5.0 AFFECTED ENVIRONMENT AND SOCIAL, ECONOMIC, AND ENVIRONMENTAL IMPACTS

5.1 Social Environment

5.1.1 Existing Social Environment

This section updates information presented in the DEIS Section 5.1.1 regarding population, housing, community facilities and services, non-vehicular mobility, and neighborhood and community character and cohesion.

5.1.1.1 Population

Figure 5-1 in the DEIS provided the Census tracts along the study corridor. The following information compares DEIS population figures (1990 U.S. Census Bureau) with 2000 Census data and population projections from the *2030 Regional Development Forecast for Southeast Michigan* (SEMCOG, 2001) for the project area. The 2000 Census tracts have nearly identical boundaries to those used in the DEIS (FEIS Figure 5-1). The DEIS Census tracts are illustrated in the DEIS Figure 5-1. The project area year 2000 population is discussed in relation to comparable data for the city of Detroit, Wayne County, Southeast Michigan, and the state of Michigan.

Since 1990, the project area population decreased 21.1 percent, while population in the city of Detroit and Wayne County also decreased, but by lower percentages: 7.5 percent and 2.4 percent, respectively (Table 5-1). During the same time period, population in both the Southeast Michigan region and the state of Michigan increased by 5.3 percent and 6.9 percent, respectively.

Table 5-1: 1990 and 2000 Population

Location	Population		Percent Change
	1990	2000	
Project Area	48,406	38,148	-21.1%
Detroit	1,027,974	951,270	-7.5%
Wayne County	2,111,687	2,061,162	-2.4%
Southeast Michigan	4,590,000	4,833,492	5.3%
State of Michigan	9,295,277	9,938,444	6.9%

Source: 2000 US Census.

Figure 5-1: ICE Year 2000 Census Tract Boundaries

Recent population projections from SEMCOG, shown in Table 5-2, indicate that the population of Southeast Michigan is expected to continue growing through 2025. However, the population of Wayne County and the city of Detroit is expected to decline by 2.5 percent and 8.6 percent, respectively. Population projections are not yet available for the project area. As noted in the DEIS, it is anticipated that the population of the project area would follow the city of Detroit's population trend.

Table 5-2: Current and Projected Population

Location	2000	2010	2020	2025	Change 2000 - 2025
Detroit	951,270	908,983	879,059	869,623	-8.6%
Wayne County	2,061,163	2,032,675	2,013,215	2,009,924	-2.5%
Southeast Michigan	4,833,493	5,036,318	5,221,042	5,314,326	10.0%

Source: SEMCOG, 2001.

Population characteristics from 1990 and 2000 for the project area and Detroit, Wayne County, and Michigan are shown in Table 5-1. Population characteristics for the project area from 1990 are referenced in the discussion below for comparison. This data is found in the DEIS Table 5-3.

Since 1990, the number of households in the project area has decreased from 18,452 to 14,623 (a 21 percent decrease). There also has been a decrease in the number of persons per household from 2.6 to 2.5 and an increase in the percentage of families classified as households from 51-percent to 55 percent. The project area includes approximately 10 percent fewer households classified as families than in the city, county, and state based on the 2000 Census.

Wayne County and the state of Michigan's population has significantly larger percentages of whites than the project area or the city with 52 percent in the county and 80 percent in the state compared to 9 percent in the project area and 12 percent in the city. The project area includes 87 percent African Americans compared to the city with 82 percent. The project area also has the highest overall percentage of minority groups as compared to the city, county, and state. Census data related to characteristics of race for the population within the project area that are relevant to the analysis of Environmental Justice issues are discussed further in Section 1.5.2 of this FEIS.

The following discussion compares the 1990 Census data with the 2000 Census data shown in Table 5-3. Median 1999 household income and per capita income for the project area are notably higher than in 1989 ($20,816 compared to $11,438; $10,864 compared to $6,709, respectively). The percentage of people below poverty level in the project area was slightly lower in 1999 than in 1989 (35 percent compared to 40 percent). The percentages of people 18 to 64 years old with a mobility and/or self-care limitation and unemployed people are notably higher in 2000 than in 1990 (23 percent compared to 9 percent; and, 21 percent compared to 13 percent).

Table 5-3: 1990/2000 Population Characteristics of the Project Area, Detroit, Wayne County and Michigan

Population Characteristic	Project Area	City of Detroit	Wayne County	State of Michigan
Total Persons	48,406 / 38,212	1,027,974 / 951,270	2,111,687 / 2,061,162	9,295,297 / 9,938,444
Median Age	26.5 / 32.7	30.9 / 30.9	32.5 / 34.0	32.3 / 35.5
Males as a Percentage of All Persons	47.1% / 48%	46.4% / 47%	47.3% / 48%	48.5% / 49%
Females as a Percentage of All Persons	52.9% / 52%	53.6% / 53%	52.6% / 52%	51.5% / 51%
Persons 65+ Years as a Percentage of All Persons	13.1% / 14%	12.1% / 10%	12.5% / 12%	11.9% / 12%
Persons under 18 Years as a Percentage of All Persons	28.2% / 28%	29.4% / 31%	27% / 28%	27.9% / 26%
Whites as a Percentage of All Persons	10% / 9%	21.6% / 12%	57.4% / 52%	83.4% / 80%
African Americans as a Percentage of All Persons	87.4% / 87%	75.7% / 82%	40.2% / 42%	13.8% / 14%
American Indian and Alaska natives as a Percentage of All Persons	0.3% / 0.5%	0.3% / 0.3%	0.3% / 0.4%	0.6% / 0.6%
Asian as a Percentage of All Persons	1.9% / 2%	0.8% / 1%	1 % / 2%	1.1% / 2%
Hispanic or Latino as a Percentage of All Persons	0.7% / 1%	2.6% / 5%	2.3% / 4%	2.1% / 3%
Total Households	18,452 / 14,623	373,857 / 336,428	780,493 / 768,000	3,419,331 / 3,785,661
Persons Per Household	2.61 / 2.5	2.71 / 2.8	2.67 / 2.6	2.72 / 2.6
Families as a Percentage of Households	51.1% / 55%	66.2% / 65%	69.5% / 67%	71.3% / 68%

Source: 1990 US Census / 2000 US Census.

Table 5-4 shows that the 1990 and 1999 median income and the 2000 per capita income in the project area are notably lower than in the metropolitan Detroit area, and the state of Michigan. Additionally, there are approximately twice as many people 18 to 64 years old who have mobility and/or self-care limitations in the project area than in the city. There also is a notably higher population of unemployed people in the project area as compared to the city as a whole and the state of Michigan.

Table 5-4: 1990/2000 Income and Disability in the Project Area

Population Characteristic	Project Area	City of Detroit	Wayne County	State of Michigan
Median 1989 / 1999 Household Income	$11,438 / $20,816	$18,742 / $29,526	$27,997 / $40,776	$31,020 / $44,667
Per Capita Income	$6,709 / $10,864	$9,443 / $14,717	$13,016 / $20,058	$14,154 / $22,168
Persons Below Poverty Level in 1989 / 1999	40.4% / 35%	32.4% / 26%	20.1% / 16%	13.1% / 11%
Persons 18 to 64 Years Old with a Mobility and/or Self-Care Limitation	8.9% / 23%	13.8% / 11%	11% / 13%	5.6% / 8%
Unemployed Persons 16 Years and Older in Labor Force	13% / 21%	19.7% / 14%	12.4% / 9%	8.2% / 6%

Source: 1990 US Census / 2000 US Census.

5.1.1.2 Housing

There are residential neighborhoods located throughout the project area comprised of single-family and/or two-family structures. There also are a number of multi-family complexes in the project area. Throughout the project area, homes are typically on small lots, on a grid street pattern. There are many brick as well as some stone and wooden homes. Most of the homes appear well-built though some are in disrepair and vacant. The median year of construction for homes in the project area is 1944, the oldest of the political units is noted in Table 5-6. As indicated in Table 5.5, the number of households in 2000 has decreased since 1990. This decrease was largest in the project area, 26.3 percent, and in the city of Detroit, 17.9 percent.

Table 5-6 shows selected housing characteristics. The project area has the lowest percentage of owner-occupied homes, median home value, median monthly rent, and percentage of detached housing units. The project area also has the highest homeowner vacancy rate and the oldest homes overall. These are the same trends that were evident based on the 1990 Census data.

5.1.1.3 Community Facilities and Services

For a detailed discussion of community facilities and services, refer to Section 5.1.1.3 of the DEIS. The locations of churches, fire stations, police stations, libraries, hospitals, and neighborhood city hall offices are illustrated in Figure 5-2A, B, and C in the DEIS. Any changes to this information are noted in the following section.

Table 5-5: Number of Households (1990 and 2000)

Location	1990	2000	Change
Project Area	19,853	14,637	-26.3%
Detroit	410,027	336,428	-17.9%
Wayne County	780,535	768,440	-.01%
Michigan	3,847,926	3,785,661	-.02%

Source: 2000 US Census.

Table 5-6: Housing Characteristics for the Project Area, City of Detroit, Wayne County, and Michigan, 2000

Housing Characteristics	Project Area	City of Detroit	Wayne County	State of Michigan
Persons in Group Quarters	1,146	19,701	32,419	249,981
Percent of Owner-Occupied Units	38%	54.9%	66.6%	73.8%
Median Value of Owner-Occupied Units	$28,400	$62,800	$96,200	$115,600
Median Monthly Rent	$321	$486	$530	$546
Percent of Detached Units	36.7%	63.2%	67.8%	70.6%
Percent of Homeowner Vacancy Rate	6.0%	1.6%	1.9 %	1.8%
Percent Rental Vacancy Rate	8.0%	8.3%	8.2%	7.5%
Median Year That Houses Were Built	1944	1948	1954	1965

Source: 2000 US Census.

Medical Facilities. The locations of hospitals are illustrated in Figure 5-2A, B, and C of the DEIS. The facilities include the Detroit Medical Center, Samaritan Health Center, and Henry Ford Hospital. There have been no changes in the locations of hospitals since publication of the DEIS.

Police and Fire. The locations of police and fire stations are illustrated in Figure 5-2A, B, and C of the DEIS. There have been no changes in the locations of police and fire stations since publication of the DEIS.

Libraries. Since publication of the DEIS, the Mark Twain Library, located at Gratiot Avenue and Burns Road, closed. The Mark Twain Annex has since opened to provide a library in the

same area until the other branch on Gratiot Avenues is able to reopen. The annex is located on Iroquois Street just north of Forest Avenue in the Mount Calvary Missionary Baptist Church.

Schools. There are 14 high school/adult education/vocational schools, 24 elementary schools, and 8 middle schools within one mile of I-94 in the project area. Several schools have closed or have changed locations since publication of the DEIS. Figure 5-3A, B, and C from the DEIS have been updated to show the new school locations in Figure 5-3A, B, and C. It was stated in the DEIS that the Catherine C. Blackwell Institute of International Studies, Commerce, and Technology would be impacted; however, the Recommended Alternative will not impact this school.

The higher education facilities located along I-94 include Wayne State University (WSU), which provides four-year undergraduate degrees, graduate degrees, and law and medical degrees, and Wayne County Community College, which is a two-year college offering associate's degrees. The locations of higher education facilities have not changed since publication of the DEIS.

Churches. A variety of churches are located along the I-94 corridor. Since the DEIS, several churches have closed and new churches have opened. The locations of these churches have been updated and are shown in Figure 5-2A, B, and C.

Community Groups. There are many community-based groups in the project area, including citizen district councils, business associations, neighborhood associations, church groups, and other organizations such as Warren/Connor Development Coalition.

5.1.1.4 Non-Motorized (Pedestrian and Bicycle) Mobility

For pedestrian use, there is no sidewalk inventory currently available for the City. A pedestrian survey was conducted in 1995. The survey determined that 24 percent of the population in the project area does not own a vehicle. Refer to Section 5.1.1.4 of the DEIS for a more detailed discussion of survey results. Since land use along the corridor follows the same general pattern as in 1995, it is likely that non-motorized mobility movement and habits have not materially changed.

Data for vehicle ownership from the U.S. Census Bureau is measured per occupied housing unit. According to the 2000 Census, 34 percent of occupied housing units in the study area do not own vehicles. This has changed since the 1990 Census, which showed that 52 percent of the occupied housing units did not own vehicles. Thus, safe mobility of the elderly and other pedestrians is important to get to the bus or walking to their destinations.

Figure 5-4 provides an updated map illustrating SMART transit routes traversing the project area (previously Appendix D of the DEIS). Figure 5-5 updates Detroit Department of Transportation bus stops from Appendix D of the DEIS. Several pedestrian and bicycle initiatives are underway in the greater Detroit metropolitan area. SEMCOG has prepared an overall inventory of shared-use paths for Wayne County and the city of Detroit (2002). A concept plan also has been prepared, focused on pedestrian and bicycle greenways throughout the region (Greenway Collaborative, 1999). To implement this vision, the Community Foundation for Southeast Michigan has targeted $25 million toward the construction and preservation of various walking/cycling paths, including the Dequindre Cut greenway that crosses the I-94 corridor at

the Dequindre Bridge, just east of I-75. The first phase of this project is underway with nearly 1.6 miles of trails planned for use by 2006.

5.1.1.5 Neighborhood/Community Character and Cohesion

Impacts associated with the original construction of I-94 are frequently described as one of the causes of significant displacement in Detroit's urban core. With major urban renewal projects occurring at the same time in the 1950s, the impacts divided communities and contributed to people moving out of the city of Detroit. The effects of this did not only change Detroit's landscape, it also adversely affected the quality of life for the people who either decided to stay in Detroit or could not afford to move. Additionally, the neighborhoods that were once bounded by city streets and sidewalks were disconnected; this adversely affected neighborhood cohesion. Not only were people impacted, but so were community facilities as well as businesses that employed people from the local neighborhoods. Detroit's population declined during this period, and the population relocated either to other parts of the urban core or to suburbs where a new pool of jobs and homes was developing. The city of Detroit is still adversely impacted by residential/business vacancies that used to generate tax revenues for the city of Detroit.

Residential and commercial development is occurring in various neighborhoods in the project area, particularly in the New Center and Woodward corridors. The Midtown Area (between I-75 to the south and east, I-94 to the north, and M-10 to the west) is seeing resurgence in development and rehabilitation of existing buildings for residential, commercial, and office uses. Although population is increasing in some sections of the City, there are locations—particularly in the project area—where there are opportunities for development to occur and population growth.

'Cluster Planning' is a process adopted by the city of Detroit. There are ten clusters within the city of Detroit limits and the boundaries address neighborhood needs to coordinate and plan within Detroit. Through Cluster Planning, the city of Detroit addresses the specific needs of each neighborhood as well as implements solutions that cross neighborhood boundaries. In effect, this type of integration helps to prevent gaps in development and promote a sense of cohesion through collaboration amongst the neighborhoods. The project study area encompasses Clusters 1-6, as shown in Figure 5-6.

According to the 2000 Census, the I-94 Rehabilitation Project area is predominantly inhabited by low-income and minority persons. Approximately 90-percent of the population in the study area reside in Clusters 1, 3, and 4. Clusters 3, 4, and 6 include the majority of the land area in the project area. A brief description of all of the Clusters located in the project study area is provided below and in the *I-94 Rehabilitation Study, Technical Memorandum: Technical Social, Economic and Environmental Studies, Indirect and Cumulative Effects Analysis*, June 10, 2004. Figure 5-6 (Neighborhood Cluster Areas and Study Area of Affect) shows the Cluster boundaries in comparison to the general project study area boundaries, and census tract distinctions.

Figure 5-2A: Locations of Community Facilities and Services

Figure 5-2B: Locations of Community Facilities and Services

Figure 5-2C: Locations of Community Facilities and Services

Figure 5-3A: Location of Schools

Figure 5-3B: Location of Schools

Figure 5-3C: Location of Schools

Figure 5-4: Suburban Mobility Authority for Regional Transportation Service Map

Figure 5-5: Detroit Department of Transportation Service Map

Figure 5-6: Study Area of Affect

Cluster 1 (98,436 Population; 2000 Census)

Cluster 1 is generally bounded by Eight Mile to the north; the Ford Freeway (I-94) and the Highland Park and Hamtramck city limits to the south; the Canadian National Railroad and Conner Avenue to the east; and Woodward Avenue to the west. The cluster consists of six neighborhood areas. There is a range of mixed land use including residential, commercial, and industrial. There were 35,903 occupied housing units (89-percent of the total housing units) reported in the 2000 census. Approximately, 11-percent of the housing units are vacant. Homeownership (60%) is slightly over renter occupied housing units (40%). The average value of the homes is $20,000. Slightly over four-percent of the homes in this cluster are in the $100,000 to $199,999 range.

Cluster 1 has a significant Environmental Justice population. Cluster 1 is more than 89-percent Non-White. More than 33-percent of the population in Cluster 1 is younger than 18 years of age, while the 65 and older population is approximately 20-percent of the population and have incomes below poverty. The average median household income in 1999 was $26,869. Approximately 17-percent of the population in Cluster 1 is without an automobile.

Cluster 2 (116,751 Population; 2000 Census)

Cluster 2 is generally bounded by the East Pointe and Warren city limits to the north, the Ford Freeway (I-94) to the south, Conner and the Canadian National Railroad to the west, and the Harper Woods city limits to the east. This cluster consists of four neighborhood areas. There is a variety of land use in this cluster; however, residential is the greatest percentage. According to the 2000 census, there were 38,996 occupied housing units, which represent 92-percent of the total housing units in this cluster. Slightly over eight-percent of the housing stock is vacant housing units. Of the 92-percent of the total housing stock, close to 59-percent are owned with slightly over 33-percent renters. The average home value is $50,000. Just over five-percent of the homes are in the $100,000 to $199,999 range.

Cluster 2 has a significant Environmental Justice population. More than 91-percent of the population is Non-White. Residents under age 18 equal 33-percent and the senior population (65 and older) equals ten-percent of the population. The average median household income in 1999 was $32,577. Approximately 21-percent of the population in Cluster 2 is without an automobile.

Cluster 3 (109,229 Population; 2000 Census)

The Cluster 3 boundaries are Ford Freeway (I-94) to the north, the Detroit River to the south, the Harper Woods and Grosse Pointes city limits to the east and Mt. Elliott to the west. Several public housing sites are located in Cluster 3. Cluster 3 consists of nine neighborhood areas. There is a range of mixed land use, but the majority is residential with a large industrial/manufacturing concentration. There were 39,096 occupied housing units reported in the 2000 census. This number represents 88-percent of the total housing units in this cluster, as slightly over 12-percent of the housing stock is vacant. Approximately 45-percent of the occupied housing units are owned while over 42-percent are renters. The average value of the homes in this cluster is $40,000. There is, however, over 20-percent of the owner occupied units in the $100,000 to $199,999 range. Additionally, approximately four-percent of the owner occupied homes are worth $200,000 or more.

Cluster 3 is predominantly an Environmental Justice population. This Cluster is 89-percent Non-White. Over 30-percent of the residents are under age 18, and 13-percent is age 65 and older. The average median household income in 1999 was $26,193. The number of people without an automobile is 17-percent.

Cluster 4 (71,963 Population; 2000 Census)

The general boundaries for Cluster 4 are the Highland Park city limits to the north, the Detroit River to the south, Mt. Elliott to the east, and the Lodge (M-10) and Jeffries Freeways (I-96) to the west. Cluster 4 consists of nine neighborhood areas. The predominant land use is residential, but it also has a significant commercial/business district, education facilities, and the main branch of the Detroit Public Library. There are 32,733 occupied housing units or 83-percent of the total housing units according to the 2000 census. More than 66-percent of those units are renter occupied. Homeowners represent 16 percent of the total occupied housing units, while slightly more than 17-percent of the total is vacant housing units. The Woodbridge Historic District is found on the National Register of Historic Places and is located adjacent to the south of I-94 between M-10 and I-96. The average value of the homes in Cluster 4 is $50,000. Approximately 23-percent of the homes are in the $100,000 to $199,999 range and just over eight-percent are of the homes are worth $200,000 or more.

Cluster 4 has a significant Environmental Justice population. The Non-White population in this cluster is just over 87-percent. Those residents under age 18 represent 22-percent of the total population, while the percentage of age 65 and older totals 14-percent. The average median household income in 1999 was $19,546 according to the 2000 census. Approximately 36-percent of the population does not own an automobile.

Cluster 5 (87,745 Population; 2000 Census)

The Cluster 5 boundaries are Warren Avenue and I-94 to the north, the Detroit River to the south, I-96 and the Ambassador Bridge to the east and the Dearborn, Melvindale, Lincoln Park, Ecorse, and River Rouge city limits to the west. The cluster consists of seven neighborhoods. Land use in this cluster is mixed with residential, heavy industrial and a number of freight railroads. Occupied housing units (28,947) in this cluster equal 88-percent of the total housing units, as approximately 12-percent of the total housing units are vacant. Of the occupied housing units, homeowners comprise 46-percent and renters comprise 42-percent. The average home value is $20,000. There is, however a growing number (three-percent) of homes ranging in value of $100,000 to $199,000.

Cluster 5 is predominantly an Environmental Justice population. The Non-White population is 58-percent. Residents under the age of 18 total 32-percent of the total population, while the senior population (65 and older) is slightly over nine-percent of the total population. The average median household income in 1999 was $24,654. The number of people without an automobile is 31-percent.

Cluster 6 (92,517 Population; 2000 Census)

The Cluster 6 boundaries are Oakman Boulevard to the north, Warren and I-94 to the south, the Lodge (M-10) to the east, and a railroad to the west. This cluster is primarily residential with a number of neighborhoods that are historic (Oakman, Atkinson, and Boston-Edison). Cluster 6

consists of four neighborhood areas. According to the 2000 census, over 84-percent of the total housing units (41,050) were occupied and slightly over 16-percent were vacant. The majority of land use in this cluster is residential, light commercial, and light industrial. Homeowners represent 35-percent of the occupied housing units and renter occupancy (49-percent) exceeds that number. The average value of the homes in this cluster is $40,000. At least ten-percent of the owner occupied units are values at $100,000 to $199,999. Additionally, approximately two-percent of the homes total $200,000 or more.

