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US-31 Holland to Grand Haven

FINAL ENVIRONMENTAL IMPACT STATEMENT

Submitted pursuant to 42 U.S.C. 4332 (2) (c) and, 49 U.S.C. 303

U.S. Department of Transportation
Federal Highway Administration
and
Michigan Department of Transportation
Cooperating Agencies
U.S. Coast Guard
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This Final Environmental Impact Statement (FEIS) describes the social, economic and natural environmental impacts associated with proposed improvements to US-31 in Holland and Grand Haven, and a new route (M-231) west of 120th Avenue in Robinson and Crockery Townships, Ottawa County, Michigan. The improvements to US-31 are from East Lakewood Boulevard north to Quincy Street in Holland, and from south of Franklin Street to north of Jackson Street in Grand Haven. The new M-231 will be constructed west of 120th Avenue from M-45 to the I-96/M-104 interchange; including a new crossing of the Grand River, improvements to M-104 near I-96, new ramps at the I-96 and M-231 interchange, and improvements to the I-96/112th Avenue interchange. This document includes a summary of the planning basis, the process used to determine the recommended alternative and the associated impacts. Mitigation of the impacts is also included. The estimated cost of the proposed project is \$170 million in 2014 dollars. This document addresses the comments received on the social, economic, and environmental issues and provides substantiation for selection of the Preferred Alternative.

PREFACE

This Final Environmental Impact Statement (FEIS) has been prepared in compliance with the National Environmental Policy Act (NEPA), federal regulations on procedures for preparing environmental documents, and the Michigan and federal environmental laws and regulations.

The NEPA, enacted in 1969, requires that an Environmental Impact Statement (EIS) be prepared for all major federal actions significantly affecting the quality of the human environment. The EIS must discuss the environmental impacts of the federal action it covers and all alternatives to that action. Such actions include federal projects, state and local programs funded by federal assistance and private development authorized by federal permits.

Part 771 of 23 Code of Federal Regulations (Highways) states that alternative courses of action must be evaluated and decisions should be made in the best overall public interest. The decisions should be based upon a balanced consideration of the need for safe and efficient transportation, social, economic, and environmental impacts of the proposed transportation improvement, and national, state, and local environmental protection goals. In addition, the alternatives should connect logical termini and be of sufficient length to address environmental matters on a broad scope. Technical Advisory T 6640.8A of the Federal Highway Administration (FHWA) states that all reasonable alternatives under consideration must be developed to comparable level of detail so that their comparative merits may be evaluated. The US-31 FEIS complies with these requirements.

The original study area in the Draft Environmental Impact Statement (DEIS) included most of Ottawa County, southern Muskegon County and northern Allegan County. The study area for the FEIS no longer includes Muskegon or Allegan Counties because the Preferred Alternative is not located in, nor does it have impacts in, either of the counties. The current study area includes the western half of Ottawa County. 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.

A re-evaluation of the DEIS was completed as required by NEPA because the time between Federal Actions (FHWA signing of DEIS and issuance of the Record of Decision) was more than 3 years. Based on the proceeding analyses, FHWA determined, there are no significant changes that would warrant preparation of a supplemental EIS. MDOT is ready to proceed with the Final EIS and is requesting FHWA's concurrence with this finding. See **Appendix F**.

In addition, in keeping with FHWA regulations and guidelines, an extensive public involvement program was developed and implemented for this project. Early coordination and scoping activities have informed the public and appropriate agencies about the proposed US-31 EIS in Ottawa County, Michigan. The public involvement programs continues and affords the public and agencies opportunities for further review and comment.

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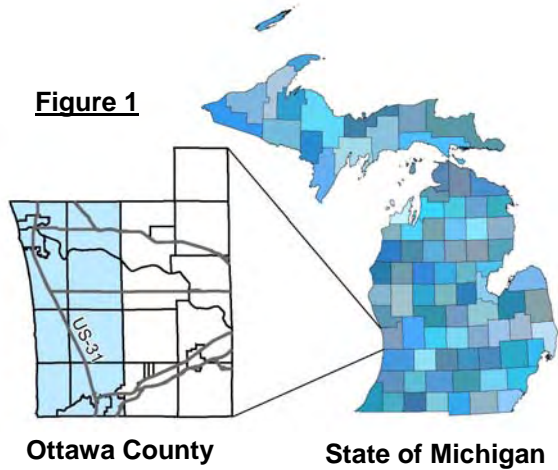
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 Appendix E – Methodology of Environmental Justice
 Appendix F – Final US-31 DEIS Re-evaluation
 Appendix G – Wetland Mitigation/Public Interest Finding Statement

1.0 EXECUTIVE SUMMARY

Where is the US-31 Project Located?



This Final Environmental Impact Statement (FEIS) includes the study and evaluation of alternatives on US-31 between the cities of Holland and Grand Haven in Ottawa County, Michigan (**Figure 1**).

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 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.

Why is the US-31 Project Important?



Traffic along US-31 in Grand Haven, Michigan

US-31, a principal arterial road on the National Highway System, parallels Michigan's west coast. It begins in Michigan at the state border, near South Bend, Indiana, and stretches northerly nearly 390 miles to its northern terminus near the Mackinac Bridge. The arterial provides access to numerous recreational attractions along the Lake Michigan coastline; including over 15 state parks public and private harbor, and numerous other tourist-oriented businesses and recreational opportunities. US-31 is also an important commercial corridor linking state and regional commercial and agricultural businesses. The Michigan Department of Transportation (MDOT) recently published the MI Transportation Plan, which is the state's 2005-2030 Long Range Transportation Plan (MI Transportation Plan). US-31 is recognized as a statewide corridor of highest significance in this plan. This proposed project is also included in this plan.

In response to local concerns about traffic volumes and access, MDOT prepared a preliminary assessment of conditions on US-31 in Ottawa County in 1990. The results contained in the report entitled "*A Feasibility Study Report for the Improvement of US-31 from the City of Holland to the City of Grand Haven through Ottawa County, Engineering Report #1932*" recommended development of a detailed study of on-alignment and off-alignment alternatives.

Based on the findings of the 1990 Engineering Report, MDOT began preparing the DEIS in 1993. After releasing the DEIS and conducting the Public Hearing in 1998, MDOT continued working closely with local units of government, resource agencies, the public and other

interested parties to develop an acceptable Preferred Alternative. These discussions and meetings led to the identification of an alternative which minimized impacts to wetlands, farmlands, land development, and addressed the most important transportation needs in the corridor. Another influencing factor in the development of the Preferred Alternative was the limited amount of funds projected to be available to design and construct the project. All of these discussions and reviews led to the selection of the Preferred Alternative as described in this FEIS.

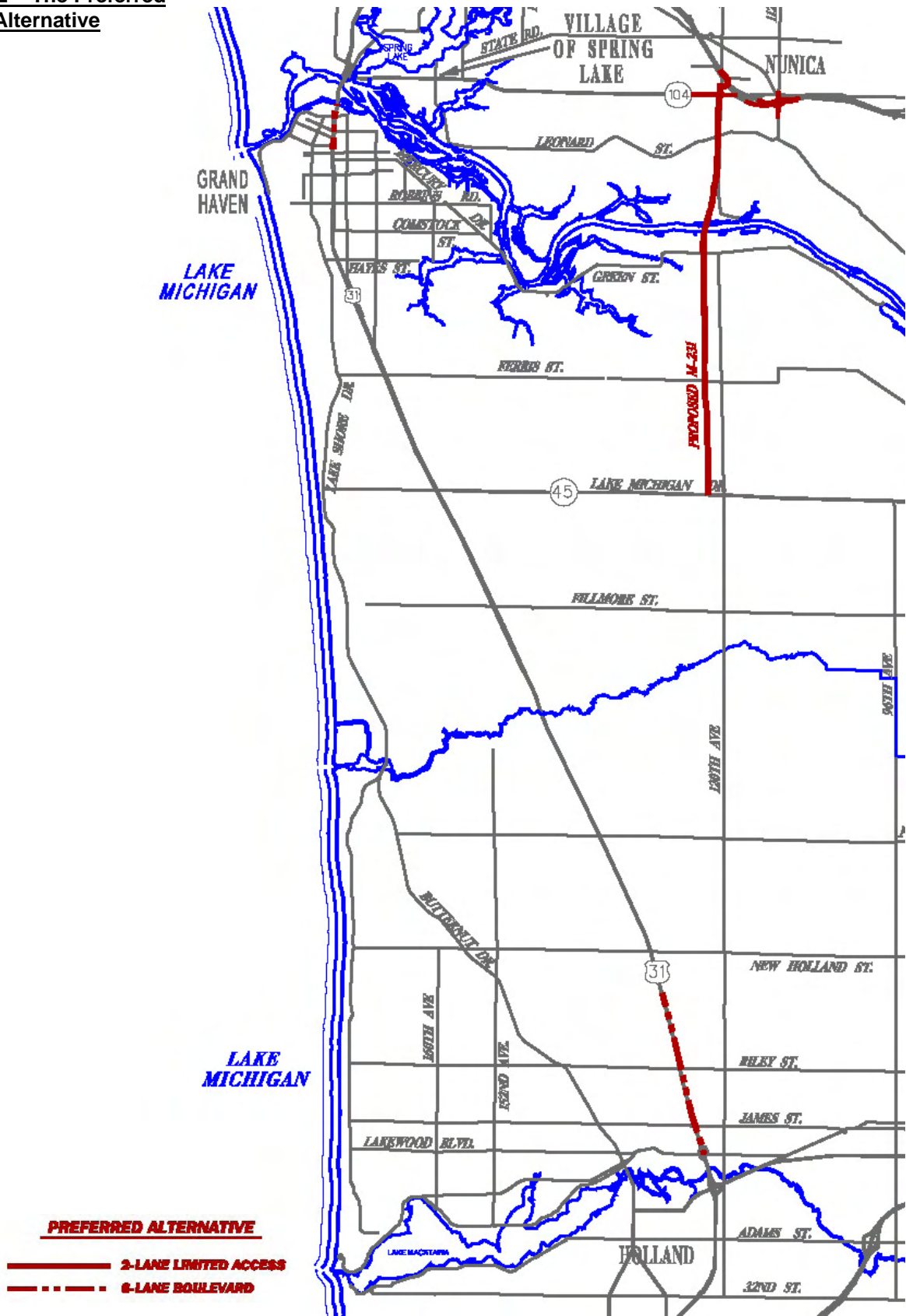
MDOT pursued innovative options and met extensively with concerned citizens and public agencies, and took time to address the concerns raised in response to public and agency comments during and after the development of the DEIS and after the Public Hearing. MDOT led the development of an assessment of indirect impacts through an innovative research study conducted by Michigan State University's (MSU) Basic Science and Remote Sensing Institute. The study paired observations of historic land use changes with anticipated population and employment growth projections to determine potential land use changes in the future (2020). The study concluded that the intense pressure for growth and development in the area is due to the robust regional economy. The corridor alternatives evaluated in the study have a limited impact on the future location of land development, due to the fact that local governments control land use through zoning and master plans. In addition, location decisions are based more on economic conditions and proximity to regional activity centers than any one transportation facility.

What is the Preferred Alternative?

The Preferred Alternative (F-1a), as presented in this FEIS, best meets the stated Purpose and Need of the project, complies with the National Environmental Policy Act (NEPA) and is within the funds expected to be available over the next 20 years. The Preferred Alternative is shown on **Figure 2** and described below.

A new route (M-231) will be constructed near 120th Avenue from M-45 north to the I-96/M-104 interchange; including a new Grand River crossing, improvements to M-104 near I-96, new ramps at the I-96 and M-231 interchange, and improvements to the I-96/112th Avenue interchange. M-231 will be constructed as a two-lane limited access roadway with controlled access at intersections. See **Appendix A** for detailed maps of the Preferred Alternative. These actions to limit and control the access will help protect the corridor from development. Acquisition of the right-of-way (ROW) for the roadway will also preserve the potential for expansion to a four lane divided facility, when warranted.

Figure 2 – The Preferred Alternative



Improvements will be made to segments of US-31 in Grand Haven, from south of Franklin Street to north of Jackson Street and from Lakewood Boulevard north to Quincy Street in the Holland area. Improvements include adding an additional lane in each direction and intersection modifications.

In addition to its identification in the MI Transportation Plan, the Preferred Alternative is in MDOT's Five-Year Transportation Program (2009-2013) for preliminary engineering, purchase of ROW, and construction.

The Preferred Alternative is located within two Metropolitan Planning Organizations (MPOs): the West Michigan Shoreline Regional Development Commission (WMSRDC), which is the MPO for the Muskegon area and the Macatawa Area Coordinating Council (MACC), which is the MPO for the Holland area. During 2007, the Preferred Alternative was included in the two approved 2035 MPO Long Range Transportation Plans (LRTP). The design/engineering and ROW phase were also added to the 2005-2011 MPO TIPs in 2008. The project is included in the recently approved LRTP. Construction is included in the Five-Year Transportation Program, beginning in 2010, and will be added to the MPO TIPs upon receipt of a ROD on this FEIS from the FHWA.

What is the Purpose of the Project and Why is it Needed?

Purpose of the Proposed Action

The purpose of the proposed action is to develop a financially feasible transportation improvement to reduce traffic congestion and delay, improve safety, and increase access to improve the movement of people and goods in the corridor study area.

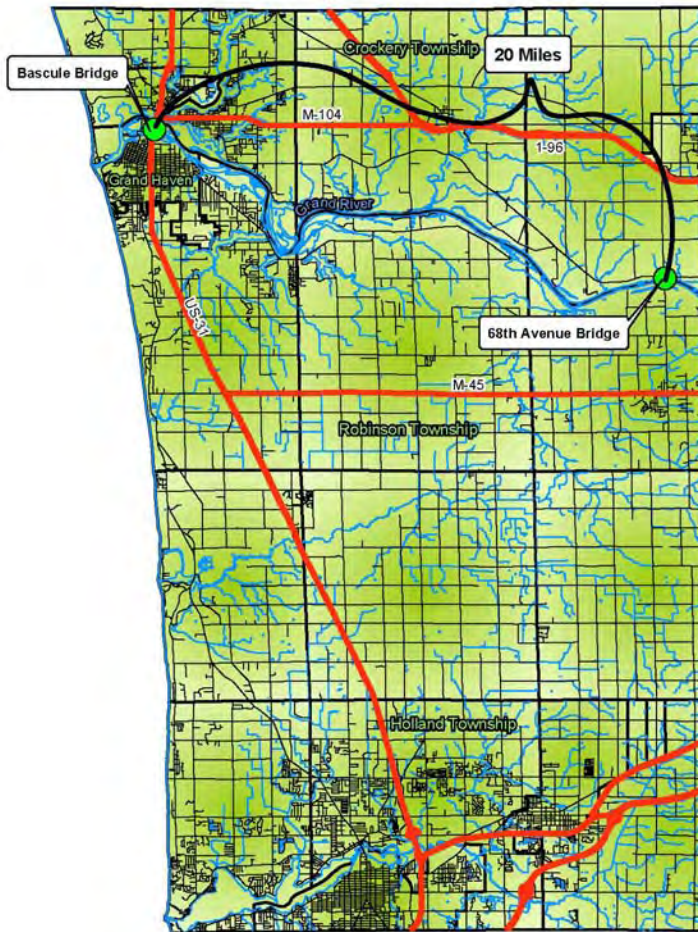
Need for the Proposed Action

There is a need to alleviate existing and future traffic congestion within the corridor to reduce vehicular delays that restrict the movement of people and goods. Several factors contribute to congestion in the corridor, including the widely spaced crossings of the Grand River in Ottawa County. The scheduled and unscheduled bascule bridge openings on existing US-31 in the City of Grand Haven further contribute to congested traffic conditions and delay.

Additional access across the Grand River is needed to provide alternative access options for area residents, businesses, and for the growing population, and commercial areas in Ottawa County. From existing US-31 the next nearest crossing of the Grand River is a two-lane bridge on 68th Avenue, in Eastmanville, located approximately 20 road miles east of the existing bascule bridge (**Figure 3**). As development continues to occur in

Figure 3

Ottawa County Grand River Crossing



the area, the ability to provide timely access to emergency services becomes more critical.

The bascule bridge on US-31 opens to allow boats to pass between March 15 and December 15 on the hour from 6:30 a.m. to 8:30 p.m. every day, except during the peak travel times. The bridge may also open on demand at any time for eligible commercial vessels including barges, Coast Guard vessels, and charter boats. Recurring instances of mechanical and electrical failures, routine maintenance, and openings for boat traffic cause the bascule bridge to open and stop traffic unexpectedly, sometimes for hours at a time.

Another important need is to enhance safety by reducing the potential for crashes by providing additional capacity, geometric improvements, and operational improvements on existing US-31. The crash rates for portions of US-31 (i.e. City of Holland, Holland Township and Grand Haven) are already above the average crash rates for similar facilities in the state. As traffic volumes increase, the potential for crashes will also increase.

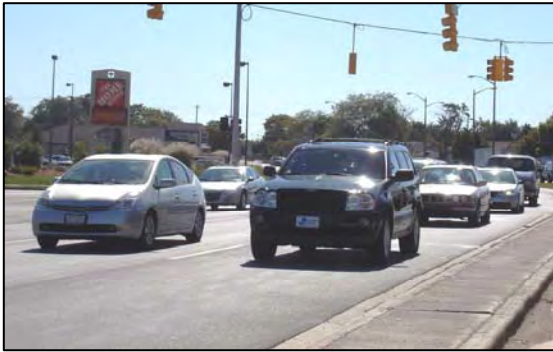
Increasing instances of mechanical and electrical failures, causing the bridge to open/close improperly in the mid-1990's, led to rehabilitation of the structure in 1997 and 1998 by MDOT. Since then, the number of malfunctions has decreased, but has not been eliminated. MDOT completed additional maintenance work on the bascule bridge, and non-motorized improvements in 2006. These improvements extended the service life of the bridge up to 50 years. The work included rehabilitation of the electrical, mechanical, and structural systems. Painting and deck repairs occurred in 2007. However, frequent bridge openings will continue to be an issue, especially during the peak summer travel (roadway and water) months.

What are the Characteristics of the Corridor Study Area?

Ottawa County, located in southwestern Michigan, is approximately 150 road miles northeast of Chicago, Illinois and 170 road miles west of Detroit, Michigan. With its western boundary formed by the Lake Michigan shoreline, it is an attractive place to live and visit. As of 2006, there were over 257,000 residents in the county, ranking it as the 8th largest county in the state in population. The population in Ottawa County grew by 27% between 1990 and 2000 compared to 7% for the state of Michigan. There are 565 square miles of land in Ottawa County comprised of seventeen townships, six cities and one village. Thirty-eight (38%) percent of Ottawa County's land mass is farmland.

While Ottawa County is predominately rural, the Cities of Holland and Grand Haven have urban characteristics

typical of small cities. Development along existing US-31 in each of these cities has concentrations of commercial and office uses, which transitions to suburban shopping and commercial uses farther from the city center. The presence of Grand Rapids, a major regional economic center approximately 15 miles east of the corridor, also contributes to growth in the county. In addition to this local and regional development, tourist attractions add to the traffic congestion.



Traffic along US-31 in Grand Haven, Michigan

Another major contributor to traffic and access issues along the corridor in the study area is the six-lane US-31 bascule bridge over the Grand River which connects the Cities of Grand Haven, Ferrysburg, and the Village of Spring Lake. The bridge is two miles east of Lake Michigan. Marinas and commercial boating locations are located farther upriver. The bascule bridge opens periodically to allow boats to pass between March 15 and December 15. During these closures traffic either stops on existing US-31 or diverts to 68th Avenue, located approximately 20 road miles east of the bascule bridge. Recurring instances of mechanical and electrical failures, routine maintenance, and openings for scheduled boat traffic cause the bascule bridge to open and stop traffic unexpectedly, sometimes for hours at a time. These closures cause travel delays, and negatively impact the adjacent land uses and tourism traffic.

Bridge operations and closures can also pose potential concerns for Emergency Medical Services (EMS) access to the North Ottawa Community Hospital 1.5 miles away from the bridge.

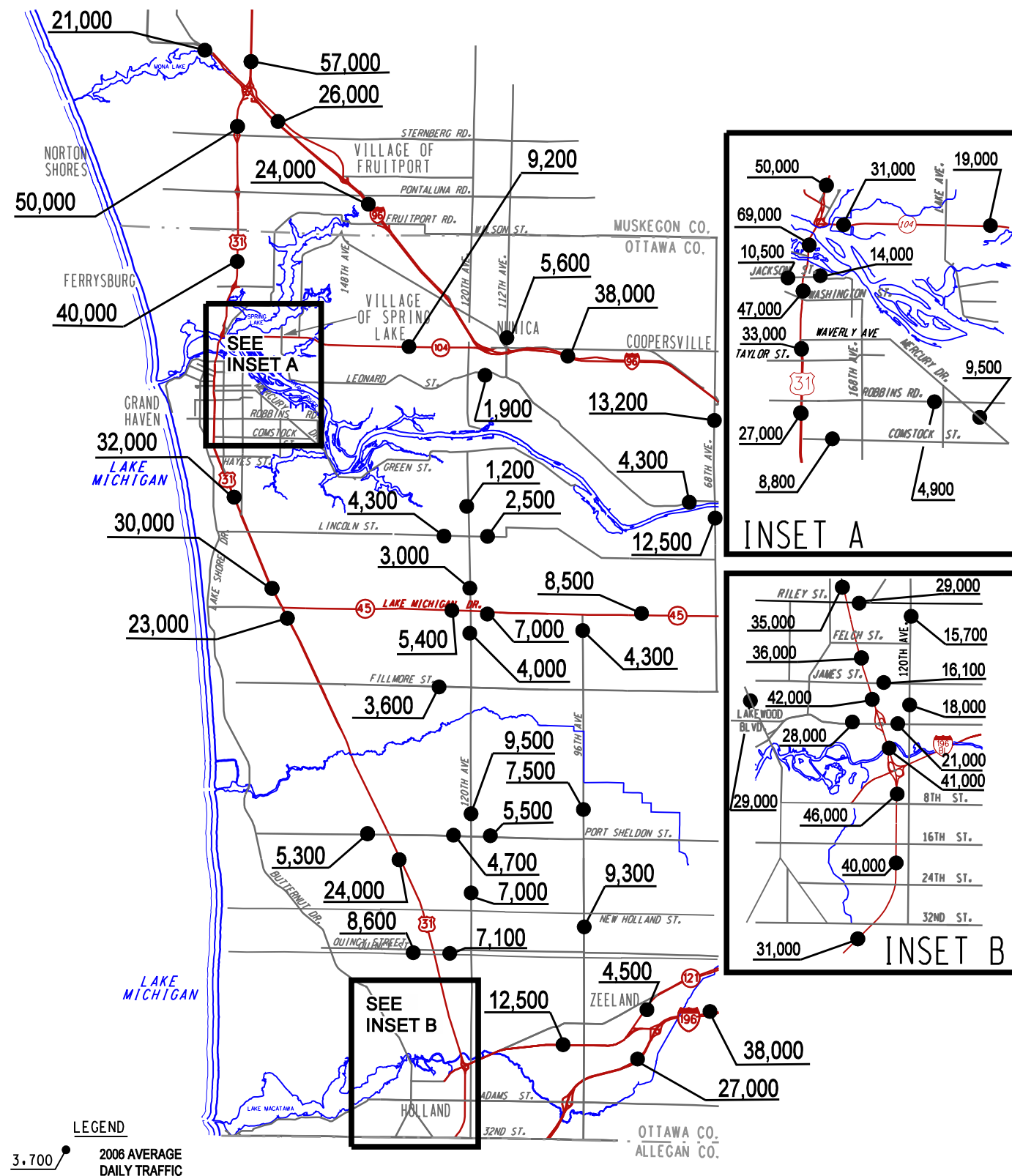
The existing crossing alternative to US-31, 68th Avenue Bridge, is a two-lane structure without a non-motorized path. The bridge directly connects Coopersville, Allendale (home of Grand Valley State University), and Polkton Township. 68th Avenue is a two-lane County Primary road running north-south in Ottawa County and also provides a connection between I-96 and M-45.

The 2006 Average Daily Traffic (ADT) on US-31 varied from 31,000 to 46,000 in the Holland area; 23,000 to 32,000 in the rural area between Holland and Grand Haven; 27,000 to 69,000 in the Grand Haven area; and 40,000 to 50,000 north of M-104 (**Figure 4**).

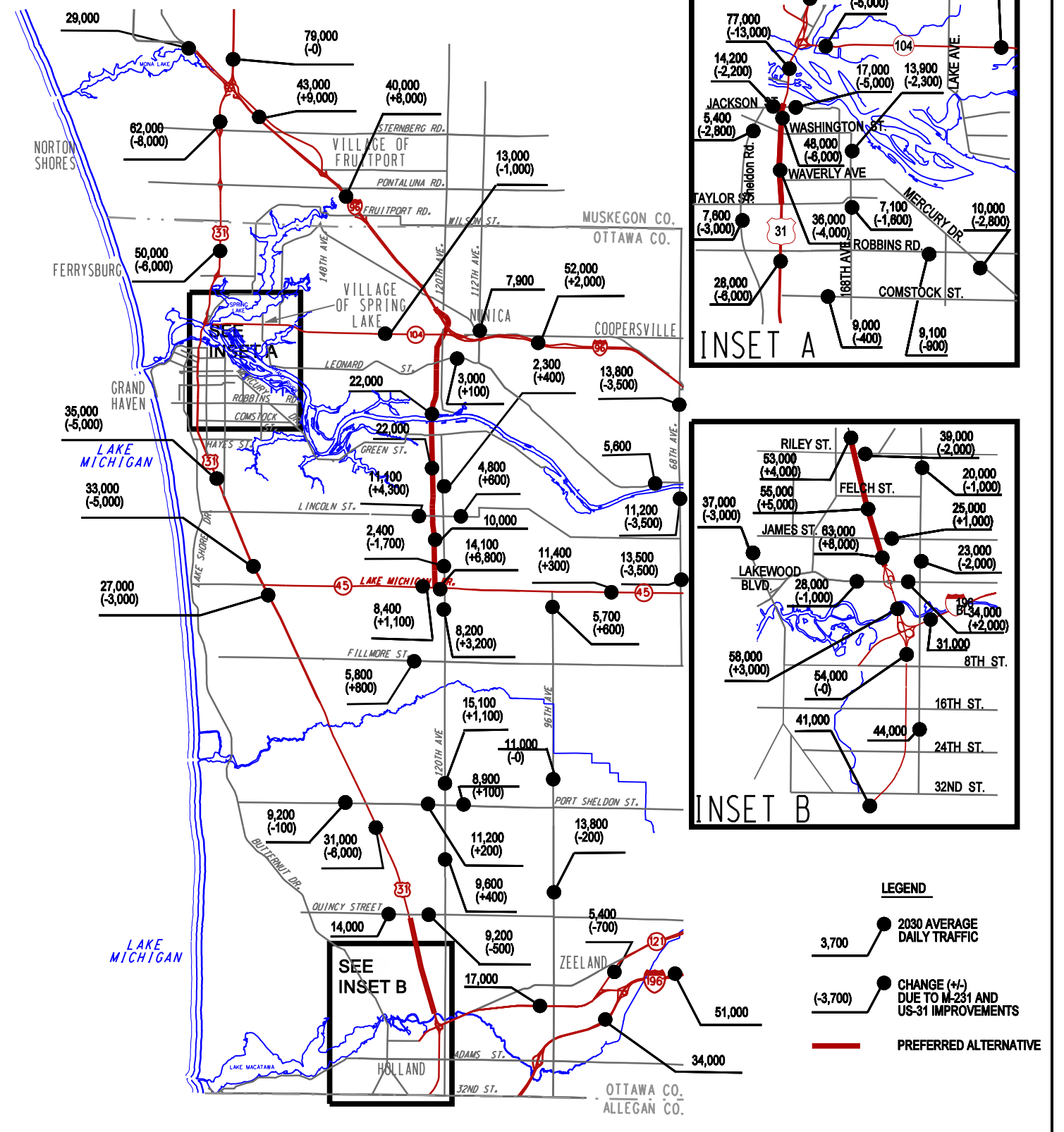
Crash rates for portions of US-31 (BL I-196 to James Street in Holland Township, and Robbins Road to Jackson Street in Grand Haven) are above the average crash rates for similar transportation facilities within the state. From 2002 through 2006 on US-31, thirty-seven percent (37%) of all crashes in the study area occurred in and near the City limits of Grand Haven.

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2006 AVERAGE DAILY TRAFFIC



2030 PREFERRED ALTERNATIVE AVERAGE DAILY TRAFFIC



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What Work Has Been Completed Since Publication of the DEIS?



Construction along US-31 in Holland

Since publication of the DEIS in 1998, MDOT completed several projects in the corridor study area that improved the condition and/or traffic operation of US-31. As a result, the majority of the corridor has eight to ten more years of remaining service life left in the pavement, according to MDOT's Pavement Management System.

MDOT completed maintenance work on the bascule bridge in 2006. These improvements will extend the service life of the bridge for up to 50 years. The work included rehabilitation of the electrical, mechanical, and structural systems. Painting and deck repairs occurred in 2007. Other improvements include: construction of a non-motorized path on the bridge, signal upgrades and intersection improvements.

Signal upgrades on US-31 in Holland as well as continued Transportation System Management (TSM) intersection improvements in the urbanized area of the MACC have been made since the DEIS was published. The TSM actions include operational improvements that will improve traffic flow, but not alleviate all congested conditions in the corridor.

Recommendations from the recently completed Intelligent Transportation Systems (ITS) Architecture Deployment Study will be initiated over the coming years. ITS initiatives are planned for US-31 in Grand Haven in 2009. Initial ITS deployment will occur in 2009 and will consist of one Dynamic Message Sign (DMS) and three Closed Circuit Television (CCTV) cameras. The DMS will be located on southbound US-31, approximately 1.5 miles north of the US-31 and I-96 interchange. The proposed DMS will allow MDOT to provide southbound motorists with advanced notification of traffic congestion on US-31 and I-96 as well as bascule bridge malfunctions. A DMS will be installed in the future just south of M-45 to notify NB US-31 traffic of congestion or bascule bridge malfunctions, to allow traffic to use the proposed M-231.

What Alternatives Were Considered?



Figure 5 – Practical Alternatives Evaluated after the DEIS

Alternatives Refined and Evaluated After the DEIS

MDOT carried forward five Practical Alternatives (in addition to the No-Action Alternative) for further refinement after the publication of the DEIS and the Public Hearing (see **Figure 5**). After the public hearing, Alternative F/J-1 emerged initially as the alternative that would best meet the project's Purpose and Need. Alternative F/J-1 included a new off alignment freeway between I-96 and I-196, and existing route improvements in Holland and Grand Haven.

As development of this FEIS continued, it became clear that funding would not be available to construct the entire F/J-1 Alternative at a cost of \$170 million (2014 dollars). It was determined that a new route south of M-45 (Lake Michigan Drive) was a longer term need, and was beyond the scope of this FEIS. MDOT began to evaluate conceptual practical alternatives from the DEIS that would address the critical traffic and access issues, reduce impacts identified by resource agencies, as well as address statewide financial issues. Therefore, the Preferred Alternative (F-1a) as presented in this FEIS, substantially meets the project Purpose and Need, and addresses local interests, by relieving congestion on existing US-31 and providing another crossing of the Grand River in Ottawa County.

Preferred Alternative

The following describes the Preferred Alternative (F-1a):

New Route

Construct a new route (M-231) west of 120th Avenue, between M-45 and the I-96/M-104 interchange area: including a new Grand River crossing. This route will include improvements to M-104 near the I-96 interchange and the I-96/M-104/112th Avenue interchange area, additional lanes will be added to M-104 in the vicinity of the new I-96/M-231 junction, new ramps will be added to the I-96/112th Avenue interchange, and a new Grand River crossing. In addition, there will be other stream and county drain crossings along M-231 including the Little Robinson Creek (Allen Pipple Drain), Stearns Creek, the North Beeline Drain, and the Parkhurst Drain (Black Creek Tributary).

M-231 will be constructed as a two-lane route. Property will be acquired to accommodate limited access right-of-way, with controlled access at intersections, to protect the corridor from development and to not preclude future expansion to a four-lane boulevard or for a non-motorized facility. Additional lanes on M-231 will likely

be needed, based on projected traffic levels, following the 20 year planning time-frame covered in this FEIS.

Existing US-31

Segments of US-31 in Grand Haven from south of the Franklin Street to north of Jackson Street, and segments in Holland from East Lakewood Boulevard north to the Quincy Street are included in the Preferred Alternative. Improvements include adding an additional lane in each direction and intersection modifications.

The Preferred Alternative (F-1a) is expected to impact 3.04 acres of wetland as compared to the 90 acres estimated in the DEIS for F-J1. The meetings with federal, state and local agencies resulted in alignment changes that significantly reduce the impacts to wetlands and reduce impacts to unique farmlands. A comprehensive discussion on why this Preferred Alternative meets the "Purpose and Need" is found in **Section 3**.

The costs for the improvements to US-31 and the new M-231 are estimated at \$170 million in 2014 dollars.

What Are the Environmental Effects of this Project and What Mitigation is Proposed?

Table 1 summarizes the environmental impacts for the Preferred Alternative. Direct impacts include the following.

Displacements

The Preferred Alternative will require 51 residential full displacements, 10 residential partial takes, 9 business full displacements, and 6 agriculture full displacements along the proposed new roadway. The majority of the full displacements are residential properties in Robinson Township. MDOT will make every attempt feasible to minimize and avoid displacements. However, if the purchase of a property is required, MDOT will follow all state and federal laws related to property acquisition. For further details, see **Section 4.1.3**.

Farmland

Farmland and residential displacements comprise the majority of the impacts from the project, as a portion of the Preferred Alternative is located along a new alignment through a rural portion of Ottawa County. There are 14.4 acres of prime farmland and 101.4 acres of generally classified farmland that are expected to be impacted by the Preferred Alternative. The Preferred Alternative will require 6 full agricultural displacements and 8 partial agricultural displacements. MDOT will make every attempt feasible to minimize and avoid displacements. However, if the purchase of a property is required, MDOT will follow all state and federal laws

Table-1 Summary of 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

related to property acquisition. For further details, see **Section 4.1.3.**

Community Facilities and Cohesion

The Preferred Alternative does not impact community facilities. Portions of the residential community in Robinson Township may be impacted by the proposed M-231. However, all local roads in Robinson Township except Johnson Street will remain open. The proposed M-231 will also provide a critical link for emergency services between Robinson and Crockery Townships.

Environmental Justice

The Preferred Alternative will not have a disproportionately high or adverse effect on minority and low-income populations group. Environmental Justice population groups will be impacted in the same manner as the general population. If such impacts are identified, every effort will be made to involve impacted groups in the project development process to mitigate these impacts.

Economics

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

Non-Motorized Facilities

The Preferred Alternative will not permanently impact any existing or planned non-motorized facilities within the study area, and includes the option to add a new non-motorized facility on the new Grand River Bridge.

Air Quality

There are no direct impacts to air quality from the Preferred Alternative. Regional air quality conformity was determined with the MPO LRTP amendment process. The area is designated as attainment/maintenance for ozone and PM 2.5.

Noise

Thirty-two receivers in thirteen NSAs will have noise levels equal to or greater than 66-dBA for the future year (2030) due to the Preferred Alternative. Thirty-three receivers in twenty-one NSAs experienced a substantial increase of 10-dBA or more for the future year (2030) due to the Preferred Alternative. 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 experience a substantial increase of 10-dBA or more. However, noise abatement measures at these twenty-one sites are not considered feasible under the current MDOT Noise Policy and therefore not warranted.

Groundwater

Groundwater impacts are associated with the purchase and relocation of residents and businesses along the proposed new route. Nine wells are projected to be displaced and will be properly abandoned in accordance with Michigan Department of Environmental Quality (MDEQ) regulations (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.



Wetland Mitigation Site in Robinson Township, Michigan

Wetlands

Refinements to the alignment of the Preferred Alternative have resulted in a significant reduction in wetland impacts (total wetland impacts are 3.04 acres) compared to F/J-1 (total wetland impacts were 90.0 acres) in the DEIS. MDOT has purchased property for the purpose of wetland mitigation, in accordance with the MDEQ regulations. The maximum required acreage of wetland mitigation was calculated for each watershed using MDEQ regulatory replacement ratios. Based on the mitigation to impact ratios, a total of 4.70 acres of mitigation will be needed. Any temporary wetland impacts related to construction will be restored.

Aquatic Issues

Impacts to fisheries and aquatic habitats will occur during construction of the new crossing of the Grand River. However, efforts to limit the type and timing of construction activities will minimize or avoid impacts.

The proposed new crossing of the Grand River has the potential to cause degradation in water quality due to increased runoff. However, extensive mitigation activities will be employed to reduce degradation during and after construction. Soil Erosion and Sedimentation Control (SESC) measures will be in place during construction. The bridge will be designed to span the floodplains adjacent to the river, and runoff will be discharged via enclosed drainage structures to detention basins.

Drainage and Hydrology

In addition to this major crossing, the Preferred Alternative crosses three waterways along the existing US-31 alignment and seven waterways along the proposed new alignment. While these waterways are less likely to contain sustainable, valuable fisheries, construction of the bridges or culverts will impact aquatic biota due to potential sedimentation during construction and modification of the streambed habitat. Bridges or culverts at these crossings will be sized to allow

sufficient space for fish passage and to minimize impacts to stream channels.

In order to avoid and minimize impacts to the Grand River and adjacent floodplain, the proposed bridge will span the entire floodplain. Two piers are proposed to be constructed within the river banks. The federal and state resource agencies will regulate these activities by the issuance of permits and other approval. Methods to minimize construction impacts such as the proper application of soil erosion and sedimentation control measures and restriction of construction activities during periods of above normal flow will also be undertaken.



Grand River Floodplain in Robinson Township

Floodplain

Since this study is of a north-south corridor and the Grand River flows east-west, avoidance is not possible. In addition, the width of the floodplain makes construction of a long single span structure without piers located in the floodplain impractical. At the proposed crossing site, The Grand River is about 580 feet wide and varies in depth up to 21 feet deep during normal flow. The 100-year floodplain varies from about 3,800 to 4,500 feet wide.

A hydraulic analysis was conducted to examine the upstream effect of the proposed bridge on the 100-year water surface elevation. The analysis used the FEMA HEC-RAS model, with the addition of four surveyed cross-sections near the proposed bridge. For the model, the bridge was assumed to be 3,998 feet long and 70 feet wide. When the bridge is added to the HEC-RAS model, the 100-year water surface elevation (WSEL) would increase by less than 0.01 feet. Piers were assumed to be seven feet wide. It was determined that for a 3,998-foot bridge, a maximum of 26 piers could be used while limiting the increase in backwater to less than 0.01 feet. This number of piers leaves room for the minimum required navigable channel clearance (160 feet). A calculated backwater increase of less than 0.01 feet is within the margin of error of this study's computational model. A final hydraulic study based on the actual construction plans will be required prior to the construction of the bridge. Final mitigation design plans will be developed in consultation with the appropriate agencies.

Threatened and Endangered Species

Based on site visits and coordination with the resource agencies, no state or federally threatened or endangered species are known to exist within the project area. Consequently, it is unlikely that any threatened or endangered species would be impacted by the Preferred Alternative.

Cultural Resources

The Preferred Alternative will not affect the Southside Historic District in the City of Grand Haven, which is the only National Register-eligible above-ground historic resource within the project area. Nor will the Preferred Alternative have any adverse effect on known archaeological resources.

Parks and Recreation

There are no impacts to parks or recreation facilities from the Preferred Alternative.

Potential Contaminated Sites

Sixteen known and/or potentially contaminated sites or hazardous waste generators were identified as being directly impacted by the Preferred Alternative. Prior to construction of the Preferred Alternative, a Project Area Contamination Survey (PACS), or Phase I Environmental Site Assessment, will be conducted before a contaminated property is acquired, unless previous assessments are adequate to investigate parcels of property potentially affected by the project for the presence of environmental contamination and to determine the need for further investigation and mitigation measures. Should any of these sites be disturbed, MDOT must follow all appropriate and applicable state and federal regulations relating to clean-up standards and proper disposal of contaminated materials.

Utilities

Utilities that are adjacent or cross the Preferred Alternative may be impacted. Any required temporary or permanent relocations will be identified and mitigated during the project design phase. 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. MDOT and its contractors will coordinate with the utilities and affected communities prior to beginning construction or implementation of new phases.

Aesthetics and Visual Character

The improvements on existing US-31 will not impact on the visual quality of the landscape. Existing US-31 is an urban roadway in both Holland Township and Grand Haven, and will remain urban following the proposed improvements.

The proposed M-231 will negatively affect the visual quality of the agricultural and wooded landscape surrounding it, as well as the view of the Grand River.

Mitigation for visual quality may vary based on the location. Mitigation for the existing alignment of the project is likely to differ from mitigation for the proposed

alignment. Visual quality and aesthetics are integral components of the planning process and conceptual design.

Indirect and Cumulative Impacts

The Preferred Alternative will have little overall cumulative or indirect impacts, but may influence the location of some of the cumulative impacts. For example, concentrated areas of development and traffic may occur along the proposed M-231 route at intersection locations.

How Does the Preferred Alternative Meet the Project's Purpose and Need?

This alternative satisfies the "Purpose and Need" of the project better than the other Practical Alternatives presented in the DEIS within the funding expected to be available. The following summarizes why the Preferred Alternative satisfies the broad categories of "Purpose and Need".

New Grand River Bridge

Construction of a new bridge over the Grand River provides improved regional access. Additional access for emergency services between Crockery and Robinson Townships will be available and help improve response time. The new bridge also provides an alternative to the existing bascule bridge in the City of Grand Haven, and will reduce existing congestion and travel time.

Reduce Traffic Congestion

The Preferred Alternative includes adding a lane in each direction on key segments of existing US-31 in the Holland Township and the City of Grand Haven. The new M-231 trunkline connection will relieve congestion, and provide improved regional access between M-45 and I-96 and over the Grand River.

Improve Safety

The Preferred Alternative includes a new state trunkline connection (proposed M-231) to provide an alternate regional and long-distance truck route from the existing boulevard, through the City of Grand Haven while addressing future capacity needs. The two-lane segment between M-45 and I-96 will be a limited access roadway with controlled access at the intersections with local roads. Limiting the access will not allow driveways, which reduces the potential for crashes caused by vehicles turning into or out of driveways into traffic. The Preferred Alternative also includes adding a third through lane in each direction and intersection improvements for existing US-31 in Holland Township and the City of Grand Haven.



Traffic in Grand Haven, Michigan

Access

The Preferred Alternative includes a new route (M-231) that parallels 120th Avenue and provides a new crossing of the Grand River. The new route serves area residents and businesses, provides another north-south trunkline route that helps to reduce congestion on existing US-31, and provides an alternate crossing 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.

What Issues Were Raised by the Public?

The initial public response to the alternatives presented at the Public Hearing for the DEIS centered on issues related to environmental impacts, development impacts, an additional Grand River crossing and need for additional ROW in the cities of Holland and Grand Haven. While there was agreement about the need for a new Grand River crossing, there was significant opposition to the proposed widening of US-31 outside the existing right-of-way in the cities of Holland and Grand Haven. Further, the public as well as public agencies expressed concern over the impacts to farmlands, wetlands and the potential for the project to entice additional development.

How Were the Issues Addressed?

The first step taken by MDOT after releasing the DEIS was to begin examining ways to mitigate impacts and respond to local concerns about the project, and address the concerns of resource agencies. Simultaneously, MDOT began meeting with township officials to make the alignment more compatible with local land uses.

One of the results of meeting with local officials was a reduction of impacts. Measures taken included the following: widening existing US-31 along the median side of the roadway in the Cities of Holland and Grand Haven. The alignment of F/J-1 was refined to the Preferred Alternative F-1a to minimize farmland impacts and other environmental impacts. Similarly, wetland impacts were also reduced through minor alignment changes.

MDOT contracted with MSU to complete a land use study to be used to assess indirect and cumulative impacts. The study concluded that the economic activities in the Grand Rapids, Holland, and Grand Haven urbanized areas have a greater influence on the development of open space than a proposed relocation of US-31.



Field in Crockery Township

MDOT met with concerned citizens and public officials extensively since the publication of the DEIS. This initial input formed the basis for preliminary changes, which were then re-presented for clarification, concurrence and ultimately support for the Preferred Alternative (F-1a). **Chapter 5** contains a comprehensive list of the agencies that met with MDOT and the dates that these meetings were held.

MDOT staff met with Ottawa County officials in June 2005, and then subsequently held over 15 meetings with over 100 people in affected local agencies in 2005 and 2006. A public meeting was also held in November 2006 with approximately 350 people in attendance. Individual meetings were also held with the MPOs to review local and state priorities and needs. The Preferred Alternative is included in each MPO's LRTP, as a result of these efforts. Design engineering was also included in the MPO TIP's.

How Were Other Agencies Involved?

In addition to periodic formal meetings convened to provide updates to the cooperating agencies, MDOT frequently met informally with representatives from the following agencies: Michigan Department of Environmental Quality, Michigan State Historic Preservation Office, Michigan Department of Natural Resources, Federal Highway Administration, the United States Fish and Wildlife Service, the United States Army Corp of Engineers, and United States Environmental Protection Agency.

Issue-specific meetings were held with US Army Corp of Engineers, and US Coast Guard to resolve issues related to the height of the bridge over the Grand River for the Preferred Alternative.

What Are the Next Steps?

This FEIS will be made available for public review and comment. A Notice of Availability will be published in the Federal Register. Following the public comment period, the Record of Decision (ROD) will be issued by the FHWA, which is FHWA's formal acceptance of this FEIS. This completes the EIS process and allows for subsequent processes such as design, ROW acquisition and construction to proceed.

In the future additional lanes on M-231 will likely be needed, based on projected traffic levels, following the 20 year planning time-frame covered in this FEIS.

2.0 PURPOSE AND NEED

This section demonstrates the “Purpose and Need” for the proposed action and summarizes the project history. The project’s purpose, as included in the Draft Environmental Impact Statement (DEIS), was “to reduce traffic congestion and improve safety for the traveling public”. This Final Environmental Impact Statement (FEIS) includes additional information that enhances and clarifies the Purpose and Need Statement in the DEIS, and reflects public and agency comments since the release of the DEIS.

2.1 PURPOSE OF THE PROPOSED ACTION

The purpose of the proposed action is to develop a financially feasible transportation improvement to reduce traffic congestion and delay, improve safety, and increase access to improve the movement of people and goods in the corridor study area.

Some specific objectives of the “Purpose” of the proposed project include the following:

- Improve safety,
- Enhance Grand River crossing efficiency,
- Increase transportation system capacity,
- Reduce vehicular delay,
- Reduce congestion,
- Meet access needs of regional growth and development, and
- Improve safety, emergency service access, incident management and traffic circulation in the study area.

2.1.1 Project Background

US-31, a principal arterial on the National Highway System, parallels Michigan’s west coast. It begins in Michigan along the state border line, near South Bend, Indiana, and stretches northerly nearly 390 miles to its northern terminus near the Mackinac Bridge. The arterial provides access to numerous recreational attractions along the Lake Michigan coastline such as over 15 state parks, public and private harbors, and numerous other tourist-oriented businesses and recreational opportunities. US-31 is also an important commercial and agricultural corridor, linking three urbanized areas. The Michigan Department of Transportation (MDOT) recently published the MI Transportation Plan, which is the state’s 2030 long range transportation plan (LRTP). US-31 is recognized as a statewide Corridor of Highest Significance (COHS) in this plan. This proposed project is included in the plan. It is considered a critical link in the regional (Allegan, Ottawa, and Muskegon Counties’) economy and development plans (See **Figure 2.1-1 and 2.1-2**). US-131, another north-south COHS for the state, is located approximately 30 miles east of US-31. I-96, I-196, M-45 and M-104 also crosses at, or terminates at, US-31 in or near the study area.

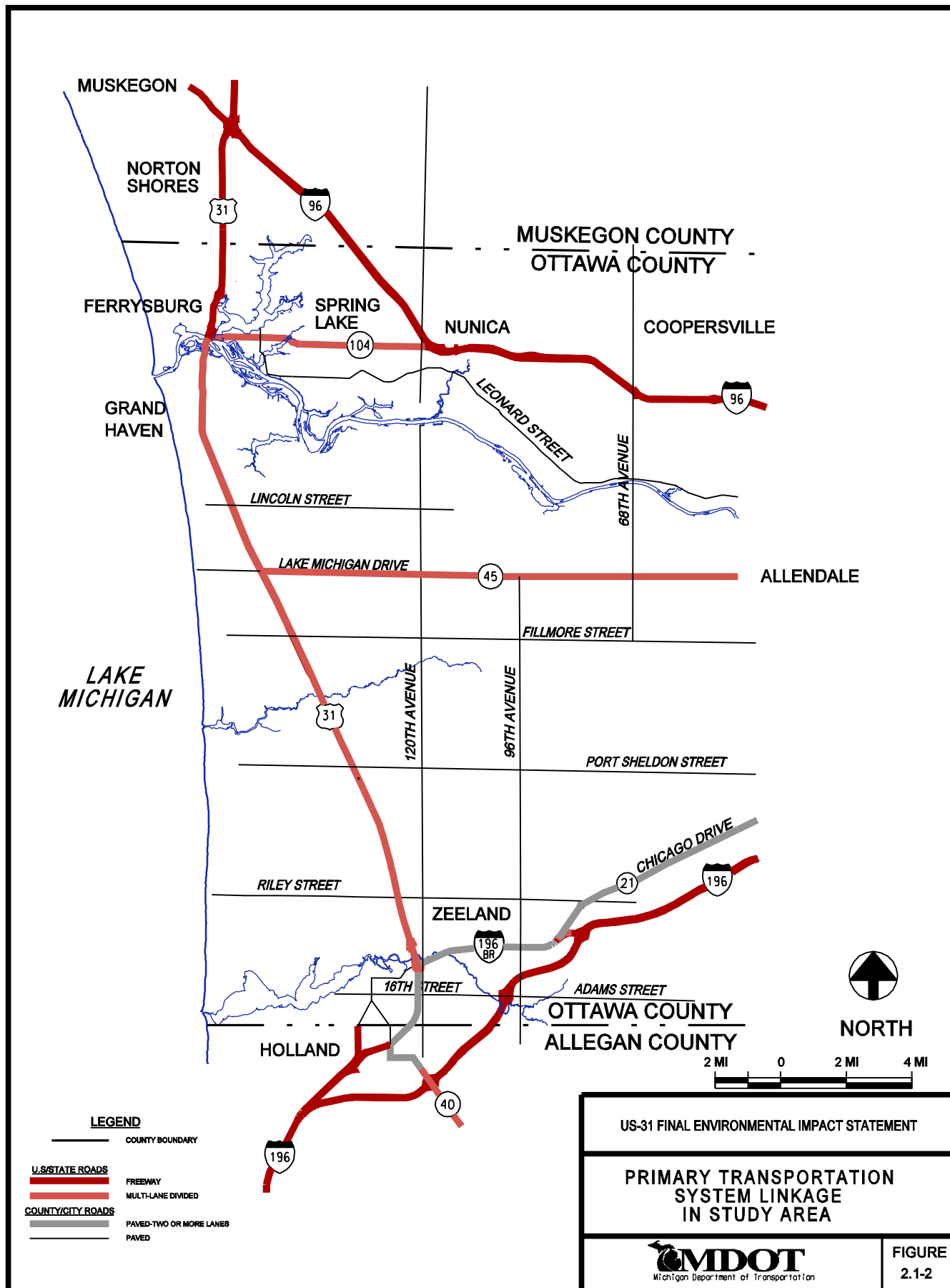
As of 2006 there were over 257,000 residents in Ottawa County, ranking it as the 8th largest county in the state in population. There are 565 square miles of land in Ottawa County comprised of 17 townships, six cities and one village. Thirty-eight (38%) percent of the county’s land mass is farmland. Eastern Ottawa County is also within the Grand Rapids urbanized area, the second largest in Michigan, which is located about 20 miles from US-31. This project is located within the Holland and Muskegon/Grand Haven urbanized areas.

