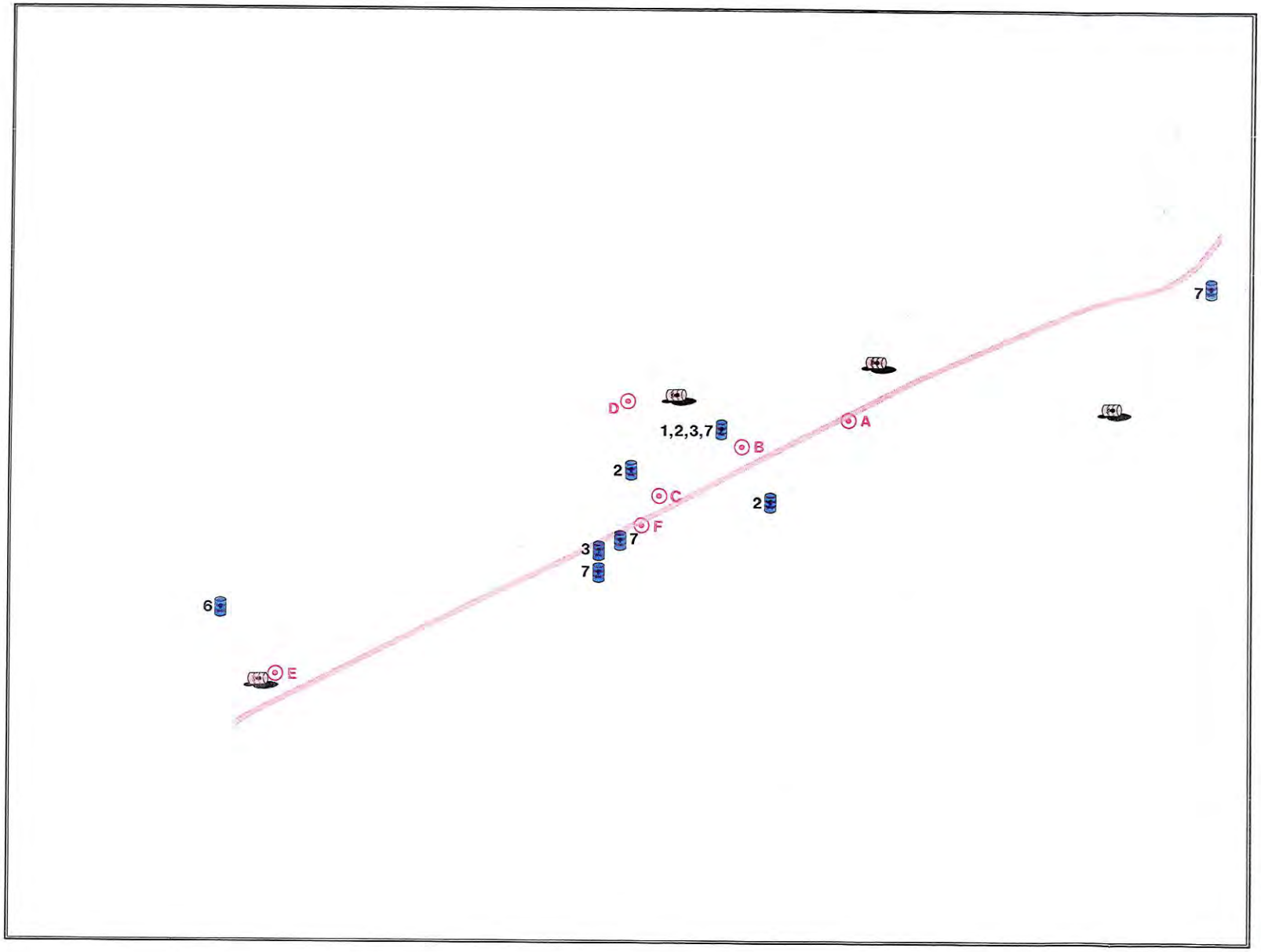
Floodplain

661W DNR Protected Wetlands

HCRRA

LRT System

Environmental Impact Statement



Locations of Possible Soil Contamination

Figure 4.25

Legend

- LRT Alignment
- **Contaminated Sites Identified in Soil Boring Logs**
- **Minnesota Pollution Control Agency:**
- Reported Leak Sites
- Listed Sites

1. National Priorities List (NPL)
2. Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS)
3. Permanent List of Priorities (PLP)
4. Regulatory Compliance, Hazardous Waste Enforcement Log
5. List of Permitted Solid Waste Facilities
6. Hazardous Waste Permit Unit Project Identification List
7. 1980 Metropolitan Area Waste Disposal Site Inventory
8. 1980 Statewide Open Dump Inventory

HCRRA

LRT System

Environmental Impact Statement

down by zip code, but rather by city. The spill sites identified included 11 in Hopkins and 41 in Saint Louis Park.