Cluster 6 is predominantly an Environmental Justice population. The Non-White population in this cluster is over 98-percent. Residents under the age of 18 total 30-percent of the population. The age group 65 and older equals 15-percent of the population. The average median household income in 1999 was $23,068. The number of people without an automobile is 45-percent.

For a more detailed discussion of these areas, refer to Section 5.1.1.5 of the DEIS.

5.1.2 Impacts to the Social Environment

5.1.2.1 Acquisition and Displacement Impacts

The Recommended Alternative would require the acquisition of additional right-of-way and the displacement of residences and businesses, though reduced from the Build Alternative described in the DEIS. Persons that reside in structures to be acquired will be relocated to other suitable housing. Displaced businesses would be relocated to new facilities. The structures to be acquired are shown in Figures 5-7A and B. Table 5-7 provides information on the number and type of structures that will be acquired with implementation of the Recommended Alternative. The Recommended Alternative would acquire fourteen single family residences, two duplexes, and two apartments with a total of 14 units. These numbers have decreased from the estimates for the Build Alternative in the DEIS, which were 27 single family residences, five duplexes and two apartment buildings totaling 14 units. There are an estimated 104 full parcel takes and 198 partial parcel takes of individual tax identification parcels. Refer to Section 5.1.2.1 of the DEIS for a detailed discussion of the DEIS Build Alternative.

The Recommended Alternative displacement numbers are approximate and based on conceptual design. This design establishes the early layout of the freeway to identify impacts associated with the right-of-way needed for design and construction. Final design, final determination of impacts to residences and businesses, and coordination with residents will determine the actual acquisitions and displacements.

In addition to acquiring structures, the Recommended Alternative would require acquisition of some partial pieces of property adjacent to the freeway. All property acquired will be in accordance with state and federal laws. Mitigation to acquisition impacts is found in Section 7.1 of this FEIS. Final design would determine the precise location and amount of right-of-way required.

Table 5-7: Estimated Number of Structure Acquisitions and Displacements for the Recommended Alternative

Type of Property	Estimated Number of Parcels with Structures to be Acquired	Estimated Number of Structures to be Acquired
Apartments	2 (14 Units)	2
Single Family	14 (14 Units)	14
Duplexes	2 (4 Units)	2
Commercial	12	12
Industrial	4	5
Public Facilities / Maintenance Yards	3	5
Garage / Structure	1	1
Utility Substation	1	1
Total	**39**	**42**

5.1.2.2 Impacts to Community Facilities and Services

The Recommended Alternative will have a positive impact on pedestrians in the corridor by providing sidewalks adjacent to the service drives between the project limits of I-94, as well as creating an opportunity for bus service along the service drives. Bicyclists and motorists will have a positive impact with improved access to community facilities along the project corridor with the provision of continuous service drives along the mainline freeway.

Medical Facilities, Police, and Fire. Emergency vehicle response routes (police, fire, and ambulance) will have to establish new routes over I-94 between M-10 and I-75 with some of the vehicular bridges being removed. The emergency vehicle response will have an overall positive impact in the project limits as the travel time will decrease due to reconstructed vehicular bridges, continuous service drives, and decreased congestion.

Libraries. The Recommended Alternative will provide sidewalks on the vehicular bridges and pedestrian bridges, which are longer than they exist today. The Recommended Alternative will construct pedestrian facilities to enhance community access to the libraries and provide a beneficial impact. The Detroit Public Library Book Bindery Service is to be acquired, as indicated in the DEIS, and will be relocated in coordination with the library administration.

Schools. The Recommended Alternative will construct sidewalks to enhance community access to schools and continue to provide vehicular and pedestrian access crossing I-94 at school locations. One exception is at the Golightly School (southwest quadrant of I-94/I-75 interchange. Ferry Street will no longer cross I-75 with the Recommended Alternative. The Recommended Alternative does provide pedestrian and vehicular access in three blocks or less of existing structures, so the impact is expected to be minimal.

Figure 5-7A: Recommended Alternative and Potential Impacts

Figure 5-7B: Recommended Alternative and Potential Impacts

Churches and Community Facilities. A negative impact is the removal of some of the pedestrian and vehicular bridges in the corridor to access churches and community facilities. The area of highest concentration of vehicular and pedestrian bridge removal is between Woodward and I-75 along I-94. There are a number of churches that will be impacted by the removal of some of the existing bridges. The Recommended Alternative does provide pedestrian and vehicular access in three blocks or less of existing structures, so the impact is expected to be minimal.

For the most part, the Recommended Alternative has a positive impact to community facilities and services. A detailed discussion of impacts is provided in Section 5.1.2.3 of the DEIS.

5.1.2.3 Non-Motorized (Pedestrian and Bicycle) Mobility

The existing non-motorized mobility is not continuous. There are seven existing pedestrian-only crossings across I-94 and three existing pedestrian-only crossings along M-10 in our study limits. The current pedestrian-only crossings span over only the I-94 mainline freeway. There are some sections of roadway adjacent to I-94 where a service drive exists, sometimes with a sidewalk. These service drive sections along I-94 occur in part between I-96 and M-10, in some blocks from Woodward to I-75, and in some blocks from Chene to Conner avenues. The problem is there is no consistent treatment for non-motorized travel and the existing facilities are aging.

The Recommended Alternative would provide continuous sidewalks along the service drives, as well as sidewalks along all vehicular crossings over I-94. This provides a benefit to all age groups for non-motorized travel within the corridor. Construction of the Recommended Alternative will result in the removal of two pedestrian-only bridges, leaving six remaining pedestrian-only bridges along I-94 and two pedestrian-only bridges along M-10 (Selden/M-10 pedestrian-only crossing will be replaced with a pedestrian/vehicular crossing). The first removal is the Brooklyn Street pedestrian bridge over I-94, located between Trumbull Street and M-10. The second removal is the Canfield Avenue pedestrian bridge, located south of I-94 and Forest Avenue.

The Brooklyn Street pedestrian bridge connects the Research Park Apartments and WSU. According to 1995 pedestrian counts, the volumes were low compared to other pedestrian bridges in the corridor. Under the Recommended Alternative, pedestrians wanting to cross I-94 could travel approximately one block east and use the continuous service drives through the M-10 interchange.

The removal of the Canfield Avenue pedestrian bridge, due to the Recommended Alternative, requires pedestrians wanting to cross M-10 to travel approximately one block north to Forest Avenue or one block south to a combined pedestrian/vehicle turnaround located near Selden Avenue. See Figures 5-8A and B for the locations of the pedestrian bridges, as well as Figures 5-2A through C and Figures 5-3A through C.

Nine combined existing vehicular/pedestrian bridges also would be removed (seven over I-94 and two over I-75). See Figures 5-8A and B for the locations of the facilities: The numbering below for the nine locations matches the orange circular numbers on the exhibit.

The seven bridges over I-94 to be removed (with the associated closest new crossing identified) are:

1. 3rd Street Bridge (one block to the M-10 continuous service drive or 2nd Street);
2. John R Street Bridge (one block to Brush Street or Woodward Avenue);
3. Beaubien Street (one block to Brush Street or I-75 continuous service drive);
4. Lucky Street (one block to E. Grand Boulevard or Mt. Elliott Avenue);
5. Saginaw Street turnaround (relocated approximately 300 feet to the east);
6. Eastbound Harper Avenue Bridge (a few blocks to Concord Street or Frontenac Street); and
7. McClellan Street Bridge (one block to Gratiot Avenue).

The two bridges over I-75 to be removed (with the associated closest new crossing identified) are:

8. Piquette Avenue Bridge (two blocks to Milwaukee Avenue or one block to the I-94 continuous service drive); and
9. Ferry Street Bridge (two blocks to the I-94 continuous service drive or two blocks to Warren Avenue).

As indicated on Figure 5-8A and B, the Selden pedestrian-only crossing will be replaced with a combined pedestrian/vehicular crossing. There are 36 pedestrian/vehicular bridge crossings (37 crossings exist today) over/under I-94, M-10 and I-75 within the study limits that would be built to include sidewalks for pedestrians and bicyclists (refer to Figure 5-7A and B). The loss of the nine combined vehicular/pedestrian bridges are replaced with eight continuous service drive crossings through the M-10/I-94 and I-75/I-94 interchanges; the distance from an existing crossing to a replaced crossing is never greater than three blocks.

The provision of continuous service drives with sidewalks for the Recommended Alternative would have a positive overall impact on pedestrians, providing improved east/west connectivity north and south of I-94. In addition, the improved vehicular bridges with sidewalks would provide additional, safer pedestrian crossings across I-94. Residents would have an improved capability to walk and ride their bikes in high-density residential and neighborhood commercial areas that would be more accessible via sidewalks and pedestrian bridges. Such areas include:

- The WSU campus;
- Shops in the New Center Area along Woodward Avenue north of I-94;
- The I-94/Van Dyke Avenue interchange area that includes Kettering High School;
- The Trombly Alternative High School on Harper Avenue just north of I-94; and
- The Conner Avenue Bridge with Wayne County Community College and shopping center area in the southwest corner of the I-94/Conner Avenue interchange.

Figure 5-8A: Non-Motorized Mobility for the Recommended Alternative

Figure 5-8B: Non-Motorized Mobility for the Recommended Alternative

5.1.3 Mitigation of Recommended Alternative Impacts to the Social Environment

5.1.3.1 Mitigation of Acquisitions and Displacements

Any person, family, business, or non-profit organization displaced by the Recommended Alternative will be assisted by the MDOT Real Estate Division in locating suitable replacement property. This assistance would be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (Federal Public Law 91-646). See Section 5.1.3.2 of the DEIS for a detailed discussion.

The Relocation Plan (Appendix C) states that property acquired for this project will be purchased in segments or phases, providing for the efficient and complete relocation of all eligible displaced residents, businesses, and nonprofit organizations impacted by the project.

As part of the Relocation Plan, a study of the local housing market determined that there are an adequate number of replacement homes and rentals that will be available throughout the relocation process. A similar study was conducted for the local commercial real estate market; it determined that there are a sufficient number of replacement sites available to accommodate the eligible displaced businesses. The Relocation Plan in its entirety can be found in Appendix C.

5.1.3.2 Mitigation of Other Impacts to the Social Environment

The current pedestrian crossings span over only the I-94 mainline freeway. To provide for safer crossings for all pedestrians with the Recommended Alternative, six pedestrian bridges will span over both the freeway and the continuous service drives. The six pedestrian bridges will be replaced in approximately the same location as they exist today. Thus the connectivity with the community facilities and services will be maintained. The city of Detroit staff and the community were consulted in the location of the pedestrian only crossings, as well as the vehicular/pedestrian crossings over I-94, to ensure the community needs were met. The continuous service drives and adjacent sidewalks will provide a benefit to older drivers and pedestrians. Older drivers will have connected local access adjacent and across I-94. Pedestrians will have sidewalks provided adjacent and across the roadways over I-94. See Figure 5-8A and 5-8B for pedestrian bridge locations.

The Recommended Alternative will provide opportunities for bus service along the continuous service drives. No bus service exists today along I-94 in the project limits, as there is no continuous street system adjacent to the freeway. All existing and planned bus routes will have their needs met with the Recommended Alternative. Pedestrians, bicyclists, and vehicles will have improved access to community facilities along the project corridor with the provision of continuous service drives along the mainline freeway. All crossings being removed have a replacement crossing within one to three blocks to address connectivity across the I-94 freeway.

Emergency vehicle response time would decrease due to reconstructed vehicular bridges, continuous service drives, and decreased congestion.

5.1.4 Environmental Justice

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was issued February 11, 1994. The executive order requires federal agencies to identify and address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. Identifying and addressing disproportionately high and adverse effects on protected populations requires identification of minority groups and persons living below the poverty level. It also requires determining if the proposed action will have a disproportionately high and adverse effect of these populations.

The U.S. Department of Transportation (USDOT) and the Federal Highway Administration (FHWA) issued orders to address Executive Order 12898. The USDOT and FHWA orders outline how environmental justice analyses should be performed and how transportation project decisions should be made to avoid disproportionately high and adverse effects on minority and low-income populations. The USDOT requires agencies to (1) explicitly consider human health and environmental effects related to transportation projects; and (2) implement procedures to provide meaningful opportunities for public involvement to members of low-income and minority populations during project planning and development.

Appendix D provides more information on Environmental Justice Legislation and Guidance.

5.1.4.1 Determination of Effects on Minority and Low Income Populations

Historical Census data from the 1950s was obtained as part of the updated Environmental Justice (EJ) analysis. As shown in Table 5-8, the 1950 population of the city of Detroit was approximately 1.8 million, consisting of approximately 84-percent White and 16-percent Non-White residents. The Study Area of Affect and tracts bisected by the construction of I-94 consisted of higher percentages of minority residents. The average median income of these areas was less than that of the city of Detroit.[2] The review of the historical Census data indicated that of the 27 tracts bisected by the eventual construction of I-94, only three tracts reported median incomes greater than that of the city of Detroit. Of these 27 tracts, five contained greater than 50-percent minority residents located between Woodward and Dequindre Avenues. See Appendix B for tract numbers, locations, and data tabulations. In the 1950s, the I-94 Rehabilitation Project area population was below the median income and predominantly White.

In the year 2000, the Study Area of Affect is predominantly minority and low income. Thus, it meets the criteria for an EJ population.

[2] The Study Area of Affect includes Hamtramck which is outside the City of Detroit limits.

Table 5-8: 1950 Historical Census Data

Location	Population, 1950	Percentage Non-White, 1950	Percentage White, 1950	Median Income
Study Area of Affect[3]	819,160	27%	73%	$3,205 (average)
EJ Census tracts area (Tracts bisected by I-94)	119,672	28%	72%	$3,045 (average)
Detroit	1,849,568	16%	84%	$3,465 (average)

Source: 1950 US Census.

The Recommended Alternative evolved from input received from the public, project stakeholders, Interagency Coordinating Council, city of Detroit departments, and special interest groups. The Recommended Alternative addresses the purpose and need for the project and has the least impact on the low-income and minority populations in the proposed project area compared to the other alternatives and modifications considered.

5.1.4.2 Impacts on Minority and Low Income Populations

This section of this FEIS shows how the Recommended Alternative affects the minority and low-income populations in the project area and discusses how environmental justice considerations were included in the decision-making process. As stated in earlier sections of this document, the population of the Study Area of Affect is approximately 88-percent minority. One of the tests of the environmental justice examination was to determine if the Recommended Alternative will cause disproportionately high or adverse effects to the environmental justice population. The analysis concludes that the Recommended Alternative impacts the overall population in the Study Area of Affect equally. That said, the environmental analysis focused on avoiding, minimizing and mitigating the effects on the EJ population as well as engaging these stakeholder groups to ensure their input was considered in the decision making process. The impacts are summarized in Table 5-9.

The environmental justice analysis examined the impacts based on the following factors:

- Displacement of persons, businesses, and non-profit organizations;
- Pedestrian accessibility and mobility;
- Air, vibration, noise, and water pollution; soil contamination;
- Destruction or disruption of natural resources;
- Destruction or diminution of aesthetic values;
- Destruction or disruption of community cohesion;

[3] Census data for the Study Area of Affect and Census tracts area is based on 1950 tract-level data. Approximately 150 tracts (tract units are smaller than Census 2000) compose the Study Area of Affect and 27 composed the Census tract area and, to the extent possible, parallels the geographic boundaries used in Census 2000 calculations. See Appendix B.

- Destruction or disruption of the community's economic vitality and employment effects;
- Destruction or disruption of the availability of public and private facilities and services;
- Traffic congestion;
- Exclusion, separation, or isolation of minority/low-income individuals within a given community from a broader community; and
- Denial of, Reduction in, or Significant Delay in the Receipt of Benefits.

Summary of Impacts

The Recommended Alternative adversely affects the Environmental Justice population in some of the categories mentioned above. The Recommended Alternative primarily causes potential displacements, increases certain environmental factors during construction, and could change the current land use patterns in the affected areas. The categories of impacts are described in the text that follows. The specific Areas of Affect, Impact on EJ Population, and Mitigation Actions can be found in Table 5-9.

The impacts were determined by examining the Recommended Alternative against the existing baseline conditions. The assessment also involved input from stakeholders during the DEIS and FEIS phases. This feedback was used to determine the most effective means to offset impacts.

5.1.4.3 Offsetting Benefits, Mitigation, and Reduction of Impacts Summary

The federal and state environmental justice (EJ) guidance requires that measures be considered to eliminate, minimize, and/or mitigate impacts on the low-income and minority populations. The low-income and minority populations will be adversely impacted by the Recommended Alternative, but not at the level of some of the other alternatives or modifications considered during the DEIS and FEIS stages.

The affects of the proposed project impacts the corridor in the same way consistently except in areas where more infrastructure changes are proposed, such as removal of pedestrian bridges and/or installing new interchanges. Proposed changes were thoroughly examined in order to ensure minimal impacts in the study area and particularly to the EJ population.

Mitigation concepts have been evaluated throughout preparation and review of the DEIS and this FEIS (particularly during the Air and Noise Quality analyses). One of the public participation events, Context Sensitive Solutions Workshop #1 (formerly known as Mitigation Day), involved a number of community stakeholders and resulted in the following recommendations:

- Build service drives first to aid local connectivity;
- Keep all traffic on the I-94 mainline during construction;
- Construct the service drives between I-75 and M-10 as three lanes;
- Include traffic calming in the design of the continuous service drives;
- Develop an aesthetic design plan to promote a consistent theme throughout the corridor and on the continuous service drives;

- Employ workers from the impacted community during the construction phase and encourage minority business development and utilization in rehabilitating I-94; and
- Form non-traditional partnerships to leverage the benefits of a significant public financial investment to improve the surrounding neighborhoods and provide a more aesthetic, economically vibrant community when construction is finished.

Additional mitigation actions are included in Table 5-9. Chapter 7 provides specific mitigation in more detail for areas such as air, vibration, soil contamination, and noise.

- MDOT provided extensive public/stakeholder involvement during the DEIS and FEIS stages. Specific efforts were implemented to connect with minority community leaders to help ensure meaningful involvement and maximum participation at the public/stakeholder meetings. Sections 8.1 and 8.2 of this FEIS describe the public outreach program.

The recommendations provided during the public outreach effort helped to shape the design of the Recommended Alternative. Additionally, the feedback is incorporated, where feasible, in the proposed mitigation measures associated with each of the impact categories previously described.

Infrastructure improvements including continuous service drives, adding capacity and improving design of bridges and interchanges will help to better connect the community, prompt land use development, and facilitate better bus service and transit amenities. The pedestrian only crossings will be safer than those that exist today, as they will go over the new continuous service drives and the I-94 freeway mainline. Pedestrian accessibility will be affected by the elimination of two pedestrian-only crossings and eight bridge crossings in the corridor. This accessibility is addressed by having another crossing within three blocks of an existing crossing. Accessibility also is enhanced by eight additional crossings being provided in each direction through the M-10/I-94 and I-75/I-94 interchanges. Even with some closures, the traveling public will not be isolated from other people, communities, and services in the study area. Mobility and accessibility in fact will be improved through the installation of continuous service drives.

Implementing the Recommended Alternative not only addresses the purpose and need for the project, but creates opportunities to develop partnerships necessary to maximize benefits to the affected community as the project progresses through the developmental stages. Efforts to minimize impacts will include collaborating with the public/stakeholders throughout the project to address such issues as noise, air quality, community impacts, aesthetic design (including service roads), and landscaping.

Table 5-9: Recommended Alternative (RA) Impacts and Mitigation to EJ Population

Affected Areas	Pedestrian accessibility and mobility	Air, noise, water pollution, and soil contamination	Destruction or disruption of constructed or natural resources	Destruction or diminution of aesthetic values	Destruction or disruption of community cohesion	Destruction or disruption of the community's economic vitality	Destruction or disruption of the availability of public and private facilities and services	Vibration	Adverse employment effects	Displacement of persons, businesses, or non-profit organizations	Traffic congestion	Isolation	Exclusion/ separation of minority/ low-income individuals within a given community from a broader community	Denial of, reduction in, or significant delay in the receipt of benefits
Impacts to EJ Population	**Positive** Provides increased safety, east-west access along the corridor, and an enhanced pedestrian/bicyclist environment. **Negative** Reduction of pedestrian-only crossing opportunities.	**Positive** Compliance in air, contamination, and water quality. **Negative** Increased noise levels. Increased noise and air issues during construction.	**Positive** Use Context Sensitive Solutions (CSS) in the community.	**Positive** Opportunity to involve the community in developing aesthetic concepts for the corridor and generate local partnerships.	**Positive** CSS to address cohesion; safer crossings for pedestrians. **Negative** Increased width and loss of pedestrian/ vehicular crossings.	**Positive** Create new business and residential development opportunities **Negative** Acquisitions and possible temporary construction implications.	**Positive** Improved accessibility and potential bus service. **Negative** Wider, relocated, and reduced number of crossings.	**Negative** Possible impacts during construction to adjacent facilities.	**Positive** Potential to increase employment and transit service. **Negative** Removing businesses and affecting community character.	**Negative** Acquisition of 42 estimated structures to be acquired.	**Positive** Improved levels of service, emergency service and potential bus service. **Negative** Traffic on service drives where it did not exist.	**Positive** No significant isolation.	**Positive** Continuous service drives; safer pedestrian crossings over both the service drives and the freeway mainline; and CSS possibilities.	**Positive** No access being denied. Provides improvements both locally and regionally. **Negative** Construction will have a temporary impact on the local community.
Mitigation Measures	Build service drives first to aid local connectivity Keep all traffic on the I-94 mainline during construction Construct the service drives between I-75 and M-10 as three lanes Include traffic calming in the design of the continuous service drives Vehicular/pedestrian crossing that are removed are replaced within three blocks of the removed facility	Refer to the Air Quality Technical Report and 7.16 Refer to Sections 5.6.6 and 7.6 for noise mitigation actions, as well as the Noise Technical Report. State of the practice will be utilized.	None required	None required, but the continued development of an aesthetic design plan to promote a consistent theme throughout the corridor and on the continuous service drives can be accomplished through continued Context Sensitive Solutions workshops.	The community feedback helped identify pedestrian crossings within approximately 3 blocks of those removed. The crossings will be safer than exists today.	Potential to create a community economic development program that would create jobs. Business opportunities for minorities and women on the I-94 rehabilitation project Construction staging to ensure access and mobility is not adversely impaired	Construction staging will be implemented in order to address access issues. The potential for displaced businesses to relocate in the Study Area of Affect is likely. MDOT will coordinate relocation with all affected parties. Regular public information updates to address changes in the community will be communicated	MDOT will have baseline vibration in proximity of the proposed continuous service drives prior to construction.	Refer also to Destruction or Disruption of the Community Cohesion MDOT will collaborate with community leaders/planners to address business/ employment impacts.	Federal/State relocation regulations and guidelines will be followed MDOT will work with the affected community to determine relocation options	Construction staging will help to alleviate congestion and safety factors during construction Consistent public information will communicate changes in routes particularly detours, long delays, and other modal options	None required. Changes in the infrastructure will not alienate the EJ population. Community feedback identified alternate locations for structures slated for removal. Continuous service drives, pedestrian bridges and sidewalks will reduce barriers to community cohesion	None required. Refer to the Isolation section of this chart Continuous service drives, pedestrian bridges, sidewalks will help maintain connectivity and continuity in the impacted areas. MDOT will implement context sensitive solutions to address aesthetics and community values and character	Community feedback identified issues that were addressed in the design. Public/ Stakeholder program will continue during construction Federal/State regulations will be followed with respect to relocation benefits

5.2 Economic Environment

The local economy within the I-94 corridor is tied to regional, national, and global economies. I-94 connects the Michigan interstate system to the busiest border crossings in North America. Southeast Michigan, uniquely positioned around the I-94 corridor, plays an important role in the shipment of goods from major European ports through Canada to Chicago where they are distributed to other parts of the United States.