US-31 Study Area

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 US-31 Preferred Alternative corridor study area is located in the western half Ottawa County, which is along Michigan’s western boundary. Ottawa County is on the Lake Michigan shoreline, and it is comprised of 17 townships, six cities and one village. Crockery Township, Village of Spring Lake, Spring Lake Township, the City of Ferrysburg, the City Grand Haven, Grand Haven Township, Robinson Township, Olive Township, Port Sheldon Township, Park Township, Holland Township, and the City of Holland are all within the corridor study area. Based on discussions with stakeholders and data analysis through the environment review process, the transportation issues identified in the Purpose and Need were determined to be more focused within western Ottawa County.

Project History

In the 1950s and early 1960s, US-31 was widened from two lanes to four lanes and the present bascule bridge was constructed over the Grand River between Grand Haven and Ferrysburg. During this time, US-31 in the Holland area was relocated from River Avenue and 136th Avenue east to its current



location. In the Grand Haven area, US-31 was relocated from its previous route along 168th Avenue. US-31 has remained essentially unchanged since that time.

In response to local concerns about traffic volumes and access, MDOT prepared a preliminary assessment of conditions on US-31 in Ottawa County in 1990. The results contained in the report entitled *"A Feasibility Study Report for the Improvement of US-31 from the City of Holland to the City of Grand Haven through Ottawa County, Engineering Report #1932"* recommended development of a detailed study of on-alignment and off-alignment alternatives.

Based on the findings of the 1990 Engineering Report, MDOT began developing the DEIS in 1993. The DEIS was completed, published and a Public Hearing was held in 1998. As a result of issues raised during the DEIS comment period some minor modifications were made to clarify to the project's Purpose and Need. After releasing the DEIS and conducting the Public Hearing, MDOT continued working closely with local units of government, resource agencies, the public, and other interested parties to develop a Preferred Alternative that addressed the Purpose and Need. Alternative development is discussed further in Section 3.

2.2 NEED FOR THE PROPOSED ACTION

There is a need to reduce existing and future traffic congestion within the US-31 corridor in order to provide more efficient movement of people and goods. The bascule bridge openings on existing US-31 in the City of Grand Haven further contribute to congested traffic conditions and delay.

Efficient crossing of the Grand River is needed to provide access options for area residents and businesses, and for the growing population and commercial areas in Ottawa County. The next nearest crossing to the existing US-31 crossing of the Grand River is a two-lane bridge on 68th Avenue, which is a local road, located approximately 20 road miles east of the US-31 bridge. Bridge closures result in a 40 road mile detour for the public (20 road miles each way). As development continues to occur in the area, the ability to provide timely access to emergency services becomes more critical. Travel times and fuel consumption are also impacted by congestion, distances, and travel time to the limited existing river crossings.

Another need is to enhance safety by reducing the potential for crashes by providing additional capacity, geometric, and operational improvements on existing US-31 in the Holland area and the City of Grand Haven. The crash rates for portions of US-31 (i.e. City of Holland, Holland Township and Grand Haven) are already above the average crash rates for similar facilities in the state. As traffic volumes increase, the potential for crashes also increases.

Some specific "Needs" identified during the process include the following:

- Roadway capacity deficiencies and congestion in the US-31 corridor,
- Land use/growth within the study area,
- Lack of system linkages between state highways and local arterials,
- Less than desirable levels of service at some intersections,
- Less than desirable crash rates exceeding statewide averages at some locations, and;
- Delay and traffic interruptions caused by unscheduled openings or malfunctions of the bascule bridge in the City of Grand Haven.

Additional local needs identified in subsequent meetings with government units and as a result of public comments from the DEIS emphasized the need for the following:

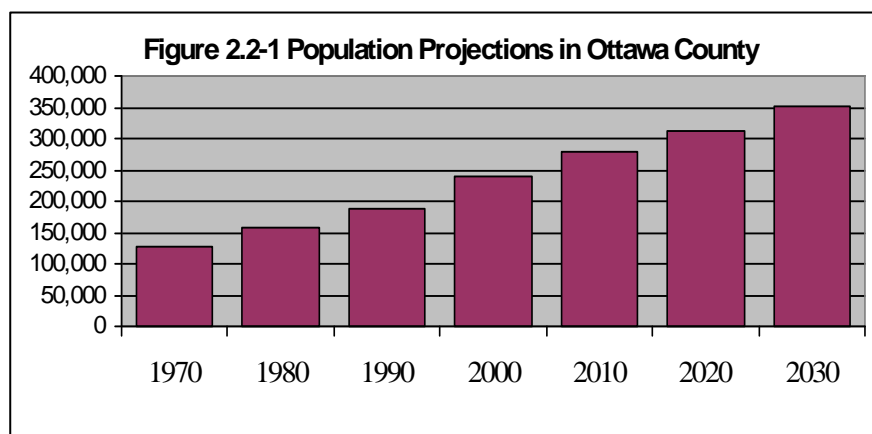
- A new Grand River crossing,
- Improved emergency access,
- North-south road continuity in Ottawa County,
- Maintain local road access to and through US-31, and;
- Relief of traffic growth on 68th Avenue and the existing Grand River crossing.

In addition, now that the entire study area is within one of two Metropolitan Planning Organizations (MPO) areas, the need to demonstrate financial feasibility has increased significance in the selection of a Preferred Alternative

2.2.1 Population Growth and Land Use Changes in the Area

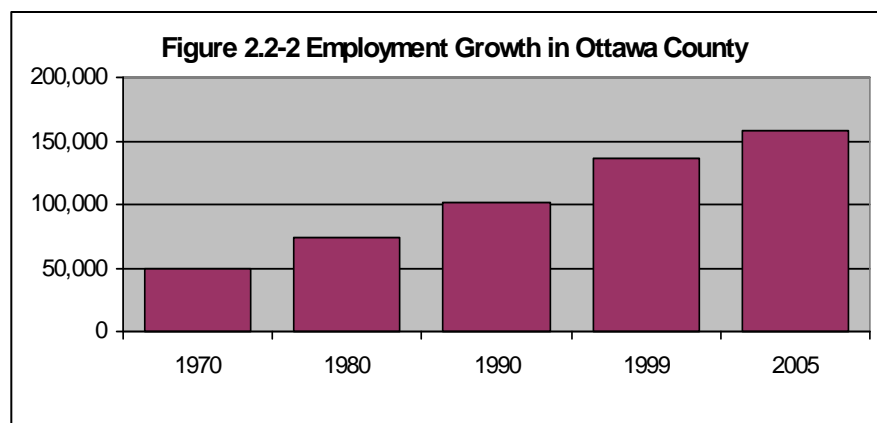
Population and Employment Growth

Ottawa County has experienced rapid population and employment growth since US-31 was first constructed in the 1960's. The population increased from 128,181 to 239,440 (+87 percent) from 1970 to 2000. In 2006, over 257,000 people resided in the county. The population is projected to increase by 112,482 people (+47 percent) from 2000 to 2030 (see **Figure 2.2-1**). This population growth is expected to continue independent of any significant expansion of the existing road system.



Sources: U.S. Census Bureau, University of Michigan.

Total employment in Ottawa County in 2005 was 158,559, according to the Michigan Department of Career Development (not including government employees). Employment in Ottawa County has outpaced the state population growth trends and has increased from 101,225 to 158,559 from 1990 to 2005 (+57 percent) (**Figure 2.2-2**).



Source: Michigan Department of Career Development

While the US-31 study area is still relatively rural and perceived as agricultural, less than one percent of the labor force is currently employed by farming operations. Approximately seventy-five percent (75%) of employment in Ottawa County is in manufacturing, services, and retail or wholesale trade. This results in long-distance commuting patterns between the residential developments, manufacturing and retail

centers on the northern and southern ends of the US-31 Corridor, as well as the City of Grand Rapids in the east.

US-31 Land Use Study

The US-31 Land Use Study was prepared by Michigan State University (MSU), in response to local and resource agency concerns over the potential for increased development. The primary purpose of the US-31 Land Use Study was to provide a mechanism for quantifying the indirect and cumulative land use impacts arising from the alternatives carried forward in this FEIS. The study found that due to its proximity, the Grand Rapids urbanized area is the dominant force in determining land use changes in the US-31 study area, and will continue to influence growth and development for the next two decades.

The analysis in the study focused on Ottawa County land use changes. Ottawa County had an increase of approximately 9,900 acres in built land between 1988 and 2001, according to data collected through Landsat satellite imagery. This amounted to an annual conversion of approximately 300 acres per year in Ottawa County over the 13 years observed. The overall increase in built land changed from 55,500 acres in 1988 to 65,400 acres in 2001, an approximate 18 percent (18%) change in land use.

According to the US-31 Land Use Study, the “growth triangle” (the area between Grand Rapids, Holland, and Muskegon/Grand Haven) is a critical area for western Michigan and will become more densely populated with or without improvements to US-31 or any other major road improvements. The positive economic conditions within the “growth triangle” will make the area attractive for residential and commercial development. The study indicated only minor changes in the type and location of developed land as a result of the US-31 alternatives studied.

2.2.2 Existing Traffic and Level of Service (LOS)

A review of existing and future traffic volumes and patterns confirms the need for improvements along existing US-31 in Holland Township and in Grand Haven.

Conventional analysis of signalized intersections involves the determination of a “Level of Service” (LOS). LOS range from “A” to “F”, similar to an alphabetic grading system, with each level describing a different set of operational characteristics for the intersection. LOS “A” describes intersection performance with minimal delay, while LOS “F” describes intersections with extensive delays and long traffic backups. LOS “C” and “D” are generally considered acceptable for peak-hour traffic operations. If LOS D cannot be achieved, the objective is to not further degrade LOS.

The analysis of signalized intersections for this study was conducted utilizing the operational analysis procedure as outlined in the *2000 Highway Capacity Manual (HCM)*. The HCM is nationally recognized as the standard for highway and intersection capacity analysis. HCM methodology defines LOS in terms of control delay per vehicle. Control delay includes all delay caused by traffic signal control, including deceleration delay, time spent waiting for the traffic signal to turn green, and acceleration delay. Control delay is a measure of driver and/or passenger discomfort, frustration, fuel consumption and lost travel time.

The existing peak travel hours in Holland and Grand Haven along US-31 occur between 6:30 and 8:30 AM and between 3:30 and 6:30 PM. As depicted in **Table 2.2-1**, the signalized intersections along US-31 currently operate anywhere from LOS “B” (little delay and congestion) to LOS “F” (intersection failure with delays greater than 80 seconds per vehicle) during peak hours in both Holland and Grand Haven. LOS values worsened during the summer months due to increased tourism traffic.

Table 2.2-1			
Existing 2006 Peak-Hour Intersection Levels of Service			
Location on US-31		AM-Peak Hour	PM-Peak Hour
Holland Area	32 nd Street	D	D
	24 th Street	B	B
	16 th Street	C	C
	8 th Street	B	C
	James Street	D	D
	Felch Street	B	B
	Riley Street (median cross-over)	D	E
	Quincy Street	B	C
	Port Sheldon Street	B	B
Grand Haven Area	M-45	B	B
	Ferris Street	C	B
	Hayes Street	C	B
	Comstock Street	B	C
	Robbins Road	B	C
	Taylor Street	B	C
	Washington Street	B	C
	Jackson Street	C	F

Note: Intersections with LOS "E" or "F" are shown in **bold** and shaded.

As shown in **Table 2.2-1**, peak-hour LOS values are poor (LOS "E" or LOS "F") during the afternoon peak hour at the directional median crossover south of James Street and at Riley Street in Holland Township. Similarly, the existing afternoon peak-hour LOS at Jackson Street in Grand Haven is LOS "F". Congestion at these intersections causes back-ups along US-31 throughout Holland Township and the City of Grand Haven. The peak-hour volumes associated with the LOS depicted in **Table 2.2-1** were collected during spring or fall months, not during the peak summer months. Peak-hour LOS values are generally worse than those depicted in **Table 2.2-1** during summer months due to increased tourism traffic.

2.2.3 Future Traffic and Level of Service (LOS)

Future traffic volumes and LOS were projected to the design year 2030 for all intersections along US-31 in the study area for the Preferred Alternative as well as for the No-Action Alternative (**Table 2.2-2**). Computer models from the Macatawa Area Coordinating Council (MACC) area (which incorporates the Holland area) and from the West Michigan Shoreline Regional Development Commission (WMSRDC) area (which incorporates Grand Haven and connecting township areas within the Muskegon MPO) were used to generate traffic projections. These models incorporate data for future land-use and socioeconomic conditions. The MDOT Statewide model was used to provide data for areas not covered by the MPO models.

The No-Action Alternative assumes that no capacity improvements will be made along US-31 other than typical maintenance improvements through 2030. The year 2030 was selected as the design year, since projects constructed with federal funds must address traffic needs for at least 20 years into the future. As depicted in **Table 2.2-2**, if no capacity improvements are made along US-31, severe levels of congestion will occur throughout Holland Township and Grand Haven as intersections along US-31 become congested with traffic.

A comparison of existing peak-hour traffic conditions with traffic conditions for the No-Action Alternative is depicted in **Figures 2.2-3** and **2.2-4** for the morning and afternoon peak hours, respectively. A review of these figures reveals that peak-hour traffic operations are anticipated to deteriorate without improvements.

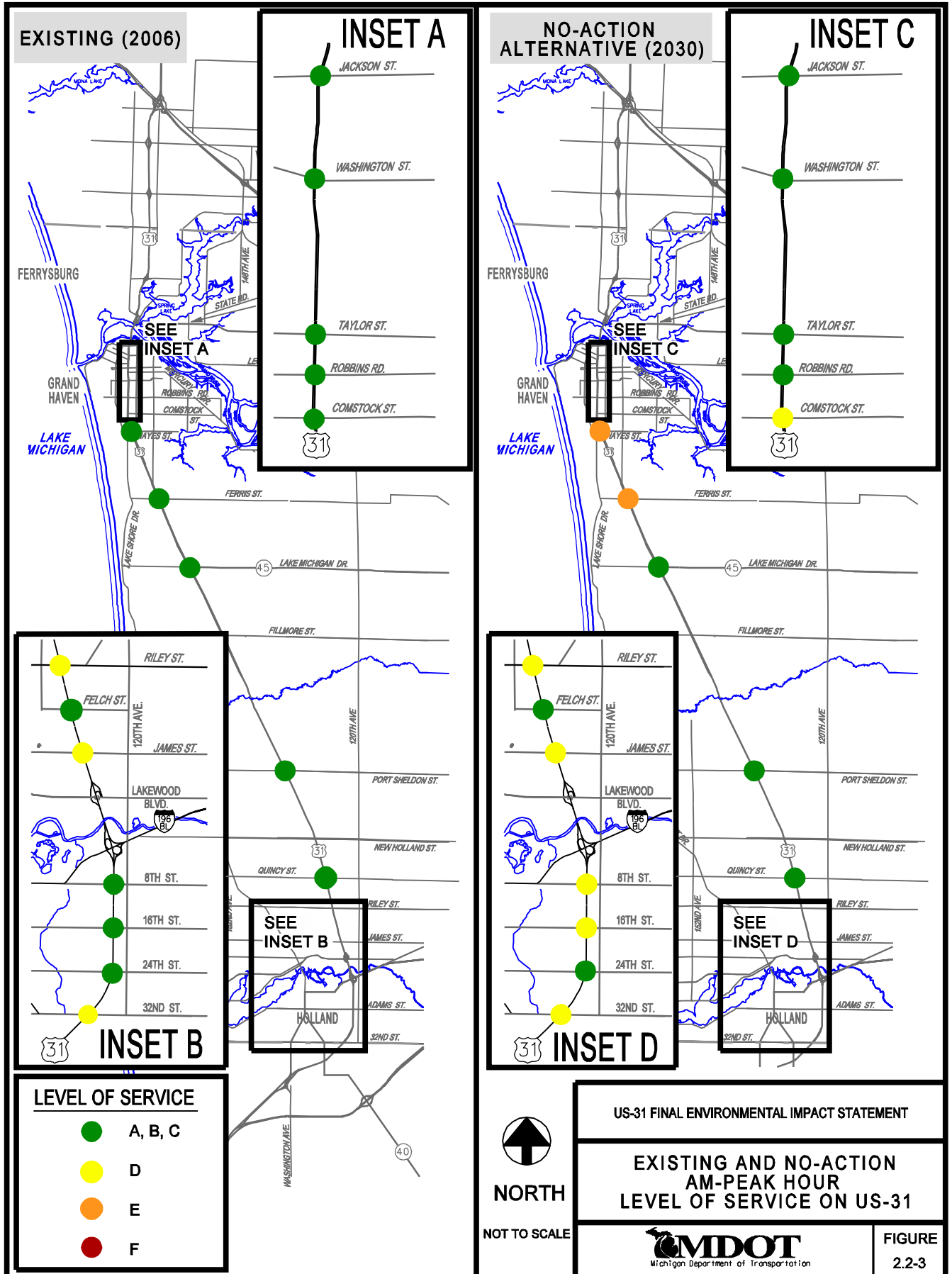


Table 2.2-2 Existing (2006) and Design Year (2030) No-Action Alternative Peak-Hour Intersection Levels-of-Service					
Location on US-31		AM Peak-Hour		PM Peak-Hour	
		Existing (2006)	Design Year (2030) No-Action	Existing (2006)	Design Year (2030) No-Action
Holland Area	32 nd Street	D	D	D	D
	24 th Street	B	B	B	B
	16 th Street	C	D	C	D
	8 th Street	B	D	C	D
	James Street	D	D	D	F
	Felch Street	B	C	B	C
	Riley Street	D	D	E	F
	Quincy Street	B	C	C	D
Grand Haven Area	Port Sheldon St	B	B	B	B
	M-45	B	C	B	B
	Ferris Street	C	E	B	D
	Hayes Street	C	E	B	D
	Comstock St	B	D	C	C
	Robbins Road	B	C	C	E
	Taylor Avenue	B	C	C	D
	Washington Ave	B	C	C	D
	Jackson Street	C	C	F	F

Note: Intersections with LOS "E" or "F" are shown in **bold** and shaded.

2.2.4 Safety

Improving safety along US-31 is a clear need and is consistent with statewide goals. Crash rates for portions of US-31 in Holland and Grand Haven are above the average crash rates for similar transportation facilities within the state. The majority of crashes occurred in the more urbanized areas where traffic volumes are the highest. From 2002 through 2006 on US-31, twenty-five percent (25%) of all crashes in the study area occurred within the city limits of Grand Haven, twenty-three percent (23%) in Holland Township (8th Avenue to New Holland Street), and thirteen percent (13%) in the City of Holland.

Between 2002 and 2006, 3,550 crashes occurred on US-31 between 32nd Street in Holland and M-104 in Ferrysburg. This number includes 799 crashes causing 1,264 injuries and 10 fatalities. **Table 2.2-3** presents an overview of the total number of crashes from 2002 to 2006 along US-31 between 32nd Street and M-104. Also shown are the statewide average crash rates for each segment analyzed. The five-year crash rates indicated in bold are rates that exceed the statewide average.

Crash data for US-31 shows that the crash rates in two urban segments of existing US-31 are higher than the average for similar facilities in the state. The data in **Table 2.2-3** shows that the US-31 corridor has higher-than-average crash rates from BL I-196 to James Streets in Holland and Robbins Road to Jackson Street in Grand Haven when compared to statewide averages. Congestion and high commercial traffic (as much as 8 percent of volume) are two factors contributing to the higher-than-average crash rates in the urban segments of US-31.

Table 2.2-3 US-31 Crash Analysis (2002-2006)					
US-31 Segment	Number of Crashes	Number of Injury Crashes	Number of Fatalities	5 –Year Crash Rate (A)	Average Crash Rate Statewide(1999)
<i>Holland Area</i>					
32 nd to BL I-196	470	122	1	274	449 (B)
BL I-196 to James	374	85	1	517	449
James to Quincy	408	129	3	339	449
<i>Rural Ottawa County</i>					
Quincy to Port Sheldon	189	49	1	137	259 (C)
Port Sheldon to M-45	354	76	2	129	259
M-45 to Hayes	428	99	1	205	259
Hayes to Robbins	247	38	0	398	449
<i>Grand Haven Area</i>					
Robbins to Jackson	590	129	1	560	449
Jackson to M-104	490	72	0	534	595 (D)
TOTAL	3,550	799	10		
Percent of Crashes	100.0%	22.5%	0.3%		

(A) - per 100 million vehicle-miles traveled

(B) - MDOT Statewide (4-lane divided, free-access, urban highway) 1999

(C) - MDOT Statewide (4-lane divided, free-access, rural highway) 1999

(D) - MDOT Statewide (6-lane divided, free-access, urban highway) 1999

Note: Crash rates greater than the statewide average crash rate are shown in **bold** and shaded.

Source: MDOT

The average number of crashes per year along US-31 within the study area decreased by nine percent (9%) (769 to 711 crashes per year) overall between the two most recent five-year time periods (1995-1999) and (2002-2006). Two segments, however, experienced an increase of crashes greater than 30 percent. The largest increase in crashes was in the segment on US-31 between James Street and Quincy Street, which went from an average of 59 crashes per year to an average of 82 crashes per year, including three (3) fatalities. A total of forty-six percent (46%) of the 82 crashes were rear-end collisions, while thirty percent (30%) of the 82 crashes were angle collisions. Angle collisions along a high-speed expressway like US-31 often result in injuries. **Table 2.2-4** compares the average number of crashes per year between the years 1995–1999 and 2002-2006.

Table 2.2-4 Average Annual Crashes Per Year			
US-31 Segment	Crashes/Year '95-'99	Crashes/Year '02-'06	Percent Change
32 nd to BL I-196	112	94	-16%
BL I-196 to James	95	75	-21%
James to Quincy	59	82	+39%
Quincy to Port Sheldon	39	38	-3%
Port Sheldon to M-45	60	71	+18%
M-45 to Hayes	64	86	+34%
Hayes to M-104	340	265	-22%
Total Crashes/Year	769	711	-9%

Source: MDOT

MDOT is actively addressing safety along US-31. Many intersection safety improvements such as construction of indirect left-turns, elimination of bi-directional median crossovers, and improved signal timings, have been implemented since the DEIS was issued. While these safety improvements provide incremental benefits, a long term and comprehensive solution is needed to improve safety and reduce congestion along US-31.

2.2.5 Increasing Access

Access across the Grand River, which bisects Ottawa County, is limited to only three crossing locations within the county compared to twenty-one crossings in Kent County. This limited north-south access causes longer and more circuitous trips, and delays at the existing crossing in Grand Haven. These travel delays, congested existing river crossing routes and current circuitous routing also impact fuel consumption and air quality in the study area.

A major contributor to traffic and access issues along the corridor in the study area is the six-lane US-31 bascule bridge over the Grand River that connects the cities of Grand Haven and Ferrysburg and the Village of Spring Lake (**Figure 2.2-5**). The bridge is two miles east of Lake Michigan and spans a heavy recreational boat travel corridor between marinas located on the Grand River channel and Lake Michigan.



Figure 2.2-5: Existing US-31 bascule bridge

The bascule bridge opens to allow boats to pass between March 15 and December 15 on the hour from 6:30 a.m. to 8:30 p.m. every day, except during the peak travel times on US-31. The bridge may also open on demand at any time for eligible commercial vessels including barges, Coast Guard vessels, and charter boats. Recurring instances of mechanical and electrical failures, routine maintenance, and openings for boat traffic cause the bascule bridge to open and stop traffic unexpectedly, sometimes for hours at a time.

Increasing instances of mechanical and electrical failures, causing the bridge to open/close improperly in the mid-1990's, led to rehabilitation of the structure in 1997 and 1998 by MDOT. Since then, the number of malfunctions has decreased, but has not been eliminated. MDOT completed additional maintenance work on the bascule bridge, and non-motorized improvements in 2006. These improvements extended the service life of the bridge up to 50 years. The work included rehabilitation of the electrical, mechanical, and structural systems. Painting and deck repairs occurred in 2007. However, frequent bridge openings will continue to be an issue, especially during the peak summer travel (roadway and water) months.

Bridge operations and closures can also pose potential concerns for Emergency Medical Services (EMS) access, travel delays, and can negatively impact the adjacent land uses and tourism traffic. Bridge closures, whether planned or unplanned, initiate vehicular congestion within the entire tri-city (Grand Haven, Ferrysburg and Village of Spring Lake) and surrounding areas. The current incident management plan detours traffic east via M-104/I-96 and US-31/M-45 to the 68th Avenue Grand River bridge in Eastmanville; a detour route of approximately 40 road miles (20 road miles each direction). The 68th Avenue Bridge is a two-lane structure without sidewalks or a non-motorized path. The bridge directly connects Allendale, home of Grand Valley State University (GVSU), and Coopersville. 68th Avenue is a two-lane County Primary under the jurisdiction of the Ottawa County Road Commission (OCRC) and runs north-south in Ottawa County. It also provides a connection between I-96 and M-45. The long detour results in issues of public mobility, EMS access and safety, particularly during the summer tourist season, as well as commercial vehicle delays.

2.2.6 Conclusion

The travel demand is exceeding the capacity of the existing US-31 system due to a combination of shifting land use patterns, growth in jobs and households, and increasing travel. This has led to increased traffic congestion, travel delays, and crashes along the existing US-31 from Holland to Grand Haven. The increase in traffic volumes has created a growing trend of traffic backups and serious crashes. As growth in the area continues, the congestion, delays, and accidents would be expected to worsen. If no action is taken to decrease demand or improve capacity and operational characteristics along US-31, unacceptable traffic delays are projected to occur at many intersections. In order for US-31

to reduce congestion, improve safety and provide an efficient means of local and regional travel, capacity must be increased or demand decreased in the US-31 study area, particularly at the Grand River.

3.0 ALTERNATIVES CONSIDERED

The purpose of this section is to describe the alternative evaluation and selection process that occurred after publication of the Draft Environmental Impact Statement (DEIS). The DEIS did not include a Preferred Alternative. This chapter also explains the reasons for not selecting various alternatives and for selecting the Preferred Alternative, as well as how the Preferred Alternative was developed. The Chapter concludes with a summary of how the Preferred Alternative (F-1a) meets the project's Purpose and Need.

3.1 ALTERNATIVES DEVELOPMENT

Twenty-nine Illustrative Alternatives were considered throughout the development of the DEIS. After analysis and comparison to the project's purpose and need, eighteen were eliminated. Eleven Practical Alternatives, including the No-Action Alternative, were presented at the DEIS Public Hearing in 1998. Following the Public Hearing, and after additional evaluation based on comments from the DEIS process, six of the Practical Alternatives were eliminated from further consideration due to their inability to address the project's Purpose and Need.

3.1.1 Practical Alternatives Eliminated after the DEIS

Detailed descriptions of the Practical Alternatives eliminated after the DEIS are included below and are referenced in **Figure 3.1-1**.

3.1.1.1 2005 Transportation System Management (TSM) Alternative

The TSM Alternative is an interim step that provides for short-term, low-cost improvements to existing US-31 to increase capacity and/or safety in spot locations. The 2005 TSM Alternative described in the DEIS included improvements such as:

- New or lengthened right-and left-turn bays where right-of-way (ROW) permitted.
- Modifications to traffic signal timing and progression.
- Removal of on-street parking
- Construction of park & ride lots

While these types of improvements reduce traffic congestion and improve safety, the positive impacts cannot be sustained over the planning period, and therefore will not meet the project's purpose and need as a stand-alone alternative. In fact, all of the specific improvements identified in the 2005 TSM Alternative have already been implemented as independent projects.

3.1.1.2 2020 Transportation System Management (TSM) Alternative

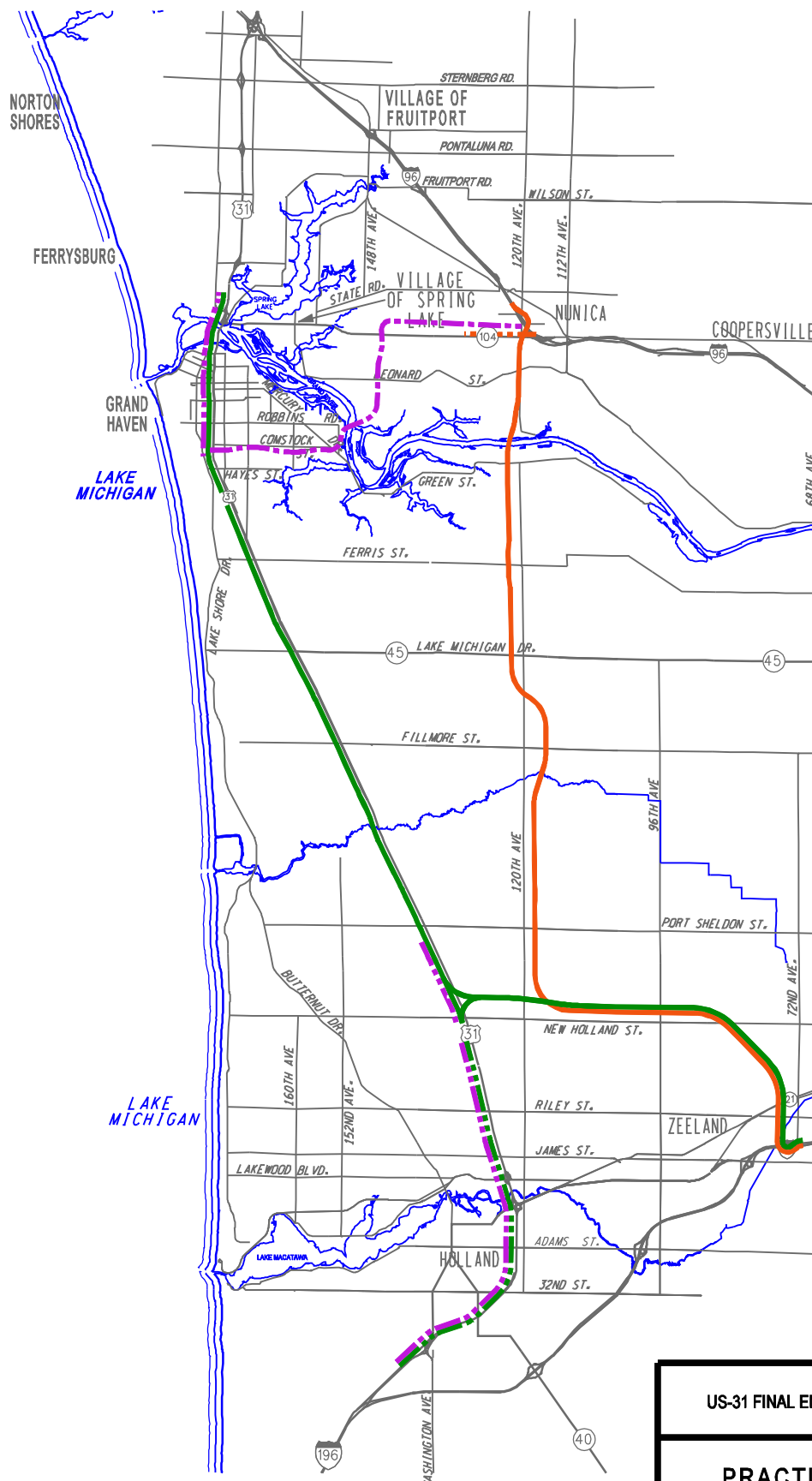
The 2020 TSM Alternative is an interim step that provides for short-term, low-cost improvements to existing US-31 to increase capacity and/or safety in spot locations. It includes all the improvements described in the 2005 TSM Alternative as well as:

- Converting direct left-turn intersections to indirect left-turn intersections.
- Pavement repairs and reconstruction.
- Improved traffic signals and/or controllers.
- Intelligent Transportation Systems (ITS).

The estimated cost of the 2020 TSM Alternative was approximately \$3.2 million in 2007 dollars. These options do not include a new crossing of the Grand River to improve regional accessibility, a need consistently expressed during the Environmental Impact Statement (EIS) process. While these types of improvements reduce traffic congestion and improve safety, the positive impacts cannot be sustained over the planning period, and therefore will not meet the project's purpose and need as a stand-alone alternative. However, some of the TSM options identified have been and will continued to be implemented as independent projects to address safety and condition issues within the FEIS study area.

3.1.1.3 Alternative F – New Alignment Freeway

This alternative included the construction of a new limited-access freeway east of existing US-31 connecting I-196 east of Zeeland to I-96 at the M-104 interchange. This alternative did not include improvements to the existing US-31 route. Additionally, the significant social and environmental impacts combined with the financial impacts were disproportionate to any benefits to traffic congestion or regional access. Alternative F did not address the project's Purpose and Need for the reasons noted, and was therefore eliminated from further consideration.



ALTERNATIVES	
TRANSPORTATION SYSTEM MANAGEMENT	
F	NEW FREEWAY IN CENTRAL CORRIDOR
J1	FREEWAY ON EXISTING US-31 AND AROUND HOLLAND & ZEELAND
P	WIDE MEDIAN BOULEVARD WITH GRAND HAVEN BYPASS
P1	NARROW MEDIAN BOULEVARD WITH GRAND HAVEN BYPASS

FACILITY TYPE	
	LIMITED ACCESS FREEWAY
	6-LANE BOULEVARD
	4-LANE BOULEVARD
	FREE ACCESS



NORTH

NOT TO SCALE

US-31 FINAL ENVIRONMENTAL IMPACT STATEMENT

**PRACTICAL ALTERNATIVES
ELIMINATED AFTER THE DEIS**



**FIGURE
3.1-1**

3.1.1.4 Alternative J1– Holland/Zeeland Area Freeway Bypass

This alternative included the construction of a limited-access freeway bypass around the east and north sides of the Holland/Zeeland area with a freeway connecting I-196 east of Zeeland to US-31 north of Holland Township. Existing US-31 south of the connection would be constructed as a six-lane boulevard. Existing US-31 north of the connection and through the City of Grand Haven would be constructed as a limited-access freeway. This alternative did not address the project's purpose and need and was eliminated from further consideration primarily due to the strong opposition from the City of Grand Haven, and the extensive negative impacts to residents and businesses from relocations, community division and loss of local access from converting US-31 to a freeway. Other factors contributing to its inability to address purpose and need were that the alternative did not include an alternate crossing of the Grand River to help improve regional access, lack of congestion relief along existing US-31, and high cost relative to benefit.

3.1.1.5 Alternative P – Wide Median Boulevard on Existing US-31

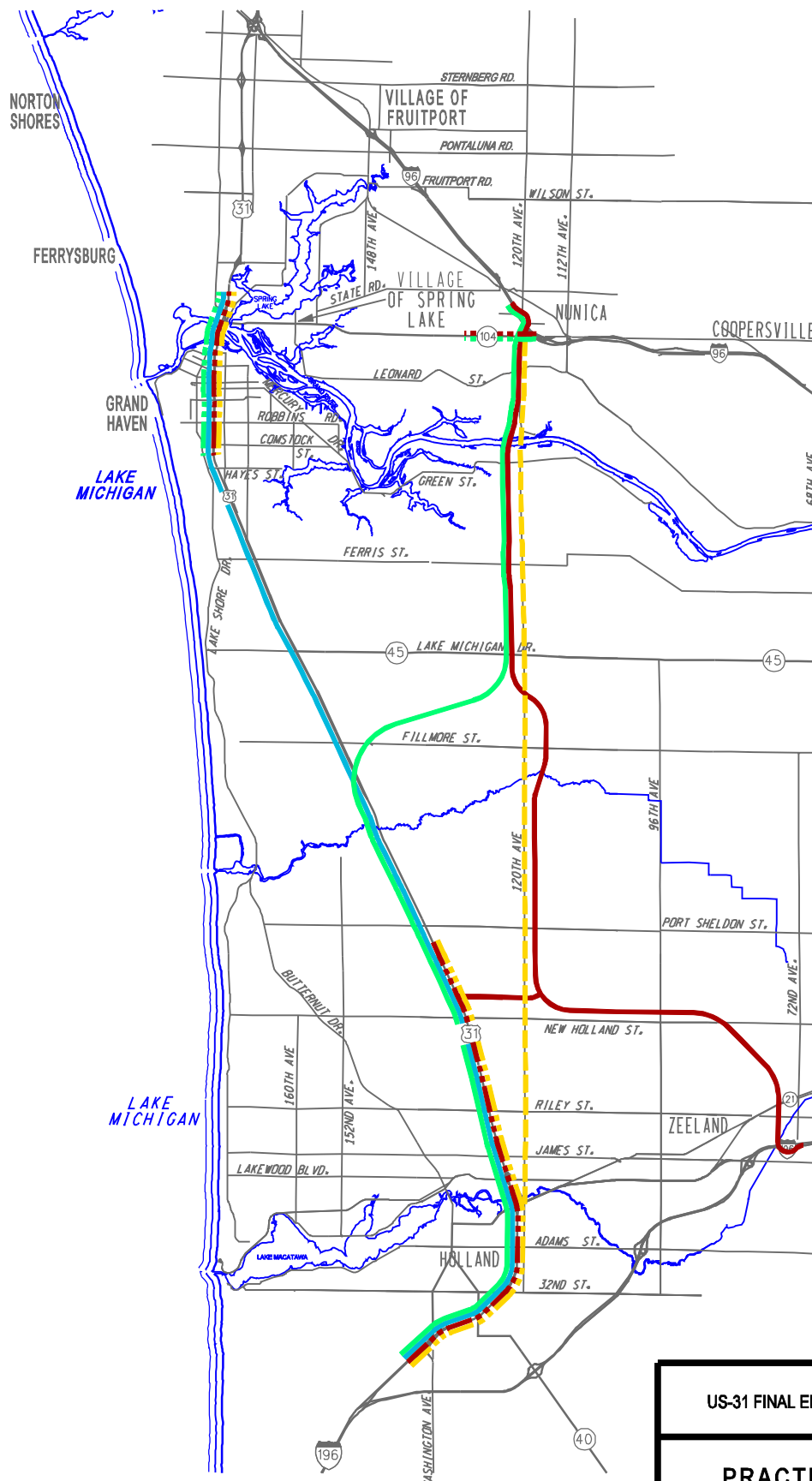
This alternative included the construction of a wide median boulevard on existing US-31 between I-196 and M-104, and a controlled-access local Grand Haven bypass connecting US-31 and I-96. A lane in each direction would be added to US-31 through Holland/Holland Township and Grand Haven. It also included a bypass crossing the Grand River near 148th Avenue. Alternative P met part of the project's purpose and need relative to traffic congestion relief because it provided the highest diversion of traffic from US-31 in Grand Haven as compared to other alternatives. However, there was strong public opposition (petition signed with over 500 signatures) and extensive negative impacts to residents, businesses, and schools from relocations required for construction. The proposed new river crossing was not practicable or feasible due to width of the river channel and connecting wetlands, bayous, and floodplain. As a result, it was dropped from further consideration.

3.1.1.6 Alternative P1– Narrow Median Boulevard on Existing US-31

Although evaluated independently, Alternative P and Alternative P1 are substantially the same. The width of the boulevard is the only difference between the two alternatives. Alternative P1 included a narrow median boulevard on existing US-31 between I-196 and M-104, and a controlled-access local Grand Haven Bypass connecting US-31 and I-96. Therefore, impacts to adjacent property along US-31 were comparatively less than Alternative P. The alternative also included widening existing US-31 for an additional lane in each direction through Holland/Holland Township and Grand Haven. Alternative P1 met part of the project's purpose and need relative to traffic congestion relief because it provided the highest diversion of traffic from US-31 in Grand Haven as compared to other alternatives. However, there was a strong public opposition (petition signed with over 500 signatures) and extensive negative impacts to residents, businesses, and schools from relocations required for construction. The proposed new river crossing was not practicable or feasible due to width of the river channel and connecting wetlands, bayous, and floodplain. As a result, it was also dropped from further consideration.

3.2 PRACTICAL ALTERNATIVES EVALUATED AFTER THE DEIS

After eliminating the alternatives described above, the Michigan Department of Transportation (MDOT) began evaluating the remaining alternatives against the project's Purpose and Need. Five Practical Alternatives, including the No-Action Alternative, were carried forward from the DEIS for further analysis in this Final Environmental Impact Statement (FEIS). Alternatives A, F-1/F-3, R, and F/J-1 each included a new crossing of the Grand River and/or a replacement of the existing bascule bridge. MDOT also evaluated a new option presented by the Coalition for Sensible Transportation Solutions (CSTS) after publication of the DEIS. Detailed descriptions of the Practical Alternatives and the CSTS option are included below. The proposed route for the CSTS option can be found in **Figure 5.4-1**. **Figure 3.2-1** includes a map of the proposed Practical Alternatives.



ALTERNATIVES	
NO-ACTION	
TRANSPORTATION SYSTEM MANAGEMENT	
A	FREEWAY ON EXISTING US-31
F-1/F-3	NEW FREEWAY ON EXISTING & IN CENTRAL CORRIDOR
F/J-1	NEW FREEWAY ON CENTRAL CORRIDOR AND AROUND HOLLAND & ZEELAND & IMPROVEMENTS ON EXISTING
R	UPGRADE OF 120TH AVENUE
FACILITY TYPE	
—————	LIMITED ACCESS FREEWAY
- - - - -	6-LANE BOULEVARD
.	4-LANE BOULEVARD
- . - . -	FREE ACCESS



NORTH

NOT TO SCALE

US-31 FINAL ENVIRONMENTAL IMPACT STATEMENT

PRACTICAL ALTERNATIVES
EVALUATED AFTER THE DEIS



FIGURE
3.2-1

These alternatives were further refined to minimize impacts and address public and agency concerns raised during subsequent public and agency meetings and discussions. Public, local government and regulatory agency concerns were identified and considered in the evaluation process. Traffic impacts, congestion relief, and access improvements to existing US-31 and within the overall FEIS study area were evaluated for existing and future (2030) conditions. Social and environmental factors were assessed, as well as future land use impacts. Project costs were also considered. The corridor study area in this FEIS includes western Ottawa County, and is the primary area of impact from the practical alternatives. In addition, the future year projections were extended to 2030 to cover a 20 year timeline.

3.2.1 No-Action Alternative (Rehabilitating Existing US-31)

The No-Action Alternative did not reduce traffic congestion and delay, improve safety, or increase access. Therefore, it did not meet the purpose and need of the project.

The No-Action Alternative would maintain US-31 in its present location without additional lanes. No new ROW, access changes, or crossing of the Grand River would be included with the No-Action Alternative. The existing bascule bridge between Grand Haven and Ferrysburg would be in its current location with the same number of lanes. This alternative was used as the basis of comparison with the other Practical Alternatives.

3.2.2 Alternative A – Freeway on Existing US-31

This alternative included the construction of a limited-access four-lane freeway on existing US-31 from I-196 in the City of Holland to M-104 in Ottawa County, including a replacement of the existing bascule bridge between Grand Haven and Ferrysburg. The freeway included the ability to add an additional lane when warranted by traffic volumes and funding. The interchanges were designed to minimize ROW acquisition and reduce impacts. The estimated cost of Alternative A is approximately \$1.5 billion in 2004 dollars.

Alternative A did not meet the projects Purpose and Need as well as the Preferred Alternative, and it was eliminated from further consideration due to significant environmental, social, and economic impacts along existing US-31. Specific factors included:

- Large number of displacements and ROW acquisitions along the entire length of US-31 in the corridor study area for the conversion of the existing roadway to a freeway.
- Interchanges restricted to some existing major intersections, access to US-31 eliminated at all other intersections, which resulted in loss of access impacts to the business and residential area, and opposition from the impacted business community.
- Adverse community cohesion impacts to the City of Holland, Holland Township, Grand Haven Township and the City of Grand Haven created by local east-west road closures and freeway design.
- Replacement of the existing Grand River crossing and no additional crossing provided.
- Disruption to the local road systems in the cities of Holland, Grand Haven and Ferrysburg.
- High costs relative to derived benefits.

3.2.3 Alternative F-1/F-3 – New Alignment Freeway

This alternative included the construction of a new limited-access four-lane freeway from I-196 in the City of Holland to M-104 at I-96 in Ottawa County and boulevard improvements in the City of Grand Haven. The estimated cost of Alternative F-1/F-3 was approximately \$1.4 billion in 2004 dollars. Specific improvements included in this alternative were:

New Alignment Freeway

- US-31 upgraded to a freeway from I-196 northerly through the City of Holland to north of the Pigeon River.

- New freeway diverging away from existing US-31 northeasterly to M-45, north paralleling 120th Avenue, and connecting with I-96 in Crockery Township.
- M-104 reconstructed as a four-lane boulevard/five-lane roadway between 130th Avenue and I-96 in Crockery Township.

US-31 Six-Lane Boulevard

- A free-access six-lane boulevard on US-31 through Grand Haven Township and the City of Grand Haven (Comstock Street to the Grand River).
- Reconstruction of the bascule bridge on US-31 between Grand Haven and Ferrysburg.

Alternative F-1/F-3 did not meet the projects Purpose and Need as well as the Preferred Alternative, however it was eliminated from further consideration due to significant environmental, social, and economic impacts. Specific factors included:

- Substantial social, environmental, and economic impacts and displacements in the City of Holland and Holland Township.
- Extensive ROW acquisition of commercial properties in the City of Holland and Holland Township is required for conversion of US-31 to a freeway.
- Community cohesion impacts to the City of Holland and Holland Township.
- Access to many existing businesses would be eliminated.
- Access restricted due to limited interchange locations, especially along US-31 in Holland.
- High costs relative to derived benefits.

3.2.4 Alternative R – Upgrading 120th Avenue to a State Highway

This alternative included improvements on US-31 in the City of Holland, Holland Township, and the City of Grand Haven (Allegan and Ottawa Counties) and an upgraded roadway on 120th Avenue from I-196BL to I-96. The jurisdiction of 120th Avenue would be transferred from Ottawa County Road Commission (OCRC) to MDOT. The estimated cost of Alternative R was approximately \$750 million in 2007 dollars. This alternative included:

US-31 Six-Lane Boulevard

- A controlled-access six-lane boulevard on US-31 through the City of Holland and Holland Township (32nd Street to approximately Port Sheldon).
- A free-access six-lane boulevard on US-31 through Grand Haven Township and the City of Grand Haven (Comstock Street to the Grand River).
- Reconstruction of the bascule bridge on US-31 between Grand Haven and Ferrysburg.

120th Avenue Upgrade

- Widening 120th Avenue to five lanes from Riley Street to Port Sheldon Street (since the DEIS, 120th Avenue has been widened to five lanes from I-196 BL to Riley Street).
- A four-lane free access boulevard on 120th Avenue from M-45 to Leonard Street.
- Controlled access from Leonard Street to I-96.
- Construction of a new Grand River bridge at 120th Avenue.
- M-104 would also be reconstructed as a four-lane boulevard/five-lane roadway between 130th Avenue and I-96 in Crockery Township.

Alternative R was eliminated from further consideration because it did not meet the project's purpose and need. There were minimal improvements to roadway capacity, safety features or congestion on existing US-31. Also, the traffic diverted to 120th, a free access local roadway, would become congested without access or local land use controls, as well as multiple at-grade intersections. Widening 120th Avenue requires extensive residential and some commercial displacements.

Alternative R was also eliminated from further consideration due to significant environmental and social impacts along 120th Avenue related to purchasing adjacent properties. Specific factors included:

- Extensive opposition from the local units of government (more than any other alternative).
- Large number of residential and commercial displacements along 120th Avenue due to ROW acquisition for widening.
- Negative impacts to the local traffic system which was projected to have increased traffic.
- Free access roadway does not help control development along the 120th Avenue corridor; additional indirect and cumulative impacts were anticipated.

3.2.5 Alternative F/J-1

Alternative F/J-1 included the construction of a six-lane boulevard on portions of existing US-31, a limited-access freeway connection from I-196 east of the City of Zeeland and from existing US-31 north of Holland to I-96 in Crockery Township, the removal and replacement of the existing bascule bridge between Grand Haven and Ferrysburg, and M-104 improvements. The estimated cost of Alternative F/J-1 was approximately \$1.3 billion in 2007 dollars. Specific improvements included in this alternative were:

New Alignment Freeway

- A new freeway beginning at I-196 east of Zeeland, extending northwesterly to 120th Avenue and New Holland Street, and paralleling 120th Avenue on the west, then northerly to I-96 in Crockery Township.
- A new freeway connection from US-31 to the new freeway just north of New Holland Street.
- M-104 reconstructed as a four-lane boulevard/five-lane roadway between 130th Avenue and I-96 in Crockery Township.

US-31 Six-Lane Boulevard

- A controlled access six-lane boulevard on US-31 through the City of Holland and Holland Township (32nd Street to Port Sheldon).
- A free access six-lane boulevard on US-31 through Grand Haven Township and the City of Grand Haven (Comstock Street to the Grand River).
- Reconstruction of the bascule bridge on US-31 between Grand Haven and Ferrysburg.

Alternative F/J-1 was selected and presented by MDOT initially as the proposed Preferred Alternative in 2000 based on its ability to address current and future traffic demand on US-31, as well as providing regional access improvements within the corridor study area, with an additional crossing of the Grand River, and consistent with the project's purpose and need.

Although originally selected as the Preferred Alternative, Alternative F/J-1 was eliminated from further consideration due to the following reasons:

- Traffic flow and safety issues north of the Holland urbanized area and south of M-45 are less significant.
- Traffic projections south of M-45, and north of and east of the Holland urbanized area can be accommodated by the existing US-31 and local system roads through 2030.
- Significant environmental and social impacts south of M-45 as compared to limited anticipated benefits from major improvements at this time.
- High costs could not be supported by the projected revenues statewide and in the affected MPO areas.

Subsequently, MDOT developed Alternative F-1a, in cooperation with local officials in the corridor study area; it includes critical segments of F/J-1. Alternative F-1a, (**Figure 3.4-1**) which became the Preferred Alternative for this FEIS, addresses local and state priority needs in the corridor study area, with

significantly less social and environmental impacts, and within the revenues projected to be available for the project. F-1a is described in more detail in Section 3.4 of this document.

