

4.0 ENVIRONMENTAL RESOURCES, IMPACTS, AND MITIGATION

This section provides an overview of existing conditions within the Preferred Alternative corridor study area, as well as a review of potential social, economic, and environmental impacts related to the Preferred Alternative. Methods and measures to minimize impacts during construction are also included in this Section.

There are no Section 4(f) lands or Section 6(f) properties affected by the Preferred Alternative.

The study area in the Draft Environmental Impact Statement (DEIS) and FEIS includes most of Ottawa County, southern Muskegon County and northern Allegan County. The Preferred Alternative corridor study area (corridor study area) includes the western half of Ottawa County. It is not located in, and does not directly impact, Allegan or Muskegon counties. The data collected for analysis in this section is from a variety of governmental sources, which may include different years for the most recent data. **Table 4.1-1** summarizes the project's impacts within the corridor study area.

Table 4.1-1 Preferred Alternative Impacts	
Impact	Preferred Alternative
Length (miles)	New Alignment: 7.1 Existing US-31: 3.8
Wetland Impacts (acres)	3.04
Prime Farmland Impacts (acres)	14.4
Unique Farmland Impacts (acres)	0
Locally Important Farmland (acres)	101.4
Residential Displacements	Full: 51 Partial: 10
Commercial Displacements	Full: 9 Partial: 6
Agricultural Displacements	Full: 6 Partial: 8
Vacant Land Displacements	Full: 4 Partial: 3
New Roadway Separations (Number)	4
New Railroad Grade Separations (Number)	0
Major Stream Crossings (Number)	2
Environmental Justice Impacts/Title VI Populations	No Disproportionately High & Adverse Impacts
Noise Impacts (NSAs)	34
Air Quality Impacts	None
Potential Historic Architectural Impacts (Number)	0
Potential Archaeological Impacts (Number)	0
Natural Areas Sites (Number)	1
Threatened & Endangered Species (Number)	0
Potential Contaminated Sites (Number)	17
Total Costs (\$ Millions, 2014 dollars)	\$170

4.1 LAND USE

The Preferred Alternative includes proposed improvements along existing US-31 in Holland Township and the City of Grand Haven and a proposed new crossing of the Grand River with a new connecting road between M-45 and I-96 in Ottawa County. The land use characteristics adjacent to existing US-31 are consistent with urban development patterns along major roadways. There is dense commercial and office development along US-31 with driveways providing access to clustered retail development in the Holland area where access is limited.

While commercial and office development dominate the land use adjacent to US-31 in Grand Haven, there are several east-west cross streets that serve residential neighborhoods. This concentration of development, combined with the fact that US-31 is the only continuous north-south access route in western Ottawa County, causes high traffic volumes and traffic congestion. Land use and development patterns north of Holland are rapidly changing and extending the congested conditions north toward the City of Grand Haven. **Figures 4.1-1** and **4.1-2** show examples of the transformation of land use between 1992 and 2007 along US-31 at Riley Street in Holland Township.



Figure 4.1-1: US-31 and Riley Street in 1992



Figure 4.1-2: US-31 and Riley Street in 2007

In contrast, the land uses along the proposed new alignment between M-45 and extending north across the Grand River to M-104 are predominantly rural including: rural residential, outdoor recreation, resource conservation natural areas, forest, wetlands, stream floodplains, disturbed open space habitats, and scattered agricultural uses, (see **Figure 4.1-3, 4.15-1 – 4.15-5**). This land is gradually transitioning into residential land uses due to the availability of land, attractive location and proximity to employment centers in the Cities of Grand Rapids, Holland, Grand Haven and Muskegon.

Residential, commercial and industrial growth is anticipated to continue in Ottawa County. However, commercial and industrial growth may be limited to areas either currently serviced by, or planned to be serviced by, public water and sanitary sewer. Holland Township and the City of Grand Haven are service districts with sanitary sewer facilities.

4.1.1 Land Use Planning and Zoning

The status of land use planning and zoning plans from study area cities, villages and townships is shown in **Table 4.1-2**. All of the governmental units located in the study area for the Preferred Alternative have active, comprehensive land use plans or zoning ordinances. The local units of government determine land use changes through master planning and zoning. Schedules for updating Master Plans and zoning plans are dictated by the individual governmental agencies.

Table 4.1-2 Status of Planning and Zoning within the Study Area						
Political Unit	Zoning Ordinance			Land Use Plan		Other Planning Documents, Relevant Comments
	Y/N	Types	Date Approved	Y/N	Date	
Holland Township	Yes	ELU, FLU	01/15/07	Yes	09/06	Comprehensive Plan
City of Grand Haven	Yes	ELU, FLU	03/05/07	Yes	06/21/01	Master Plan
Robinson Twp.	Yes	ELU	02/15/07	Yes	01/06/04	Master Plan
Crockery Twp.	Yes	ELU, FLU	05/04	Yes	10/04	Wall Map available at Township Office
County of Ottawa	No	Delegated to local governmental units	No Date	No	No Date	The Ottawa County Development Plan is currently being updated. The last update was in 1992. However, the updated plan will support the Preferred Alternative according to County Planning. No date is set for its release.

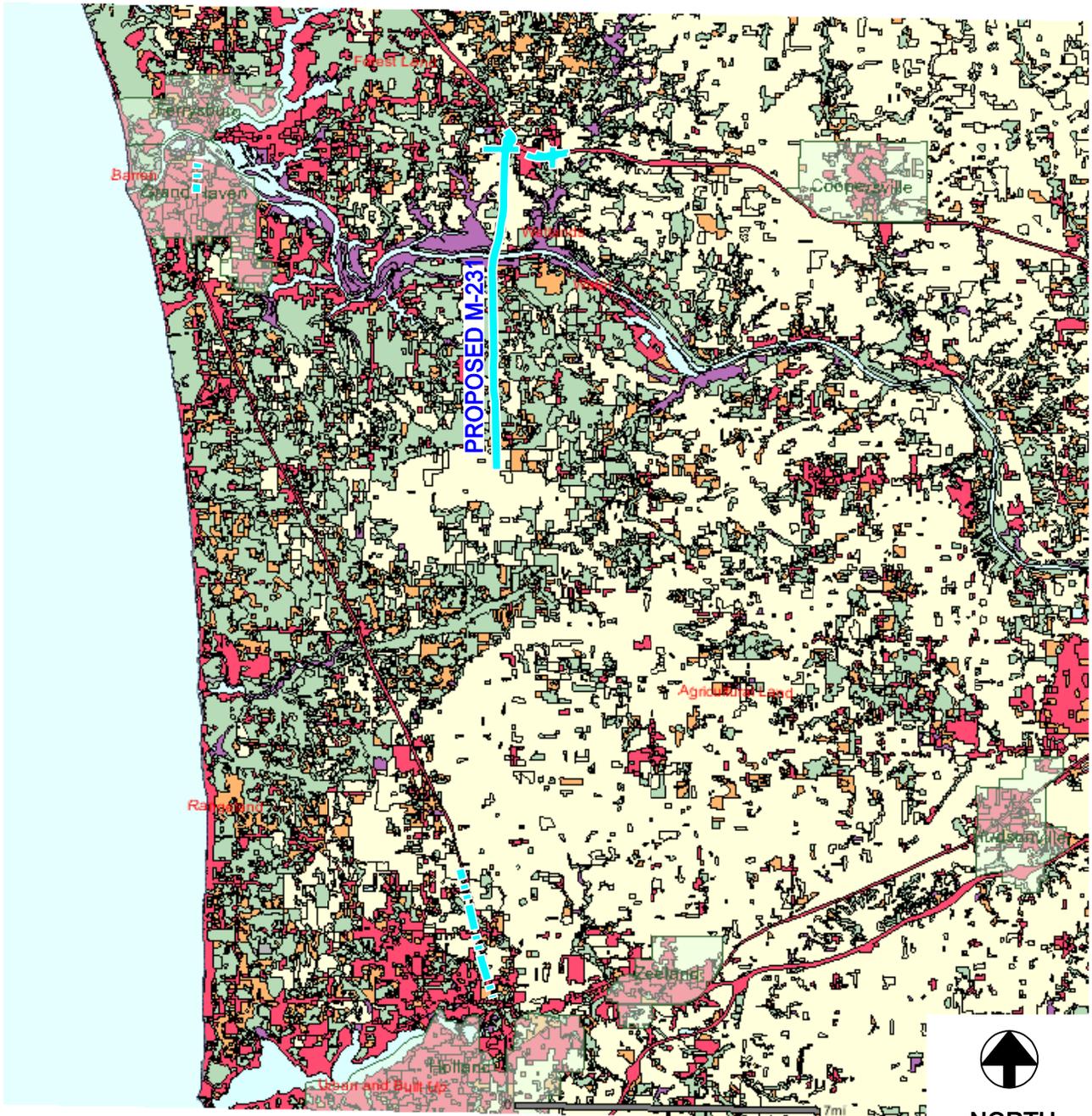
ELU – Existing Land Use FLU – Future Land Use

Compatibility with Planning and Zoning

Holland Township Zoning Districts Map, January 2007

Holland Township has prepared a zoning district map within the township. The land uses that will be affected by the Preferred Alternative are general commercial land uses located in the southern, more densely developed area north of and adjacent to the City of Holland. The Preferred Alternative is compatible with existing and planned land uses in Holland Township.

In a letter dated January 25, 1999, the Macatawa Area Coordinating Council (MACC) Policy Committee, including representatives from Holland Township, conveyed to the Michigan Department of Transportation (MDOT) that the committee had voted unanimously to support the Alternative F/J-1. The Preferred Alternative (F-1a), as described in this FEIS, is a subset of Alternative F/J-1 and lies fully within the limits of Alternative F/J-1 in Holland Township. Further, the Preferred Alternative is included in the MACC's 2035 Long Range Transportation Plan (LRTP).



NORTH

NOT TO SCALE

- WATER
- WETLAND
- BARREN
- OTHER

- URBAN
- AGRICULTURE
- OPEN FIELD
- FOREST

PREFERRED ALTERNATIVE

- 2-LANE LIMITED ACCESS
- 6-LANE BOULEVARD

US-31 FINAL ENVIRONMENTAL IMPACT STATEMENT

LAND USE MAP



FIGURE
4.1-3

City of Grand Haven Master Plan, 2001

The City of Grand Haven's Master Plan discusses transportation issues in Grand Haven, including US-31 (Beacon Boulevard). The plan acknowledges the congestion problem on existing US-31, and states that the city is working with Ottawa County, other communities, and MDOT, to develop a long-range plan for US-31. The plan concludes that F/J-1 will have a significant impact on the city and land uses along the roadway. However, through subsequent meetings and discussions with city officials, modifications such as adding the third lane in the median rather than on the outside were made to the Preferred Alternative and it no longer impacts current or future land uses.

A two-phased approach to improvements along US-31 was agreed to by the city and MDOT. In a joint letter dated January 21, 1999, the Cities of Holland and Grand Haven indicated support for Alternative F/J1. In addition, the City of Grand Haven passed a resolution on November 5, 2001 supporting F/J-1 with conditions (See **Chapter 5**).

The City of Grand Haven and MDOT continued to work together to resolve access issues related to the city's GrandWater development (west of US-31 and between Jackson Street and the south channel of the Grand River). In order to address the city's concerns, MDOT agreed to provide right-in and right-out direct access to southbound US-31 to and from the development at Adams Street. As a result, the City of Grand Haven also supported the Preferred Alternative, which is a refined version of Alternative F/J1.

Robinson Township Zoning Ordinance, 2007

The 2007 Robinson Township Zoning Ordinance and accompanying zoning map regulate future development within the township. Robinson Township completed a township Master Plan in the spring of 2008. Development of local roadways is discussed, but not highways. Changes in zoning may be warranted at the local level as development patterns change in the future; especially near the intersections of the Preferred Alternative at M-45 and Lincoln Street.

The Preferred Alternative will impact existing land use in Robinson Township by the need to acquire right-of-way (ROW) from land zoned as agricultural preservation in the southern part of the township, and land zoned as rural residential in the northern part of the township. The Preferred Alternative also crosses land designated as Lowland Resource Conservation as it crosses the Grand River and associated bayous and streams south of the Grand River.

The Preferred Alternative is not compatible with existing and planned land uses in Robinson Township. In a joint letter dated January 22, 1999, representatives from Olive, Robinson, and Crockery Townships indicated that they had passed a joint resolution indicating that they did not support Alternative F/J-1. However, MDOT subsequently met with Robinson Township to review their concerns about the project. Modifications such as building bridges over the local through streets, keeping the community connected, and moving the alignment to avoid houses, were acceptable to the township. Robinson Township officials concurred with the Preferred Alternative on August 23, 2005. The project is also included in the West Plan (Muskegon's MPO) LRTP of which Robinson Township is a member.

Crockery Township Comprehensive Plan, 2004

The Comprehensive Plan map shows commercial, residential, and agricultural land uses along the 120th Avenue corridor where the Preferred Alternative is proposed to be constructed. According to the Comprehensive Plan, the land is designated as commercial, woodlands, and industrial along M-104, and near the interchange of M-104 and I-96 the land is designated open space.

The Preferred Alternative is not compatible with the current designations in many locations. In a joint letter dated January 22, 1999, representatives from Olive, Robinson, and Crockery Townships, conveyed a joint resolution indicating opposition to Alternative F/J-1. MDOT subsequently met with Crockery Township to discuss modifications such as moving the alignment west to avoid houses and redesigning the ramps for I-96 at the Nunica exit were acceptable to the township. As a result, Crockery Township officials concurred with the Preferred Alternative on August 23, 2005. The project is also included in the West Plan (Muskegon's MPO) LRTP of which Crockery Township is a member.

Ottawa County Development Plan

The current Ottawa County Development Plan was adopted by resolution of the Ottawa County Planning Commission on December 22, 1992. The Ottawa County Planning Department is in the process of updating the plan. The updated plan will include the Preferred Alternative, and the Preferred Alternative will be compatible with the development plan. In their *US-31 Staff Position Paper, the Ottawa County Planning and Grant Department, January 22, 1999*, the Planning Department stated, "It is clear that the best choice to alleviate traffic and safety problems is Alternative F/J-1." At an Ottawa County Board of Commissioners meeting on January 26, 1999, the Ottawa County Board approved the US-31 Position Paper and recommended supporting Alternative F/J-1. The Preferred Alternative (F-1a) as described in this FEIS, is within the original Alternative F/J-1 footprint and is supported by Ottawa County officials.

West Michigan Shoreline Regional Development Commission (WMSRDC)

The Preferred Alternative is included in the West Plan (Muskegon's MPO) 2035 LRTP. The City of Grand Haven, Robinson and Crockery townships are also within the MPO boundary and represented on the MPO Policy Committee. The 2008-2011 Transportation Improvement Program (TIP) includes design and ROW. Construction will be included in the TIP when the Record of Decision (ROD) is approved.

Macatawa Area Coordination Council (MACC)

The Preferred Alternative is included in the MACC's (Holland's MPO) 2035 LRTP. The 2008-2011 TIP Program includes design and ROW. Construction will be included in the TIP when the ROD is approved. Holland Township is a member of the MACC.

4.1.2 Property Acquisitions and Relocation Assistance

There are direct impacts to existing residential and commercial land uses due to property acquisitions needed for the proposed M-231. Estimated direct displacements were calculated and tabulated by agricultural, commercial, industrial, residential, developmental, and public service properties, as shown in **Tables 4.1-3**. The partial acquisition of a property occurs when only a portion of the property is needed for constructing the Preferred Alternative. Examples of partial acquisitions are the purchase of a property corner to improve an intersection, or the purchase of a continuous strip along the length of a property.

Table 4.1-3 Potential Property Impacts of the Preferred Alternative									
Municipality	Agricultural		Commercial		Industrial		Residential		Total Impacts
	Full	Partial	Full	Partial	Full	Partial	Full	Partial	
Holland Township	0	0	0	1	0	0	0	0	1
City of Grand Haven	0	0	0	3	0	0	0	0	3
Robinson Township	3	3	2	2	0	0	43	8	61
Crockery Township	3	5	7	0	0	3	12	2	32
Total Full	6		9		0		55		70
Total Partial		8		6		3		10	27
Total:									97

Note: The Conceptual Stage Relocation Plan does not include vacant land or partial acquisitions when calculating the amount of properties that will need to be relocated. Therefore, the number of relocations in Table 4.1-4 will differ from the potential property impacts for the Preferred Alternative in Table 4.1-3.

Acquisition of a full parcel occurs when the majority of a parcel is required for ROW, the structures on the property are required for the project, access to the property from a public ROW is eliminated (land locking), or when the remaining portions of the property no longer have economic viability.

4.1.3 Mitigation for Existing Land Use

Right-Of-Way Acquisition and Relocation Impacts

1. **Compliance with State and Federal laws** – Acquisition and relocation assistance and advisory services will be provided by the MDOT in accordance with Act 31, Michigan P.A. 1970; Act 227, Michigan P.A. 1972, Act 149, Michigan P.A. 1911, as amended; the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended; and Act 87, Michigan P.A. 1980, as amended. The MDOT will inform individuals, businesses and non-profit organizations of the impact, if any, of the project on their property. Every effort will be made through relocation assistance to lessen the impact when it occurs.
2. **Residential** – The MDOT is required by statute to determine the availability of comparable, decent, safe and sanitary housing for eligible displaced individuals. The MDOT has specific programs to implement the statutory and constitutional requirements of property acquisition and relocation of eligible displacees. Appropriate measures will be taken to ensure that all eligible displaced individuals are advised of the rights, benefits, and courses of action available to them.
3. **Business, Farms or Non-Profit Organizations** – The MDOT is required by statute to offer relocation assistance to displaced businesses, farms and non-profit organizations. The MDOT has specific programs that will implement the statutory and constitutional requirements of property acquisition and relocation of eligible displacees. Appropriate measures will be taken to ensure that all eligible displaced businesses, farms or non-profit organizations are advised of the rights, benefits, and courses of action available to them. Displaced businesses and organizations will be encouraged to relocate within the same community.
4. **Purchasing Property** – The MDOT will pay just compensation for fee purchase or easement use of property required for transportation purposes. “Just compensation” as defined by the courts is the payment of “fair market value” for the property rights acquired plus allowable damages to any remaining property. “Fair market value” is defined as the highest price estimated, in terms of money, the property would bring if offered for sale on the open market by a willing seller, with a reasonable time allowed to find a purchaser, buying with the knowledge of all the uses to which it is adapted and for which it is capable of being used.
5. **Relocation Information** – A booklet entitled “Your Rights and Benefits” detailing the relocation assistance program can be obtained from www.michigan.gov/mdot (select “doing business” then “Real Estate”) or contact:

Michigan Department of Transportation
Real Estate Division
P.O. Box 30050
Lansing, Michigan 48909
(517) 373-2200

Michigan Department of Transportation
Grand Rapids Region Office
1420 Front Ave NW
Grand Rapids, MI 49504
(616) 451-3091

6. **Property Acquisition Information** – A booklet entitled “Public Roads & Private Property” detailing the purchase of private property can be obtained from www.michigan.gov/mdot (select “doing business” then “Real Estate”) or contact:

Michigan Department of Transportation
Real Estate Division
P.O. Box 30050
Lansing, Michigan 48909
(517) 373-2200

Michigan Department of Transportation
Grand Rapids Region Office
1420 Front Ave NW
Grand Rapids, MI 49504
(616) 451-3091

7. **Conceptual Stage Relocation Plan** – The Conceptual Stage Relocation Plan for this project is attached in Appendix D.

In the City of Grand Haven and Holland Township there are no relocations needed. In Robinson and Crockery Townships there will be six farms, nine businesses, and fifty-one residential properties impacted by acquisitions, all shown in **Table 4.1-4**. MDOT will assist all eligible persons displaced, including persons requiring special services and assistance. MDOT’s relocation program will provide for the orderly, timely, and efficient relocation in all eligible displaced persons in compliance with state and federal guidelines.

Table 4.1-4 Conceptual Stage Relocation Plan				
	Farm	Business	Residential	Total Impacts
Improving segments of US-31 in Grand Haven from south of Franklin Street to north of Jackson Street.	0	0	0	0
Improving segments of US-31 in Holland from Lakewood Boulevard to Quincy Street.	0	0	0	0
Construction of new route, between M-104 and I-96/M-104 interchange area	6	9	51	66
Total:				66

Note: The Conceptual Stage Relocation Plan does not include vacant land when calculating the amount of properties that will need to be relocated. Therefore, the number of relocations will differ from the potential property impacts for the Preferred Alternative.

4.1.4 Indirect and Cumulative Impacts

The following section includes a discussion on the indirect and cumulative impacts in the areas that are likely to result from the Preferred Alternative. Land use and development, agricultural, wetlands and natural areas as well as transportation patterns are included in the analysis.

Indirect impacts are described in the Council on Environmental Quality’s (CEQ) regulation (40 CFR 1508.8), 1997 as: caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.

The CEQ regulations for implementing the National Environmental Policy Act (NEPA) define cumulative effects as: the impact on the environment which results from the incremental impact 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 (40 CFR 1508.7), 1997. This FEIS identified impacts resulting directly from the Preferred Alternative. The impacts will be mitigated as required in this FEIS.

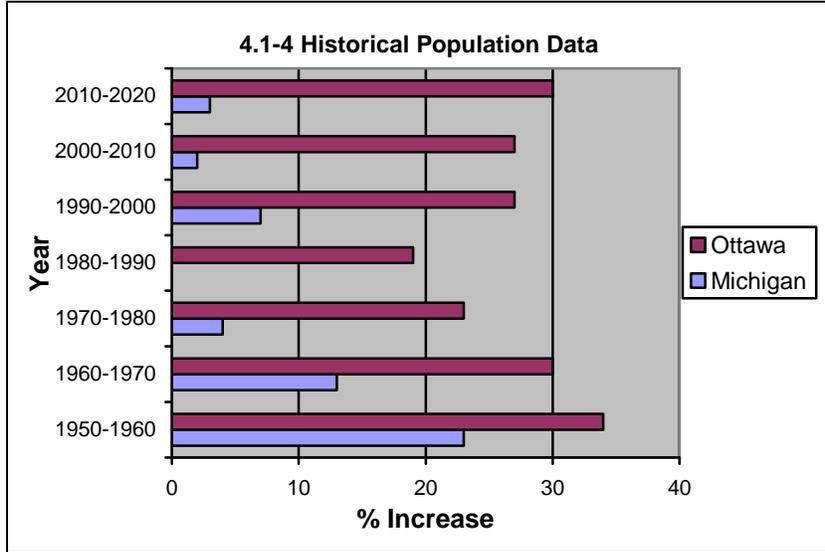
4.1.4.1 Geographic Boundary

The geographic boundary used for this analysis includes all of Ottawa County, because the Preferred Alternative is principally located in Ottawa County and trend data (population and employment) for the county is consistently available. Population and employment growth are the historic influences of development activities in the county. The county was included as part of a broader study area consisting of Kent, Ottawa, Muskegon and Allegan Counties in the US-31 Land Use Study, conducted by Michigan State University (MSU). A trend analysis was used to determine the boundary, which is consistent with guidelines published in the document “*Considering Cumulative Effects Under the National Environmental Policy Act*”, published by the CEQ. Impacts resulting directly from the proposed US-31 project have been identified and will be mitigated as required and included in this FEIS.