5.2.1 Economic Development

A variety of businesses are scattered along the I-94 corridor, ranging from strip malls to large industries. Strip commercial developments front major thoroughfares such as West Grand Boulevard, Warren Avenue, Van Dyke Avenue, Harper Avenue, and Gratiot Avenue. Industries are concentrated around the northeast portion of the M-10 interchange, I-75/Conrail interchange, along Piquette Avenue, and along Trombly Street. A more detailed discussion of existing businesses is found in Section 5.2.1 of the DEIS. No substantive change has taken place in the overall business and commercial setting in the project area. The I-94 corridor traverses several of Detroit's Empowerment Zones and Renaissance Zones. Empowerment Zones were designated by the Secretary of the U.S. Department of Housing and Urban Development as areas targeted for federal and local development assistance. The Empowerment Zone boundaries illustrated in the DEIS in Figures 5-4A and 5-4B are still accurate. The state of Michigan implemented Renaissance Zones to stimulate investment and in largely industrial areas by virtually eliminating all state and local taxes for businesses and residences located in these zones. The Renaissance Zone boundaries also shown in Figures 5-4A and B of the DEIS have been corrected in two locations, the northwest quadrant of I-75 and I-94 and south of I-94, west of Mount Elliott illustrated in this FEIS Figures 5-9A and B.

Employment data was updated based on the 2000 Census. The 2000 Census indicates that there are approximately 11,527 people employed within the Census tracts in the project area. This is a decline of approximately 3,570 from the 1990 Census. The highest numbers of employees are in manufacturing, and health care and social assistance. These two classifications—combined with educational services, arts, entertainment, recreation, accommodation, and food services (the next 6 highest employers)—comprise approximately one-half of the types of employment represented in the project area. This indicates a heavily service-oriented economy that is typically dependent on vehicular accessibility. Table 5-10 summarizes the year 2000 employment by industrial class in the rehabilitation corridor.

5.2.2 Impacts to the Economy

5.2.2.1 Recommended Alternative

The Recommended Alternative would result in the beneficial impacts of enhanced access to businesses in the project area and construction jobs and money added to the local economy. Refer to Section 5.2.2.3 of the DEIS for a detailed discussion of impacts to the economy.

Figure 5-9A: Renaissance Zone Boundaries

Figure 5-9B: Renaissance Zone Boundaries

Table 5-10: 2000 Employment by Industrial Class in the Project Area

Industrial Class	Employment	Percentage of Total
Agriculture, Forestry, Fishing, and Hunting	6	0.1%
Mining	0	0.0%
Construction	253	2.2%
Manufacturing	1822	15.8%
Transportation and Warehousing	449	3.9%
Information, Utilities	410	3.6%
Wholesale Trade	246	2.1%
Retail Trade	1072	9.3%
Finance, Insurance, Real Estate, Rental and Leasing	543	4.7%
Professional, Scientific and Technical Services	427	3.7%
Management of Companies and Enterprises	0	0.0%
Administrative and Support and Waste Management Services	713	6.2%
Arts, Entertainment, Recreation, Accommodations, and Food Services	1314	11.4%
Health Care and Social Assistance	1492	12.9%
Educational Services	1457	12.6%
Other Services (except Public Administration)	721	6.3%
Public Administration	602	5.2%
Armed Forces	0	0.0%

Sources: US Census Bureau, 2000

The construction of the Recommended Alternative will require the acquisition of property and displacement of residents and businesses. The estimated numbers of residential and non-residential properties that would be displaced are shown in Table 5-7. Sixteen (16) businesses would be displaced; 12 are commercial and four are industrial. The commercial businesses include two bars, a motel with 24 units, two fast food restaurants, a recording studio, an automotive service center, a storage unit, truck sales, a development center, a new strip development, and a vacant building.

Employment losses associated with the displaced commercial and industrial businesses will be largely dependent on the interest of these enterprises to relocate to other properties within the area, as there is land available. Up to one-third of the commercial structures may be vacant,

while the remaining businesses are generally small, service-oriented enterprises. Several of the industrial displacements include ancillary buildings servicing larger corporate businesses in the metropolitan area. A more detailed assessment of the commercial and industrial displacements – and the job losses associated with them – will be undertaken during the subsequent design phase of the project.

Property tax revenues would be reduced slightly (0.6 percent) as a result of right-of-way acquisitions for the Recommended Alternative. It is expected that as the area redevelops, property tax revenues would be regenerated.

5.2.3 Mitigation of Recommended Alternative Impacts to Economic Conditions

Mitigation was discussed in detail in Section 5.2.3 of the DEIS. Meetings have been subsequently held with the business community throughout the course of the project. Since publication of the DEIS, meetings have been held with the New Center Area, General Motors, and Wayne State University. The MDOT will continue coordination with the business community through ongoing Context Sensitive Solutions workshops. In addition, local businesses will be contacted during final design, and appropriate mitigation will be developed to assist businesses with viability issues during and after construction.

The four industrial and twelve commercial properties that would be displaced as a result of the Recommended Alternative would be acquired in conformance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (Federal Law 91-646). Businesses and non-profit organizations are eligible for actual reasonable moving costs and related expenses. An updated Conceptual Stage Relocation Plan for the Recommended Alternative is found in Appendix C.

5.3 Land Use

5.3.1 Existing Land Use Conditions

Land use within the project area is illustrated in the DEIS Figure 5-5. The existing land use conforms to the city of Detroit zoning ordinances and land-use policies. Land use throughout the project area is dominated by residential and industrial land use, with scattered commercial and institutional land use, intermixed with vacant land use. A detailed discussion of land use is presented in Section 5.3.1 of the DEIS.

One area of active development since publication of the DEIS is in the vicinity of Wayne State University and the University Cultural Center. This area is south of I-94 and west of M-10. A large residential development is under construction between Canfield Avenue and Martin Luther King Boulevard. The development is a mix of single-family residences, townhouses, and duplexes. This area would not be impacted, but demonstrates an area of re-growth in the project area.

Land-Use Policy. The I-94 project area is located entirely within the city of Detroit. Land use in Detroit and adjacent to I-94 follows the policies put forth in the *Detroit Master Plan of Policies* (1990). The city of Detroit is updating its *Master Plan of Policies* and expects City Council approval in Summer 2004. The Mayor's Land Use Task Force published *A Framework*

for Action (1995), a report that discusses land-use strategies and makes recommendations for more livable communities in the city of Detroit.

A Framework for Action makes several recommendations including coordinating the rebuilding of I-94 with policies for future land use. Therefore, the reconstruction of I-94 is consistent with the framework. It is stated in the framework that the rebuilding of I-94 would provide opportunities for retaining and attracting business and improving access to jobs and services. DEIS Figure 5-6 provides a summary of land use recommendations.

Since the completion of *A Framework for Action*, ten "cluster reports" were written as part of the Detroit Community Reinvestment Strategy strategic planning process. The Clusters within the project area are shown on DEIS Figure 5-7. Cluster Reports 1, 3, 4, and 6 include the project area. Section 5.3.1 of the DEIS provides a detailed discussion regarding the individual reports for Clusters 1, 3, 4, and 6.

5.3.2 Impacts to Land Use

Construction of the Recommended Alternative would support existing land uses and the implementation of future land-use recommendations. The Recommended Alternative would provide improved mobility and access to land uses within the project area and encourage redevelopment of areas along I-94 by improving access and mobility. Refer to Section 5.3.2.2 of the DEIS for a more detailed discussion of impacts.

Since issuance of the DEIS, MDOT conducted meetings with representatives from each Cluster potentially impacted by the Recommended Alternative. Locations of Clusters along the I-94 corridor are illustrated in Figure 5-7 of the DEIS and Figure 5-6 of this report. Feedback from the Cluster meetings primarily focused on positive aspects of the Recommended Alternative (such as the continuous service drives) to areas of concern (such as potential negative impacts on local businesses and local traffic). Discussions with the Cluster representatives will continue during the design phase of the project to address these and other concerns, including construction phasing and maintenance of traffic during construction. Communication with key representatives, such as the Clusters and city of Detroit, will continue as the project moves forward into the design phase.

5.4 Aesthetics and Visual Resources

5.4.1 Existing Conditions

There is no change in regional visual character, viewers, viewsheds, or landscape units as described in the DEIS. The regional visual character reflects Detroit's industrial past, as the City's urban character dominates the landscape in the absence of any distinctive landforms or natural features. Six visually distinct landscape units were described in Section 5.4.1 of the DEIS and provided a framework for comparing the visual effects of alternatives considered, including the Recommended Alternative. The landscape units include: Transportation, Historic, Institutional, Industrial, Residential, and Mixed-Use.

5.4.2 Impacts to Aesthetics and Visual Resources

The effects of the proposed I-94 improvements on the visual resources and aesthetic setting of the I-94 corridor were previously described in Section 5.4.2 of the DEIS. Few impacts are expected to occur to the Historic, Institutional, Mixed-Use, and Industrial Landscape units, while the Residential Landscape Unit is expected to sustain some change as several single-family and apartment dwellings are removed for construction of the Recommended Alternative. The Transportation Landscape Unit would experience an improved overall aesthetic appearance as the existing mainline, interchanges, and local access roads are reconstructed.

5.4.2.1 Reconstructed Interchanges

Reconstruction of the M-10 and I-75 interchanges would result in improved traffic flow with more efficient and safer vehicular movements. Visual changes in the landscape also would be evident to local motorists and to through traffic. It is expected that the functional requirement of one additional set of ramps above the existing operating level would necessitate an increase in the height of each interchange. The profile of the M-10 interchange would be approximately 30 to 35 feet higher than the highest existing ramp, while the I-75 interchange will be approximately 40 feet higher on the west side of the interchange and 30 feet higher on the east side. Combined with the larger mass of the structures themselves, less use of grassed embankment and a greater dependence on retaining walls throughout, the interchanges would increase in overall prominence in the local landscape.

5.4.2.2 Proposed Right-of-Way Cross-Section

The Recommended Alternative has been preliminarily designed to limit the need for additional right-of-way while providing one additional travel lane in each direction of the mainline. As previously described in FEIS Section 4.5, this approach would, however, require a considerable increase in the use of retaining walls. The primary visual change to motorists on I-94, thus, would be the loss of the grass embankments and a commensurate increase in concrete retaining walls along the mainline. Further apparent visual differences would be evident in the height of the proposed retaining walls, which can reach up to 25 feet in height, depending on the actual grade compensation required.

5.4.2.3 Impacts to Landscape Units

Six Landscape Units were described in the DEIS. The discussion below focuses on how changes in the roadway cross-section and interchange design would influence five of the Landscape Units: Residential, Historic, Institutional, Industrial, and Mixed Use. A sixth unit, Transportation, is considered unchanged from that presented in the DEIS. Namely that within this unit, "…users of the facility experience little viewshed outside the right-of-way. The freeway becomes the focal point and has low memorability..." As described in the DEIS for the Build Alternative, deteriorating infrastructure relating to the freeway would be replaced, thus providing motorists with an improved setting within which to travel. Such is the case with the Recommended Alternative. Since a defining characteristic of the Transportation Landscape Unit

was that there is "…little viewshed outside the right-of-way[,]" replacement of deteriorating infrastructure, by itself, would be beneficial from an aesthetic standpoint.

Residential and Historic Landscape Units. Within the Residential Landscape Unit, the widened road cross-section and full height walls would reduce or eliminate space for plant material for buffering. The loss of the grassed slopes combined with retaining walls would alter motorists' views, thus helping to create a more visually prominent freeway over the residential area. The additional loss of residential and commercial structures would not significantly alter the appearance of these Landscape Units. While existing views of the Residential or Historic Landscape Units remain, particularly along the western half of the I-94 corridor, the roadway and interchange improvements would strengthen the prominence of the Transportation Landscape Unit, minimizing motorists' awareness of the other adjoining landscape units.

Use of partial or low height retaining walls would create a more pleasing foreground as the walls are designed to complement the character of the area, especially in the residential areas near Conner Avenue. While somewhat less green space would be available for planting compared to what is there now, it would be utilized effectively, where available, by installing appropriate plantings, thus creating a more pleasing setting for both motorists and area residents.

Institutional Landscape Unit. The DEIS states that the Institutional Landscape Unit is discontinuous because it exists in smaller concentrations, most notably Wayne State University and Wayne County Community College. Few impacts of the reconstructed M-10 interchange to Wayne State are expected, given the close proximity of recreational fields and existing parking structure, combined with the existing full height retaining wall in the immediate vicinity of the interchange.

Industrial Landscape Unit. Full or partial height walls within the Industrial Landscape Unit will help screen less-desirable views and provide an opportunity for vegetation if some grassy slope can be maintained. Where provided in the final design, the combination of partial height walls and landscaping would help offset the industrial setting and create a better driving experience. If only walls are provided in certain areas, they will be designed sensitively to enhance the driving experience.

Mixed Use Landscape Unit. A full height wall within this unit would help to unify the appearance of what the DEIS has described as a landscape unit that lacks strong visual unity, most notably east of Gratiot Avenue (north and south of the I-94 corridor). A well-designed wall would help lessen the incongruous nature of the existing conditions in this landscape unit. In other locations, partial height walls will help unify views by offsetting the unrelated architecture and contrasting visual characteristics of the mixed use area. Where design opportunities provide for the inclusion of plantings, a stronger positive impact also would be realized. Further discussion of mitigation and design opportunities associated with the Recommended Alternative is provided in Section 7.7 of this FEIS.

5.4.3 Mitigation of Impacts to Aesthetics and Visual Resources

Mitigation of impacts to aesthetics and visual resources will be directly influenced by the new appearance of the reconstructed facilities along I-94. One apparent change will occur in the

extensive use of retaining walls. Where retaining walls are needed for grade compensation or to limit the number of acquired properties, they would incorporate pleasing design elements. These elements would not influence motorists' perceptions of other features outside the right-of-way and should positively affect residents outside the right-of-way "looking in." As noted in the DEIS, walls are perhaps less desirable than a landscaped or grassy embankment; however, they can be designed, using wall colors or patterns, to help create a pleasing setting for those using the freeway. Where design opportunities provide for the inclusion of plantings, a stronger positive impact would be realized. Further discussion of mitigation and design opportunities associated with the Recommended Alternative is provided in Section 7.7 of this FEIS.

5.5 Air Quality

An air quality impact assessment focusing on the Recommended Alternative was conducted for this Final EIS. Where discussion from the DEIS remain valid, it will be noted as such.

5.5.1 Relevant Pollutants

Air pollution is a general term that refers to one or more chemical substances that degrade the quality of the atmosphere. Individual air pollutants degrade the atmosphere by reducing visibility, damaging property, reducing the productivity or vigor of crops or natural vegetation, or reducing human or animal health.

The U.S. Environmental Protection Agency (EPA) has identified six air pollutants that are of nationwide concern: carbon monoxide, sulfur dioxides, nitrogen dioxides, ozone, particulate matter (sized 10 microns & sized 2.5 microns or less), and lead. The sources of these pollutants, their effects on human health and the nation's welfare, and their final deposition in the atmosphere vary considerably. A brief description of each pollutant is found in Appendix H.

5.5.2 National and State Ambient Air Quality Standards

As required by the Clean Air Act, National Ambient Air Quality Standards (NAAQS) have been established for seven major air pollutants:

- CO;
- PM_{10};
- $PM_{2.5}$;
- SO_2;
- NO_2;
- O_3; and
- Pb.

The national and state ambient air quality standards are summarized in Table 5-11. Their descriptions are in the pages following the table. The primary standards have been established to protect the public health. The secondary standards are intended to protect the nation's welfare and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the general welfare. The descriptions below the table explain the NAAQS and the thresholds.

Table 5-11: National and State Ambient Air Quality Standards

Pollutant	Averaging Period	National and State Standards and State Standards	
		Primary	Secondary
Carbon Monoxide (CO)	8 Hours[b]	9 ppm (10 mg/m^3)	No Secondary Standard
	1 Hour[b]	35 ppm (40 mg/m^3)	No Secondary Standard
Lead (Pb)	Maximum Quarterly Average	1.5 ug/m^3	Same as Primary Standard
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.053 ppm (100 ug/m^3)	Same as Primary Standard
Ozone (O_3)	Maximum Daily 1-Hour Average[c]	0.12 ppm (235 ug/m^3)	Same as Primary Standard
	4th Highest 8-Hour Daily Maximum[d]	0.08 ppm	Same as Primary Standard
Particulate Matter (PM_{10})	Annual Arithmetic Mean[e]	50 ug/m^3	Same as Primary Standard
	24-Hour[e]	150 ug/m^3	Same as Primary Standard
Fine Particulate Matter ($PM_{2.5}$)**	Annual Arithmetic Mean[fg]	15 ug/m^3	Same as Primary Standard
	98th Percentile 24-Hour[f]	65 ug/m^3	Same as Primary Standard
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	80 ug/m^3 (0.03 ppm)	–
	24 Hours[b]	365 ug/m^3 (0.14 ppm)	–
	3 Hours[b]	–	1300 ug/m^3/(0.5 ppm)

Source: US EPA, "National Primary and Secondary Ambient Air Quality Standards." (49 CFR 50). Michigan Department of Environmental Quality, Air Quality Division.

[a] Parenthetical value is an approximate equivalent concentration.
[b] Not to be exceeded more than once per year.
[c] The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.1 ppm is equal to or less than one, as determined according to Appendix H of the Ozone NAAQS. The one-hour standard applies only to areas that are still designated nonattainment. For areas with air quality data showing attainment, the one-hour standard has been revoked.
[d] The eight-hour ozone standard is met when the three-year average of the annual fourth highest daily maximum eight-hour ozone concentration is less than or equal to 0.08 ppm.
[e] Particulate standards when using PM_{10} (particulates less than 10 mm in diameter) as the indicator pollutant. The annual standard is attained when the expected annual arithmetic mean concentration is less than of equal to 50 ug/m^3 (three-year average); the 24-hour standard is attained when the expected number of days above 150 ug/m^3 is equal to or less than 1.
[f] Particulate standards when using $PM_{2.5}$ as the indicator pollutant. The annual standard is met when annual average of the quarterly mean $PM_{2.5}$ concentrations is less than or equal to 15 ug/m3, when averaged over three years. If spatial averaging is used, the annual averages from all monitors within the area can be averaged in the calculation of the three-year mean. The 24-hour standard is met when the 98th percentile value, averaged over three years, is less than or equal to 65 ug/m^3.

***Abbreviations:** ppm= parts per million, ug/m^3= micrograms per cubic meter.*

- **CO.** Two primary standards exist for carbon monoxide. The standards depend on the period used to compute the concentration of carbon monoxide. Based on an eight-hour maximum, the primary standard is nine parts per million (ppm) or 10 mg/m^3. Based on a one-hour maximum, the primary standard is 35 ppm (40 mg/m^3). Both standards are not to be exceeded more than once per calendar year.
- **Total Suspended Particulates/PM_{10}.** On July 31, 1987, the EPA began using $PM_{10,}$ replacing total suspended particulate as the indicator for particulate matter. The reason for changing the standard was based on available scientific information indicating that the smaller particles can penetrate deeper into the respiratory tract. The information showed that efforts should be concentrated on controlling the smaller particles' levels in the ambient air. The PM_{10} primary and secondary standards are 50 ug/m^3 (micrograms/cubic meter) (annual arithmetic mean) and 150 ug/m^3 (24-hour average). These standards are not to be exceeded more than an average of one day per calendar year.
- **Fine Particulate Matter ($PM_{2.5}$).** On July 16, 1997, the EPA established a new standard for particulates with a diameter smaller than 2.5 microns ($PM_{2.5}$). Medical evidence indicated that these much smaller particles also are a serious threat to human health, since the particles lodge deeply in the lungs and can cause premature death and respiratory problems. The $PM_{2.5}$ standards are based on (1) a 24-hour exposure set at 65 ug/m^3 and (2) an annual average exposure set at 15 ug/m^3. The 24-hour limit is the 98th percentile of the highest levels measured at a neighborhood-oriented monitoring site averaged over a three-year period.
- **SO_2.** Two primary standards and one secondary standard exist for SO_2. The standards are based on the time-averaging period. Based on an arithmetic mean or 24-hour average, the primary standards are 0.03 ppm (80 ug/m^3) and 0.14 ppm (365 ug/m^3) respectively. Based on a three-hour maximum, the secondary standard is 0.5 ppm (1300 ug/m^3).
- **NO_2.** NO_2 has one standard that is both the primary standard and the secondary standard. Based on an annual arithmetic mean, .053 ppm (100 ug/m^3) is both the primary standard and the secondary standard.
- **O_3.** Ozone has one standard that is both the primary standard and the secondary standard. Based on a one-hour maximum, 0.12 ppm (235 ug/m^3)—the primary standard and the secondary standard is not to be exceeded more than an average of one day per year. This standard is being phased out and replaced with a new eight-hour standard set to protect public health against longer exposure periods. It has been found that exposures over a longer period of time, even at levels below the existing standard, can cause significant health problems. The new eight-hour O_3 standard is set at 0.08 ppm. A violation of this standard will occur if the three-year average of the annual fourth highest daily maximum eight-hour concentration exceeds the standard. The existing 0.12 ppm standard will be revoked when conformity to the eight-hour standard is determined.
- **Pb.** Lead has one standard that is both the primary standard and the secondary standard. Based on a three-month quarterly mean, both the primary and secondary standards are 1.5 ug/m^3.