3.2.6 Coalition for Sensible Transportation Solutions (CSTS) Option

The CSTS Option included a freeway bypass of the Holland-Zeeland area, a freeway on existing US-31 between Holland Township and the City of Grand Haven, a freeway bypass of the City of Grand Haven, a local 104th Avenue crossing of the Grand River and a new interchange at I-96 and Sternberg Road (see **Figure 5.4-1**).

The CSTS Option was not carried forward because it did not meet the project's purpose and need for the following reasons:

- Adverse distance to the proposed bypass, and circuitous routing, reduced the amount of traffic potentially diverted from south of Holland to north of Grand Haven.
- Proposed Grand River crossing not proximate to growing area east of existing US-31.
- Benefits accrue primarily to the City of Grand Haven rather than to the region.
- Includes two, as opposed to one, additional river crossings, resulting in unnecessary impacts/costs.
- Residential and commercial impacts due to ROW acquisitions in the City of Grand Haven and Grand Haven Township.
- Included other improvements outside the US-31 FEIS study area.

3.3 COMPLETED US-31 IMPROVEMENTS

Since the release of the DEIS, MDOT continued to maintain the roadway and improve traffic flow on US-31 with projects such as pavement repairs, intersection reconfigurations, turn lane improvements, and traffic signal optimizing upgrades. Specific projects included:

- Asphalt pavement overlay and concrete repairs from Port Sheldon Street north to M-104.
- Addition of indirect-left and elimination of local road through movements at the New Holland Street/US-31 intersection.
- Addition of indirect-left turns and elimination of local road through movements at the Buchanan Street/US-31 and Lincoln Street/US-31 intersections.
- Additional left and right-turn lanes and increased turning radii at the Jackson Street/US-31 intersection.
- Addition of an island that prevents through movements on Waverly Avenue across US-31 and turning lane improvements in Grand Haven.
- Various indirect left-turn and/or right-turn lane improvements at US-31 and the intersections of James Street, Riley Street, Croswell Street and Greenly Street to enhance traffic flow and safety.
- Turning lane improvements at the US-31/Comstock intersection to address impacts from a new Wal-Mart Super-Store, funded by the developer.
- Traffic signal optimization on US-31 through the Holland and Grand Haven areas.

3.4 THE PREFERRED ALTERNATIVE (ALTERNATIVE F-1a)

Based on its ability to meet the project's Purpose and Need, Alternative F/J-1 was selected and presented by MDOT initially as the Preferred Alternative in 2000. As compared to the other alternatives, it best met the current and future traffic demand on US-31, created a new limited access freeway route between I-196 and I-96, and provided an alternate access over the Grand River to serve development east of existing US-31. MDOT made further refinements to the location of Alternative F/J-1 to address concerns and minimize impacts identified by affected citizens and agencies during numerous meetings and discussions. The cost estimate for F/J-1 was approximately \$1.3 Billion in 2004 dollars.

3.4.1 Continued Development of the Preferred Alternative

After releasing the DEIS in 1998 and initially selecting F/J-1 as the Preferred Alternative, MDOT began examining ways to mitigate impacts, respond to opposition to the project from some local officials, and address the concerns of resource agencies. MDOT then met with township officials to make the alignment more compatible with local land uses and also initiated a land use study that would help quantify indirect impacts.

One of the first outcomes of the local meetings regarding F/J-1 was the reduction of impacts by widening existing US-31 along the median side of the roadway in the cities of Holland and Grand Haven. The alignment of the freeway connection between existing US-31 and I-196 north of the City of Zeeland was also adjusted to minimize farmland impacts and coincide with the township future development plans. Similarly, wetland impacts were reduced through minor alignment changes. Additional local road crossings were also added to the plans to improve emergency services and access across the proposed new freeway.

During this period an assessment of indirect impacts was accomplished through an innovative research study, conducted by the Michigan State University's (MSU) Basic Science and Remote Sensing Institute (BSRSI) in 2002. The study paired observations of historic land use changes with anticipated population and employment growth to determine potential land use changes in the future (2020). The study concluded that the intense pressure for residential, commercial, and industrial growth in the area is due to the robust regional economy. It further concluded that the economic activities in the Grand Rapids, Holland, and Muskegon/Grand Haven urbanized areas have a greater influence on the conversion of open space to developed land uses than any proposed relocation of US-31. The practical alternatives evaluated in the Land Use Study, therefore have a limited impact on the future location of land development, due to the fact that local governments control land use through zoning and master plans. In addition, location decisions are based more on economic condition and proximity to regional activity centers than any one transportation facility. The study indicated only minor changes in the type and location of developed land as a result of Alternative F/J-1.

Another factor that influenced the development of the Preferred Alternative was that population growth in Ottawa County resulted in expansion of the urbanized areas, as designated by the 2000 Census. As a result, the Holland and Muskegon MPO boundaries expanded so that each included a portion of the corridor study area. The MPO planning process also requires additional financial considerations and regional air quality conformity assessments. Specifically, federal MPO regulations require financial constraint within a 20 year planning time frame for major projects. As the alternative analysis continued, it became clear that anticipated federal and state transportation revenue would not support a project of this magnitude (Alternative F/J-1) within the two MPO areas over the 20 year time frame of the EIS. Therefore, in 2005, MDOT began working with MPO and local officials to identify and prioritize transportation needs in the corridor study area. Over 20 meetings were held with local governments and MPO committees between 2005 and 2006 to refine local priorities and state trunkline objectives within the US-31 corridor study area. Early in the process it became clear that a new Grand River crossing was the most consistent need expressed. In addition, traffic congestion issues were found to be less significant south of M-45 and north of the Holland urbanized area as compared to the expected social and environmental impacts from F/J-1.

Identifying a Preferred Alternative that could be funded with anticipated state and federal revenue became increasingly important, as the project needed to be included in the Transportation Improvement Programs (TIPs) and Long Range Transportation Plans (LRTP) of the MPOs. Compliance with federal air quality regulations was also needed in order for the project to proceed. While SAFETEA-LU contained a \$7.2 million earmark for continuation of the project, additional funding for the alternative needed to be identified. MDOT, working with local agencies, identified segments of Alternative F/J-1 that substantially met the project's Purpose and Need, minimized impacts, had support from affected local governments, and could be funded within projected revenues.

3.4.2 Preferred Alternative Description

As a result, MDOT developed the current Preferred Alternative (F-1a) (**Figures 3.4-1, 3.4-2 and Appendix A**) to address the need for a new Grand River crossing, provide a high level of safe and efficient state trunkline service to the area, as well as address the project's Purpose and Need within the revenues projected for the MPO areas and the State of Michigan. The Preferred Alternative includes: a new two-lane roadway (**Figure 3.4-3**), with a new Grand River crossing, located generally along the previously identified F/J-1 alignment between M-45 (Lake Michigan Drive) and the I-96/M-104/112 Avenue interchange area; additional lanes on M-104 in the vicinity of the new M-104/M-231 junction; a new I-96/M-231 interchange will be constructed; and new ramps will be added to the existing I-96/112th Avenue interchange. Additional lanes on M-231 will likely be needed in the future, based on the projected traffic levels, following the 20 year planning time-frame covered in this FEIS. Alternative F-1a also includes improvements to key congested segments of existing US-31 in Grand Haven from south of the Franklin Street to north of Jackson Street, and in Holland from Lakewood Boulevard north to the Quincy Street (**Figure 3.4-4 and Appendix A**). Existing US-31 improvements include adding an additional lane in each direction and intersection modifications. The revised Preferred Alternative (Alternative F-1a) only includes a segment of the new route in F/J-1, and therefore will have less land use impacts, social environmental and economic impacts. The Preferred Alternative corridor study area (corridor study area) in this FEIS includes western Ottawa County, and is the primary area of impact. Alternative F-1a addresses the project Purpose and Need as follows:

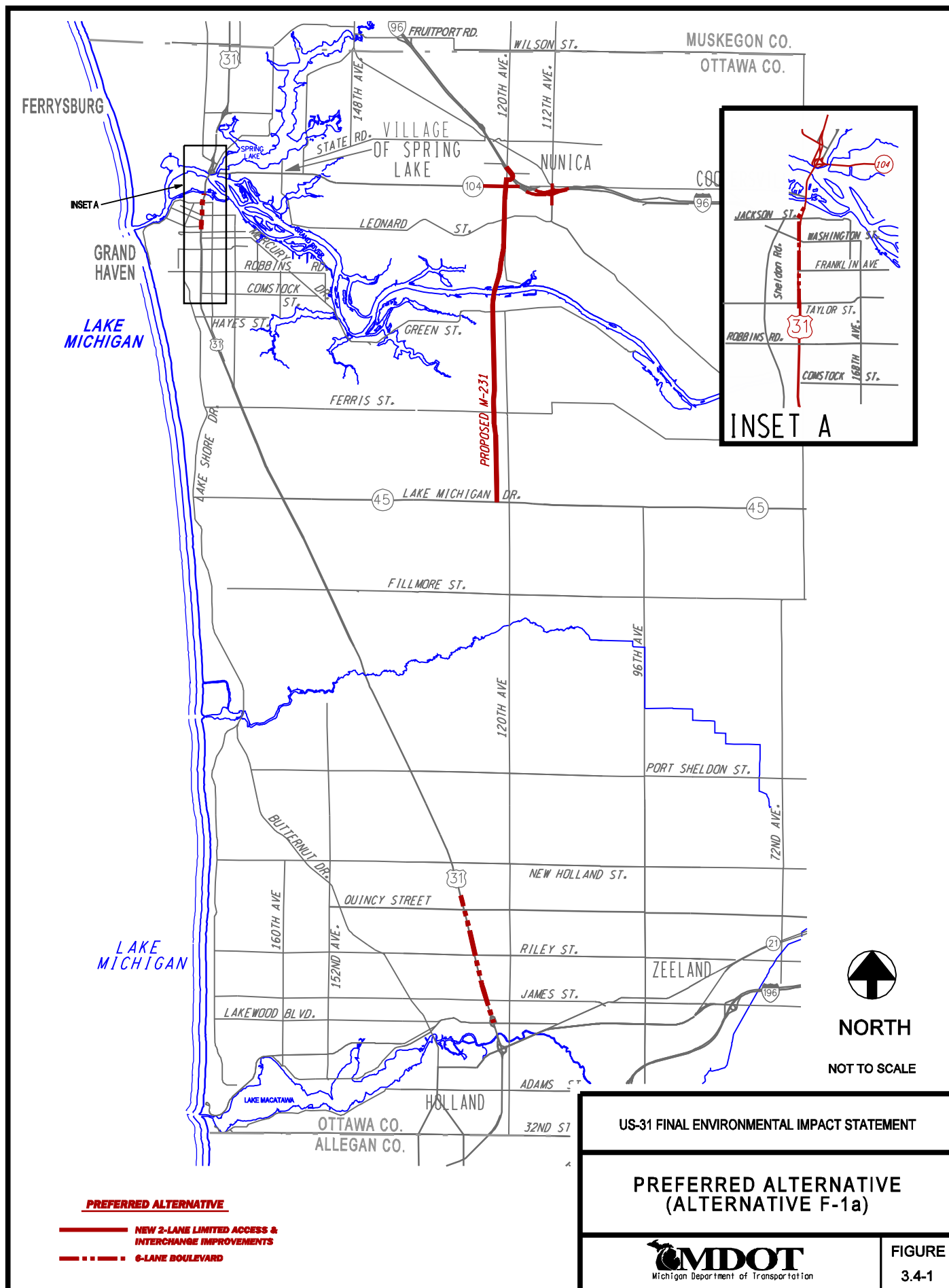
- Improves the movement of people and goods by reducing vehicular delay and congestion along key segments of US-31 in Grand Haven and the Holland area.
- Increases transportation system capacity, addresses regional growth and enhances Grand River crossing efficiency by providing a new river crossing (M-231) approximately mid-way between the two existing crossings of the Grand River in the corridor study area.
- The new Grand River bridge and existing US-31 improvements will enhance safety, emergency service access, incident management and traffic flow in the corridor study area.
- Provides north/south route continuity and connectivity in the Ottawa County by creating a new state highway segment (M-231), linking three existing state highways (M-45, M-104 and I-96), as well as county primary roads (Lincoln Street and 120th Avenue).
- Minimizes impacts compared to other Practical Alternatives evaluated in this FEIS.

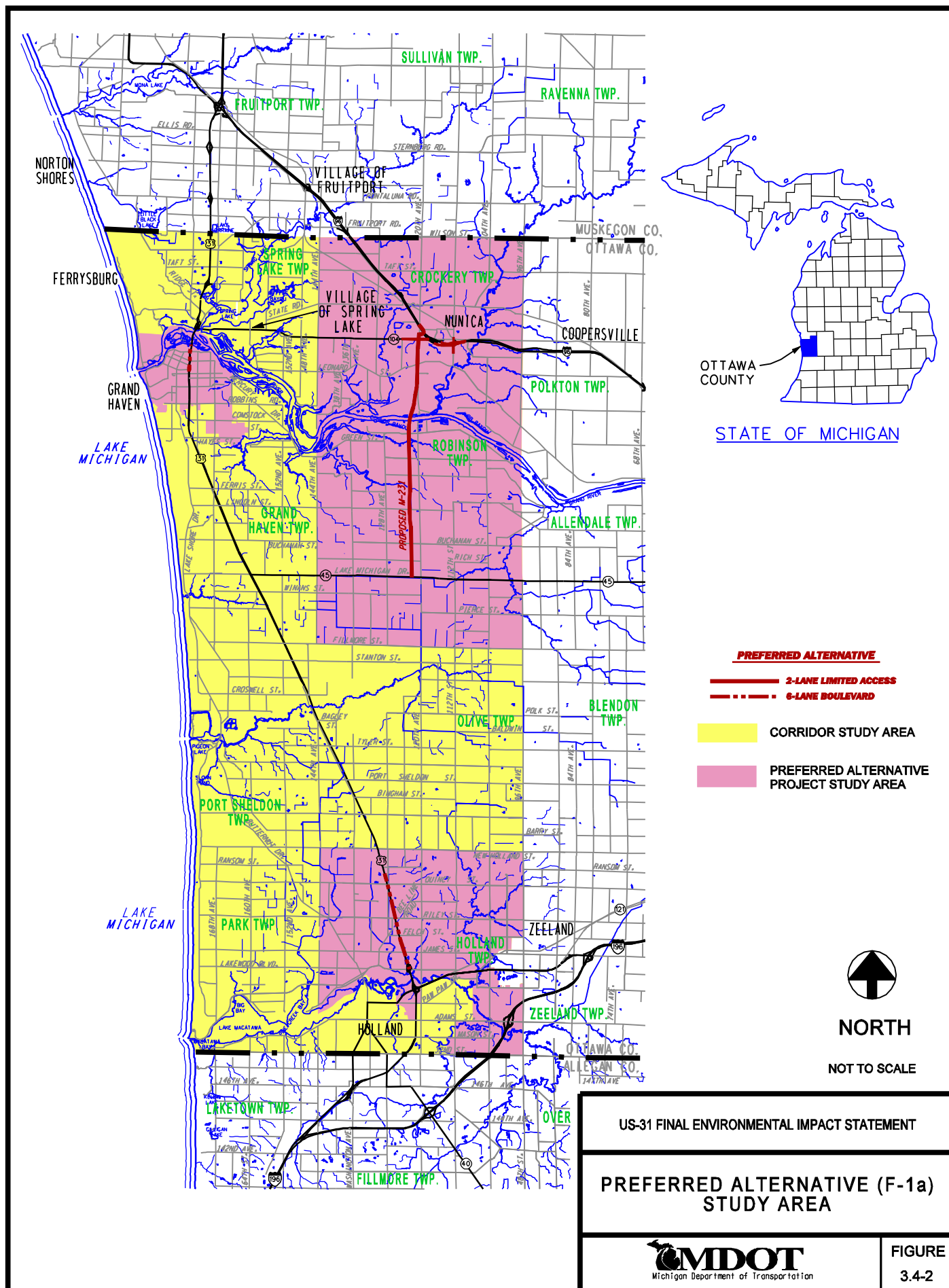
The segments of Alternative F/J-1, south of M-45, were not included with this Preferred Alternative (F-1a) because traffic issues and needs were determined to be less significant. The social, environmental and economic impacts were also not offset by the anticipated benefits derived over the EIS planning horizon. In addition, replacement of the existing bascule bridge in Grand Haven is beyond the timeframe covered in this FEIS, based on its condition, and therefore, it is not included in the Preferred Alternative.

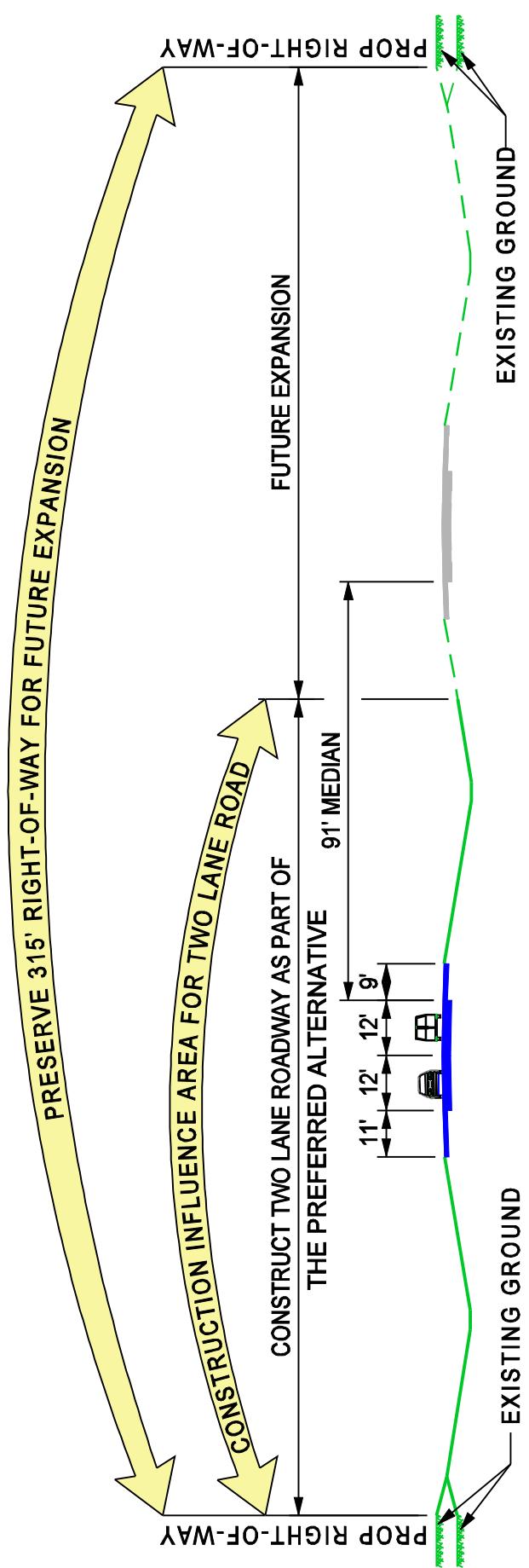
New M-231 Route

The new two-lane route (M-231) will be constructed as a limited access corridor with controlled access at-grade intersections to protect the corridor from development. The Preferred Alternative (F-1a) will be designed so as not to preclude future expansion of the new M-231 route to a four-lane divided facility between M-45 and I-96, or non-motorized facility accommodation when warranted. Additional lanes on M-231 will likely be needed in the future, based on the projected traffic levels, following the 20 year planning time-frame covered in this FEIS. Lengthened sub-structure (piers) to allow for the conceptual future widening of the M-231 route will also be identified in this FEIS and evaluated further during the subsequent design/engineering phase of the project. The ROW identified, preserved and cleared in this FEIS will accommodate future drainage, grading, structures, utilities and intersection concepts along the M-231 new route. ROW will be purchased upon the approval of the Record of Decision (ROD). The ROW preserved will be adequate to accommodate the additional lanes needed for a future four-lane divided facility, to address future traffic growth.

The M-231 route creates a logical trunkline segment with independent utility. Additional information, regarding traffic, resources, impacts, and mitigation in this FEIS, is based on this Preferred Alternative. Direct access to the new M-231 alignment will be available at the intersections shown in **Table 3.4-1**.







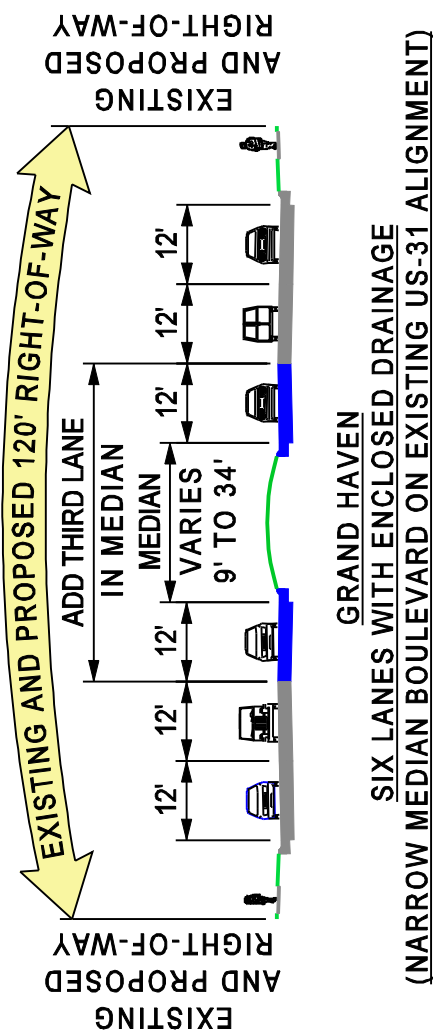
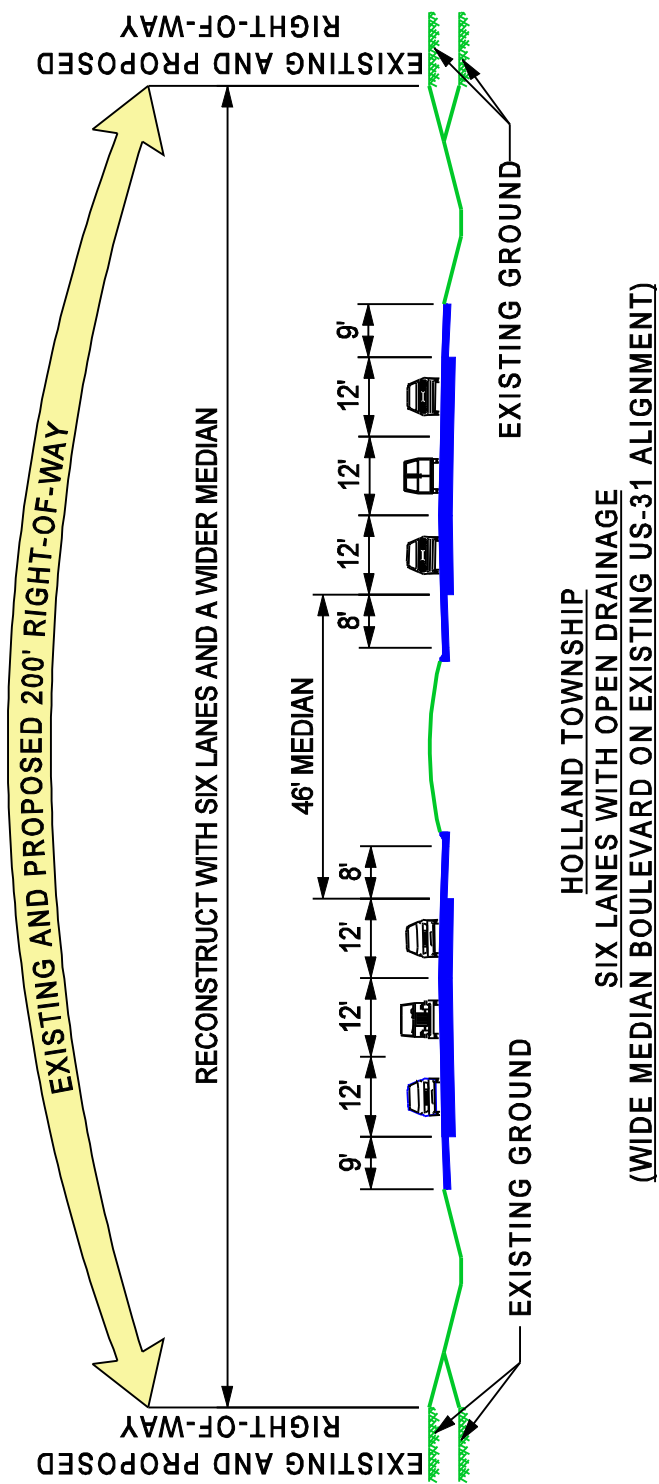
TWO LANES WITH OPEN DITCH DRAINAGE
LIMITED ACCESS ROADWAY ON PROPOSED M-231 ALIGNMENT

US-31 FINAL ENVIRONMENTAL IMPACT STATEMENT

TYPICAL NEW ALIGNMENT
 CROSS-SECTION FOR THE
 PREFERRED ALTERNATIVE



FIGURE
 3-4-3



Because it will be designated as a limited access facility, there will be no driveways or additional at-grade cross streets, beyond the intersections noted, along the new M-231 segment.

Table 3.4-1 Access to the New Alignment		
Intersection	Overpass	Cul-de-Sac
M-45 Lincoln Street M-104 I-96	Rich Street Buchanan Street Sleeper Street North Cedar Drive Limberlost Lane Leonard Street	Johnson Street Cypress Street 120 th Avenue at M-104

New Grand River Bridge and other Structures

The proposed M-231 includes a new Grand River crossing about a quarter-mile west of 120th Avenue. This new bridge will be about 3900' long and will span the entire 100-year floodplain and associated wetlands of the Grand River.

Bridge sub-structure (pier) options, impacts and mitigation for the Grand River and flood plain area, are discussed in **Section 4** of this FEIS. Additional engineering, beyond what is included in this FEIS, is needed to address all of the issues associated with the construction of a new bridge. Therefore, a Bridge Study will be completed during the subsequent design/engineering phase of the project, after this FEIS ROD is approved. The new Grand River bridge and pier type, size, costs and impacts will be assessed in more detail, and a bridge option will be selected, based on the study findings in the final engineering phase. The Bridge Study will determine the most reasonable and practical bridge and pier configuration to accommodate the new M-231 two-lane route being cleared in this FEIS, minimize Grand River and flood plain area impacts during construction, and to not prevent future expansion of the bridge and roadway when needed.

In addition, other larger stream and county drain crossings along M-231 include the Little Robinson Creek (Allen Pipple Drain), south of North Cedar Drive, Stearns Creek, south of Johnson Street, the North Beeline Drain, near Lincoln Street, and the Parkhurst Drain (Black Creek tributary) near M-1-04. The longest of those structures is the Little Robinson Creek bridge, at approximately 575 feet.

Conceptual Phasing Plan for the Preferred Alternative (F-1a)

This FEIS will be sent to the Federal Highway Administration (FHWA) by MDOT for their review and approval. After FHWA approval, this FEIS will be made available for, public and agency review and comment. A Notice of Availability will be published in the Federal Register. Following the public comment period, the ROD will be issued by the FHWA, which is FHWA's formal acceptance of this FEIS. This completes the EIS process and allows for subsequent phases such as design, ROW acquisition and construction to proceed, later in 2009.

Upon completion and approval of this FEIS and ROD, MDOT will complete the design/engineering phase (including the Bridge Study) and begin buying property for the new M-231 bridge over the Grand River in late 2009. Permits from regulatory agencies will be obtained in 2010, for the new bridge segment. Additional design, ROW and construction phases of the project will be added to the MPO TIPs as work progresses on the Preferred Alternative.

Construction of the new bridge is planned begin in late 2010 and take two to three years to complete. Following the new bridge, will be construction of the M-231 segment from north of the Grand River to the I-96/M-104/112th interchange area. The last segment of M-231 will be completion of the new route from south of the Grand River to M-45 (Lake Michigan Drive). Along existing US-31, the segment north of Holland will be constructed first, followed by the segment in Grand Haven. Construction of the Grand Haven segment is not expected to begin until the new M-231 route is open to traffic. The timeframe for completing this project in its entirety is projected to be five to seven years, depending on statewide needs and funding availability.

A bridge study will be completed during the subsequent design/engineering phase of the project. The bridge study will determine the most reasonable and practical bridge and pier configuration in the Grand River and flood plain to accommodate the new M-231 two-lane route being cleared in this FEIS, minimize impacts, and to not prevent future expansion of the bridge when needed. FHWA concurrence on the traffic analysis and ROW preservation was received on March 18, 2009 (**Appendix C**). An Interchange Justification Report, for the I-96/M-104/M-231/112th Avenue area, will be completed and submitted to FHWA after approval of the ROD.

Other F-1a Information

Alternative F-1a is shown in detail with a photo mosaic background in **Appendix A** for this FEIS. These drawings show the general recommended roadway improvements, proposed ROW, structure locations, existing and proposed drainage facilities, and select natural, physical, cultural or social environmental information. The estimated cost for Alternative F-1a is \$170 million in 2014 dollars and is within the transportation revenues forecasted for the two affected MPO areas and the State of Michigan.

Public/Agency Coordination

The Preferred Alternative (F-1a) was presented formally at a Public Meeting in November, 2006. Nearly 350 people attended this meeting and were provided the opportunity to comment and ask questions of MDOT staff in attendance. Comments received at the meeting and after were addressed, and MDOT met with citizens, agencies and organizations that had additional questions. The Preferred Alternative incorporates, where feasible, the comments and concerns resulting from these discussions.

During 2007, Alternative F-1a was included in the two approved MPO LRTPs. The design/engineering and ROW phase were also added to the MPO TIPs in 2008. 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.

Draft EIS Re-Evaluation

A Re-Evaluation of the DEIS was also completed and approved in 2009. With the new alignment of the Preferred Alternative established, updates to traffic, noise and air quality analysis needed to be performed as part of this FEIS. MDOT also updated information related to wetland identification, delineation and mitigation, addressed United States Coast Guard (USCG) and Army Corps of Engineers (USACE) bridge height issues, conducted an Indiana Bat Survey, and Above Ground Historic Resources Survey. The information contained in this FEIS is current and complies with existing federal and state regulations. The DEIS Re-Evaluation is included in Appendix F.

Future Actions

This FEIS and ROD will be completed based on the Alternative F-1a as described herein. Any other major improvements within the US-31/M-231 corridor and FEIS study area, north or south of M-45, are beyond the scope of this FEIS, and will require additional environmental documentation and alternative evaluation through the federal National Environmental Policy Act (NEPA) process. Any subsequent NEPA activities will be initiated by MDOT, when warranted by traffic levels and funding is available, in coordination with the affected MPOs and local officials.

3.4.3 Design Year (2030) Traffic Projections

Design year (2030) traffic volumes were projected for the Preferred Alternative using data from the MDOT Statewide model, the West Michigan Shoreline Regional Development Commission (WMSRDC/WestPlan) model, and the Macatawa Area Coordinating Council (MACC) model. Design year (2030) traffic volumes for the Preferred Alternative were projected on US-31 in Grand Haven, Holland, and the rural areas between the cities, and along the new M-231 route from M-45 to M-104/I-96.

In the Holland/Zeeland area, design year traffic projections and traffic changes caused by Alternative F-1a improvements were derived from the MACC/MPO travel demand model. The US-31 and Alternative

F-1a diverted traffic were developed using projected growth rates and MACC/MPO travel demand model results. The MACC/MPO model was used to determine design year daily, diverted and peak-hour traffic volumes for the Preferred Alternative in the Holland/Zeeland area from 32nd Street in the south, to Fillmore Street in the north, and eastward to 96th Avenue, M-121 and I-196.

In the Grand Haven area, design year traffic projections and the amount of traffic being diverted from US-31 to the M-231 bypass were derived from the WestPlan/MPO travel demand model. The WestPlan model was used to determine design year daily, bypass, diverted and peak-hour traffic volumes for the Alternative F-1a in the Grand Haven area from Fillmore Street in the south, to M-104 in the north, and eastward to 68th Avenue. The MDOT Statewide model was used to provide data for rural areas not covered by the MPO models.

An overview of the projected average daily traffic (ADT) values for US-31, the M-231 Bypass, and associated diversion values for the Preferred Alternative is shown in **Figure 3.4-5** for the entire study area.

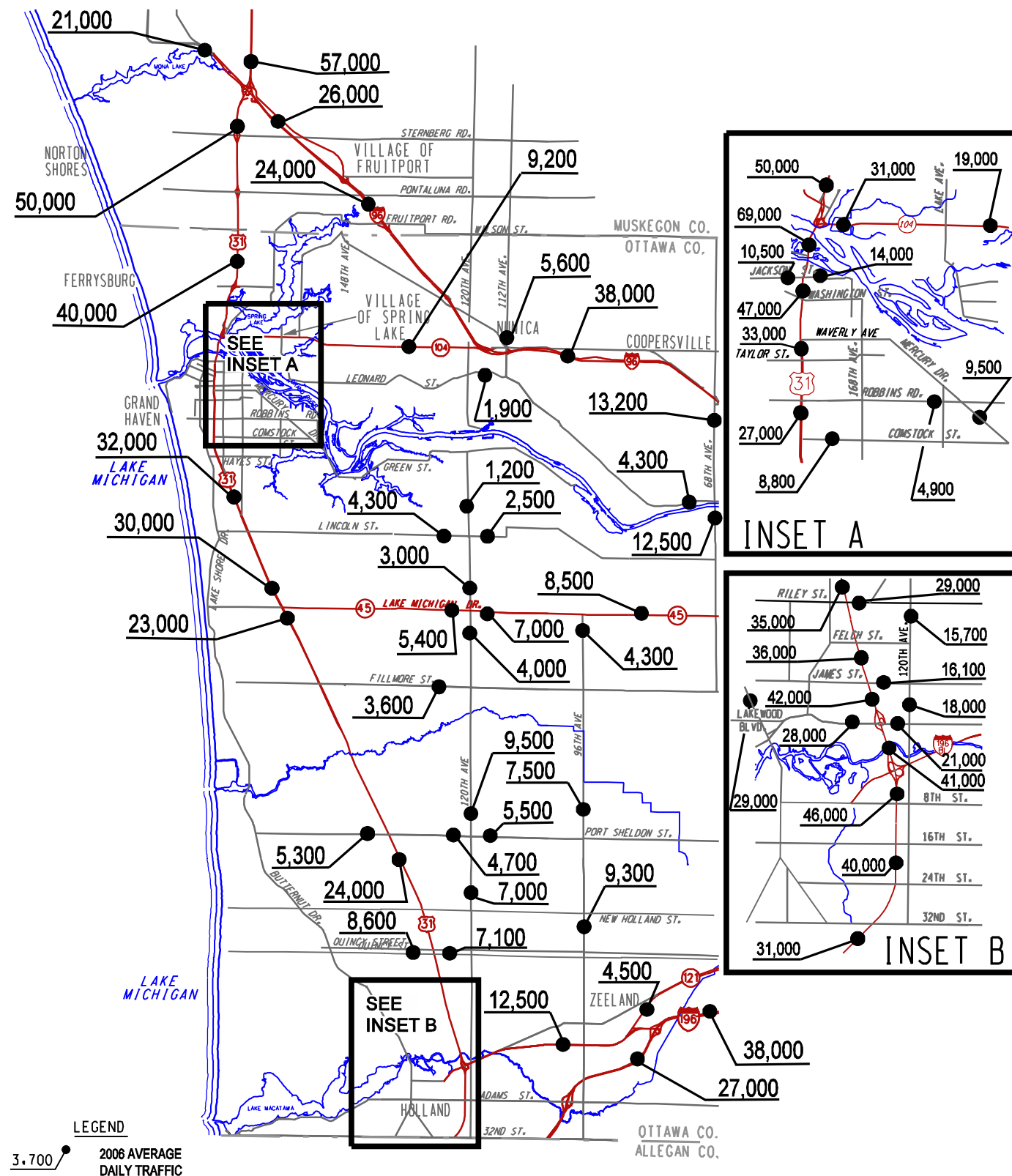
Based on the WestPlan/MPO model, it is projected that up to 22,000 vehicles per day will be diverted from existing US-31, 68th Avenue and other area routes to the proposed new M-231 alignment. As seen in **Figure 3.4-5**, traffic is expected to divert from US-31 to the new alignment via I-96, M-45, M-104, Lincoln Street, 120th Avenue from the south, and other routes in the corridor study area. Travel patterns on M-104 will also change with some overall reduction in volumes projected. North-south routes in Grand Haven near US-31, such as Lakeshore Drive/Sheldon Road and 168th Avenue/Beechtree Street, are shown to have reductions in daily traffic that will be diverted to the new alignment. At the US-31/Grand River crossing it is projected that 13,000 vehicles per day would be diverted to the new alignment. The diversions shown in **Figure 3.4-5** are based on the annual average daily traffic (AADT). Even larger volumes may be diverted during the peak summer tourist season. Additional studies may be needed to determine the full extent of diversion during the summer peak, after the new route is open.

The peak-hour level of service (LOS) for 2030 No-Action and 2030 Preferred Alternative are depicted in **Table 3.4-2**. A comparison of peak-hour Levels of Service at intersections along the US-31 corridor between the No-Action Alternative and the Preferred Alternative are shown in **Figure 3.4-6** and **Figure 3.4-7**.

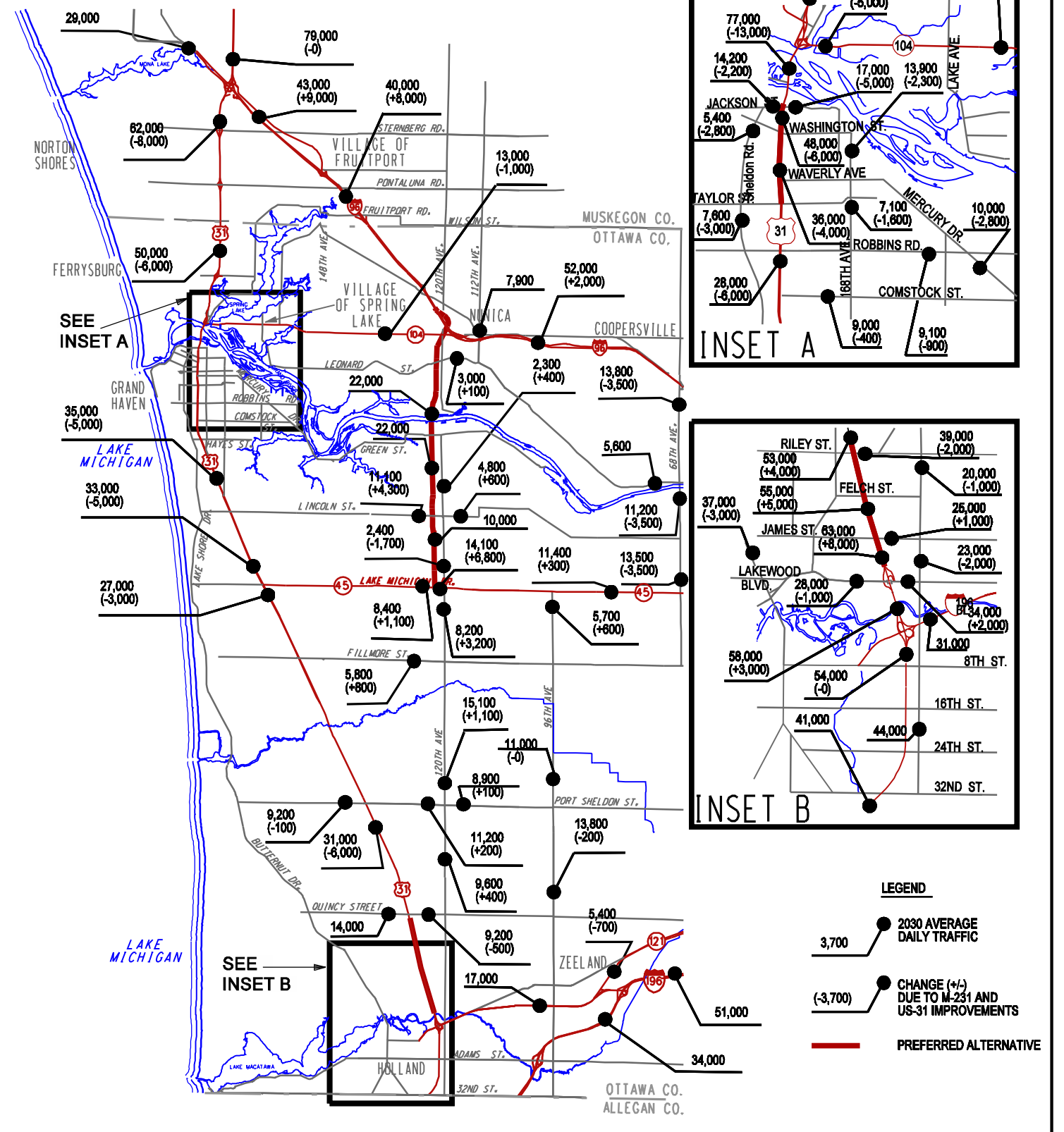
Table 3.4-2 Design Year (2030) No-Action Alternative and Preferred Alternative Peak-Hour Intersection Levels-of-Service					
Location on US-31		AM Peak-Hour		PM Peak-Hour	
		Design Year (2030) No-Action	Design Year (2030) Preferred Alternative	Design Year (2030) No-Action	Design Year (2030) Preferred Alternative
Holland Area	32 nd Street	D	D	D	D
	24 th Street	B	B	B	B
	16 th Street	D	D	D	D
	8th Street	D	D	D	D
	James Street	D	C	F	D
	Felch Street	C	B	C	C
	Riley Street	D	C	F	C
	Quincy Street	C	B	D	C
	Port Sheldon St	B	B	B	B
	M-45	C	C	B	B
Grand Haven Area	Ferris Street	E	C	D	C
	Hayes Street	E	C	D	C
	Comstock Street	D	B	C	C
	Robbins Road	C	C	E	D
	Taylor Avenue	C	B	D	C
	Washington Ave	C	B	D	C
	Jackson Street	C	C	F	E

Note: Intersections with LOS "E" or "F" are shown as shaded

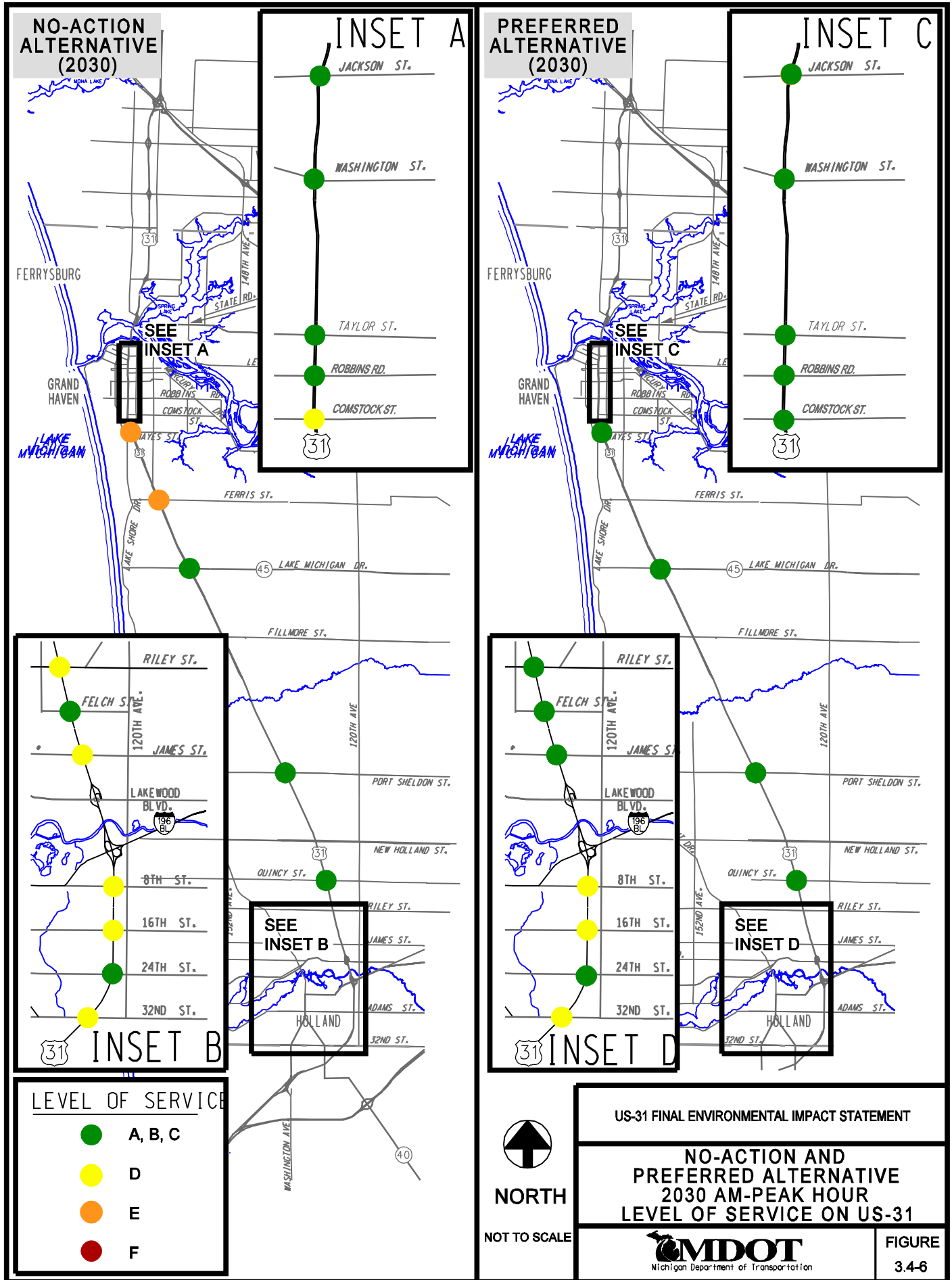
2006 AVERAGE DAILY TRAFFIC

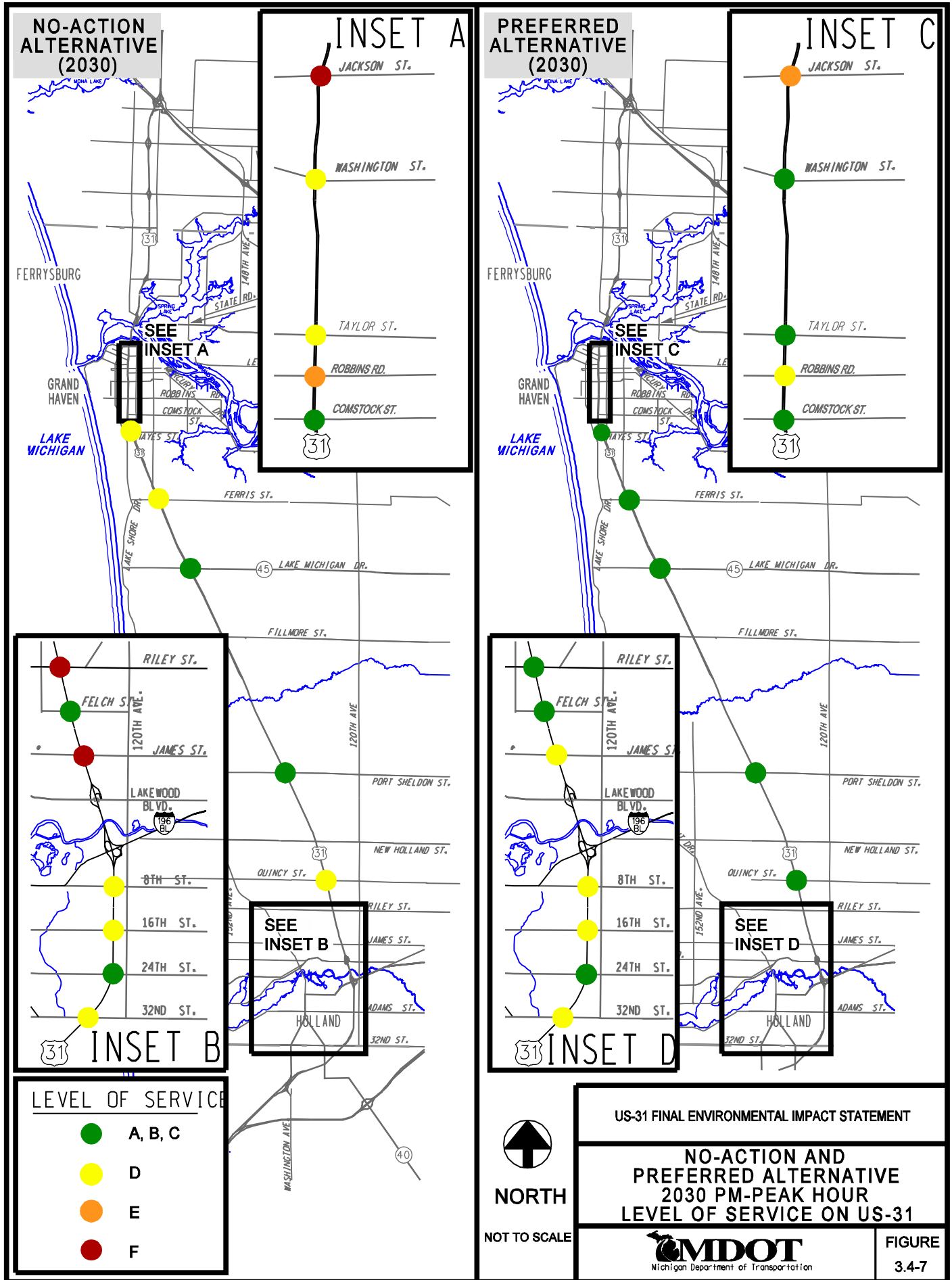


2030 PREFERRED ALTERNATIVE AVERAGE DAILY TRAFFIC



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As shown in **Table 3.4-2**, construction of the Preferred Alternative is expected to relieve traffic congestion and the safety issues associated with congestion along US-31 at the majority of locations in both Holland Township and City of Grand Haven. The section between East Lakewood Boulevard and Quincy Street was selected for widening due to the increasing congestion, rate of crashes, and the rising number of fatal crashes along this segment. The LOS at the US-31 and Jackson Street intersection improves from F to E and delays are less than half of the No-Action Alternative.

3.5 OTHER PROJECTS IN THE FEIS STUDY AREA

Road and Bridge

MDOT will continue to address roadway condition and operational issues using road and bridge reconstruction, rehabilitation and safety enhancements throughout the study area. Since the DEIS, intersection improvements have been completed along US-31 at the following intersections: Waverly Avenue (in Grand Haven), Lincoln Street, Buchanan Street, Croswell Street, New Holland Street and Comstock Street.