4.1.4.2 Temporal Boundary (Time Frame)

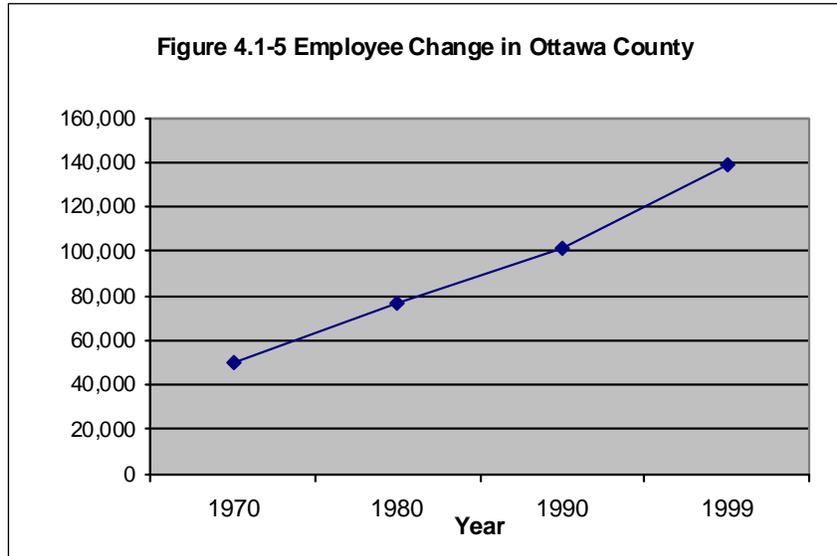
Ottawa County population data for 1950-2020 was reviewed (see **Figure 4.1-4**). The year 1950 represents the date just before US-31 was widened to its current width in its existing location. During the decade following the opening of the roadway, Ottawa County’s population increased by 34%. Continued growth in population is not attributable to any new transportation project constructed during this time.

Regional economic conditions were conducive to business investment, especially in manufacturing, which contributed to population growth in the entire four-county area. The completion of the area freeway system that occurred between 1950 and 1990 helped to establish patterns of development in the study area. At the time the study was conducted, Ottawa County experienced a much higher increase in growth between 1990 and 2000 as compared to the state. The future temporal boundary of 2020 represents the design year for the proposed project.



The US-31 Land Use Study was conducted in 2004 and the 2020 planning horizon was acceptable for study purposes and development of this FEIS. Projections for employment and population were expected to level off after 2010. As a result, extending the timeframe to 2030 to coincide with the current FEIS planning year horizon will not affect the study outcomes.

Employment data for the years 1970 to 1999 is shown in **Figure 4.1-5**. The employment growth trends parallel the population trends for the area. I-196, connecting Grand Rapids with Holland, was completed in 1974 providing an important economic link, reducing the travel time between the two cities to approximately 30 minutes. The proximity and size of the Grand Rapids metropolitan area facilitated the expansion of economic opportunities in the county, which became more accessible with the completion of I-196.



4.1.4.3 Transportation Projects

The US-31 Land Use Study model was based on a highway network that contained major road projects expected to be constructed by 2006. Therefore, associated land use impacts were reflected in the study's conclusion. The model included road projects expected to be underway within the study time frame in the base analysis. Summaries of direct impacts from the Preferred Alternative are included in this FEIS. Direct impacts from other actions in combination with the impacts of the Preferred Alternative have cumulative impacts within the geographic boundary established for the indirect and cumulative effects analysis. The land use study also included a comparison of impacts between select Practical Alternatives from the DEIS.

M-6 Freeway Construction FEIS

The 20-mile M-6 freeway bypass from I-96 to I-196 south of Grand Rapids was completed in 2004. The Federal Highway Administration (FHWA) approved this project on November 5, 1993. M-6 improved east/west access and travel capacity in Kent and Ottawa Counties. There are approximately four miles of M-6, including interchanges with 8th Avenue and I-196, contained in the geographic area for this analysis (Ottawa County). The direct impacts of the project were documented in the M-6 FEIS, along with mitigation actions from design and through the construction phases.

M-45 Boulevard FEIS

The M-45 Boulevard through Allendale and Tallmadge Townships opened to traffic in 2002. The boulevard increased east/west access and travel capacity and safety conditions. M-45 is the primary route to the campus of Grand Valley State University (GVSU) from the City of Grand Rapids. GVSU, established in 1960, has an enrollment of approximately 22,000 students. The direct impacts associated with the project were identified in the M-45 FEIS and have been mitigated throughout the design and construction phases.

Future Projects

Based on a review of the three MPO's Transportation Improvement Programs (TIPs) for the MACC, the WMSRDC and the Grand Valley Metropolitan Council (GVMC), there are no planned transportation improvements that will contribute significantly to cumulative impacts. The US-31 Land Use Study assumed the implementation of projects included in the TIPs as part of the baseline analysis.

The MACC 2035 LRTP, the GVMC 2035 Long Range Plan, and the WMSRDC 2035 LRTP all include several roadway capacity improvements to existing roadways. Widening projects included in these plans are approximately one mile in length and will not require major NEPA documentation.

4.1.4.4 Analysis Approach

MSU provides research in the areas of land use and land cover change, modeling, public data visualization and access, and public outreach. The Basic Science and Remote Sensing Institute (BSRSI) performed the analysis for assessing indirect and cumulative impacts of the Practical Alternatives. Please see the descriptions below.

The assessment of indirect and cumulative impacts involved a series of analytical techniques and modeling strategies to arrive at projections of the future built areas in Kent, Ottawa, Muskegon and Allegan Counties in the year 2020. The analysis included two general activities with several sub-components: forecasting the amount of new built area and forecasting its location. As indicated, this FEIS focuses on Ottawa County.

4.1.4.5 Baseline Analysis

This innovative analysis process began with baseline mapping from satellite imagery to establish land cover and use trends from 1988 to the 2001. For this study, researchers acquired and processed imagery collected by NASA's high-resolution Landsat satellites for the years 1988, 1997 and 2001. **Figure 4.1-6** shows the results of the comparison between images obtained for 1988 and 2001. These areas of change are shown in yellow in **Figure 4.1-6**. These areas in Ottawa County experienced an 18% increase in built area during the 13 years between satellite measurements.

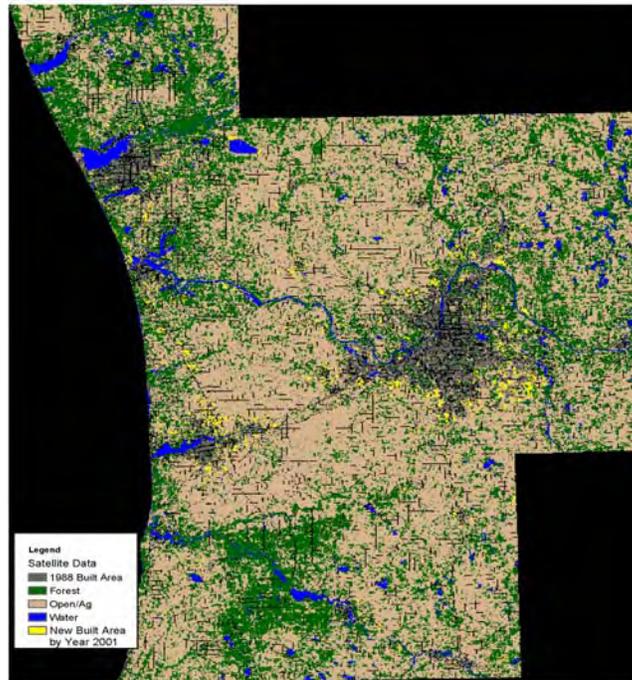


Figure 4.1-6 MSU Satellite Data

4.1.4.6 Forecasting Impacts

Forecasting the impacts of the Practical Alternatives on land conversion involved developing a relationship between economically driven traffic patterns, land use trends, and access to economic markets. The researchers at BSRSI established a regression relationship between trip numbers per unit area (trip density) and land cover as observed by satellite (built density) across a standard 1-kilometer modeling grid. The economic and demographic forecasts were applied to the transportation model to produce a measure of future trip density for each modeling grid cell. These values were applied to the regression formula producing a measure of future built area for 2020 for each of the Practical Alternatives. Adjustments to the transportation network and model were made for each alternative. The Preferred Alternative, which is a subset of Practical Alternative F/J-1, was part of the analysis, and not considered separately. The impacts associated with the Preferred Alternative are therefore anticipated to be consistent with or less than Alternative F/J-1.

The analysis showed that conversion of land from open/agricultural to built land has, and will continue, to occur in Ottawa County due to the positive economic climate of the region and proximity and access to the Grand Rapids urbanized area. Empirical data collected and observed from satellite images over the last 13 years supports this conclusion; however the average annual rate of growth for the future will be less than half of the rate over the previous decade. The reduced rate of growth is due to economic projections provided by economic forecasting models and local forecasts. The analysis showed that none of the individual 1 km grid cells experienced an increase of more than 7% for any of the Practical Alternatives when compared to the no-action alternative for the year 2020 (**Table 4.1-5**). The subtlety of these differences indicates that road location does not affect the location of potential new built areas. Other factors such as proximity to economic centers and land availability have a much greater influence.

Jurisdiction	2001	2020 No-Action	2020 Alternative F/J-1*	Percent Change 2020 Alternative F/J-1* to No-Action
Allendale Township	2,119	2,472	2,486	0%
Blendon Township	2,234	2,634	2,636	0%
Chester Township	1,257	1,260	1,282	0%
Coopersville Township	764	825	833	1%
Crockery Township	2,111	2,501	2,588*	5%
Ferrysburg Township	969	1,045	1,027	2%
Georgetown Township	7,422	7,808	7,738	1%
Grand Haven Township	4,589	5,095	4,978	3%
Grand Haven – City of	3,183	3,323	3,289*	1%
Holland Township	6,826	7,276	7,255*	1%
Holland – City of	3,537	3,670	3,653	1%
City of Hudsonville	1,078	1,136	1,134	0%
Jamestown Township	2,093	2,406	2,416	0%
Olive Township	2,570	2,989	3,042	2%
Park Township	4,487	4,630	4,655	1%
Polkton Township	2,177	2,548	2,609	3%
Port Sheldon Township	2,832	3,077	3,065	1%
Robinson Township	2,602	3,081	3,154*	3%
Spring Lake City/Twp	3,458	3,712	3,666	1%
Tallmadge Township	2,965	3,432	3,359	3%
Wright Township	1,799	2,150	2,146	1%
Zeeland Township	3,059	3,437	3,498	6%
Zeeland – City of	1,255	1,313	1,312	0%
Total	65,386	71,821	71,821	0%

* The Preferred Alternative (F-1a), as described in this FEIS, is a subset of Alternative F/J1 and lies fully within the limits of Alternative F/J-1.

4.1.4.7 Indirect and Cumulative Effects Analysis Conclusions

The identification of areas most susceptible to change gives local communities the unique opportunity to develop a regional land use plan to influence and shape future land use change. **Table 4.1-6** shows that without Alternative F/J-1 the number of acres of forested land decreases by 1,785 acres, agricultural land decreases by 4,337 acres, and wetlands decrease by 316 acres by 2020 as compared to 2001. Alternative F/J-1 has a negligible effect (less than 75 acres) on the number of acres converted in each category as compared to the No Action Alternative. Land conversion creates fragmented wildlife habitats. Wetlands are afforded a significant degree of protection from federal and state regulations.

The Preferred Alternative (Alternative F-1a) includes portions of Alternative F/J-1 and impacts that are expected to be even further reduced. For example, the segment of Alternative F/J-1 that extended across Zeeland Township to connect the proposed new route to existing US-31 is not included. Therefore, there are no anticipated impacts in Georgetown and Zeeland Townships. The impacts from F-1a are not anticipated to be focused within the townships and cities noted above.

The US-31 Land Use Study focused on changes in Ottawa County, because the alternatives are all located in Ottawa County and the area of influence is contained in Ottawa County. The following chart compares the future No-Action Alternative to Alternative F/J-1 and the types of open space lands projected to be converted.

	Total	Total Open Area	Forested	Agricultural	Wetland	% Change From 2001
2001 (existing)	379,546	317,372	84,869	217,728	14,775	
2020 No Action	379,546	310,935	83,085	213,391	14,459	-2.03%
2020 Alternative F/J1 (inclusive of Alternative F-1a)	379,546	310,862	83,111	213,288	14,463	-2.05%

Source: US-31 Land Use Study Results – Michigan State University @ 2002 BSRSI

Indirect Impacts

When viewed in the context of the overall growth anticipated for the study area, significant indirect impacts to natural resources from construction of the Preferred Alternative (Alternative F-1a) are not anticipated. Impacts are attributed to growth resulting from economic development already occurring in the area, not specifically resulting from the Preferred Alternative. The US-31 Land Use Study indicated that development pressures are substantial in the Kent, Ottawa, Muskegon and Allegan County area as a whole and that substantial growth has occurred and is predicted to occur with or without additional transportation improvements, due primarily to the attractiveness of the Grand Rapids market area. The Grand Rapids metropolitan area is the center of economic activity in west Michigan and has a population of over one million (2000 U.S. Census). The Holland and Muskegon areas also contribute to economic opportunities in the triangular connection between the three cities. Travel time between each of these cities is less than 50 minutes.

Indirect wetland impacts attributable to the Preferred Alternative are expected to be statistically insignificant as compared to the No-Action Alternative. There is a 3.04-acre difference between the No-Action and the Preferred Alternative, which is .02%, as compared to the total 14,459 acres of wetland according to the model. The remaining wetlands will be impacted by increased storm water runoff from additional impervious surfaces created by new development in Ottawa County.

Wildlife habitat in forested and agricultural lands would be slightly reduced with the Preferred Alternative (Alternative F-1a) as compared to the No-Action Alternative. The land use study results showed that land conversion from these uses to built uses would occur regardless of the alternative chosen due to the positive economic climate and availability of land. This land transformation will cause wildlife to migrate to other open areas permanently and may fragment existing habitats. As a significant portion of Ottawa County will remain undeveloped, impacts will be minor and wildlife will relocate to these undeveloped lands.

Conversion of open land to built land increases impervious surfaces such as parking lots, driveways and roads. The No Action Alternative will cause similar impacts to aquatic resources as the Preferred Alternative because the amount of land expected to be converted with each alternative is nearly equal. The long-term impact to aquatic resources will be overall degradation of conditions of fish habitat.

The Preferred Alternative (Alternative F-1a) is expected to increase accessibility for people living in and traveling in the study area. While the No Action Alternative will also result in increased development, there will be more pressure on local roads to meet travel demand. Direct access to land adjacent to the intersections on the proposed M-231 will be improved and development will likely be concentrated at these sites due to the increased accessibility. However, with only a limited number of intersections and the controlled access ROW at the intersections with proposed M-231, there is an opportunity to focus and manage development through local zoning ordinances with the Preferred Alternative.

Cumulative Impacts

Cumulative impacts are those incremental impacts to the environment that result from the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such actions. Resources that could experience cumulative effects include surface water quality, groundwater, wetlands, farmland, human community structure, cultural resources, air quality and noise. These resources have been significantly impacted by development in the past. Future impacts are expected to occur at a slower rate than the previous decade due to a forecasted slowing of the economy, and therefore, development.

Past Conditions

Reviewing and comparing the 1992 and 2004 aerial photography of the study area shows that development primarily occurred adjacent to the existing urban areas. The largest independent areas of new growth occurred in Allendale Township around the campus of GVSU, established in 1960, and in and around the City of Grandville and Georgetown Township along the border of Ottawa and Kent Counties. The development consisted of low-density residential homes and large-tract development of industrial

parks and shopping malls. Ottawa County, the fastest growing county in the four-county study area, increased its population by 50,546 to 238,314 between 1990 and 2000.

This growth in population and employment and expansion of development resulted in 9,900 acres of new built area in Ottawa County, which is an 18% increase in overall built land (55,493 acres to 65,386 acres) between 1988 and 2001. Ottawa County had 15% of its land classified as built land in 1988. By 2001, 17% of the 379,546 acres in the county were classified as built and by 2020 19% will be classified as built.

Present Conditions

Local zoning by the townships within the study area provides regulation for land use and development. The Ottawa County Development Plan supports the Preferred Alternative (Alternative F-1a). The majority of land uses near proposed M-231 are open space, agricultural, and rural residential, while land uses along existing US-31 are commercial or industrial. Future expansion and development is planned for areas adjacent to the cities of Holland, Zeeland, Grand Haven, Ferrysburg and the Village of Spring Lake.

Reasonably Foreseeable Actions

Eighty-three percent of the land in Ottawa County is open, therefore potentially attractive to new development. Zoning designations are subject to change and will be modified by the individual jurisdictions as development, increases. The US-31 Land Use Study analyzed the attractiveness of the area for future growth. It concluded, based on historic trends and economic analysis, that an additional 6,400 acres would be converted from open land to built land between 2001 and 2020 without major road improvements like the Preferred Alternative. This is lower than the approximate 10,000 acres converted in the 1988-2001 period. The slowing in growth is related to the population and employment forecasts provided by the local agencies and regional forecasts. This brings the total amount of built land in the county up to 71,821 acres, or 19% of the total acres in Ottawa County. The area remains attractive for residential development. Several large developments have been proposed and constructed since the DEIS. For example, construction of the Macatawa Legends began in the spring of 2004. This development includes more than 500 acres in Holland, Park, Olive and Port Sheldon Townships for development of an 18-hole golf course and 700 new homes.

Surface Water

Surface runoff and runoff from peak storm flows are expected to increase as a result of the conversion of open land to built land, as areas of impervious surfaces increase. All new projects will be required to comply with current regulations to reduce water quality impacts, including storm water management and erosion and sediment control plans. Agencies such as the MACC's Macatawa Watershed Project and the Pigeon River Watershed Advisory Council provide opportunities to educate and implement measures to improve water quality. It is not possible to determine the future success of efforts from these agencies or other plans.

Past actions negatively affected water quality in the Macatawa River watershed, and Lake Macatawa. Lake Macatawa was identified in a 1971 publication entitled "Problem Lakes in the United States" (Ketelle and Uttormark, 1971). Water quality remains in non-attainment due to nutrient enrichment according to Section 303(d) of the Federal Clean Water Act. The Preferred Alternative will temporarily impact water quality during construction. Water quality will likely continue to degrade as adjacent land is developed unless additional measures are taken to control non-point source pollution, through programs such as the Macatawa River Watershed Plan. It is not possible to determine the future success of efforts from these agencies or other plans on the water quality of the Macatawa River.

The lower Grand River is also listed as being in non-attainment with water quality standards (WQS) for fish consumption and combined sewer overflows, according to the United States Environmental Protection Agency (USEPA). Temporary sedimentation impacts to water quality will occur during construction of the new crossing. Permanent impacts will be minimized by completely spanning the river with a new crossing. Water quality will continue to degrade as land is developed unless additional measures are taken to control non-point source pollution. It is not possible to determine the future

success of future corrective actions. **Section 4.11** discusses direct impacts and mitigation actions for the Preferred Alternative.

Groundwater

GVSU conducted a study of Ottawa County wells to determine the susceptibility of the wells to groundwater contamination. The well logs prepared by the well drillers and knowledge of the hydrogeology of the county were used as the basis for the study. Variables used in the analysis included the depth to groundwater, the depth to any confining clay layers encountered, and the number and thickness of confining clay layers.

The groundwater levels have dropped in recent history throughout most of the study area according to GVSU's Annis Water Resource Institute (AWRI) due to such things as deep ditching for draining agricultural land and land clearing for development. These trends will likely continue as the area continues to be developed. The proposed project, including the mitigation plan, is not anticipated to adversely contribute to the cumulative effects. **Section 4.9** addresses direct impacts and mitigation actions for the Preferred Alternative.

Drainage

Tributaries of the Macatawa River and Grand River historically have had their drainage courses altered, primarily to improve drainage of agricultural lands for farming, and are now county-maintained and regulated drains. Future residential, commercial and industrial development and the creation of additional impervious areas within the boundaries of the analysis area indicate the potential to negatively affect drainage. Long-term impacts on stream hydrology associated with increased highway impervious surfaces may include increased peak flows, the loss of existing flood storage capacity, and degraded water quality. Impervious areas prevent runoff from being filtered through soils and the runoff enters drainage courses directly. **Section 4.12** addresses direct impacts and mitigation actions for the Preferred Alternative.

Future land development within the study area will result in the construction of additional impervious areas, including buildings, parking lots, and roadways. This loss of open area prevents direct absorption of rainfall into the soil and increases storm water runoff.

Regulation of storm sewer designs for future developments will be done by one or more agencies. The local municipality (city, village or township) can review/regulate storm sewer designs as part of site plan, plat, or condominium review processes. The Ottawa County Drain Commissioner will review storm sewer designs that involve discharge into a designated county drain. The Michigan Department of Environmental Quality (MDEQ) has permit authority for any land development project that affects waters of the State (rivers and streams) or wetlands and floodplains.

Designs of future land development projects can be expected to incorporate detention or retention facilities and other best management practices that will serve to mitigate the impacts of increased storm water runoff.

Storm water management for the Preferred Alternative is consistent with the goals and objectives of the Ottawa County Parks Department River Greenway Projects and the MACC's Macatawa River Watershed Project. These projects have as their mission the improvement of water quality within the watersheds through such things as storm water management, protection of riparian buffers, and wetland restoration. Cumulative impacts will be managed through implementation of these efforts.

Wetlands

The cumulative effects of the Preferred Alternative do not cause significant impacts to wetlands due to minimization of direct impacts and mitigation of all direct impacts. Since 1990, wetlands have been altered, compromised or lost due to development. In Michigan, federal wetland regulatory authority has been delegated to the state, and the extent to which wetland mitigation is required for a project is dictated through the wetland permit process administered by the MDEQ. The wetland mitigation actions

combined with the actions identified in **Section 4.10** address the direct impacts of the Preferred Alternative.

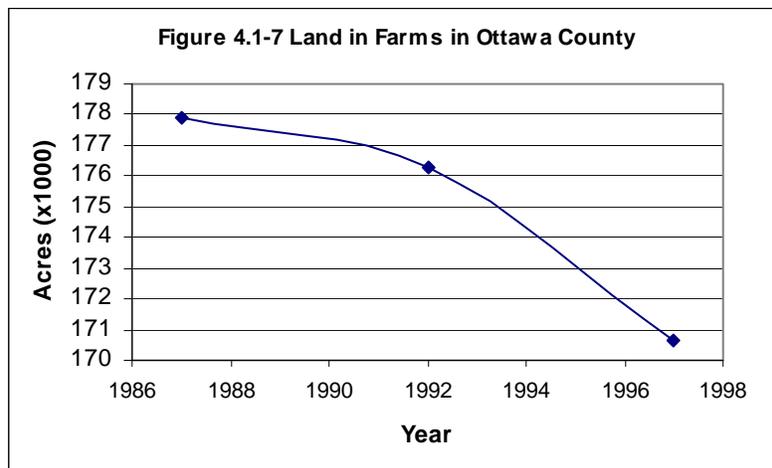
The US-31 Land Use Study forecasted the probable conversion of wetlands between 2001 and 2020 for both the No-Action Alternative and Alternative F/J-1 for comparison purposes. The conclusions were that roughly 2.19% of the wetland areas would be converted by 2020 with the No-Action Alternative, as opposed to a 2.26% reduction with Alternative F/J-1. Alternative F/J-1 resulted in four more acres being converted over the No-Action Alternative. The Preferred Alternative has less impact than Alternative F/J-1. Therefore, the project is not anticipated to cause significant cumulative impacts, because its long-term impacts are minimal as compared to other proposed or planned development. Wetlands are regulated by the MDEQ and in some instances by local governments.