5.5.3 Air Quality Regulations and Planning

5.5.3.1 Clean Air Act Amendments (CAAA) of 1990

The information contained in Section 5.5.3.1 of the DEIS remains valid.

5.5.3.2 The Non-Attainment Status of the Project Area

Section 107 of the 1977 CAAA requires that the EPA publish a list of all geographic areas in compliance with the NAAQS, as well as those that have not attained the NAAQS. Areas in compliance with the NAAQS are termed attainment areas. Areas not in compliance with the NAAQS are termed non-attainment areas. Areas with insufficient data to make a determination are unclassified and are treated as being attainment areas until proven otherwise. Areas designated as non-attainment when the CAAA were implemented—and have since attained compliance with the standards—are classified as attainment areas but are given "maintenance" status. Maintenance status requires the area to comply with conformity requirements. The designation of an area is made on a pollutant-by-pollutant basis.

Almost all of Michigan is classified as an attainment area for CO. Prior to 1999, the portion of Wayne County including the study area was designated as a nonattainment area for CO. Because monitoring data collected since 1995 shows that the NAAQS are being met, the area was redesignated to attainment-maintenance status on August 30, 1999. The maintenance area also includes Oakland and Macomb Counties. As a maintenance area, all conformity requirements apply.

Wayne County is classified as an attainment-maintenance area for the one-hour O_3 standard. The maintenance area includes all 7 counties in southeast Michigan. On July 22, 1998, the EPA revoked the one-hour ozone standard for the areas that previously were classified as attainment-maintenance and replaced it with the new eight-hour O_3 standard, though conformity still applied. On October 25, 1999, the revocation was rescinded. On April 15, 2004, an eight county area, including Wayne County, was designated as a moderate non-attainment for the eight-hour O_3 standard. On September 17, 2004, EPA redesignated the area as marginal/nonattainment for the eight-hour O_3 standard. As such, it must reach attainment by June 2007.

All areas of Michigan are classified as in attainment for PM_{10}, Pb, SO_2 and NO_2. The EPA and the Michigan Department of Environmental Quality (MDEQ) currently are collecting data to determine $PM_{2.5}$ attainment status. It is highly likely that Wayne County will be within the area designated by EPA as nonattainment for the $PM_{2.5}$ standard.

5.5.4 Impact Assessment

Pollutants that can be traced principally to motor vehicles are relevant to the evaluation of the project impacts; these pollutants include CO, O_3, PM_{10} and $PM_{2.5}$. Transportation sources account for a small percentage of regional emissions of SO_2 and Pb; thus, a detailed analysis is not required. While the EPA has indicated that PM_{10} and $PM_{2.5}$ are pollutants of concern for mobile-source projects, hot-spot analysis guidance has not been adopted by the EPA. Since it is likely that Wayne County will be within the area designated by EPA as nonattainment for $PM_{2.5}$, it is likely that a hot-spot analysis for $PM_{2.5}$ will be required in the future. It is possible that a

hot-spot analysis for PM_{10} might be required in the future, though it is unlikely that the project study area would require this analysis as it is classified as an attainment area for PM_{10}.

HC and NO_x emissions from automotive sources are a concern primarily because they are precursors in the formation of ozone and particulate matter. Ozone is formed through a series of reactions which occur in the atmosphere in the presence of sunlight. Since the reactions are slow and occur as the pollutants are diffusing downwind, elevated ozone levels often are found many miles from sources of the precursor pollutants. Therefore, the effects of HC and NO_x emissions generally are examined on a regional or "mesoscale" basis to determine conformity with the SIP. PM_{10} also is examined on a regional basis. However, a localized or hot-spot analysis might be required in the near future (as previously discussed) for nonattainment areas.

CO impacts are localized. Even under the worst meteorological conditions and most congested traffic conditions, high concentrations are limited within a relatively short distance (300 – 600 feet) of heavily traveled roadways. Vehicle emissions are the major sources of CO. Gasoline engines are sources of 96% of the CO. Consequently, it is appropriate to predict concentrations of CO on both a regional and a localized or "microscale" basis.

Mesoscale Air Quality Analysis

The regional or mesoscale air quality analysis determines the overall impact on regional air quality levels. A transportation project is analyzed as part of a regional transportation network developed by a county or a state. Projects in this network are found in the Regional Transportation Plan (RTP) and the Transportation Improvement Program (TIP). The RTP and TIP includes a regional air quality analysis utilized to determine if emissions are within the emissions budget for the area. The results of this analysis determine if an area conforms with regulations set forth in the Final Conformity Rule.

The I-94 Rehabilitation Project currently is listed in the 2030 RTP developed by the Southeast Michigan Council of Governments (SEMCOG) and adopted on November 4, 2004. The project is listed as a study in the current TIP (2004-2006). Once the project is in the RTP, the TIP is amended to include the project.

The regional analysis performed for the RTP and TIP will incorporate the effects of this project and will satisfy the regional requirements set forth in the Final Conformity Rule.

Microscale Analysis

Microscale air quality modeling was performed using the most recent version of the EPA mobile source emission factor model (MOBILE6.2) and the CAL3QHC version 2 air quality dispersion model to estimate existing, future No-Build Alternative, and the Recommended Alternative CO levels at selected locations in the project area. A detailed description of the analysis parameters, meteorological conditions, and the site selection process can be found in the *Air Quality Technical Report* and in Section 5.5.4 of the DEIS. The information contained in the *Air Quality Technical Report* and the DEIS remains valid with the following exceptions:

- The emission factor program used in the DEIS (MOBILE5) has been replaced with EPA's most current emission factor program, MOBILE6.2.
- Background CO concentrations used in the DEIS were based on 1998 concentrations from the Livonia monitoring station. The Linwood Station readings were not available for use

for the DEIS. For this FEIS, the background concentrations were available and were utilized from the Linwood monitoring station, which is adjacent to the project corridor.

Vehicular Emissions

Vehicular Emissions were estimated using the EPA MOBILE6.2 vehicular emission factor model. (*User's Guide to MOBILE6.2, Mobile Source Emission Factor Model, Ann Arbor, Michigan,* EPA 420-R-02-028, October 2002).

MOBILE6.2 is a mobile source emission estimate program that provides current and future estimates of emissions from highway motor vehicles. The latest in the MOBILE series, dating back to 1978, MOBILE6.2, was designed by the EPA to address a wide variety of air pollution modeling needs. This latest version of MOBILE differs significantly in both structure and data requirements from previous versions. MOBILE6.2 incorporates updated information on basic emission rates, more realistic driving patterns, separation of start and running emissions, improved correction factors, and changing fleet composition. It also includes impacts of new regulations promulgated since MOBILE5b. Basic vehicle mix information used in MOBILE6.2 is shown in Table 5-12.

Emissions also are affected by speed, ambient temperature, vehicle age, and mileage distribution. An ambient temperature of 34.4^{o} F, with a minimum temperature of 26^{o} F and maximum temperature of 39^{o} F, was recommended by SEMCOG. Local vehicle age also was provided by SEMCOG.

Table 5-12: MOBILE6.2 Vehicle Mix Information

Vehicle Type	Percentage of Fleet	
	2000	2025
Light-Duty Gas Vehicles	47.30	26.05
Light-Duty Diesel Vehicles	.08	.02
Light-Duty Gas Trucks	40.70	61.74
Light-Duty Diesel Trucks	.18	.26
Heavy-Duty Gas Vehicles	3.30	3.20
Heavy-Duty Diesel Vehicles	8.02	8.33
Motorcycles	.45	.36

Analysis Sites Selection and Receptor Locations

Intersection analysis sites were selected through a screening analysis based on overall intersection volume, changes in intersection volume, and changes in level of service (LOS) estimates. A total of 49 intersections were screened. These sites represent the intersections within the study area that are expected to be impacted by the project.

Based on the screening analysis, eight intersection sites were selected for detailed analysis. Two interchange sites were also chosen for detailed analysis. The interchange sites were selected because of high traffic volumes on the ramps and the mainline as well as the proximity

of sensitive receptors (that is, locations where the public has access). Thus a total of ten analysis sites were selected. The analysis sites are listed in Table 5-13 and shown in Figure 5-10A and B.

Table 5-13: Air Quality Analysis Sites

Site no.	Site Description
1	Intersection of Trumbull/Kirby
2	Interchange of I-94/M-10
3	Interchange of I-94/I-75
4	Intersection of I-94 eastbound (EB) Ramps/Mt. Elliott
5	Intersection of I-94 westbound (WB) Ramps/Mt. Elliott
6	Intersection of Gratiot/McClellan
7	Intersection of I-94 EB Ramps/Gratiot
8	Intersection of I-94 WB Ramps/Gratiot
9	Intersection of Gratiot/Harper
10	Intersection of Cadillac/Harper

Receptors were chosen at each site in accordance with the guidelines found in the EPA's *Guideline for Modeling Carbon Monoxide from Roadway Intersections* (EPA-454/R-92-005). Each analysis site is shown in detail along with its receptors in the *Air Quality Technical Report* and the DEIS.

Persistence Factor

Peak eight-hour concentrations of CO were obtained by multiplying the highest peak hour CO estimates by 0.7.

Analysis Years

The existing year (2000) and the project's design year (2025) were analyzed to determine the project's air quality effects.

Background Concentrations

Microscale modeling is used to predict CO concentrations resulting from emissions from motor vehicles using roadways immediately adjacent to the locations at which predictions are being made. A CO background level must be added to this value to account for CO entering the area from other sources upwind of the receptors.

A one-hour CO background level of 7.7 ppm and an eight-hour background level of 4.5 ppm were added to each analysis site. These values are the second-highest one-hour and eight-hour readings from the Linwood monitoring station for the years 2000 – 2002. The use of data from Linwood was selected because of its proximity to the project area.

5.5.4.1 Existing Conditions

Maximum one-hour and eight-hour CO levels predicted at the ten analysis sites within the study area are shown in Table 5-14 and Table 5-15 respectively.

Figure 5-10A: Air Quality Analysis Sites Recommended Alternative

Figure 5-10B: Air Quality Analysis Sites Recommended Alternative

Table 5-14: Predicted Worst-Case One-Hour Carbon Monoxide Concentrations (ppm)

Site #	Analysis Sites	2000 Existing		2025 No-Build Alternative		2025 Recommended Alternative	
		AM	PM	AM	PM	AM	PM
1	Intersection of Trumbull/Kirby	12.7	12.8	10.3	10.3	10.8	10.9
2	Interchange of I-94/M-10	12.0	11.5	9.9	9.9	10.5	10.4
3	Interchange of I-94/I-75	14.5	14.5	10.8	11.0	11.2	11.9
4	Intersection of I-94 EB Ramps/Mt. Elliott	13.0	13.9	10.7	12.7	11.0	13.6
5	Intersection of I-94 WB Ramps/Mt. Elliott	12.2	13.0	10.8	10.9	11.2	12.0
6	Intersection of Gratiot/McClellan	14.7	14.6	12.4	12.5	11.8	12.7
7	Intersection of I-94 EB Ramps/Gratiot	14.8	13.9	12.5	12.3	12.0	13.3
8	Intersection of I-94 WB Ramps/Gratiot	14.0	14.6	12.2	11.9	12.9	13.9
9	Intersection of Gratiot/Harper	15.0	14.3	11.8	10.8	11.4	13.3
10	Intersection of Cadillac/Harper	13.3	13.0	10.2	10.0	10.1	11.0

Concentrations include a CO background level of 7.7 ppm.

One-hour CO Standard = 35 ppm.

Table 5-15: Predicted Worst-Case Eight-Hour Carbon Monoxide Concentrations (ppm)

Site #	Analysis Sites	2000 Existing	2025 No-Build Alternative	2025 Recommended Alternative
1	Intersection of Trumbull/Kirby	8.1	6.3	6.7
2	Interchange of I-94/M-10	7.5	6.0	6.5
3	Interchange of I-94/I-75	9.3	6.8	7.4
4	Intersection of I-94 EB Ramps/Mt. Elliott	8.8	8.0	8.6
5	Intersection of I-94 WB Ramps/Mt. Elliott	8.2	6.7	7.5
6	Intersection of Gratiot/McClellan	9.4	7.9	8.0
7	Intersection of I-94 EB Ramps/Gratiot	9.4	7.9	8.4
8	Intersection of I-94 WB Ramps/Gratiot	9.3	7.7	8.8
9	Intersection of Gratiot/Harper	9.6	7.4	8.4
10	Intersection of Cadillac/Harper	8.4	6.3	6.8

Concentrations include a CO background level of 4.5 ppm.

Eight-hour CO Standard = 9 ppm; a violation of the standard is 9.5 or greater.

In the existing conditions, the eight-hour predicted concentration at Site 9 (intersection of Gratiot/Harper) exceeds the eight-hour CO standard by 0.1 ppm. This concentration is considered a worst-case level. Given the conservative parameters used and the amount of the exceedance, it is highly probable that the exceedance would not be predicted using more realistic parameters. Local monitors have not indicated a violation of the CO standard in the last three years.

5.5.5 Impacts

Maximum one-hour and eight-hour CO levels predicted at the ten analysis sites within the study area are shown in Table 5-14 and Table 5-15 respectively.

For the year 2025, the Recommended Alternative eight-hour CO levels are higher than the No-Build Alternative CO levels at all of the sites analyzed. These sites were chosen to demonstrate the worst-case impact the project is expected to have on local air quality levels. Though the Recommended Alternative levels are higher than the No-Build Alternative, all predicted concentrations are below applicable federal and state standards. The project is not predicted to cause or exacerbate a violation of the CO standards.

5.6 Noise

A noise analysis (performed in 2002 using the 1996 guidelines) on the Recommended Alternative was conducted for this Final EIS and is summarized below. The analysis is in 2002 dollars and even with the new noise guidelines none of the recommendations would change.

5.6.1 Sound Descriptors and Human Perception to Changes in Noise Levels

Noise levels are measured in units called *decibels* (dB). The human ear does not respond with the same sensitivity to all frequencies (or pitches). Measured sound levels are adjusted or weighted to correspond to the audible frequency range of sound or loudness that can be heard by humans. The weighting system used in objective measurement of noise for the purpose of assessing human response to noise is referred to as "A-weighting" and is abbreviated as "dBA."

Traffic noise levels are expressed in L_{eq} (1-hour) dBA. This is defined as the equivalent steady-state sound level that, in a period of one hour, contains the same acoustic energy as the time-varying sound level during that hour. This descriptor correlates well with human response to changes in noise levels. The one-hour equivalent noise level (L_{eq}) during the noisiest traffic hour, expressed as L_{eq} (1-hour) dBA, is used by the FHWA and MDOT as the descriptor for assessing the effects of traffic noise. All noise measurements, traffic noise predictions, and impact assessments contained in this report were completed using the L_{eq} (1-hour) dBA descriptor.

Noise is undesirable or unwanted sound perceived subjectively by individuals. Representative environmental noises and their respective levels are shown in Table 5-17. Research has been done to evaluate human sensitivity to noise increases and has shown that a 3-dBA increase in the sound level with respect to a reference base level is barely noticeable, a 5-dBA increase would be a noticeable change, and a 10-dBA increase would be perceived as doubling of loudness.

5.6.2 Noise Impact Criteria and Abatement Guidelines

The basic goals of noise criteria—as they apply to highway projects—are to minimize the adverse noise impacts on the community and, where necessary and appropriate, to investigate feasible and reasonable measures to mitigate noise impacts. The FHWA and MDOT traffic noise abatement criteria are presented in Table 5-16.

The FHWA regulations define noise abatement criteria (NAC) as the maximum acceptable L_{eq} (1-hour) noise levels for:

- Exterior land use activities; and
- Certain types of indoor activities.

Table 5-16: Noise Abatement Criteria for Highway Projects (1)

Activity Category	dBA L_{eq}	Description of Activity
A	57 (Exterior)	Lands on which serenity and quietness of extraordinary significance serve an important public purpose and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B.
D	–	Undeveloped lands.
E	52 (Interior)	Interior spaces of Category B, such as residences, motels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: *Federal Highway Administration 23 CFR 772.* Revised April, 1998.

(1) Approach noise abatement criteria in Michigan are 1 dBA less than the noise levels shown.

The NAC represent the threshold levels above which noise will begin to intrude on the existing environment for land-use activity types described in Table 5-16. Accordingly, a project is defined as having a traffic noise impact if either of these conditions occurs:

1. Predicted noise levels [L_{eq} (1-hour) dBA] approach or exceed the NAC given in Table 5-17. The MDOT defines "approach" as a noise level that is 1 dBA less than the NAC. An impact occurs, for example, when exterior noise levels are equal to or greater than 66 dBA under the Category "B" land-use activity designation.
2. A substantial increase in future Recommended Alternative noise level occurs. The MDOT defines a substantial increase as one that results in an increase of 10 dBA or more in the Recommended Alternative traffic noise level over the existing noise level during the same time period.

Table 5-17: Common Noise Levels and Typical Reactions

Sound Source	Noise Level (dBA)	Apparent Loudness	Typical Reaction	Activities
Military jet, air raid siren	130	64 times as loud	Limit amplified speech	
Amplified rock music	110	16 times as loud	Maximum vocal effort	
Jet takeoff at 500 meters	100	8 times as loud		
Heavy truck at 15 meters Busy city street	90	4 times as loud	Very annoying	
Busy traffic intersection	80	2 times as loud	Annoying	Highway construction sites
Highway traffic at 15 meters	70	Base reference	Telephone use difficult	Roadside traffic
Light car traffic at 15 meters	60 55	½ as loud	Intrusive	Outdoor recreation
Noisy office	50 45	¼ as loud	Beginning of speech interference Quiet	
Public library Soft whisper at 5 meters Threshold of hearing	40 30 10	$^1/_8$ as loud $^1/_{16}$ as loud $^1/_{64}$ as loud	 Very quiet Just audible	Kitchens/bathrooms Living/dining/bedrooms

Note: The minimum difference in noise level noticeable to the human listener is 3 dBA. A 10-dBA increase in level is perceived as doubling the loudness, while a 10-dBA decrease in noise level is perceived as halving the loudness.

Source: Road and Rail Noise: Effects on Housing. Canada Mortgage and Housing Corporation, 1981.

5.6.3 Methodology for Predicting Noise Levels

Existing and future traffic noise levels were determined utilizing the FHWA Traffic Noise Model TNM (FHWA-PD-96-009) Version 2.0. Based on recommendations received from the MDOT (via a FHWA memorandum dated 10/10/02), all TNM 2.0 existing noise predictions were adjusted to equal field-measured noise levels recorded during the same time period. The calibration of existing TNM-predicted noise levels with measured noise levels would ensure that future noise level predictions are not overestimated. These calibration factors, shown in Table 5-18, were applied to all TNM noise predictions presented in this noise study report. Construction noise issues were assessed qualitatively.

5.6.3.1 Factors Affecting Traffic Noise Levels

The traffic noise level at a site depends on both site geometry and traffic characteristics (traffic volume, vehicle type, and speed) of roadways near the site. Input to the computer model program consisted of site geometry, lane configurations, receptor coordinates, shielding factors, and traffic data. Existing data and future traffic projections—including vehicle classification and travel speeds—near each prediction site was provided for both the AM and PM peak travel time periods.

5.6.4 Existing Noise Conditions

Noise level measurements were taken at locations for developed lands and undeveloped lands where development currently exists or where development plans have been approved. In accordance with the MDOT traffic noise analysis policy for Type I highway improvement projects, development is defined to be planned, designed, and programmed if a noise-sensitive use such as a residence, school, hospital, and so forth has a building permit.

Noise measurement locations were selected based on several factors:

- Provide broad geographic coverage.
- Be representative of existing and future land uses in the project area.
- Most importantly, the site's potential sensitivity to changes in noise levels for which mitigation considerations might be needed.

Measurements at one selected site were used as representative of noise exposure at nearby receivers that fell under the same FHWA land-use activity category as is shown in Table 5-17.

Field measurements were conducted according to procedures described in *Sound Procedures for Measuring Highway Noise* (Report Number FHWA-DP-45-1R). The measurements were made with an integrating Bruel and Kjaer (B&K) Type 2231 sound-level meter fitted with a B&K Type 4155 condenser microphone. Prior to any noise level readings; the sound-level meter was calibrated using a B&K Type 4231 acoustical calibrator to ensure accuracy in recorded noise levels. All measurements were performed under acceptable climatic and street surface conditions (wind speed less than 20 km/h [12 mph] and dry road surface).

Noise measurements were taken at 30 locations during the week of September 30, 2002, through October 4, 2002. The noise monitoring locations are depicted in Figure 5-11A and B. Noise measurements were completed during 6:00 AM to 9:00 AM and 3:00 PM to 6:30 PM time periods to provide an estimate of baseline peak daytime ambient noise conditions.

Generally, land use in the project area is single-family residences or vacant lots with few commercial and institutional properties. Table 5-18 is a summary of the noise levels measured during the noise monitoring survey at each of the 30 locations. There also is a brief description of each site. Ten of the 30 noise monitoring sites selected for study are locations taken from the January 2001 *I-94 Rehabilitation Projected DEIS Report* (FHWA MA-EIS-01-01-D). The site numbers shown in parentheses with an asterisk identify the original site number.