Some additional planned projects not dependent on the Preferred Alternative include:

- Reconstruction/rehabilitation of US-31 from 8th Avenue to Lakewood Boulevard, including the ramps at the I-196 BL interchange and rehabilitation of the structures at the Black River, I-196 BL, a railroad crossing, and Lakewood Boulevard in Holland.
- Indirect left-turn and/or right-turn improvements are planned at US-31, at the following intersections: Fillmore Street, Stanton Street and Bagley Street, and Taylor Avenue (in Grand Haven).
- Intersection improvements (additional turning lanes) at the M-104/144th Avenue intersection.

Intelligent Transportation Systems (ITS)

The primary focus of ITS deployment is to provide an incident detection, response, and management system throughout the US-31 corridor, and to provide timely and accurate traveler information

ITS initiatives are planned for US-31 in the Grand Haven area in the near future. Initial ITS deployment will occur in 2009 and will consist of one Dynamic Message Sign (DMS) and two or three Closed Circuit Television (CCTV) cameras. The DMS will be located on southbound US-31, approximately 1.5 miles north of the US-31 and I-96 interchange. The proposed DMS will allow MDOT to provide southbound motorists with advanced notification of traffic congestion on US-31 and I-96 as well as bascule bridge malfunctions.

CCTV cameras will be deployed in three locations to provide surveillance along US-31 near the Grand River bascule bridge, and on US-31 north of the bascule bridge. The CCTV cameras will assist MDOT with providing accurate information to be displayed on the proposed DMS on southbound US-31 and to provide traveler information via email/internet, and to provide incident response with information. The proposed ITS devices will primarily be monitored and controlled by the West Michigan Traffic Management Center (WMTMC) staff located at the MDOT Grand Region Office in Grand Rapids.

The full deployment of ITS in this area is planned for 2013 and beyond. It will include the following:

- DMS - A full ITS deployment in the Grand Haven/Muskegon metro areas including DMS on US-31, I-96, M-104, and M-45.
- Alternative Routes – The current emergency management route for US-31 diverts traffic to 68th Avenue. After the construction of the M-231 bypass route in Alternative F-1a, the official emergency management routes will consist of roads under the jurisdiction of MDOT, in this case reducing the length of the emergency management route by half. The Preferred Alternative will allow for a more reasonable alternate route for through traffic on US-31, making DMS even more beneficial.
- Arterial Surveillance – The highest priority locations for arterial surveillance deployments are congested signal corridors and incident management routes. US-31 from Robbins Road to Jackson Street and M-104 near I-96 (and the Preferred Alternative) are listed as high priority locations for

arterial surveillance deployments.

- **Freeway Surveillance** – Freeway surveillance at major junctions, including the possibility of midpoint camera coverage to monitor backups associated with incidents at the major junctions are planned for future deployment. US-31 at M-104, I-96 at M-104 (and the Preferred Alternative) are listed as high priority locations for freeway surveillance deployments.

Other possible ITS deployments in the project area include cell phone probe data, video sharing, illuminated trailblazing signs, and road weather information systems (RWIS).

3.6 CONCLUSION

The Preferred Alternative (F-1a) best satisfies the Purpose and Need for this project while minimizing impacts and providing financially feasible improvements. This conclusion was reached after additional coordination with MPO's, local agencies, resource agencies, other local stakeholders, and the public.

The Preferred Alternative effectively addresses the current traffic-related issues and future traffic demand by improving existing US-31 in the most congested areas, and providing an alternate route with a new Grand River crossing to increase regional access. The new M-231 route will create a logical trunkline segment with independent utility. Potential indirect and cumulative impacts from urban sprawl pressures are minimized by limiting direct access to the new M-231 route.

Reduce Traffic Congestion and Delay

Capacity improvements consisting of adding lanes and improving intersections will enhance traffic flow along US-31 within the Holland and Grand Haven urbanized areas. These improvements will increase capacity, reduce delay and improve intersection operations. The new alignment with the new Grand River crossing will provide an alternate through route for regional access and help further reduce traffic congestion and delay in the Grand Haven area. Traffic is also diverted from the Ottawa County Road Commission 68th Avenue two-lane river crossing on the east end of the corridor study area.

Improve Safety

The capacity improvements on existing US-31 will reduce traffic congestion and delay and will also reduce the potential for crashes on existing US-31. The new M-231 alignment will be limited access (allows no access for vehicles or adjacent land use, between intersections), which has a reduced crash rate as compared with free access (provides access for vehicles at intersections, and adjacent land use access).

Increase Access

The new alignment includes an additional crossing of the Grand River, a new I-96/M-231 interchange and improvements at the existing I-96/112th Avenue Interchange. This relieves travel demand on the existing US-31 crossing in Grand Haven, provides improved access to the growing area east of existing US-31 in the corridor study area, and provides a critical link for emergency services between Robinson Township and Crockery Township and the region.

Future Demand

This new route will not preclude additional lanes on the Preferred Alternative M-231 alignment north of M-45, when warranted by land use and traffic growth in the corridor study area. Additional improvements beyond this Preferred Alternative will require future NEPA environmental documentation and alternative evaluation, based on statewide financial considerations, state trunkline needs, and local priorities.

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.

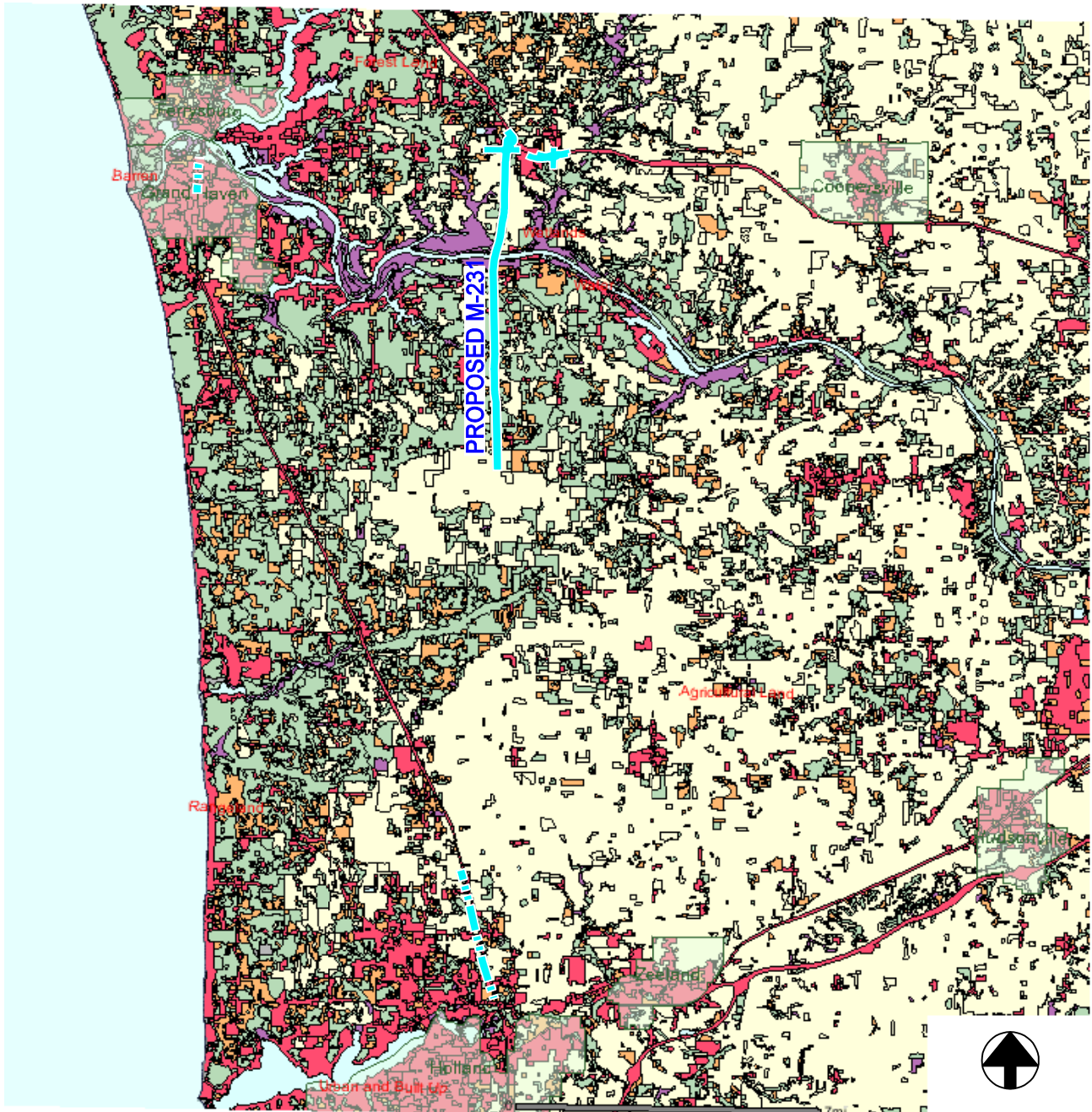
ELU – Existing Land Use FLU – Future Land Use

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.

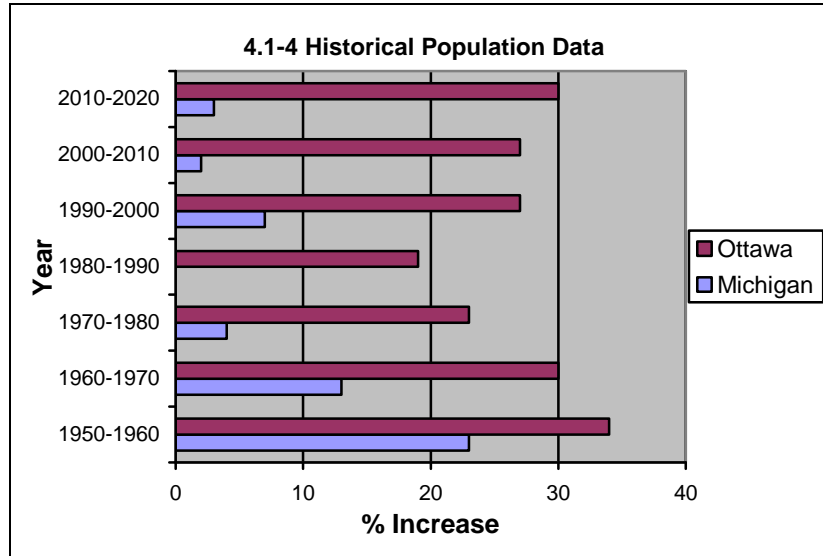
4.1.4.1 Geographic Boundary

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)

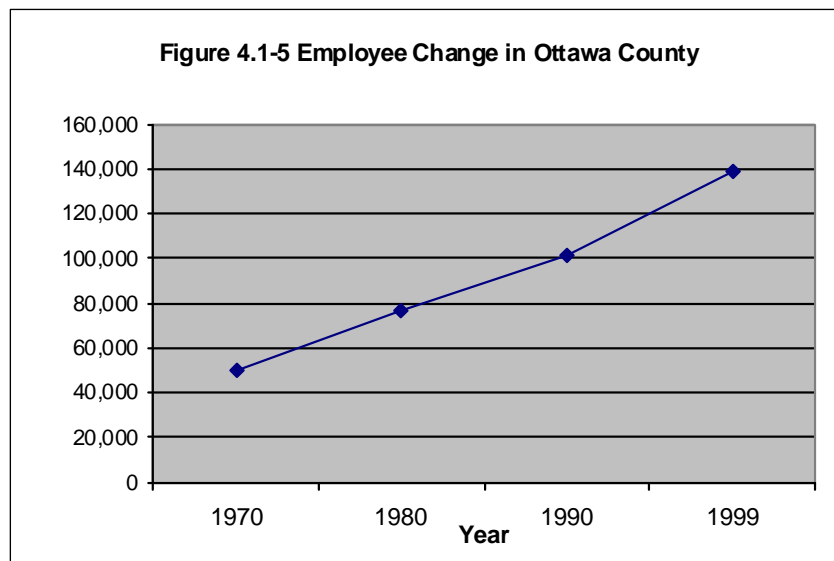
Ottawa County population data for 1950-2020 was reviewed (see **Figure 4.1-4**). The year 1950 represents the date just before US-31 was widened to its current width in its existing location. During the decade following the opening of the roadway, Ottawa County's population increased by 34%. Continued 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.

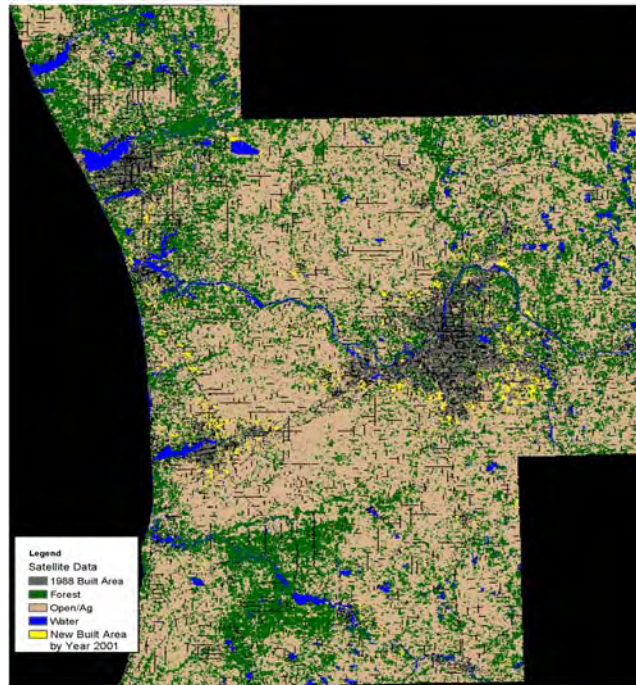


Figure 4.1-6 MSU Satellite Data

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 BRSI 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.

Table 4.1-5 Comparison of Total Built Area				
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.

Table 4.1-6 Forecasted Conversion of Land Uses in Ottawa County (in acres)						
	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.

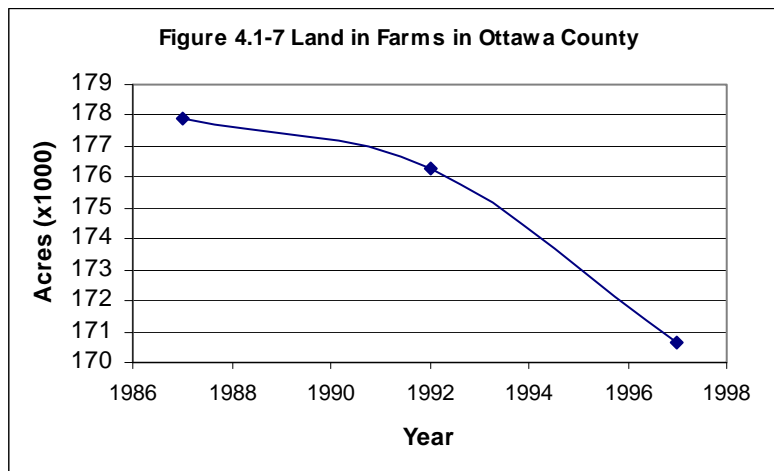
The US-31 Land Use Study forecasted the probable conversion of wetlands between 2001 and 2020 for both the No-Action Alternative and Alternative F/J-1 for comparison purposes. The conclusions were that roughly 2.19% of the wetland areas would be converted by 2020 with the No-Action Alternative, as opposed 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 provide 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

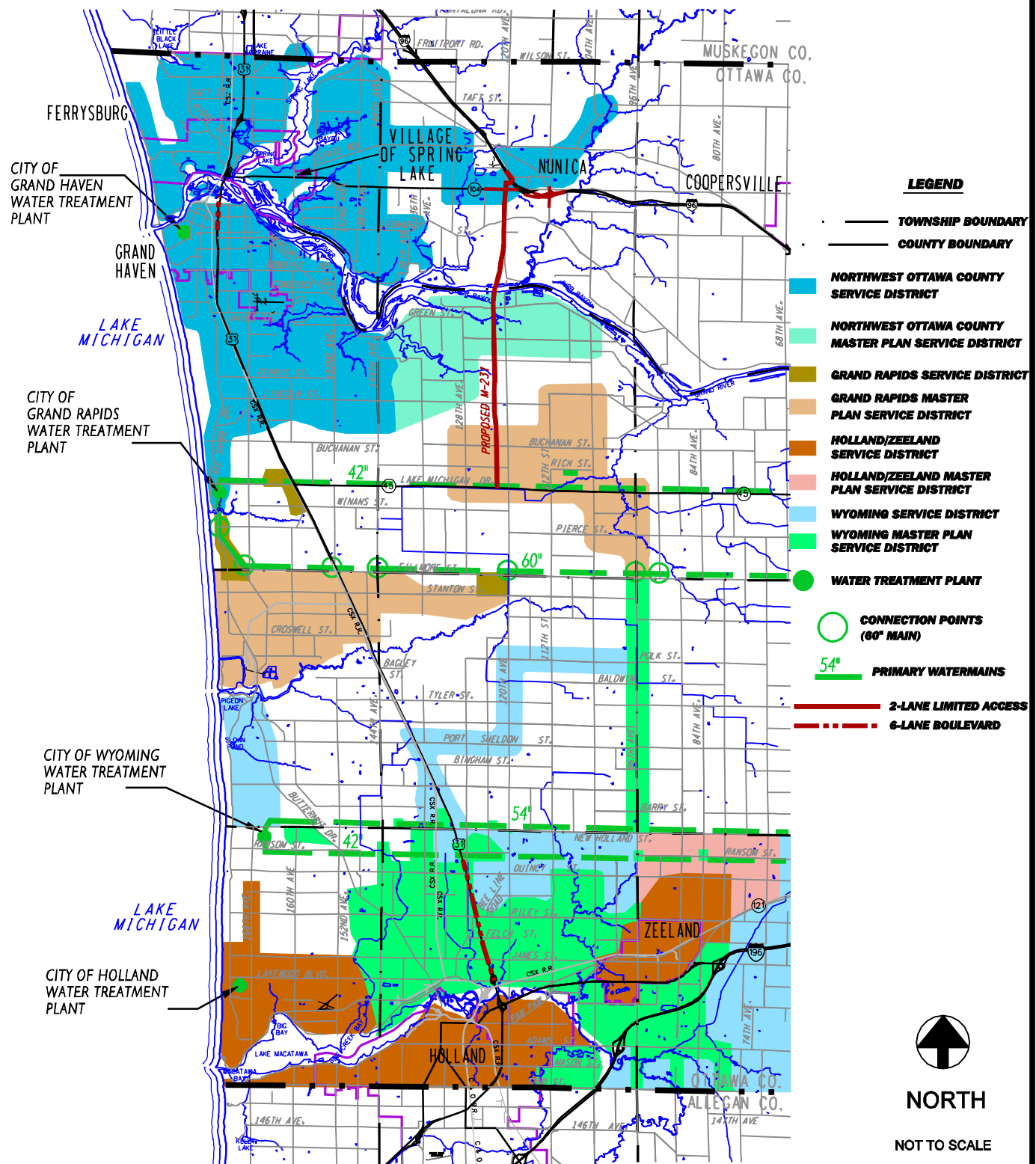
The gas utility provider within the study area is DTE Energy. Major natural gas and oil pipelines are ANR Pipeline Company, SEMCO, Wolverine Pipeline and Marathon Ashland Pipeline Company.

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.



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.

Table 4.2-1 Acreage of Active Farmland Impacted and LESA Scores									
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%

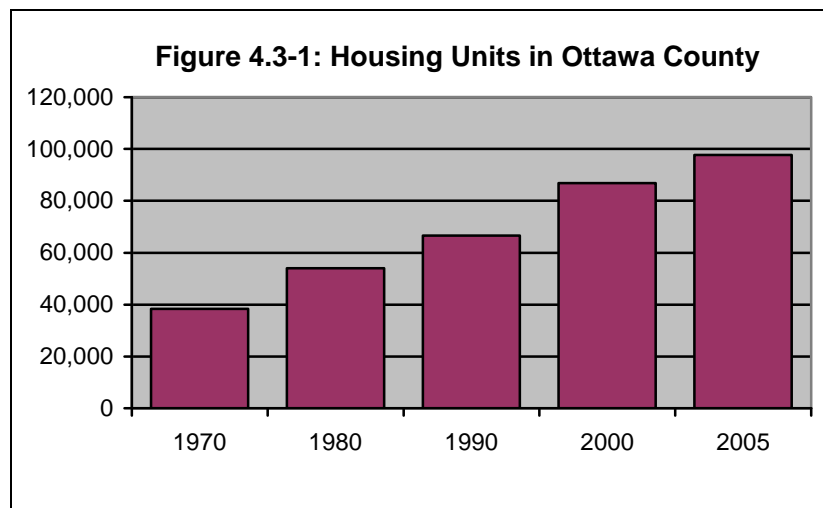
Sources: 1970 to 2000 Population from U.S. Census Bureau. Forecasts completed by University of Michigan.

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

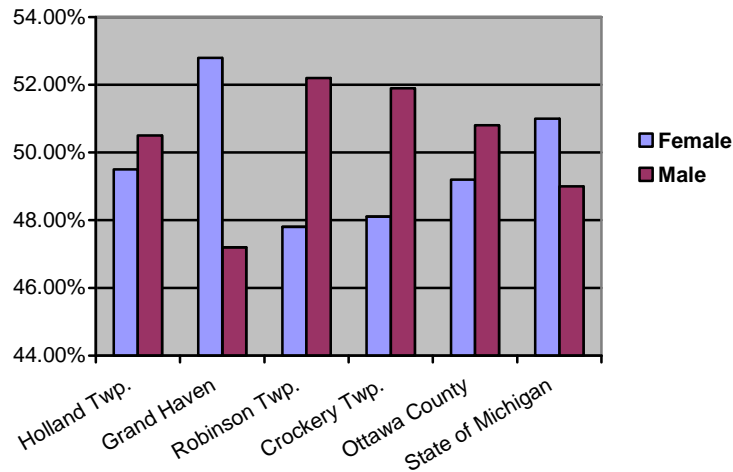
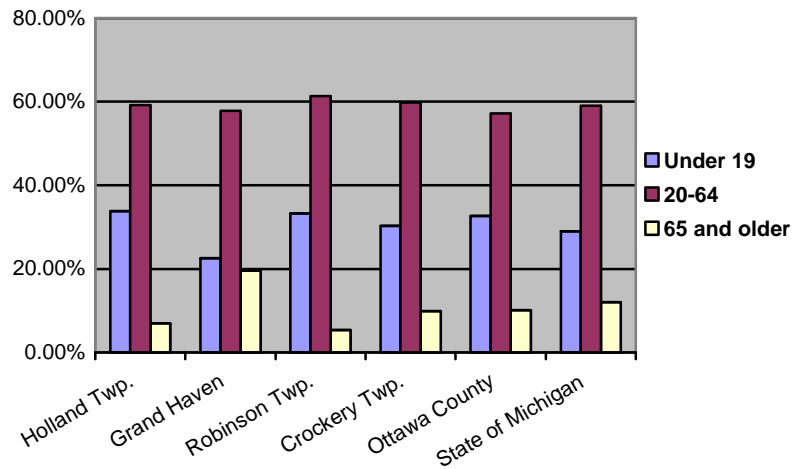


Figure 4.3-3 Age Profile



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 9th grade	1,154	6.9%	497	6.3%	146	4.3%	110	4.4%
9th to 12th 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 provide 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 within the study area. This section discusses the analysis and coordination performed as a part of the Environmental Justice Evaluation.

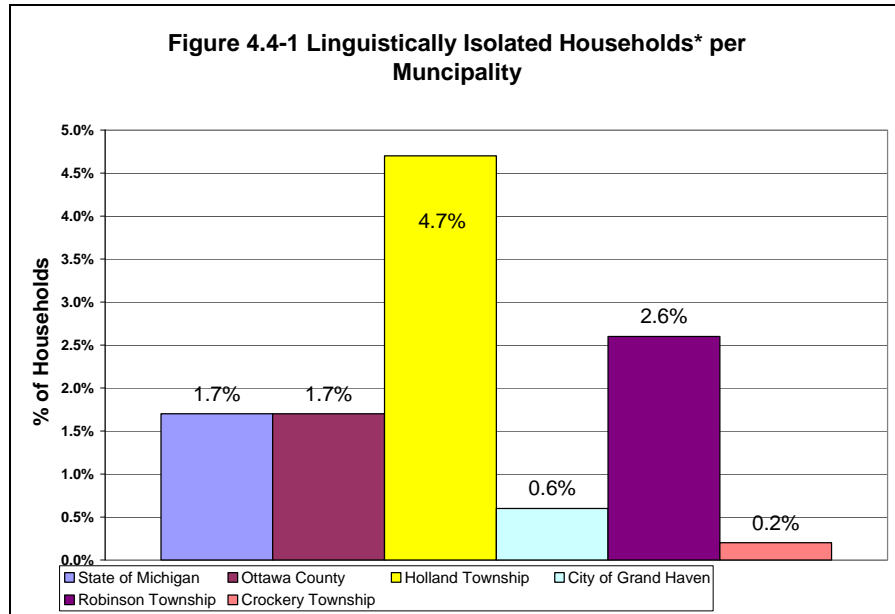
4.4.1 Analysis of Environmental Justice

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.

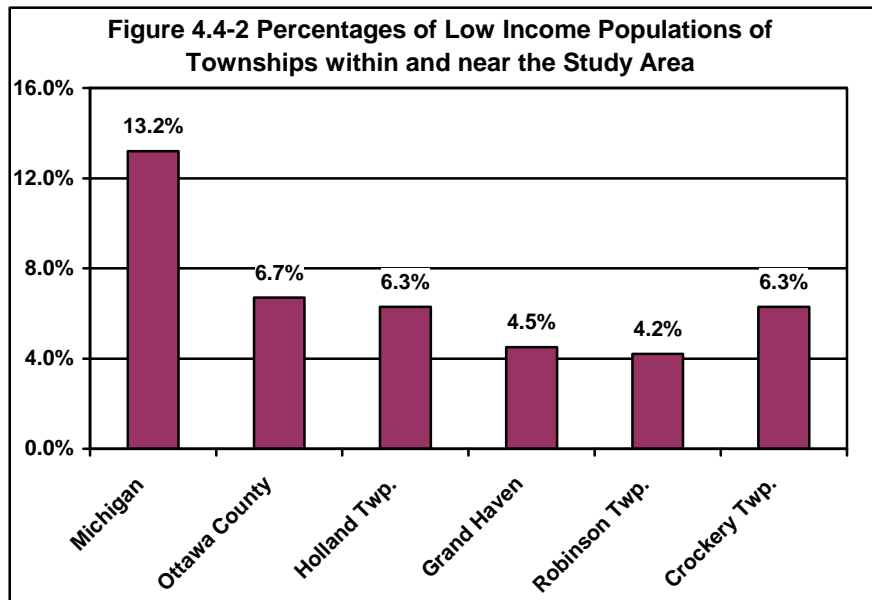
4.4.2 Minority and Low-Income Groups in Study Area

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.

Table 4.4-1 Minority Population Percentages of Townships within the Preferred Alternative Study Area						
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	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. Negative: Pedestrian crossings will be more difficult due to an addition of a third lane in Holland and Grand Haven.	Positive: Compliance in air quality, soil erosion and sedimentation, and water quality. Negative: Increased air, water, soil issues during construction.	Positive: Compliance in air quality, contamination, and water quality. Negative: Increased noise levels during construction.	Negative: Construction of a new road will remove many trees, wetlands, animal habitats and the median will be reduced in Grand Haven.	Positive: Visual quality is enhanced or improved for those using the new roadway. Negative: Visual Quality is degraded for those viewing the facility from off the road.	Positive: The bridge over the Grand River provides increased accessibility and connectivity between townships on either side of the river. Negative: Construction of a new roadway in Robinson and Crockery Townships, Increased roadway width in Grand Haven and Holland.	Positive: The bridge over the Grand River provides increase accessibility and connectivity between townships on either side of the river. Negative: Acquisitions and possible temporary construction implications.	Positive: Better access to emergency services and other public services Negative: Wider roadways, relocations	Negative: Possible impacts during construction to adjacent facilities.	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. Negative: Removing farm land from use.	Negative: 66 estimated structures to be acquired and relocated.	Positive: Improved levels of service, access to emergency service and potential bus service. Negative: Traffic along the M-231.	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. Negative: Temporary inconveniences while building the Preferred Alternative	Positive: The bridge over the Grand River provides increased accessibility and connectivity between townships on either side of the river. Negative: Limited access across river	Positive: No access being denied. Provides improvements both locally and regionally. Negative: Construction will have temporary impact on the local community.
Mitigation Measures	Replace existing sidewalks and maintain local connectivity along existing US-31 in Grand Haven and Holland.	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.	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.	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.	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.	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.	Construction staging to ensure access and mobility is not adversely impaired.	Construction staging will be implemented in order to address access issues. The potential for displaced businesses to relocate in the Study Area is likely. MDOT will coordinate relocation with all affected properties. Regular public information updates to address changes in the community will be communicated.	Please refer to section 4.22	MDOT will collaborate with community leaders/planners to address business/employment impacts	Federal/State relocation regulations and guidelines will be followed. MDOT will work with the affected community to determine relocation options.	Construction staging will help to alleviate construction and safety factors during construction. Consistent public information will communicate changes in routes particularly detours, long delays.	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.	MDOT will implement context sensitive solutions to address aesthetics, community values and character with the new bridge.	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.

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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.

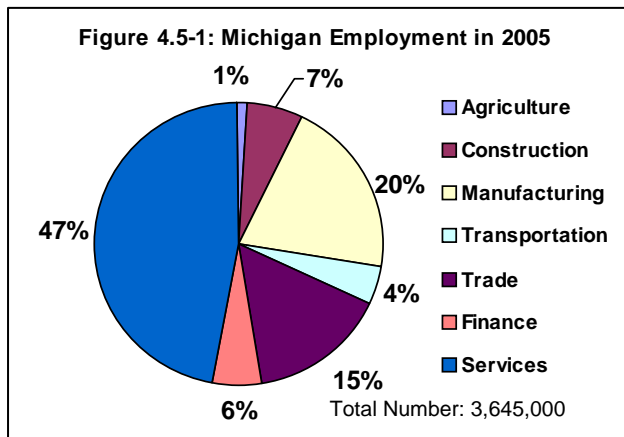
4.5.1 Existing Conditions

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.

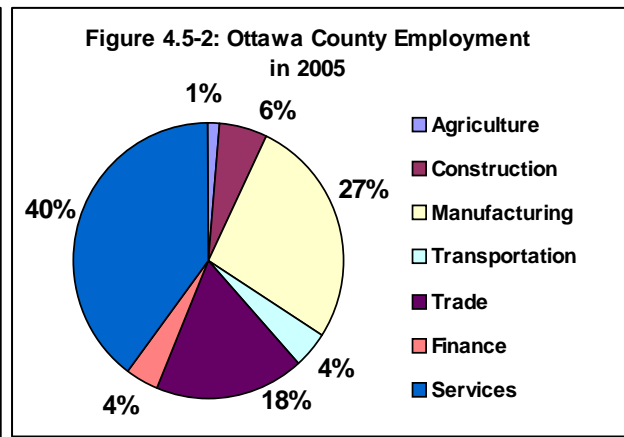
Employment

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**).

Table 4.5-1 Income and Poverty		
	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%

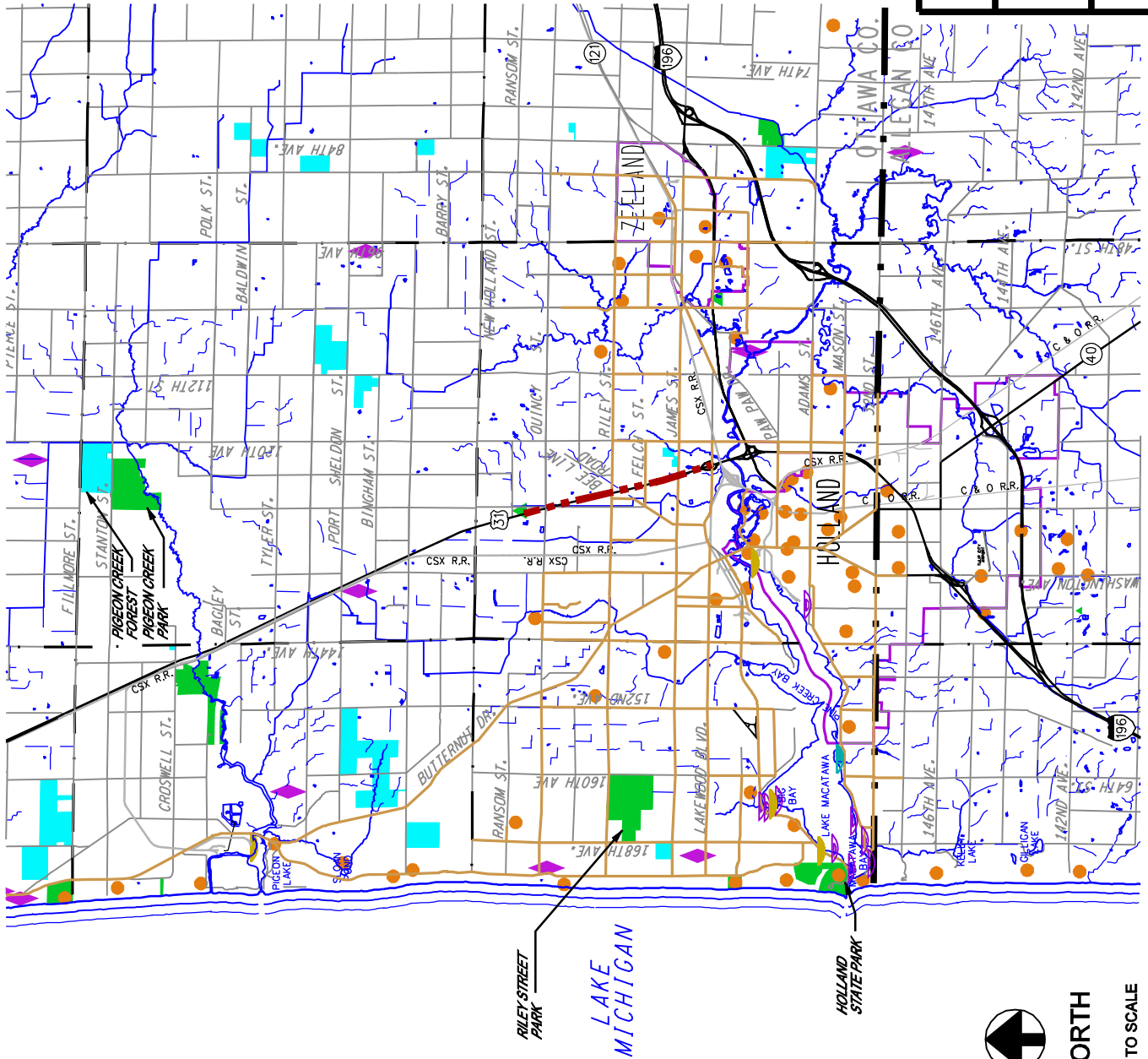
Source: Ottawa County Department of Equalization

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 SOUTH OF FILLMORE STREET

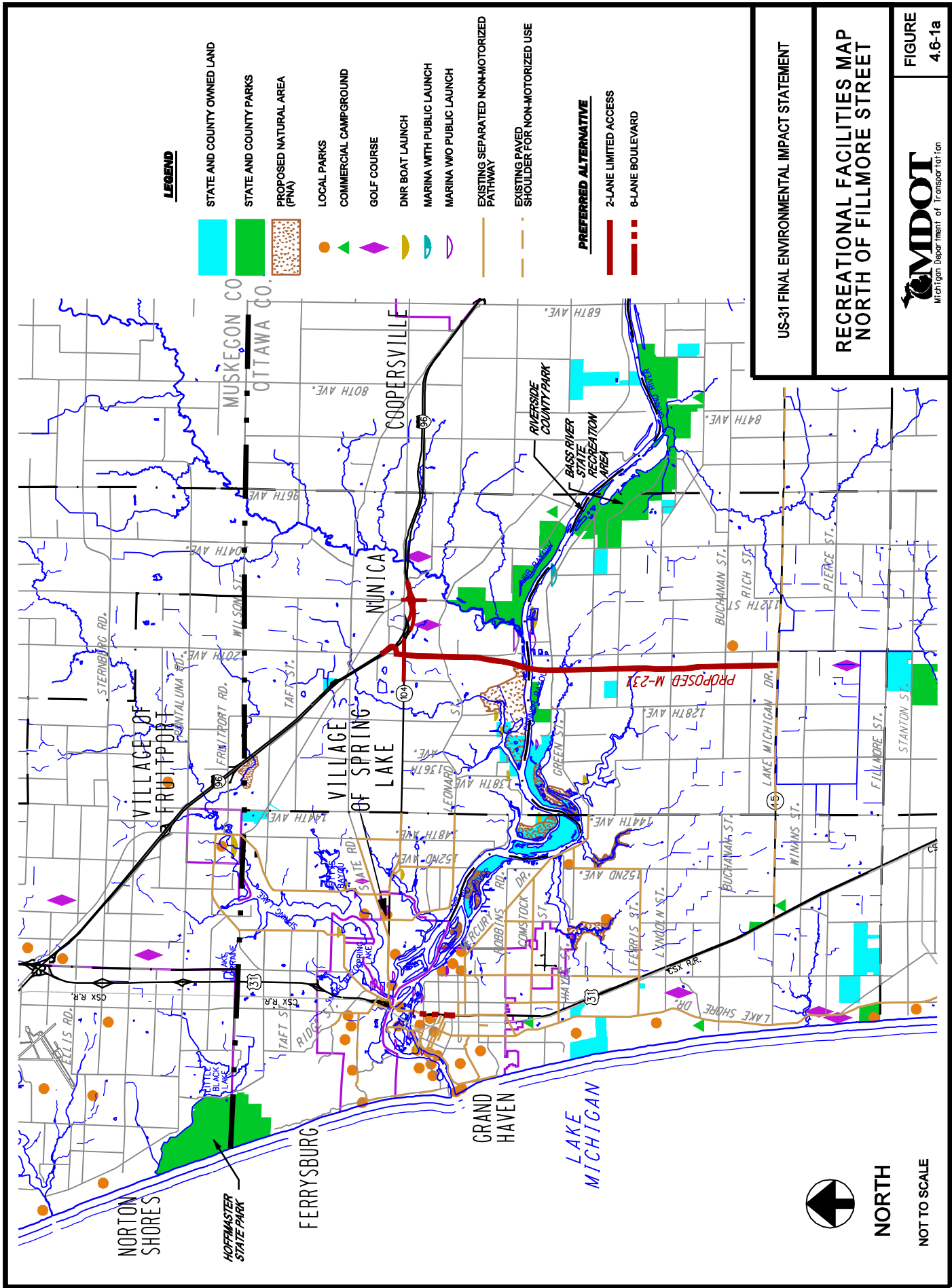


FIGURE
4.6-1b



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 hear. 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.

Table 4.8-1 Common Outdoor and Indoor Noise Levels		
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)	L₁₀(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

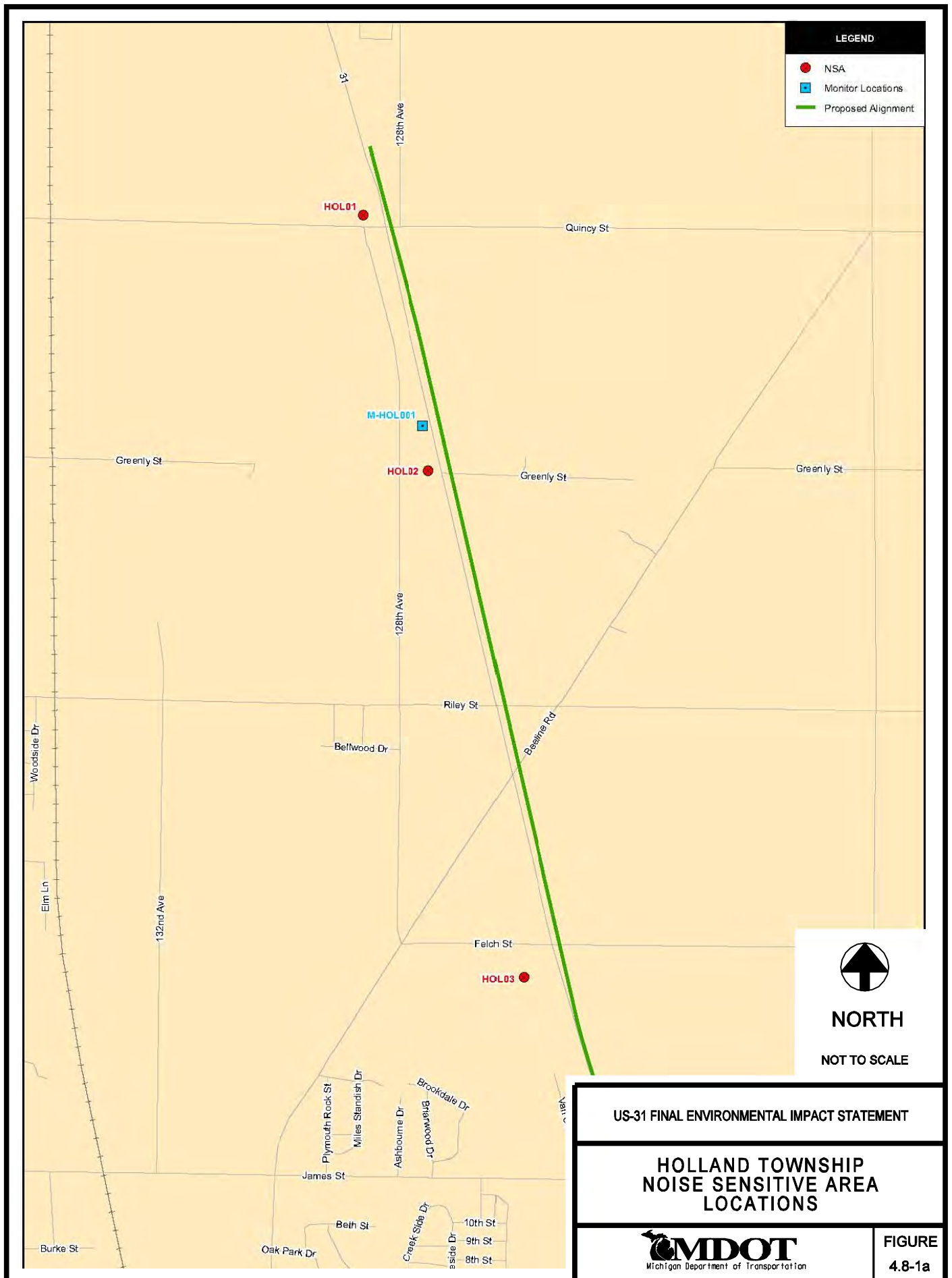
In general, for areas where existing noise levels are dominated by traffic noise, existing noise levels were predicted using the Traffic Noise Model (TNM). The traffic volumes used to predict the existing sound levels were obtained from traffic data from MDOT and the OCRC. Where data was not available, 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.

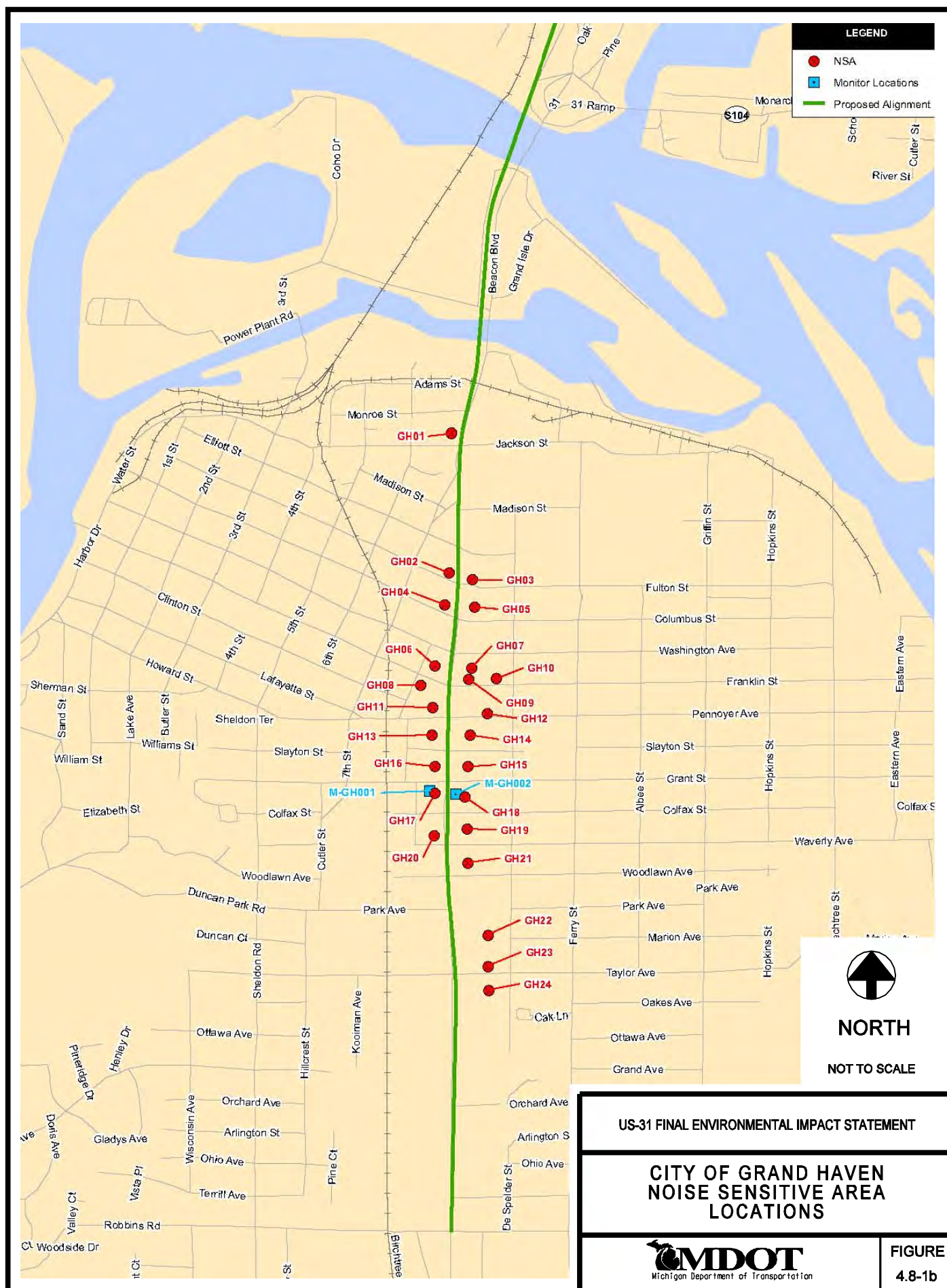
The proposed M-231 is a new roadway alignment, and traffic noise is not the dominant noise source for the existing condition. Existing noise levels in this area were instead determined by taking noise measurements at representative locations along the proposed alignment. These measurements were applied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

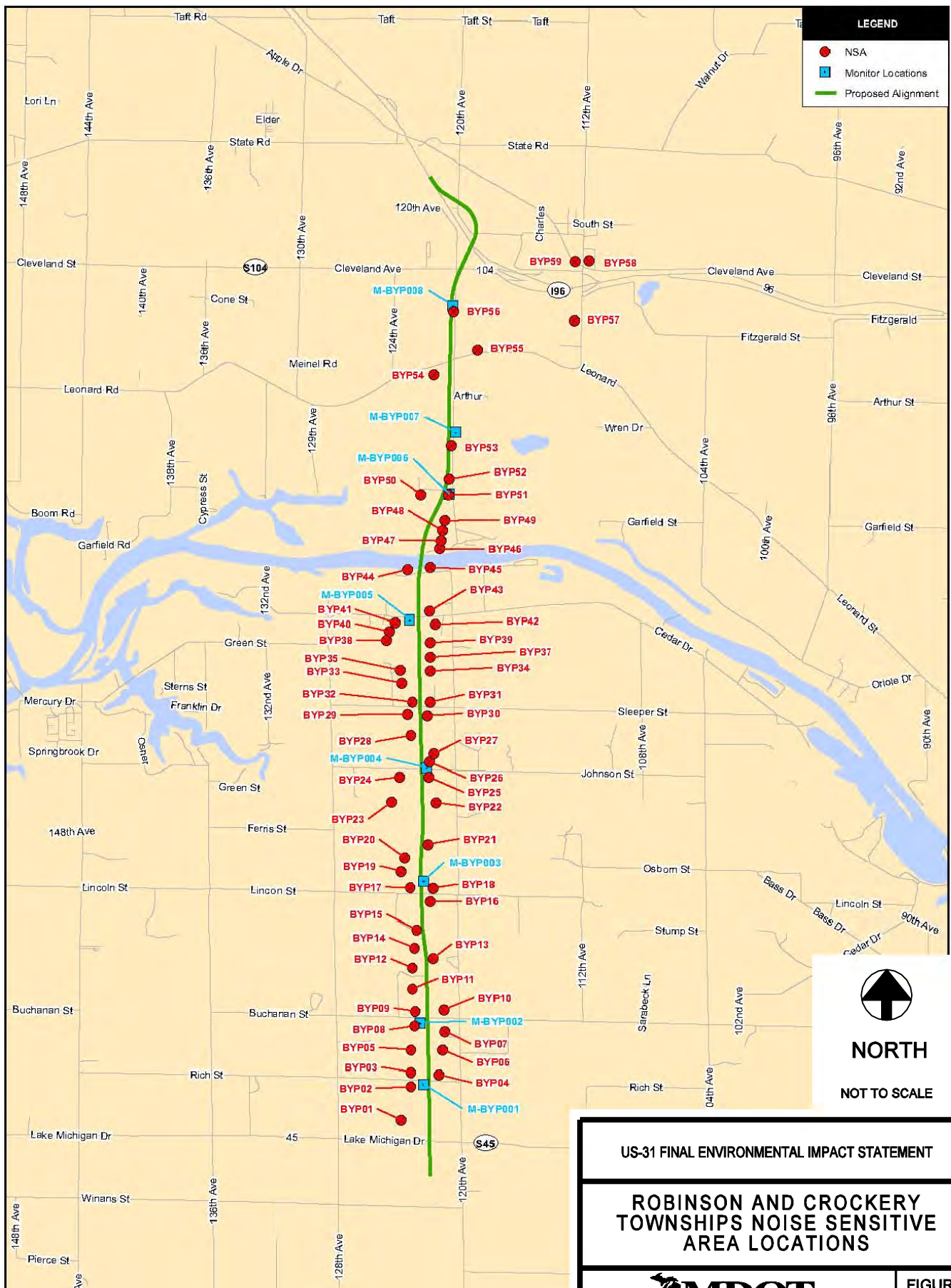
Ambient noise level measurements were conducted for two reasons: to validate the Noise Sensitive Area (NSA), where modeled highways are the dominant noise source and to establish representative existing ambient noise levels for NSAs where modeled traffic noise is not the dominate noise source.