Wildlife

Ottawa County is expected to have approximately 80% of its land remain in open space by the year 2030. Wildlife will relocate to areas where there are suitable and available habitats. While the amount of land available for wildlife relocation in response to changes in land use may be sufficient, the combined actions of the Preferred Alternative and other future actions will negatively affect wildlife by restricting or eliminating migratory passageways and possibly the availability of certain food sources or terrestrial habitats. Populations of species less able to adapt to changes will decline in areas of heavy development, while those more adaptable will increase. **Section 4.15** addresses direct impacts and mitigation actions for the Preferred Alternative.

Farmland and Farming

The amount of land used for farming in Michigan has been declining for the last 50 years. The United State Department of Agricultural Statistics Service, 1997 United States of America (U.S.) Census of Agriculture, reports that farm acreage in Michigan decreased by 4% between 1987 and 1997 (10,316,860 acres to 9,872,810 acres). Similarly, between 1987 and 1997, Ottawa County’s farmland acreage decreased by 4%, from 177,894 acres to 170,627 acres (See **Figure 4.1-7**).



Source: USDA National Agricultural Statistics Service, 1997 Census of Agriculture

The Preferred Alternative directly impacts approximately 115.8 acres. The Preferred Alternative improves access from farms to major markets and agriculture related businesses.

The Preferred Alternative minimally contributes to other cumulative impacts primarily caused by past and future development patterns. These patterns indicate that farmland will be converted to built land even without transportation improvements. The location and degree to which this development occurs is managed by the local land use policies and zoning regulations.

The number of farms in Ottawa County experienced a similar decline to the state's over the past decade. Ottawa County had 1,471 farms in 1987. By 1997, that number was reduced to 1,292, which is a 14%

decrease. The number of farms in Michigan also decreased by 11% (51,172 to 46,027) during this time. Ottawa County's loss of 179 farms represents 3% of the state's loss of 5,145 farms between 1987 and 1997. While the overall acres dedicated to farming and the number of farms is declining, the average size of farms is increasing. This trend is in response to cost savings in managing larger farms. This trend will likely continue due to changes in land use, number of acres available for farming and the business of farming. **Section 4.2** addresses direct impacts and mitigation actions for the Preferred Alternative.

Human Community Structure

The No-Action Alternative will result in increased traffic volumes and traffic congestion through the cities of Holland and Grand Haven and on existing US-31. Traffic volumes and congestion can serve to divide communities, as it becomes increasingly difficult for autos, pedestrians and bicyclists to cross busy facilities to access destinations on either side. Quality of life could be impaired due to auto emissions, noise and additional debris and litter, especially in the residential communities located adjacent to existing US-31. These impacts would be associated with the No-Action Alternative.

The Proposed M-231 will pass through portions of a residential community on the south bank of the Grand River. All local roads in Robinson Township, except Johnson Street, will remain open to provided access between the east and west sides of the proposed M-231. The Preferred Alternative will benefit communities throughout Ottawa County by providing another north-south trunkline access route that reduces congestion on existing US-31 and provides an alternate crossing of the Grand River when the existing bascule bridge is closed for operations or maintenance. It also provides a critical link for emergency services between Robinson Township and Crockery Township and the region.

Cultural Resources

The Preferred Alternative is not expected to contribute to cumulative impacts to cultural resources, as future development patterns are not significantly influenced by the location of the alternative. Decisions on future land development are made by the local agencies. These communities have the data provided in the US-31 Land Use Study to help them manage and avoid adverse impacts to identified cultural resources.

There are no direct impacts from the Preferred Alternative; however, development pressures may challenge preservation of eligible, but not designated National Register Historic sites. Local agencies should consider these impacts in their plans.

Air Quality

Ottawa County is designated (on June 15, 2004) by the EPA as an attainment area for all the criteria air pollutants except ozone (O₃), for which it is designated as an "attainment/maintenance" area for both the eight-hour and one-hour standards. Conformity is determined using regional air quality analysis for the TIP and the Long Range Plan for the MPOs. The analysis includes the transportation projects in each of these plans. As a result, the impacts of the Preferred Alternative, along with other projects in the plans, are included in the assessment of potential cumulative effects. The plans conform to the SIP; therefore, there are no cumulative impacts.

Noise

Potential cumulative impacts that could occur in the future include increases in traffic noise levels. Future development that generates additional traffic along the proposed route and adjacent transportation can create congestion. Congested facilities generate less noise from tires due to reduced speeds. Consequently, noise levels in the area may decline.

Summary

The Preferred Alternative will have little impact on overall cumulative or any environmental impacts, but may influence the location of future cumulative impacts. Concentrated areas of impact may occur along the proposed M-231 at intersection locations. In addition to the limited access control along the route and controlled access at new intersections in the route, mitigation actions required as part of the project will considerably reduce the direct impacts. Local planning and zoning actions developed in response to data provided in the US-31 Land Use Study can further reduce and manage cumulative impacts. Since the

US-31 Land Use Study indicated that growth and development will occur without transportation improvements, and the Preferred Alternative does not significantly alter the outcome, minimal cumulative impacts (as compared to the No-Action Alternative) are expected.

4.1.5 Utilities

Impacts and Mitigation

Utilities that are adjacent or cross the Preferred Alternative may be impacted. Even if utilities do not require permanent relocation or adjustment, service to the study area may be temporarily interrupted during the construction period. Any required temporary or permanent relocations will be identified and mitigated during the project design phase. If no relocation is required there may be temporary service interruptions during the construction period. All private and public utilities including water, sewer, electric, telephone, cable, cell phone towers, and gas will be protected, or where necessary, relocated during construction. MDOT and its contractors will coordinate with the utilities and affected communities during the design phases prior to beginning construction and during construction. The coordination would be maintained throughout the project, per existing applicable processes and or agreements.

Electric Power Plants and Transmission

Since the DEIS, a new gas-fired power plant has been constructed in Zeeland Township to provide peaking power to all of the utility suppliers in this growing area. The Zeeland power plant provides service to Holland Township and the City of Grand Haven. Robinson and Crockery Townships are serviced by Consumers Energy and Great Lakes Energy.

Telephone Facilities and Transmission

Local phone companies include AT&T and Allendale Telephone Company. Long distance service is provided by AT&T and Verizon.

Cable Television Facilities and Transmission

Cable television is provided by Comcast and Charter Communications within the study area.

Natural Gas and Oil Facilities

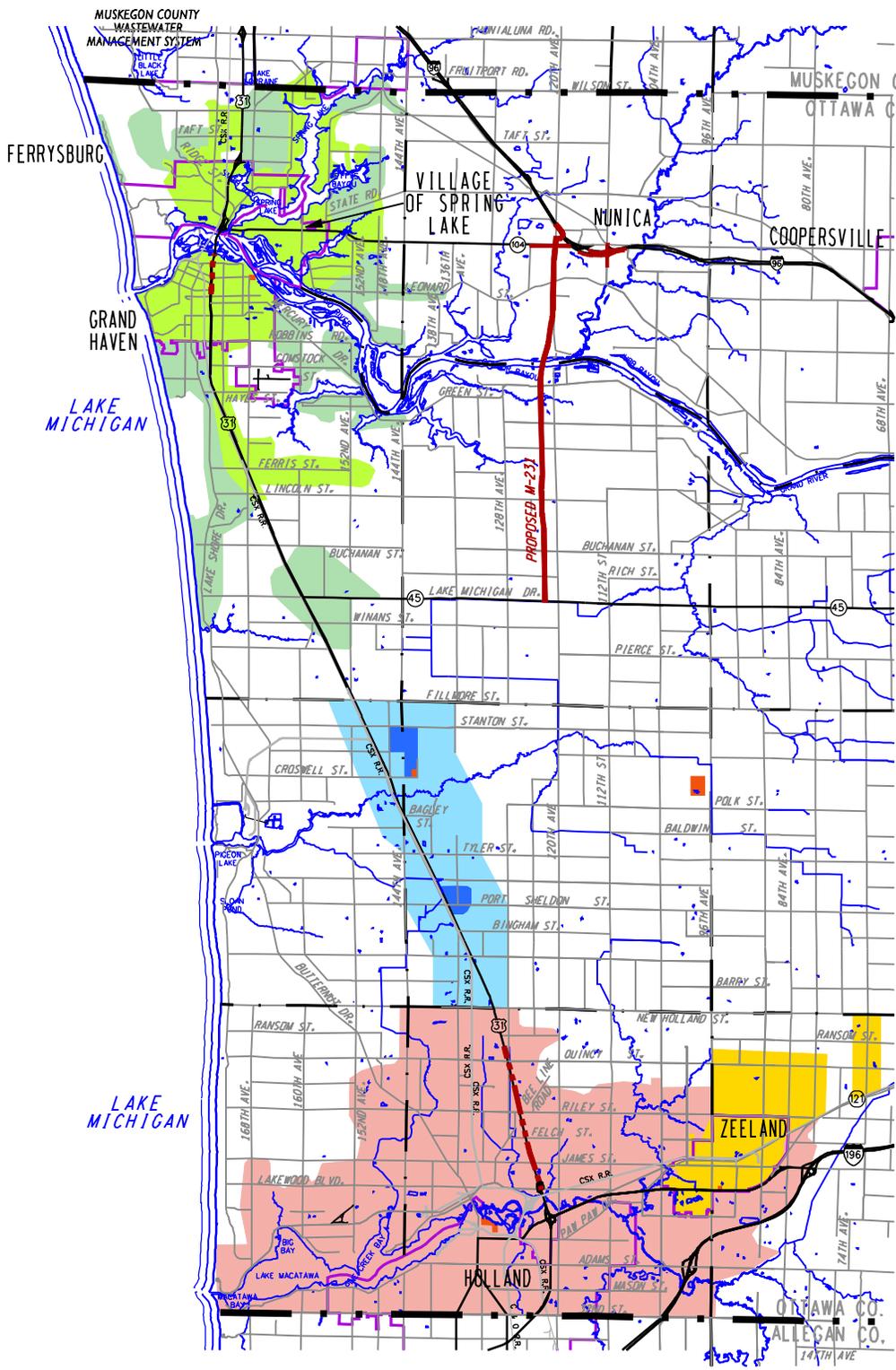
The gas utility provider within the study area is DTE Energy. Major natural gas and oil pipelines are ANR Pipeline Company, SEMCO, Wolverine Pipeline and Marathon Ashland Pipeline Company.

Sanitary Sewer Facilities and Transmission

There are two public sanitary sewer service districts near the Preferred Alternative. Holland Township is serviced by the Holland Board of Public Works and the City of Grand Haven is serviced by the Ottawa County Road Commission (OCRC) and the City of Grand Haven. The majority of the study area outside the Cities of Holland and Grand Haven is currently not serviced by any public sanitary sewer service district (**Figure 4.1-8**). The City of Grand Haven has its own sanitary sewer system and Holland Township uses the City of Holland's sanitary sewer system, both are located within the influence of the Preferred Alternative. Robinson and Crockery Townships do not have sanitary sewer facilities. The residents of these townships use septic tank systems.

Potable Water Facilities and Transmission

The City of Grand Rapids has a primary 42-inch water transmission main along M-45 that runs through the Preferred Alternative (**Figure 4.1-9**). Although it is MDOT's intention to avoid impacts to this highly sensitive facility, temporary direct impacts may occur during construction to the City of Grand Rapids' 42-inch watermain at the proposed intersection of M-45 and M-231. Mitigation actions will be included in the design phase and coordinated with the City of Grand Rapids.



LEGEND

- TOWNSHIP BOUNDARY
- COUNTY BOUNDARY
- GRAND HAVEN/SPRING LAKE SERVICE DISTRICT
- GRAND HAVEN/SPRING LAKE MASTER PLAN SERVICE DISTRICT
- WEST-CENTRAL OTTAWA SERVICE DISTRICT
- WEST-CENTRAL OTTAWA MASTER PLAN SERVICE DISTRICT
- WASTEWATER TREATMENT PLANT
- ZEELAND SERVICE DISTRICT
- ZEELAND MASTER PLAN SERVICE DISTRICT
- HOLLAND SERVICE DISTRICT
- 2-LANE LIMITED ACCESS
- 6-LANE BOULEVARD



NORTH

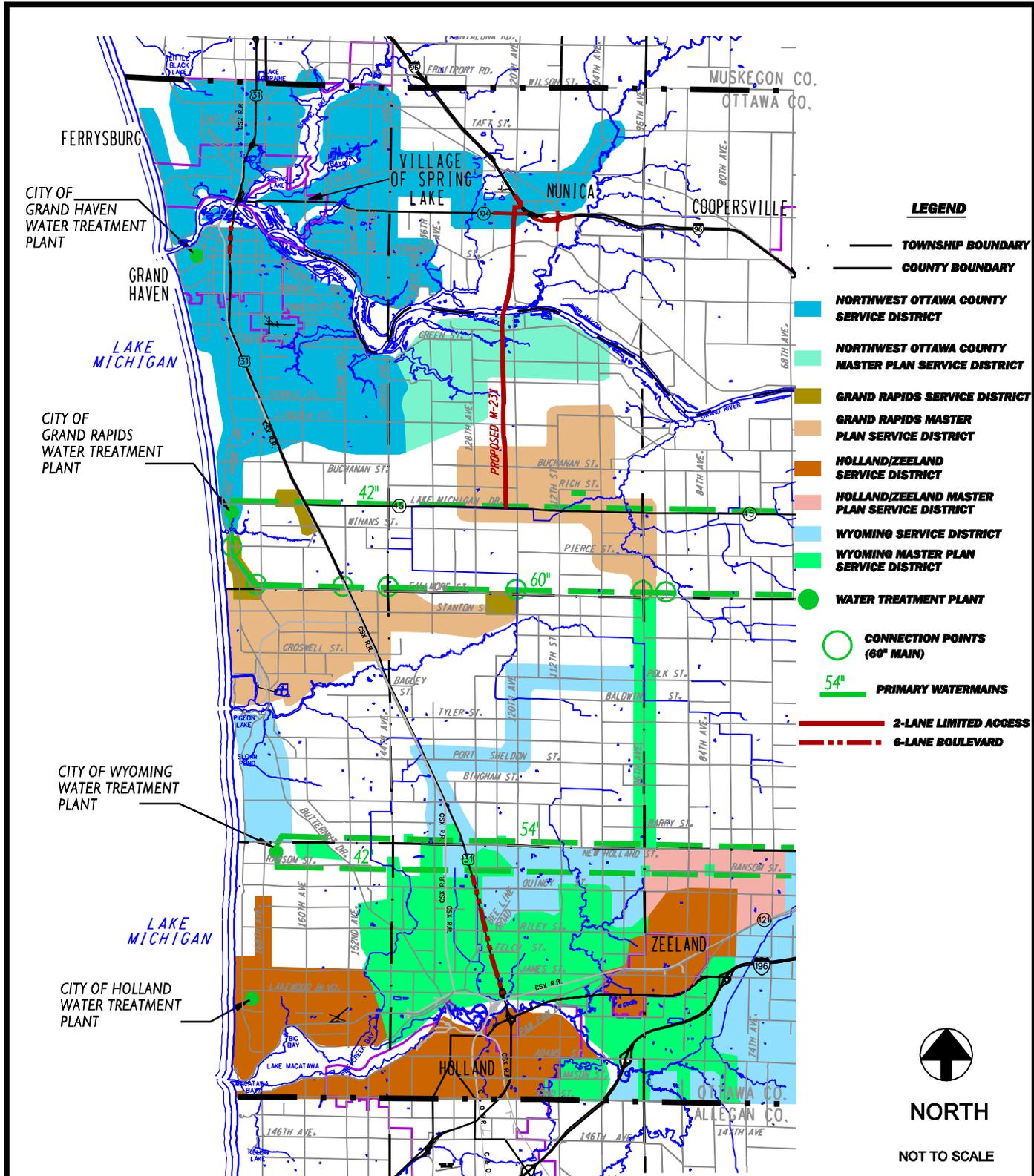
NOT TO SCALE

US-31 FINAL ENVIRONMENTAL IMPACT STATEMENT

**SANITARY SEWER FACILITIES,
SERVICE DISTRICTS AND AREAS**



**FIGURE
4.1-8**



LEGEND

- TOWNSHIP BOUNDARY
- COUNTY BOUNDARY
- NORTHWEST OTTAWA COUNTY SERVICE DISTRICT
- NORTHWEST OTTAWA COUNTY MASTER PLAN SERVICE DISTRICT
- GRAND RAPIDS SERVICE DISTRICT
- GRAND RAPIDS MASTER PLAN SERVICE DISTRICT
- HOLLAND/ZEELAND SERVICE DISTRICT
- HOLLAND/ZEELAND MASTER PLAN SERVICE DISTRICT
- WYOMING SERVICE DISTRICT
- WYOMING MASTER PLAN SERVICE DISTRICT
- WATER TREATMENT PLANT
- CONNECTION POINTS (60" MAIN)
- 54" PRIMARY WATERMAINS
- 2-LANE LIMITED ACCESS
- 6-LANE BOULEVARD



NORTH

NOT TO SCALE

US-31 FINAL ENVIRONMENTAL IMPACT STATEMENT

POTABLE WATER SERVICE AREAS AND DISTRICTS



FIGURE 4.1-9

4.2 AGRICULTURE AND FARMLANDS

Farms in the study area yield a wide range of products, including vegetables, fruits, meats, animal feed, and nursery products. Since the DEIS, the two fish farms in Robinson Township have closed and have been converted to wetland mitigation banks by MDOT. There is a total of 354.2 acres within the study area along the Proposed M-231. A total of 115.8 acres of prime, unique, locally and statewide important farmlands will be impacted by the Preferred Alternative.

Nationally, Michigan ranks mid-range in agricultural output, with most of its production concentrated in the southern half of the Lower Peninsula. As of 2002, Ottawa County ranked eighth in the state for number of farms, with a total of 165,484 acres being farmland. Less than one percent of the farmland in Ottawa County is within the study area. The total acres of farmland have been on the decline since 1945, both in the state and the county. This trend is likely to continue as the population within the county grows, pressure for development, and land is converted from farmland to other uses.

Table 4.2-1 illustrates the acreage of any direct impact and AD-1006 score for the Preferred Alternative. This score was obtained from the completion of the Farmland Conversion Impact Rating for Corridor Type Projects form that can be found in **Appendix B**. Direct impacts refer to farmland that would potentially be acquired as ROW for construction of road and drainage improvements. Indirect farmland impacts include properties that are uneconomic remainders and/or landlocked parcels as a result of direct impact to the farming operation. As stated by the *FHWA Real Estate Appraisal Guide*, an uneconomic remainder is a parcel of real property in which the owner is left with an interest after the partial acquisition of the owner's property and which the acquiring agency has determined has little of no value or utility to the owner. These parcels are sometimes sold or leased to adjoining property owners for continued agricultural production.

Practical Alternative	Number of Actively Farmed Parcels	Number of Parcel Splits	Total Acres of Active Farmland Impacted	Total Acres of Indirect Farmland Impacted*	Total Acres of all Land Uses Impacted	Percentage of Active Farmland of all Impacted Land	AD-1006 Score (Scale from 100-260)	Prime Farmland	Unique Farmland
No-Build	0	0	0	0	0	N/A	N/A	0	0
PA F-1a	8	2	59.11	20.9	354.2	39%	99.5	14.4	0

* Indirectly impacted farmland is land that is not required for construction and could remain in agricultural use.

The amount of impacts on farmland acres has been minimized since the DEIS. Compared to Alternative F/J-1, the Preferred Alternative's total amount of farmland impacted went from approximately 830 acres to approximately 115.8 acres, minimizing farmland impacts by 714.2 acres. Specifically, Prime Farmland impacts for F/J-1 were 190.5 acres and Unique Farmland impacts were 27 acres. The Preferred Alternative will impact Prime Farmland by 14.4 acres, and there will be zero acres of Unique Farmland impacted.

The Preferred Alternative will directly affect less than one percent of the total farmland in Ottawa County and will not have a substantial regional impact on farmland, farm employment or farm production. The Preferred Alternative will not require the displacement of any farmland operation. The Preferred Alternative will impact a total of 59.11 acres of active farmland. MDOT will purchase the farmland property in accordance with FHWA regulations.

The Preferred Alternative may require additional land acquisitions outside the required ROW as a result of various parcels becoming unusable or landlocked. This will be negotiated with the landowners during the property acquisition process.

The Preferred Alternative has an AD-1006 score of 99.5 on a scale from 0-260 with 160 being the threshold in which alternative does not need to be considered. The 99.5 score is the lowest score compared to all the other alternatives evaluated in this FEIS. The Form AD-1006, which evaluates the impacts of farmland conversion, is provided in **Appendix B**.

4.2.1 Federal Prime and Unique Farmland

Prime and unique farmlands have good or specialized soils that are well suited for producing crops. There is no unique farmland adjacent to the Preferred Alternative or existing US-31 in Holland Township or the City of Grand Haven. The new alignment impacts prime farmland north of the Grand River.

Prime Farmlands

According to the United States Department of Agriculture (USDA) and NRCS there are approximately 103,000 acres of Prime Farmland in Ottawa County, which are mostly concentrated in the northeast and eastern parts of the county. There are approximately 14.4 acres of Prime Farmland impacted by the Preferred Alternative along the proposed M-231 north of the Grand River. The direct impacts of the Preferred Alternative equate to less than one percent of the total Prime Farmland within Ottawa County.

Unique Farmlands

According to the USDA, NRCS, and Michigan Resource Information System (MIRIS) data sources, there are no acres of Unique Farmland within the study area. Therefore, the Preferred Alternative does not impact any unique farmland.

4.2.2 Statewide and Locally Important Farmlands

Farmland of Statewide importance is used for the production of food, feed, fiber, forage, and oilseed crops as determined by the appropriate state agency or agencies. There are no Statewide Important Farmlands located within the study area. Therefore, Statewide Important Farmlands are not impacted by the Preferred Alternative.

The farmlands in the study area not designated as Prime or Unique are considered Locally Important Farmlands according to the 1992 Ottawa County Development Plan. However, these lands include township areas zoned or planned for rural residential and other land uses, and areas with less than ideal soils. According to the USDA Statistical Service, 1997 U.S. Census of Agriculture, there are approximately 53,627 acres of farmland not designated as Prime or Unique (Locally Important) in Ottawa County. The Preferred Alternative will impact 101.4 acres of these farmlands. The direct impacts of the Preferred Alternative equate to less than one percent of the total Locally Important Farmland in the study area.

4.2.3 Farmland and Open Space Preservation Program

The Farmland and Open Space Preservation Program (Part 361), of the Natural Resources and Environmental Protection Act (NREPA), Public Act 451 of 1994, as amended, more commonly known as "PA 116" is designed to preserve farmland and open space through agreements that restrict development, and provide tax incentives for program participation. The program provides an income tax credit to the landowner to maintain the property in an agricultural/non-developed state, as well as exemption from special assessments for sanitary sewer, water, lighting, or non-farm drainage. Farmlands and open space must be enrolled for a minimum of ten years and a maximum of ninety years.