The results of the noise monitoring survey, presented in Table 5-18, show that noise levels within the project area vary greatly depending upon the site's proximity to major roadways. Maximum ambient noise levels occurred adjacent to sites near exposed sections of I-94, M-10, and I-75. Measured noise levels of 66 dBA or higher were reported at 18 of the 30 locations evaluated. They included R1, R2, R3, R6, R7, R8, R10, R12, R14, R15, R16, R17, R18, R19, R20, R22, R24, and R26. Highest noise level measured was 71 dBA, occurring at sites R16 and R17. The lowest recorded noise levels were 58 and 59 dBA, occurring at sites R9 and R22 respectively.

Noise measurements were completed during peak traffic noise hours to ensure that the measured noise levels were representative of worst-case traffic noise conditions and to allow direct comparison with the TNM2 computer model predictions. Baseline existing traffic volumes and speeds used for the TNM noise modeling were for calendar year 1995 (per agreement between the MDOT and FHWA due to continual construction projects within and around the project area since 1995 which would result in non-representative traffic volumes).

Table 5-19 summarizes AM and PM peak period predicted versus measured noise levels and presents the estimated difference between the two noise levels. The TNM2 computer model-predicted noise levels for both peak AM and PM travel time periods showed significant variability with measured noise levels completed for the same time period. Most likely, some of the differences reported in Table 5-18 can be attributed to the traffic-volume growth that occurred from 1995 to 2002 when the noise measurements were recorded. However, the measured-versus-predicted differences for many locations are too large to be attributed to traffic growth alone. The MDOT recommended procedure to adjust for TNM2 over-prediction is discussed further in Section 5.6.5 of this FEIS.

Figure 5-11A: Recommended Alternative Noise Monitoring, Prediction & Barrier Locations

Figure 5-11B: Recommended Alternative Noise Monitoring, Prediction & Barrier Locations

5.6.5 Modeled Noise Impact

The FHWA Traffic Noise Model (TNM) Version 2.0 was used to determine future year 2025 traffic-noise levels under both the No-Build Alternative and the Recommended Alternative. Peak hour AM and PM traffic volumes and speeds were used in the computer model. Predicted future noise levels with and without the project at the 30 monitoring sites are presented in Table 5-20. Noise levels were estimated for the AM and PM travel time periods. In accordance with the MDOT directive, all TNM2 predicted future noise levels were adjusted by the calibration factors shown in Table 5-20. Calibration is the process of adjusting traffic model predicted noise levels at a given location to the ambient measured noise levels recorded at the same location for the same modeling time period. For example, in the case of an under predicted noise level, by adjusting the model predicted noise level upward, predicted noise levels will include any inherited noise from non-traffic related sources which are included in the noise measurement, such as air craft noise. Thereby ensuring that future traffic noise level estimates include noise from all sources affecting a particular modeling location and representative of what the future overall noise quality will be like. Conversely, in the case of an over predicted noise level an adjustment downward is applied to correct for any simplified modeling assumptions that were applied to the traffic data used that might have caused the over prediction. For example, using posted vehicle speeds or generalized vehicle classification data can cause noise predictions to differ significantly from the measured noise levels. Finally, most state DOT's accept measured versus modeled existing noise levels which fall within a two decibel plus or minus range, with calibration adjustments applied to those noise predictions which exceed this range.

All 30 monitoring sites are FHWA Category B land-use activities as defined in Table 5-16. Accordingly, noise impact occurs when the future noise level is equal to or exceeds 66 dBA or when future Recommended Alternative noise levels increase by 10 or more decibels over existing conditions. The results of the noise modeling show that noise levels of 66 dBA or greater are projected to occur at 21 of the 30 representative locations. There are no impacts resulting from an increase of 10 decibels or more at any location in the I-94 study area corridor. However, a noise level increase approaching this limit occurs at site R11.

At most locations, future peak hour 2025 Recommended Alternative noise levels increase from their 2002 existing levels. Overall, noise levels under the Recommended Alternative are predicted to increase 1 to 9 decibels over their 2001 DEIS-reported levels.

Conversely, Recommended Alternative noise levels decrease 1 to 3 decibels from existing levels at six locations (R4, R5, R6, R7, R28, and R29) due to roadway modifications causing a shifting of traffic volumes away from these communities. The loudest traffic noise area along the I-94 corridor covers a stretch from just east of I-75 to the Conrail railroad underpass. Recommended Alternative peak travel noise levels in this area generally will exceed a L_{eq} (1-hour) of 70 dBA and, in a few cases, noise levels approach 75 dBA**.** Overall, Recommended Alternative AM noise levels were higher than corresponding Recommended Alternative PM noise-level predictions. However, there was no distinct trend.

Receptor sites R8, R19, and R29 are all educational institutions and are evaluated under the FHWA Category E designation. Category "E" land uses, as defined in Table 5-16, are those activities which apply for interior spaces, such as schools, churches, libraries, hospitals, auditoriums, and public meeting rooms. The FHWA Category "E" impact approach level is 51

dBA. In accordance with the MDOT, guidelines, estimated interior noise levels with closed window conditions yields a 25-decibel noise reduction. Predicted interior noise levels at sites R8, R19 and R29 are shown in parentheses. Interior noise levels at all three locations are below the impact threshold.

Under the 2025 No-Build Alternative, future noise levels are projected to increase or decrease depending on what time period is evaluated. Predicted lower No-Build noise levels are most likely due to greater traffic congestion and lower travel speeds projected under the No-Build Alternative. This is particularly true in 2025 No-Build PM traffic conditions where most No-Build noise-level predictions are lower than the corresponding peak PM existing 2002 noise levels. However, predicted noise level estimates under AM peak hour conditions follow the normally demonstrated trend of existing noise levels being the lowest and Recommended Alternative noise levels the highest with No-Build noise levels somewhere in between.

5.6.6 Noise Mitigation Measures

5.6.6.1 Evaluation of Alternative Abatement Measures

As required by the regulation (23 CFR 772), alternative abatement measures were evaluated in terms of their effectiveness in substantially reducing the predicted design-year noise levels at locations exceeding the MDOT noise abatement criteria. This evaluation is required even if noise levels do not increase as a result of the project. Potential alternative abatement measures to be considered include:

- Traffic management procedures;
- Alteration of roadway horizontal or vertical alignments;
- Acquisition of undeveloped property for use as buffer zones;
- Installation of noise barriers within the right-of-way; and
- Noise insulation or sound proofing of public or non-profit institutional structures.

Traffic management measures sometimes are feasible for noise abatement, and they can produce noise benefits. Such measures include:

- Limiting the highway to automobiles and medium trucks; and
- Enforcing lower speed limits.

Prohibition of heavy trucks is not allowed by State Law, because the roadway is a major route for the movement of all classes of vehicles, including heavy trucks. Alteration of roadway alignment is not practical due to right-of-way restrictions.

Acquisition of property for buffer zones can reduce noise impacts where unimproved property exists between noise-sensitive receptors and the corridor. No such opportunity exists along the affected segments of the project corridor. Therefore, the only remaining potential abatement measures are:

- Considering noise barriers; and
- Evaluating the noise barriers' feasibility and reasonableness.

Table 5-18: Comparing Measured Existing Noise Levels and TNM2 Predicted Existing Noise Levels during Peak AM, PM Travel Time Periods

Site #	Description of Monitoring Location	Land Use	Measured and Predicted Noise Levels L_{eq} (1-hour) dBA					
			Measured	TNM2 Existing	AM Calibration Factors	Measured	TNM2 Existing	PM Calibration Factors
			AM Time Period			PM Time Period		
R1 (1)*	2541 Kirby Avenue	Residential	67	75	-8	67	75	-8
R2	5468 Station Street	Residential	64	76	-12	66	76	-10
R3 (2)*	5505 14th Street	Residential	62	68	-6	66	69	-3
R4	5280 Avery Street	Residential	63	73	-10	61	73	-12
R5	Research Park Apts. Trumbull Avenue	Residential	64	71	-7	64	71	-7
R6	5647-End unit - (McCoy Townhouse)	Residential	68	72	-4	67	73	-6
R7	5810 4th Street	Residential	68	71	-3	68	72	-4
R8 (15)*	Alex Manoogian Hall - JC Lodge Street	Institutional	69	75	-6	69	76	-7
R9 (4)*	226 Hendrie Street	Residential	60	68	-8	58	68	-10
R10	401 Edsel Ford East St.	Residential	66	72	-6	66	72	-6
R11	530 Kirby Avenue	Residential	59	66	-7	64	66	-2
R12 (5)*	5918 St Antoine (Elaine Apartments)	Residential	67	75	-8	66	74	-8
R13	Building # 27- End unit Palmer East Street	Residential	60	68	-8	61	69	-8
R14	5359 Chrysler Street	Residential	67	72	-5	64	73	-9
R15 (6)*	2258 Harper Avenue	Residential	70	75	-5	70	74	-4
R16	3156 Harper Avenue	Residential	69	76	-7	71	76	-5
R17 (7)*	3733 Holborn Street	Residential	71	72	-1	69	72	-3
R18	6443 Concord Avenue	Residential	70	72	-2	67	74	-7

Table 5-18 (continued): Comparing Measured Existing Noise Levels and TNM2 Predicted Existing Noise Levels during Peak AM, PM Travel Time Periods

Site #	Description of Monitoring Location	Land Use	Measured and Predicted Noise Levels L_{eq} (1-hour) dBA					
			Measured	TNM2 Existing	AM Calibration Factors	Measured	TNM2 Existing	PM Calibration Factors
			AM Time Period			PM Time Period		
R19 (8)*	Kettering H. S. Van Dyke Avenue	Institutional	66	72	-6	66	74	-8
R20 (9)*	6400 Seminole Avenue	Residential	67	71	-4	65	73	-8
R21	6161 Burns Avenue	Residential	64	75	-11	65	77	-12
R22	5060 McClellan Street	Residential	61	64	-3	66	66	0
R23	6035 Pennsylvania Avenue	Residential	62	70	-8	63	72	-9
R24	6112 Cadillac Avenue	Residential	67	70	-3	66	73	-7
R25	6000 Hurlbut Avenue	Residential	61	75	-14	61	76	-15
R26	5775 French Road	Residential	69	73	-4	70	76	-6
R27	5857 Springfield Street	Residential	63	73	-10	65	75	-10
R28	6074 Beniteau Avenue	Residential	63	65	-2	61	68	-7
R29 (13)*	Wayne County Comm. College - East Campus	Institutional	61	67	-6	62	69	-7
R30	6062 Gunston Street	Residential	64	72	-8	64	74	-10

* *Numbers shown in parentheses with asterisks are the original receptor sites evaluated in the Jan 2001 DEIS (Report: FHWA-MI-EIS-01-01-D).*

Table 5-19: Summary of Baseline Noise Monitoring

Site #	Description	Land Use	Date	Time	Measured L_{eq} (1-hr) dBA
R1 (1)*	2541 Kirby Avenue	Residential	9/30/02	7:05 AM	67
			9/30/02	4:04 PM	67
			10/4/02	6:25 AM	66
R2	5468 Station Street	Residential	9/30/02	6:40 AM	64
			9/30/02	3:40 PM	66
R3 (2)*	5505 14th Street	Residential	9/30/02	6:15 AM	62
			9/30/02	3:15 PM	66
R4	5280 Avery Street	Residential	9/30/02	7:30 AM	63
			9/30/02	4:10 PM	61
R5	Research Park Apts. Trumbull Avenue	Residential	9/30/02	7:55 AM	64
			9/30/02	4:30 PM	64
R6	5647-End unit - (McCoy Townhouse)	Residential	9/30/02	8:00 AM	68
			9/30/02	4:35 PM	67
R7	5810 4th Street	Residential	9/30/02	8:25 AM	68
			9/30/02	5:25 PM	68
R8 (15)*	Alex Manoogian Hall - JC Lodge Street	Institutional	9/30/02	8:50 AM	69
			9/30/02	5:15 PM	69
			10/1/02	6:50 AM	65
R9 (4)*	226 Hendrie Street	Residential	9/30/02	9:15 AM	60
			9/30/02	6:10 PM	58
R10	401 Edsel Ford East Street	Residential	10/1/02	6:20 AM	66
			10/1/02	3:40 PM	66
			10/4/02	7:15 AM	65
R11	530 Kirby Avenue	Residential	9/30/02	9:15 AM	59
			9/30/02	6:10 PM	64
R12 (5)*	5918 St. Antoine (Elaine Apartments)	Residential	10/1/02	6:20 AM	67
			10/1/02	3:15 PM	66
R13	Building # 27- End unit Palmer East St.	Residential	10/1/02	6:45 AM	60
			10/1/02	4:05 PM	61
R14	5359 Chrysler Street	Residential	10/1/02	7:10 AM	67
			10/1/02	4:10 PM	64
R15 (6)*	2258 Harper Avenue	Residential	10/1/02	7:35 AM	70
			10/1/02	4:35 PM	70
R16	3156 Harper Avenue	Residential	10/1/02	8:00 AM	69
			10/1/02	5:00 PM	71
R17 (7)*	3733 Holborn Street	Residential	10/1/02	8:25 AM	71
			10/1/02	5:25 PM	69
R18	6443 Concord Avenue	Residential	10/1/02	8:50 AM	70
			10/1/02	5:50 PM	67
			10/4/02	8:45 AM	68
R19 (8)*	Kettering H. S., Van Dyke Avenue	Institutional	10/1/02	8:55 AM	66
			10/1/02	5:55 PM	66
R20 (9)*	6400 Seminole Avenue	Residential	10/1/02	9:20 AM	67
			10/1/02	6:20 PM	65

Table 5-19 (continued): Summary of Baseline Noise Monitoring

Site #	Description	Land Use	Date	Time	Measured L_{eq} (1-hr) dBA
R21	6161 Burns Avenue	Residential	10/1/02	6:15 AM	64
			10/1/02	6:20 PM	65
R22	5060 McClellan Street	Residential	10/2/02	6:20 AM	59
			10/2/02	3:15 PM	66
			10/4/02	7:45 AM	61
R23	6035 Pennsylvania Avenue	Residential	10/2/02	7:05 AM	62
			10/2/02	3:40 PM	63
R24	6112 Cadillac Avenue	Residential	10/2/02	9:20 AM	67
			10/2/02	5:55 PM	66
R25	6000 Hurlbut Avenue	Residential	10/2/02	7:10 AM	61
			10/2/02	3:45 PM	61
R26	5775 French Road	Residential	10/2/02	9:15 AM	69
			10/2/02	3:40 PM	70
R27	5857 Springfield Street	Residential	10/2/02	7:35 AM	63
			10/2/02	4:10 PM	65
R28	6074 Beniteau Avenue	Residential	10/2/02	8:50 AM	61
			10/2/02	5:25 PM	61
			10/4/02	8:20 AM	63
R29 (13)*	Wayne Co. Comm. College – E. Campus	Institutional	10/2/02	8:00 AM	61
			10/2/02	4:35 PM	62
R30	6062 Gunston Street	Residential	10/2/02	8:25 AM	64
			10/2/02	5:00 PM	64

** Numbers shown in parentheses with an asterisk are the original receptor sites evaluated in Jan 2001 DEIS (Report: FHWA-MI-EIS-01-01-D).*

Table 5-20: Summary of I-94 TNM2 Noise-Level Predictions

Site #	Description	2002 FEIS Land Use	TNM2 Predicted Noise Levels								MDOT Impact Yes or No	
			2001 DEIS Existing Conditions*** L_{eq} (1-hr), dBA		2025 No-Build Conditions L_{eq} (1-hr), dBA		2025 Recommended Alternative Conditions L_{eq} (1-hr), dBA		Recommended Alternative Minus Existing L_{eq} (1-hr), dBA			
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
R1 (1)*	2541 Kirby Avenue	Residential	67	67	67	66	72	71	5	4	Yes	Yes
R2	5468 Station Street	Residential	64	66	62	63	66	68	2	2	Yes	Yes
R3 (2)*	5505 14th Street	Residential	62	66	62	64	62	65	0	-1	No	No
R4	5280 Avery Street	Residential	63	61	63	58	63	61	0	1	No	No
R5	Research Park Apts.-Trumbull Avenue	Residential	64	64	63	61	62	62	-2	-2	No	No
R6	5647-End unit - (McCoy Townhouse)	Residential	68	67	68	65	67	65	-1	-2	Yes	No
R7	5810 4th Street	Residential	68	68	68	66	65	65	-3	-3	No	No
R8 (15)*	Alex Manoogian Hall - JC Lodge Street	Institutional	69(44) **	69(44) **	68(43) **	67(42) **	66(41) **	66(41) **	-3	-3	Yes(No) **	Yes(No) **
R9 (4)*	226 Hendrie Street	Residential	60	58	61	60	67	65	7	7	Yes	No
R10	401 Edsel Ford East Street	Residential	66	66	65	66	69	70	4	4	Yes	Yes
R11	530 Kirby Avenue	Residential	59	64	60	66	68	73	9	9	Yes	Yes
R12 (5)*	5918 St. Antoine (Elaine Apartments)	Residential	67	66	67	68	68	67	1	1	Yes	Yes
R13	Building #27-End unit Palmer East Street	Residential	60	61	62	63	64	64	4	3	No	No
R14	5359 Chrysler Street	Residential	67	64	67	64	67	64	0	0	Yes	No
R15 (6)*	2258 Harper Avenue	Residential	70	70	71	70	72	73	2	3	Yes	Yes
R16	3156 Harper Avenue	Residential	69	71	68	70	72	75	3	3	Yes	Yes
R17 (7)*	3733 Holborn Street	Residential	71	69	72	69	75	73	3	4	Yes	Yes
R18	6443 Concord Avenue	Residential	70	67	71	65	73	69	4	3	Yes	Yes
R19 (8)*	Kettering High School-Van Dyke Avenue	Institutional	66(41) **	66(41) **	68(43) **	64(39) **	71(46) **	69(44) **	5	4	Yes(No) **	Yes(No) **
R20 (9)*	6400 Seminole Avenue	Residential	67	65	68	62	72	67	5	2	Yes	Yes
R21	6161 Burns Avenue	Residential	64	65	65	62	67	66	3	1	Yes	Yes

Table 5-20 (continued): Summary of I-94 TNM2 Noise Levels Predictions

Site #	Description	Land Use	TNM2 Predicted Noise Levels								MDOT Impact Yes or No	
			2001 DEIS Existing Conditions*** L_{eq} (1-hr), dBA		2025 No-Build Conditions L_{eq} (1-hr), dBA		2025 Recommended Alternative Conditions L_{eq} (1-hr), dBA		Recommended Alternative Minus Existing L_{eq} (1-hr), dBA			
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
R22	5060 McClellan Street	Residential	61	66	62	66	62	67	2	0	No	Yes
R23	6035 Pennsylvania Avenue	Residential	62	63	64	62	62	62	1	-1	No	No
R24	6112 Cadillac Avenue	Residential	67	66	69	64	72	67	5	1	Yes	Yes
R25	6000 Hurlbut Avenue	Residential	61	61	63	59	66	64	4	4	Yes	No
R26	5775 French Road	Residential	69	70	70	67	74	71	5	2	Yes	Yes
R27	5857 Springfield Street	Residential	63	65	65	62	67	66	4	-1	Yes	Yes
R28	6074 Beniteau Avenue	Residential	63	61	65	60	64	60	0	1	No	No
R29 (13)*	Wayne County Community College East Campus	Institutional Residential	61(36) **	62(37) **	63(38) **	61(36) **	62(37) **	62(37) **	1	-2	No(No) **	No(No) **
R30	6062 Gunston Street	Residential	64	64	67	63	68	67	4	-2	Yes	Yes

** Numbers shown in parentheses with asterisks are the original receptor sites evaluated in the Jan 2001 DEIS (Report: FHWA-MI-EIS-01-01-D).*

*** Numbers shown in parentheses with double asterisks (**) are interior noise levels at receptor sites R8, R19, and R29 all FHWA Category "E" land uses.*

****These are TNM predicted noise levels adjusted to agree with the measured noise levels*

5.6.6.2 MDOT Noise Barrier Policy

In the interest of public health and welfare, the MDOT will abate highway traffic noise impacts on developed land adjacent to highway right-of-way where feasible and reasonable (as defined below) through *Type I* programs. Type I projects include proposed federal and federal-aid highway projects for either of these situations:

- Construction of a highway at a new location; and
- Physical alteration of an existing highway and the alteration significantly changes either the horizontal or vertical alignment or increases the number of through-traffic lanes.

The I-94 Rehabilitation Project is defined as a Type I highway improvement project. The general feasibility and reasonableness requirements for noise-barrier construction, for both Type I and Type II highway improvement projects, are:

- Noise abatement will be provided only for (1) zoned residential land uses and (2) publicly used (or non-profit) institutional structures such as hospitals, libraries, and schools when a substantial reduction can be achieved.
- Noise abatement is considered feasible and reasonable if noise levels can be reduced by 6 dBA or more, and the cost per benefiting residence is at or below a threshold level that changes by year of analysis (which for this analysis was $34,220 in 2002 dollars). The actual noise barrier cost comprises two components: (1) the cost of the noise wall above the ground and (2) the footing cost.
- For the above ground portion of the noise barrier, the MDOT uses $23.77 (2002 dollars) per square foot-unit cost factor (barrier height times length times unit cost). The footing cost is determined by multiplying the required linear length of the noise wall times the footage cost, which is $219.60 (2002 dollars). The sum of these two cost components must not exceed $34,220 dollars per benefited residence.
- Noise abatement will be provided if the construction cost does not exceed $34,220 (in 2002 dollars) per benefiting residence. The number of benefiting residential units shall include all dwelling units (such as rental units, mobile homes, and each unit in a multi-family building), where the decrease in noise level is predicted to be 5 dBA or more. If it is determined during design that the project will cost more than $34,220 (in 2002 dollars) per benefiting residence, the proposed mitigation will be re-evaluated. The mitigation might be eliminated from further consideration unless the affected local jurisdiction(s) agrees to pay the additional cost.
- When abatement is proposed, noise barriers should be a minimum of 183 meters (600 feet) long, a maximum of 7.5 meters (25 feet) high, and designed to provide a minimum decrease of 6 dBA (substantial decrease) in predicted noise levels.
- The MDOT will not provide maintenance for the aesthetic appearance of the residential side of any barrier.
- Noise barriers will be constructed only along the shoulder of the roadway where guardrails otherwise would be present. The MDOT does not want the placement of a

noise barrier to cause safety problems, detract from the roadway's operation, or require extra strength to withstand vehicle impact.