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

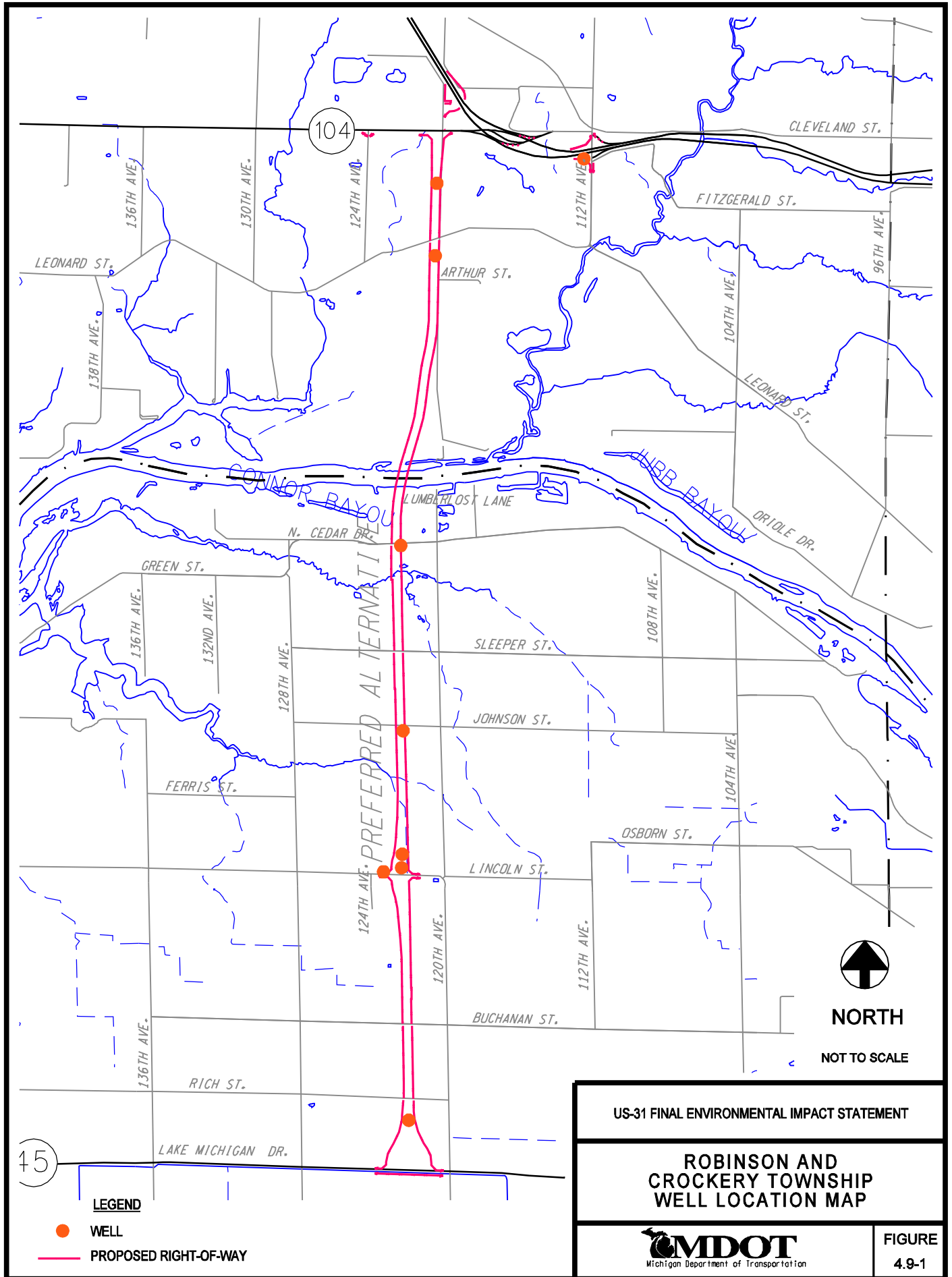
The study area has an abundant supply of both surface water and groundwater. Groundwater is accessed from both shallow and deep wells which provide ample water for domestic uses, livestock, and irrigation; primarily in rural areas of the study area. Urban area water is primarily supplied by Lake Michigan, 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.



**Table 4.9-1
Wells Impacted by the Preferred Alternative**

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

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4.10.1 Impacted Wetlands

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Assessment Method (MnRAM) was used to assess the functions and values of each wetland. For complete MnRAM results for each wetland, refer to **Table 4.10-2**. The Preferred Alternative will impact approximately 3.04 acres of wetland. An additional summary of wetland impacts is also shown on **Figures 4.10-1 through 4.10-4**.

Table 4.10-1 Wetland Summary Table			
Wetland I.D	Wetland Type	Delineated Wetland Size	Total Wetland Impact (Acres)
A	Palustrine Scrub/Shrub	1.69	0.25
B	Palustrine Emergent/Scrub/Shrub	3.24	0.41
C	Palustrine Emergent/Scrub/Shrub	7.77	0.84
D	Palustrine Emergent/Scrub/Shrub	9.53	1.12
E	Palustrine Forested	0.60	0.12
F	Palustrine Forested	0.36	0.15
G	Palustrine Emergent	0.26	0.08
H	Palustrine Emergent/Scrub/Shrub	0.86	0.01
I	Palustrine Scrub/Shrub	0.56	0.06
J	Palustrine Emergent	N.A	0.002

Wetland A is a palustrine scrub/shrub wetland associated with Stearns Creek (**Figure 4.10-1**). This wetland contains broad-leaved cattail (*Typha latifolia*), grey dogwood (*Cornus foemina*), iris (*Iris sp.*), cardinal flower (*Lobelia cardinalis*), common boneset (*Eupatorium perfoliatum*), angelica (*Angelica atropurpurea*), spotted joe-pye-weed (*Eupatorium maculatum*), goldenrod (*Solidago sp.*), sensitive fern (*Onoclea sensibilis*), cinnamon fern (*Osmundo cinnamomea*), Eastern cottonwood (*Populus deltoides*), spotted touch-me-not (*Impatiens capensis*) and quaking aspen (*Populus tremuloides*). Evidence of hydrology includes soil saturation and drainage patterns.

Wetland A's functions and values rated high in vegetative diversity and integrity, hydrology-characteristic, water quality-downstream, water quality-wetland and characteristic wildlife habitat structure. In addition, the wetland was rated as exceptional in maintenance of characteristic fish habitat.

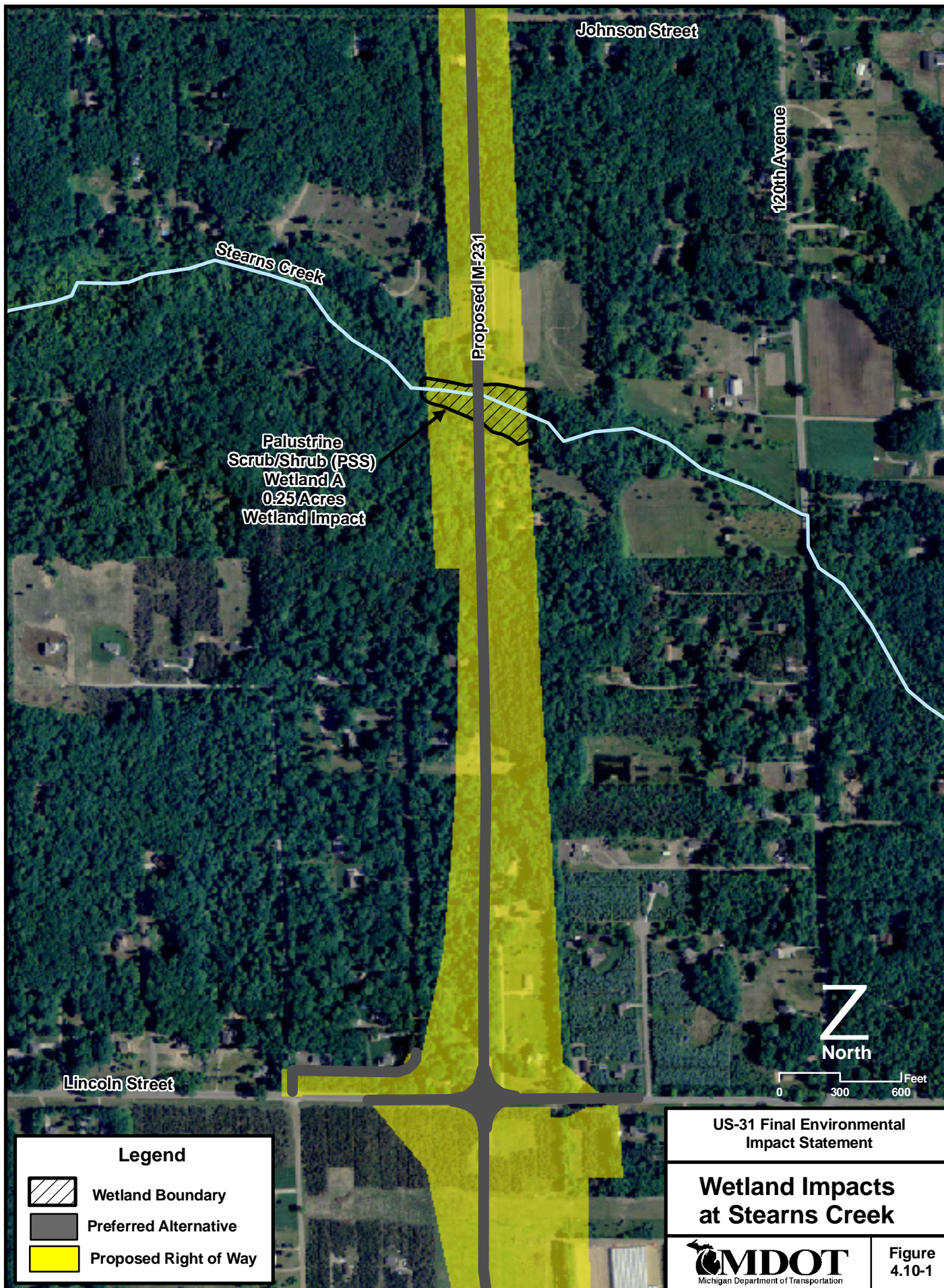
Of the 1.69 acres of Wetland A delineated within the proposed ROW, 0.25 acre will be impacted by the Preferred Alternative. Wetland A continues to the east and west outside of the proposed ROW.

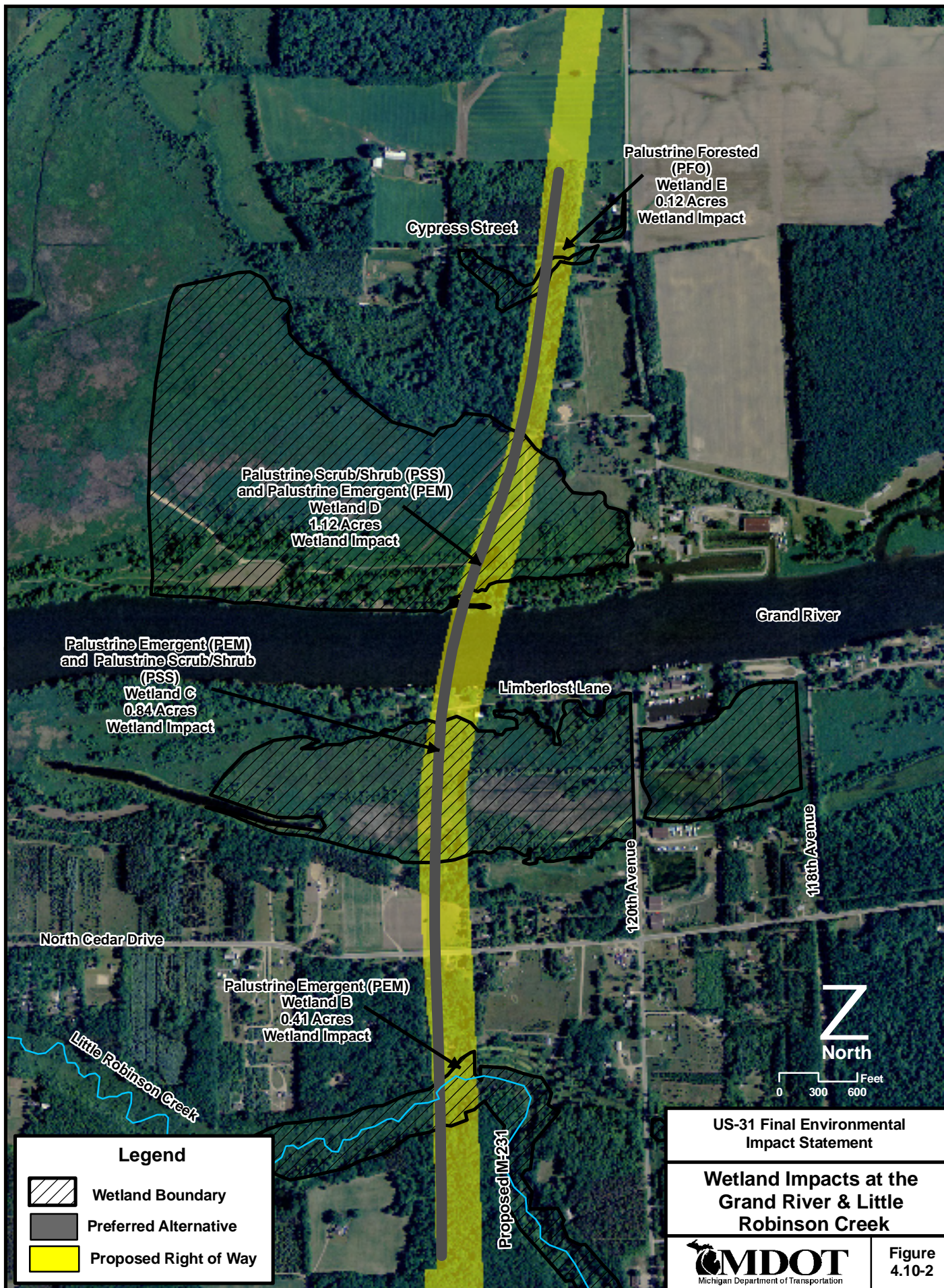
Wetland B is a palustrine emergent/scrub/shrub wetland complex associated with Little Robinson Creek (**Figure 4.10-2**). This wetland contains reed canary grass (*Phalaris arundinacea*), narrow-leaved cattail (*Typha angustifolia*), sumac (*Rhus sp.*), gray dogwood (*Cornus foemina*), red-osier dogwood (*Cornus stolonifera*), weeping willow (*Salix alba*), green ash (*Fraxinus pennsylvanica*), American elm (*Ulmus americana*), Eastern cottonwood (*Populus deltoides*), goldenrod (*Solidago sp.*) and paper birch (*Betula papyrifera*). Evidence of hydrology includes inundation, soil saturation and watermarks.

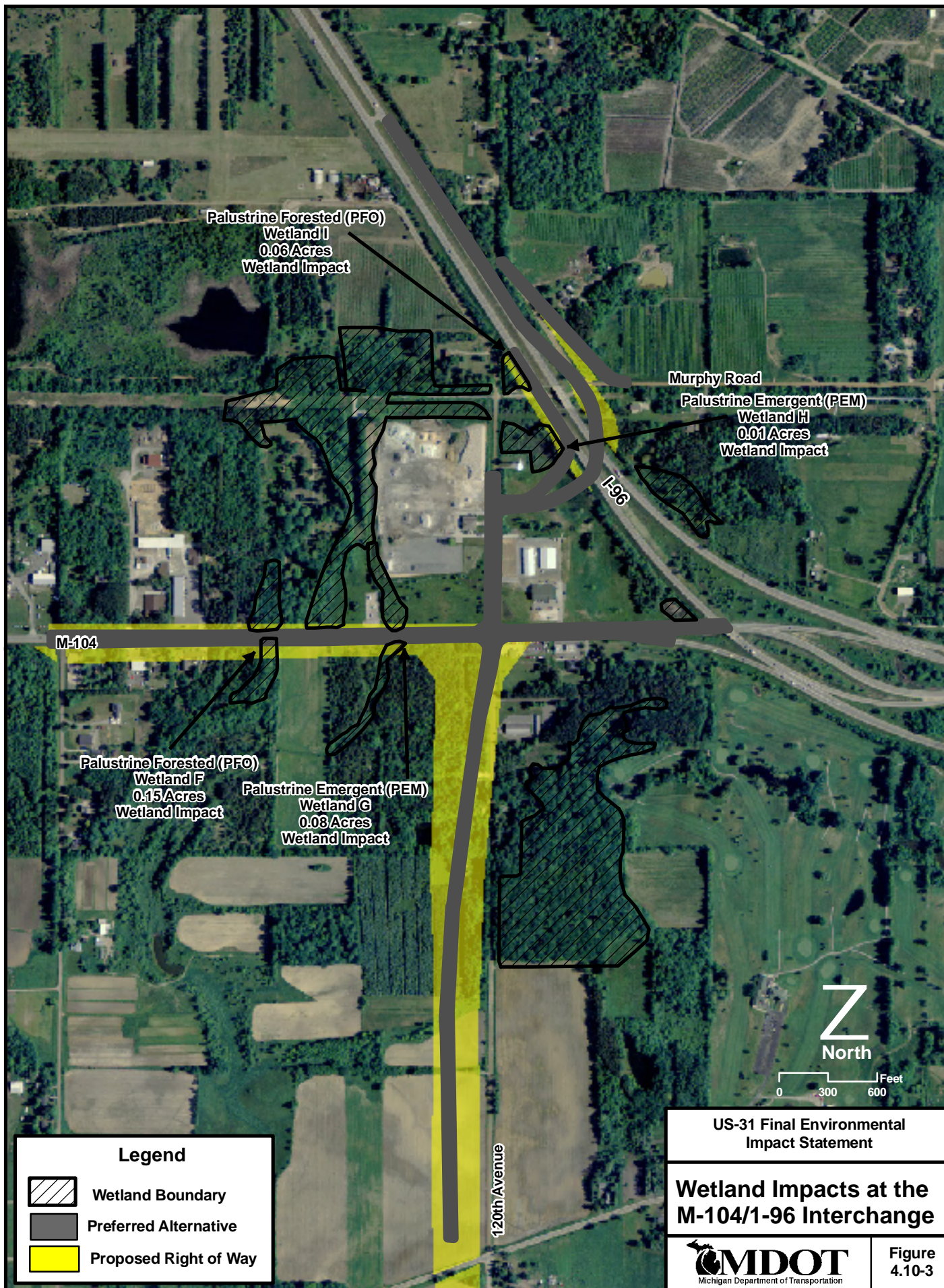
Wetland B's functions and values scored high in the categories of hydrology-characteristic, water quality-downstream, water quality-wetland, and maintenance of characteristic fish habitat.

Of the 3.24 acres of Wetland B delineated within the proposed ROW, 0.41 acre will be impacted by the Preferred Alternative. Wetland B continues to the east and west outside the proposed ROW.

Wetland C is a palustrine emergent wetland with some scrub/shrub habitat associated with the Grand River (**Figure 4.10-2**). This wetland contains narrow-leaved cattail (*Typha angustifolia*), willow (*Salix sp.*), red-osier dogwood (*Cornus stolonifera*), Eastern cottonwood (*Populus deltoides*), green ash (*Fraxinus pennsylvanica*), reed canary grass (*Phalaris arundinacea*) and gray dogwood (*Cornus foemina*). Evidence of hydrology includes inundation, water stained leaves, drift lines and saturated soils.









Wetland C's functions and values scored high in the categories of hydrology-characteristic, flood attenuation, water quality- downstream, water quality- wetland, characteristic wildlife habitat structure, and maintenance of characteristic fish habitat.

Of the 7.77 acres of Wetland C delineated within the proposed ROW, 0.84 acre will be impacted by the Preferred Alternative. Wetland C continues to the east and west outside of the proposed ROW.

Wetland D is a palustrine emergent/scrub/shrub wetland complex associated with the Grand River (**Figure 4.10-2**). Several wetland types are associated within this wetland. The first area of wetland vegetation occurs along the banks of the river. This palustrine scrub/shrub wetland is dominated by sandbar willow (*Salix exigua*), weeping willow (*Salix alba*), riverbank grape (*Vitis riparia*) and Eastern cottonwood (*Populus deltoides*).

An area of palustrine emergent vegetation occurs to the north of the palustrine shrub/scrub area and is dominated by reed canary grass (*Phalaris arundinacea*), narrow-leaved cattail (*Typha angustifolia*), buttonbush (*Cephalanthus occidentalis*) and arrow arum (*Peltandra virginica*). This emergent habitat has a mature relic tree fringe dominated by green ash (*Fraxinus pennsylvanica*), silver maple (*Acer saccharinum*), sandbar willow (*Salix exigua*) and black willow (*Salix nigra*).

The largest wetland area within the complex is a palustrine emergent wetland dominated by spotted joe-pye-weed (*Eupatorium maculatum*), wood sage (*Teucrium canadense*), blue vervain (*Verbena hastata*), late goldenrod (*Solidago gigantea*), tall ironweed (*Vernonia gigantea*) and swamp milkweed (*Asclepias incarnata*).

The wetland complex has evidence of soil saturation, water-stained leaves, water-marks and exhibited buttressing. This entire wetland complex is hydrologically connected to Bruce's Bayou.

Wetland D's functions and values scored high in the categories of vegetative diversity/integrity, flood attenuation, water quality-downstream, water quality-wetland, and characteristic wildlife habitat structure.

Of the 9.53 acres of Wetland D delineated within the proposed ROW, 1.12 acres of palustrine emergent/shrub/scrub wetland will be impacted by the Preferred Alternative. Wetland D continues to the east and west outside of the proposed ROW.

Wetland E is a palustrine forested wetland complex associated with an intermittent stream, an unnamed tributary to Bruce's Bayou, just south of Cyprus Street (**Figure 4.10-2**). The wetland continues via a culvert under Cyprus Street to an area of palustrine emergent wetland. The forested wetland area is dominated by silver maple (*Acer saccharinum*), spotted touch-me-not (*Impatiens capensis*), green ash (*Fraxinus pennsylvanica*), reed canary grass (*Phalaris arundinacea*) and sedges (*Carex* spp.). The emergent wetland area is dominated by reed canary grass (*Phalaris arundinacea*), narrow-leaved cattail (*Typha angustifolia*), spotted joe-pye-weed (*Eupatorium maculatum*), sandbar willow (*Salix exigua*), sedges (*Carex* spp.), boneset (*Eupatorium perfoliatum*) and spotted touch-me-not (*Impatiens capensis*). The wetland has drainage patterns and drift lines, soil saturation and some inundation. This wetland is also hydrologically connected to Bruce's Bayou.

Wetland E's functions and values scored high in the categories of vegetative diversity/integrity, hydrology characteristic, water quality-downstream, water quality-wetland, characteristic wildlife habitat structure, and maintenance of characteristic amphibian habitat.

Of the 0.60 acre of Wetland E delineated within the proposed ROW, 0.12 acre will be impacted by the Preferred Alternative. Wetland E continues to the east and west outside of the proposed ROW.

Wetland F is a palustrine forested wetland just west of the Nunica Cemetery (**Figure 4.10-3**). This wetland is dominated by paper birch (*Betula papyrifera*), reed canary grass (*Phalaris arundinacea*), green ash (*Fraxinus pennsylvanica*), silver maple (*Acer saccharinum*) and speckled alder (*Alnus rugosa*). Evidence of hydrology includes drift lines, buttressing and watermarks.

Wetland F's functions and values scored medium in all applicable categories.

Of the 0.36 acre of Wetland F delineated within the proposed ROW, 0.15 acre will be impacted by the Preferred Alternative. Wetland F continues to the north and south outside of the proposed ROW.

Wetland G is a palustrine emergent wetland associated with the Black Creek (**Figure 4.10-3**). This wetland is dominated by narrow-leaved cattail (*Typha angustifolia*) and reed canary grass (*Phalaris arundinacea*). Evidence of hydrology includes inundation and soil saturation.

Wetland G's functions and values scored medium and low in all applicable categories.

Of the 0.26 acre of Wetland G delineated within the proposed ROW, 0.08 acre will be impacted by the Preferred Alternative. Wetland G continues to the north and south outside of the proposed ROW.

Wetland H is a palustrine emergent/scrub/shrub wetland (**Figure 4.10-3**). This wetland is dominated by goldenrods (*Solidago spp.*), narrow-leaved cattail (*Typha angustifolia*), reed canary grass (*Phalaris arundinacea*), high-bush cranberry (*Viburnum opulus*), gray dogwood (*Cornus foemina*), red-osier dogwood (*Cornus stolonifera*), and yellow birch (*Betula alleghaniensis*). Evidence of hydrology includes water-stained leaves and soil saturation.

Wetland H's functions and values scored medium and low in all applicable categories.

Of the 0.86 acre of Wetland H delineated within the proposed ROW, 0.01 acre will be impacted by the Preferred Alternative. Wetland H continues outside of the proposed ROW.

Wetland I is a palustrine scrub/shrub wetland dominated by narrow-leaved cattail (*Typha angustifolia*), reed canary grass (*Phalaris arundinacea*), gray dogwood (*Cornus foemina*), red-osier dogwood (*Cornus stolonifera*), paper birch (*Betula alleghaniensis*) and silver maple (*Acer saccharinum*) (**Figure 4.10-3**). Evidence of hydrology includes inundation and watermarks.

Wetland I's functions and values scored medium in all applicable categories.

Of the 0.56 acre of Wetland I delineated within the proposed ROW, 0.06 acre will be impacted by the preferred alternative. Wetland I extends outside of the proposed ROW.

Wetland J is a palustrine emergent wetland dominated by narrow-leaved cattail (*Typha angustifolia*) and reed canary grass (*Phalaris arundinacea*). It is located at the corner of US-31 and Riley Street in Holland (**Figure 4.10-4**). This is the only wetland that will be impacted within the Macatawa River Watershed.

Wetland J's functions and values scored medium in flood attenuation, water quality downstream, and aesthetics/recreation/education/culture.

0.002 acre of wetland J may be impacted by the Preferred Alternative. Measures will be taken to avoid impacts to this wetland, but if impacts do occur, mitigation will take place at MDOT's Macatawa wetland bank site.

The complete MnRAM results summarizing the functions and values for each individual wetland previously mentioned are listed below in **Table 4.10-4**.

Impacts

Some wetlands will be impacted by the Preferred Alternative and will require mitigation. Mitigation will be provided by the construction of new, similar wetlands within the appropriate watersheds. Wetland impacts have been calculated and are shown in **Table 4.10-2** using the Cowardin classifications. The calculations assumed that all wetlands from approximately 33 feet within the proposed ROWs 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. MDOT will

make every attempt during the design phase of the project to avoid and minimize impacts. See **Section 4.22 Construction-Related Impacts and Mitigation** for a discussion of temporary impacts to wetlands due to construction.

Table 4.10-2 Wetland Impact Matrix	
Wetland Classification (Cowardin, et al.)	Direct Impact (Acres)
Palustrine Emergent	0.08 Acre
Palustrine Emergent/Scrub/Shrub	2.38 Acre
Palustrine Scrub/Shrub	0.31 Acre
Palustrine Forested	0.27 Acre
Total Impact	3.04 Acres

Indirect impacts to wetlands may include habitat fragmentation since the Preferred Alternative could potentially divide wetlands into separate sections. This can affect wildlife and plant communities by encouraging the spread of invasive and exotic species and may increase the probability of vehicular impacts with terrestrial animals. However, given the small size of most of the wetlands, the indirect impacts are expected to be minimal.

Wetland Functions and Values

A wetland function and value assessment using the MnRAM method was conducted to provide a basis for determining the quality of the wetlands that will be affected by the Preferred Alternative. The function and value assessment also provides data for determining the wetland mitigation goals and targeted functions that will need to be designed into the mitigation areas to compensate for unavoidable wetland impacts.

One of the primary purposes for conducting the wetland function and value assessment was to determine the goals for replacing impacted wetlands, therefore, the assessment focused on wetlands within the vicinity of the Preferred Alternative. **Table 4.10-3** depicts the mitigation objectives for the two watersheds impacted by the Preferred Alternative, the Grand River and Macatawa Watersheds. A map of the watershed boundaries is provided as **Figure 4.11-1**.

Table 4.10-3 Mitigation Objectives By Watershed		
Watershed	Primary Objectives	Secondary Objectives
Grand River	Groundwater Interaction Floral Diversity	Flood/Storm Water Detention Wildlife Habitat Water Quality
Macatawa River	Flood/Storm Water Detention	Water Quality

All wetlands that will be impacted by the proposed project were assessed for functions and values. The majority of these wetlands provide flood attenuation, water quality, hydrology characteristic, vegetative diversity, and wildlife habitat. These are important benefits that the wetland mitigation sites will need to supply.

Some of the functions that wetland mitigation sites can provide are water quality enhancement, hydrology, flood attenuation, and wildlife habitat. Specifically, mitigation sites can be designed to serve as sinks for nutrients and other pollutants. Runoff from adjacent land uses and flood flows from adjacent rivers and streams, flow into the mitigation sites where they are retained and treated. The wetland vegetation in the mitigation sites filter sediment and incorporate nutrients into plant tissue, thereby removing and recycling pollutants. They also can provide vegetative diversity and habitat for wildlife.

Table 4.10-4 MnRAM Results for each Wetland										
	Wetland A	Wetland B	Wetland C	Wetland D	Wetland E	Wetland F	Wetland G	Wetland H	Wetland I	Wetland J
Vegetative Diversity/Integrity	High	Med	Med	High	High	Med	Low	Low	Med	Low
Hydrology – Characteristic	High	High	High	Med	High	Med	Med	Med	Med	Low
Flood Attenuation	Med	Med	High	High	Med	Med	Med	Med	Med	Med
Water Quality—Downstream	High	High	High	High	High	Med	Med	Med	Med	Med
Water Quality—Wetland	High	High	High	High	High	Med	Low	Med	Med	Low
Shoreline Protection	N/A	N/A	N/A	Med	N/A	N/A	N/A	N/A	N/A	N/A
Characteristic Wildlife Habitat Structure	High	Med	High	High	High	Med	Med	Med	Med	Low
Maintenance of Characteristic Fish Habitat	Exc	High	High	Med	Med	N/A	N/A	N/A	N/A	N/A
Maintenance of Characteristic Amphibian Habitat	Low	Med	Low	Low	High	N/A	N/A	N/A	N/A	N/A
Aesthetics/Recreation/Education/Cultural	Med	Med	Med	Med	Low	Med	Med	Med	Med	Med
Commercial use	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

State and Federal Wetland Mitigation Requirements

Wetland mitigation for unavoidable impacts can be required through Part 303 (Wetlands Protection) of Act 451, NREPA, as amended and Section 404 of the Federal Clean Water Act. 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 U.S. Army Corps of Engineers (USACE) retains authority over navigable rivers, including the Great Lakes and adjacent wetlands. A permit will be required jointly by the USACE and MDEQ for the impacts to wetlands and other waters of the United States in order to construct the Preferred Alternative.

The following site characteristics were determined to be important for the wetland mitigation development areas, based on MDOT's criteria for determining feasible wetland mitigation sites:

- Proposed mitigation sites should not be heavily wooded or existing wetlands;
- Mitigation should be in-kind and within the same watershed as the impacts. It is also preferred that mitigation be accomplished in areas that were formerly wetlands, such as disturbed areas along the Grand River;
- Utilize prior converted historical wetland areas or land with a water table near the surface if feasible;
- The number of proposed wetland mitigation sites should be minimized while providing the full amount of required mitigation;
- Wetland mitigation sites should be compatible with adjacent land uses (e.g., not in a subdivision); and
- The number of landowners at each site should be at a minimum.

Table 4.10-5 Wetland Mitigation Table			
Wetland Classification (Cowardin, et al.)	Total Wetland Impact (Acres)	Mitigation Ratio	Mitigation Required (Acres)
Palustrine Emergent	0.08	1.5:1	0.12
Palustrine Emergent/Scrub/Shrub	2.38	1.5:1	3.57
Palustrine Scrub/Shrub	0.31	1.5:1	0.47
Palustrine Forested	0.27	2:1	0.54
Totals	3.04	--	4.70

4.10.2 Wetland Mitigation Sites

The maximum required acreage of wetland mitigation was calculated for each watershed using MDEQ regulatory replacement ratios. The wetland mitigation ratios required by MDEQ are 2:1 (mitigation-to-impact) for forested wetlands and 1.5:1 for scrub/shrub and emergent wetlands. Ratios for areas of exceptionally high quality or low quality may be adjusted on an individual basis upon review by the resource agencies during permitting. Based on the mitigation to impact ratios, 0.12 acre of emergent, 3.57 acres of emergent/scrub/shrub, 0.47 acre of scrub/shrub and 0.54 acre of forested mitigation will be required by the MDEQ for a total of 4.70 acres of mitigation.

A field review of potential wetland mitigation sites within the Grand River watershed was conducted November 13, 2007 by the MDEQ, MDOT and USACE. Several criteria were used in selecting potential mitigation sites, including those provided by MDOT policy, Soils and Hydrology Data Collected in the Field, and the wetland mitigation goals for the watershed.

Potential wetland mitigation sites were preliminarily identified from aerial photographs of the study area. Soil survey maps were also consulted regarding the presence of hydric soils or soils with hydric inclusions, which generally have been identified as hydric, poorly drained or very poorly drained in the Ottawa County Soil Survey. Sites located adjacent to large drains and other waterways were considered particularly suited to wetland mitigation. Also considered were the wetland mitigation design goals determined by the wetland function and value assessment, and best professional judgment. The wetland mitigation sites were cross-referenced with historical wetland maps to determine whether restoration of drained or otherwise altered wetlands is feasible.

The overriding factor to ensure successful wetland mitigation is the presence or provision of adequate hydrology to support the wetland system so both surface water and groundwater were considered as hydrological sources for the mitigation sites. Restored or created wetlands without adequate water will often fail as wetland mitigation sites. Conversely, it is often feasible to manage excess water. Therefore, sites where it is believed that sufficient surface water can be delivered, or where adequate groundwater exists are being considered for mitigation. Redundancy of hydrology (a combination of surface water and groundwater) will be provided where possible.

The wetland mitigation sites described below vary in function and location. Some of the sites are adjacent to drains and other water bodies that will be developed so they will primarily provide floodwater attenuation, improved wildlife habitat, and water quality functions. Others are located in headwater areas that will be developed so their primary functions will be water quality protection for the watershed by treating agricultural runoff, groundwater recharge, and wildlife habitat. Downstream fisheries' habitats will also benefit from water quality improvements in the headwaters.

The following sites have been identified for wetland mitigation and are shown in **Figures 4.10-5 thru 4.10-8**. These sites provide the maximum amount that will be required within the watershed. The owners of these potential mitigation sites have expressed an interest in selling the portion of their properties desired by MDOT for mitigation.

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Grand River

Limberl Lane

Existing Wetland "G"

Existing Wetland "G"

Legend

-  Potential Palustrine Scrub/Shrub (PSS) Wetland Mitigation Area
-  Existing Wetland
-  Preferred Alternative
-  Proposed Right of Way



Existing Wetland "C"

Existing Jack's Fish Farm
Wetland Mitigation Site

Proposed Access Road

North Cedar Drive

Proposed M-231

Existing Wetland "C"

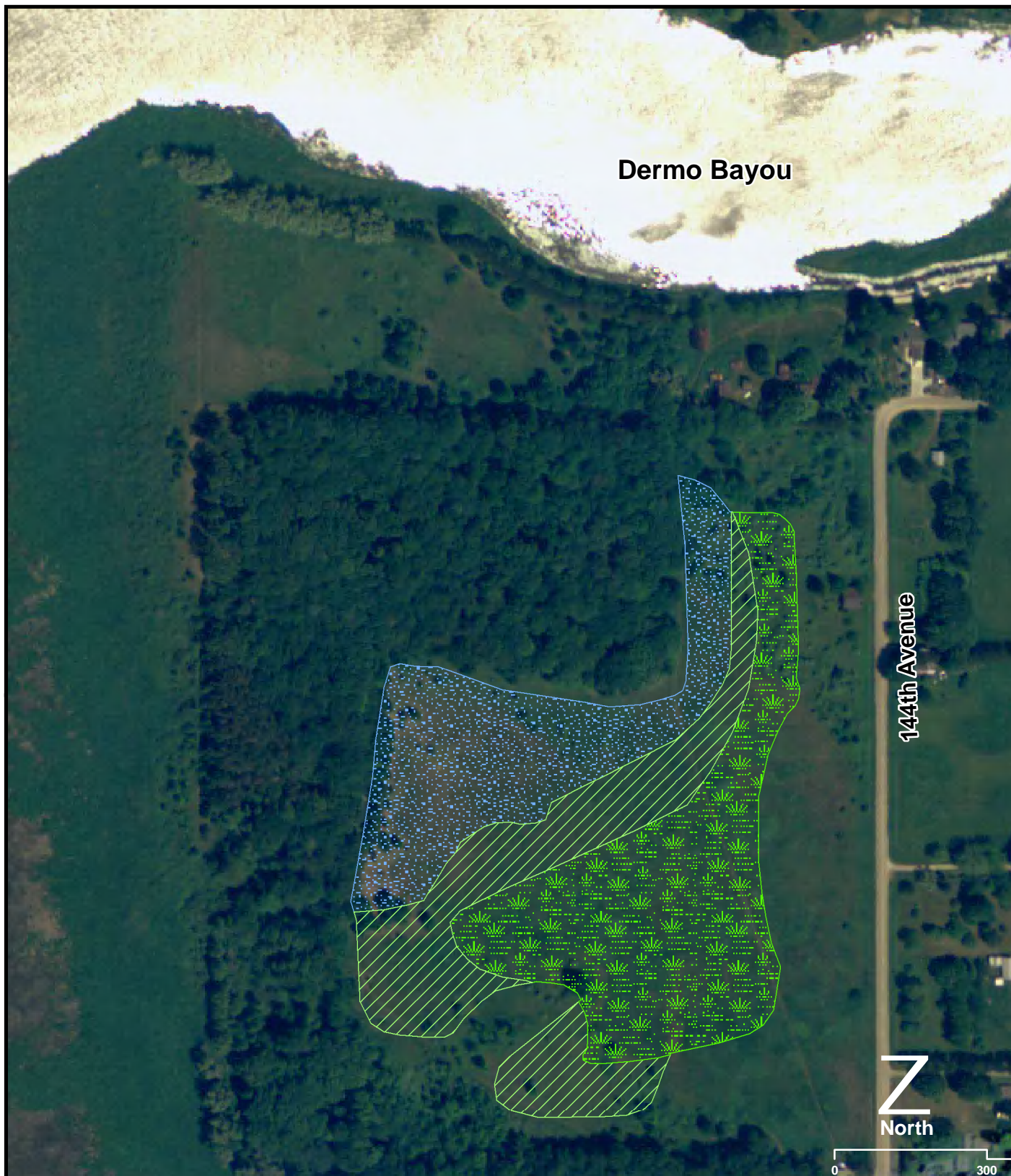
Legend

Potential Palustrine Scrub/Shrub (PSS)
Wetland Mitigation Area

Existing Wetland




Preferred Alternative

Proposed Right of Way



Legend

Wetland Mitigation

-  Potential Palustrine Forested (PFO) Wetland
-  Potential Palustrine Scrub/Shrub (PSS) Wetland
-  Potential Palustrine Emergent (PEM) Wetland

US-31 Final Environmental
Impact Statement

Potential Roger Mitigation Site



Figure
4.10-7

Lake Michigan Drive

Outlet Structure




Existing Pond

North

0 150 300 Feet

Legend

Wetland Mitigation

-  Potential Palustrine Forested (PFO) Wetland
-  Potential Palustrine Scrub/Shrub (PSS) Wetland
-  Potential Palustrine Emergent (PEM) Wetland

US-31 Final Environmental
Impact Statement

Potential Bolthouse Mitigation Site



Figure
4.10-8

On Site Mitigation

The first option for wetland mitigation is on-site wetland mitigation. This is generally the best place to successfully build wetlands that will replace the functions and values of the impacted wetlands. There are two potential on-site locations that are being considered. The first is on parcels owned by MDOT along the Grand River (**Figure 4.10-5**). The second possible on-site mitigation area is on a site called Jack's Fish Farm owned by MDOT just south of the Grand River (**Figure 4.10-6**). There is potential to create approximately 1.59 acres of additional wetland at this location. Mitigation at this site would be highly beneficial to the watershed given its proximity to the Grand River. The expected functions and values at this mitigation site are flood attenuation, water quality, and wildlife habitat.

Off Site Mitigation

If on-site mitigation is not an option, there are two potential off-site mitigation locations.

Rogers Property

The first off-site location is the Roger's property (**Figure 4.10-7**), an approximate 75-acre parcel located on the west side of 144th Avenue where it intersects with Garfield Road in Spring Lake Township, Ottawa County, Michigan (T8N, R16W, Section 36). The site consists of well drained Chelsea complex (CIB) soils, poorly drained Glendora Sandy Loam (GI) soils and somewhat poorly drained Shoals loam (Sh). The site is located adjacent to the Grand River floodplain and is surrounded by Dermo Bayou to the north and Indian Channel to the west, which are both connecting tributaries to the Grand River. The property consists of a sandy, upland woods dominated by mixed oak (*Quercus sp.*), American beech (*Fagus grandifolia*), cherry (*Prunus sp.*), and maple (*Acer sp.*), as well as fallow farm fields. The expected functions and values at the Roger's property mitigation site are flood attenuation, wildlife habitat and recreational uses. This property also provides an opportunity for MDOT to create additional wetland mitigation for future project impacts.

This location is currently the preferred wetland mitigation site for the project, based on the information available at this time. MDOT is therefore pursuing the early acquisition of the property for this purpose. The Rogers site was one of three sites field reviewed by MDEQ and USACE. Prior to selection, MDOT staff installed groundwater monitoring wells and conducted soil borings to determine groundwater levels. It was determined that the groundwater level was sufficient to support the necessary wetland mitigation. As a result, the wetland mitigation on this site will be groundwater fed. The site was preferred by the USACE because it is located in the lower Grand River area and it is within (or is adjacent to) the floodplain of the Grand River. Additional USACE comments are addressed in Chapter 5 (P. 5-14) Other factors used for selection of this site include its location within the project study area, the availability of the property, and the capacity to accommodate mitigation for future projects.

The Public Interest Finding Statement and related correspondence between MDOT and FHWA, explaining the process, are in **Appendix G**. Additional or updated information, as needed regarding wetland mitigation activities related to this project, will be included in the Record of Decision for this FEIS.

Bolthouse Property

The second off-site location is the Bolthouse property (**Figure 4.10-8**), which is an approximately 100-acre parcel located at the southwest corner of the intersection of M- 45 (Lake Michigan Drive) and Linden Drive in Tallmadge Township, Ottawa County, Michigan (T7N, R13W, Section 19). The site consists of existing forested and scrub/shrub wetlands and farmland. Soils on the site are hydric, poorly drained Sloan loam. The entire site is within the floodplain of the Grand River that runs adjacent to the west. Other streams and water bodies nearby include Ottawa Creek, a perennial stream to the northwest and man-made lakes formed from gravel pits to the east. The site contains a floodplain forest dominated by silver maple (*Acer saccharinum*), green ash (*Fraxinus pennsylvanica*), box elder (*Acer negundo*) and American elm (*Ulmus americana*); and farm fields that are currently planted with corn. Approximately 20-acres of wetland would be created at this site and the remaining acreage would be enhanced and preserved. The expected functions and values at the Bolthouse property mitigation site are water quality, wildlife habitat, and flood attenuation.

Comprehensive Wetland Mitigation and Monitoring Plan

As required under Section 303, of the P.A. 451 of 1994, MDOT will prepare and submit a comprehensive mitigation and monitoring plan to document the development of the created wetland. The mitigation and monitoring plan will specifically address mitigation goals and objectives, performance standards, monitoring procedures and long-term protection (i.e. conservation easement) of the wetland. This plan will be submitted during the permitting process of the appropriate regulatory agencies in compliance with their current standards.

4.11 AQUATIC ISSUES

4.11.1 Surface Water Quality

The study area has a wide range of surface water resources, including public drains, streams and navigable waterways (primarily the Grand River). These resources, along with known groundwater resources, have been inventoried and mapped. Existing published water quality data has been collected for the Grand River, Macatawa River, and their associated tributaries.

Macatawa River

According to MDEQ reports, Lake Macatawa and all of its tributaries are included in a list of water bodies within the state that do not attain the Michigan's desired WQS. The report states that Lake Macatawa displays the classic symptoms of a hypereutrophic lake, which includes extremely high nutrient and chlorophyll *a* levels, excessive turbidity, periodic nuisance algal blooms, low dissolved oxygen levels, and a high rate of sediment deposition. Monthly water quality monitoring of Lake Macatawa and its tributaries has concluded that phosphorus levels are consistently unacceptable and concentrations are extremely variable on a monthly and annual basis. Phosphorous concentrations in the river have been as high as 129 micrograms/liter, compared to the MDEQ phosphorous standard of 50 micrograms/liter.

The MACC is working to improve the quality of the Macatawa Watershed. Their effort is focusing primarily on the reduction of phosphorous. The MACC has targeted both non-point and point sources of phosphorous discharges into the Macatawa River and its tributaries, through its Macatawa Watershed Project. Sampling found that 91 percent of the phosphorous loading is from non-point sources (agricultural) and nine percent from storm water runoff and municipal and industrial discharges. The main objective of the MACC's project is to reduce the amount of phosphorous in the Macatawa River by 70 percent in the next ten years, as described in a plan finalized on September 16, 1999 entitled *Nonpoint Source Phosphorus Reduction Plan for the Macatawa Watershed, 1999-2009* (Higgins and McDonald).

Grand River

The majority of the Grand River from Lake Michigan upstream to the City of Jackson has been included on the list of water bodies that do not attain designated uses due to fish consumption advisories. Consumption of fish should be limited due to the presence of Polychlorinated biphenyl (PCBs) in the fish tissue. The Grand River in the vicinity of Walker and Johnson Parks, near Grandville, has been included on the list of water bodies that do not attain designated uses due to combined sewer overflows and elevated levels of pathogens. In addition, the Grand River near the City of Grand Haven has been included on the list of water bodies that do not attain designated uses due to levels of mercury in the water that exceed Michigan's WQS.

GVSU's Annis Water Resource Institute (AWRI) collected and analyzed water quality samples of the Grand River in August of 1990. The analyses were summarized in a Water Quality Index (WQI) that ranged from a score of 0 (poor water quality) to 100 (excellent water quality). The water quality parameters analyzed include fecal coliform, nitrate-nitrogen, pH, ammonia-nitrogen, total phosphorous, dissolved oxygen, temperature, chloride and total dissolved solids. The WQI indicated that the quality of the Grand River is quite variable, ranging from moderately good (WQI=83) near the city of Lowell, to poor (WQI=18) near the mouth of the river in the city of Grand Haven. Three of the 35 sampling locations were located near the study area. The Grand River had a WQI score of 19 near its confluence with Crockery Creek, a score of 18 three miles downstream of Crockery Creek near 138th Avenue, and a score of 27 in

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Spring Lake. The overall results of this study indicate poor water quality within the lower reaches of the Grand River.

An MDEQ report details biological sampling and water chemistry data collected from the lower Grand River and its tributaries. Several non-point source problems were identified during this study. Cattle had unrestricted access to streams at several locations within the watershed. This contributed, along with dairy operations, manure disposal, and other farming practices, to nutrient enrichment problems within specific tributaries. Other problems include an illicit connection discharging septic water to a tributary, as well as soil erosion and sedimentation due to housing developments and road crossings. Despite the water quality problems associated with its tributaries, the lower Grand River showed no exceedence of WQS during this survey.

During this same study, macroinvertebrate communities were evaluated at 45 stations throughout the lower Grand River Watershed. The macroinvertebrate community was rated as acceptable at 37 survey locations, excellent at four stations, and poor at four stations. Stream habitat was also examined at these 45 locations. Within this examination, the habitat at 30 stations was rated as good (slightly impaired), nine stations were rated as excellent (non-impaired) and six stations were rated as marginal.

The MDEQ attributes relatively larger loadings of nutrients to non-point sources, like agricultural lands, than to specific point sources. As of January 2007, the MDEQ indicates that the Upper Grand River Watershed contains 166 permitted National Pollutant Discharge Elimination System (NPDES) discharges. Of these, 115 are storm water facilities and 51 are individual permits. In the Lower Grand Watershed there were 546 permitted NPDES dischargers. Of these, 380 are storm water facilities and 166 are individual permits.

Impacts

The greatest potential for water quality impacts resulting from the construction of the Preferred Alternative will be in the surface water systems crossed by the new alignment. The water quality impacts can include increased salinity due to snow removal operations, increased turbidity due to construction runoff, increased levels of motor vehicle pollutants (such as motor oil) from pavement runoff, and/or increased local water temperatures.

Existing US-31 Crossings

The widening of existing US-31 will result in an increase in impervious surfaces and therefore an increase in runoff containing pollutants. Construction activities could also result in soil erosion and sedimentation in the area. Temporary degradation of water quality in the river, streams, and drains near construction areas may also occur.

New Alignment Crossings

A new Grand River crossing will have the potential to introduce new sources of pollutants to the Grand River both during construction and during long-term operation of the facility. These new sources of contaminants could potentially impact the water quality and wildlife species of these stream systems. While bridges and culverts limit the impacts on existing drainage patterns, these aquatic systems may still be affected by pollutants contained in storm water runoff. Possible storm water contaminants may include the following:

- Temporary sediment inputs from erosion caused by construction activity,
- Salt placed on the roadways during snow storms,
- Increased storm water runoff volume that results in changes to the hydrograph and stream channel morphology,
- Petrochemicals, oil, grease and heavy metals associated with automobile traffic,
- Trash and debris discarded by motorists,
- Chemicals and hazardous materials accidentally spilled during transport.

Mitigation

MDOT has developed a Storm Water Management Plan (SWMP), with the intent of reducing or eliminating storm water pollution. In accordance with the SWMP, impacts to water quality will be mitigated through various avoidance and minimization strategies. The use of the following construction techniques and implementation of storm water Best Management Practices (BMPs) should lessen surface water quality degradation during construction and the long-term use of these structures.

Temporary

Sedimentation will be controlled by protecting the side slopes, ditches and other areas draining directly into the waterway with sod, seed, riprap, mulch, and erosion control fabric or blankets. All disturbed areas will be stabilized and re-vegetated as soon as possible. All natural vegetative growth outside the project limits will be protected. Specific design plans will be completed for the Preferred Alternative incorporating these protective measures.

Temporary water quality impacts resulting from the construction of bridges can be mitigated by the following measures, each of which will be considered during the project design:

- Avoiding the construction of bridge abutments and piers in the wetlands and waterways to the maximum extent possible,
- Minimizing excavation for the installation of bridge piers and piles,
- Minimizing wetland impacts for the approach roadways and spanning wetlands by the bridge structures,
- Minimizing dredging required for barge construction access,
- Providing soil erosion and sedimentation control (SESC) measures in accordance with MDOT's approved Soil Erosion and Sedimentation Control Manual and MDOT's Drainage Design and Storm Water Management Manual for all earth disturbing activities,
- Restricting in-stream work to specific times during the year when aquatic species are not reproducing,
- Constructing temporary cofferdams to contain turbidity during bridge pier construction.