A Michigan Department of Agriculture (MDA) database was used to identify the preserved farmlands. Approximately 3.16 million acres were enrolled throughout Michigan as of 2007, and 41,000 contracts existed within the State. This enrollment was down approximately 27 percent from the peak enrollment of 4.5 million acres recorded in 1992. Ottawa County in 2007 had approximately 41,000 acres enrolled and about 654 contracts existed. This decline is due to the expiration of contracts and the decisions by landowners not to re-enroll. Farmlands enrolled in this program within the study area are found within Robinson and Crockery Townships.

Impacts to PA 116 properties have been reduced from 170.56 acres for Alternative F/J-1 in the DEIS to 4.8 acres for the Preferred Alternative. Many of the impacts to PA 116 properties for Alternative F/J-1 were in Olive and Zeeland Townships, which are no longer impacted by the Preferred Alternative. In addition, the number of properties enrolled in the program has decreased significantly, resulting in a decrease in the number of impacts.

Part 361 of the Natural Resources and Environmental Act, as amended, is intended to support the preservation of farmland and open spaces through restrictive covenants. Part 361 provides tax incentives for participation in the program. The Act also allows for lands acquired for highway improvements in the public interest to be released from this preservation program. MDOT would coordinate with the Michigan Department of Agriculture, Crockery Township, and impacted property owners to identify affected properties or portions of properties, which would require a public interest release.

As of 2007, one parcel enrolled in the program will be impacted by the Preferred Alternative. This parcel is in Crockery Township, and the owner's agreement will expire in 2011. If the owner of this parcel re-enrolls in the program, 4.8 acres of preserved farmland will be impacted by the Preferred Alternative. If the owner does not re-enroll, there will be no impacts to preserved farmlands. The Uniform Relocation Act for property acquisition and state public interest release procedures will be followed for this parcel.

Ottawa County is planning a Purchase of Development Rights Ordinance (PDR), an ordinance for the Ottawa County Farmland Preservation Program which protects farmland by acquiring development rights voluntarily offered by landowners. This Ordinance authorizes the cash purchase and/or installment purchases of such development rights through sources other than the County General Fund, places an agricultural conservation easement on the property which restricts future development, and provides the standards and procedures for the purchase of development rights and the placement of an agricultural conservation easement. The PDR is currently in the planning phase, and therefore no properties have been impacted.

4.3 SOCIO-DEMOGRAPHICS

This section discusses who lives in the community, how they travel, and where schools and other community facilities are found. It also explains how the impacts and mitigation measures for the Preferred Alternative would affect the neighborhoods and community facilities.

4.3.1 Population Trends and Characteristics

Based on information from the 2000 U.S. Census, Michigan's population grew by less than one percent between 1980 and 1990, and 6.9 percent from 1990 to 2000. The population of Ottawa County grew at substantially higher rates, as shown in **Table 4.3-1**.

The sustained population increase over the last two decades is reflected in land use changes such as, from rural, pastoral environment, to a suburban environment in portions of Ottawa County. In particular, Ottawa County had one of the fastest growing populations in the state. It now has the tenth largest population in Michigan. While the highest percentage of growth in Ottawa County occurred from 1990 to 2000, the rate of growth is expected to be four times the state average between 2000 and 2010. According to forecasts provided by the University of Michigan the growth rate from 2010 to 2030 is expected to level off to around 12.2 percent during those two decades.

**Table 4.3-1
Population Trends for the State and Ottawa County**

	Michigan	Ottawa County
1970 Population	8,881,826	128,181
1980 Population	9,262,044	157,174
1990 Population	9,295,297	187,768
2000 Population	9,950,536	239,440
2010 Projected Population	10,351,644	280,004
2020 Projected Population	10,831,980	313,560
2030 Projected Population	11,416,811	351,922
2000 Population Density (persons per square mile)	151.3	423.0
Projected 2030 Population Density (persons per square mile)	173.6	621.8
Percent Change 1970 to 1980	4.3%	22.6%
Percent Change 1980 to 1990	0.3%	19.5%
Percent Change 1990 to 2000	6.9%	26.6%
Projected Percent Change 2000 to 2010	4.0%	16.9%
Projected Percent Change 2010 to 2020	4.6%	12.0%
Projected Percent Change 2020 to 2030	5.4%	12.2%

Sources: 1970 to 2000 Population from U.S. Census Bureau. Forecasts completed by University of Michigan.

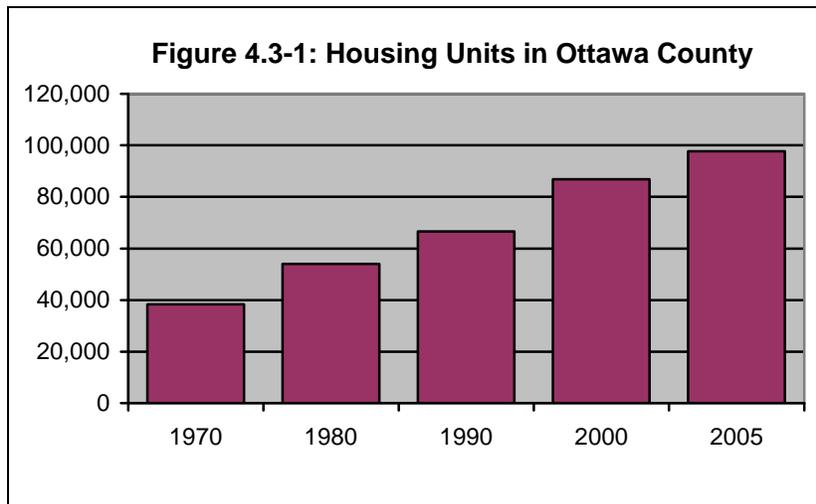
Population growth trends and projections for the individual townships in the study area are shown in **Table 4.3-2**. The 2030 forecast information is not available at the township level, but projected population changes for townships within the study area for 2000-2020, range from a 7 percent decline to a 119 percent increase. The highest population growth between 2000 and 2020 is projected to occur in Holland Township, with a 119 percent population increase.

**Table 4.3-2
Population Trends for the Study Area by Community**

	1980	1990	2000	FORECAST 2010	FORECAST 2020	FORECASTED % CHANGE 2000-2020
Holland Township	13,739	17,523	28,911	42,784	63,229	119%
City of Grand Haven	11,763	11,951	11,168	10,748	10,338	-7%
Robinson Township	3,018	3,925	5,588	7,763	10,752	92%
Crockery Township	3,536	3,599	3,782	4,008	4,244	12%

Sources: 1970 to 2000 Population from U.S. Census Bureau and forecasts done by West Michigan Regional Planning Commission. 2030 projections will not be available until the next census in 2010.

In response to the population growth, the number of homes steadily increased, as shown in **Figure 4.3-1**. In 2005, Ottawa County had 97,636 housing units, which is the fourth highest in the state. The median value of owner occupied housing units was \$133,000 in 2000.



Source: 2000 U.S. Census

Age and Gender

Table 4.3-3 and **Figures 4.3-2** and **4.3-3** show the age and gender profiles for the municipalities within the Preferred Alternatives area and the State of Michigan. Most of the municipalities are close to an equal number of male and female residents. However, the City of Grand Haven has a higher percentage of females (52.8%) than males (47.2%) and the number of people age 65 and older in Grand Haven is higher by about 10% than the other municipalities. Robinson Township has the highest percentage of 20-64 year olds (61.3%). There are no direct impacts to any person of a certain age, or gender within the Preferred Alternative.

Table 4.3-3 Age and Gender Assessment						
Population Characteristics	Holland Township	City of Grand Haven	Robinson Township	Crockery Township	Ottawa County	State of Michigan
Total Persons	28,911	11,168	5,588	3,782	238,314	9,938,444
Under 19	33.8%	22.6%	33.3%	30.3%	32.7%	29%
20-64	59.2%	57.8%	61.3%	59.8%	57.2%	59%
65 and older	7%	19.6%	5.4%	9.9%	10.1%	12%
Female	49.5%	52.8%	47.8%	48.1%	49.2%	51%
Male	50.5%	47.2%	52.2%	51.9%	50.8%	49%

Figure 4.3-2 Gender Assessment

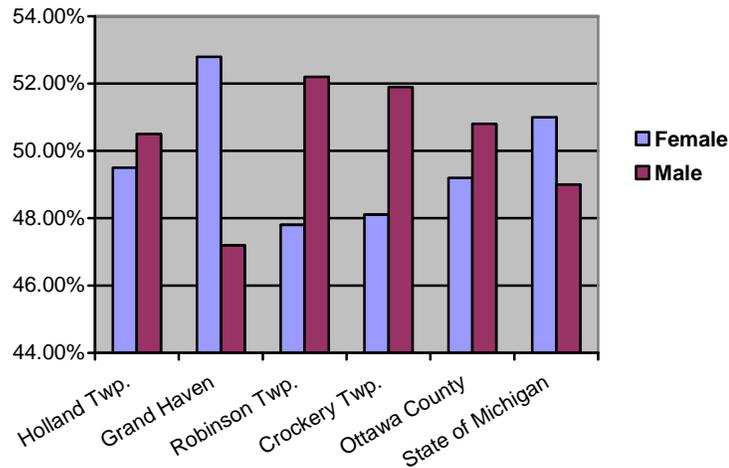
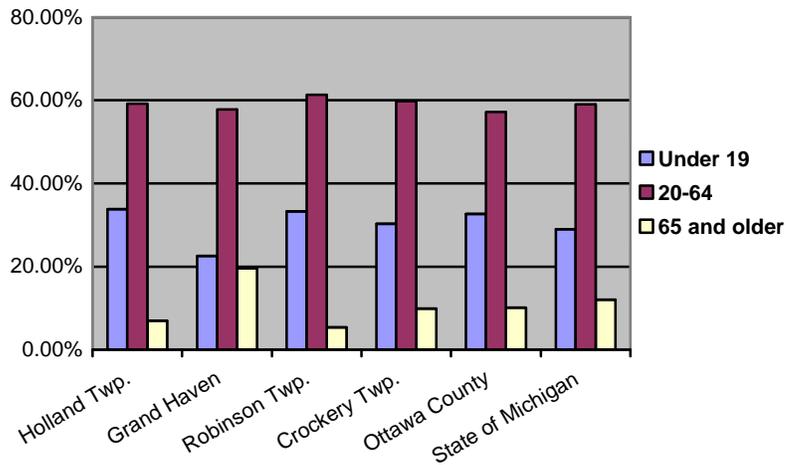


Figure 4.3-3 Age Profile



4.3.2 Local School Systems

There are three school districts within the study area: Grand Haven, Spring Lake, and West Ottawa. The combined districts have approximately 16,500 students attending elementary through secondary schools. There are two schools in the Grand Haven School District that are near the Preferred Alternative, Central High School and Ferry Elementary School. Grand Haven Christian School is the only private school in the City of Grand Haven. There are no direct impacts to any schools related to the Preferred Alternative.

Table 4.3-4 shows the number of students enrolled in various types of schools in the study area. This includes the Grand Haven, Spring Lake, and West Ottawa School Districts, and private schools. Nearly 50 percent of all students are in grades one through eight. **Table 4.3-4** also shows the education levels for residents in the study area. Education levels are reasonably consistent throughout the study area. Holland Township and the City of Grand Haven have a higher percentage of people who have a bachelor’s degree or higher. Overall, 86.6 % of people in Ottawa County have their high school diploma.

Table 4.3-4 School Enrollment and Education Levels								
	Holland Township		City of Grand Haven		Robinson Township		Crockery Township	
	Total	Percent	Total	Percent	Total	Percent	Total	Percent
School Enrollment								
Population 3 years and over enrolled in school	7,972	100%	2,401	100%	1,392	100%	966	100%
Nursery School, preschool	623	7.8%	130	5.4%	94	6.8%	31	3.2%
Kindergarten	630	7.9%	152	6.3%	42	3%	77	8%
Elementary School (grades 1-8)	3,940	49.4%	1,026	42.7%	687	49.4%	501	51.9%
High School (grades 9-12)	1,663	20.9%	592	24.7%	379	27.2%	249	25.8%
College or graduate school	1,116	14%	501	20.9%	190	13.6%	108	11.2%
Education Level								
Population 25 years and older	16,711	100%	7,919	100%	3,422	100%	2,512	100%
Less than 9 th grade	1,154	6.9%	497	6.3%	146	4.3%	110	4.4%
9 th to 12 th grade, no diploma	1,790	10.7%	728	9.2%	382	11.2%	263	10.5%
High school graduate (includes equivalency)	5,385	32.2%	2,268	28.6%	1,119	32.7%	884	35.2%
Some college, no degree	3,379	20.2%	1,786	22.6%	924	27%	640	25.5%
Associate degree	1,213	7.3%	511	6.5%	301	8.8%	247	9.8%
Bachelor’s degree	2,824	16.9%	1,523	19.2%	429	12.5%	257	10.2%
Graduate or professional degree	966	5.8%	606	7.7%	121	3.5%	111	4.4%
Percent high school graduate or higher	X	82.4	X	84.5	X	84.6	X	85.2
Percent bachelor’s degree or higher	X	22.7	X	26.9	X	16.1	X	14.6

Source: 2000 U.S. Census

4.3.3 Transportation

Cars, trucks and vans are the most common means of personal transportation for residents within the study area. **Table 4.3-5** shows that approximately 85 percent of the employed populations use a motor vehicle to get to work, and less than one percent uses public transportation.

Table 4.3-5 Transportation to Work				
Geographic Area	Workers 16 years and older			
	Percent Driving to Work	Percent in Carpools	Percent Using Public Transportation	Mean Travel Time Work (minutes)
Ottawa County	85.9%	7.2%	0.5%	19.4
Holland Township	85.6%	9.3%	1%	16.5
City of Grand Haven	83.2%	8.3%	1%	17
Robinson Township	89.2%	6.5%	0%	25.5
Crockery Township	81.5%	10.7%	0.7%	22.3

Source: 2000 U.S. Census

Public Roads

Public roads are essential to the transportation system since most of the study area population use a vehicle. Major roads in the study area include US-31, M-45, M-104, and 120th Avenue. **Figure 2.1-2** depicts the primary transportation system in the study area. There will not be direct impacts to local roads crossing existing US-31. Most local roads crossing the proposed M-231 will be maintained with intersections or bridges. Johnson Street, Cypress Street, and 120th Avenue at M-104 are all local gravel roads, and will be cul-de-saced where they intersection with the proposed M-231.

Pedestrians and Cyclists

Please see **Section 4.6** Non-Motorized Facilities for details.

Public Transit

One fixed-route line-haul transit provider exists near the Preferred Alternative: the Macatawa Area Express (MAX), serving the Holland/Zeeland area. A fixed-route line-haul transit provider is a bus transit system that utilizes buses circulating on defined, or fixed, routes within a designated service area. Fixed-route transit providers typically include year-round service and signed bus stops, versus seasonal or undefined route service.

In 2007 the Ottawa County Planning Commission received a grant funding from MDOT to conduct a transit needs assessment and feasibility study. The study that recently started will involve the analysis of three different types of commuter transit needs. If the study indicates that there is a need for commuter transit services and if the study finds that the provision of such services are feasible, the final recommendations for the creation of a commuter transit system shall meet the requirements of “commuter bus service” as defined by the Federal Transit Administration (FTA).

A brief description of each transit organization follows. There will be no direct impacts to the public transit systems related to the Preferred Alternative.

Holland/Zeeland Area Transit

MAX was started in January of 2000, expanding and replacing the previous Dial-A-Ride service. The MACC initiated the formation of a fixed-route line-haul transit service in the late 1990s at the request of Holland Township and the Cities of Holland and Zeeland. MAX provides a fixed-route line-haul service called Catch-A-MAX, as well as a dial-a-ride service, which is currently called Reserve-A-MAX. Beginning in September 2007, MAX expanded its fixed routes from three to seven, and added the Padnos Transportation Center as a central transfer hub. Annually, MAX Transit transports more than 225,000 passengers to their destinations in the local Holland and Zeeland area.

Grand Haven/Spring Lake/Ferrysburg Area Transit

Harbor Transit serves the greater Grand Haven metropolitan area, including the City of Grand Haven, the Village of Spring Lake, and the City of Ferrysburg. Services provided by Harbor Transit include a year-round demand responsive system and a seasonal fixed-route trolley service, which operates between Memorial Day and Labor Day. The trolley service runs two sightseeing routes: one in Grand Haven and one through the Villages of Spring Lake and Ferrysburg.

In Fiscal Year 2006, Harbor Transit provided service to 165,225 passengers. Eighty-three percent (136,925) passengers used the demand-responsive systems and 17 percent (28,300) passengers used the seasonal trolley service. The demand-responsive system averages 538 rides per day, assuming 307 days of service.

Non-Profit Organizations

There are various transit services provided through non-profit agencies within the study area. The non-profit agencies provide transportation to people with mobility impairments, developmental disabilities, senior citizens and others facing transportation barriers.

Carpool Facilities

There is one existing Carpool facility within the study area, which is located in the northwest interchange quadrant at I-96 and 112th Avenue. It is a lighted, paved parking lot, with 40 available vehicle spaces and an entry sign. As of July 2008 it was used about 55% of the time (Source: MDOT).

Existing and proposed pedestrian, bicycle, transit, and other transportation modes were reviewed for increased intermodal use and connectivity opportunities. New, relocated, or expanded Park & Ride lots could be placed in strategic locations to provide easily accessible assembly points for persons traveling within and out of the study area. Existing and potential Park & Ride/intermodal facilities include:

- Proposed M-231/M-45
- I-96 @ M-104 (existing Carpool Lot)
- I-96/112th Avenue (existing Carpool Lot)

Existing transit service, and/or expansion, is encouraged as an alternative to vehicular trips, in conjunction with road improvements, but not as a stand-alone solution to address long-term congestion and safety needs. There are no direct impacts to the existing carpool lot related to the Preferred Alternative.

4.3.4 Community Facilities

This section discusses the existing parks, churches, and other community facilities that are important components of the community and neighborhood cohesion. There will be no permanent direct impacts to community facilities related to the Preferred Alternative.

Schools

Indirect impacts to the following schools include periodic school bus detours during construction.

- Robinson Elementary School (120th Avenue between Rich and Buchanan Streets) in Robinson Township.
- Grand Haven Middle School (Cutler Street between Park Avenue and Grant Street) in the City of Grand Haven.
- Ferry Elementary School (Ferry Street between Grant Street and Pennoyer Avenue) in the City of Grand Haven.

Parks and Recreation

Please see **Section 4.18** Parks and Recreation for more details.

Churches

Three churches are adjacent to the Preferred Alternative. The New Apostolic Church at the corner of existing US-31 and Grand Street in Grand Haven, St. Patrick's Catholic Church on US-31 between Columbus Street and Fulton Street in Grand Haven, and Robinson Baptist Church at the corner of 120th Avenue and Buchanan Street in Robinson Township.

Emergency Services

Ottawa County has an emergency dispatch system. The system is known as the Ottawa County Central Dispatch Authorities (OCCDA). This dispatch unit handles all the 911 calls for their area as well as any police, ambulance or emergency vehicle needs. Impacts anticipated during construction will be identified and mitigated by MDOT during the design and construction phases.

Ambulance service within the study area is provided by American Medical Response (AMR) West Michigan, LIFE EMS, and North Ottawa Community Hospital (NOCH) EMS.

Medical Facilities

Within the study area there are several community hospitals and health care facilities. During construction, access to these facilities may be affected temporarily; however MDOT will address mobility and access issues during the design process. These include the North Ottawa Community Hospital in Grand Haven, which has the North Ottawa Care Center as a subsidiary, the South Haven Nursing Home in Grand Haven, which is affiliated with Mercy Hospital in Muskegon; Holland Community Hospital, including the Lakeshore Area Radiation Oncology Center (LAROC) site.

Cemeteries

The Nunica Cemetery located on M-104 between 124th Avenue and 120th Avenue is the only cemetery near the Preferred Alternative. Indirect impacts may occur due to restricted access during construction. Access needs will be coordinated between the cemetery owner and MDOT.

Airports

Jablonski Landing Field in Crockery Township serves as a private general aviation airfield regulated by the MDOT Bureau of Aeronautics. Access to Jablonski Landing Field will be directly impacted by the Preferred Alternative during construction. Construction along 120th Avenue north of M-104 will be required for the proposed interchange of new alignment/I-96/M-104. This county road is the only public access road to Jablonski Landing Field and close coordination with the airport will be maintained prior to and during construction to minimize or avoid access concerns. MDOT will maintain access to the airport at all times during the construction.

Community Businesses

Various service and retail establishments are located within the study area mainly in the City of Grand Haven and Holland Township. These consist of gas stations, fast food restaurants, malls, and convenience stores. In Robinson Township there is a marina along the Grand River and a nursery along 120th avenue. In Crockery Township there is a campground along the Grand River and near the M-104 interchange there are a few of various services and retail establishments. Businesses in the study area employ people who live in the neighboring communities. See **Section 4.5** for information on business impacts and mitigation.

4.3.5 Community Cohesion

The term “community cohesion” is used to describe patterns of social networking within a community. The effects of transportation projects upon community cohesion may be beneficial or adverse. Transportation projects can create physical, visual, and psychological barriers within a neighborhood or community. Conversely, they may serve to join a neighborhood together (e.g., construction of improved pedestrian facilities). In general, they may include splitting neighborhoods, isolating a portion of a neighborhood or an ethnic group, generating new development, changing property values, and separating or connecting residents from community facilities. An important and direct effect is the displacement of residences and businesses. The changes brought about by transportation projects may include the following:

- Direct effects of household and business relocation,
- Direct effects of physical barriers such as wider roads and interchanges between residents and community facilities,
- Indirect effects of psychological barriers such as increased traffic and safety concerns related to increased traffic.

Existing US-31

The widening of existing four-lane US-31 boulevard to a six-lane boulevard within the existing ROW in Holland Township and the City of Grand Haven will not impact community cohesion because there will be no expansion of the width of the existing ROW. The Preferred Alternative includes provisions to retain local street access to US-31. Existing pedestrian signals will be maintained and new ones established where warranted. This will provide pedestrian and non-motorized traffic the maximum feasible time to cross US-31. Property impacts will be limited to corner clips and will not require any relocation.

Proposed M-231

The Proposed M-231 will pass through portions of a residential community on the south bank of the Grand River and the Spoonville Gun Club on the north bank of the Grand River. Community cohesion in Robinson Township may be impacted by the 315' wide ROW needed for the proposed roadway. All local roads in Robinson Township, except Johnson Street, will remain open to provided access between the east and west sides of the proposed M-231. The Preferred Alternative will benefit communities throughout Ottawa County by providing another north-south trunkline access route that reduces congestion on existing US-31 and provides an alternate crossing of the Grand River when the existing bascule bridge is closed for operations or maintenance. It also provides a direct link for emergency services between Robinson Township and Crockery Township and the region.

4.4 ENVIRONMENTAL JUSTICE

Executive Order 12898, issued in 1994, requires every agency undertaking a transportation project that is fully or partially funded by the federal government to consider the impact of such a project on minority populations and/or low-income groups. At the core of the environmental justice requirements are the following three fundamental principles:

The environmental justice process ensures that minority or low-income populations are not disproportionately impacted as compared to the general population. The following principles guide the environmental justice process:

- Ensure full and fair participation by all potentially affected communities in the decision-making process,
- Avoid, minimize, or mitigate disproportionately high or adverse effects on minority and low-income populations,
- Prevent the denial of, reduction in or significant delay in the receipt of benefits by minority and low-income populations.