- Since it is generally known that commercial and industrial sites prefer that their visibility not be reduced, existing sites and sites expected to convert to a commercial or industrial land use will not receive noise abatement.
- The MDOT will furnish the results of all highway traffic noise analysis to the local government and will encourage local communities to practice noise-compatible development. Local coordination will be accomplished through distribution of environmental documents and noise study reports.

5.6.6.3 Specific Abatement Requirements for Type I Projects

The following items are specific abatement requirements for Type I projects:

- A traffic noise analysis will be done for developed lands and undeveloped lands where development is planned, designed, and programmed. Development will be deemed to be planned, designed, and programmed if a noise-sensitive use such as a residence, school, hospital, and so forth has received a building permit.
- Where noise impacts are expected to occur, noise abatement will be considered and implemented, if found feasible and reasonable, as defined in this document. For example, predicted future highway traffic noise levels are one decibel below or greater than the federal noise abatement criteria or 10 dBA above noise levels from existing conditions, as measured with a sound-level meter.
- The development has to be present or committed to (construction started) before the date of public knowledge. The date of public knowledge will be the date that a project's environmental analysis and documentation is approved (that is, the date of approval of a Categorical Exclusion [CE], Finding of No Significant Impact [FONSI], or Record of Decision [ROD]). After this date, the MDOT is no longer responsible for providing noise abatement for new development that occurs adjacent to the proposed project. Provision of such abatement becomes the responsibility of local governments and private developers.
- The MDOT will continue to maintain the trunk-line side of the barrier as well as the integrity of the structure. The exception to this is when the barrier is proposed on the residential side of a service drive. In this case, the MDOT will maintain the structural integrity of the barrier for a period of five years. At the end of the five years, the local jurisdiction must accept ownership and maintenance of the barrier. A resolution stating the willingness of the local jurisdiction(s) to accept ownership of the barrier will be required. Prior to construction, the MDOT will enter into a formal agreement with the affected jurisdiction(s).
- For highway projects along the new alignment, the combination of air conditioning and insulation will be considered a mitigation measure for residential land use if one of the following is true:

  There is a 30 dBA or greater noise level increase.

  If the absolute noise level is 75 dBA or more and no other abatement measures are feasible.

5.6.6.4 Noise Abatement Findings

Noise-barrier feasibility and reasonableness were evaluated at 19 of the 21 impacted locations identified in Table 5-21: R1, R2, R6, R10, R11, R12, R14 – R21, R24, R25, R26, R27, and R30. Impacts identified at sites R9 and R22 were not evaluated for abatement consideration. At R9, the noise barrier would have to be broken into two 335-foot-long segments in order to accommodate a proposed build design ramp which bisects the area. In accordance with the 1996 MDOT Noise Abatement Policy Guidelines, noise barriers must be a minimum length of 600 feet to be considered acceptable. In addition, several non-residential buildings located in the general area would have to be removed in order to accommodate the two noise barrier segments. For these reasons, a noise barrier was not evaluated at R9.

Residential receptor site R22 is situated behind several commercial properties and noise walls are usually not considered in areas adjacent to commercial properties. Noise abatement consideration is generally limited to the FHWA Category "B" land uses which does not include commercial properties. In addition, noise level increases reported at R22 are more likely the result of traffic noise generated from Gratiot Road which is significantly closer to R22. This is further illustrated by comparing predicted future build noise level estimates at R23, which is located in the same general area as R22, but is further away from Gratiot Road and closer to I-94. At R23, future build noise levels are below the 66 dBA impact threshold and show little change from existing conditions; this is more indicative of I-94 build traffic noise influence in this area. For these reasons, a noise barrier was not evaluated adjacent to R22.

The FHWA TNM2 traffic noise model was used to investigate the effectiveness of all noise walls. Table 5-21 summarizes the noise abatement analysis. All investigated noise barriers satisfy the MDOT acoustic requirements and achieve the required minimum six-decibel-or-more noise reduction.

Noise barrier cost is determined by the sum of two components: (1) the footing cost based on a $219.60 linear foot (year 2002 dollars) cost factor and (2) the square foot cost of the noise wall above the ground established as $23.77 per square foot (year 2002 dollars). Of the 14 proposed noise barrier locations investigated, three stay below the MDOT maximum unit cost limit of $34,220 (year 2002 dollars) per benefited property. They are proposed noise barriers locations B3, B5, and B7, depicted in Figure 5-11. Consequently, only these three noise barrier locations satisfy both the cost and acoustic components of the MDOT's 1996 noise abatement policy guidelines for feasibility and reasonableness. Noise barriers that do not satisfy these guidelines need not be considered further.

Potential mitigation measures pertaining to construction noise are described in Chapter 7.

5.7 Vibration

The information contained in Section 5.7 of the DEIS remains valid.

Table 5-21: Summary of Noise Abatement Analysis to Satisfy the MDOT Criteria

Barrier #	Nearest Monitoring Receptor Location	(1) Achieved Noise Reduction (dBA)	Barrier Length (Feet)	(2) Beginning Point of Noise Wall	Barrier Height (feet)	(3) Estimated Barrier Cost ($)	Number of Benefited Properties	Estimated Cost per Benefited Property ($)	Barrier Effectiveness		MDOT Criteria Satisfied (Yes/No)
									(4) Acoustic (Yes/No)	(5) Cost (Yes/No)	
B1	R1	7	1,185	190’ west of Linwood	16	$710,905	1	$710,905	Yes	No	No
B2	R2	11	1,733	585’ west of Linwood	16	$1,063,658	9	$118,184	Yes	No	No
B3	R6	8	890	870’ east of Trumbull	10	$406,997	12	$33,916	Yes	Yes	Yes
B4	R10	8	1,455	80’ east of Woodward	16	$872,884	12	$72,740	Yes	No	No
B5	R-11	7	1521	40’ east of Brush	16	$912,478	34	$26,838	Yes	Yes	Yes
B6	R12	6	625	180’ east of Beaubien	20	$434,375	4	$108,594	Yes	No	No
B7	R14	10	1,801	250’ north of Ferry	12	$909,217	33	$27,552	Yes	Yes	Yes
B8	R15	6	999	45’ east of St. Aubin	16	$599,320	8	$74,915	Yes	No	No
B9	R16	9	1,991	Center Line of Grandy	12	$1,005,136	9	$111,682	Yes	No	No
B10	R17	6	729	265’ east of Moran	24.5	$584,362	3	$194,787	Yes	No	No
B11	R18	8	1,179	210’ west of Concord	16	$707,306	4	$176,827	Yes	No	No
B12	R19,	10	2,523	70’ east of Concord	10	$1,153,768	14	$82,412	Yes	No	No
B13	R20	11	3,348	60’ east of Van Dyke	16	$2,008,532	22	$91,297	Yes	No	No
B-14	R 21	11	3,215	65’ east of Van Dyke	10	$1,470,220	24	$61,259	Yes	No	No
B15	R25	12	1,629	Center Line of Hurlbut	10	$744,942	16	$46,559	Yes	No	No
B16	R24, R26	10	1,265	Center Line of Bewick	16	$758,899	13	$58,377	Yes	No	No
B17	R27	12	757	50’ east of French	10	$346,176	5	$69,235	Yes	No	No
B18	R30	12	1,046	240’ east of NB Conner	10	$478,336	8	$59,792	Yes	No	No

Notes:

1. Insertion loss shown is maximum value at the most benefited property.
2. Estimated cost of the barriers is based on the following formula: (linear ft. x $219.60) + (wall surface area in sq. ft. x $23.77) as recommended by the MDOT documents.
3. Acoustic effectiveness of a barrier was judged by satisfying the required insertion loss necessary to reduce future road traffic noise levels by at least 6 dB.
4. Cost-effectiveness was based on the MDOT barrier cost limit of $34,220 per benefited property.
5. The beginning point of a noise wall is referenced to the centerline of a nearby cross street and is either the westernmost or northernmost end of the wall.

5.7.1 Existing Conditions

There are a number of structures located near I-94, I-75, and M-10 and their service drives including several historic buildings. No vibration impacts to properties along I-94 have been identified since circulation of the DEIS.

5.7.2 Impacts

Vibration that is created by vehicles moving along a roadway or by construction operations, such as pile driving or pavement breaking, can travel through the underlying soil to adjacent structures. If the vibration is of sufficient magnitude, the nearby structures might be susceptible to damage due to usage, old age, poor condition, or other causes. The impact of the vibration is affected by the size of the vehicle, the speed of the vehicle, the pavement structure, the roadway condition, the nature of the underlying soils (loose soils, compacted soils, or rock), the distance from the road to the structure, and the building's foundation.

5.7.3 Mitigation

Basement surveys will be offered in areas where vibration impacts could occur. Structures within a specified distance from construction operations such as bridge/pavement removal or piling/steel sheeting installation will be reviewed. These areas will be identified during final design. Vibration impacts are not anticipated at this time.

5.8 Contaminated Sites

For the DEIS, a contamination assessment was conducted using data acquired in 1998. That assessment was based on an environmental database search by Environmental Data Resources, Inc. (EDR), together with a review of Sanborn fire insurance maps, soils maps, environmental maps, aerial photography, and local city directories. For this Final EIS, a Project Area Contamination Survey (PACS) of the project corridor was conducted to determine the potential for contamination of the I-94 right-of-way from adjacent properties and business operations.

If further investigation indicates that soils have been impacted, requirements for handling impacted soils and worker safety measures will be developed and incorporated into final construction plans. If contaminated soils are present in the M-10 and I-75 interchange areas where multi-level interchanges are planned, consideration should be given to structure foundations that do not involve excavation or drilling to depths where contaminated soils might exist. If excavated soils and/or drilling waste are contaminated, they could require disposal in an approved landfill. If pile-supported substructures are a viable option, wastes that require special handling could be limited.

If further investigation results in finding multiple areas of contamination, soils will be characterized and areas with similar characteristics will be identified. Moving soils between areas with similar characteristics would not change the character or degree of contamination in those areas. It would allow some contaminated soils to be re-used within the project and limit the amount of soil to be disposed of in a landfill. Care would have to be taken to protect

workers, provide proper storage of soils until re-used, assure only soils with similar characteristics are mixed, prevent any release of contaminants off-site, and implement safeguards to contain the contamination and assure the compatibility of future land uses.

The following engineering and monitoring controls should be used when earthwork is performed near any of the sites of concern:

1. Appropriate stormwater and sedimentation controls should be constructed to minimize the potential for spreading potentially contaminated material to offsite areas. Equipment used onsite should be free of all soil and site material before leaving any potentially contaminated site.
2. Any necessary dewatering activities in areas with potential contamination should be assessed to determine the most feasible method to limit the amount of water removed. Any water removed should be safely contained and tested prior appropriate disposal.
3. Standard mitigation measures should include the development of a risk management plan that includes a work health and safety component.
4. During invasive work, properly trained personnel should be available to screen any potentially contaminated unearthed soils for possible hazards. Any potentially contaminated material should be stockpiled on plastic sheeting and covered with additional plastic sheeting at the end of each workday. All impacted material should be properly disposed.
5. Utility corridors backfilled with permeable fill can act as a conduit in which contaminants can migrate long distances from a source area. Therefore, if invasive work is conducted in a utility corridor where contaminated materials are encountered or near a known site of environmental contamination, low permeability backfill should be used to minimize the potential migration of contaminants through the utility corridor.
6. All groundwater monitoring wells impacted by the construction should be properly abandoned.

The above mentioned engineering and monitoring controls will: (1) aid in identifying contaminated material, (2) reduce the potential for offsite migration of contaminants, (3) limit and/or eliminate spreading of contamination through improper storage or disposal of impacted soil, and (4) protect human health and the environment.

5.8.1 Existing Conditions

The methodology generally followed the procedures of the American Society for Testing and Materials (ASTM) Phase 1 Environmental Site Assessment E-1527-00. The sites were researched for evidence of documented contamination and evaluated for potential contamination with respect to the anticipated construction impacts.

In addition to sites evaluated that are in proximity to the proposed improvements, a supplemental evaluation of federally mandated cleanup activities (Superfund sites) within 1 mile of the proposed improvements was completed. Eleven sites located within 1 mile of the project area were identified on the federal CERCLIS (Superfund).

Asbestos was used extensively until the 1970s when the US Environmental Protection Agency (U.S. EPA) banned certain applications with the establishment of the Asbestos National Emissions Standards for Hazardous Air Pollutants (NESHAP) regulation, promulgated under Section 112 of the Clean Air Act on April 6, 1973 (Revised 1990). Structures designated for demolition with this project were evaluated to determine if they are subject to Asbestos NESHAP regulation.

After identification, a rating system was used to further subdivide sites. The ratings included LOW, MEDIUM, and HIGH—generally defined as follows:

LOW: The former or current operation has a hazardous waste generator ID number or deals with hazardous materials; however, based on best available information, there is no reason to believe there would be any contamination involvement.

MEDIUM: Medium impacts are indicated due to a potential contaminated site identified adjacent to the proposed right-of-way. After a review of best available information, indications are found that identify known or likely soil and/or water contamination and that the problem does not need remediation, is being remediated (air stripping of the groundwater, etc.), or that continued monitoring is required.

HIGH: High impacts are based on a contamination site being listed as potential in the proposed right-of-way. After a review of best available information, there is a potential for contamination issues during construction. Further assessment will be required after alignment selection to determine the actual presence and/or levels of contamination and the need for remedial action.

Table 5-22 below provides a summary of the findings from the Project Area Contamination Study.

Table 5-22: Contaminated Sites

Rating	No. of Sites
LOW	15
MEDIUM	15
HIGH	19

The 49 potential contaminated sites are shown in Appendix H with the risk evaluation ratings.

For additional information regarding contamination, refer to the PACS that was prepared as a separate document.

5.8.2 Mitigation

If further investigation indicates that soils have been impacted, requirements for handling impacted soils and worker safety measures will be developed and incorporated into final construction plans. If contaminated soils are present in the M-10 and I-75 interchange areas where multi-level interchanges are planned, consideration should be given to structure foundations that do not involve excavation or drilling to depths where contaminated soils might exist. If excavated soils and/or drilling waste are contaminated, they could require disposal in an

approved landfill. If pile-supported substructures are a viable option, wastes that require special handling could be limited.

If further investigation results in finding multiple areas of contamination, soils will be characterized and areas with similar characteristics will be identified. Soils will be handled per state of Michigan standards.

Standard mitigation for contaminated sites should include appropriately abandoning all groundwater monitoring wells; evaluation of new utility cuts through contaminated areas (use appropriate backfill where shallow contaminated groundwater will be intercepted); and appropriate disposal of contaminated media generated during construction (soil and groundwater). Standard mitigation should also include development of a risk management plan which includes a worker health and safety component.

5.9 Water Quality

5.9.1 Existing Conditions

The Michigan Department of Environmental Quality (MDEQ) Land and Water Management Division (LWMD) were contacted and a site inspection conducted to determine the location of any regulated watercourses within the project area (see attached copy of letter). Neither the site inspection nor MDEQ-LWMD correspondence identified any regulated watercourses within the I-94 Rehabilitation Project area. The Detroit River, located approximately 3 miles southeast of the project area, is the closest surface water body.

5.9.2 Potential Impacts

Stormwater. Stormwater from the I-94 Rehabilitation area enters the Detroit Water & Sewerage Department (DWSD) combined sewer overflow system, where the stormwater is treated before entering the Detroit River. The DWSD was contacted to determine their schedule for separating the combined sewer system and identify pollution control measures currently in place at existing pump stations. DWSD representatives indicated that there are no plans to separate the combined system and that the DWSD is exempt from separating the system within the project area. DWSD representatives also indicated that there are no specific pollution control measures associated with the current pump stations; however, oil and material that collect in the sumps is removed during routine maintenance of the pump stations. No pollution control measures were identified in the pump station as-built drawings.

Storm water runoff from the paved areas of the Recommended Alternative will be increased over the existing paved surface areas. The increase in surface area has been calculated based on the October 12, 1989 Stipulation for Settlement and Entry of Consent Judgement (Settlement) the Michigan Department of Transportation and the city of Detroit. Per the Settlement, changes to the surface area "shall be measured on the basis of length of the roadway, including ramps, multiplied by the width of the through lanes or ramps and left turn lanes of the road surface only." The 1989 Settlement identified I-94, from Wyoming Road to Kingsville Road as being 13.00 miles in length with 113.46 acres of through lane acres and 12.95 ramp acres. The Recommended Alternative increases the paved through lanes by 20.0 acres and the ramps by 5.0 acres. The impervious factor (C) within the corridor remains the same: 0.75.

Construction activities, increased traffic volume, and freeway maintenance activities are expected to increase the amount of pollutants contained in the stormwater runoff from the project area. Use of I-94 by motor vehicles will cause pollutants commonly associated with automobiles and trucks to be introduced onto the road surface and adjacent rights-of-way. The pollutants can include greases, oils, heavy metals, fuels, and other fluids. Larger quantities of pollutants might be released to the project area during vehicle accidents or when inadvertent spills and leaks occur. Freeway maintenance activities, such as de-icing and herbicides application in the freeway right-of-way, also have the potential to increase the contaminant load in the surface water runoff. Erosion and sediment transport are expected to be greatest during construction activities associated with the project. Leaks and spills from construction equipment and/or equipment storage areas also can occur during the construction phase. The potential for impacts related to contaminated sites is discussed in Section 5.8 of this FEIS.

Contaminated Sites. A Project Area Contamination Study (PACS) was conducted in May 2004**.** Even though many of the sites are rated as LOW, MEDIUM, or HIGH, none of the 49 sites identified in the PACS is expected to impact the potable groundwater resources in the project area. The significant confining layer encountered between the ground surface and the available potable groundwater prohibits the migration of contamination to the underlying aquifer.

Surface water runoff can be impacted during construction activities conducted in the area of contaminated sites. Impacts to surface water can be limited by avoiding contaminated sites, containing contamination on the site in question, and/or properly restricting water flow over and through unearthed contamination.

The following engineering and monitoring controls should be used when earthwork is performed near any of the sites of concern:

1. Appropriate stormwater and sedimentation controls should be constructed to minimize the potential for spreading potentially contaminated material to offsite areas. Equipment used onsite should be free of all soil and site material before leaving any potentially contaminated site.

2. Any necessary dewatering activities in areas with potential contamination should be assessed to determine the most feasible method to limit the amount of water removed. Any water removed should be safely contained and tested prior appropriate disposal.

3. Standard mitigation measures should include the development of a risk management plan that includes a work health and safety component.

4. During invasive work, properly trained personnel should be available to screen any potentially contaminated unearthed soils for possible hazards. Any potentially contaminated material should be stockpiled on plastic sheeting and covered with additional plastic sheeting at the end of each workday. All impacted material should be properly disposed.

5. Utility corridors backfilled with permeable fill can act as a conduit in which contaminants can migrate long distances from a source area. Therefore, if invasive work is conducted in a utility corridor where contaminated materials are encountered or near a known site of environmental contamination, low permeability backfill should be used to minimize the potential migration of contaminants through the utility corridor.

6. All groundwater monitoring wells impacted by the construction should be properly abandoned.

The above mentioned engineering and monitoring controls will: (1) aid in identifying contaminated material, (2) reduce the potential for offsite migration of contaminants, (3) limit and/or eliminate spreading of contamination through improper storage or disposal of impacted soil, and (4) protect human health and the environment.

5.9.3 Water Quality Mitigation

General Mitigation. Proposed activities will enhance the overall safety of the I-94 Rehabilitation Area. Enhanced safety will result in decreased auto accidents and subsequent release of automotive fluids. The Recommended Alternative will include a new underground inline drainage system that will positively impact water quality by reducing or eliminating surface detention and/or retention ponds. The drainage system will include oil/water separators, discharge controls, inline detention basins, and other features that will also reduce pollutants and sediments in the stormwater runoff. Maintenance operations such as catch basin cleaning and pavement sweeping will also reduce stormwater pollution. These features will minimize the potential negative effects on overall water quality. It is anticipated that the I-94 Rehabilitation Project will not have any substantial negative effect on the overall water quality of the project area. More specific mitigation measures regarding engineering controls and contaminated sites are discussed below.

Engineering Controls. The following engineering and monitoring controls will be applied to minimize the potential for impacts to surface water resources. These engineering/monitoring controls include, but are not limited to the following:

1. Direct discharge of surface water runoff into the DWSD sewer will be controlled through the use of design techniques such as inline detention basins. These systems reduce the pollutant and sediment loads by reducing the flow velocity of the water, allowing contaminant laden sediments to settle out. Oil/water separators also will be installed at the pump stations to remove oil from the stormwater runoff.

   The current maximum discharge rate of stormwater to the DWSD will be maintained through 1) the use of inline detention systems and 2) the pumping rates of the lift stations. Limiting the discharge rate to the current conditions will maintain the existing rate at which DWSD system is bypassed during heavy storm events. Therefore, by metering the discharge of stormwater to a rate no greater than the current conditions, bypass of the DWSD system will not occur earlier than under pre-improvement conditions.

   The engineering controls identified above will also reduce the pollutant/sediment load in the stormwater before it enters either: (1) the Detroit River during major storm events, or (2) the DWSD system during periods of normal flow.

2. During construction activities, the Soil Erosion and Sedimentation Control Act (Part 91, PA 451, 1994, as Amended) requires that sedimentation caused by highway construction be controlled before it leaves the freeway right-of-way or enters waters of the State. Sedimentation can be controlled with the use of riprap, erosion control netting, re-seeding activities, and protection of the natural vegetation outside the construction area.