Long-Term

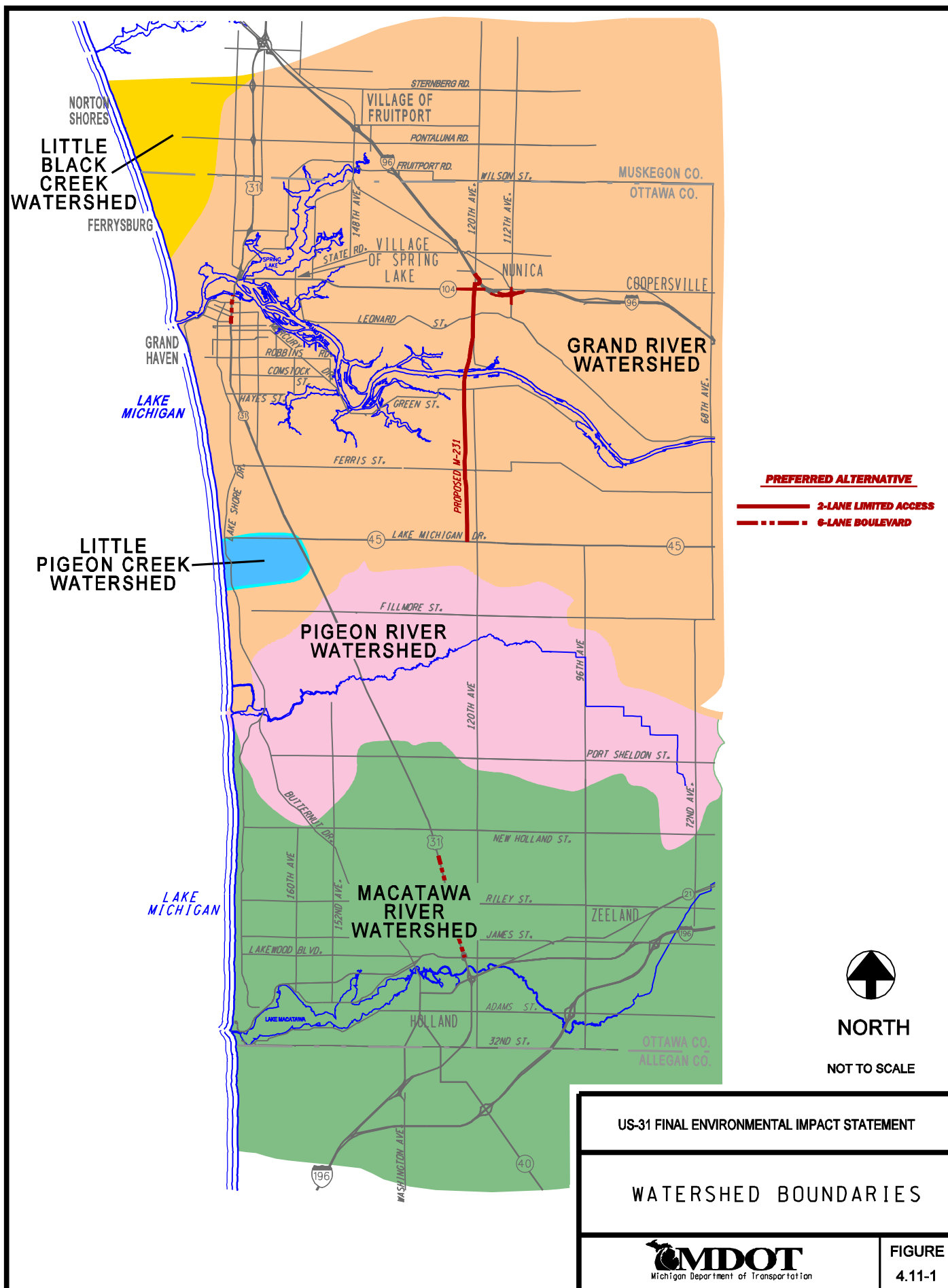
Impacts to water quality will be minimized in accordance with MDOT's Drainage Design and Storm Water Management Manual. Direct discharge of highway and bridge runoff to public drains and streams will be avoided when possible.

This avoidance will be accomplished by utilizing post-construction storm water BMPs that include detention basins with discharges directed to vegetative controls, such as grassy drainage ways, filter strips, overland flows and wetlands. These systems reduce pollutant and sediment loads to streams by reducing flow velocity, which allows contaminant-laden suspended solids to settle out prior to discharge. Detention basins and vegetated swales also protect water quality by detaining peak storm flows. Detaining this runoff prevents stream flows from increasing rapidly, which can lead to instability of the stream channel and habitat degradation. Potential locations for these detention basins are shown in **Appendix A**.

See **Section 4.22.3**, Soil Erosion and Sedimentation Control; and **Section 4.23**, Permits for further information regarding applicable permits and laws.

4.11.2 Fisheries and Aquatic Habitat

The Preferred Alternative has the potential to impact fish resources within the rivers, streams and drains of the Grand River Watershed and the Macatawa River Watershed (see **Figure 4.11-1**). The main impact will be along the proposed new alignment corridor as it crosses the Grand River and its associated drains and tributaries.



Macatawa River Watershed

The watercourses within the Macatawa River Watershed are generally characterized as degraded, shallow, warm-water habitat with a soft-bottom and are unlikely to support sustainable fisheries. Many of these drains have poor water quality and may not possess flowing water year round. If fish populations are present at all, they may include warm-water fish species such as bass (*Micropterus sp.*), minnows (*Pimephales sp.*), carp (*Cyprinus carpio*), white sucker (*Catostomus commersoni*), chubs (*Hybopsis sp.*) and members of the catfish family (*Ictaluridae*). Some of these species may also forage in connected intermittent streams when water is present, although the lack of continuous flow in these streams precludes the establishment of sustainable fisheries.

Grand River Watershed

Studies performed in the Grand River by the MDNR revealed the presence of many species of fish within the Grand River. Alewife (*Alosa pseudoharengus*), gizzard shad (*Dorosoma cepedianum*), quillback (*Carpoides cyprinus*) and freshwater drum (*Aplodinotus grunniens*) were the dominate fish species near the mouth of the river. Northern pike (*Esox lucius*), smallmouth bass (*Micropterus dolomieu*) and channel catfish (*Ictalurus punctatus*) were the most abundant sport species while black crappie (*Pomoxis nigromaculatus*), rock bass (*Ambloplites rupestris*) and flathead catfish (*Plyodictis olivaris*) were also plentiful throughout the river. Largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), pumpkinseed (*Lepomis gibbosus*) and bullhead species (*Ameiurus sp.*) were in good numbers in the bayous and lower river locations. The bluntnose minnow (*Pimephales notatus*) occurred at every sampling station and carp (*Cyprinus carpio*) occurred at all but one.

An MDNR survey of a limited section of the lower Grand River was conducted March 22-25, 1996 using trap nets, and on July 17, 1996 using electroshocking methods. The study was restricted to an area extending from east of the Grand Isle Marina on both sides of the south and north channels to the existing US-31 bridge. The study provided some relevant migratory data in addition to providing a species list and confirming the presence of several of the fish species mentioned above. The fish identified in the survey included a breeding pair of spawning adult northern pike (*Esox lucius*). Gizzard shad (*Dorosoma cepedianum*), bass (*Micropterus sp.*), white sucker (*Catostomus commersoni*), and carp (*Cyprinus carpio*) were also trapped. Species of gamefish electroshocked were those that migrate upriver in the spring to spawn and to the bayous, backwaters and shallow water edges of the Grand River in the summer. These areas also provide excellent nursery habitat for juvenile fish.

A MDNR survey performed on August 3, 2007 characterized the species composition of the Grand River near its confluence with Bass River. A total of 31 fish species were collected, consisting of 895 individuals. Bluegill (*Lepomis macrochirus*), was the most abundant species in the survey with 235 total individuals. Golden redhorse (*Moxostoma erythrurum*) with 134 individuals, and largemouth bass (*Micropterus salmoides*) with 117 individuals followed as the next two most common species. When collected fish were expressed as biomass, shorthead redhorse (*Moxostoma macrolepidotum*), largemouth bass (*Micropterus salmoides*), and golden redhorse (*Moxostoma erythrurum*) accounted for the largest percentage.

There is one commercial fishing operation within the Grand River, a regionally recognized minnow fishery. Recreational fishing is good to excellent for walleye (*Sander vitreus*), pike (*Esox lucius*), members of the sunfish family (*Centrarchidae*), and spawning salmonids including coho salmon (*Oncorhynchus kisutch*), Chinook salmon (*Oncorhynchus tshawytscha*), steelhead (*Oncorhynchus mykiss*), brown trout (*Salmo trutta*) and lake trout (*Salvelinus namaycush*). There is some fish spawning or migration in the Grand River throughout most of the year, except during the summer months between July 1 and September 15.

Impacts

The Preferred Alternative should have minimal impacts to the Macatawa River Watershed due to minor improvements on the existing US-31 roadway and the lack of quality fish habitat. The Preferred Alternative has potential for impacting Grand River fish resources with the construction of the proposed M-231 bridge. The crossing will create a new source of storm water runoff from impervious surfaces, including runoff to headwaters of streams along the alignment. The proposed M-231 Grand River crossing could potentially introduce an increased and new source of pollutants to the waterway, which

could have long-term effects on fish resources. In addition to this main river crossing, the Preferred Alternative will cross three streams/drains on the existing US-31 alignment and seven streams/drains for the new alignment. While the streams/drains are less likely to contain sustainable, valuable fisheries, construction of the bridges and culverts over these stream/drains will impact aquatic biota due to sedimentation during construction and modifications to the streambed habitat.

Temporary

Fish resources within the study area will be affected by short-term impacts during construction. Sedimentation during roadway and bridge construction has the potential to degrade water quality, thus impacting fish habitat. Siltation of streambeds has an adverse effect on the habitat for fish spawning and macroinvertebrate production. Turbidity within the water column also has a negative effect on the production of rooted aquatic plants, which are important as a food source and to support the production of epiphytic organisms. Bridge construction will require pile driving or drilling for a lengthy period of time, which could impact fish migration if conducted during the spawning period due to vibration, noise and physical activity within the waterway.

Long-Term

Degradation of surface water quality can also affect the species composition of the stream or river, as species tolerant of poorer water quality replace those requiring higher water quality. Long-term impacts to fish resources result from the water quality and quantity effects of increased storm water runoff, increased loading of de-icing chemicals, sediment and hydrocarbons.

Fishing Access

Fishing access to the Grand River near 120th Avenue will not be directly affected by the Preferred Alternative and is expected to be indirectly improved due to a new river crossing located close to these sites, although the new bridge will not be a fishing access point.

Mitigation

Mitigation for impacts on fish and aquatic biota may include the installation of bridges and adequate sized and/or depressed culverts at road crossings to span creeks or drains, provide for fish and wildlife passage, span floodplains, and minimize impacts on stream channels. Major river, stream and drain crossings will be sized to pass the 100-year storm flow. In some locations, temporary restriction devices, such as coffer dams and flume crossings, may be needed at these structures to avoid downstream or upstream impacts while awaiting downstream and/or upstream drainage improvements. In addition, drainage and storm water management for roadway and bridge surfaces will include the routing of storm water to detention basins to be discharged to the Grand River.

The MDNR and MDEQ use standard dredge construction timeframes for work in lakes and streams that are applied as conditions in their permits. However, applications for MDEQ permits, reviewed by the MDNR, are reviewed on a case-by-case basis and the appropriateness of time restrictions is determined. The time of year restrictions are based on the type of fish inhabiting the system. According to a general time frame determined by the MDNR Fisheries Division, the peak fish migration period is March 1 to the end of June for spring migration for river spawning. The window when there is little-to-no fish spawning or migrating in the Grand River is July 1 into the fall. Salmon spawning in the fall should not be impacted by construction with the use of cofferdams. Cofferdams will be required for bridge construction.

4.12 DRAINAGE AND HYDROLOGY

The Preferred Alternative crosses two major watershed systems, the Macatawa River Watershed and the Grand River Watershed. These watersheds include a river, tributaries, and drains that will be impacted by construction of the proposed new alignment and improvements on existing US-31 (**Table 4.12-1**).

The appropriate crossing options will be analyzed and selected during the design phase. Impacts for these crossing are considered the most conservative or greatest impact scenario. During the design

phase and permit process, wildlife movements and other relevant issues will be considered as part of the evaluation of crossing options.

Macatawa River Watershed

The Macatawa River Watershed covers portions of northern Allegan and southern Ottawa counties, encompassing approximately 110,000 acres of land. The main branch of the river is over 16.8 miles long. The regional flow is primarily from east to west, discharging into Lake Macatawa, where it becomes navigable and connects to Lake Michigan. The total drainage area of the watershed is 174 square miles, which is small in comparison to many of the large basins in Michigan. The topography along the river varies from flat agricultural lands in its upper reaches, to undeveloped forest within urban areas of its lower reaches. Channelized tributaries of the Macatawa River flow through low lying agricultural lands that contain organic soils surrounding the urbanized Holland/Zeeland area. The main river channel becomes meandering as it approaches Holland/Zeeland, where there is gently rolling topography. The topography is level in the cities of Holland and Zeeland, except adjacent to the river. North of the river in Park, Holland and Zeeland townships, the once frequent farm fields and flat topography are rapidly being converted into residential and commercial developments. Most tributaries in this area are ditched county drains with some deep roadside ditches.

Grand River Watershed

The Lower Grand River Watershed connects with the Upper and Middle Grand River Watersheds, which bisect the State of Michigan. The Grand River Watershed is one of the largest watersheds in the State of Michigan and empties into Lake Michigan in the City of Grand Haven. The Lower Grand River Watershed covers 3,020 square miles of the 5,572 square miles of the entire Grand River Watershed. The main channel of the Grand River is approximately 478 miles long. The regional flow is east to west from its headwaters in Hillsdale County, to its discharge into Lake Michigan in Ottawa County. The navigable portion of the river is 17.5 miles upriver from Lake Michigan and under the jurisdiction of the U. S. Coast Guard (USCG). The topography along the river is composed primarily of relatively flat agricultural land between the urbanized metropolitan areas. The topographical relief is more pronounced within this watershed, with level floodplains consisting of many wetland types (shallow marshes, scrub/shrub wetlands, open water ponds, forested wetlands, and wet meadows) and rising, wooded river valley walls. Upland ridges and rolling topography are often adjacent to and around one or more sides of the associated large bayous, oxbows, and tributary streams. A watershed map detailing watershed boundaries and major water bodies can be found as **Figure 4.11-1**.

Table 4.12-1 River, Creek & Drain Crossing Summary				
Watershed	Body of Water	Roadway Crossing	Proposed Crossing Treatment	Approximate Proposed Crossing Length
Macatawa River	Drain 9	Existing US-31 south of James Street	Extend existing 48 inch x 120 foot concrete culvert	175 feet
	Bareman Drain	Existing US-31 at Riley Street	Extend existing 72 inch x 240 foot concrete culvert	280 feet
	Drain 15 & 17	Existing US-31 between Quincy and Greenly Streets	Extend existing 140 inch x 74 inch culvert	280 feet
Grand River	Beeline Drain (immediately upstream of Stearns Creek)	New Alignment between Johnson & Lincoln Streets	Proposed culvert	120 feet
	Stearns Creek	New Alignment between Johnson & Lincoln Streets	Proposed bridge	210 feet
	Little Robinson Creek	New Alignment south of North Cedar Drive	Proposed bridge	503 feet
	Grand River	New Alignment	Proposed bridge	3,998 feet
	Unnamed Drain	New Alignment at Cypress Street	Proposed culvert	120 feet
	Black Creek Tributary	M-104 west of 120 th Ave	Extend existing 48 inch x 84 foot concrete culvert	120 feet
	Black Creek Tributary	New Alignment /I-96 Interchange	Extend existing 72 inch x 48 inch x 100 foot box culverts	120 feet
	Unnamed Drain	I-96/112 th Interchange ramps	Extend or replace existing 36 inch x 100 foot concrete culverts	120 feet

4.12.1 River, Creek, and Drain Crossings

The Preferred Alternative will traverse several watercourses within both watersheds. Most watercourses will be crossed using culverts; however, bridges will be constructed for the following crossings: Grand River, Little Robinson Creek, and Stearns Creek. Many of these waterways have already had their drainage courses altered, primarily to improve drainage of agricultural lands for farming. Most are now county-maintained and regulated drains.

New culverts or bridges will be constructed within four small watercourses including Little Robinson Creek, Stearns Creek, Beeline Drain, and an unnamed drain at Cypress Street. To provide a general evaluation of macrohabitat and potentially present wildlife, these streams were assessed using the Ohio Environmental Protection Agency's (EPA) Qualitative Habitat Evaluation Index (QHEI). This method was created to assess habitat in flowing waters and coupled with field observations will provide insight about the quality and productivity of these watercourses. The following table summarizes the results of the stream assessments and details important data collected in the field. The type of structure in these crossings will be determined during the design phase/permit process of the project. Impacts presented in the FEIS for these crossing are considered the most conservative or greatest impact scenario.

Table 4.12-2 Stream Assessment Summary					
	Beeline Drain	Stearns Creek	Little Robinson Creek	Upstream Little Robinson Creek (survey purposes only)	Unnamed Drain
Substrate	Sand – 80% Silt – 20%	Sand – 65% Silt – 20% Gravel – 15%	Muck – 100%	Sand – 50% Gravel – 25% Silt – 20% Cobble – 5%	Sand – 80% Silt – 20%
Instream Cover	Logs/Woody Debris	Overhanging Vegetation, Shallows, Rootmats, Logs/Woody Debris	Shallows, Oxbows/Backwaters, Logs/Woody Debris	Undercut Banks, Overhanging Vegetation, Pools, Logs/Woody Debris	Undercut Banks, Overhanging Vegetation, Pools, Logs/Woody Debris
Bank Erosion	Moderate	Little	None	Little to Moderate	Moderate
Riparian Zone	Wide	Moderate to Wide	Moderate to Wide	Moderate	Wide
Floodplain Quality	Forest, Swamp	Forest, Swamp	Forest, Swamp	Forest, Swamp	Forest, Swamp
Instream Habitat	Run	Run	Pool	Run – 80% Pool – 15% Run – 5%	Run – 90% Pool – 10%
Current Velocity	Slow	Moderate	Interstitial	Moderate	Intermittent
Average Measurements (inches unless noted)	Width = 5.0 ft Depth = 2.6 Max Depth = 6.3	Width = 8.7 Depth = 3.9 Max Depth = 7.1	Width = 10-15 ft Depth = 33.9 Flooded Depth = 18.9 Flooded Width = 328 ft	Width = 6.9 ft Depth = 1.6 Max Depth = 16.9	Width = 19.3 Depth = 5.9 Max Depth = 8.3
QHEI Score	Poor – 35	Fair – 48.5	Poor – 43.5	Good – 61.5	Poor – 43
Fisheries	No trout, no fish observed, very limited fisheries if any, possibly small minnow-like species	No trout, no fish observed, very limited fisheries if any, possibly small minnow-like species	No trout, no fish observed, may be some limited warmwater fish	No trout, no fish observed, some fisheries, possibly minnows, chubs, darters, or daces	No trout, no fish observed, no fisheries due to intermittent flow
Benthic Invertebrates	Gastropoda – Rare Oligochaeta – Rare	Amphipoda – Common Odonata – Rare	None observed	Amphipoda – Abundant Gastropoda – Rare Trichoptera (Limnephiliidae) - Rare	None observed
Wetland Impact	None	0.25 acre	0.41 acre	Not Applicable	0.12 acre
Other Issues	Flash Flooding, Erosion	Drainage has been altered greatly	Beaver impoundment has caused flooding covering the entire floodplain area, channel barely recognizable	Sample location upstream of site and before its confluence with another waterway	Only has intermittent flow, drainage has been altered

Beeline Drain

The Beeline Drain is a very slow-moving silt-laden stream with a sandy bottom. Because of past human alterations, it is prone to flash flooding, high water levels, and erosion. According to the MDEQ, the Beeline Drain is a designated coldwater trout stream, however, no trout associated habitat, or common coldwater trout stream benthic invertebrates were observed within the stream. Due to the size, depth, and flow regime of the stream, potential fisheries are very limited. The low amounts of benthic invertebrates suggest that the waterway may be intermittent during the summer and drier periods.

Impacts

The potential impacts on waterway hydrology are associated with the increased highway impervious surfaces and include increased peak flows, loss of existing flood storage capacity, and degraded water quality due to introduced contaminants. New sources of contaminants could potentially impact the water quality and wildlife species of the Beeline Drain. While the new culvert will limit the impacts on existing drainage patterns, the aquatic system may still be affected by pollutants contained in storm water runoff. Possible storm water contaminants may include the following:

- Temporary sediment inputs from erosion caused by construction activity,
- Salt placed on the roadways during snow storms,
- Increased storm water runoff volume that results in changes to the hydrograph and stream channel morphology,
- Petrochemicals, oil, grease and heavy metals associated with automobile traffic,
- Trash and debris discarded by motorists,
- Chemicals and hazardous materials accidentally spilled during transport.

Any impacts to the Beeline Drain should be minor. The waterway has already been greatly altered by human activities and is now subjected to flash flooding, high water levels, and erosion. The drain's instream environment and hydrologic regime provides very little suitable habitat for fish and benthic macroinvertebrates.

Mitigation

The use of appropriate construction techniques should lessen temporary water quality degradation of the Beeline Drain during construction. Sedimentation will be controlled by protecting the side slopes, ditches and other areas draining directly into the waterway with sod, seed, riprap, mulch, and erosion control fabric or blankets. All disturbed areas will be stabilized and re-vegetated as soon as possible. All natural vegetative growth outside the project limits will be protected.

Long term impacts to water quality will be minimized by the construction of detention basins with discharges directed to vegetative controls, such as grassy drainage ways, filter strips, overland flows and wetlands. These systems reduce pollutant and sediment loads to streams by reducing flow velocity, which allows contaminant-laden suspended solids to settle out prior to discharge. Detention basins and vegetated swales also protect water quality by detaining peak storm flows. Detaining this runoff prevents stream flows from increasing rapidly, which can lead to instability of the stream channel and habitat degradation. The culvert installed in the Beeline Drain will be sized correctly and allow the waterway to retain its current drainage patterns.

Stearns Creek

Upstream of the site, Stearns Creek is a very slow-moving silt-laden stream with a sandy bottom. Because of alterations in its drainage, mainly installed culverts, it pools into a wetland area onsite. The wetland then empties through the culverts to a swifter moving, shallow stream with some small areas of gravel substrate. According to the MDEQ, Stearns Creek is a designated trout stream, however, no trout, associated habitat, or common coldwater trout stream benthic invertebrates were observed within the wetland or stream area. Due to the size, depth, and flow regime of the stream potential fisheries are limited.

Impacts

The potential impacts on stream hydrology are associated with the increased highway impervious surfaces and include increased peak flows, loss of existing flood storage capacity, and degraded water quality due to introduced contaminants. New sources of contaminants could potentially impact the water quality and wildlife species of Stearns Creek. While the new bridge will limit impacts on the morphology and drainage patterns of the creek, the aquatic system may still be affected by pollutants contained in storm water runoff. Possible storm water contaminants may include the following:

- Temporary sediment inputs from erosion caused by construction activity,
- Salt placed on the roadways during snow storms,
- Increased storm water runoff volume that results in changes to the hydrograph and stream channel morphology,
- Petrochemicals, oil, grease and heavy metals associated with automobile traffic,
- Trash and debris discarded by motorists,
- Chemicals and hazardous materials accidentally spilled during transport.

Any impacts to Stearns Creek should be minor. The waterway has already been altered by human activities including the installation of double culverts within the project ROW. The culverts have significantly impacted stream hydrology and morphology. It has slowed the flow of the stream and created a backwater wetland area. Due to the construction a bridge, the creek's instream habitat and hydrologic regime should not be significantly impacted.

Mitigation

The use of appropriate construction techniques should lessen temporary water quality degradation of Stearns Creek during construction. Sedimentation will be controlled by protecting the side slopes, ditches and other areas draining directly into the waterway with sod, seed, riprap, mulch, and erosion control fabric or blankets. All disturbed areas will be stabilized and re-vegetated as soon as possible. All natural vegetative growth outside the project limits will be protected.

Long term impacts to water quality will be minimized by the construction of detention basins with discharges directed to vegetative controls, such as grassy drainage ways, filter strips, overland flows and wetlands. These systems reduce pollutant and sediment loads to streams by reducing flow velocity, which allows contaminant-laden suspended solids to settle out prior to discharge. Detention basins and vegetated swales also protect water quality by detaining peak storm flows. Detaining this runoff prevents stream flows from increasing rapidly, which can lead to instability of the stream channel and habitat degradation.

The Stearns Creek bridge will be approximately 210 feet long, which will span most of the adjacent wetlands. Specific length, pier spacing, and construction methods will be determined during the design process.

Little Robinson Creek

Little Robinson Creek was assessed in two separate locations. Due to beaver activities, Little Robinson Creek has been impounded within the project area. The old stream channel is barely recognizable and the entire floodplain area around the stream is inundated with stagnant water. A beaver hut is located onsite. According to the MDEQ, Little Robinson Creek is a designated coldwater trout stream, however, at this location the stream resembles a large emergent wetland and no trout species or associated benthic invertebrates are likely to be present. An adjacent landowner reported that the stream used to contain trout until the beavers arrived approximately 3 years ago, but common carp and northern pike still exist. Based on field observations, it is possible that warm water fish are present like common carp, sunfish, and white suckers; however, the potential for northern pike to inhabit the area is unlikely.

A second area upstream from the impoundment and project area was assessed to determine the past condition of the creek prior to beaver activity. However an unnamed waterway does flow into the creek between the two assessment locations making comparisons difficult. The upstream location was in the best condition of all the waterways analyzed and actually contained some cobble substrate and a small

amount of riffle habitat. Although the size and depth of the creek make it unlikely to support trout species, small fish species may be present including minnows, chubs, daces, and darters. Although rare, one caddisfly species was present within the gravel-bottomed portions of the stream, probably from the Limnephilidae family.

Impacts

The potential impacts on stream hydrology are associated with the increased highway impervious surfaces and include increased peak flows, loss of existing flood storage capacity, and degraded water quality due to introduced contaminants. New sources of contaminants could potentially impact the water quality and wildlife species of Little Robinson Creek. While the new bridge will limit impacts on the hydrology and wetland areas associated with the creek, the aquatic system may still be affected by pollutants contained in storm water runoff. Possible storm water contaminants may include the following:

- Temporary sediment inputs from erosion caused by construction activity,
- Salt placed on the roadways during snow storms,
- Increased storm water runoff volume that results in changes to the hydrograph and stream channel morphology,
- Petrochemicals, oil, grease and heavy metals associated with automobile traffic,
- Trash and debris discarded by motorists,
- Chemicals and hazardous materials accidentally spilled during transport.

Any impacts to Little Robinson Creek should be minor. The waterway has already been significantly altered by beaver activity and now resembles a large wetland area. This drastic change in habitat has already severely impact any previously existing fish or benthic macroinvertebrate populations. Bridge construction should not impact the old stream channel but will impact approximately 0.012 acre of associated wetland habitat. This 0.012 acre is already included in the total 3.4 acres of total wetland impact for the entire project.

Mitigation

The use of appropriate construction techniques should lessen temporary water quality degradation of Little Robinson Creek and associated wetland areas during construction. Sedimentation will be controlled by protecting the side slopes, ditches and other areas draining directly into the waterway with sod, seed, riprap, mulch, and erosion control fabric or blankets. All disturbed areas will be stabilized and re-vegetated as soon as possible. All natural vegetative growth outside the project limits will be protected.

Long term impacts to water quality will be minimized by the construction of detention basins with discharges directed to vegetative controls, such as grassy drainage ways, filter strips, overland flows and wetlands. These systems reduce pollutant and sediment loads to streams by reducing flow velocity, which allows contaminant-laden suspended solids to settle out prior to discharge. Detention basins and vegetated swales also protect water quality by detaining peak storm flows. Detaining this runoff prevents stream flows from increasing rapidly, which can lead to instability of the stream channel and habitat degradation.

The Little Robinson Creek bridge will be approximately 503 feet long, which will span the 100-year floodplain and adjacent wetlands. The only planned wetland impact are due to the construction of 4 piers. Specific length, pier spacing, and construction methods will be determined during the design process.

Unnamed Drain

The unnamed drain near Cypress Street drains nearby agricultural fields and is present on site as a wide wetland swale flowing into a small stream with well-defined bed and banks. The flow through the drain is most likely intermittent based on field observations and the lack of a benthic invertebrate population. Consequently no fisheries are likely to be present.

Impacts

The potential impacts on waterway hydrology are associated with the increased highway impervious surfaces and include increased peak flows, loss of existing flood storage capacity, and degraded water

quality due to introduced contaminants. New sources of contaminants could potentially impact the water quality and wildlife species of the Unnamed Drain. While the new culvert will limit the impacts on existing drainage patterns, the aquatic system may still be affected by pollutants contained in storm water runoff. Possible storm water contaminants may include the following:

- Temporary sediment inputs from erosion caused by construction activity,
- Salt placed on the roadways during snow storms,
- Increased storm water runoff volume that results in changes to the hydrograph and stream channel morphology,
- Petrochemicals, oil, grease and heavy metals associated with automobile traffic,
- Trash and debris discarded by motorists,
- Chemicals and hazardous materials accidentally spilled during transport.

Any impacts to the Unnamed Drain should be minor. The waterway has already been greatly altered by human activities and has several shoddily installed culverts near the project ROW. Additionally, the hydrologic regime and intermittent flow of the Unnamed Drain severely limits the suitable habitat for fish and benthic macroinvertebrates.

Mitigation

The use of appropriate construction techniques should lessen temporary water quality degradation of the Unnamed Drain during construction. Sedimentation will be controlled by protecting the side slopes, ditches and other areas draining directly into the waterway with sod, seed, riprap, mulch, and erosion control fabric or blankets. All disturbed areas will be stabilized and re-vegetated as soon as possible. All natural vegetative growth outside the project limits will be protected.

Long term impacts to water quality will be minimized by the construction of detention basins with discharges directed to vegetative controls, such as grassy drainage ways, filter strips, overland flows and wetlands. These systems reduce pollutant and sediment loads to streams by reducing flow velocity, which allows contaminant-laden suspended solids to settle out prior to discharge. Detention basins and vegetated swales also protect water quality by detaining peak storm flows. Detaining this runoff prevents stream flows from increasing rapidly, which can lead to instability of the stream channel and habitat degradation. The culvert installed in the Unnamed Drain will be sized correctly and allow the waterway to retain its current drainage patterns.

General Impacts

Storm water management for the Preferred Alternative is consistent with the goals and objectives of the Ottawa County Parks Department, River Greenway Project. This project's mission supports the improvement of water quality within the watersheds, through such actions as storm water management, protection of riparian buffers, and wetland restoration. There will be no impacts to the parks along the river.

River, Creek, and Drain Crossings

The long-term impacts on stream hydrology are associated with the increased highway impervious surfaces and include increased peak flows, loss of existing flood storage capacity, and degraded water quality. Long-term effects will be minimized by the construction of detention basins.

Culverts constructed on designated county drains will be sized according to the regulating authorities' standards and in accordance with MDOT's Drainage Manual guidelines.

General Mitigation

Storm water will be collected and routed to detention basins before being released back into receiving waterways. The basins will be constructed to attenuate storm flows to pre-construction rates and will consist of approximately ten detention areas along the proposed new alignment and two along existing US-31 in Holland Township. Potential locations of the basins with estimated storage volumes (acres-feet) are shown in the **Appendix A**. Detention basins as shown in **Appendix A** do not impact existing wetlands. The location, size, and design of these basins will be finalized during the design of the project,

in coordination with the MDNR to avoid negative impacts on the receiving waterways. No direct discharges of storm water from the Grand River bridge to the river below the bridge will be provided without routing the water through a detention basin first.

Existing US-31

A combination of enclosed drainage and/or roadside ditches will be incorporated into all urban areas. Drainage within the City of Grand Haven will consist of an enclosed system with curbs and gutters. This enclosed drainage system will be designed to carry a 10-year storm event, in accordance with MDOT's Drainage Manual guidelines. Storm water in Holland Township will be controlled using open drainage.

New Alignment

Wherever possible, the new alignment grades will be set to allow for open drainage ditches in the median and outside shoulder areas. These roadside ditches will be designed to handle a 50-year storm event, in accordance with MDOT's Drainage Manual guidelines. The lack of driveways due to the limited access roadway will limit the amount of impervious surface associated with the new alignment. The lack of impervious surface will result in less storm water runoff. Three bridges will be constructed over existing waterways, including the Grand River, Little Robinson Creek, and Stearns Creek. Each of these structures will span most wetlands and the entire 100-year floodplain.

The Grand River bridge is discussed in the floodplain section of this chapter. The number of substructures outside of the river will be limited to minimize impacts to the wetland areas. Specific length, pier spacing, and construction methods will be determined during the design process.

Existing and proposed culverts will be designed during the design process in accordance with MDOT's Drainage Manual guidelines.

Short-Term Impacts

All road fill, slopes, ditches, and other cleared areas that drain directly to any stream channel will be stabilized through the use of riprap, sod, seed, and/or mulch. Silt fencing will be used to prevent sediment from entering any wetland or watercourse. Construction activities in the watercourses during periods of above normal flow will be avoided.

4.12.2 Floodplains

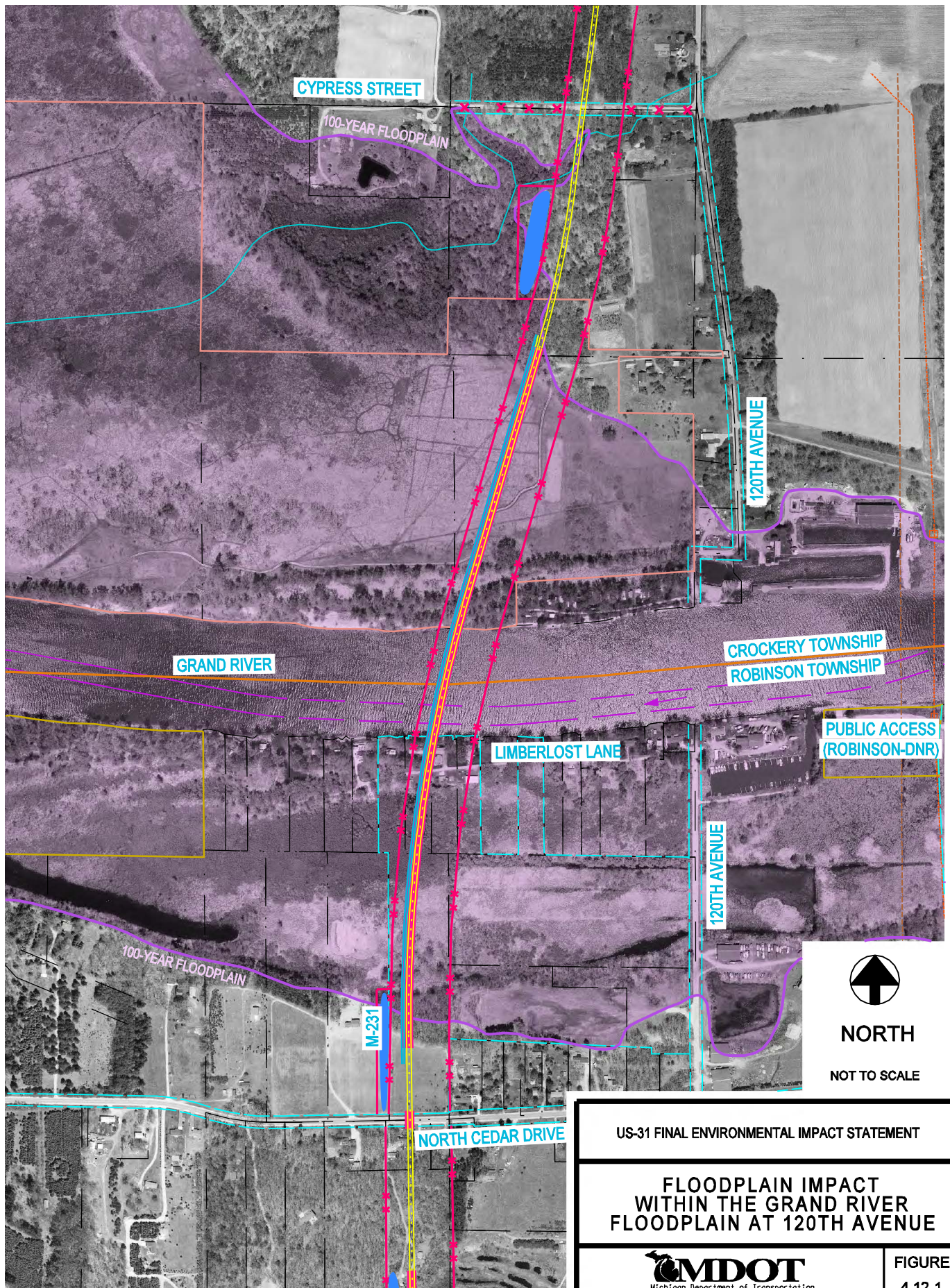
The Preferred Alternative crosses one major hydrologic system, the Grand River, which contains floodplains within the project area. The Preferred Alternative also crosses Little Robinson Creek and Stearns Creek.

The following were used to determine the limits of floodplains and floodways within the study area:

- A preliminary HEC-RAS model of the Grand River in Ottawa County, developed by the MDEQ for future use by the Federal Emergency Management Agency (FEMA) in the preparation of a county-wide Flood Insurance Study (FIS)
- This study's 3.2-foot Digital Terrain Model (DTM)
- This study's hydraulic analysis of the proposed Grand River bridge
- This study's hydraulic analysis of the proposed Little Robinson Creek bridge

The 100-year floodway boundary has been adopted by FEMA as the base floodway for purposes of floodplain management. **Figure 4.12-1** and **Appendix A** depict the extent of the 100-year floodplains that have been mapped.

Encroachment, such as artificial fill on floodplains, reduces the flood-carrying capacity, and potentially increases the flood heights of streams, as well as potentially increasing flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For the purposes of the National Flood Insurance Program (NFIP), the concept of a floodway is used as a tool to assist local communities in this aspect of floodplain management.



Under Part 31, Water Resources Protection, Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, encroachment in the floodplain cannot be permitted if it will cause a harmful interference with the stage and discharge characteristics of the streams. Harmful interference is site specific and is defined as likely to cause any of the following: 1) damage to property, 2) a threat to life, 3) a threat to personal injury, 4) pollution impairment, or 5) destruction of water or other natural resources. In areas subject to potential flood damage, an increase in flood stage of more than 0.00 feet may be considered harmful. Affected property owners would have to be notified of increases in flood stage, and a damage assessment certification would be required to be completed by a licensed engineer.

As part of its administration of the NFIP, FEMA publishes flood hazard maps, called Flood Insurance Rate Maps, or FIRMs. If the project causes an increase in flood stage or more than 0.00 feet, MDOT is required under Part 31 to coordinate with the FEMA to update these maps. This process is described Section 4.23.

Impacts and Mitigation

The FHWA's 23 CFR 650, Subpart A, requires an analysis of alternatives crossing floodplains to determine whether or not there will be encroachment upon the base (100-year) floodplain. If an encroachment is projected, a discussion on the level of risk or environmental impact must address the following items:

- Flooding risk,
- Impacts on natural and beneficial floodplain values,
- Support of probable incompatible floodplain development,
- Measures to minimize floodplain impacts, and
- Measures to restore and preserve the natural and beneficial floodplain values.

Since this study is of a north-south corridor and the Grand River flows east-west, avoidance is not possible. In addition, the width of the floodplain makes construction of a long single span structure without piers located in the floodplain impractical. At the proposed crossing site, The Grand River is about 580 feet wide and varies in depth up to 21 feet deep during normal flow. The 100-year floodplain varies from about 3,800 to 4,500 feet wide.

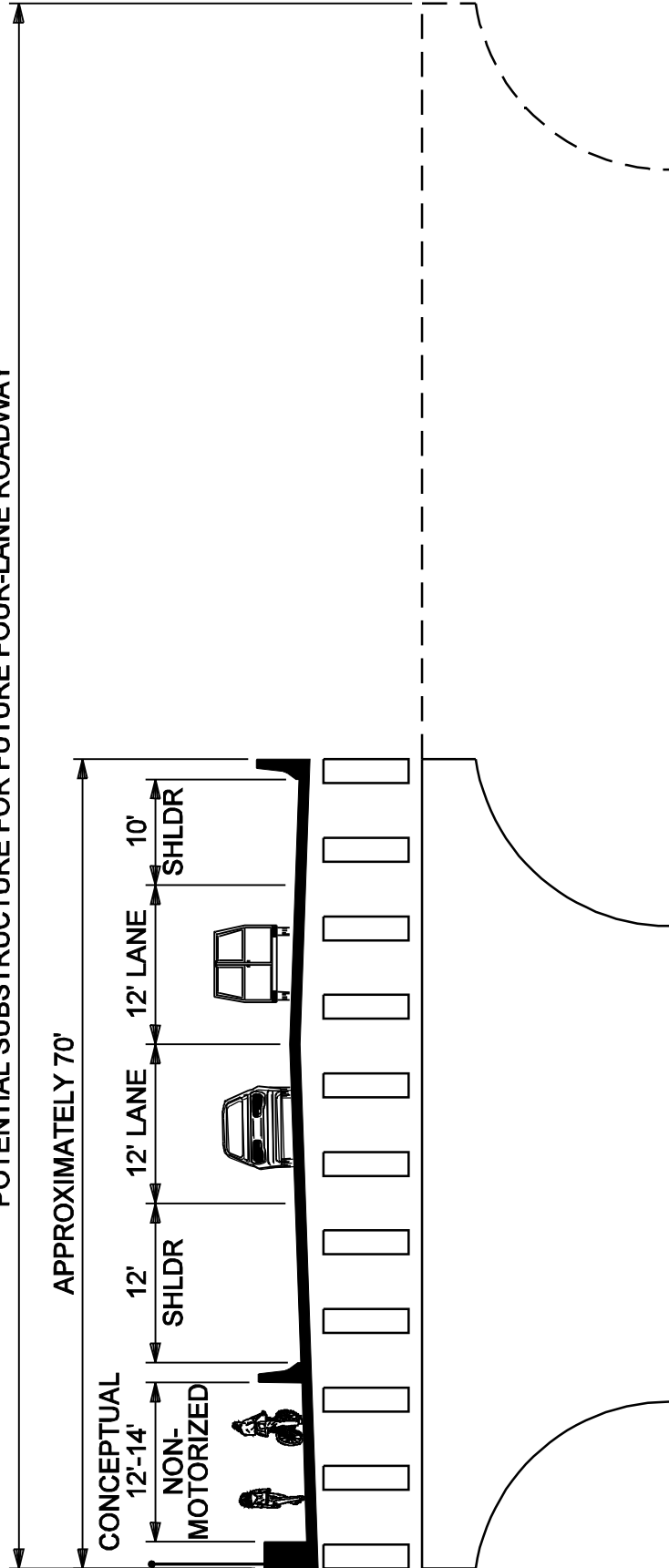
A hydraulic analysis was conducted to examine the upstream effect of the proposed bridge on the 100-year water surface elevation. The analysis used the FEMA HEC-RAS model, with the addition of four surveyed cross-sections near the proposed bridge. For the model, the bridge was assumed to be 3,998 feet long and 70 feet wide with two traffic lanes, as shown in **Figures 4.12-1** and **4.12-2**. A second model was also created to examine the upstream effects of a possible future bridge configuration. For the second model, the bridge was assumed to be 127 feet wide with four traffic lanes.

As shown in **Table 4.12-3**, when these bridges are added to the HEC-RAS model, the 100-year water surface elevation (WSEL) would increase by 0.01 feet in both cases.

Table 4.12-3 Impacts to the 100-Year Floodplain Elevation of the Grand River	
Existing Elevation (feet)	590.00
Future Elevation (feet)w/70 foot wide bridge	590.01
Future Elevation (feet)w/127 foot wide bridge	590.01

Note: elevations are for a point immediately upstream from the proposed bridge

POTENTIAL SUBSTRUCTURE FOR FUTURE FOUR-LANE ROADWAY



US-31 FINAL ENVIRONMENTAL IMPACT STATEMENT

TYPICAL CROSS-SECTION
FOR THE PROPOSED M-231
GRAND RIVER BRIDGE



FIGURE
4.12-2

Piers were assumed to be seven feet wide. It was determined that for a 3,998-foot bridge, a maximum of 26 piers could be used while limiting the increase in backwater to 0.01 feet. This number of piers leaves room for the minimum required navigable channel clearance (160 feet). Soil borings reveal no unusual subsurface conditions that would require more than 26 piers. The width of the navigation channel will require that at least part of the bridge be made of steel, since concrete spans are generally limited to approximately 140'-150'. The hydraulic model assumed two long steel center spans, allowing the use of only 26 piers, reducing cost by minimizing piers in the river, and improving aesthetics. It further allows the remainder of the bridge to be constructed with concrete, which is more cost-effective than steel. See **Figure 4.12-3** for an elevation view of the modeled bridge.

A calculated backwater increase of 0.01 feet is within the margin of error of this study's computational model. A final hydraulic study based on the actual construction plans will be required prior to the construction of the bridge. The final bridge length, width, and pier spacing may be different from the assumptions made in this study. If such a study determines that the project causes backwater impacts beyond the limits of the project right of way, there are two available mitigation measures:

1. Remove a sufficient number of piers (i.e. increase pier spacing) to eliminate backwater impacts that extend beyond the limits of the road right of way, or
2. Obtain flood damage waivers from affected property owners.

The proposed Grand River bridge will span the entire floodplain and therefore have only a minimal adverse impact to the natural and beneficial qualities of the floodplain. Beneficial qualities of the floodplain include flood attenuation, water quality, and wildlife habitat and shoreline protection. Only two piers will need to be constructed in the main river channel. The floodplain impact of all the piers will be approximately 0.29 acres for the two lane bridge and 0.53 acres for the four lane bridge. Measures that may be implemented to minimize floodplain impacts during the construction phase include, but are not limited to:

- Proper application of soil erosion and sedimentation control measures,
- Restricting construction activities in the watercourse during periods of above normal flow.
- Compensating cuts to offset placing piers in the floodplain.

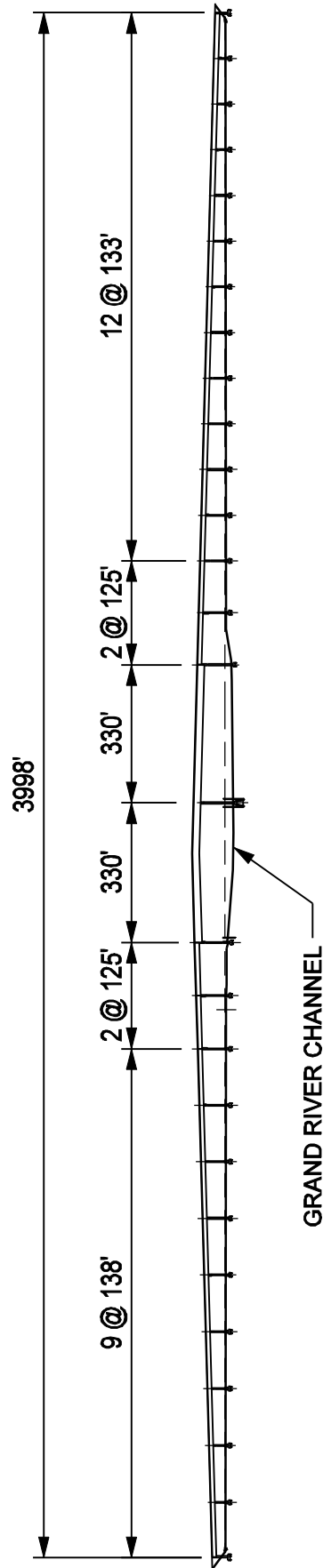
Final mitigation design plans will be developed in consultation with the appropriate agencies. Ottawa County is currently pursuing federal grants to assist in the acquisition of some properties that are within the floodplains and often flooded. Specific acquisitions would be dependent on owner participation.

Like the Grand River, Little Robinson Creek flows east-west and, since the corridor is north-south, avoidance is not possible. The width of the floodplain at Little Robinson Creek makes construction of a long single span structure without piers located in the floodplain impractical. At the proposed crossing site, the 100-year floodplain is approximately 400 feet wide.

A hydraulic analysis was conducted to examine the upstream effect of the proposed Little Robinson Creek bridge on the 100-year water surface elevation. The analysis used a HEC-RAS model based on surveyed cross-sections near the proposed bridge. For the model, the bridge was assumed to be 503 feet long and 70 feet wide with two traffic lanes, similar to the Grand River bridge crossing as shown in **4.12-2**. A second model was also created to examine the upstream effects of a possible future bridge configuration. For the second model, the bridge was assumed to be 127 feet wide with four traffic lanes.

Piers were assumed to be seven feet wide. It was determined that for a 503-foot bridge, four piers could be used with no increase in backwater. The proposed Little Robinson Creek bridge will span the entire floodplain and therefore have only a minimal adverse impact to the natural and beneficial qualities of the floodplain.

At Stearns Creek, the floodplain is approximately 210 feet wide. A long, single span structure without piers in the floodplain is a practical alternative. The proposed bridge would span the entire floodplain



US-31 FINAL ENVIRONMENTAL IMPACT STATEMENT

PROPOSED M-231
GRAND RIVER BRIDGE
ELEVATION VIEW



FIGURE
4.12-3

and therefore have no backwater increase and only a minimal adverse impact to the natural and beneficial qualities of the floodplain.

4.12.3 Navigation

The general definition of a navigable waterway is “waters that are...presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce” (33 CFR 329.4). All construction or modification of a bridge or causeway across navigable waters of the United States requires approval by the USCG under Section 9 of the Rivers and Harbors Act of 1899. A bridge permit approved by the USCG is required before construction or modification work begins.

USACE (under Section 10) is responsible for the maintenance of the navigable river channel and its approval of the location and design of structures crossing a navigable waterway is required. It is concerned with such things as maneuvering room, sight distance necessary for safe navigation, and pier protection.

The Grand River is a navigable waterway and under the jurisdiction of the USCG eastward from the mouth of the river at Lake Michigan to approximately 102nd Avenue (approximately 2.5 miles upstream from the proposed M-231 Grand River crossing). The USACE maintains a navigation channel to a width of 300 feet and a depth of 21 feet west of US-31, and a width of 100 feet and a depth of eight feet east of US-31. Starting at Lake Michigan and moving east upstream, overhead obstructions to vessel passage on the Grand River include:

- Railroad swing bridge located immediately downstream of the US-31 bascule bridge,
- US-31 bascule bridge (23 feet clearance when closed),
- Overhead power lines immediately upstream of US-31,
- Overhead power lines west of 148th Avenue, and
- Overhead power lines east of 120th Avenue.