In addition to the data obtained from the MPCA, available soil boring logs pertaining to the Southwest Corridor area were reviewed. Table 4.25 outlines potential soil contaminated sites obtained from the logs and identified in Figure 4.25.

TABLE 4.25
SOIL CONTAMINATION SITES (SOURCE: SOIL BORING RECORDS)

REFERENCE ON MAP	LOCATION	CONTAMINATION
A	3630 Wooddale Avenue	Fuel oil at 10'-37'
B	C & NW; Chicago, Milwaukee, St. Paul & Pacific and Southern Railroad intersections near W. 36th St. and Colorado Ave.	Faint chemical odor at 53'
C	Area adjacent to (B), to the southwest	Chemcial odor in soil
D	Northwest of (B) & (C)	Creosote
E	Washington Ave. & Excelsior Boulevard, SW corner of intersection	Petroleum odors in soil
F	Adjacent to railroad across from Edgebrook Drive & Pennsylvania Avenue on north side of tracks	Petroleum odors in soil

4.5.12 Steep Slopes

There are no steep slopes in the Southwest Corridor.

4.5.13 Parklands

The two parks which are adjacent or close to the proposed Southwest LRT track are identified in Figure 4.20 (Land Use) and briefly described below.

- Edgebrook Park (Saint Louis Park):

  This park is primarily an open recreation area with a volleyball court and children's play equipment.

- Jorvig Park (Saint Louis Park):

  This is a small neighborhood park containing picnic tables and grills, horseshoe courts and a historic train depot.

4.5.14 Visual and Aesthetics

The photographs in Figure 4.26 illustrate the visual and aesthetic environment of the Southwest Corridor Area.

- Terminus Station, West of County Road 18 to Blake Road:

  At the terminating point the width of the rail corridor is 100-150 feet. The adjacent land use is a mixture of retail-commercial-industrial and manufacturing. The urban scale is one to four stories with random setback, creating a sense of openness. At Excelsior Boulevard the building setback is reduced, and views are of the rear of the building structures. The visual image is very mixed and includes typical roadway signage, overhead wires along the right-of-way, surface parking, and open storage lots.

- Blake Road to Highway 100:

  This segment is primarily a commercial-industrial area with some adjacent residential housing. The scale is one- and two-story structures with setbacks of 150 feet or more. East of the railroad crossing the building setbacks diminish and the character becomes more of an older business-commercial area, centered at Wooddale Avenue. Visually the area is basically industrial with overhead wires along the right-of-way, open storage, parking lots, and rear views of the area businesses.

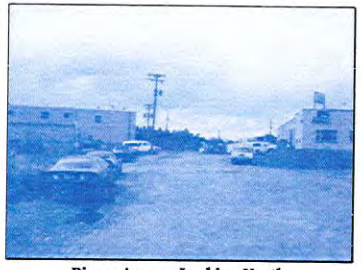
- Highway 100 to East Saint Louis Park City Limits:

  At the point the LRT track passes over TH 100, the open area view extends for approximately 1,200 feet. East of TH 100 there is a redeveloped business park which includes residential-retail-commercial and manufacturing uses. The major adjacent land use, at the East Saint Louis Park City limits, is higher density multi-family residential. Most of the building heights in this segment are one to four stories. The visual image is still one of a commercial-industrial zone, with overhead wires along the right-of-way, with rear views of the adjacent buildings.

Photo/Visual Aesthetics

5th Avenue Looking East Toward
TH 169

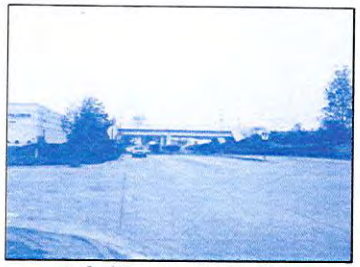
Looking West at Excelsior Boulevard
Railroad Crossing



Pierce Avenue Looking North
Toward Elevated Railroad Tracks

Looking South Across Blake Road
Crossing

Oxford Street Industrial Area
Looking Northeast



Oxford Street Looking North at
Louisiana Avenue Railroad Bridge

Wooddale Boulevard Looking North
Toward TH 7

TH 100 Looking South Toward
Railroad Bridge

Looking Northeast Across Belt Line
Boulevard at Commercial-Residential

Joppa Avenue Looking East to
Eastern End of Southwest Corridor

Figure 4.26
Southwest Corridor

BRW

HCRRA LRT System
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