The use of engineering/monitoring controls is expected to mitigate a substantial portion of the potential negative impacts to the surface water resources. Minimal pollutant loading to the Detroit River might occur during major storm events. However, the maximum rate of outflow to the DWSD will not change due to engineering controls installed as part of this project. Wayne County will be responsible for maintaining any and all engineering controls and pump stations installed as part of this project.

Contaminated Sites

A Project Area Contamination Study (PACS) was conducted in May 2004**.** Even though many of the sites are rated as LOW, MEDIUM, or HIGH, none of the 49 sites identified in the PACS is expected to impact the potable groundwater resources in the project area. The significant confining layer encountered between the ground surface and the available potable groundwater prohibits the migration of contamination to the underlying aquifer.

Surface water runoff can be impacted during construction activities conducted in the area of contaminated sites. Impacts to surface water can be limited by avoiding contaminated sites, containing contamination on the site in question, and/or properly restricting water flow over and through unearthed contamination.

The following engineering and monitoring controls should be used when earthwork is performed near any of the sites of concern:

1. Appropriate stormwater and sedimentation controls should be constructed to minimize the potential for spreading potentially contaminated material to offsite areas. Equipment used onsite should be free of all soil and site material before leaving any potentially contaminated site.
2. Any necessary dewatering activities in areas with potential contamination should be assessed to determine the most feasible method to limit the amount of water removed. Any water removed should be safely contained and tested prior appropriate disposal.
3. Standard mitigation measures should include the development of a risk management plan that includes a work health and safety component.
4. During invasive work, properly trained personnel should be available to screen any potentially contaminated unearthed soils for possible hazards. Any potentially contaminated material should be stockpiled on plastic sheeting and covered with additional plastic sheeting at the end of each workday. All impacted material should be properly disposed.
5. Utility corridors backfilled with permeable fill can act as a conduit in which contaminants can migrate long distances from a source area. Therefore, if invasive work is conducted in a utility corridor where contaminated materials are encountered or near a known site of environmental contamination, low permeability backfill should be used to minimize the potential migration of contaminants through the utility corridor.
6. All groundwater monitoring wells impacted by the construction should be properly abandoned.

The above mentioned engineering and monitoring controls will: (1) aid in identifying contaminated material, (2) reduce the potential for offsite migration of contaminants, (3) limit and/or eliminate spreading of contamination through improper storage or disposal of impacted soil, and (4) protect human health and the environment.

5.10 Natural Resources

The selection of the Recommended Alternative, which has the least amount of additional right-of-way, reduces the potential impacts of the project on natural resources to a minimum. Any impacts on natural resources are expected to be very limited.

5.10.1 Wetlands and Floodplains

The discussion of wetlands and floodplains in the DEIS remains valid. No wetlands or floodplains are located in the project area.

5.10.2 Wild and Scenic Rivers and Natural Areas

The discussion of wild and scenic rivers and natural areas in the DEIS remains valid. No wild and scenic rivers or natural areas are located in the project area.

5.10.3 Vegetation and Wildlife

The discussion of vegetation and wildlife in the DEIS remains valid. No long-term impacts are expected to occur.

5.10.4 Threatened and Endangered Species

The discussion of threatened and endangered species in the DEIS remains valid. While four threatened plant species were known to occur in the vicinity of the project area, a field survey did not identify any federal- or state-listed threatened or endangered species in the project area. State and federal lists of threatened and endangered species will be consulted again prior to construction to verify that no new reports have occurred in the project area.

5.10.5 Geological Resources

The discussion of geology in the DEIS remains valid. While the project will involve earthmoving activities to rehabilitate the existing roadway, it is expected to have only minor effects, if any, on the area geology. No mitigation is necessary.

5.10.6 Soils

The discussion of soils in the DEIS remains valid. The glacial till soils present in the project area have been disturbed previously, and any impacts associated with the rehabilitation of I-94 will be minor. No mitigation is necessary.

5.11 Cultural Resources

Section 106 of the National Historic Preservation Act of 1966, as amended (36 CFR 800), requires federal agencies to take into account the effects of an undertaking on historic properties. In accordance with Section 106, archaeological and architectural reviews and surveys were performed in the project area to identify cultural resources that might be listed on, or eligible for listing on, the National Register of Historic Places (NRHP). The reviews and surveys are described further in Section 5.11 of the DEIS and in Chapter 6 of this FEIS.

5.11.1 Archaeological Resources

No archaeological resources are known to exist in the Area of Potential Effect (APE), and the Recommended Alternative will not impact archaeological resources.

5.11.2 Historic Resources

The NRHP is authorized under Section 106 and contains a list of cultural resources worthy of preservation. The criteria for inclusion on the Register are described in Section 5.11.2 of the DEIS.

Although the DEIS described a number of historic resources that could be potentially affected by the project, only four historic resources were identified that would be affected by the DEIS Build Alternative. The Recommended Alternative requires less right-of-way than the DEIS Build Alternative; but it will still affect the four identified historic resources.

5.11.2.1 Existing Historic Resources Affected

The Recommended Alternative will affect the Woodbridge Neighborhood Historic District which is listed on the NRHP. It also will affect the I-94/M-10 interchange, the Square D/Detroit Fuse and Manufacturing Company Building, and the United Sound Systems Recording Studio which have been determined eligible for the NRHP. These properties were described in detail in Section 5.11.2.1 of the DEIS, with the exception of the Square D/Detroit Fuse and Manufacturing Company Building, which has been added since the DEIS. The Recommended Alternative does not impact the building that was listed in the DEIS at 5287 Trumbull.

Figure 5-12 updates the locations of historic resources within the corridor.

5.11.2.2 Impacts to Historic Resources

The Recommended Alternative's specific impacts on each of the historic resources are described below.

Figure 5-12A: Locations of Historic Resources

Figure 5-12B: Locations of Historic Resources

5.11.3 Woodbridge Neighborhood Historic District

The Recommended Alternative will move the proposed I-94 service drive (Kirby Avenue) south and will encroach up to approximately 40 feet into the Woodbridge District. The majority of District lots adjacent to the service drive are currently vacant. There are two exceptions to this: the house at 5287 Hecla Street (Figure 5-13 of the DEIS), and the commercial building at 5287 Trumbull Avenue. The house at 5287 Hecla Street will be acquired and removed as a result of the service drive shift, which is considered an adverse effect for the district. The commercial building at 5287 Trumbull Avenue, which was identified in the DEIS to be impacted, will not be affected and can remain in place. Parts of eight vacant lots also will be acquired to accommodate the service drive shift. The vast majority of the District and its buildings will remain intact after the rehabilitation of I-94 is complete.

The house at 5287 Hecla Street was listed as a contributing structure to the District in the National Register Nomination Form. The house at 5287 Hecla Street contributes to the Woodbridge Historic District, despite some exterior alterations, as an example of a smaller, working class, simple Queen Anne-style residence built in the latter part of the nineteenth century.

Traffic on the service drive (Kirby Avenue) between Fourteenth and Trumbull is expected to increase from approximately 200 vehicles in the peak hour, to approximately 800 vehicles in the peak hour in 2025 with the Recommended Alternative. Most of this traffic is expected to stay on the service drive in this area and not travel through the District. Traffic on Rosa Parks and Trumbull avenues south of I-94 is not expected to change significantly from current volumes to 2025 volumes with the Recommended Alternative. This is a further indication that increases in traffic on the service drive will not translate into more traffic in the Historic District. Trucks now avoid the low bridge clearances and other restrictions by traveling on Kirby, Forest, Warren, and Trumbull. Bridge clearances on I-94 and the service drives all will be increased to at least the current standard of 14 feet, 6 inches. Some of the truck traffic that currently uses neighborhood streets to avoid low clearances on I-94 is expected to return to I-94 and reduce truck traffic in the Historic District. The District is expected to retain its residential character.

The acquisition of vacant property and the house at 5287 Hecla Street at the edge of the district will have an adverse effect. The removal of this single building on the outskirts of the District will limit the overall effect. An increase in traffic on the service drive at the northern boundary of the District also might have an adverse effect; however, it is not expected to create more traffic within the District, and the effect of the traffic increase also will be limited.

5.11.4 I-94/M-10 Interchange

The I-94/M-10 interchange is historically important because it is the first freeway-to-freeway interchange in the Midwest to provide direct turning movements in all directions. The Recommended Alternative will replace the entire existing interchange with a new interchange consisting of a completely different ramp configuration. This will result in the removal of all existing pavement and structures and construction of a new interchange in the same location. This complete removal and replacement will result in an adverse effect.

5.11.5 United Sound Systems Recording Studio

The United Sound Systems Recording Studio was founded in 1933 and moved to the building at the corner of Second Street and the I-94 service drive. It was Detroit's first major recording studio and produced recordings by Miles Davis, Charlie Parker, John Lee Hooker, Jackie Wilson, and Smokey Robinson and the Miracles. The redesign of the I-94/M-10 interchange, using current standards, results in a shift of the mainline of the freeway to the north causing the off-ramp from westbound I-94 to M-10 to traverse the area currently occupied by the United Sound Systems Recording Studio building. In order to construct the ramp at this location, the United Sound Systems Recording Studios building would have to be acquired and removed. The removal of the building would be an adverse effect.

5.11.6 Square D/Detroit Fuse and Manufacturing Company Building

The building is located on the northeast quadrant of the I-94 and I-75 interchange. It is bordered by Piquette, Harper, Rivard, and Russell. The original, three-story Detroit Fuse and Manufacturing Company Building, designed by the architect Albert Kahn, was built in 1909 of reinforced concrete. The Detroit Fuse and Manufacturing Company was a pioneer in the development and manufacture of enclosed electrical safety switches. In 1917 the company changed its name to Square D and grew to become one of the largest suppliers of electrical supplies in the United States. The success of the company did not preclude a 107-day strike by roughly 1,200 United Electrical Workers-member employees of Square D in 1954, which erupted in violence and filled Detroit newspapers for several weeks. The Square D/Detroit Fuse and Manufacturing Company Building is significant for its historical associations with both Square D and the 1954 strike. Demolition of the Square D/Detroit Fuse and Manufacturing Company Building would be an adverse effect.

5.11.7 Mitigation of Impacts to Historic Resources

A Memorandum of Agreement (MOA) has been developed to address impacts to the four facilities mentioned in Sections 5.11.3 through 5.11.6. The mitigation of impacts to historic resources is described in Sections 6.5 and 7.8. A relocation plan will be developed for the house at 5287 Hecla Street in the hope the house can be moved to another suitable site within the Woodbridge Historic District. The I-94/M-10 interchange will be recorded to the SHPO standards prior to the initiation of any demolition to preserve a permanent record of its existence. The documentation would be provided to the SHPO and any appropriate archives as designated by the SHPO. Also as part of the MOA, copies of original plans and other materials relating to the design and construction of the interchange will be compiled and retained by the MDOT and copies will be given to the SHPO and any repositories as directed by the SHPO.

As part of the MOA, prior to the initiation of any demolition or construction activity affecting the building at 5840 Second Street, the MDOT will record the building which housed the United Sound Systems Recording Studios to the SHPO standards to create a permanent record of its existence. The documentation would be provided to the SHPO and any appropriate archives as designated by the SHPO. A survey of important music-related sites in the Detroit area will be conducted.

The Square D/Detroit Fuse and Manufacturing Company Building will have the building recorded to SHPO standards and an exhibit will be developed with the SHPO on the 1954 Square D strike.

5.12 Energy

The prediction of transportation energy usage involves a number of factors; for example:

- Driver behavior;
- Changes in existing land uses and travel patterns;
- Improvements in vehicle efficiency;
- Availability of other modal options; and
- Increases in population and employment in the Detroit metropolitan area.

The additional capacity provided by the Recommended Alternative will accommodate the projected 35 percent increase in the number of miles traveled by vehicles using I-94 in the project area. If other factors remain the same, the additional miles traveled will result in an increase in transportation energy usage. The increase in the number of vehicle miles traveled on I-94 in the project area and the associated energy use is very small when compared to the total number of vehicle miles traveled in the Detroit metropolitan area. According to the SEMCOG *2025 Regional Transportation Plan for Southeast Michigan* (June 2000), the total vehicle miles traveled in the Detroit area is expected to rise by 11.4 percent by 2025. The I-94 project will contribute about 2 percent of the expected area-wide increase.

The Recommended Alternative also might reduce congestion by allowing motor vehicles to operate more efficiently. The increased efficiency will offset, at least in part, the increased fuel usage resulting from more vehicle miles traveled. In addition, vehicles that might have traveled out of their intended route to avoid a congested I-94, now will be allowed to stay on an improved I-94. This could result in some reduction in the number of vehicle miles traveled.

The overall effect of the Recommended Alternative on transportation energy usage is expected to be limited.

5.13 Utilities

The discussion of utilities in Section 5.13 of the DEIS remains valid.

The Recommended Alternative requires less additional right-of-way than the DEIS Build Alternative, and as a result, will disturb fewer existing utilities. It will allow several existing service drive segments east of I-75 to remain in place. Since these service drives will not be relocated, any utilities located along them also will be allowed to remain in place and undisturbed. The result is a reduced impact on existing utility services compared to the impacts created by the DEIS Build Alternative.

5.14 Construction Impacts

The discussion of construction impacts in the DEIS remains valid. Some additional information is provided below to more specifically describe impacts resulting from the Recommended

Alternative. Construction operations such as pile driving or pavement-breaking also can cause impacts. Generally, those buildings closest to the roadway or construction operations are most susceptible to damage.

5.14.1 Traffic Flow

The Traffic Management Plan and public awareness and information programs described in the DEIS will be pursued as part of the Recommended Alternative.

5.14.1.1 I-94 Traffic

The Recommended Alternative would result in temporary impacts to traffic flow while freeway improvements are being constructed. These impacts would vary in location and duration and would be unavoidable consequences of the proposed action. Potential impacts would include traffic on the interstate slowing or stopping and causing increased congestion.

5.14.1.2 Mitigation

See Section 7.13 of this FEIS for a description of actions proposed to mitigate and minimize traffic impacts.

5.14.2 Emergency Services

The discussion of emergency services in the DEIS remains valid and will apply to the Recommended Alternative.

5.14.3 Air Quality

The description of air quality impacts contained in the DEIS is valid for the Recommended Alternative. Mitigation measures for the impacts beyond those described in the DEIS are described in FEIS Section 7.16.

5.14.4 Erosion Control and Water Quality

The erosion-related impacts described in the DEIS for the Practical Alternatives also will apply to the Recommended Alternative. Mitigation measures relating to soil erosion and erosion-related water quality are described in FEIS Section 7.3.

5.14.5 Noise

The DEIS indicated that passersby and individuals living or working near the project would be impacted by construction noise. That conclusion also applies to the Recommended Alternative. The Recommended Alternative has a narrower median and a two-lane service drive, thus it is not as wide from one side of the freeway to the other side as the DEIS Build Alternative. It also will be constructed in stages, and construction will not be underway on the whole project at any one time.

Even where construction operations are ongoing, some operations are noisier than others. Pile driving and jackhammers are noisy, while building forms or placing reinforcing steel for

concrete is relatively quiet. Noise levels will vary over time as construction locations and operations progress. In general, no one location will be subjected to loud noise for the entire multi-year construction period; however, most locations along the project will experience loud noise periodically with most of the activity confined to daytime hours. Indirect effects from noise are possible if the added noise and traffic cause homeowners to move away from the area. Any homeowners that move could be replaced by rental property and/or commercial development along the improved service drives.

5.15 Indirect (Secondary) and Cumulative Impacts

Indirect and cumulative effects are expected to occur as a result of the Recommended Alternative. The following analysis describes these effects respectively for each of the following topics: Land Use, Socioeconomic Resources, Community Facilities and Services, Pedestrian and Bicycle Mobility, Neighborhood Character and Community Cohesion, Environmental Justice, Mobility, Construction, Cultural Resources, Air Quality, Water Quality, and Noise.

5.15.1 Study Area Boundaries and Definitions

Indirect Effects. Typically, indirect effects occur at some future time and away from the proposed action. The Council on Environmental Quality (CEQ) defines indirect effects as "effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable" (1997). Indirect effects could include changes to land use and community cohesion, and to new commercial and/or industrial development, which can result in an increase in the number of new jobs available.

Indirect effects can occur some time in the future after construction of the Recommended Alternative is complete; these effects were considered up to 2025 (the 20-year planning horizon available from SEMCOG). The effects also can be removed in distance from the Recommended Alternative, the distance varying according to the parameter considered. For this analysis, the distance varied from the immediate right-of-way (visual resources) to region-wide (air quality).

Cumulative Effects. Cumulative effects result from an accumulation of actions that have occurred over time. These include all direct and indirect effects that occurred in the past, and any reasonably foreseeable actions. The analysis of cumulative effects considers a broader timeframe than direct or indirect effects; consequently, their geographical distribution may also be wider in scope. The CEQ defines cumulative effects as "effects, which result from the incremental effect of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (1997).

5.15.2 Indirect Effects

Land Use. Land-use change would be accelerated as a result of implementing the Recommended Alternative due to improved access to land that is currently vacant or underutilized. This induced change is expected to occur primarily:

- Where new service drives are being constructed; and

- From the I-75 interchange to the west end of the Indirect and Cumulative Effects (ICE) study area where infrastructure (water, sewer) exists, where consistent with land-use recommendations outlined in the city of Detroit's *Master Plan of Policies* (1992) and, subsequently, in the city's *Community Reinvestment Strategy (CRS)* (1997).

The CRS study included general guidelines for future redevelopment with the more in-depth planning completed "…to identify the assets, strengths, land use, and other reinvestment opportunities for individual neighborhoods in Detroit, and to recommend reinvestment priorities for the next five to ten years." The CRS is not an official city document for land-use guidance; rather, it is a visionary document. Detroit's *Master Plan of Policies* is the official guide for the city regarding future land use and development, and is currently being updated.

Socioeconomic Resources. Indirect effects are expected to include a slight increase in population and demographic shifts along the corridor as new housing develops or is built on vacant lands and existing commercial and industrial land uses are sustained with the rehabilitation of I-94, and the attendant improvement of the service drives. The Recommended Alternative provides opportunities to increase development and re-development. Specifically, the *Master Plan of Policies* recommends new and rehabilitated housing between West Grand Boulevard and I-94, on Virginia Park Street, and along Grand River Avenue and Joy Road. Projected declines in Detroit's population might slow as the Recommended Alternative provides opportunities to increase development plans for new housing or residential infill opportunities. The Recommended Alternative should positively affect the economy through improved transportation of goods, services and people, new business development, and expansion of existing businesses.

Community Facilities and Services. The Recommended Alternative would improve access to land near community facilities; this might result in construction of additional and revitalized housing and businesses. The increased population and business workforce would, in turn, require the services provided by these community facilities.

Non-Motorized (Pedestrian and Bicycle) Mobility. Improved sidewalks in the immediate vicinity of the Recommended Alternative and new sidewalks along new service drives would have the indirect effect of encouraging more residents and students to walk and bicycle in residential and neighborhood commercial areas. This would be most evident in high-density residential and civic/cultural areas, including the Wayne State University (WSU) campus; shops in the New Center Area, Wayne County Community College (WCCC), and the shopping center area in the vicinity of the Conner Avenue interchange. The Recommended Alternative includes service drives with sidewalks along the north and south sides of I-94 that would comply with the Americans with Disabilities Act (ADA) design guidelines. Continuous service drives with sidewalks also would be added to portions of M-10 and I-75 in close proximity to I-94. Throughout the corridor, service drives would be continuous with sidewalks that include appropriate crosswalks.

Neighborhood Character and Community Cohesion. Improved access as a result of the Recommended Alternative would improve community cohesion as traffic flow is improved within and between neighborhoods. However, an increase in traffic along the new service drives could be expected in residential areas where service drives currently do not exist. There are three neighborhoods south of I-94 where new segments of service drive would be constructed,

including a residential area from Burns Street to McClellan Street, and residential areas in the southeast corner of the Gratiot Avenue and Conner Avenue interchanges, respectively.

Environmental Justice. The community adjacent to the I-94 corridor is predominantly minority and low-income and, therefore, qualifies as an Environmental Justice population. Pedestrian and vehicular safety and business activity might be temporarily adversely affected during construction. Increased housing and business opportunities might create greater job opportunities.

Mobility. Few indirect effects to local businesses or residents are expected due to bridge closures, as reconstructed bridges would be readily available in the vicinity of each closure. Overall mobility would increase with improved freeway conditions and construction of continuous service drives.

Capacity improvements to the freeway and service drive system are anticipated to benefit local community traffic flow by providing the adjacent local road network with additional capacity and connectivity. All of the intersections adjacent to the project corridor are designed to operate at an acceptable Level of Service D or better (vehicles might be required to stop and experience some delay) in the peak hours of the day. Most of the intersections operate at Level of Service B or better (low driver delay and good traffic flow and progression), which would allow for capacity associated with additional future development along the corridor to be accommodated.

Construction. Disruptions to local and the mainline freeway traffic during construction might adversely affect businesses in the project vicinity. Congestion associated with construction vehicles or traffic temporarily rerouted may decrease pedestrian or vehicular access to local businesses. The extent of adverse effects would be localized and vary according to the construction staging option finally selected, since construction of the Recommended Alternative likely would consist of several smaller projects staged over approximately eight years or more. There is a potential for local job growth, due to the freeway reconstruction.

Cultural Resources. The character of historic districts and/or properties might be affected adversely should new development occur in close proximity to the district boundary, where the architecture is of a more contemporary style. The revitalization of vacant parcels adjacent to the service drives in proximity to the Woodbridge, East Ferry, and Piquette Avenue Industrial Historic District, might result in new projects or additional commercial/retail with more contemporary architecture, possibly conflicting with the architectural character of the districts. Little impact is expected to result from new building construction or renovations to existing structures within the districts, since these activities would conform to established architectural guidelines.

Air Quality. No consequential effects to air quality are anticipated, based on anticipated land-use changes and a worst-case analysis of local 2025 air quality levels (CO) for the Recommended Alternative in 2025. All 2025 parameters are anticipated to be below standards.