A Navigation Boat Survey was performed in 1995 to assist the USCG in determining the number, type and height of vessels using the Grand River for navigation. This study was conducted over a two-week period in August, including the Grand Haven Coast Guard Festival, which is typically the river's busiest use time. Based on this study and an update completed in 2001, vessels currently using the Grand River include:

- Lake freighters (west of the railroad swing bridge only),
- Cruise ships (west of the railroad swing bridge only),
- Tug boats,
- Barges,
- USCG vessels, and
- Pleasure craft – sail and motor boats.

Impacts to Navigation

Boating traffic disruptions may occur at the new Grand River crossing. Impacts to boating traffic will be minimized.

Vertical Clearance: The proposed M-231 Grand River crossing will be a fixed-span bridge with a minimum vertical clearance of 35 feet. Vessels taller than 35 feet will not be able to pass under this structure. All vessels currently using this segment of the Grand River require less than 35 feet of vertical clearance.

Horizontal Clearance: The proposed M-231 Grand River crossing will maintain the 100 feet navigable channel with at least 30 feet buffer on either side of the channel, for a total horizontal clearance between piers of at least 160 feet. All vessels currently using this segment of the Grand River require less than 160 feet of horizontal clearance.

4.13 WILD AND SCENIC RIVERS

No Federal Wild or Scenic River systems are located within the study area, nor are there any State designated Natural River systems that are regulated by Part 305 (Michigan Natural Rivers) of Act 451, NREPA.

4.14 COASTAL BARRIERS/CRITICAL DUNES

The improvements planned for the existing US-31 segment within the city limits of Grand Haven, from south of Franklin Avenue to the Grand River, is located in a Coastal Zone Management Area. These improvements are within existing ROW, and will not impact any Coastal Zone Management Areas. The new alignment is not located in a Critical Dune Protection/Management Area or a high risk erosion area.

4.15 WILDLIFE AND VEGETATION

The Michigan Resource Information System Land Cover/Use Classification System was used to map the impacted areas by cover types. **Figures 4.15-1 thru 5** shows the areas mapped and the acreage of impact within the ROW. The paragraphs below outline the general characteristics and plant species present in each cover type area.

Cropland areas are under cultivation for food crops as well as fallow farm fields and pastures used for grazing livestock. Typical plant species found in this cover type area include goldenrod (*Solidago sp.*), mullein (*Verbascum sp.*), Queen Anne's lace (*Daucus carota*), common chicory (*Cichorium intybus*) and asters (*Aster spp.*) in addition to cultivated row crops, small grains and hay.

Mixed Deciduous and Conifer areas are forested upland areas comprised predominately of hardwoods, but also contain coniferous trees. These areas along the proposed M-231 are dominated by white oak (*Quercus alba*), false solomon seal (*Smilacina racemosa*), sassafras (*Sassafras albidum*), black oak (*Quercus velutina*), scotch pine (*Pinus sylvestris*), sugar maple (*Acer saccharum*), red oak (*Quercus rubra*), raspberry (*Rubus sp.*), red pine (*Pinus resinosa*), white pine (*Pinus strobus*), black cherry (*Prunus serotina*), Virginia creeper (*Parthenocissus quinquefolia*) and bracken fern (*Pteridium aquilinum*).

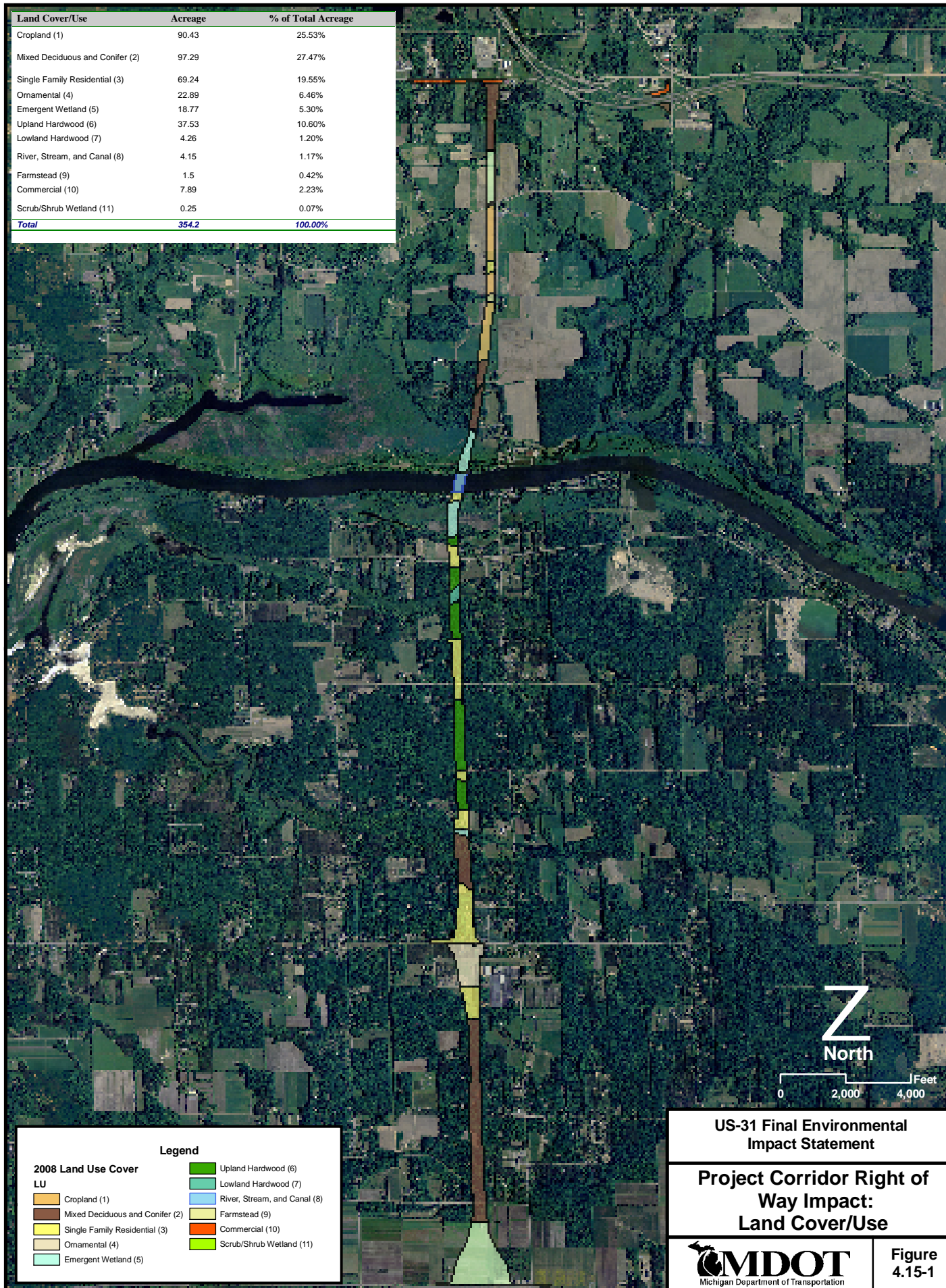
Single Family areas are detached, single family homes that are occupied permanently or seasonally.

Ornamental areas along the proposed M-231 are used for ornamental horticulture purposes such as nurseries.

Emergent Wetlands are areas characterized by an herbaceous plant layer and shallow water. Typical plant species found in the emergent wetlands along the proposed M-231 are narrow-leaved cattail (*Typha angustifolia*), reed canary grass (*Phalaris arundinacea*), buttonbush (*Cephalanthus occidentalis*), arrow arum (*Peltandra virginica*), riverbank grape (*Vitis riparia*), spotted joe-pye-weed (*Eupatorium maculatum*), wood sage (*Teucrium canadense*), blue vervain (*Verbena hastata*), late goldenrod (*Solidago gigantea*), tall ironweed (*Vernonia gigantea*) and swamp milkweed (*Asclepias incarnata*).

Upland Hardwood areas along the proposed M-231 are forested, non-wetland areas dominated by white oak (*Quercus alba*), sassafras (*Sassafras albidum*), black oak (*Quercus velutina*), sugar maple (*Acer saccharum*), red oak (*Quercus rubra*), black cherry (*Prunus serotina*), scotch pine (*Pinus sylvestris*), false solomon seal (*Smilacina racemosa*), Virginia creeper (*Parthenocissus quinquefolia*), bracken fern (*Pteridium aquilinum*) and raspberry (*Rubus sp.*).

Lowland Hardwood areas include both deciduous forested wetlands and deciduous floodplain forests. Lowland hardwoods along the proposed M-231 were dominated by silver maple (*Acer saccharinum*), spotted touch-me-not (*Impatiens capensis*), green ash (*Fraxinus pennsylvanica*), reed canary grass



Land Cover/Use	Acreage	% of Total Acreage
Cropland (1)	90.43	25.53%
Mixed Deciduous and Conifer (2)	97.29	27.47%
Single Family Residential (3)	69.24	19.55%
Ornamental (4)	22.89	6.46%
Emergent Wetland (5)	18.77	5.30%
Upland Hardwood (6)	37.53	10.60%
Lowland Hardwood (7)	4.26	1.20%
River, Stream, and Canal (8)	4.15	1.17%
Farmstead (9)	1.5	0.42%
Commercial (10)	7.89	2.23%
Scrub/Shrub Wetland (11)	0.25	0.07%
Total	354.2	100.00%

2008 Land Use Cover
LU

Cropland (1)

Mixed Deciduous and Conifer (2)

Single Family Residential (3)

Ornamental (4)

Emergent Wetland (5)

Legend

Upland Hardwood (6)

Lowland Hardwood (7)

River, Stream, and Canal (8)


Farmstead (9)

Commercial (10)

Scrub/Shrub Wetland (11)

**US-31 Final Environmental
Impact Statement**

**Project Corridor Right of
Way Impact:
Land Cover/Use**

**MDOT**
Michigan Department of Transportation

**Figure
4.15-1**

A

A

B

C

D












North

0 500 1,000 Feet

Legend

2008 Land Use Cover

LU

- | | |
|---|--|
|  Cropland (1) |  Upland Hardwood (6) |
|  Mixed Deciduous and Conifer (2) |  Lowland Hardwood (7) |
|  Single Family Residential (3) |  River, Stream, and Canal (8) |
|  Ornamental (4) |  Farmstead (9) |
|  Emergent Wetland (5) |  Commercial (10) |
| |  Scrub/Shrub Wetland (11) |

**US-31 Final Environmental
Impact Statement**

**Project Corridor Right of
Way Impact:
Land Cover/Use**



**Figure
4.15-2**

D

A

B

C

D

North

0 500 1,000 Feet

Legend

2008 Land Use Cover

LU

- | | |
|---------------------------------|------------------------------|
| Cropland (1) | Upland Hardwood (6) |
| Mixed Deciduous and Conifer (2) | Lowland Hardwood (7) |
| Single Family Residential (3) | River, Stream, and Canal (8) |
| Ornamental (4) | Farmstead (9) |
| Emergent Wetland (5) | Commercial (10) |
| | Scrub/Shrub Wetland (11) |

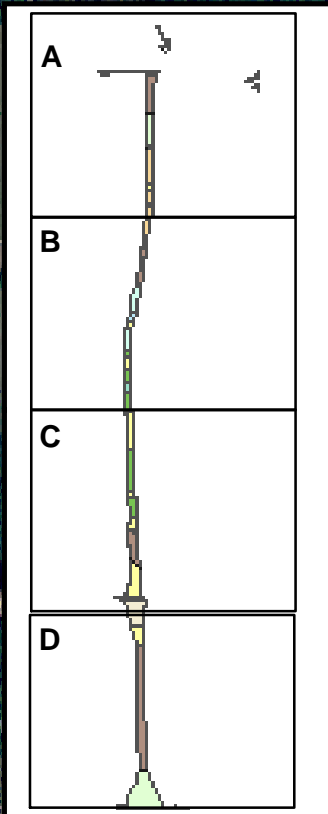
US-31 Final Environmental
Impact Statement

Project Corridor Right of
Way Impact:
Land Cover/Use















Figure
4.15-5

C



North

0 500 1,000 Feet

2008 Land Use Cover	
LU	
	Cropland (1)
	Single Family Residential (3)
	Ornamental (4)
	Emergent Wetland (5)
	Mixed Deciduous and Conifer (2)
	Farmstead (9)
	Commercial (10)
	Scrub/Shrub Wetland (11)
	Upland Hardwood (6)
	Lowland Hardwood (7)
	River, Stream, and Canal (8)
	Farmstead (9)

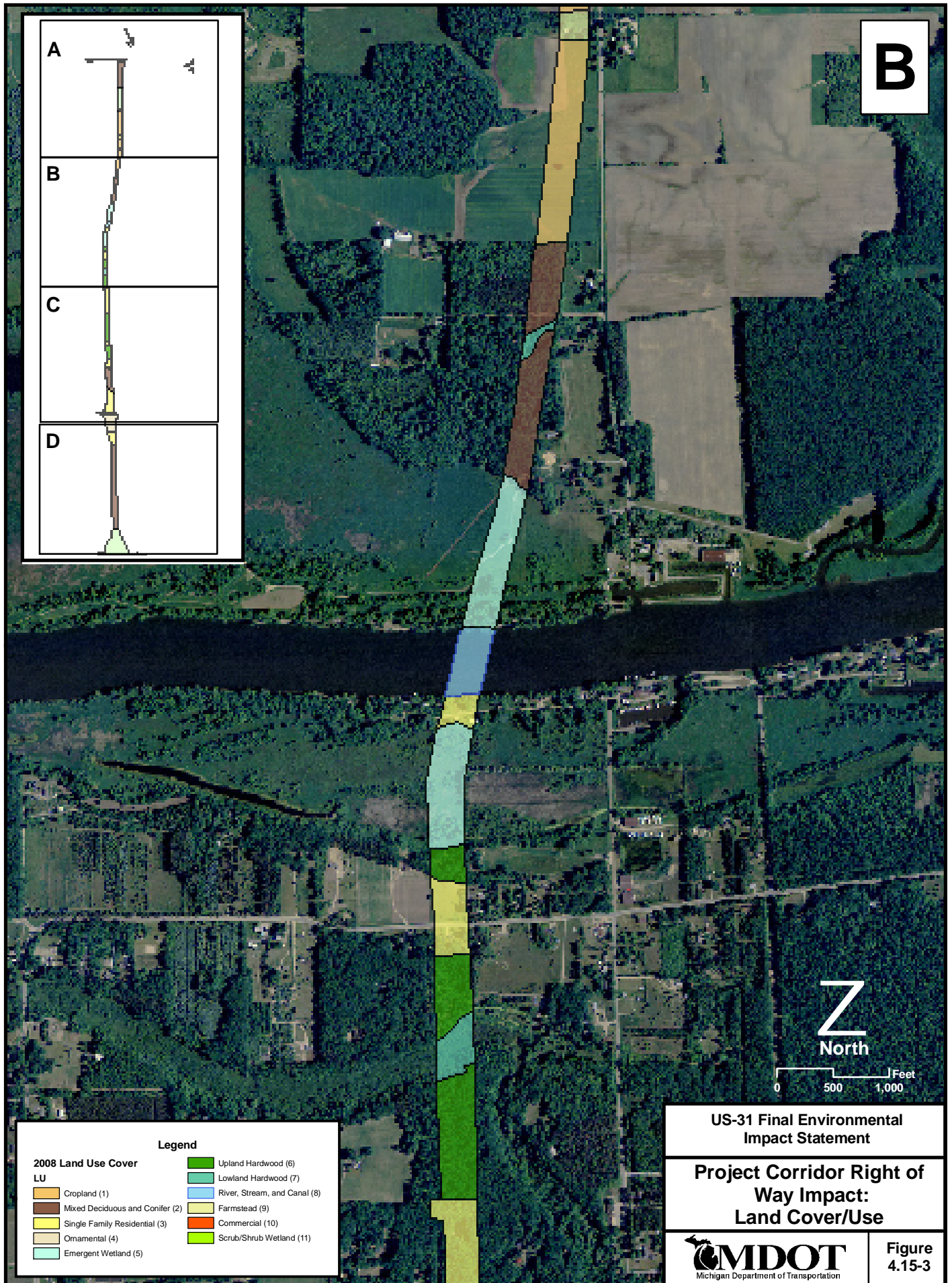
Legend

US-31 Final Environmental Impact Statement

Project Corridor Right of Way Impact:
Land Cover/Use



Figure 4.15-4



(*Phalaris arundinacea*), sedges (*Carex spp.*), paper birch (*Betula papyrifera*) and speckled alder (*Alnus rugosa*).

Areas mapped as **River, Stream or Canal** are open water, linear watercourses with little or no aquatic vegetation.

Areas mapped as **Farmstead** indicate an area of structures associated with farming operations.

Commercial areas along the existing US-31 are areas of commercial businesses such as retail stores and professional offices.

Shrub/Scrub Wetland areas are wetlands with brush and woody vegetation less than six meters in height. These areas are dominated by broad-leaved cattail (*Typha latifolia*), grey dogwood (*Cornus foemina*), iris (*Iris sp.*), cardinal flower (*Lobelia cardinalis*), common boneset (*Eupatorium perfoliatum*), angelica (*Angelica atropurpurea*), spotted joe-pye-weed (*Eupatorium maculatum*), goldenrods (*Solidago spp.*), sensitive fern (*Onoclea sensibilis*), cinnamon fern (*Osmundo cinnamomea*) Eastern cottonwood (*Populus deltoides*), spotted touch-me-not (*Impatiens capensis*), quaking aspen (*Populus tremuloides*), sumac (*Rhus sp.*), red-osier dogwood (*Cornus stolonifera*), weeping willow (*Salix alba*), green ash (*Fraxinus pennsylvanica*), American elm (*Ulmus americana*), and Eastern cottonwood (*Populus deltoides*).

Upland Grass areas along the proposed M-231 are upland fields and meadows dominated by goldenrod (*Solidago sp.*), mullein (*Verbascum sp.*), Queen Anne's lace (*Daucus carota*), common chicory (*Cichorium intybus*) and asters (*Aster spp.*).

Areas with **Pine** cover type are coniferous, upland forests dominated by red pine (*Pinus resinosa*), white pine (*Pinus strobus*) and scotch pine (*Pinus sylvestris*).

Road Transportation areas are limited-access highways, divided surface highways and the ROWs associated with them.

Upland Shrub areas are dominated by scattered shrubs and shrub masses with ground cover and young tree growth. Along the proposed M-231 these areas are dominated by sumac (*Rhus sp.*), sassafras (*Sassafras albidum*), goldenrods (*Solidago spp.*), autumn olive (*Eleagnus umbellata*), mullein (*Verbascum sp.*), Queen Anne's lace (*Daucus carota*), common chicory (*Cichorium intybus*) and asters (*Aster spp.*).

Fauna observed in the habitats along the proposed M-231 are common to areas settled and somewhat disturbed by human activity. Mammal species that were observed in the project area include eastern chipmunk (*Tamias striatus*), long-tailed weasel (*Mustela frenata*), eastern cottontail (*Sylvilagus floridanus*) and white-tailed deer (*Odocoileus virginianus*). Other common wildlife species most likely in the area are: muskrat (*Ondatra zibethicus*), Virginia opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), woodchuck (*Marmota monax*), bats, mice, voles, moles, coyote (*Canis latrans*), red fox (*Vulpes vulpes fulva*) and striped skunk (*Mephitis mephitis*). Reptiles and amphibians also frequent the Preferred Alternative area including snakes, turtles, frogs, salamanders and toads. Species observed include Eastern American toad (*Bufo americanus*), wood frog (*Rana sylvatica*), northern leopard frog (*Rana pipiens*), and eastern box turtle (*Terrapene carolina carolina*).

Various birds observed inhabiting the Preferred Alternative include species such as the European Starling (*Sturnus vulgaris*), Song Sparrow (*Melospiza melodia*), American Robin (*Turdus migratorius*), American Crow (*Corvus brachyrhynchos*), and Mourning Dove (*Zenaida macroura*). Other perching bird species that were identified are Sedge Wren (*Cistothorus platensis*), Barn Swallow (*Hirundo rustica*), Northern Cardinal (*Cardinalis cardinalis*), Rose-breasted Grosbeak (*Pheucticus ludovicianus*), Common Yellowthroat (*Geothlypis trichas*) and Gray Catbird (*Dumetella carolinensis*). Raptors including hawks, kestrel and owls may also inhabit the project area. Red-tailed Hawk (*Buteo jamaicensis*) and Turkey Vulture (*Cathartes aura*) were identified. Red-winged Blackbird (*Agelaius phoeniceus*), Great Blue Heron

(*Ardea herodias*), Mallard (*Anas platyrhynchos*), and Mute Swan (*Cygnus olor*) were found in and adjacent to wetlands. Despite a game bird preserve being present within the Preferred Alternative, the only upland game species observed was Wild Turkey (*Meleagris gallopavo*).

Detailed inventories of upland habitats were conducted along proposed alternatives from 1994 to 1998. During these surveys, detailed documentation of the wildlife observed was recorded in a series of reports entitled *Biological Assessment Working Papers* submitted to the MDNR. This information is available for review.

Impacts

Terrestrial resources along the Preferred Alternative provide suitable habitat for numerous plants and animals. This project lies in an already fragmented landscape; the addition of a highway corridor will likely not greatly increase fragmentation. Most species observed along the Preferred Alternative are adaptable generalists that have become accustomed to living in proximity to human populations. Most of these species should easily relocate from areas impacted by the project.

Quantifying wildlife impacts generally requires the use of predictive habitat models such as Habitat Evaluation Procedures (HEP). In the absence of semi-quantitative techniques such as HEP, the wildlife impacts are often discussed in terms of the amount of plant community disturbance, as these communities and cover types provide the habitat for the various species found in the area.

Table 4.15-1 lists the total acreage potentially impacted by each cover type along the Preferred Alternative. Impacts were determined by assuming that everything within the proposed construction limits would be impacted by the project, which is a conservative estimation. Note that while upland hardwood and mixed deciduous and conifers are mapped in many locations, the woods in the area are generally younger and second growth stands. Much of the wooded areas contain single family residences, so functionally many of these wooded areas are actually in residential land uses.

Table 4.15-1 Cover Types Mapped within the Preferred Route Right-of-Way		
Land Cover/Use (MIRIS)	Acreage	Percent of Total Acreage
Cropland	90.43	25.53%
Mixed Deciduous and Conifer	97.29	27.47%
Single Family Residential	69.24	19.55%
Ornamental	22.89	6.46%
Emergent Wetland	18.77	5.30%
Upland Hardwood	37.53	10.60%
Lowland Hardwood	4.26	1.20%
River, Stream, and Canal	4.15	1.17%
Farmstead	1.50	0.42%
Commercial	7.89	2.23%
Shrub/Scrub Wetland	0.25	0.07%
TOTAL	383.99	100%

Temporary

Mobile wildlife species that inhabit the Preferred Alternative will be temporarily displaced to adjacent habitats during construction. Smaller, less mobile mammals, reptiles and amphibians may be directly impacted. Temporary noise associated with construction could disrupt breeding and nesting activities of birds and other wildlife, depending upon the timing of construction. However, this is an area that already experiences a good deal of noise and other activity associated with human populations. Most birds in the area should easily relocate nests and perches to un-impacted areas around the project.

Long-Term

Vegetation, especially species of trees and shrubs that provide wildlife food and/or cover, will be impacted within the proposed ROW during construction and in the operation of the freeway facilities. Forested areas play a critical role in the improvement and maintenance of water, soil, and air quality which provide habitat for diverse wildlife, as well as, recreation opportunities and resources for the community. Grasslands and old fields regenerate faster and are more tolerant to disturbance from construction than forests.

Some terrestrial wildlife species on their seasonal migration and daily search for food require the regular use of wetland habitats, including floodplains, ravines and forested wetlands, as well as upland habitats, as established wildlife corridors. The new alignment will not inhibit the passage of terrestrial species along the major watercourse or its floodplain. The project as planned will span the entire 100 year floodplain of the Grand River, and should therefore not pose a restriction to animal travel along the riparian corridor. Wetland losses were minimized to 3.04 acres, a small amount of permanent impact considering the amount of wetland in the project area. There were approximately 24.87 acres of wetland delineated within the project study area, thus 88% of the wetland resource will be avoided by the project.

Given the list of species observed during the various field identification efforts, it seems that the generalist species typically found in the area should be able to find additional habitat and readily move to avoid construction impacts. Proposed M-231 will likely not impact non-resident animal species. The habitat adjacent to the proposed right of way is very similar to the habitat of the surrounding areas. The majority of non-wetland habitat that will be impacted contains mixed deciduous and coniferous forests, upland hardwood forests and cropland. These habitats are common throughout Ottawa County as well as Allegan and Muskegon Counties.

Mitigation

Compensatory mitigation is not required for upland impacts. However, design oriented avoidance measures and the use of native plant species post construction are often applied to highway projects within Michigan. The use of invasive species control measures should be considered.

Over half of the acreage impacted by the project currently lies in cropland and single family residences. While cropland provides habitat for some species, upland forests provide habitat for multiple species. The Preferred Alternative minimizes impact to upland habitats through strategic avoidance. In these areas, options for limiting roadside wildlife fatalities will be explored. Likewise, re-vegetation of the right-of-way after construction with native plant species will be considered to enhance the floristic quality of the roadside. These strategies will be developed during the design phase. The need for restoration of upland hardwood and mixed deciduous and conifer areas will also be evaluated.

Bridges that span the waterways and floodplains will allow the continued use of these areas as wildlife corridors. At stream crossing locations where bridges are not proposed, large box culverts will be used to facilitate the passage of wildlife. Culvert design for wildlife movement will be determined based upon need and feasibility at each individual location. Wetland mitigation is addressed in Section 4.10.2. The completed Wetland Mitigation Plan will replace the acreage and associated functions and values, including the provision of habitat for wildlife.

4.16 NATURAL AREAS

Natural areas are unique habitats with rare botanical and biological diversity or rare natural features. The Nature Conservancy has proposed protection for one Proposed Natural Area (PNA) adjacent to the Preferred Alternative, Bruce's Bayou. Bruce's Bayou is hydrologically connected to the wetlands on the Spoonville Gun Club property. The Preferred Alternative will not impact the Proposed Natural Area.

4.17 THREATENED AND ENDANGERED SPECIES

Threatened and endangered species are protected by the state of Michigan under Part 365, Endangered Species Protection of the NREPA (Act 451 of the Michigan Public Acts of 1994), and/or the federal government, under Section 7 of the Endangered Species Act of 1973 as amended. Special concern species or candidate species are monitored, but not protected by law. According to correspondence with the MDNR and the United States Fish and Wildlife Service (USFWS), the following species are known to occur near the Preferred Alternative:

Pitcher's thistle (*Cirsium pitcheri*) is a state and federally threatened plant species which grows extensively along shorelines on open sand dunes and low open beach ridges of the Great Lakes. It is most often found in near-shore plant communities but is known to grow in non-forested areas of a dune system. This native thistle often occurs in association with the Great Lakes endemic Houghton's goldenrod (*Solidago houghtonii*). Suitable dune habitat does not exist within the Preferred Alternative. Pitcher's thistle was not observed along the Preferred Alternative during field surveys in August of 2007. Most of the existing US-31 area is commercialized, while the proposed new alignment corridor mainly consists of open fields, upland forests, wetlands, or residential lots. Pitcher's thistle and its habitat will not be affected by the Preferred Alternative.

American ginseng (*Panax quinquefolius*) is listed as state threatened and is most often found in rich hardwood forests on slopes or ravines and sometimes in swampy areas or wooded dune hollows. Ginseng grows best in heavy soils (clay mixed with gravel) covered with leaf mold or rotted wood. Flowering occurs during June and July with the flowers developing into small green fruits in late July and early August. In late August and September the fruits ripen and become bright crimson in color. No individuals were observed along the Preferred Alternative area during the field surveys in August of 2007. Proper habitat for American ginseng does not exist in this area. The Preferred Alternative will have no effect on American ginseng.

A **Great Lakes marsh**, a high quality natural area, is a multi-seral, non-forested wetland, directly influenced by and connected to a large freshwater lake. They provide habitat for waterfowl, shorebirds, fish, and mammals. Plant community structure and distribution are influenced by the type of coastal features present, including deep marsh, emergent marsh, marsh meadow, and upland margin. No **Great Lakes marshes** were observed due to the absence of large freshwater lakes in the project area.

The **Indiana bat (*Myotis sodalis*)** is a state and federally endangered mammal which roosts in trees in riparian, bottomland and upland forests from approximately April 15 to September 15. Indiana bats may summer in a wide range of habitats from highly altered landscapes to intact forests. Roost trees are generally large, dead and dying. Roost trees can also be live trees with peeling or exfoliating bark favoring southern exposure to the sun. During an Indiana Bat habitat assessment, only three small areas were determined to contain suitable Indiana Bat habitat. Along the proposed M-231, only a few dead or dying trees or other trees with exfoliating bark or cavities big enough for a bat to roost in were present. Forested habitats usually had a full canopy shading much of the area leaving very few trees exposed to the sun. The complete findings of this habitat survey can be found in "Indiana Bat (*Myotis sodalis*) Habitat Study for The US 31 Extension Ottawa County, Michigan." Additionally, a survey conducted in May and June of 2007 produced no signs of the Indiana bat during mist netting studies and acoustic monitoring. The report based on the mist-netting and acoustic monitoring, "A Survey for Bats at the Proposed US-31 Bypass of the City of Grand Haven, Ottawa County, Michigan" concluded that this bat species most likely does not use the area. Given the lack of good quality roosting habitat and the lack of bats found during mist netting and acoustic monitoring, the Indiana Bat and its associated habitat will not be affected by the proposed M-231.

The **bald eagle (*Haliaeetus leucocephalus*)**, although recently delisted, is still federally protected under the Bald and Golden Eagle Protection Act. The bald eagle inhabits, breeds, and forages around freshwater lakes with fish as their main dietary staple. Although the bald eagle may use the Grand River area for foraging and resting, it most likely does not nest in the proposed M-231 alignment. No

individuals, nests, or activities were observed during the field surveys in August of 2007. The Bald Eagle and its associated habitat will not be affected by the Preferred Alternative.

One species of special concern was observed within the study area on August 30th, 2008. A large, dead **eastern box turtle (*Terrapene carolina carolina*)** was found along the proposed new alignment corridor. The turtle was discovered on Sleeper Street and was an apparent automobile fatality. In previous surveys, two box turtles specimens were also discovered in Robinson and Crockery Townships. The eastern box turtle is Michigan's only terrestrial turtle and occurs in forested habitats with sandy soils near a water source such as streams, ponds, marshes or swamps. Access to un-shaded nesting sites in sandy, open areas is critical to reproduction.

During the field survey, no state or federally threatened or endangered species were observed within the project area. Consequently, it is unlikely any threatened or endangered species would be impacted by the Preferred Alternative. Letters were sent to both the MDNR and USFWS describing the findings of the habitat and species assessment and indicating that the project would have no effect on listed species. The MDNR responded on January 15, 2008 and agreed with the findings that the project should have no direct impacts on known special natural features. According to the Section 7(a)(2) consultation process, once it is determined that a project will have no effect on federal threatened or endangered species, no further correspondence with USFWS is necessary.

Mitigation

A letter requesting a finding of no effect was submitted to the US Fish and Wildlife Service. Given that potential habitat for the Indiana bat is present, tree clearing for the project cannot occur between April 1st and October 1st. Since tree clearing for the project will not be completed within one year of the mist netting study, further studies may be required by USFWS before clearing occurs.

If Eastern box turtles are encountered during construction, special care must be taken to remove them from the construction zone. At the preconstruction meeting, construction crews will be required to undergo Eastern box turtle identification and removal procedures with qualified MDOT personnel prior to start of work. Although species of special concern are not legally protected by the State of Michigan, great care should be taken to preserve this rare turtle species. MDOT does protect special concern species, even though they are not protected by law.

4.18 CULTURAL RESOURCES

The Michigan State Historic Preservation Office (SHPO) has issued a no historic properties affected determination for above-ground historic resources, and a no adverse effect determination for archaeological resources (see **Appendix C** for concurrence letter).

4.18.1 Historic Architectural Resources

The Preferred Alternative will not affect any above-ground historic resources. During the development of the DEIS, several surveys of above-ground historic resources were conducted to comply with Section 106 of the National Historic Preservation Act of 1966, as amended (36 CFR 800). The surveys, all accepted by the SHPO, identified a total of 3 National Register-eligible properties including the Boer Farm in Zeeland Township, the Ottawa Station School in Olive Township, and the Southside Historic District in the City of Grand Haven. The Area of Potential Effect (APE) of the Preferred Alternative no longer incorporates any land in Olive and Zeeland Townships, so the project will not impact the Boer Farm or the Ottawa Station School.

Southside Historic District in the City of Grand Haven:

The Southside Historic District is significant as an important collection of residential properties dating from 1880 to the 1920s, and has been identified as eligible for listing in the National Register of Historic Places (NRHP). The main concentration of the district's residential properties is located to the west of Sixth

Street, and between Pennoyer Avenue and Jackson Street. The only portion of the district adjacent to existing US-31 (see **Figure 4.18-1**) is on the west side of US-31 between Pennoyer Avenue and Franklin Street. This segment of US-31 will be reconstructed as part of the Preferred Alternative, but will retain the existing two lanes of traffic in either direction. The Preferred Alternative improvements between Franklin and Pennoyer will take place primarily in the median, away from the Historic District. The curb will remain in its existing location, and thus the improvements will not affect the character of the Historic District. The SHPO concurred with the no historic properties affected determination (see **Appendix C**).

Archaeological Resources

Impacts to Archaeological Resources

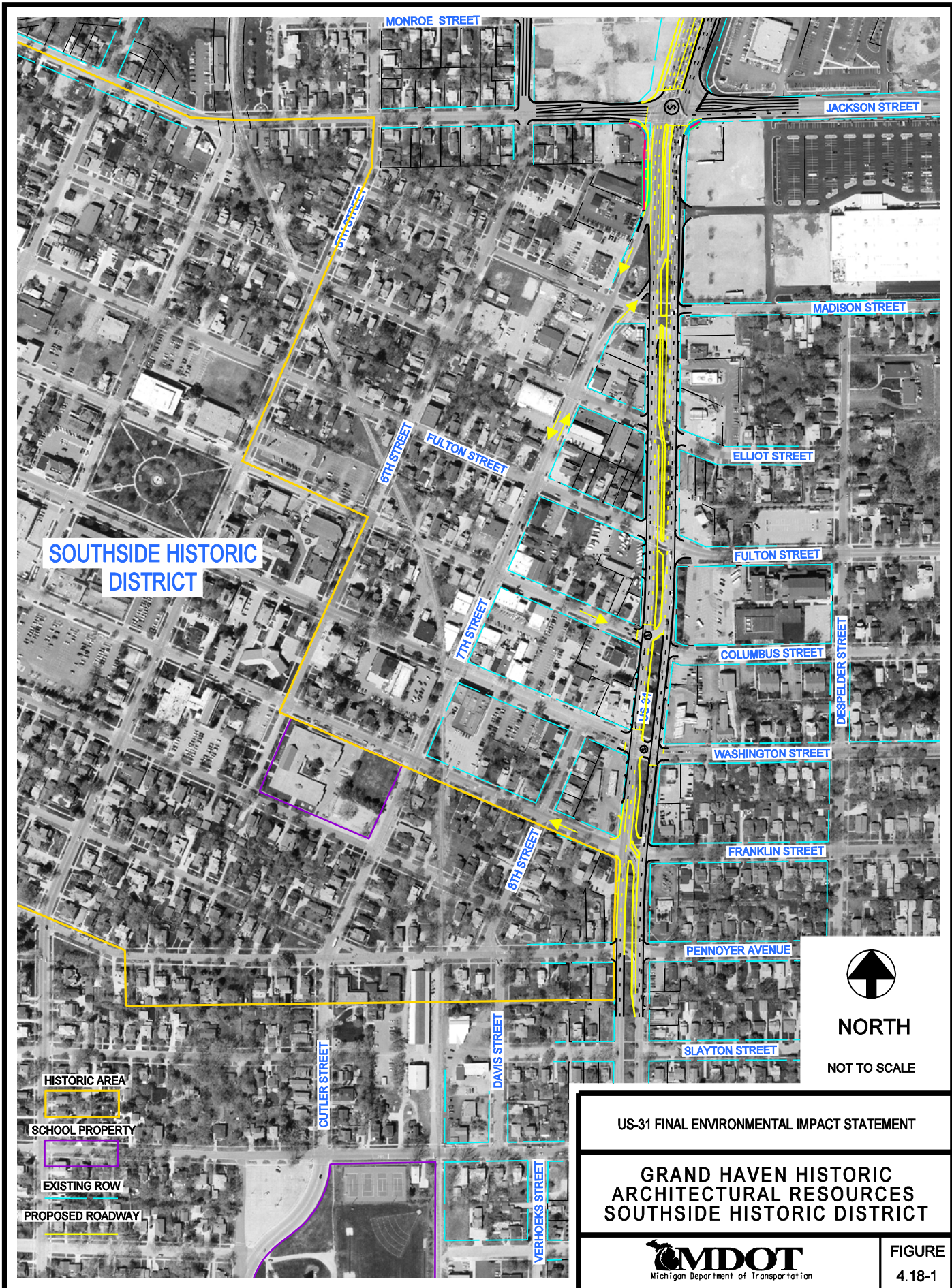
The analysis of Alternative F/J-1 included a Phase I survey of all portions of the Preferred Alternative that were accessible. Two prehistoric sites (20OT318, 20OT319), four historic sites (20OT320, 20OY321, 20OT322, 20OT323), and one site (20OT317) that had prehistoric and historic components were identified as a result of the Phase I survey efforts. None are recommended eligible for inclusion on the NRHP and no further work is considered necessary. Unfortunately, property owners denied access to several properties, preventing their survey. The Michigan SHPO concurred that once MDOT purchased these properties, the surveys would be completed and any eligible archaeological sites located would be mitigated through data recovery. If eligible sites are discovered, MDOT shall consult with the Michigan SHPO and Office of the State Archaeologist to develop an acceptable data recovery mitigation plan.

4.18.2 Section 106 - Traditional Cultural Properties

Indian Tribes were consulted regarding historic properties, in accordance with Section 106 of the National Historic Preservation Act and its implementing regulations at 36 CFR 800, during the course of this study. In August 2001, letters were mailed to eight federally recognized Tribes of Michigan and one Indian Tribe of Michigan that was not federally recognized. The letter requested comments on the potential for the four-lane limited access Alternative F/J1 to impact areas that may traditionally have been used or that may be culturally significant to Native Americans who reside or once resided in the area. Supporting documentation included a map depicting Alternative F/J1. The Saginaw Chippewa Tribe responded that they did not know of any Indian Traditional Cultural Properties, Sacred Sites, or other Significant Properties in the study area. The Hannahville Indian Community responded that the alternative would not affect any Indian religious site or burial ground of the Hannahville Indian Community.

In September 2007, letters were mailed to the twelve federally recognized Tribes of Michigan requesting comments about the proposed areas to be widened in the Preferred Alternative along existing US-31 and the proposed two-lane road between M-45 and I-96/M-104 (Alternative F-1a). Supporting documentation included a map of the proposed project. The Keweenaw Bay Indian Community responded that they had no interests at this time regarding religious or cultural sites documented in the proposed project areas and requested to be consulted if the scope of work changes, or if artifacts or human remains are discovered. The Little Traverse Bay of Odawa Indians responded that they do not have any information concerning the presence of any Indian Traditional Cultural Properties, Sacred Sites, or Other Significant Properties in the proposed project areas and requested to be consulted if Native American human remains or burial objects are inadvertently discovered (see correspondence in **Appendix C**).

In October 2008, letters were mailed to the twelve federally recognized Indian Tribes of Michigan. In addition, letters were also sent to two Indian Tribes of Michigan that are not, as yet, federally recognized. The letters described the proposed improvements along existing US-31 and the proposed two-lane road between M-45 and I-96/M-104 and included detailed illustrations of the proposed work drafted for this FEIS. Also discussed was a proposed wetland mitigation site, the feasibility of which is currently being studied. In the letter, MDOT offered the opportunity to meet and discuss the proposed project in more detail and requested written comments on the project if a meeting was not possible. Additional follow up phone calls were also made to tribes in the proximity of the project. The Ketegitigaaning Ojibwe Nation responded that they have no interests documented at this time in the proposed project areas and requested to be consulted if the scope of work changes in any way, or if artifacts or human remains are discovered (see correspondence in **Appendix C**). No requests to meet with MDOT were received.



Impacts to Section 106 - Traditional Cultural Properties

Traditional cultural properties are most frequently associated with Native American sacred places. They are important because of the association with the traditional practices or beliefs of a living community. Those beliefs are rooted in that community's history. They are important to maintaining the continuing cultural identity in that community.

Indian Tribes were consulted regarding historic properties, in accordance with Section 106 of the National Historic Preservation Act and its implementing regulations at 36 CFR 800, during the course of this study. In August 2001, letters were mailed to eight federally recognized Tribes of Michigan and one Indian Tribe of Michigan that was not federally recognized (Grand River Band of Ottawa Indians). In September 2007, consultation letters were mailed to the twelve federally recognized Tribes of Michigan. In October 2008, consultation letters were mailed to the twelve federally recognized Indian Tribes of Michigan. In addition, letters were also sent to two Indian Tribes of Michigan that are not, as yet, federally recognized (Grand River Band of Ottawa Indians and the Burt Lake Band of Ottawa and Chippewa Indians). None of these Tribes identified any known Traditional Cultural Properties within the APE for this undertaking (see correspondence in **Appendix C**).

No National Register-eligible historic or prehistoric Native American archaeological sites have been identified within the APE for this undertaking. Two areas north of the Grand River, however, have not been surveyed because access was denied by the landowners. In consultation with the SHPO, the MDOT and SHPO agreed that once MDOT purchases the two properties, the surveys will be completed. The SHPO and MDOT further agreed that any eligible sites would be mitigated through data recovery since any such sites would be important for the information they may yield but not for preservation in place (see correspondence in **Appendix C**).

The Keweenaw Bay Indian Community, the Little Traverse Bay of Odawa Indians, and the Ketegitigaaning Ojibwe Nation asked to be consulted if the scope of work changes, or if artifacts or human remains are discovered. In addition, the Tribal Historic Preservation Office for the Pokagon Band of the Potawatomi Indians will be consulted as they have been recognized by the Department of the Interior.

In the event of accidental discovery of Native American human remains during design or construction, the above four Tribes will be contacted for consultation in accordance with the appropriate federal and state laws, rules and regulations regarding such finds. An "unanticipated finds" plan will be developed to provide detailed procedures to deal with significant historic resources which may be identified during project implementation. This plan will establish procedures to evaluate and treat these resources. The procedures include stopping work, examining findings, determining eligibility and documenting results.

4.19 PARKS AND RECREATION

There are no direct impacts to parks or recreation facilities from the Preferred Alternative.

4.19.1 Parks and Recreation Lands

Park, recreation, and game areas are found throughout the study area, including publicly and privately owned facilities. Park and recreational facilities within the study area are shown on **Figures 4.6-1a** through **4.6-1b**. The Central Community Park (120th Avenue and Buchanan Street) and Johnson Street Wildlife Management Area (Johnson Street just west of 120th Avenue) are located near the Preferred Alternative, but will not be impacted.

4.19.2 Public School Recreation Areas

Robinson Elementary School is adjacent to the proposed new alignment. It will not be directly impacted, although there may be temporary impacts, such as access limitations or restrictions to some roadways during construction. It may be necessary to modify bus routes during construction. There are no direct or permanent impacts to public school recreational areas by the Preferred Alternative.

4.19.3 State Recreation Lands and Game Areas

Recreation and game areas on the Grand River are found throughout the study area, including publicly- and privately-owned facilities. See to **Figures 4.6-1a** and **4.6-1b** for locations of public recreational lands. There are no publicly owned recreation lands or game areas near the Preferred Alternative; therefore there are no direct impacts.

4.19.4 Sidewalks

The Preferred Alternative will not impact any existing or planned non-motorized facilities within the study area. Temporary impacts will be related to limitations or restrictions on local roads during construction. See **Section 4.6** for a discussion on non-motorized facilities.

Existing US-31

There are no sidewalks adjacent to existing US-31 in the Holland Township area and none are proposed. Pedestrian movements will be routed to 120th Avenue (Waverly Road) for this stretch of US-31. Existing cross-street sidewalks in Holland Township will be maintained, and stay in compliance with the ADA.

In Grand Haven, there are existing sidewalks adjacent to US-31, which will be maintained or replaced as needed. Existing cross-street sidewalks in Grand Haven will be removed at the following locations: Pennoyer Avenue, Franklin Street, Fulton Street, Elliot Street, and Madison Street to accommodate new crossovers along existing US-31. All other cross-street sidewalks will be maintained, and stay in compliance with the ADA.

Proposed New Alignment

The proposed new alignment does not cross any existing sidewalks.

4.20 POTENTIAL CONTAMINATED SITES

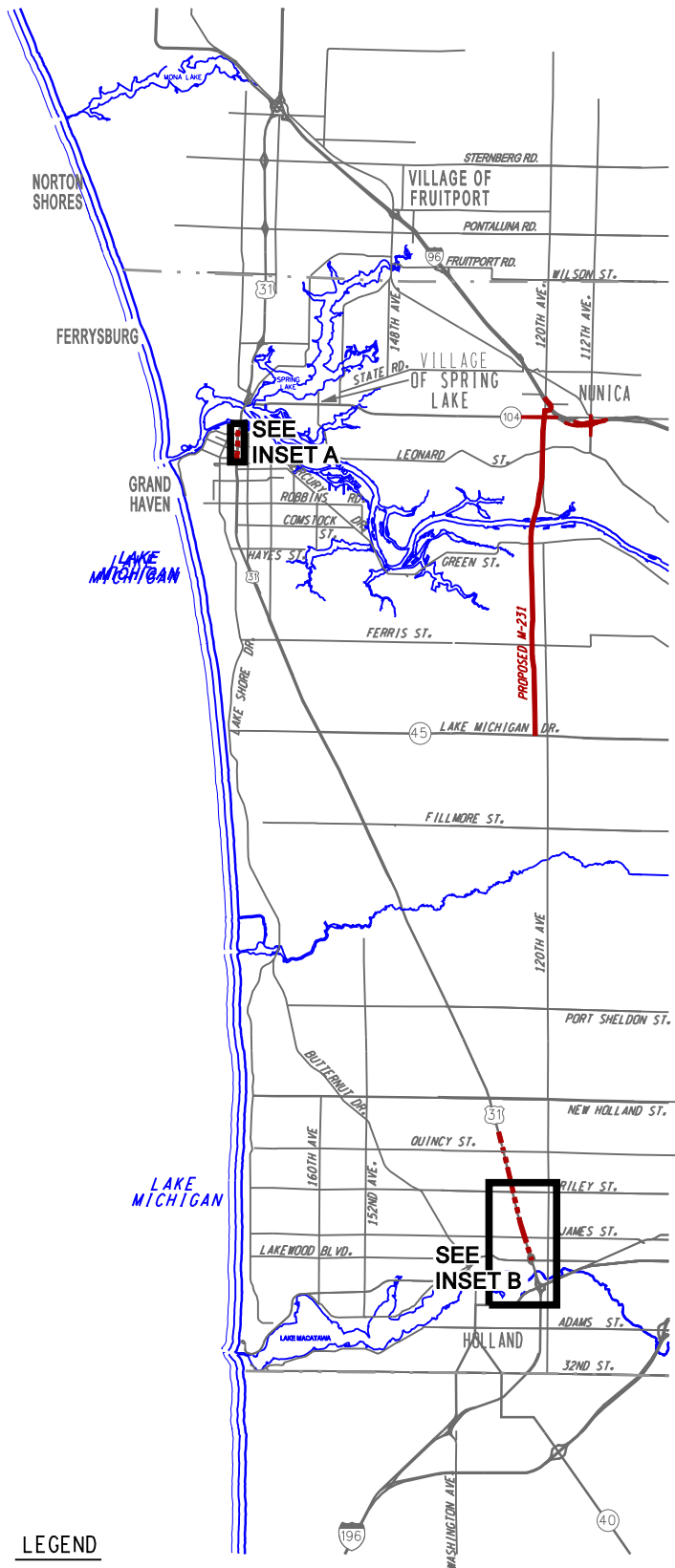
An inventory of known and potential contaminated sites and hazardous waste generator sites was undertaken near the Preferred Alternative (see **Figure 4.20-1**). The new inventory effort was completed for an area encompassing the Preferred Alternative alignment, including new and previously studied areas. The database search was updated, since regulatory databases and eligibility of sites included on the database have changed substantially since the DEIS. The database search identified sixteen individual properties where hazardous materials are present within the existing ROW, or share a common property boundary with the ROW.

Impacts

Sixteen known and/or potentially contaminated sites or hazardous waste generators were identified as being directly impacted by the Preferred Alternative. The sites were ranked according to their potential for environmental contamination and potential clean-up costs using the following categories:

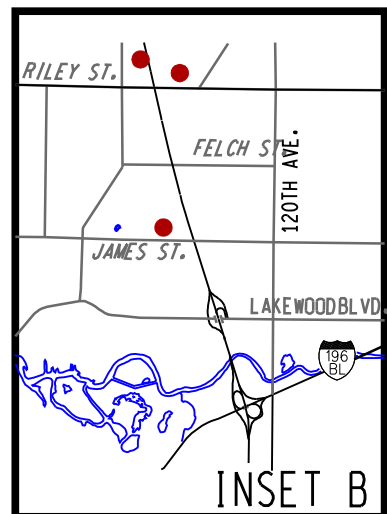
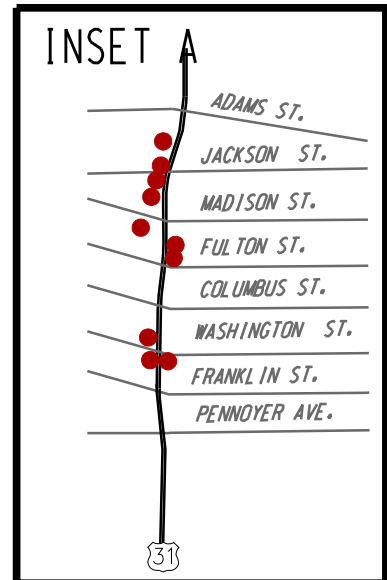
- High Risk: Sites listed as State Hazardous Waste Sites (SHWS),
- Medium Risk: Sites with documented releases of hazardous substances into the soil and/or groundwater, sites with registered underground storage tanks (UST), or landfills,
- Low Risk: Sites that store and/or use hazardous substances but have no documented or known releases.