Environmental Justice populations have been identified within the Preferred Alternative. Although there are no potential disproportionately high or adverse human health or environmental impacts to the population within the study area, the Environmental Justice population will be impacted by the Preferred Alternative as part of the overall population. The Environmental Justice population will be impacted in the same manner as other population groups with in the study area. This section discusses the analysis and coordination performed as a part of the Environmental Justice Evaluation.

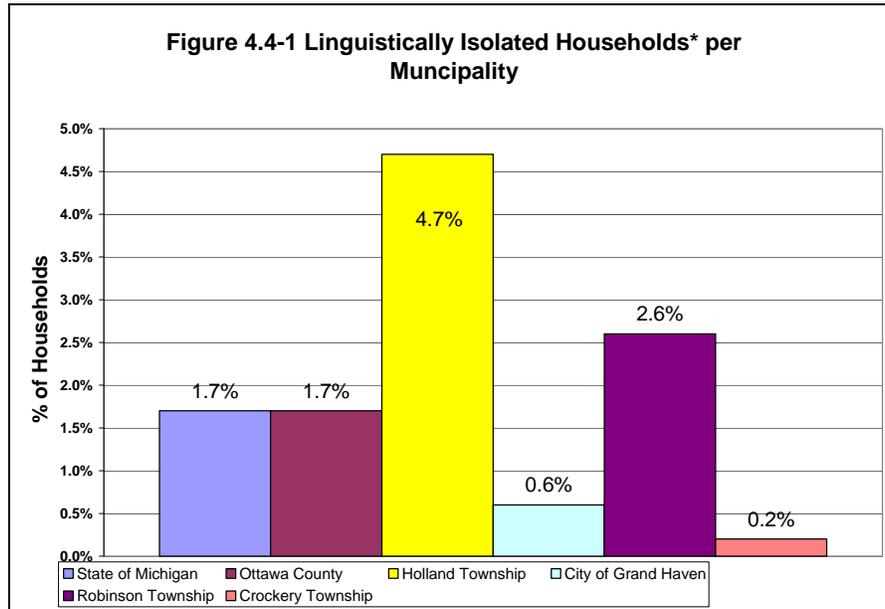
4.4.1 Analysis of Environmental Justice

In the Environmental Justice and Title VI analysis, minority persons are defined as Black, Hispanic, Asian American, American Indian, or Alaskan Native. Low income populations are those, regardless of ethnicity, who are in households with annual incomes at or below the U.S. Department of Health and Human Services poverty level (\$17,050 for a family of four in 2000). Whether or not they fit the definition of groups protected by the Environmental Justice regulations, all groups and individuals have the right to access and participate in the decision making process as provided by Title VI of the Civil Rights Act.

The Environmental Justice methodology that was used to conduct an Environmental Justice analysis of the Preferred Alternative followed MDOT and FHWA guidelines (US DOT Order 6640.23). The

methodology is detailed in **Appendix E**. In order to determine if a minority population or low-income population group is present in the study area, census tracts from the 2000 U.S. Census were reviewed, community leaders and groups, tribal governments, local officials were contacted, and public meetings were held. Any area with a minority and/or low-income population above the county-wide average for that group is considered within the environmental justice population.

According to the 2000 U.S. Census the limited English proficiency (LEP) surrounding the Preferred Alternative is low. Please see **Figure 4.4-1** for results of the ability to speak English in a household.



Note: 200 US Census: A linguistically isolated household is one in which no member 14 years old and over (1) speaks only English or (2) speaks a non-English language and speaks English "very well." In other words, all members 14 years old and over have at least some difficulty with English.

Public involvement is encouraged by providing opportunities for community input in identifying potential impacts and mitigation measures, and by making public meetings and official documents more accessible to the public. The following actions were taken to involve the public in the planning process:

- Public informational meetings were held at various accessible locations throughout the study area to minimize travel times to meetings
- Meeting locations were in compliance with the American Disabilities Act (ADA), accommodating people with disabilities.
- Options for the visual and hearing impaired were offered
- Translators were available upon request for all public meetings
- Public informational meetings were held at various times (including 10 a.m., 3:30 p.m., and 7 p.m.), increasing the likelihood of attendance and minimizing conflicts with working hours.

Prior to each public meeting, announcements were printed in local newspapers. All residents within the study area were invited to participate in the decision-making process. **Chapter 5** provides the dates, locations, and summaries of all meetings held. The public was encouraged to comment on the study and alternatives at all meetings.

No requests were received for the translation of flyers or announcements, or for translators at public meetings.

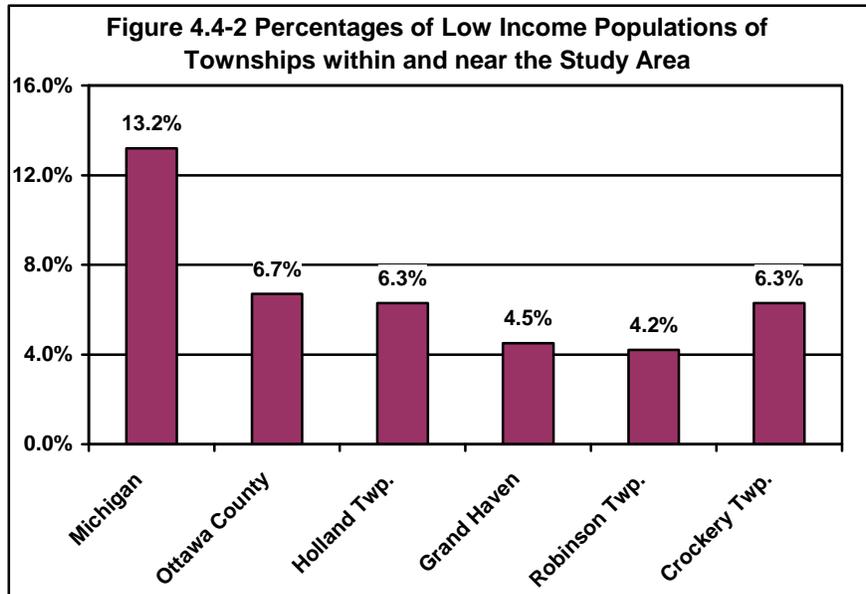
4.4.2 Minority and Low-Income Groups in Study Area

Minority information was acquired from the 2000 U.S. Census. A minority is classified as a person who is Black, Hispanic, Asian American, or American Indian. According to the Economic Development offices in Ottawa County, there are no Native American settlements within the study area. As shown in **Table 4.4-1**, the City of Grand Haven, Robinson Township, and Crockery Township each have minority populations below the county-wide average.

Ethnicity Characteristics	Holland Township	City of Grand Haven	Robinson Township	Crockery Township	Ottawa County	State of Michigan
Total Persons	28,911	11,168	5,588	3,782	239,440	9,950,536
White (Non-Hispanic)	79.2%	96.3%	93.6%	96.6%	91.5%	80.2%
African American	2.2%	0.4%	0.3%	0.6%	1.0%	14.2%
American Indian	0.4%	0.6%	0.5%	0.6%	0.4%	0.6%
Asian	7.9%	0.9%	0.7%	0.1%	2.1%	1.8%
Hispanic (all races)	15.8%	1.6%	6.1%	1.7%	7.0%	3.3%

Source: 2000 U.S. Census Data

Michigan's 2000 median household income was \$44,667. The statewide poverty level for a family of four in 2000 was \$17,050 and 7.4 percent of the state's population was below the poverty threshold (U.S. Census Bureau). Ottawa County's 2000 median household income was \$52,347 with 3.1 percent of the population below the poverty threshold. As shown in **Figure 4.4-2**, Holland Township, the City of Grand Haven, Robinson Township, and Crockery Township each have low-income populations below the county-wide average.



Source: 2000 U.S. Census Bureau

4.4.3 Impacts and Mitigation for Environmental Justice Populations

Potential Environmental Justice effects are defined as the unavoidable effects of the project that would be mostly experienced by minority and low-income populations or are higher than the negative effects that would be suffered by non-minority and/or non-low-income populations (see **Table 4.4-2**).

Table 4.4-2: Preferred Alternative Impacts and Mitigation to EJ Population

Affected Areas	Pedestrian accessibility and mobility	Air, and water pollution, and soil contamination	Noise Pollution	Destruction or disruption of constructed or natural resources, and soil	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	Displacements 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 Populations	<p>Positive: Enhances the pedestrian/ bicyclist environment by building a pedestrian- only bridge. A new connection over the Grand River, less fuel usage due to direct route, especially for detours.</p> <p>Negative: Pedestrian crossings will be more difficult due to an addition of a third lane in Holland and Grand Haven.</p>	<p>Positive: Compliance in air quality, soil erosion and sedimentation, and water quality.</p> <p>Negative: Increased air, water, soil issues during construction.</p>	<p>Positive: Compliance in air quality, contamination, and water quality.</p> <p>Negative: Increased noise levels during construction.</p>	<p>Negative: Construction of a new road will remove many trees, wetlands, animal habitats and the median will be reduced in Grand Haven.</p>	<p>Positive: Visual quality is enhanced or improved for those using the new roadway.</p> <p>Negative: Visual Quality is degraded for those viewing the facility from off the road.</p>	<p>Positive: The bridge over the Grand River provides increased accessibility and connectivity between townships on either side of the river.</p> <p>Negative: Construction of a new roadway in Robinson and Crockery Townships, Increased roadway width in Grand Haven and Holland.</p>	<p>Positive: The bridge over the Grand River provides increase accessibility and connectivity between townships on either side of the river.</p> <p>Negative: Acquisitions and possible temporary construction implications.</p>	<p>Positive: Better access to emergency services and other public services</p> <p>Negative: Wider roadways, relocations</p>	<p>Negative: Possible impacts during construction to adjacent facilities.</p>	<p>Positive: Potential to increase transit service, access over the river will create new opportunities for the public to reach jobs that otherwise would have been to far to drive to.</p> <p>Negative: Removing farm land from use.</p>	<p>Negative: 66 estimated structures to be acquired and relocated.</p>	<p>Positive: Improved levels of service, access to emergency service and potential bus service.</p> <p>Negative: Traffic along the M-231.</p>	<p>Positive: The bridge over the Grand River provides increased accessibility and connectivity between townships on either side of the river. Therefore, creating less isolation from nearby towns and cities.</p> <p>Negative: Temporary inconveniences while building the Preferred Alternative</p>	<p>Positive: The bridge over the Grand River provides increased accessibility and connectivity between townships on either side of the river.</p> <p>Negative: Limited access across river</p>	<p>Positive: No access being denied. Provides improvements both locally and regionally.</p> <p>Negative: Construction will have temporary impact on the local community.</p>
Mitigation Measures	<p>Replace existing sidewalks and maintain local connectivity along existing US-31 in Grand Haven and Holland.</p>	<p>Fugitive dust through activities such as demolition and materials handling may occur. Construction contractors will comply with all federal, state, and local laws, regulations and rules governing the control of air pollution during construction of the Preferred Alternative. For more details see Section 4.7. There are above and below ground water pollutions, please see the different sections for specific details see Sections 4.9-4.12, Soil erosion and sediment control features will be required to provide adequate vegetative or temporary stabilization of disturbed areas during construction, for specific details see Section 4.22.</p>	<p>Two NSAs were found to be reasonable, but are not feasible for mitigation actions because the proposed barriers would not be feasible due to numerous gaps required for drive openings and cross streets, therefore preventing the barriers to achieve the required 5dba noise reduction. See Section 4.8 for more detailed mitigation measures.</p>	<p>While no mitigation is required for this part of the FEIS, the local communities may seek opportunities to improve aesthetics or change in local zoning or land use regulations.</p>	<p>While no mitigation is required for this part of the FEIS, the local communities may seek opportunities to improve aesthetics or change in local zoning or land use regulations.</p>	<p>While no mitigation is required for this part of the FEIS, the local communities may seek opportunities to improve aesthetics or change in local zoning or land use regulations.</p>	<p>Construction staging to ensure access and mobility is not adversely impaired.</p>	<p>Construction staging will be implemented in order to address access issues. The potential for displaced businesses to relocate in the Study Area is likely. MDOT will coordinate relocation with all affected properties. Regular public information updates to address changes in the community will be communicated.</p>	<p>Please refer to section 4.22</p>	<p>MDOT will collaborate with community leaders/planners to address business/employment impacts</p>	<p>Federal/State relocation regulations and guidelines will be followed. MDOT will work with the affected community to determine relocation options.</p>	<p>Construction staging will help to alleviate construction and safety factors during construction. Consistent public information will communicate changes in routes particularly detours, long delays.</p>	<p>The bridge over the Grand River will provide increased accessibility and connectivity between townships on either side of the river by building motorized and non-motorized facilities.</p>	<p>MDOT will implement context sensitive solutions to address aesthetics, community values and character with the new bridge.</p>	<p>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.</p>

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The Preferred Alternative includes improvements on existing US-31 in Holland Township and the City of Grand Haven. Both municipalities have environmental justice populations: the City of Grand Haven for low-income populations, and then Holland Township for both minority and low-income populations.

Impacts

In each case, improvements are proposed to be within the existing ROW, with some minor corner clips of commercial properties that will not result in displacements. There are no residential displacements.

The proposed M-231 is a new road on a new alignment in Robinson and Crockery Townships. Both municipalities have environmental justice populations: Robinson Township is primarily agricultural and rural residential, with the overall population distributed throughout the township. Crockery Township has a similarly scattered overall population, except for a more concentrated overall population to the northeast of I-96 in Nunica. Environmental justice populations are similarly distributed throughout both townships, with the exception of four migrant housing complexes in Robinson Township that are not directly impacted by the proposed M-231.

The location of the proposed M-231 was chosen based on local input, wetland and farmland impact minimization, and engineering needs. Proposed M-231 route will require the displacement of 51 residences, 9 commercial, and 6 agricultural properties. These properties are not owned and/or occupied by a disproportionate number of minorities or low-income individuals. The acquisition of agricultural land may impact migrant workers who work on the acquired parcels. However, due to changes in crop types over time and lack of employee records, the number of migrant workers potentially being displaced is unknown.

Mitigation

Property acquisition and relocation assistance for this project will follow the guidelines contained in the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act) and Michigan regulations Act 31, Michigan P.A. 1970; Act 227, Michigan P.A. 1972; and Act 87, Michigan P.A. 1980 as amended and Acts 367 and 439, Michigan PA 2006. Adherence to these regulations ensures fair and equitable treatment of persons displaced. MDOT will contact affected property owners when there is a clear determination that their property is required for the project.

Environmental Justice populations have been identified throughout the study area, but there are no disproportionately high and adverse human health effects or environmental impacts on minorities and/or low-income populations by the Preferred Alternative. However, a continuing effort will be made to identify disproportionately high and adverse impacts to minority and low-income populations during subsequent phases of this project. If such impacts are identified, every effort will be made to involve impacted groups in the project development process to avoid or mitigate these impacts.

4.5 ECONOMICS

This section discusses the impacts of the Preferred Alternative on local businesses, tax bases, and employment.

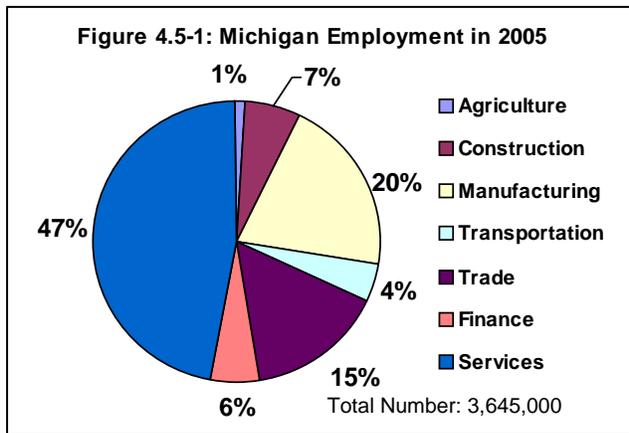
4.5.1 Existing Conditions

Much of Ottawa County is viewed as relatively rural, with an agricultural employment history. The agricultural industry requires large amounts of land, and thus reflects much of the character of western and central Michigan. Despite this, less than one percent of employment in Ottawa County is agricultural in nature, and less than one percent of employment statewide is related to agriculture. Ottawa County's economy is built on manufacturing, trade, and services manufacturing, trade, and services dominate the Michigan economy, as shown in **Figure 4.5-1**. The automotive industry remains prominent in Ottawa County as well. There has been a recent shift statewide from manufacturing to services. Ottawa County has a similar mix of employment opportunities.

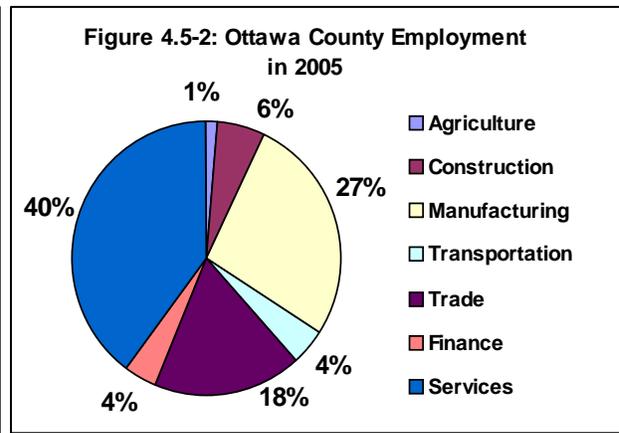
Employment

The economy of West Michigan offers opportunities in nearly employment categories, but the economy is focused primarily on manufacturing, retail and wholesale trade, and services, especially related to tourism in the City of Grand Haven. Residents of Ottawa County are employed throughout western Michigan, primarily in the urban areas surrounding the City of Grand Rapids in adjacent Kent County, the Cities of Grand Haven, Holland and Zeeland, and the City of Muskegon in adjacent Muskegon County. US-31 is a vital commuter corridor connecting residents to Holland, Grand Haven, and Muskegon.

There were approximately 158,559 people employed in Ottawa County in 2005. Manufacturing accounted for approximately 27 percent of this and includes the food processing industry as well as manufacturers of furniture, metal products, machinery, automotive and transportation, and pharmaceutical products. Retail and wholesale trade accounted for about 18 percent of employment within Ottawa County. Services accounted for about 40 percent of employment and include education, health care, and various consulting services that are not included in other sectors (**Figure 4.5-2**). Information on government employment in the area was not available.



Source: US Census 2005. Data does not include government employees.



Source: US Census 2005. Data does not include government employees.

Some of the major employers in Ottawa County are Gentex Corporation, GVSU, Herman Miller, Haworth, Johnson Controls, Magna Donnelly, Perrigo Company, Pfizer, Prince Corporation, and Sara Lee Foods. Public schools and local government are also major employers in the area.

Income and Poverty

Ottawa County has higher household income, as well as lower poverty and unemployment rates than the state as a whole (**Table 4.5-1**).

	Michigan	Ottawa County
2005 Median Household Income	\$46,039	\$56,984
2005 Poverty Rate	9.9%	6.7%
2007 Unemployment Rate	7.2%	5.2%

Source: Bureau of Labor Statistics, U.S. Department of Labor

4.5.2 Impacts to and Mitigation for Employment and Economics

Employment

No businesses in Holland Township or the City of Grand Haven will be relocated as a result of this project. Six businesses may need to be relocated in Robinson and Crockery Townships, including a boat repair business, car repair business, car sales business, gas station, and a couple of storage facilities.

They will be assisted according to the Federal Uniform Relocation Assistance and Real Property Acquisition Act of 1970 (Uniform Act), as amended. These businesses will be able to relocate nearby, with little or no impact to employment.

No significant shift in employment is anticipated from existing US-31 to the proposed M-231 route. Planned improvements on existing US-31 in the Holland Township and Grand Haven areas should maintain, and even enhance, the existing corridor's attractiveness to businesses due to access and traffic congestion.

The conversion from these land uses to transportation infrastructure is generally irreversible, yet with an expected net employment growth, job loss is not expected to affect the tax revenues of the municipalities in the study area. Employment will continue to grow along US-31 in Holland Township and the City of Grand Haven. Improved access to I-96 and the City of Grand Haven will also be contributing factors to expansion of employment.

Another positive, but temporary, economic impact will be the increase in construction employment that will occur during the construction of the project.

Property Values and Tax Base Loss

Economic impacts include the effect on property values and the tax base due to direct and indirect impacts of an alternative. Estimated 2007 State Equalized Value (SEV) tax base losses due to property acquisition for the Preferred Alternative are shown in **Table 4.5-2**.

Table 4.5-2 Estimated 2007 SEV Tax Base Summary (Dollars)			
Municipality	Preferred Alternative Impacts	Total Municipal	Percent Loss
Holland Township	\$36,945	\$1,230,607,500	<0.1%
City of Grand Haven	\$63,417	\$566,730,300	<0.1%
Robinson Township	\$3,660,977	\$269,308,700	<0.1%
Crockery Township	\$1,715,921	\$158,871,100	<0.1%
Total:	\$5,477,260	\$2,225,517,600	<0.1%

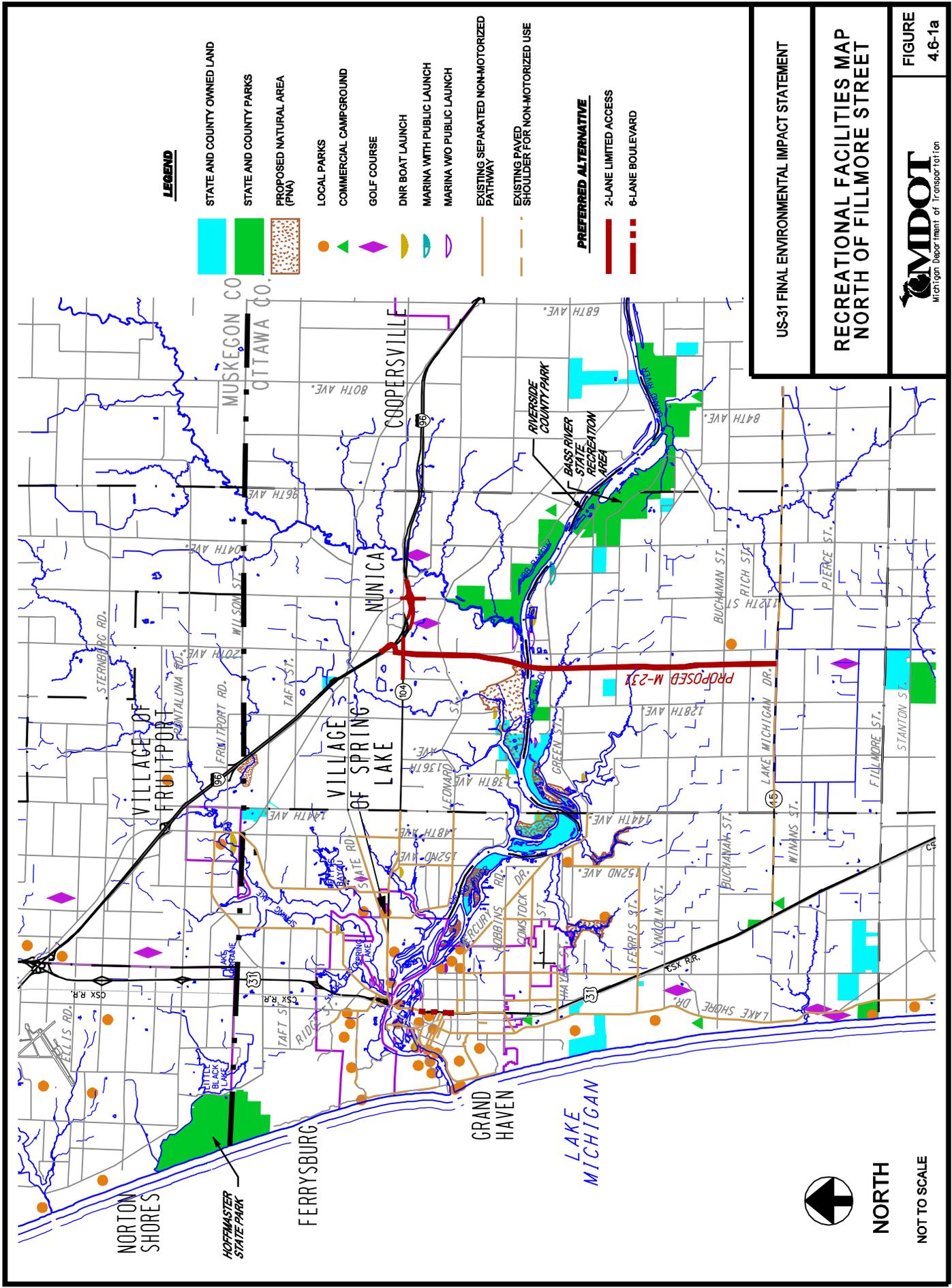
Source: Ottawa County Department of Equalization

The economic impact on tax bases for municipalities is less than 0.1 percent of their total tax base. The above tax base losses are anticipated to be short-lived and then offset by the increase in new business and its associated tax revenues along an improved existing US-31.