Water Quality. Indirect effects of the Recommended Alternative include an increased amount of surface water runoff in the I-94 corridor. This increase likely would occur as vacant land and residential property are developed with commercial structures consisting of large buildings and impervious parking areas. An increase in the surface water runoff also would be related to additional residential development that occurs on undeveloped parcels of land.

Pollutant loading to the surface water might increase as the development of residential and commercial parcels accelerates and vehicular traffic increases. The predominant sources of potential additional pollutants during construction activities are leaking equipment, spills, and erosion of disturbed soils. Once construction is complete, an increased volume of vehicles and vehicular traffic will provide additional sources of pollutants, including fluid leaks, fluid spills, and fluid discharges during vehicular crashes. However, the rehabilitation efforts would reduce potential sources of contaminant loading by minimizing crashes and improving drainage within the project area. The improved drainage will eliminate existing periodic flooding along I-94 within the project area.

Water quality would indirectly benefit from the new underground drainage system and engineering controls, including catch basins, in-line detention, oil/water separators and filter strips. Highway maintenance operations could also improve water quality with pavement sweeping, trash collection, and catch basin cleaning.

Noise. No indirect effects are expected to occur from noise.

5.15.3 Cumulative Effects

A summary of key past, present, and reasonably foreseeable future actions has been compiled. These actions were considered in the assessment of cumulative effects associated with the Recommended Alternative. A number of these major actions follow and are also shown in Figure 5-13.

Industrial

1. *General Motors Hamtramck Assembly Plant.* Construction of the plant began in 1981; it displaced 4,200 residents and razed 1,300 homes, 140 businesses, six churches, and one hospital (http://www.detnews.com/history/poletown/poletown.htm).
2. *I-94 Industrial Park.* This new development was formerly a brownfield site and is located east of Mt. Elliott Street at Van Dyke Avenue and Huber Street. A Daimler-Chrysler Corporation supplier, which employs 300, is the first to sign a lease in the new park (city of Detroit, 2004).

Residential

3. *Unnamed housing development*. Jefferson Park North, LLC. plans to build 123 homes at Charlevoix, St. Jean, and Lemay streets on Detroit's east side (Crains Detroit, 2004).
4. *St. Anne's Gate Condominiums*. The 72-unit condominium project is located south of Michigan Avenue on Detroit's south side. The first units opened in 2004 (Detroit News, 2004).
5. *Unnamed housing development.* There are plans for 1,200 acres on Detroit's east side for rehabilitation and revitalization of an existing neighborhood. The area is bounded by Jefferson, Mack, Alter, and Conner avenues and will include housing, retail, public spaces, churches, and recreational areas. First homes are expected to be available in the first quarter of 2005. When completed approximately 3,000 – 4,000 new or renovated homes will be available (city of Detroit, 2004).

6. *Jefferson Village.* Construction is underway on 350 houses and a 15-acre shopping center near the Detroit River (Detroit News, 2002).

Commercial

7. *New Center Area.* This important economic complex for the city of Detroit was created between 1919 and the 1950s, including the General Motors Headquarters Building, the Fisher Building, and Henry Ford Hospital.

8. *Compuware World Headquarters*. In 1999, the Compuware Corporation announced the consolidation of operations in several facilities in metropolitan Detroit; construction was completed in 2003 on the new Compuware World Headquarters in downtown Detroit.

9. *General Motors World Headquarters.* The Renaissance Center in downtown Detroit has become the world headquarters for the General Motors Corporation.

Civic/Cultural

10a. *University Cultural Center.* Notable civic institutions were established near Woodward Avenue and Kirby during the 1920s and 30s with construction of the Art Institute, the Main Library, and the Historical Museum.

10b. *Wayne State University Welcome Center*. Construction on the 100,000-square-foot Welcome Center and bookstore complex is nearing completion.

11a. *Medical Center.* Creation of a medical center occurred from 1900 to the present in the vicinity of Woodward Avenue and Warren, including Harper and Grace Hospitals, Hutzel Hospital, Detroit Receiving Hospital, Children's Hospital, and (more recently) the Veterans Administration Hospital in the 1980s.

11b. *Detroit New Science Center*. The Detroit New Science Center underwent an expansion and renovation in 2001; it now includes an IMAX® Dome theater.

Recreational

12. *Comerica Park.* The new ballpark for the Detroit Tigers professional baseball team was built in downtown Detroit and is bordered by Montcalm, Witherell, Adams, and Brush streets. The club began playing there for the 2000 season.

13. *Ford Field.* The Detroit Lions professional football team moved to Ford Field for the 2002 season. Ford Field is located at 2000 Brush Street near Comerica Park.

14. *Detroit RiverWalk.* A three-mile long waterfront park is being planned along the Detroit River. It begins downtown at Hart Plaza and will proceed north to the Belle Isle Bridge.

15. *Tri-Centennial State Park*. At 25 acres, Tri-Centennial State Park is the state of Michigan's first urban state park. It is located along the Detroit River in the center of the planned Detroit RiverWalk, and was dedicated in May 2004.

16. *Dequindre Cut.* An extensive study is underway to improve and protect this corridor as an important addition to Detroit's greenway system.

17. *Conner Creek Greenway*. A master plan has been prepared for this 8-mile non-motorized corridor paralleling the historic route of Conner Creek (now enclosed).

18. *Midtown Loop*. A 1.8-mile non-motorized corridor is proposed in the Cultural Center area, generally aligned in the vicinity of Woodward and Warren Avenue.

19. *Hamtramck Greenway*. An improved trail is being planning for approximately two miles within the City of Hamtramck, linking nearby neighborhoods, parks and other open space areas in the city.

Transportation

20. *Detroit to Windsor Vehicular Tunnel.* This first international tunnel crossing was constructed in 1930 and provided motorists a second option for passage between the United States and Canada.

21. *I-75 Ambassador Gateway Project.* This project, including access and ramp improvements for I-75 and I-96 to the Ambassador Bridge, is listed on the approved Regional Transportation Plan.

22. *I-96*. Improvements include the construction of a new ramp carrying eastbound traffic on I-96 to eastbound I-94 in Detroit. In conjunction with the project, bridge rehabilitation to McGraw and Pacific bridges over I-96, and Grand River entrance and exit ramps to westbound I-94 is planned. Construction began April 2004.

23a. *I-375, East Riverfront Access Improvements*. The MDOT completed a Finding of No Significant Impact (FONSI) on access improvements from I-375 to the East Riverfront Area in Detroit. Overall, the project is to support the redevelopment of the East Riverfront Area, and to promote economic growth in downtown Detroit.

23b. *I-75/I-375.* Construction of these additions to the Interstate highway system in Detroit during the 1950s resulted in the displacement of minority and low-income families from the historic "Black Bottom" & "Paradise Valley" neighborhoods, and the subsequent establishment of the Lafayette Park Housing Development urban renewal project.

24. *Detroit Intermodal Freight Terminal (DIFT).* The MDOT is preparing an Environmental Impact Statement to evaluate potential improvement, expansion or consolidation of intermodal terminals to accommodate an increase of rail-truck transfers. Several alternatives are being evaluated in southwest Detroit, including improving the existing facility at the junction of the Norfolk Southern Railroad and the CSX rail lines.

25. *Canada-United States-Ontario-Michigan Border Crossing Study*. A planning needs and feasibility study was completed to develop a long-term strategy to provide for the safe and efficient movement of people, goods, and services between Southeast Michigan and Southwest Ontario. A formal study of the river crossing is to comment in 2005 to select a preferred location in the Detroit area for the new border crossing. Several areas will be investigated including Belle Isle, the Ambassador Bridge, Zug Island/River Rouge, and Wyandotte/Riverview.

The study area of effect for the Indirect and Cumulative Effects (ICE) Analysis is shown in Figure 5-14.

Figure 5-13: Cumulative Effects Major Actions

Figure 5-14: Indirect and Cumulative Analysis Study Area of Affect

Land Use. Construction and implementation of the Recommended Alternative in combination with other transportation project—such as the proposed DIFT or I-75, and other development projects and land-use recommendation—is expected to result in the cumulative effect of increasing industrial and commercial land uses, and (to a lesser extent) residential land use.

There are two areas within the ICE study area where there is high potential for cumulative land-use change at the west and east ends of the study corridor. This is due to the expanding transportation network, tracts of vacant land, available infrastructure, complementary land uses, and consistent land use recommendations.

Socioeconomic Resources. Projected declines in the City's population would slow or positively reverse as the area becomes more attractive to live and work. Available housing (all types) is expected to increase with a diverse price range, as might owner occupancy. The economy in the ICE study area would diversify, thereby reducing its vulnerability to economic downturns. Increased employment from business and industrial expansion would help offset predicted job loss through 2025. In the long term, this would increase income levels, individual buying power, and the City's tax base.

Community Facilities and Services. Growth in population would prompt the expansion of existing community facilities and services and, increase the need for new facilities and expanded services. Community facilities might expand subsequently or new facilities might be constructed to accommodate the anticipated growth. For example, the proposal for a new school by the Detroit Academy of Arts and Sciences, located along the eastbound service drive and east of I-75, would support new housing developments proposed for the same general area. Additional residential developments might, in turn, be attracted to this area because of the new school.

Non-Motorized (Pedestrian and Bicycle) Mobility. Improvements to pedestrian and bicycle infrastructure should enhance pedestrian and bicycle mobility and connectivity throughout the project area. Pedestrian and bicyclist access improvements could have the cumulative effect of improving the viability of the *Master Plan of Policies* recommendations for housing rehabilitation, new housing construction, and commercial revitalization efforts in ICE sub-area neighborhoods that are within close proximity to I-94.

There are several greenway initiatives that would provide additional opportunities for pedestrian and bicycle mobility. Initiatives within the ICE study area include the Dequindre Cut (which runs south to the Detroit River just east of I-75 and under I-94), the Midtown Loop, and the Conner Creek Greenway. Outside of the ICE study area, greenways initiatives include the Rouge Gateway Project, Riverside Park and Clark Park, Fort Wayne, West Vernor Highway and the Detroit RiverWalk. These studies have been commissioned independent of one another; combined, the studies' results would strengthen and support a larger pedestrian and bicycle system throughout the metropolitan Detroit area.

Neighborhood Character and Community Cohesion. The Recommended Alternative—combined with other actions including other transportation projects, land-use recommendations, and housing developments—increases the likelihood of greater pedestrian activity, thereby enhancing neighborhood character and community cohesion. Safety for pedestrians and bicyclists would improve with an expanded pedestrian and bicycle infrastructure, creating an environment where people can walk more often and interact on the streets, creating a well-connected community.

Environmental Justice. The quality of life might improve through residential and business development, and an improved local economy. However, the environmental justice population might be challenged by increases in property taxes and the cost of living, as long-term development expands into previously vacant and underutilized lands in the project area.

Mobility. Overall, conditions along the interstate system in Detroit are expected to improve, given the planned transportation enhancements associated with the Recommended Alternative in combination with other notable improvements associated with I-75, I-375, and the Ambassador Gateway project. System-wide local community benefits of increased capacity, combined with reduced congestion and improved safety, would have an overall positive effect on mobility throughout the region. More specifically, these improvements in mobility would serve to: 1) provide appropriate infrastructure to support future land use development envisioned by the city of Detroit's *Master Plan of Policies*, 2) sustain key employers or resources in the study area, e.g., GM Cadillac Plant, WSU and Wayne County Community College (WCCC), and 3) accommodate other large-scale initiatives, such as additional truck and vehicular traffic from the proposed DIFT and Ambassador Bridge Gateway projects.

Construction. Construction of the Recommended Alternative—in combination with residential, commercial and industrial development, and other transportation projects—is expected to result in cumulative effects related to traffic flow, local commerce, noise, and air and water quality. Some adverse cumulative effects already have occurred with the original construction of I-94. Additional effects are expected in the future on traffic flow as new construction occurs, not only from the Recommended Alternative, but from other projects proposed in the area (i.e., I-375 and the DIFT. This assumes the Ambassador Gateway Project will be built prior to I-94 construction). These other construction projects can cause traffic patterns to shift, possibly to the I-94 corridor; this might induce higher traffic volumes as vehicles try to avoid other construction areas, resulting in possible impacts to local businesses, temporary air quality degradation, or increases in noise levels. The funding and exact timing of these various projects is not yet clear in the long-range plan, and the extent and duration of impacts associated with constructing these projects are not known.

Cultural Resources. Prior to the construction of I-94 in the 1940's and 1950's, this area of Detroit was largely residential with areas of commercial developments along the major roadways and at the corners of major intersections. The notable exceptions were industrial areas that emerged near railroad lines, especially the Milwaukee Junction industrial area where the Grand Trunk and Detroit and Milwaukee railroads converged. The construction of I-94 in the project area severed neighborhoods and destroyed their cohesiveness by displacing thousands of residents. The later construction of I-75 and M-10 further impacted these neighborhoods by disrupting local roadways, especially through discontinuous service drives. After the construction of I-94, very little new residential development occurred in the project area, reflecting the overall transfer of population from the city of Detroit to the suburbs. In fact, large facilities like Wayne State University and the construction of the GM Hamtramck Plant show the land use in the area has shifted toward more public and industrial uses. Today, the project area in the east is mostly residential with some institutional uses, while the western part of the study area is mostly commercial and industrial, intermixed with old residential buildings. The construction of the Recommended Alternative would not further cause any additional changes or adverse cumulative impacts to the character of the area because the original construction of the freeway was and remains the major impact along the corridor. Through the construction of the

continuous service drives, the Recommended Alternative would help to reconnect the entire area. The improvements to the system from the Recommended Alternative should help mitigate some the impacts that were caused by the original construction of the freeways in the project area. For more information on the history of I-94, see sections 2.2 and 5.1.1.5.

The Recommended Alternative—combined with various development proposals and other transportation enhancement projects planned in the metropolitan Detroit area —likely would increase traffic volumes and development pressures in the vicinity of cultural resources in the study area. Where land use change occurs consistent with future development plans, overall cumulative effects to cultural resources would be limited. There may be some adverse consequences in the areas where the land use may change due to the presence of historic resources. These increased development pressures can be expected to cumulatively affect historic resources along the west end of project (e.g., between Livernois and the I-75 interchange including the Woodbridge, East Ferry, and Piquette Avenue Industrial Historic District) where more contemporary architecture would detract from the historic character of these areas.

Air Quality. The air quality analysis conducted in this FEIS used traffic projections that are based on approved growth and future land-use projections; therefore, the results presented in the study represent cumulative impacts. All of the projects in the Regional Transportation Plan (RTP), including the Recommended Alternative, had a regional emissions analysis conducted by SEMCOG. This analysis included all transportation projects that are listed on the RTP. SEMCOG determined, using the Air Quality Conformity Model, that the emission burdens generated by all the projects on the transportation improvement program are within their emission budgets.

The proposed project is shown to have similar microscale conditions to the No-Build Alternative and, therefore, would not contribute to localized cumulative carbon monoxide (CO) impacts.

The Recommended Alternative addresses the increased need for capacity for goods movement by trucks and facilitates safer and less-congested traffic flow, which would assist in providing better air quality.

The SEMCOG model looks at the regional effects to air quality in the local area. The Recommended Alternative will alleviate congestion and reduce stop-and-go conditions on the I-94 mainline and should assist in improving air quality. The continuous service drives bring traffic volumes closer to some of the residences, but the flow of traffic on these service drives would not be high in volume or in speed. Therefore, there should not be a detrimental negative effect on the residences. Currently, a number of the parcels along the corridor are vacant and could be redeveloped. At this time, the city of Detroit does not anticipate zoning changes along the service drives.

Water Quality. Cumulative impacts to water quality in the project area are anticipated to be minimal because of the relatively developed urban nature of the area immediately surrounding the Recommended Alternative. The I-94 Rehabilitation project, together with improvements associated with other projects in the area, would increase the amount of surface water runoff and potentially increase the associated pollutant load.

Improved operating conditions and increased safety of the I-94 project area, in conjunction with other regional transportation improvement projects, are expected to benefit the surrounding area by decreasing crashes and, thereby, eliminating potential sources of the pollutant load to the

surface water. In addition, water quality would benefit from the new underground drainage system and engineering controls, including catch basins, in-line detention, oil/water separators and filter strips. Highway maintenance operations could also improve water quality with pavement sweeping, trash collection, and catch basin cleaning. The overall cumulative effect on water quality is expected to be positive.

Noise. Noise impacts are highly localized. Unless a person is hearing or feeling the impacts from more than one project, impacts generally do not accumulate. Individuals or noise-sensitive properties must be located in fairly close proximity to both proposed projects before any cumulative effect can occur. Nonetheless, traffic volumes and ambient noise levels would increase as economic conditions improve and new development occurs.

The analysis presented in this document considered future traffic conditions with all known and approved land development projects that have received building permits from the city of Detroit. The noise generated from as-yet-unidentified projects could increase traffic noise by adding more vehicles to local streets. If they were constructed simultaneously and in close proximity, greater construction noise levels might be apparent to individual receptors.

5.15.4 Summary and Conclusions

Table 5-23 summarizes indirect and cumulative effects on the affected environment as a result of the Recommended Alternative and other major actions. The decline in Detroit's population and housing over the past several decades has impacted the urban core with population losses of nearly 77,000 (7.5 percent), 34,900 fewer housing units and an approximate 4,600-acre increase in vacant land. This occurred most recently from 1990 to 2000. Regarding the affected environment, land use in the ICE study area should experience the greatest change. This is due primarily to the sizable amount of vacant and/or underutilized land in the ICE study area and its attraction to industrial, residential, and commercial developers. As a result, notable change is also expected to occur to socioeconomic resources.

Projected population decline might begin to reverse as local economic conditions improve and the area becomes more attractive to live and work. Employment and incomes might rise, improving residents' potential buying power. This is particularly important because median household income and per capita income in the ICE sub-area is notably lower when compared to the city of Detroit, Wayne County, and the state of Michigan. Continued growth and diversification of the local economy would reduce the project area's vulnerability to economic downturns. Quality of living for residents in the ICE study area is expected to improve.

Unlike some areas outside of Detroit, the infrastructure needed for development already exists where there is vacant and/or underutilized land. Because there is so much available land in Detroit, this presents an opportunity for infill development and neighborhood revitalization.

In conclusion, land use and the socioeconomic resources would experience the greatest indirect and cumulative effects associated with the Recommended Alternative. The density of industrial, residential, and commercial land use should increase over time as vacant land develops and the Recommended Alternative and other proposed actions are implemented in the future. Shifts in, and improvements to, current land use patterns would positively affect the socioeconomic environment. The economy, in particular, should benefit from a greater density of business and

residential development. Improved employment opportunities and an expanded tax base should result, thereby, improving the quality of life for Detroit residents.

5.16 Relationship of Local Short-Term Uses Versus Long-Term Productivity

The discussion of local short-term uses versus long-term productivity in the DEIS remains valid and will apply to the Recommended Alternative.

5.17 Irreversible and Irretrievable Commitment of Resources

The discussion of local irreversible and irretrievable commitment of resources in the DEIS remains valid and will apply to the Recommended Alternative.

Table 5-23: Summary of Potential Indirect and Cumulative Effects

Affected Environment	Land Use	Socioeconomic Resources			Community Facilities and Services	Pedestrian and Bicycle Mobility	Neighborhood Character and Community Cohesion	Environmental Justice	Mobility	Construction	Cultural Resources	Air Quality	Water Quality	Noise
		Population	Housing	Economy										
Indirect Effects	**Positive** Land use change accelerated due to improved access to vacant or underutilized land from reconstructed interchanges, bridges, and continuous service drives	**Positive** Projected City population decline might slow	**Positive** Improved access might stimulate housing in proximity to I-94	**Positive** Improved transportation of people, goods, and services New business development and expansion of existing businesses	**Positive** Increased patronage of community facilities and use of services	**Positive** Greater opportunities for local pedestrian-bicyclist activity and access to buses on continuous service drives	**Positive** Improved access would increase cohesiveness (within and between neighborhoods) **Negative** Greater levels of vehicular traffic	**Positive** Increased housing and business opportunities Greater job opportunities Better pedestrian and bicycle accessibility to buses on the service drives **Negative** Concerns for pedestrian and vehicular safety and business activity during construction Additional traffic adjacent to property along the service drives	**Positive** Improved freeway conditions and continuous service drive would improve vehicular mobility Traffic capacity provided for future land development	**Positive** Potential for local job growth **Negative** Disruption of local and mainline freeway traffic during construction Businesses affected during construction Air quality might decline and noise levels increase temporarily	**Negative** Character of historic districts and/or properties might be affected by nearby development	**Positive** Improved air quality for carbon monoxide All 2025 parameters below standards	**Positive** Improved highway operations would reduce pollutants by minimizing crashes and engineering controls will reduce pollutants entering surface water and groundwater **Negative** Increase in surface water runoff and pollutant load	No indirect effects
Cumulative Effects	**Positive** Increase in density of vacant or underutilized land for industrial, residential and commercial land uses	**Positive** Projected City population decline might slow or positively reverse trend	**Positive** Increased housing (all types) with diverse price ranges	**Positive** Business and industrial expansion Increase in jobs might help offset predicted job loss through 2025 Greater income levels and buying power Growth in tax base Diversification and stabilization of local economy	**Positive** Expansion of existing community facilities and/or services Construction of new community facilities and expanded services to serve a growing population	**Positive** Improved pedestrian and bicycle infrastructure (sidewalks) and connectivity (other greenway projects)	**Positive** New housing developments and neighborhood revitalization would positively affect neighborhood character	**Positive** Improved quality of life through increased residential and business development, and an improved local economy **Negative** Environmental justice population might be challenged by increases in property taxes and cost of living	**Positive** Increased capacity, reduced congestion, and improved safety would positively affect mobility in the ICE study area and the region	**Negative** Historical impacts to the area occurred during initial highway construction Temporary shifts in traffic patterns during construction projects in the region	**Negative** Existing historic districts/properties might experience adverse effects as development pressure increases	**Positive** Emissions to be within emission budgets for air quality standards	**Positive** Engineering controls will reduce pollutants reaching surface water and groundwater **Negative** Increase in impervious surface water runoff and pollutant load	**Negative** Traffic volumes and ambient noise levels would increase as economic conditions improve