4.6 NON-MOTORIZED FACILITIES

Existing non-motorized paths in the study area are shown on **Figure 4.6-1a and 4.6-1b**. According to the 2000 Ottawa County Non-Motorized Plan, Ottawa County has a regional non-motorized concept plan to interconnect Grand Rapids, Grand Haven and the Holland urban areas with a non-motorized trail system that follows the Grand River and Lake Michigan Shoreline of the county. Ottawa County also has conceptual plans for a non-motorized pathway along the proposed M-231 starting at North Cedar Drive in Robinson Township, crossing the proposed M-231 Grand River bridge, and ending at Cypress Street on the north side of the river in Crockery Township. This non-motorized facility is proposed to be a separate pathway with barriers provided between pedestrians and motorists, and will accommodate people with disabilities and is in compliance with the ADA.

The Preferred Alternative will not permanently impact any existing or planned non-motorized facilities within the study area. The conceptual non-motorized pathway along the south side of the Grand River is not planned for the near future, and could be located along North Cedar or under the new Grand River bridge. Temporary impacts will be related to limitations or restrictions on local roads during construction.



LEGEND

- STATE AND COUNTY OWNED LAND
- STATE AND COUNTY PARKS
- PROPOSED NATURAL AREA (PNA)
- LOCAL PARKS
- COMMERCIAL CAMPGROUND
- GOLF COURSE
- DNR BOAT LAUNCH
- MARINA WITH PUBLIC LAUNCH
- MARINA W/O PUBLIC LAUNCH
- EXISTING SEPARATED NON-MOTORIZED PATHWAY
- EXISTING PAVED SHOULDER FOR NON-MOTORIZED USE
- PREFERRED ALTERNATIVE**
- 2-LANE LIMITED ACCESS
- 6-LANE BOULEVARD

US-31 FINAL ENVIRONMENTAL IMPACT STATEMENT

RECREATIONAL FACILITIES MAP
NORTH OF FILLMORE STREET



FIGURE 4.6-1a



NORTH

NOT TO SCALE

The Preferred Alternative will not preclude the option to add a new non-motorized facility on the new Grand River Bridge. MDOT will clear in this FEIS, and provide substructure accommodations for a local trail on the new bridge. Additional connecting local trail segments, outside the MDOT owned limited access ROW, are not part of this FEIS/Preferred Alternative. Additional local trail segments will be paid for with local funds, including design, ROW, construction maintenance of the connections and other related costs. Ottawa County non-motorized trail plans are still conceptual at this point, beyond the Grand River crossing. Generally, non-motorized facilities are not permitted within limited-access ROW, if reasonable options are available outside the highway ROW. Permits will be required for any future trails impacting on MDOT owned ROW.

The new M-231 bridge will be designed so as not to preclude non-motorized trail options where feasible, consistent with local and county trail plans, as well as MDOT engineering policies and guidelines. Specific non-motorized facility options will be considered during the subsequent bridge design phase.

4.7 AIR QUALITY

This section presents background information on the Clean Air Act (CAA) of 1970 and its amendments, air quality conditions in the project area, and the results of the air quality assessment Transportation Conformity. Additional air quality information is provided in the US-31 FEIS Air Quality Technical Report. This air quality assessment was conducted in compliance with the FHWA Technical Advisory T 6640.8A. Two requirements govern the need to study air quality issues associated with federally funded transportation actions: the Council on Environmental Quality CEQ regulations implementing the NEPA air quality assessment (23 CFR 771) and Transportation Conformity pursuant to 40 CFR Parts 51 and 93.

4.7.1 Regulatory Setting

The CAA, enacted by Congress in 1970, was the most comprehensive legislation relating to air quality ever passed in the U.S. it established the National Ambient Air Quality Standards (NAAQS) to protect public health, welfare, and the environment (see **Table 4.7-1**). The pollutants considered in the NAAQS are: carbon monoxide (CO), lead (Pb), nitrogen dioxides (NO₂), ozone (O₃), particulate matter (PM₁₀ and PM_{2.5}) and sulfur dioxides (SO₂). The CAA and Amendments (CAAA) and the Final Conformity Rule (40 CFR Parts 51 and 93) direct the USEPA to implement environmental policies and regulations that will ensure acceptable levels of air quality for these and other pollutants of concern. It is stated in the amendments, "No federal agency may approve, accept or fund any transportation plan, program or project unless such plan, program or project has been found to conform to any applicable SIP in effect under this act". The Act was amended in 1977, and most recently in 1990.

At the Federal level, the USEPA sets national air policies and promulgates air quality regulations under the authority of the CAA, and USEPA Region 5 has the responsibility for maintaining the air quality in the Michigan region.

This air quality analysis was designed and conducted to evaluate the impacts of the Preferred Alternative along US-31 on the NAAQS and the SIP.

Table 4.7-1 National Ambient Air Quality Standards

Pollutant	Primary Standards		Secondary Standards	
	Level	Averaging Time	Level	Averaging Time
Carbon Monoxide	9 ppm (10 mg/m ³)	8-hour ⁽¹⁾	None	
	35 ppm (40 mg/m ³)	1-hour ⁽¹⁾		
Lead	1.5 µg/m ³	Quarterly Average	Same as Primary	
Nitrogen Dioxide	0.053 ppm (100 µg/m ³)	Annual (Arithmetic Mean)	Same as Primary	
Particulate Matter (PM ₁₀)	150 µg/m ³	24-hour ⁽²⁾	Same as Primary	
Particulate Matter (PM _{2.5})	15.0 µg/m ³	Annual ⁽³⁾ (Arithmetic Mean)	Same as Primary	
	35 µg/m ³	24-hour ⁽⁴⁾	Same as Primary	
Ozone	0.075 ppm (2008 std)	8-hour ⁽⁵⁾	Same as Primary	
	0.08 ppm (1997 std)	8-hour ⁽⁶⁾	Same as Primary	
	0.12 ppm	1-hour ⁽⁷⁾ (Applies only in limited areas)	Same as Primary	
Sulfur Dioxide	0.03 ppm	Annual (Arithmetic Mean)	0.5 ppm (1300 µg/m ³)	3-hour ⁽¹⁾
	0.14 ppm	24-hour ⁽¹⁾		

Source: EPA 2008 (1) Not to be exceeded more than once per year. (2) Not to be exceeded more than once per year on average over 3 years. (3) To attain this standard, the 3-year average of the weighted annual mean PM_{2.5} concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m³. (4) To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m³ (effective December 17, 2006). (5) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm. (effective May 27, 2008) (6)(a) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm. (b) The 1997 standard—and the implementation rules for that standard—will remain in place for implementation purposes as EPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard. (7)(a) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is < 1. (b) As of June 15, 2005 EPA revoked the 1-hour ozone standard in all areas except the 8-hour ozone nonattainment Early Action Compact (EAC) Areas.

4.7.2 Conformity

Attainment/Non-Attainment Status

The US-31 corridor is located entirely within Ottawa County. Ottawa County is designated (on June 15, 2004) by the EPA as an attainment area for all the criteria air pollutants except ozone (O₃), for which it is designated as an "attainment/maintenance" area for both the eight-hour and one-hour standards. The attainment designation signifies that the NAAQS are being met; while a non-attainment status indicates that the NAAQS are not being met. The attainment/maintenance designation indicates that violations of the NAAQS occurred in the past, but the area is progressing toward becoming a full attainment area in the future. As of June 15, 2005 the EPA revoked the 1-hour standard in all areas except the 8-hour ozone nonattainment Early Action Compact (EAC) Areas. The area is in attainment for all other NAAQS pollutants. The area has since been re-designated (on May 16, 2007) to attainment/maintenance; however conformity rules still apply to the Transportation Improvement Program and LRTP.

Transportation conformity analysis required for this project includes two parts: a Regional Conformity and a microscale or "hot-spot" analysis. The conformity analysis applies to MPO LRTPs and Transportation Improvement Programs and must determine that the projects identified in each plan do not collectively exceed NAAQS. In addition to this regional conformity determination, projects in air quality planning areas for the pollutant carbon monoxide must demonstrate project-level conformity. Project level conformity requires additional localized or microscale analysis to determine project level conformity. This analysis is sometimes referred to as "hot-spot analysis."

The EPA and the FHWA issued a joint guidance March 29, 2006 on how to perform qualitative hot-spot analyses in PM_{2.5} and PM₁₀ nonattainment and maintenance areas. Ottawa County, Michigan is an attainment for PM_{2.5} and PM₁₀. In addition, the project is not a "project of air quality concern" under 40 CFR 93.123(b)(1). Therefore, neither a PM_{2.5} nor PM₁₀ hotspot analysis is required to demonstrate transportation conformity. A conformity determination demonstrates that the total emissions projected for

a plan or program are within the emission limits (“budgets”) established by the air quality plan or SIP, and that transportation control measures (TCMs) are implemented in a timely manner.

Regional Conformity

The MACC serves as the MPO for the urbanized Holland area. The WMSRDC serves as the MPO for the urbanized Grand Haven area. These MPOs are responsible for carrying out transportation-related planning activities in their respective portions of Ottawa County. Their duties include: preparing the TIP, the development and maintenance of the LRTP, and ensuring that the transportation project adheres to the Transportation Conformity Regulations as of January 2008.

The TIP identifies proposed projects developed by local and state agencies which are expected to be constructed or implemented in the next four years in accordance with the joint regulations of the FHWA and the FTA. The LRTP is a long-range (20+ year) strategy and capital improvement program developed to guide the effective investment of public funds in transportation facilities. The Preferred Alternative was included in the two MPO long range plans and the plans were found to conform to the SIP in accordance with the Transportation Conformity Regulations as of January 2008. The design/engineering and ROW phase were added to the MPO TIPs in 2008. The Preferred Alternative construction phases will be added to the 2008-2011 TIP for the MPOs upon approval of this FEIS and ROD.

During 2007, the Preferred Alternative was included in the two approved MPO LRTPs. The project is included in the recently approved State Long Range Transportation Plan (MI-Transportation Plan). Construction is included in the MDOT Five-Year Program, beginning in 2010, and will be added to the MPO TIPs upon receipt of a ROD on this FEIS from the FHWA.

Carbon Monoxide Microscale Analysis

The methodology used to perform the air quality analysis for the proposed project conforms to the methods and procedures contained in 40 CFR Parts 51 and 93, USEPA Transportation Conformity, the USEPA Guidelines for Modeling Carbon Monoxide for Roadway Intersections and the FHWA T6640.8A Technical Advisory. CO impacts were analyzed as the accepted indicator of vehicle generated air pollution. The dispersion modeling analysis was conducted for the worst-case conditions or “hot-spots” for existing and the future year (2030) Action and No-Action scenarios. A “hot-spot” is considered an area where congested traffic volumes may produce high concentrations of CO based on meteorological conditions and the configuration of the roadway. A hot-spot analysis is an estimate of the likely future localized CO pollutant concentrations and a comparison of those concentrations to the NAAQS. Local effects of a project on CO concentrations must be considered to determine whether there is a potential that the project may cause a new CO violation or exacerbate an existing CO violation.

The identification and selection of the worst-case conditions was based on the level of service (LOS) and the total traffic volumes at intersections in the study area. The two intersections chosen were US-31 at Jackson Street in the City of Grand Haven and US-31 at James Street in Holland Township. As a result, 28 receptor locations in the vicinity of these intersections were identified for modeling. CAL3QHC, an EPA approved micro-scale atmospheric dispersion computer model, was used for the analysis.

For this analysis, a background concentration of 3.2 parts per million (ppm) for the one-hour standard and 2.0 ppm for the eight-hour standard were used. These values were obtained from the maximum second-highest concentrations measured at the Grand Rapids (Monroe Avenue) monitor in Kent County between 2003 and 2005. This monitor is the closest monitor that measures CO to the project area.

The results of the CO dispersion modeling for the worst-case intersections are summarized in **Tables 4.7-2** and **4.7-3** for the existing (2006) scenario and future-year (2030) No Action and Preferred Alternative scenarios. The table values reflect the highest predicted concentrations based on future travel demand and possible meteorological conditions.

Table 4.7-2 Maximum CO Concentrations at US-31 and Jackson Street		
Results	One Hour (ppm)	Eight-Hour (ppm)
2006 Existing Conditions		
Modeled	8.3	5.8
Background	3.2	2.0
Total Concentration	11.5	7.8
2030 No-Action Alternative		
Modeled	4.8	3.4
Background	3.2	2.0
Total Concentration	8.0	5.4
2030 Preferred Alternative		
Modeled	4.3	3.0
Background	3.2	2.0
Total Concentration	7.5	5.0
NAAQS	35	9

Source: CAL3QHC model output (2006) ppm – parts per million

For the 2006 Existing Scenario at US-31 and Jackson Street, the maximum CO concentration is 11.5 ppm for the one-hour averaging period and 7.8 ppm for the eight-hour averaging period. These concentrations occurred at Receptor 21, located in the northwest quadrant of the intersection, on the sidewalk of the southbound approach, approximately 160 feet from the center of the intersection. The maximum CO concentrations for the 2030 No-Action Scenario are 8.0 ppm for the one-hour averaging period and 5.4 ppm for the eight-hour averaging period. These concentrations occurred at Receptor 21, which is located approximately 160 feet north of the northwest corner of the intersection. The maximum CO concentrations for the 2030 Preferred Alternative are 7.5 ppm for the one-hour averaging period and 5.0 ppm for the eight-hour averaging period. These concentrations occurred at Receptor 5, which is located approximately 160 feet south of the southwest corner of the intersection.

Table 4.7-3 Maximum CO Concentrations at US-31 and James Street		
Results	One Hour (ppm)	Eight-Hour (ppm)
2006 Existing Conditions		
Modeled	5.6	3.9
Background	3.2	2.0
Total Concentration	8.8	5.9
2030 No-Action Alternative		
Modeled	4.2	2.9
Background	3.2	2.0
Total Concentration	7.4	4.9
2030 Preferred Alternative		
Modeled	4.3	3.0
Background	3.2	2.0
Total Concentration	7.5	5.0
NAAQS	35	9

Source: CAL3QHC model output (2006) ppm – parts per million

For the 2006 Existing Scenario at US-31 and James Street the maximum CO concentration is 8.8 ppm for the one-hour averaging period and 5.9 ppm for the eight-hour averaging period. These concentrations occurred at Receptors 19, 20, and 21, which are located in the northwest quadrant of the intersection at 10, 80, and 160 feet alongside US-31 respectively. The maximum CO concentrations for the 2030 No-Action Alternative are 7.4 ppm for the one-hour averaging period and 4.9 ppm for the eight-hour

averaging period. These concentrations occurred at Receptor 16, which is located approximately 10 feet south of the southwest corner of the intersection. The maximum CO concentrations for the 2030 Preferred Alternative are 7.5 ppm for the one-hour averaging period and 5.0 ppm for the eight-hour averaging period. These concentrations occurred at Receptor 1, which is located approximately 10 feet east of the northeast corner of the intersection.

Impacts of the Preferred Alternative

Results from the CAL3QHC dispersion modeling analysis indicate that the Preferred Alternative could be built and operated such that traffic-generated CO emission levels at the nearby intersections would not cause a violation of the CO NAAQS. The impact of one intersection on the other is minimal. Based on these model runs, both the 1-hour and 8-hour modeled concentrations at the two worst-case signalized intersections would be below the NAAQS for CO, and all areas would be considered to be in compliance with the NAAQS. There are no direct impacts to air quality from the Preferred Alternative.

4.7.3 Mitigation of Temporary Construction Air Impacts

The construction phase of the proposed project has the potential to impact local ambient air quality by generating fugitive dust through activities such as demolition and materials handling. Construction contractors will comply with all federal, state, and local laws, regulations and rules governing the control of air pollution during construction of the Preferred Alternative. Dust will be controlled during construction to avoid detrimental impacts to the safety, health, welfare, or comfort of any person, or damage to any property or business by such methods as ground watering and careful control of stockpiles of raw materials. There will be no open burning of waste materials.

Specifically, applying water or appropriate liquids during demolition, land clearing, grading, and construction operations can minimize fugitive dust. Water may be applied on dirt roads, material stockpiles and other surfaces capable of producing airborne dust. At all times when in motion, open-body trucks for transporting materials should be covered, and all excavated material should be removed promptly.

Mobile source emissions can be minimized during construction by not permitting delivery trucks or other equipment to idle during periods of unloading or other non-active use. The existing number of traffic lanes should be maintained to the maximum extent possible, and construction schedules should be planned in a manner that will minimize traffic disruption and air pollutants. Application of these measures will ensure that construction impact of the project is insignificant.

All bituminous and concrete proportioning plants and crushers must meet the requirements of the rules of Part 55 of Act 451, Natural Resource and Environmental Protection. Any portable concrete plant must meet the minimum 250-foot setback requirement from any residential, commercial, or public assembly property or the contractor is required to apply for a permit to install from the Permit Section, Air Quality Division, of the MDEQ. Portable crushers must have a setback of 500 feet or more for a general permit; otherwise a permit to install is required. Bituminous (asphalt) plants must have a setback of 800 feet or more or a site specific permit is required. The permit process, including any public comment period, if required, may take up to six months.

Dust collectors will be provided on all bituminous and concrete plants. Dry, fine aggregate material removed from the dryer exhaust by the dust collector will be returned to the dryer discharge unless otherwise directed by the project engineer.

Construction activities will include mitigation measures currently contained in the MDOT Standard Specifications for Constructions.

4.8 NOISE

4.8.1 Noise Definition and Measurement

People hear sounds that are created from vibrations in frequencies that can be received by the human ear. Noise differs from sound because it is unwanted, surprising or loud. Traffic noise is the aggregate sound generated by automobiles and trucks on streets and highways. Also, each vehicle has multiple sound generating sources such as tire/road interaction, engine vibration, and combustion noise conveyed by the engine intake and exhaust.

The unit of measurement that is used to measure the intensity of sound is the decibel (dB), which is based on a logarithmic scale. People respond differently to sound energy in varying acoustic frequency ranges. Sounds heard in the environment usually consist of a range of frequencies, each at different amplitude. The method of correlating human response to equivalent sound pressure levels at different frequencies is called “weighting.” The resultant sound pressure level is called “A-weighted sound pressure level.” This is generally abbreviated by the expression dBA.

The dBA scale de-emphasizes the very low and very high frequencies and emphasizes the middle frequencies, thereby closely approximating the frequency response of the human ear. **Table 4.8-1** provides examples of common outdoor and indoor noise levels and their respective noise level decibels.

Because the range of energy found throughout the spectrum of normal hearing is so wide, the numbers necessary to define these levels must represent huge variations in energy. To compensate for this wide range of numbers a base-10 logarithmic scale is used to make the numbers more convenient for discussion purposes. The A-weighted equivalent sound level (Leq) is the descriptor used most frequently in highway noise analyses. Typically, noise level changes between 2-dBA and 3-dBA are barely perceptible, while a change of 5-dBA is readily noticeable by most people. A 10-dBA increase is usually perceived as a doubling of loudness, and conversely, noise is perceived to be reduced by one-half when a sound level is reduced by 10-dBA.

Common Outdoor Noise Levels	Noise Level (dBA)	Common Indoor Noise Levels
	110	Rock Band
Jet Flyover at 1000 feet	100	Inside Subway Train (NY)
Gas Lawn Mower at 3 feet		
Diesel Truck at 50 feet	90	Food Blender at 3 feet
Noisy Urban Daytime	80	Garbage Disposal at 3 feet
Gas Lawn Mower at 100 feet	70	Vacuum Cleaner at 10 feet
Commercial Area		Normal Speech at 3 feet
	60	
		Large Business Office
Quiet Urban Daytime	50	Dishwasher Next Room
Quiet Urban Nighttime	40	Small Theater
Quiet Suburban Nighttime		Library
	30	
Quiet Rural Nighttime		Bedroom at Night
	20	
		Broadcast & Recording Studio
	10	Threshold of Hearing
	0	

Traffic noise is measured and described according to FHWA guidelines, which prescribe the use of the hourly equivalent sound level as the primary descriptor for noise analysis. Hourly equivalent sound is defined as the equivalent steady state sound level, which in one hour contains the same acoustic energy as the time-varying sound level during the same one-hour period, therefore the measure used for noise analysis is Leq (1h).

4.8.2 State and Federal Procedures for Measuring and Evaluating Noise Impacts

The FHWA has established procedures and criteria to determine and evaluate noise impacts associated with vehicular use of roadways. According to the procedures described in 23 CFR, Part 772, noise impacts occur when predicted traffic noise levels for the design year (2030) approach or exceed the noise abatement criterion prescribed for a particular land use category. The noise abatement criteria for the five defined activity categories are shown in **Table 4.8-2**. Noise impacts also occur when the predicted noise levels are substantially higher than the existing ambient noise levels. Noise abatement criteria for various land uses have been established by the FHWA in 23 CFR, Part 772. The noise abatement criterion for land uses occurring in this project study area are Category B (67-dBA Leq).

Table 4.8-2 Noise Abatement Criteria (NAC) Hourly “A-Weighted” Sound Levels			
Category	Leq(h) (decibels)	L ₁₀ (h) (decibels)	Common Indoor Noise Levels
A	57 (Exterior)	60 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	70 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	75 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	--	--	Undeveloped lands.
E	52 (Interior)	55 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Under the current MDOT Noise Policy, several factors are evaluated to determine whether noise abatement is feasible and reasonable for Type I and Type II projects. This analysis was conducted based on MDOT’s “Procedures and Rules for Implementation of State Transportation Commission Policy 10136, Noise Abatement”, dated July 31, 2003. These rules are based on the FHWA “Highway Traffic Noise Analysis and Abatement Policy and Guidance” document of June 1995.

Federal regulation 23 CFR, Part 772 defines two types of projects, Type I and II. A Type I project is “a proposed federal or federal-aid highway project for the construction of a highway on new location or the physical alteration of an existing highway which significantly changes either the horizontal or vertical alignment or increases the number of through traffic lanes”. Noise impacts also occur when the predicted noise levels are substantially higher than the existing ambient noise levels. MDOT defines “approach” to be one decibel lower than the Federal Highway Noise Abatement Criteria (NAC) criteria (i.e. 66-dBA for Category B) and uses a 10-dBA increase to define a substantial increase. This analysis was completed in accordance with federal procedures and was evaluated in accordance with MDOT policy. If noise impacts are identified, noise abatement measures must be considered and implemented where reasonable and feasible. MDOT follows all federal laws, regulations and guidelines for Type I noise abatement. The improvements proposed as part of this FEIS are considered a Type I project. Type II projects are voluntary and are used to abate traffic noise on an existing highway.

Feasibility refers to the engineering considerations, such as whether a noise barrier can be built given the topography of the locations; can a substantial noise reduction be achieved given certain access, drainage, safety, or maintenance requirements; are other noise sources present in the area? While every reasonable effort should be made to obtain a substantial noise reduction (defined as a 10 dB reduction for at least one receiver), a noise abatement measure is not considered feasible if it cannot achieve at least a 5-dBA noise reduction.

A noise mitigation project will be considered reasonable if the comparative construction cost will be \$38,060 or less (in 2007 dollars) per benefited dwelling unit. Noise barrier costs can not exceed \$25 (in 2007 dollars) per square foot of barrier material or \$250 (in 2007 dollars) per linear foot. A benefited dwelling unit must receive a 5-dBA noise reduction or more. Additionally, the local jurisdiction(s) must

have entered into the required agreements with MDOT regarding maintenance, land use policy, and funding participation. A majority of the affected residences must be in favor of abatement.

4.8.3 Identified Noise Sensitive Areas

In order to evaluate noise impacts for the alternative, NSAs are identified throughout the study area. The NSAs are identified as geographic areas of potential noise impacts made up of one or more individual noise sensitive receivers that might be protected by a single noise barrier. NSAs could include one or more single family residences, apartment buildings, condominium buildings, adult living centers, schools, and parks or recreation areas.

Eighty-six NSAs were identified throughout the study area based on the proposed improvements for existing US-31 and construction of the proposed M-231 (see **Figure 4.8-1a** through **4.8-1c**). The NSAs include Category B receivers such as single family residence, apartment buildings, condos, an adult living center, schools, an historical site, and parks or recreation areas. There are 211 Category B receivers contained in the NSA, as shown in **Tables 4.8-4a-c**.

4.8.4 Existing Noise Levels

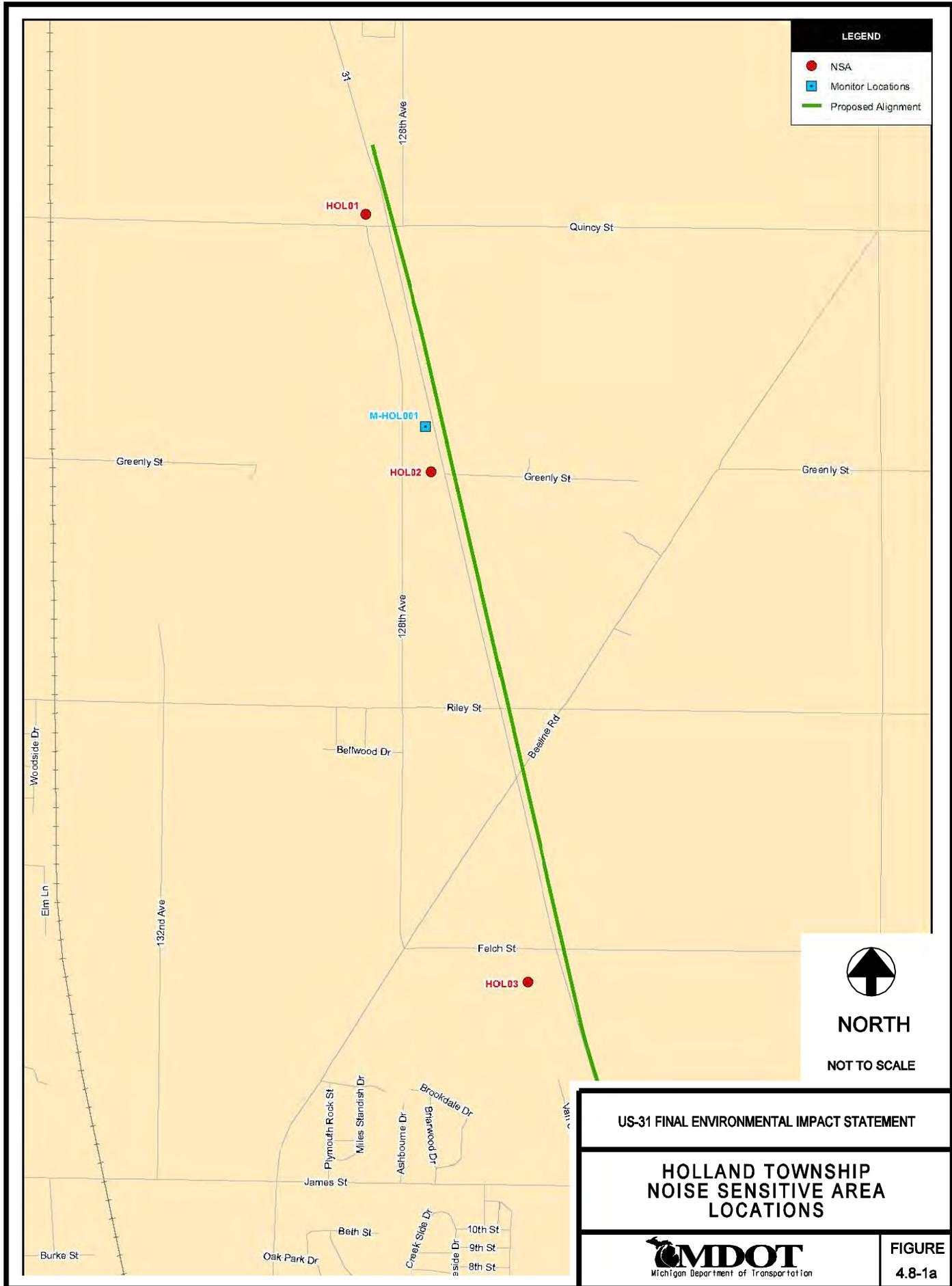
In general, for areas where existing noise levels are dominated by traffic noise, existing noise levels were predicted using the Traffic Noise Model (TNM). The traffic volumes used to predict the existing sound levels were obtained from traffic data from MDOT and the OCRC. Where data was not available, including some secondary roads and ramp connections, traffic data were taken from similarly configured nearby roads to accommodate the modeling process. Truck percentages were based on MDOT traffic data and field vehicle counts.

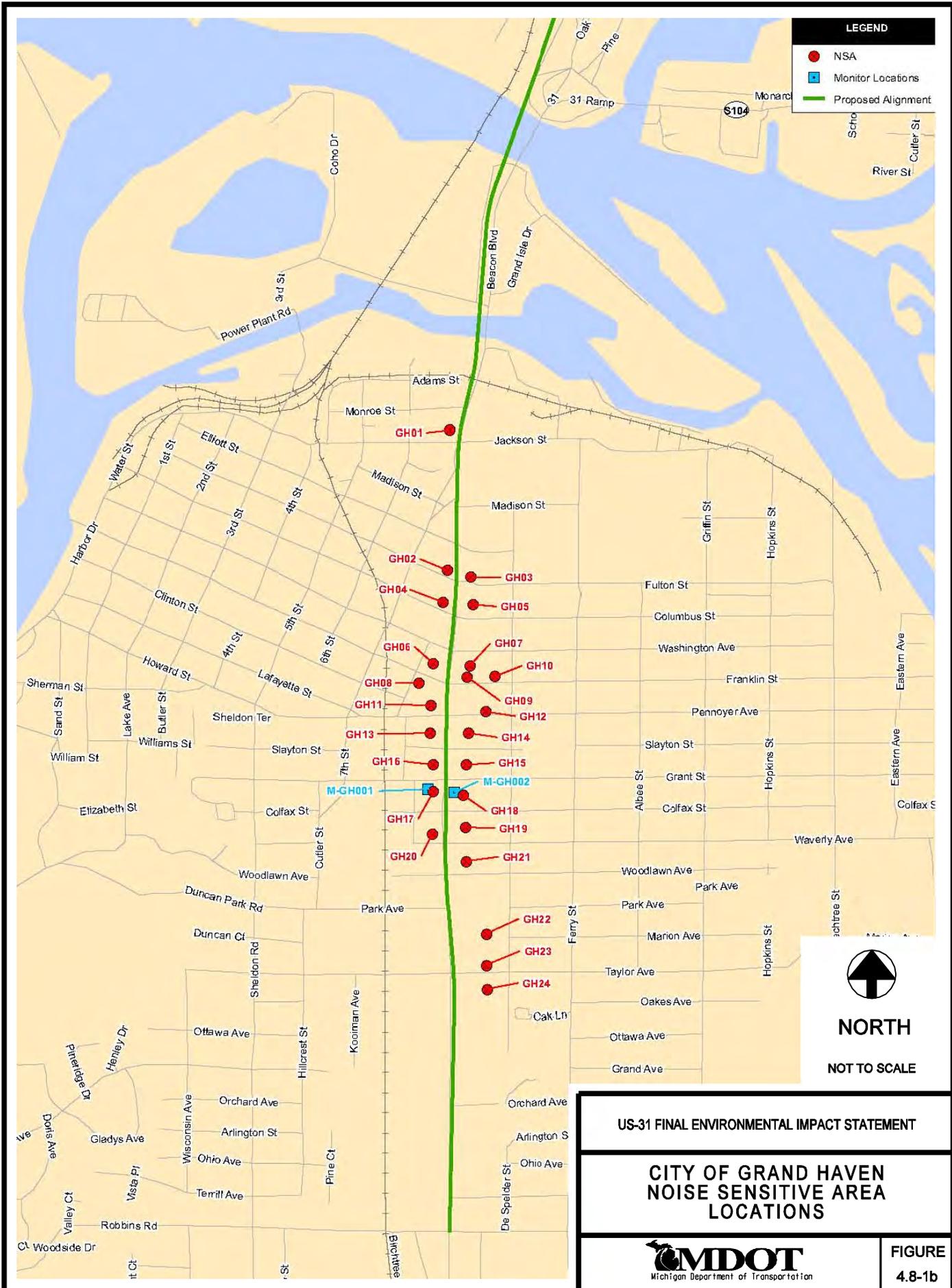
The proposed M-231 is a new roadway alignment, and traffic noise is not the dominant noise source for the existing condition. Existing noise levels in this area were instead determined by taking noise measurements at representative locations along the proposed alignment. These measurements were applied to receivers located in the same general vicinity as the measured representative locations.

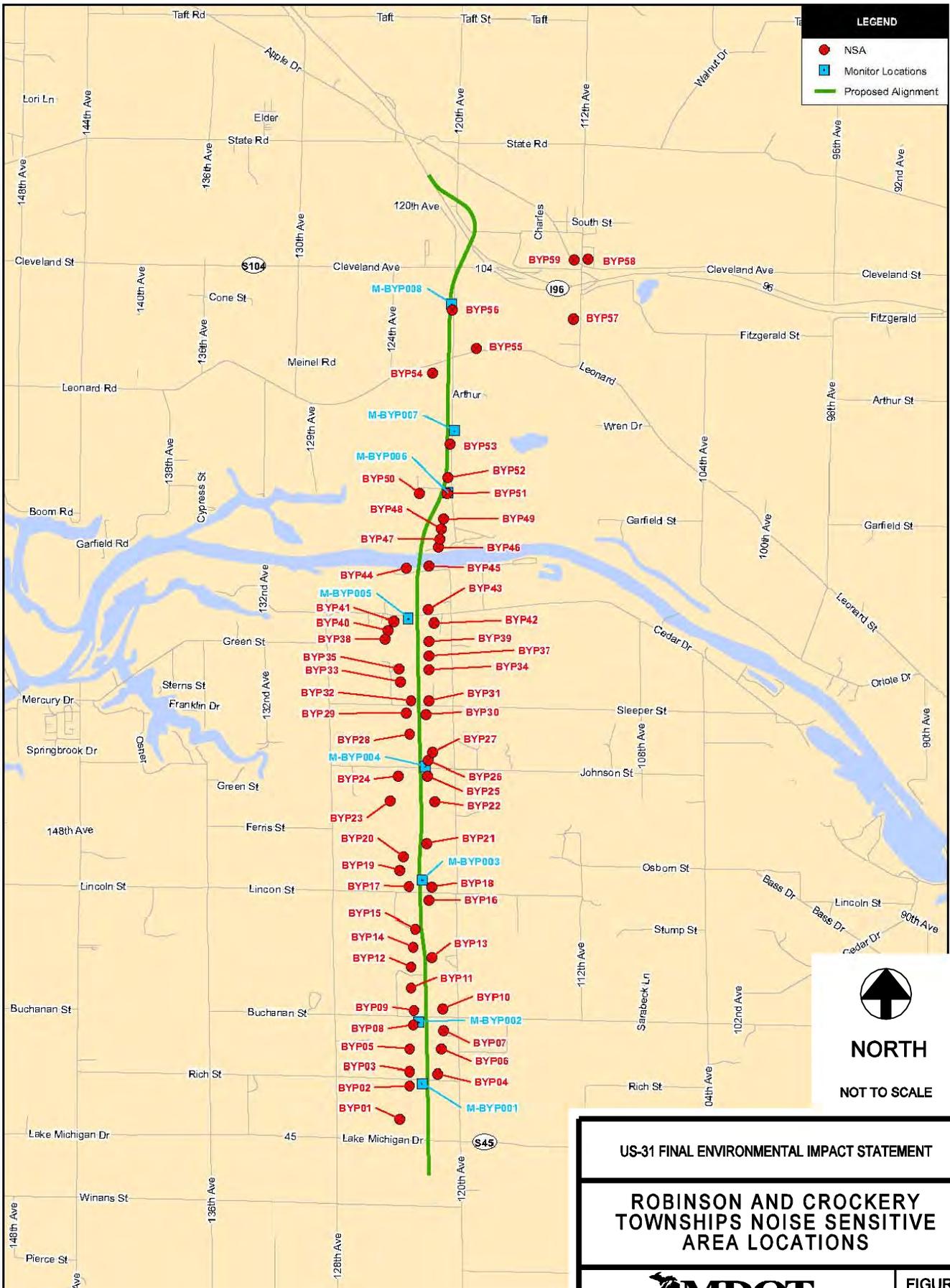
Ambient noise level measurements were conducted for two reasons: to validate the Noise Sensitive Area (NSA), where modeled highways are the dominant noise source and to establish representative existing ambient noise levels for NSAs where modeled traffic noise is not the dominate noise source.

Noise measurements were conducted in accordance with techniques described in the FHWA Report No. FHWA-DP-45-1R, "Sound Procedures for Measuring Highway Noise." One Larson Davis 820 Type I Sound Level Meter (SN 1324) and one Larson Davis 720 Type II Sound Level Meter (SN 0395) were used to monitor existing ambient noise levels using the established FHWA procedures. Acoustic laboratory calibration was performed on both meters at the Larson Davis labs, and calibration certificates are available. Field calibrators were used to conduct field calibration checks for the meters before and after each measurement period. Measurements were collected at various locations that were considered representative receivers of existing ambient noise levels within the three respective corridor segments (US-31 in Holland Township, US-31 in the City of Grand Haven, and proposed M-231).

The sound level meters were set to the A-weighted network and the slow meter response setting as recommended by FHWA guidance. Measurements were not collected if the roadway pavement was wet, or if measured wind speed exceeded 10 miles per hour. A porous windscreen was used on the microphone of the sound level meter during all measurement procedures. All of the measurements were taken with the sound level meter mounted atop tripods so that the microphone elevation was approximately five feet above the ground surface. This height is generally considered representative of the average listener's ear level. Wherever possible, measurement sites were located in open areas away from buildings or other potentially reflective surfaces.







Measurement of the ambient noise levels is required to establish the basis of impact analysis where the existing noise levels are not dominated by traffic noise. The monitored locations were selected to provide representative sound levels for each NSA in the study area. Fifteen to twenty-five minute noise measurements were performed and vehicle counts (classified by appropriate type for the analysis) were collected for the purpose of validating TNM used to predict present and future levels.

4.8.5 The Traffic Noise Model and Validation

Existing and future project sound levels for this project were calculated using the FHWA TNM version 2.5. The TNM software includes a database of speed-dependent noise emission levels for five vehicle types (automobiles, heavy trucks, medium trucks, buses, and motorcycles) under cruise (constant speed) and acceleration conditions. Hourly volume and speed of each vehicle type is applied to the model in order to predict the A-weighted sound levels at each receiver location. The TNM software accounts for the effects of accelerating vehicles such as those affected by traffic control devices (e.g., stop signs, signals, toll booths) or on-ramps and the effects of roadway grades.

Sound propagation is computed and takes into account the effects of atmospheric absorption, divergence (i.e. geometric spreading of sound energy from a source over distance), intervening ground types such as pavement or water and their acoustical characteristics, topography, natural and man-made barriers, vegetation, and rows of buildings. All TNM databases and calculations are based on 1/3 octave band data to improve accuracy (i.e. data is broken down into individual frequency bands). The results of the 1/3rd octave band data are logarithmically summed to produce the overall Leq at a modeled receiver location.

The current configuration for US-31 was used as the existing baseline for the traffic noise model. To validate this model, monitored sound levels were compared with predicted sound levels calculated from observed traffic data. Monitored and modeled results varying by less than three decibels are considered acceptably accurate, due to the fact that there is some inherent uncertainty in both the predicted values and the measured values. A comparison of modeled and monitored results is shown in **Table 4.8-3**. These results validate that the model accurately predicts highway traffic noise levels in the study area.

Table 4.8-3 Monitored Versus Modeled Noise Level Validation Results			
Receiver	Monitored Noise Level (dBA)	Modeled Noise Level (dBA)	Difference (dBA)
M-GH001	64.3	65.7	1.4
M-GH002	72.6	71.7	-0.9
M-HOL001	62.1	60.2	-1.9

Table 4.8-4a Comparison of Existing and Predicted Noise Levels City of Grand Haven						
NSA	Receiver	Peak Hour Noise Level, Leq, dBA				Impact Type
		Existing	2030 No-Action	2030 Preferred Alternative	Increase over existing	
GH01	R-GH004	65	65	65	0	NONE
GH02	R-GH009	64	65	64	0	NONE
	R-GH010	66	67	66	0	Level
	R-GH011	71	72	70	-1	Level
GH03	R-GH012	64	65	64	0	NONE
GH04	R-GH013	69	70	69	0	Level

Table 4.8-4a Comparison of Existing and Predicted Noise Levels City of Grand Haven						
NSA	Receiver	Peak Hour Noise Level, L_{eq} , dBA				Impact Type
		Existing	2030 No-Action	2030 Preferred Alternative	Increase over existing	
GH05	R-GH014	58	59	58	0	NONE
GH06	R-GH017	67	68	68	1	Level
GH07	R-GH018	65	66	66	1	Level
GH08	R-GH019	63	64	64	1	NONE
GH09	R-GH020	66	67	67	1	Level
GH10	R-GH021	62	63	62	0	NONE
GH11	R-GH023	64	65	63	-1	NONE
GH12	R-GH024	64	65	63	-1	NONE
GH13	R-GH026	62	63	62	0	NONE
GH14	R-GH029	60	61	61	1	NONE
GH15	R-GH030	71	72	71	0	Level
	R-GH033	75	76	75	0	Level
	R-GH036	64	65	65	1	NONE
GH16	R-GH031	63	64	64	1	NONE
	R-GH032	74	75	74	0	Level
	R-GH034	64	65	65	1	NONE
	R-GH035	74	75	75	1	Level
GH17	M-GH001	68	69	69	1	Level
	R-GH037	76	77	76	0	Level
GH18	M-GH002	75	75	74	-1	Level
	R-GH038	76	77	76	0	Level
	R-GH039	61	62	62	1	NONE
	R-GH040	73	74	73	0	Level
	R-GH042	71	72	71	0	Level
GH19	R-GH043	62	63	63	1	NONE
	R-GH044	57	58	58	1	NONE
	R-GH046	63	64	63	0	NONE
GH20	R-GH045	70	71	69	-1	Level
GH21	R-GH047	61	62	62	1	NONE
	R-GH048	60	61	61	1	NONE
	R-GH049	54	55	55	1	NONE
GH22	R-GH050	64	65	65	1	NONE
	R-GH051	59	60	60	1	NONE
	R-GH052	65	66	65	0	NONE
	R-GH053	60	61	60	0	NONE
	R-GH054	66	67	66	0	Level
	R-GH055	60	61	61	1	NONE
	R-GH056	66	67	66	0	Level
	R-GH057	61	62	62	1	NONE

Table 4.8-4a Comparison of Existing and Predicted Noise Levels City of Grand Haven						
NSA	Receiver	Peak Hour Noise Level, L_{eq} , dBA				Impact Type
		Existing	2030 No-Action	2030 Preferred Alternative	Increase over existing	
	R-GH058	66	67	67	1	Level
	R-GH059	61	62	62	1	NONE
	R-GH060	66	67	67	1	Level
	R-GH061	62	63	62	0	NONE
	R-GH062	67	68	67	0	Level
	R-GH063	62	63	64	2	NONE
	R-GH064	67	68	67	0	Level
	R-GH065	63	64	64	1	NONE
	R-GH066	67	68	68	1	Level
	R-GH067	62	63	64	2	NONE
	R-GH068	67	68	68	1	Level
	R-GH069	63	64	64	1	NONE
	R-GH071	51	51	51	0	NONE
GH23	R-GH072	69	70	70	1	Level
GH24	R-GH074	68	68	68	0	Level
	R-GH075	67	68	67	0	Level
	R-GH076	67	68	67	0	Level
	R-GH077	66	67	67	1	Level
	R-GH078	57	58	58	1	NONE
	R-GH080	66	67	66	0	Level
	R-GH081	65	66	66	1	Level

Table 4.8-4b Comparison of Existing and Predicated Noise Levels City of Holland						
NSA	Receiver	Peak Hour Noise Level, L_{eq} , dBA				Impact Type
		Existing	2030 No-Action	2030 Preferred Alternative	Increase over existing	
HOL01	R-HOL001	62	63	63	1	NONE
HOL02	M-HOL001	60	61	64	4	NONE
HOL03	R-HOL012	62	63	64	2	NONE
	R-HOL014	56	57	58	2	NONE
	R-HOL015	54	55	57	3	NONE
	R-HOL017	54	55	57	3	NONE
	R-HOL018	54	55	57	3	NONE
	R-HOL020	53	55	57	4	NONE
	R-HOL021	52	53	55	3	NONE

Table 4.8-4c Comparison of Existing and Predicted Noise Levels M-231 Bypass (new alignment)					
NSA	Receiver	Peak Hour Noise Level, L_{eq} , dBA			Impact Type
		Existing	2030 Preferred Alternative	Increase over existing	
BYP01	R-BYP001	50	48	-2	NONE
BYP02	M-BYP001	50	63	13	Subst'l Inc.
	R-BYP003	50	56	6	NONE
	R-BYP004	50	51	1	NONE
	R-BYP005	50	47	-3	NONE
BYP03	R-BYP006	50	50	0	NONE
	R-BYP007	50	59	9	NONE
	R-BYP011	50	59	9	NONE
	R-BYP012	50	58	8	NONE
BYP04	R-BYP008	50	48	-2	NONE
	R-BYP009	50	45	-5	NONE
	R-BYP010	50	44	-6	NONE
BYP05	R-BYP013	50	54	4	NONE
BYP06	R-BYP014	50	45	-5	NONE
BYP07	R-BYP015	45	45	0	NONE
BYP08	M-BYP002	45	56	11	Subst'l Inc.
BYP09	R-BYP016	45	46	0	NONE
	R-BYP017	45	52	7	NONE
BYP10	R-BYP018	45	53	8	NONE
	R-BYP019	45	47	2	NONE
	R-BYP020	45	52	7	NONE
	R-BYP021	45	52	7	NONE
	R-BYP022	45	53	8	NONE
BYP11	R-BYP023	45	47	2	NONE
	R-BYP024	45	49	4	NONE
BYP12	R-BYP025	45	48	3	NONE
BYP13	R-BYP026	45	47	2	NONE
BYP14	R-BYP027	45	46	1	NONE
	R-BYP028	50	62	12	Subst'l Inc.
BYP15	R-BYP029	50	52	2	NONE
	R-BYP030	50	53	3	NONE
	R-BYP031	50	47	-3	NONE
BYP16	R-BYP032	50	54	4	NONE
	R-BYP033	50	49	-1	NONE
BYP17	R-BYP034	50	54	4	NONE
	R-BYP035	50	59	9	NONE

Table 4.8-4c Comparison of Existing and Predicted Noise Levels M-231 Bypass (new alignment)					
NSA	Receiver	Peak Hour Noise Level, L_{eq} , dBA			Impact Type
		Existing	2030 Preferred Alternative	Increase over existing	
	R-BYP037	50	55	5	NONE
	R-BYP038	50	53	3	NONE
BYP18	M-BYP003	50	65	15	Subst'l Inc.
	R-BYP036	50	58	8	NONE
	R-BYP039	50	53	3	NONE
	R-BYP040	50	53	3	NONE
	R-BYP041	50	49	-1	NONE
	R-BYP042	50	49	-1	NONE
BYP19	R-BYP043	50	50	0	NONE
BYP20	R-BYP044	50	59	9	NONE
	R-BYP045	50	49	-1	NONE
	R-BYP046	50	50	0	NONE
	R-BYP047	50	46	-4	NONE
	R-BYP048	50	60	10	Subst'l Inc.
BYP21	R-BYP049	50	53	3	NONE
	R-BYP050	50	46	-4	NONE
	R-BYP051	50	49	-1	NONE
BYP22	R-BYP052	42	49	7	NONE
	R-BYP053	42	47	5	NONE
BYP23	R-BYP054	42	47	5	NONE
BYP24	R-BYP055	42	52	10	Subst'l Inc.
BYP25	R-BYP056	42	54	12	Subst'l Inc.
	R-BYP057	42	52	10	NONE
	R-BYP058	42	49	7	NONE
	R-BYP059	42	47	5	NONE
BYP26	M-BYP004	42	59	17	Subst'l Inc.
	R-BYP060	42	55	13	Subst'l Inc.
	R-BYP061	42	52	10	NONE
	R-BYP062	42	50	8	NONE
	R-BYP063	42	49	7	NONE
	R-BYP064	42	47	5	NONE
	R-BYP065	42	45	3	NONE
BYP27	R-BYP066	42	47	5	NONE
BYP28	R-BYP067	42	56	14	Subst'l Inc.
	R-BYP068	42	62	20	Subst'l Inc.
BYP29	R-BYP069	42	50	8	NONE
BYP30	R-BYP070	42	56	14	Subst'l Inc.

Table 4.8-4c Comparison of Existing and Predicted Noise Levels M-231 Bypass (new alignment)					
NSA	Receiver	Peak Hour Noise Level, L_{eq} , dBA			Impact Type
		Existing	2030 Preferred Alternative	Increase over existing	
	R-BYP071	42	51	9	NONE
	R-BYP072	42	47	5	NONE
	R-BYP073	42	46	4	NONE
BYP31	R-BYP074	42	48	6	NONE
	R-BYP075	42	54	12	Subst'l Inc.
BYP32	R-BYP076	42	60	18	Subst'l Inc.
	R-BYP077	42	56	14	Subst'l Inc.
	R-BYP078	42	52	10	Subst'l Inc.
	R-BYP079	42	50	8	NONE
	R-BYP080	42	47	5	NONE
BYP33	R-BYP081	42	47	5	NONE
	R-BYP082	42	47	5	NONE
	R-BYP083	42	57	15	Subst'l Inc.
BYP34	R-BYP084	42	51	9	NONE
BYP35	R-BYP085	42	48	6	NONE
	R-BYP086	42	47	5	NONE
BYP36	R-BYP087	42	48	6	NONE
BYP37	R-BYP088	42	47	5	NONE
BYP38	R-BYP089	42	49	7	NONE
BYP39	R-BYP090	61	47	-13	NONE
BYP40	R-BYP091	61	52	-9	NONE
BYP41	M-BYP005	61	58	-3	NONE
BYP42	R-BYP092	61	59	-2	NONE
	R-BYP093	61	54	-7	NONE
	R-BYP094	61	49	-11	NONE
	R-BYP095	61	48	-13	NONE
BYP43	R-BYP096	61	54	-7	NONE
	R-BYP097	61	52	-9	NONE
	R-BYP098	61	51	-10	NONE
	R-BYP099	61	49	-11	NONE
	R-BYP100	61	48	-13	NONE
BYP44	R-BYP101	61	52	-9	NONE
	R-BYP102	45	54	9	NONE
	R-BYP103	45	55	10	Subst'l Inc.
	R-BYP104	45	57	12	Subst'l Inc.
	R-BYP105	45	59	14	Subst'l Inc.
BYP45	R-BYP106	45	59	14	Subst'l Inc.

Table 4.8-4c Comparison of Existing and Predicted Noise Levels M-231 Bypass (new alignment)					
NSA	Receiver	Peak Hour Noise Level, L_{eq} , dBA			Impact Type
		Existing	2030 Preferred Alternative	Increase over existing	
	R-BYP107	45	56	11	Subst'l Inc.
	R-BYP108	45	55	10	Subst'l Inc.
	R-BYP109	45	55	10	Subst'l Inc.
	R-BYP110	45	52	7	NONE
	R-BYP111	45	51	6	NONE
BYP46	R-BYP112	45	58	13	Subst'l Inc.
	R-BYP113	45	56	11	Subst'l Inc.
	R-BYP114	45	52	7	NONE
	R-BYP115	45	50	5	NONE
BYP47	R-BYP116	45	49	4	NONE
BYP48	R-BYP117	45	56	11	Subst'l Inc.
BYP49	R-BYP118	45	51	6	NONE
BYP50	R-BYP119	45	48	3	NONE
BYP51	M-BYP006	45	61	16	Subst'l Inc.
BYP52	R-BYP120	45	62	17	Subst'l Inc.
BYP53	M-BYP007	45	57	12	Subst'l Inc.
BYP54	R-BYP121	45	48	3	NONE
	R-BYP122	45	46	1	NONE
BYP55	R-BYP123	45	48	3	NONE
BYP56	M-BYP008	46	66	20	Both
BYP57	R-BYP124	50	58	8	NONE
	R-BYP125	50	58	8	NONE
	R-BYP126	50	57	7	NONE
	R-BYP127	50	55	5	NONE
BYP58	R-BYP128	50	58	8	NONE
BYP59	R-BYP129	50	49	-1	NONE

4.8.6 Future Impacts

Future year (2030) noise levels for the project were predicted using the FHWA TNM version 2.5. The thirty-four impacted NSAs descriptions are listed below in **Table 4.8-5a-b**. The FHWA TNM analysis indicates that thirteen NSAs, containing thirty-two receivers, will have noise levels equal to or greater than 66-dBA for the future year (2030) Preferred Alternative. Twenty-one NSAs, containing thirty-three receivers experienced a substantial increase of 10-dBA or more. One of the twenty-one NSAs has both a noise level equal to or greater than 66-dBA for the future year (2030) build scenario and will also experience a substantial increase of 10-dBA or more.

Table 4.8-5a Impacted Noise Sensitive Areas – City of Grand Haven			
NSA	Location	Receiver(s) Impacted	Number of Impacted Dwelling Units
GH02	West of US-31, homes North of Fulton Ave.	R-GH010 and R-GH011	2 residences
GH04	West of US-31, homes between Fulton Ave. and Columbus Ave.	R-GH013	2 residences
GH06	West of US-31, homes between Washington St. and Franklin Ave.	R-GH017	3 residences
GH07	East of US-31, homes between Washington St. and Franklin Ave.	R-GH018	3 residences
GH09	East of US-31, homes along the North side of Franklin Ave.	R-GH020	3 residences
GH15	East of US-31, homes between Slayton St. and Grant St.	R-GH030 and R-GH033	8 residences
GH16	West of US-31, homes between Slayton St. and Grant St.	R-GH032 and R-GH035	4 residences
GH17	West of US-31, house at 826 Grant St. and home along South side of Grant St.	M-GH001 and R-GH037	2 residences
GH18	East of US-31, homes and church between Grant St. and Colfax St.	M-GH002, R-GH038, R-GH040, and R-GH042	1 Church (equivalent to 10 dwelling units) and 4 residences
GH20	West of US-31, homes along Waverly Ave.	R-GH045	3 residences
GH22	East of US-31, Hawthorne Square Condos	R-GH054, R-GH056, R-GH058, R-GH060, R-GH062, R-GH064, R-GH066, R-GH068	12 dwelling units for multi-family dwellings
GH23	East of US-31, South Side Adult Living Center	R-GH072	Adult Living Center
GH24	East of US-31, Williamsburg Court Apartments	R-GH074, R-GH075, R-GH076, R-GH077, R-GH080, and R-GH081	12 dwelling units for multi-family dwellings

Table 4.8-5b Impacted Noise Sensitive Areas M-231-Bypass(new alignment)			
NSA	Location	Receiver(s) Impacted	Number of Impacted Dwelling Units
BYP02	West of M-231, home along the South side of Rich St.	M-BYP001	1 residence
BYP08	West of M-231, home along the South side of Buchanan St.	M-BYP002	1 residence
BYP14	West of M-231, home between Buchanan St. and Lincoln St.	R-BYP028	1 residence
BYP18	East of M-231, house at 12888 Ail Drive, along North side of Lincoln St.	M-BYP003	1 residence
BYP20	West of M-231, between Lincoln St. and Johnson	R-BYP048	1 residence

Table 4.8-5b Impacted Noise Sensitive Areas M-231-Bypass(new alignment)			
NSA	Location	Receiver(s) Impacted	Number of Impacted Dwelling Units
	St.		
BYP24	West of M-231, home along the South side of Johnson St.	R-BYP055	1 residence
BYP25	East of M-231, home along the South side of Johnson St.	R-BYP056 and R-BYP057	2 residences
BYP26	East of M-231, house at 12201 Johnson St. and home along the North side of Johnson St.	M-BYP004, R-BYP060, and R-BYP061	3 residences
BYP28	West of M-231, homes between Johnson St. and Sleeper St.	R-BYP067 and R-BYP068	2 residences
BYP30	East of M-231, home along the South side of Sleeper St.	R-BYP070	1 residence
BYP31	East of M-231, home along the North side of Sleeper St.	R-BYP075	1 residence
BYP32	West of M-231, homes along the North side of Sleeper St.	R-BYP76, R-BYP077, and R-BYP078	3 residences
BYP33	West of M-231, home between Sleeper St. and North Cedar Dr.	R-BYP083	1 residence
BYP44	West of M-231, homes along Limberlost Ln.	R-BYP103, R-BYP104, and R-BYP105	3 residences
BYP45	East of M-231, homes along Limberlost Ln.	R-BYP106, R-BYP107, R-BYP108, and R-BYP109	4 residences
BYP46	East of M-231, homes along the North side of the Grand River	R-BYP112 and R-BYP113	2 residences
BYP48	East of M-231, home between the Grand River and Cypress St.	R-BYP117	1 residence
BYP51	East of M-231, home along the South side of Cypress St.	M-BYP006	1 residence
BYP52	East of M-231, home along the North side of Cypress St.	R-BYP120	1 residence
BYP53	East of M-231, Spoonville School Historic Site	M-BYP007	Historical Site
BYP56	East of M-231, house at 16575 120th Ave.	M-BYP008	1 residence

4.8.7 Noise Abatement Analysis

In general, the feasibility of noise mitigation for the impacted NSAs was restricted by one of two primary conditions, 1) the fact that the highway itself is not controlled-access through the City of Grand Haven, and serves as the primary access for residential and commercial properties that are impacted by it; and 2) through much of the remaining area, and for the bypass area in particular, individual homes are spaced too far apart to be protected by, and share the cost of, a single continuous noise barrier.

Two NSAs were found to be reasonable, but are not feasible for mitigation actions because the proposed barriers would not be feasible due to numerous gaps required for drive openings and cross streets, therefore preventing the barriers to achieve the required 5dba noise reduction. The following are descriptions of the two properties:

NSA GH16 – Grand Haven – West of US-31, between Slayton St. and Grant St.

NSA GH16 represents the four impacted residences between Slayton Street and Grant Street, West of US-31. Sound level impacts were identified in outside areas of frequent activity. In order to provide a benefit of at least 5 dBA for impacted dwelling units within this NSA, a noise barrier would have to be modeled and built. Barriers would not be feasible due to numerous gaps required for drive openings and cross streets, preventing the barriers to achieve the required 5dba noise reduction. Therefore, mitigation for this NSA is not feasible and is not recommended.

NSA GH24 – Grand Haven – East of US-31, Williamsburg Court Apartments

NSA GH24 represents the impacted multi-family dwelling units in Hawthorne Square Condos, located East of US-31 and North of Taylor Avenue. Sound level impacts were identified in outside areas of frequent activity. In order to provide a benefit of at least 5 dBA for impacted dwelling units within this NSA, a noise barrier would have to be modeled and built. Barriers would not be feasible due to numerous gaps required for drive openings and cross streets, preventing the barriers to achieve the required 5dba noise reduction. Therefore, mitigation for this NSA is not feasible and is not recommended.

No mitigation at these NSAs is recommended. None of the noise walls were found to be feasible and reasonable, therefore, no noise walls are recommended. Therefore, no mitigation is recommended for any of the NSAs. Where noise walls are found not to be reasonable, but are still desired by the community, the municipality may consider providing funds to cover costs above MDOT's Noise Policy reasonableness criteria.

4.9 GROUNDWATER

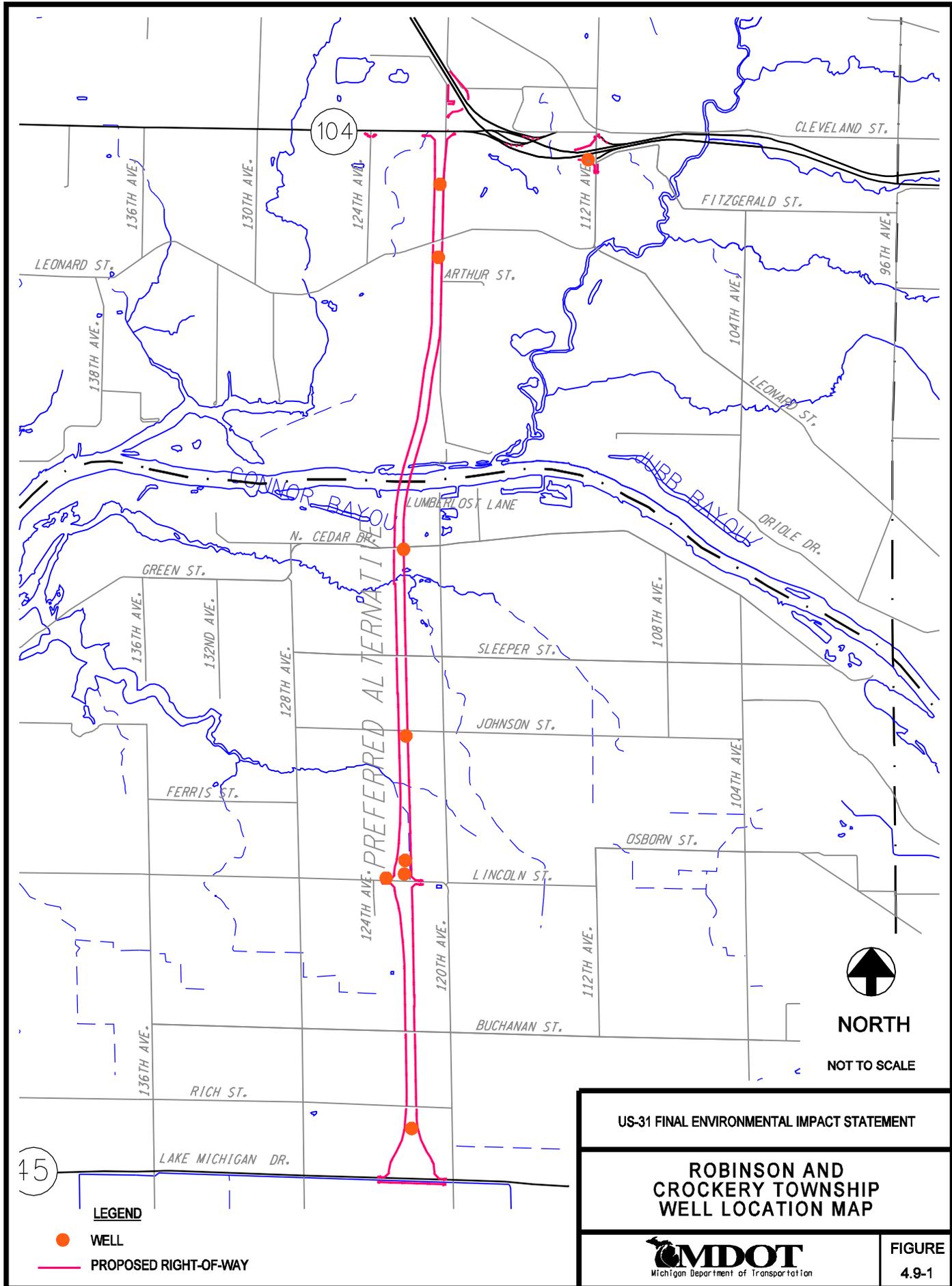
The study area has an abundant supply of both surface water and groundwater. Groundwater is accessed from both shallow and deep wells which provide ample water for domestic uses, livestock, and irrigation; primarily in rural areas of the study area. Urban area water is primarily supplied by Lake Michigan, treated, and then piped inland. Areas outside the water service districts rely predominately on well water.

A high groundwater table exists throughout most of the study area, especially in wetlands, prior converted farmlands, or farmed wetlands. The extensive tiling of agricultural land and deep drainage ditches are indications of this. Many of these ditches are also county drains, under the jurisdiction of the Ottawa County Drain Commissioner.

Impacts

The MDEQ and/or Ottawa County Health Department maintain records of all potable water wells drilled within the project area. Existing potable water wells could be affected if a proposed ROW acquisition includes parcels that contain wells. The Preferred Alternative will not impact wells along existing US-31 in Holland or Grand Haven. Nine wells will be impacted along the new alignment, see **Table 4.9-1** and **Figure 4.9-1** for additional information pertaining to the affected wells. Impact to groundwater or wells other than the direct ROW acquisition, is not expected.

The potential for groundwater contamination due to accidental spills along the Preferred Alternative is quite low, because controlled or limited-access roadways generally have lower accident rates than free-access roadways. In addition, the proposed storm water management detention may assist in limiting, containing and cleaning up spilled product, depending on the proximity of the facility to the spilled material. Lastly, the volume of contaminating materials lost due to vehicular accident is typically very small and easily remediated by quick cleanup and emergency response measures.



Well ID	Town/Range/Section	Address	Well Depth	Well Type
70000002258	08N 15W 21	16575 120 th Ave	98	Household
70000003446	08N 15W 27	15760 120 th Ave	96	Household
70000004204	07N 15W 16	12676 124 th Ave	41	Household
70000001787	07N 15W 09	12264 Johnson	27	Household
70000002294	08N 15W 33	N. Cedar Drive	28	Household
70000003059	07N 15W 09	12863 N Star Court	35	Household
70000003060	07N 15W 09	12821 N Star Court	36	Household
70000002262	08N 15W 22	16649 112th	101	Household
70000001830	07N 15W 21	RR 325	44	Irrigation

Mitigation

The displaced wells will be properly abandoned in accordance with MDEQ (Groundwater Quality Control Act, Part 127, 1978 PA 368) and/or Ottawa County Health Department requirements. All uncapped water wells and/or sewer lines within the proposed ROW will be sealed according to MDOT specifications, and in accordance with MDEQ and/or local County Health Department requirements. Sewer lines will be filled with concrete grout at the basement level and water will be turned off at the street in urban areas where structures will be relocated or demolished. In rural areas, the sewer line to the septic tank will be filled with concrete grout at the basement level and abandoned wells will be filled. If the water table intersects the roadway sub-base, under-drains will be built along the pavement to intercept horizontal seepage. Flow will be rerouted through the drains and discharged into a roadside ditch or watercourse.

The proper closing of wells and other potential conduits to groundwater, and the exercise of normal precautions to prevent or immediately clean up spills during construction of the project will ensure that there are no impacts to the groundwater. Likewise, the prompt response to spills that occur during facility operations will provide continued protection of this resource.

4.10 WETLANDS

Michigan’s wetland statute, Part 303, Wetlands Protection, of the NREPA, 1994 PA 451, as amended, defines a wetland as “land characterized by the presence of water at a frequency and duration sufficient to support, and that under normal circumstances does support, wetland vegetation or aquatic life, and is commonly referred to as bog, swamp, or marsh.” Several wetlands were identified within the project alignment. Wetlands were classified in accordance with the U.S. Fish and Wildlife Service based on Cowardin et al.’s *Classification of Wetlands and Deepwater Habitats of the United States* (1979). Along the existing US-31 sections, wetlands are mainly associated with county drains and roadside ditches which support hydrophytic vegetation. The land use around the cities of Holland and Grand Haven are mainly developed for commercial use and consist of mowed grass. The landscape along the study area corridor, south of the Grand River, is dominated by broad expanses of level ground that have been drained or ditched to provide suitable farmland. Extensive areas of wetlands are found along the stream valleys with the remainder of the wetlands adjacent to drains and in the Grand River floodplain.

4.10.1 Impacted Wetlands

The following paragraphs detail the wetlands that will be impacted by the Preferred Alternative alignment. In addition to detailed descriptions of vegetation, hydrology and soils, a wetland impact table (**Table 4.10-1**) identifies each wetland, wetland type, wetland size and impact of each wetland in acres. To calculate impacts, it was assumed that all wetlands approximately 33 feet within the proposed ROW would be drained or filled for construction of the Preferred Alternative. The actual impacts may be less when final design plans are prepared and wetland impacts are calculated within the slope stake lines. Wetlands were classified in accordance with the U.S. Fish and Wildlife Service based on Cowardin et al.’s *Classification of Wetlands and Deepwater Habitats of the United States* (1979). The Minnesota Routine