The sites consist of active and inactive gasoline stations (medium risk), a maintenance yard (high risk), an automobile service station (medium risk), and six painting facilities (low risk).



LEGEND

- MEDIUM RISK CONTAMINATED SITES
- 6-LANE BOULEVARD
- 2-LANE LIMITED ACCESS



NORTH

NOT TO SCALE

US-31 FINAL ENVIRONMENTAL IMPACT STATEMENT

OTTAWA COUNTY
CONTAMINATED SITES



FIGURE
4.20-1

Mitigation

Prior to construction of the Preferred Alternative, a Project Area Contamination Survey (PACS), or Phase I Environmental Site Assessment, will be conducted before a contaminated property is acquired, unless previous assessments are adequate to investigate parcels of property potentially affected by the project for the presence of environmental contamination and to determine the need for further investigation and mitigation measures. The PACS will include the review of federal and state environmental records and historical land use records, and a field site investigation. If necessary, a Preliminary Site Investigation (PSI) or Phase II Environmental Site Assessment including soil borings and the installation of monitoring wells may be undertaken to collect soil and groundwater samples to determine the type and extent of contamination that may exist. MDOT is not liable for contamination on property it acquires for ROW purposes unless it does something to exacerbate the existing contamination. Even so, it is sometimes necessary for MDOT to excavate or remediate environmental contamination that is encountered within the construction zone in order to proceed with construction in a safe manner. MDOT is eligible to recover these remediation costs from the parties responsible for the contamination.

It is MDOT's policy to avoid sites with environmental contamination whenever possible. When feasible, and when the nature and extent of environmental contamination is known, adjustments to the road alignment will be considered. Where it is not possible to avoid sites with environmental contamination, adequate and appropriate protection for employees, workers, the community, and the natural environment must be provided. Should any of these sites be disturbed, MDOT must follow all appropriate and applicable state and federal regulations relating to clean-up standards and proper disposal of contaminated materials. Design and engineering controls will be implemented to minimize the potential for contamination to spread. If a previously unidentified site with environmental issues is encountered during construction, MDOT must take all necessary measures to prevent any imminent threat to human health and the environment. MDOT has a contract in place with an approved environmental contractor to remove USTs it may unexpectedly encounter during construction. Where feasible and when the specific risks, extent, and type of contamination are determined, adjustments to the road alignment will be considered to avoid these sites.

4.21 AESTHETICS AND VISUAL CHARACTER

4.21.1 Landscape Analysis

The regional landscape is described to provide a reference for the visual environment of the study area. This assists in identifying unique or especially sensitive visual resources of the Preferred Alternative corridors.

The Preferred Alternative has been divided into visually distinct environments called "Landscape Units" to define its existing aesthetic and visual character. The boundaries of these Landscape Units are defined by changes in visual character or spatial experience. A variety of landscape types may occur within a single Landscape Unit. Three Landscape Units are described below, providing a framework for comparing the visual effects in the study area.



View from US-31 north of Felch Street in Holland, looking north.

Urban Landscape Unit

This landscape unit comprises the urban setting of the City of Grand Haven, and Holland Township. In the City of Grand Haven and Holland Township, the landscape is predominantly commercial, with some residential. This landscape unit adjoins the Grand River Landscape Unit in Grand Haven.



View looking west from 120th Ave. south of M-45.

The Agriculture Landscape Unit

This unit is typical of regional agricultural areas. It includes hedgerows, small woodlots, wetlands, deep roadside ditches, and some sand or gravel local roads. The Ottawa Agriculture Landscape Unit is located primarily within parts of Robinson and Crockery Townships, and is completely rural. The greatest concentration of viewers of this unit is users of M-45, which intersects with the southern end of the new alignment. The new alignment contains level row crop and nursery fields. These fields and horticultural businesses are generally large and offer expansive views set against the backdrop of trees.

There are several inland dune areas with mixed deciduous and evergreen stands, providing extensive and dramatic topographic relief. Rural residential home sites are located on the edges of these areas along local paved or gravel roads. In the northern portion, there are occasional older farmsteads broken up by sporadically located, wooded rural residential home sites, and woodlots along two-lane county roads.

The Grand River Landscape Unit

This unit includes the meandering Grand River, its shoreline, associated bayous, oxbows, floodplains, tributaries, Spring Lake, and river islands. It extends from 120th Avenue area in Robinson and Crockery Townships, downstream through Grand Haven and Spring Lake townships, to its confluence with Lake Michigan in the City of Grand Haven. The topographical relief is the most pronounced of any landscape unit in the study area. It includes level, but wide, floodplains consisting of many wetland types, rising to wooded river valley walls.



View from Spoonville Gun Club facing south.

4.21.2 Impacts to Visual Quality

The visual impact of a project is defined as a measure of the changes in the visual resource and the way in which the viewer responds to the change. Changes to the visual resource can be described as the changes in the visual information generated by the project, the compatibility of these changes with the surrounding landscape, and the resulting effect on visual quality. Accordingly, the impact of a project can be estimated as being the difference between the visual quality of the landscape before and after the project.

It is necessary to determine who the viewers of the facility will be, other than the users of the facility, as part of the visual impact assessment. It is also necessary to determine the sensitivity of these viewers to changes in the landscape character resulting from construction of the facility. The activity and awareness of the viewers in the location of the facility are important variables in the analysis.

Construction of the proposed improvements will have a visual impact on adjacent areas. The project's mainline and crossings of roadways and waterways will all be visible from the surrounding areas because of the flat terrain. Because of elevated grade separations, the road surface will be seen as a subtle rise and fall across the relatively flat landscape. In general, visual quality is enhanced or improved for those using the facility and degraded for those viewing the facility from off the road. The roadway will be highly visible at the grade separations to people in areas off the roadway, which will likely be an adverse impact. Along the new alignment, there are numerous opportunities for views across agricultural fields.

A general description of the visual quality of the Preferred Alternative and the impacts on these visual resources is provided below.

Existing US-31

The proposed improvement on existing US-31 will not have much effect on the visual quality of the landscape. Existing US-31 is an urban roadway in both Holland Township and Grand Haven, and will remain urban following the proposed improvements. With the widening occurring in the median, the amount of paved area increases and displaces the grassy median.

Proposed M-231

A new roadway will affect the visual quality of the agricultural landscape. The roadway design may result in a negative visual perception that the landscape has been subject to encroachment and therefore lacks intactness. The roadway will also negatively affect the unity of the agricultural landscape. Currently, the farm structures, farm fields, woodlots, and occasional residential development along the paved and unpaved roadways provide a sense of unity. A roadway through this landscape will negate this sense of unity within the view shed of the road.

From the bridge over the Grand River, motorists will view the river, wetlands along the river, Crockery Creek in the background, and the residential and marina development along the waterfront. Viewers in the residential and development areas will perceive a dramatic change in their view of the landscape once the bridge is constructed due to the public access to the view.

Mitigation

Mitigation for visual quality may vary based on the location. Mitigation for the existing alignment of the project is likely to differ from mitigation for the proposed alignment. Visual quality and aesthetics are integral components of the planning process and conceptual design. The goals and objectives of this section include:

- Improvement of the overall aesthetics and unity of US-31,
- Establishment of a hierarchy of areas for special visual emphasis, and;
- Development of conceptual views of the areas for special visual emphasis that may be used in the implementation of the project.

Visual quality guidelines can be developed to minimize adverse visual and auditory impacts to both users and land use neighbors adjacent to the system. The goal of these guidelines is to ensure a consistent, aesthetically pleasing treatment for the design and to minimize visual effects throughout the existing US-31 corridor and the new alignment corridor.

4.22 CONSTRUCTION-RELATED IMPACTS AND MITIGATION

The construction activities associated with building the proposed improvements will create environmental impacts. These adverse effects will be temporary, lasting only during construction.

The goal of mitigation measures is to preserve, to the greatest extent possible, existing neighborhoods, land use, and resources, while improving transportation. Although some adverse impacts are unavoidable, especially during construction, MDOT takes precautions during design and construction activities to protect as many social and environmental systems as possible. Construction activities that include mitigation measures being considered at this time are listed below. Further Agency coordination will continue throughout the design stage. Construction sites will be reviewed to ensure that the mitigation measures proposed are carried out, and to determine if additional protection is required. The appropriate construction related permits will be obtained by MDOT.

4.22.1 River Bridge Construction

Impacts

River bridge construction activities will impact the water, the river bottom, benthic (bottom dwelling) organisms, and the surrounding wetlands.

The proposed Grand River crossing will require deep piles or caissons (up to 180 feet deep). Pile driving or caisson drilling generally has temporary impact on water quality, as it generates turbidity. This work could also impact fish migration if conducted during the spawning period due to vibration, noise, and physical activity within the waterway.

Construction access to the Grand River bridge will most likely be accomplished through the use of a temporary access roadway through the wetlands and a temporary access channel or causeway through the river. Barge or causeway access may be needed for construction work or material delivery. If barge access is needed, dredging of the river may be necessary. Access roadways and channels or causeways will have temporary impacts on water quality in the form of increased turbidity, re-suspension of river and wetland bottom sediments, and disruption of benthic species in the river and wetlands affected.

Excavation of the river bottom, if necessary, will likely be accomplished by mechanical dredge. The dredged material will be placed within a confined upland area. The operation of dredging and dredged material placement will have a temporary impact on water quality resulting from re-suspension of river bottom sediments. Dredging may disrupt the benthic species in the river by disturbing habitat.

Mitigation

Specific construction methods for the proposed bridges over the wetlands and waterways will be further evaluated for the Preferred Alternative during the final design of the project. Issues related to the construction methods that will be evaluated include:

- Avoidance to the extent possible of wetlands and waterways by lengthening structures so bridge abutments and piers avoid or minimize impacts to them,
- Methodologies for the installation of piles or caissons, including whether the piles will be driven or jetted, and whether any excavation will be required for their installation,
- Dredging required for barge construction access,
- Time of year restrictions,
- The need for constructing temporary cofferdams for bridge pier construction,
- Use of Soil Erosion and Sedimentation Control measures.

Attempts will be made to restrict construction activity that disturbs the river bottom to the time of year when benthic (bottom dwelling) organisms are dormant, typically first frost to last frost or mid October to mid May. This reduces the potential for adverse biological effects. Specifically, re-suspended sediment caused by construction activity can interfere with organisms' respiration and this effect is reduced during the dormant season when respiration is minimized. The potentially negative impact on water quality and benthic species caused by dredging and construction of bridge foundations for piers should be temporary. The benthic organisms should reestablish within the disturbed area within one to two years following completion of the dredging through natural re-colonization.

4.22.2 Wildlife and Vegetation

Impacts

Construction, staging, and stockpiling operations may result in the disruption of resident wildlife populations. The removal of vegetation, human activity, and noise from construction operations may result in the temporary displacement of some mobile wildlife species. Non-mobile species can be lost as habitat is converted to construction areas. Maximum disruption of wildlife communities will occur when project construction begins, as displaced animals are forced to compete for space with other nearby

resident wildlife populations. Temporary noise associated with construction could also disrupt breeding and nesting activities of birds and other wildlife. Disruption, displacement and incidental wildlife mortality during construction will be minimized as much as possible by restricting land clearing and construction operations to within the project ROW.

Mitigation

Although some tree removal will be necessary, the existing natural and ornamental vegetative cover will be retained wherever possible within the ROW. Where the existing ground cover must be removed, replacement vegetation will be established in a timely manner using seed and mulch or sod.

Where trees are to be removed from private property, property owners will be given appropriate notice and will be offered compensation or replacement trees to help offset the functional or aesthetic loss of the trees.

4.22.3 Soil Erosion and Sedimentation Control

Soil erosion and sedimentation caused by construction activities can potentially impact water quality. Soil erosion and sediment control features will be required to provide adequate vegetative or temporary stabilization of disturbed areas during construction. MDOT is an Authorized Public Agency and has an approved Soil Erosion and Sedimentation Control Program, which governs the design and implementation of its soil erosion and sedimentation control measures. These measures include items such as silt fence, mulch, seeding, sod, and silt fabric on inlets and other measures as needed. New catch basin inlets will be protected during construction to prevent sediment from entering the enclosed system. Adherence to soil erosion and sedimentation control plans will minimize sedimentation effects during construction. In addition, areas impacted by construction will be restored as necessary to comply with MDOT's Soil Erosion and Sedimentation Control permit.

4.22.4 Disposal of Surplus or Unsuitable Material

Disposal of surplus or unsuitable material (material that is unsuitable for construction) as a result of excavation will be done so as to control the possible detrimental impacts of such actions, including aesthetic concerns. The material, per construction specifications, cannot be disposed in any public or private wetland area, watercourse, or designated floodplain without prior approval and necessary permits from appropriate resource agencies. Regulations governing disposal of solid wastes must be complied with.

4.22.5 Maintaining Traffic during Construction

Temporary detours are anticipated as construction progresses and will be addressed during the design phase. Access to existing US-31, M-45, M-104, I-96 and local routes along the new alignment (as noted in **Appendix A**) will experience some detour and access impact. These necessary detours and closures will impact public service vehicles, commercial deliveries, school districts, and fire, police and emergency vehicles in varying ways. Access for emergency services will be provided, requiring temporary or permanent rerouting during construction. MDOT will work with local agencies to ensure access is maintained for essential services. Businesses and residential access disruptions will be minimized. A temporary increase in truck traffic in the project area will occur during construction, thereby temporarily affecting capacity on existing roadways, but will cease after construction.

Disruption of traffic in the construction area will be minimized to the greatest extent possible. Although control of all construction-related inconveniences is not possible, signing all construction areas will ensure motorist and pedestrian safety. Access will be maintained to properties adjacent to existing US-31.

Boating traffic disruptions may occur at the new Grand River crossing. Impacts to boating traffic will be minimized. The contractor will be required to maintain a navigable channel on the Grand River during all phases of the project. During part-width construction operations, the contractor will place signs both upstream and downstream of the construction area that clearly indicates the location of the navigable channel. Navigation access on smaller streams may also be required to accommodate small boat and/or

canoe usage. The contractor may be required to provide lighting of barges or other navigation obstructions at night.

4.22.6 Continuance of Public Utility Service

Utilities such as water, sanitary sewer, gas, telephone, cable, and electrical transmission lines adjacent to or crossed by the project may require relocation or adjustment. If this should be the case, coordination will take place during the design phase and relocation will take place prior to construction of the road if possible.

4.22.7 Control of Air Pollution During Construction

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. 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. 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. All bituminous plants will provide dust collection. 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 under MDEQ inspection.

Fugitive dust will be minimized by applying water or appropriate liquids during demolition, land clearing, grading, and construction operations. Water may be applied on dirt roads, material stockpiles and other surfaces capable of producing airborne dust. Open-body trucks for transporting materials will be covered at all times while in motion, and all excavated material will be removed promptly.

Mobile source emissions can be minimized during construction by not permitting idling delivery trucks or other equipment to idle during periods of unloading or other non-active use.

No adverse impacts to air quality are expected during construction due to careful procedures, legal requirements, and the relatively short-term duration of construction activities.

4.22.8 Construction Noise Levels and Vibration Impacts

Construction noise will be minimized by measures such as requiring that construction equipment have mufflers, that portable compressors meet federal noise-level standards for that equipment, and that all portable equipment be placed away from or shielded from sensitive noise receptors if at all possible. All local ordinances will be adhered to. Care will be taken to prevent vibration damage to adjacent structures.

4.22.9 Control of Hazardous Materials

All hazardous waste, toxic materials, contaminated media, and/or polluting materials shall be used, stored, and/or disposed of in accordance with applicable federal, state, and local laws and regulations.

4.23 PERMITS

The construction of the Preferred Alternative will require compliance by three agencies, the Michigan Department of Environmental Quality (MDEQ), the United States Army Corps of Engineers (USACE), and the United States Coast Guard (USCG). The following permits will be necessary to comply with both state and federal laws:

State of Michigan (MDEQ):

Act 451 Natural Resources and Environmental Protection, as amended

Part 31, Water Resource Protection, requires a permit to place fill materials in an identified floodplain.

Part 301, Inland Lakes and Streams, requires a permit for activities below the ordinary high-water mark of any stream, river, pond, or lake and for temporary crossings of rivers and streams.

Part 303, Wetlands Protection, requires a permit to fill, dredge or remove sediment from; construct, operate or maintain use in; or drain surface water from a wetland.

Part 91, Soil Erosion and Sedimentation Control, specifies that sedimentation caused by highway construction will be controlled before it leaves the highway ROW or enters the waters of the State. As an Authorized Public Agency under Part 91, MDOT is not required to obtain a permit, but is instead required to implement soil erosion and sedimentation measures in accordance with its approved Soil Erosion and Sedimentation Control Manual.

MDOT maintains a statewide NPDES permit from the MDEQ (issued under the authority of the US EPA) to discharge stormwater into the surface waters of the State.

Federal Permits (USACE):

Section 404 of the Federal Clean Water Act of 1972, requires a permit for the discharge of fill or construction activities in navigable waters of the United States, such as the Grand River.

Section 10 of the Federal Rivers and Harbors Act of 1899 requires a permit from the USACE for the placement of structures, fill material, and dredging in navigable waters.

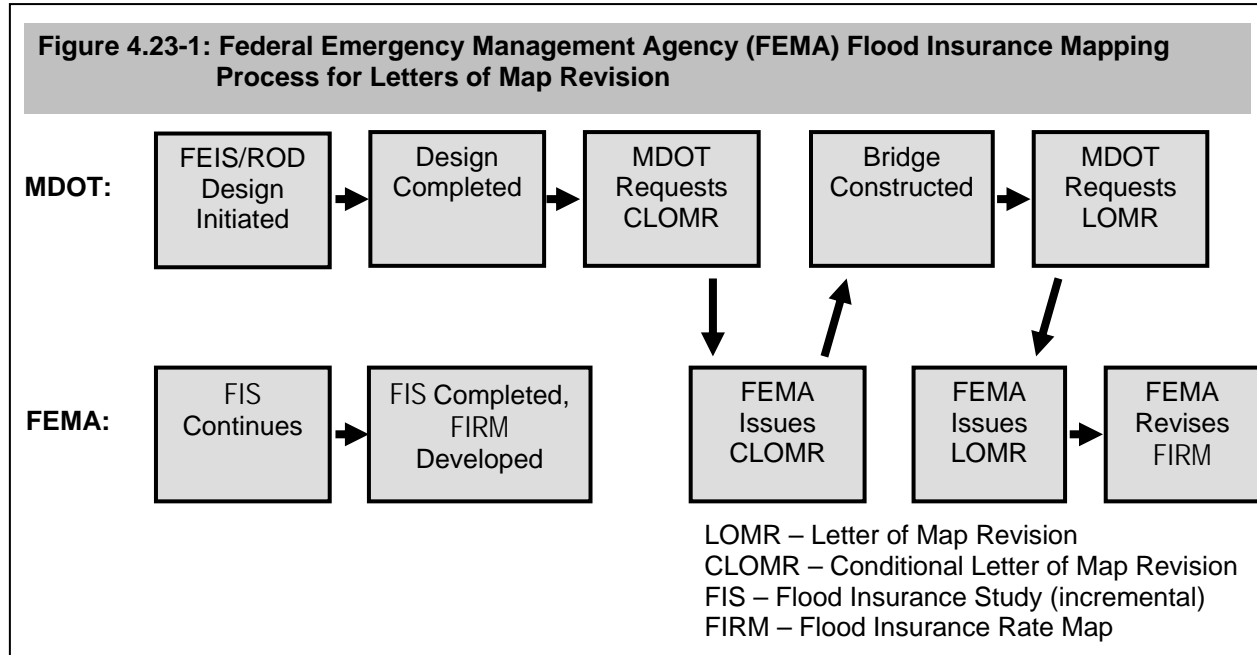
Federal Permit (USCG):

Section 9 of the Federal Rivers and Harbors Act of 1899, requires a permit from the USACE for new structures constructed across navigable rivers.

Coordination with the above-mentioned cooperating and coordinating agencies is on going, and applications for these permits will be submitted during the design phase of the project.

Once the FEIS design is initiated and the design is complete MDOT will submit an application for a Conditional Letter of Map Revision (CLOMR) to FEMA indicating that an increase in the backwater of the Grand River is proposed for the project. FEMA anticipates that the Flood Insurance Rate Map (FIRM) will be completed in 2011, at which time MDOT anticipates that a design level hydraulic analysis accurately showing the backwater increase caused by the project will be available, and FEMA will issue the CLOMR. Once the new river crossing is complete MDOT will request a Letter of Map Revision (LOMR), then FEMA will issue the LOMR and revise the FIRM.

Coordination with FEMA is on going, and an application for a CLOMR will be submitted during the design phase of the project. A flow chart outlining this process is included in **Figure 4.23-1**. It should be noted that a CLOMR is not a construction permit, but is a requirement under Part 31, Water Resources Protection, Natural Resources and Environmental Protection Act, 1994, PA 451, as amended.



Coordination with the above-mentioned cooperating and coordinating agencies is on going, and applications for these permits will be submitted during the design phase of the project.

4.24 PROJECT MITIGATION SUMMARY GREEN SHEET

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December 2009

**US-31
Holland to Grand Haven
Ottawa County**
Final Environmental Impact Statement

**Project Mitigation Summary “Green Sheet”
for the Preferred Alternative**

Social and Economic Environment

- a. *Maintaining Traffic* - Two (2) additional overpasses in rural Ottawa County will remain to maintain local road continuity.
- b. *Road Relocations* - Access will be maintained to 120th Avenue north of M-104 to Jablonski Landing Field (general aviation airport)
- c. *Carpool Lots* - Review existing Carpool Lots for possible expansion or relocation.
- d. *Acquisitions and Relocations* - MDOT and the local real estate offices will coordinate to find suitable housing for residences displaced by the Preferred Alternative. A total of sixty-six property relocations will be required. The sixty-six relocations consist of six farmland relocations, nine business relocations, and fifty-one residential relocations.
- e. *Noise* - Although there are residences that will receive noise impacts at or above the FHWA Noise Abatement Criteria levels, noise walls are not recommended for this project because they did not meet the feasible criteria of MDOT's Noise Policy. Where noise walls are still desired, the municipality may consider providing funds to cover the costs above MDOT's reasonableness criteria.
- f. *Pedestrians/Bicyclists* - 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. 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.

Natural Environment

- a. *Wells* - Properly abandon, and if needed, replace nine known water wells including potential conduits, sewer lines and drains that will be impacted by the Preferred Alternative.
- b. *Detention Basins* - Maintain detention basin (first flush) discharges to pre-construction flow rates.
- c. *Parks* - Coordinate with the Ottawa County Park Department's Grand River Greenway project and local watershed groups.
- d. *Drains* - Coordinate with Holland Township, the City of Grand Haven, and Ottawa County Drain Commission when County Drains are involved, to determine whether closed, open, or a combination of the two drainage facilities should be used in urban areas.

Environmental Resources, Impacts, and Mitigation

- e. *Storm Water* - Collect storm water on the new Grand River bridge and route it to detention/settling basins on either side of the river before discharging it to the river. Direct release of storm water from the structure to the river will be avoided. MDOT will coordinate with the MDNR, Fisheries Division for detention basins adjacent to water courses.
- f. *Floodplain* - Span the Grand River and its 100-year floodplain with a bridge. Approach embankment fill will not be used within the 100-year floodplain. This span will also minimize impacts to wetlands and tree removals. Coordinate with FEMA on the need for Letter of Map Revision's (LOMR's) for the Grand River crossing during the design phase. Maximum of two piers will be placed within the Grand River.
- g. *Wetlands* - The Preferred Alternative will impact 3.04 acres of wetland. Based on MDEQ wetland mitigation ratios, 4.70 acres of wetland will be created either on-site or at the Bolthouse or Rogers mitigation sites. MDOT will prepare and submit a comprehensive mitigation and monitoring plan to the MDEQ during the permit process.
- h. *Threatened and Endangered Species* - If Eastern box turtles are encountered during construction, special care must be taken to remove them from the construction zone. At the preconstruction meeting, construction crews will be required to undergo Eastern box turtle identification and removal procedures with qualified MDOT personnel prior to start of work.

Cultural Environment

- a. *Historic Review* - Due to denial of access, the archaeological survey of several properties was not able to be completed. SHPO concurred that once MDOT purchased the properties, the surveys would be completed and any eligible sites located would be mitigated through data recovery. If eligible sites are discovered, MDOT shall consult with SHPO and the Office of State Archaeologist to develop an acceptable data recovery mitigation plan.

Hazardous/Contaminated Materials

- a. *Project Contamination* - Perform a Project Area Containment Survey (PACS) for each of the sixteen (16) known and/or potentially contaminated sites or hazardous waste generators directly impacted by the Preferred Alternative. A Phase 2 Environmental Site Assessment (ESA) will be conducted if the PACS results or the final design permitting of the facility require it.
- b. *River Sediment Contamination* - Include soil erosion and sedimentation control measures for all construction activities in accordance with state and federal requirements.

Construction

- a. *Construction Access Pads or Work Areas* - The contractor shall not park any vehicles or store any materials on public recreational property. Access to the property shall be maintained at all times during construction. Consider alternate construction methods (top down, incremental launching, etc.) for the Grand River structures during the design phase. Bituminous and Portland cement concrete plants and crushers shall meet the requirements of Michigan Air Pollution Control Commission. Follow MDOT's Stormwater Management Plan and use stormwater Best Management Practice's (BMP's) during construction.
- b. *Maintaining Navigation* - Water navigation will be maintained on the Grand River at the new M-231 crossing site. Maintaining a navigable channel may include the placement of signs both upstream and downstream to indicate the navigable channel location. The lighting of barges and other areas may also be required.

Environmental Resources, Impacts, and Mitigation

- c. *Maintenance of Traffic* - MDOT will maintain public awareness throughout the project by providing general information, addressing public concerns, and providing specific information such as location and duration of detours, lane closures, alternate routes, upcoming activities, and anticipated construction deadlines. This will be done through a Motorist Information Plan which may include a project website, a project hotline, or portable message signs. Boating traffic disruptions may occur at the new Grand River crossing. Impacts to boating traffic will be minimized.
- d. *Time Restrictions* - Restrict construction activities within the waterways during fish spawning seasons, March 1 to June 30, in accordance with MDNR and MDEQ guidelines. The tree cutting restriction dates the Indiana bat are April 1st to October 1st.
- e. *Construction Permits* –

State of Michigan (MDEQ):

Act 451 Natural Resources and Environmental Protection, as amended

Part 31, Water Resource Protection, requires a permit to place fill materials in an identified floodplain.

Part 301, Inland Lakes and Streams, requires a permit for activities below the ordinary high-water mark of any stream, river, pond, or lake and for temporary crossings of rivers and streams.

Part 303, Wetlands Protection, requires a permit to fill, dredge or remove sediment from; construct, operate or maintain use in; or drain surface water from a wetland.

Part 91, Soil Erosion and Sedimentation Control, specifies that sedimentation caused by highway construction will be controlled before it leaves the highway ROW or enters the waters of the State. As an Authorized Public Agency under Part 91, MDOT is not required to obtain a permit, but is instead required to implement soil erosion and sedimentation measures in accordance with its approved Soil Erosion and Sedimentation Control Manual.

MDOT maintains a statewide NPDES permit from the MDEQ (issued under the authority of the US EPA) to discharge stormwater into the surface waters of the State.

Federal Permits (USACE):

Section 404 of the Federal Clean Water Act of 1972, requires a permit for the discharge of fill or construction activities in navigable waters of the United States, such as the Grand River.

Section 10 of the Federal Rivers and Harbors Act of 1899 requires a permit from the USACE for the placement of structures, fill material, and dredging in navigable waters.

Federal Permit (USCG):

Section 9 of the Federal Rivers and Harbors Act of 1899, requires a permit from the USACE for new structures constructed across navigable rivers.

Coordination with the above-mentioned cooperating and coordinating agencies is on going, and applications for these permits will be submitted during the design phase of the project.

Once the FEIS design is initiated and the design is complete MDOT will submit an application for a Conditional Letter of Map Revision (CLOMR) to FEMA indicating that an increase in the backwater of the Grand River is proposed for the project. FEMA anticipates that the Flood Insurance Rate Map (FIRM) will be completed in 2011, at which time MDOT anticipates that a design level hydraulic analysis accurately showing the backwater increase caused by the project will be available, and FEMA will issue the CLOMR. Once the new river crossing is complete MDOT will request a LOMR, then FEMA will issue the LOMR and revise the FIRM.

Environmental Resources, Impacts, and Mitigation

FEMA has indicated that the anticipated backwater elevation increase would not be problematic. Based on the available information for the project, MDNRE (Michigan Department of Natural Resources and Environment, formally MDEQ) has indicated that they agree, and that the permit process for construction activities under Act 451 Natural Resources and Environmental Protection, as amended, will proceed independently from FEMA's mapping activities.

5.0 CONSULTATION AND COORDINATION

This chapter incorporates a summary of **Chapter 9** from the Draft Environmental Impact Statement (DEIS), public scoping meetings, and coordination with government agencies prior to the release of the DEIS. **Appendix C** of the DEIS contained copies of the Notice of Intent, letters received from agencies during scoping, and comments received regarding their review of advanced copies of the DEIS. These letters are included in **Appendix C**.

5.1.1 Macatawa Area Coordinating Council (MACC) Ad-Hoc Technical Committee

The Macatawa Area Coordinating Council's (MACC) Ad-Hoc Committee was formed by the MACC, the Holland area's Metropolitan Planning Organization (MPO). The purpose of the committee is to coordinate, express concerns and issues, and act as an intermediary between the US-31 Study Team and MACC Policy Committee members. This committee consists of members of the Michigan Department of Transportation (MDOT), the Ottawa County Road Commission (OCRC), and MACC members.

5.1.2 Public Information Meetings

Several public meetings were held between the initiation of the Environmental Impact Statement (EIS) and the DEIS Public Hearing. The meetings were held in centrally located, Americans with Disabilities Act (ADA) compliant buildings. A demand responsive transit service was available to residents of the Cities of Holland and Zeeland and the greater Grand Haven metropolitan area. The meetings included:

Date & Time	Location	Major Topic
October 20, 1993	Ottawa Area ISD Building	Study Initiation and Process for Elected Officials
November 10, 1993	Ottawa Area ISD Building	Study Initiation and Process for Elected Officials
January 19, 1994	Grand Haven Community Center	Practical Alternatives
May 26, 1994	West Ottawa High School	Corridor Alternatives
June 19, 1996	Grand Haven Community Center	Draft Environmental Impact Alternatives Identified
June 20, 1996	Holland Holiday Inn	Draft Environmental Impact Alternatives Identified
March 11, 1997	Holland Middle School	City of Holland Public Informational Meeting
March 18, 1998	Olive Township Hall	Ottawa County area wide meeting on the addition of Alternative F/J1 and R
July 1, 1998	Zeeland	Ottawa County area wide meeting on US-31 Advisory Committee's questions to MDOT
August 27, 1998	Zeeland	Informational session on the contents and status of the DEIS
December 8, 1998	Grand Haven High School	Summary of DEIS
December 9, 1998	Holland Holiday Inn	Summary of DEIS
February 11, 2002	Zeeland Community Center	US-31 Land Use Study
November 8, 2006	Ottawa County Filmore Complex	Current Preferred Alternative

A project mailing list was also developed and periodic newsletters were distributed during this time. The mailing list included several thousand addresses of local community members and businesses. The newsletter presented the project's status and offered a means for local residents to comment on the alternatives under consideration. The last page of the newsletter was a comment form. Newsletters were distributed on:

Date	Major Topic
October, 1993	Study Underway
May, 1994	Corridor Alternatives Identified
December, 1994	Practical Alternatives Identified
November, 1995	Major Investment Study (MIS) Initiated
June, 1996	MIS and Practical Alternatives Public Meetings
March, 1997	Draft Environmental Impact Alternatives Identified

<u>Date</u>	<u>Major Topic</u>
June, 1998	New Alternatives Added, Alternative Composition, New Origin & Destination Study and Grand River Bridge Height Revisions
November, 1998	Draft Environmental Impact Alternatives Public Hearing Date and Meeting Locations

A toll-free telephone information line was established at the outset of the project. This number is still active and can be used by anyone who has questions on the project or desires to receive information regarding aspects of the alternatives under consideration.

5.2 PROJECT COORDINATION AND EARLY COMMENTS BY GOVERNMENT AGENCIES (PRIOR TO DEIS AND PUBLIC HEARING)

This section summarizes agency review and coordination with government agencies, and public comments received prior to the release of the DEIS. Copies of the *Notice of Intent*, Resource Agency letters, and select other letters are included later in this chapter.

5.2.1 Notice of Intent

A *Notice of Intent* to advise the public that preparation of an EIS was to begin for the proposed project was issued by the Federal Highway Administration (FHWA) on April 19, 1994, and published in the May 5, 1994 issue of the *Federal Register* (Vol. 59, No. 86, Page 23252).

5.2.2 Cooperating Agencies

Copies of letters received from the two cooperating agencies are included later in this chapter. A summary of comments provided by these agencies prior to, at, or after the Initial Scoping Meeting in 1994 is as follows:

United States Coast Guard (USCG)

Requested that information be provided on:

- Impacts of a new bridge.
- Boat traffic data.
- Classification of vessels.
- Frequency of bascule bridge openings.
- Vertical clearances of a new bascule bridge.

United States Army Corps of Engineers (USACE)

Requested that additional efforts and information be provided on:

- Bridge construction over the Grand River, including bridge piers.
- Avoidance of wetlands.
- Wetland mitigation.
- Traffic improvements.

5.2.3 Early Review of Alternatives by Resource Agencies

In addition to the cooperating agencies, several other resource agencies provided comments in 1994. These included:

Federal Agencies:

- United States Department of Interior, Fish and Wildlife Service (USFWS)
- United States Department of Interior, Bureau of Indian Affairs (BIA)
- United States Department of Agriculture (USDA)
- United States Department of Housing and Urban Development (HUD)

State Agencies:

- Michigan Department of Environmental Quality (MDEQ), Note: The Michigan Department of Natural Resources (MDNR) was divided into two entities during the study. The MDEQ is responsible for environmental permitting, and the MDNR is responsible for hunting, state parks, and the natural resources of the State.
- Michigan Department of History, Arts and Libraries, State Historic Preservation Office (SHPO)
- Michigan Department of Agriculture

Agency coordination with the cooperating and resource agencies, by MDOT, has been ongoing throughout the study. Meetings with them were held on:

- August, 1994 (initial scoping meeting)
- July 23 and 24, 1996 (scoping meeting)
- February, 1999 (Recommended Alternatives reduced to four)
- March, 1999 (resource agency meeting)
- April, 1999 (resource agency meeting)
- June, 2000 (review of wetland mitigation sites)
- April, 2001 (Practical Alternatives/Update meeting)
- December 6 and 7, 2001 (Recommended Alternative update meeting)
- October 19, 2006

Copies of letters received from the resource agencies and select others, are included later in this chapter. The following summarization of specific resource agency comments was provided prior to, at, or after the initial scoping meeting in 1994, in addition to the previous cooperating agency comments and concerns:

Federal Agencies:

United States Department of Interior, Fish and Wildlife Service (USFWS)

Requested that additional efforts and information be provided on:

- "Purpose and Need"
- Wetland impacts
- Wetland mitigation

United States Department of Interior, Bureau of Indian Affairs (BIA)

Stated that there are no Indian lands affected by any of the alternatives, but requested that they be added to the mailing list.

United States Department of Agriculture (USDA)

Requested that US-31 stay on the existing alignment to reduce the amount of impacts to agricultural land.

United States Department of Housing and Urban Development (HUD)

Had concerns with:

- Impacts on federally assisted housing
- Marketability and property values

State Agencies:

Michigan Department of Natural Resources (MDNR)

Requested more information on:

- Wetlands
- Drainage
- Indirect impacts

Department of History, Arts and Libraries, State Historic Preservation Office (SHPO) (formerly Michigan Department of State)

Requested that every attempt should be made to avoid the Boer Farm in Zeeland Township.

5.2.4 Local Agencies

Local agencies and other interested parties providing early comments included:

- MACC
- City of Holland
- Michigan United Conservation Clubs (MUCC)
- Board of County Road Commissioners of Allegan County

These comments and concerns are summarized below:

Macatawa Area Coordinating Council (MACC)

Interested in being involved with the process and requested that the US-31 Study Team keep them apprised of the options being developed. Appointed the Ad-Hoc Committee to coordinate activities and issues between the US-31 Study Team and the MACC.

City of Holland

Expressed concerns regarding the Dial-A-Ride system and increased congestion along US-31 in the City.

Michigan United Conservation Clubs (MUCC)

Expressed concern in the following areas:

- Wetlands
- Water resources
- Indirect and cumulative impacts

Board of County Road Commissioners of Allegan County

Acknowledged that they are aware of the study but had no comments at this time.

5.3 PUBLIC PARTICIPATION AND COMMENTS (DEIS AND PUBLIC HEARING)

5.3.1 Public Hearings

Following circulation of the DEIS (See **Chapter 8** in the DEIS for a distribution list of the DEIS) on November 5, 1998, Public Hearings for the US-31 Project were held December 8, 1998 in Grand Haven, Michigan, and December 9, 1998 in Holland, Michigan. A newsletter published and distributed in November, 1998 summarized the project and contained a schedule of Public Hearing dates and times. Local governments, local elected officials, the media, interested parties and residents within the study area received copies of the newsletter. MDOT distributed a press release to area newspapers on November 5, 1998 announcing the Public Hearing. MDOT also prepared a Public Hearing Notice for distribution.

The Public Hearings were conducted in an open house style format, and therefore no formal presentation was made. In place of a formal presentation by MDOT or the US-31 Study Team, a 16-minute video on the study process and alternatives was shown along with a separate MDOT right-of-way video. Both presentations were shown approximately every half-hour throughout the public hearing time. MDOT representatives and consultant staff were available to answer questions during the course of the hearings. Presentation boards displaying impacts, drawings of typical intersections and interchanges, access control, aerial drawings, and copies of **Appendix A** were available at the meeting for review and discussion during the meeting. Take home materials included newsletters, comment forms, right-of-way pamphlets on property owner rights, and MDOT's acquisition process.

The combined total attendance for the two Public Hearings was 453. The sign-in sheet indicated that 220 attended the December 8, 1998 Public Hearing in Grand Haven, and that 233 attended the December 9, 1998 Public Hearing in Holland.

Court reporters were available to record statements made by attendees and were included in the transcript of the Public Hearing. Written comments received at the meeting or within 30 days of the hearing were also included in the transcript of the Public Hearing. Eight hundred and thirty-three (833) comments, not including regulatory, county, local government and other interested parties/groups, were received during the comment period.

5.3.2 Summary of Public Comments and Concerns

During the formal public comment period, eight hundred and thirty-three (833) comments were received from private individuals. The comments were collected by several different methods: verbally, written and via email. The following summarizes the sources of the comments:

- Fifty-eight (58) written public comments were received during the December 8, 1998 Public Hearing at Grand Haven High School.
- Twenty-nine (29) written public comments were received during the December 9, 1998 Public Hearing at the Holland Holiday Inn.
- Five hundred and fifty-five (555) written and phone public comments were received during the official comment period (prior to and after the Public Hearings).
- One hundred and twenty-eight (128) email public comments were received during the official comment period (prior to and after the Public Hearings)
- Sixty-three (63) public statements were taken at the Public Hearings by the court reporters.

Typical Comments

Many of the following types of comments were received:

- Supported improvements to existing US-31: Alternative A, P or P1r.
- Opposed improving existing US-31. The majority was opposed to widening US-31 through Grand Haven.
- Supported a rural bypass for US-31.
- Opposed a rural bypass for US-31.
- Supported a freeway upgrade of existing US-31.
- Opposed improvements to US-31 that impact St. Patrick's Catholic Church in Grand Haven.

Some other types of comments were also received:

- Supported transit alternatives, such as rail, bus, car pooling, etc.
- Opposed the Alternative P and P1r (local Grand Haven bypass).
- Asked that MDOT stop studying the US-31 traffic and safety problem and start implementing a solution.

5.3.3 Local Agency Comments and Concerns

Approximately 50 letters and/or resolutions were received from study area cities, townships, villages, and other organizations on the DEIS. MDOT received letters supporting the Alternative F/J1 from:

- | | |
|----------------------------------|------------------------------|
| • Allegan County | • Ferrysburg |
| • Allegan County Road Commission | • Coopersville |
| • Ottawa County | • The Village of Spring Lake |
| • Ottawa County Road Commission | • Holland Township |
| • MACC | • Zeeland Township |
| • Holland | • Fillmore Township |
| • Zeeland | • Grand Haven Township |
| • Grand Haven | • Spring Lake Township |

Copies of all the letters and resolutions are included later in this chapter along with responses to the concerns.

5.3.4 Cooperating and Resource Agency Comments and Concerns

The following is a summary of the comments and concerns received on the DEIS by cooperating and resource agencies. Copies of their letters and select other letters are included later in this chapter along with responses to the concerns.

United States Environmental Protection Agency (USEPA)

Requested additional efforts and information be provided on:

- Purpose of and Need for the project
- Alternatives
- Wetlands
- Indirect and cumulative impacts

The USEPA asked that the Purpose of and Need for the project be simplified to more concisely and clearly state the projects Purpose and Need. The USEPA also requested that specific Transit, Transportation Systems Management (TSM) and/or Intelligent Transportation Systems (ITS) components recommended during the study phase be incorporated with each of the alternatives and clearly spelled out in the Final Environmental Impact Statement (FEIS). Another request was to investigate avoidance and minimization of wetland impacts and to elaborate on the indirect and cumulative impacts of the practical alternatives.

United States Department of the Interior, Fish and Wildlife Service (USFWS)

Requested additional efforts and information be provided on:

- The Level-of-Service (LOS), traffic congestion and accident rates of the low impact, low capital improvement options.
- A wetland habitation mitigation plan and commitments for implementation.
- A comparison of wetland functions and values among the action alternatives.

United States Coast Guard (USCG)

The USCG provided a statement that the DEIS meets the requirements for the United States Coast Guard as related to National Environmental Policy Act (NEPA).

United States Army Corps of Engineers (USACE)

Requested:

- Plans and work description for bridge construction.
- Clarification of plans for the existing US-31 bridge between Grand Haven and Ferrysburg with the TSM Alternative.
- Further investigation into a hybrid between freeway and boulevard alternatives to avoid a local Grand Haven bypass.
- More description as to why Alternative C was eliminated.
- Elimination of Alternative F to minimize impacts to the Pigeon River.
- Wetland plans include clearly stated objectives, a method for judging success, and provisions for corrective actions during development.
- Increased effort to locate wetland mitigation sites within the Grand River floodplain.

United States Department of Agriculture (USDA)

Requested Alternative A be considered because it causes the least impacts to farmlands.

Advisory Council on Historic Preservation

Requested:

- Notification of adversely affected historic properties.
- Provide a map or written description of the Area of Potential Effect (APE) is in this FEIS.

- Closer examination of visual, audible or atmospheric elements that are out of character with historic properties or alter the setting.

US Public Health Service, Department of Health and Human Services

Stated that the DEIS generally addresses potential concerns. Recommended that future DEIS' state a preferred alternative based on the best available information and current thinking of the sponsors so reviewers may compare alternatives to it.

Other agency comments and concerns received included:

State Agencies

- Michigan Department of Environmental Quality (MDEQ)
- Michigan Department of Transportation, Multi-Modal Transportation Services Bureau – Airports Division (formerly MDOT Bureau of Aeronautics)

Their comments and concerns are summarized below:

Michigan Department of Environmental Quality (MDEQ)

Requested additional review and information be provided for:

- Permits
- Ecological resources, including surface water quality and wetlands
- Environmental consequences
- Navigation
- Mitigation, especially mitigation for wetlands

Michigan Department of Transportation, Bureau of Aeronautics (formerly MDOT Airport Division)

Requested:

- Reject P and P1r due to the impacts on Memorial Airpark, Grand Haven.
- Any alternative with impacts to retention or detention basins, wetlands or other wildlife attractants be in accordance with Federal Aviation Administration (FAA) Advisory Circular (150/5200-33).

5.4 MAJOR CONCERNS OR ISSUES

The following is a summarization of the major concerns, issues and needs that resulted from the DEIS and Public Hearings. MDOT met with many township, village and city representatives to assist in developing solutions to these concerns and issues. A list of all the meetings is found in **Section 5.5**.

5.4.1 US-31 Land Use Study Prepared by Michigan State University (MSU)

Numerous questions and concerns were expressed about indirect and cumulative impacts, especially for the bypass alternatives. The Michigan Department of Transportation contracted with MSU's Department of Geography, Basic Science and Remote Sensing Initiative (BSRSI) to conduct a four-county area (Allegan, Kent, Muskegon and Ottawa) transportation and land use model. The model was developed to assess the likely change, or pressure to change, from one land use to another, such as agriculture to urban, for the Practical Alternatives analyzed in this FEIS. The MSU US-31 team was hired as a neutral third party and based on their expertise in developing similar models with state-of-the-art techniques.

The model provided empirical data from satellite imagery to measure the cumulative land use changes from 1988 to 2001. Project indirect impacts indicated that no alternative had an appreciable impact. The study concluded that substantial economic forces in Kent, Ottawa, Muskegon, and Allegan county areas would cause growth and development regardless of transportation improvements. Practical Alternatives studied after the DEIS and the CSTS option was modeled and impacts measured. It showed there were minor adjustments in the location of the development between the US-31 Practical Alternatives; however, overall development resulting from the Alternative F/J-1 was minimal compared to total study area development from all causes.

The US-31 Land Use Study conducted by MSU concluded that:

- The same amount of development within the area was going to occur regardless of which alternative was chosen.
- Growth is predicted to be less than half of the three previous decades (20 – 27%) growth, but still very healthy.
- The influence of the Grand Rapids area made east-west corridors, rather than the north-south corridors, the conduits for much of the area's growth.

5.4.2 Coalition for Sensible Transportation Solutions Option

Following the Public Hearings, a group called the Coalition for Sensible Transportation Solutions (CSTS), was organized by citizens and some township officials. The CSTS opposed a rural freeway through Ottawa County and proposed an alternative to MDOT for consideration. MDOT included a review of the CSTS Option in the US-31 Land Use Study conducted by MSU (**Section 5.4.1**).

The CSTS Option involved the construction of the following (**Figure 5.4-1**):

- A freeway on US-31 between Holland and Grand Haven,
- A freeway connection around the Holland/Zeeland area,
- A local freeway connection around the tri-city area between US-31 and I-96,
- A new 104th Avenue Grand River bridge, and;
- An I-96/Sternberg Road interchange

The CSTS Option did not meet the purpose and need of this project, in that it did not address traffic congestion and safety issues in Holland Township or the City of Grand Haven. In addition, environmental impacts were much greater than the current Preferred Alternative.

5.4.3 Farmland Impacts

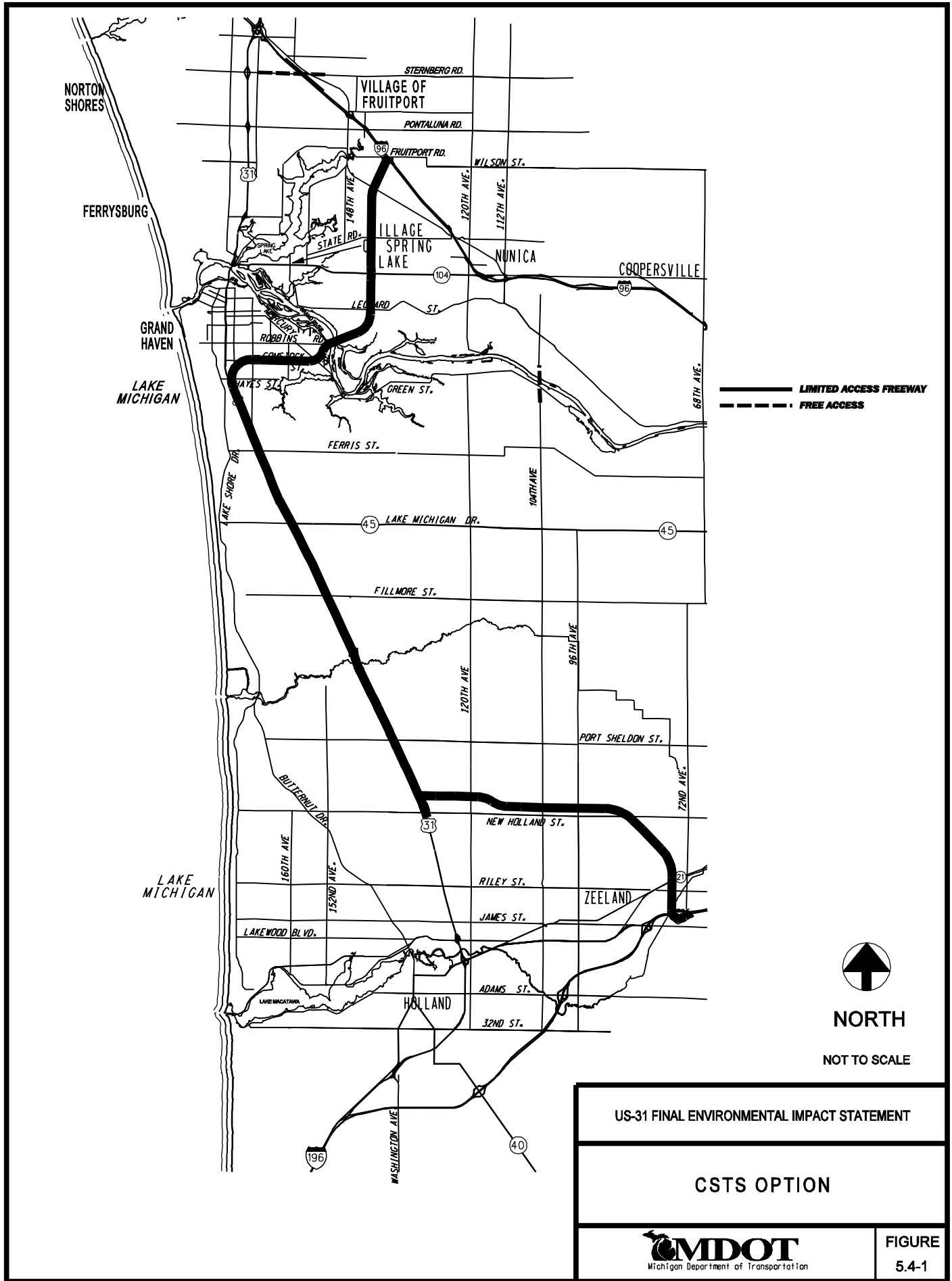
Rural townships were concerned with the quantity of direct impacts, indirect and cumulative impacts, and local road access for Alternative F/J1. MDOT worked with these townships after the DEIS Public Hearing to specifically address many of their concerns. Alignments were shifted to lessen impacts to farmlands. The current Preferred Alternative impacts 105 acres of Prime farmland and zero acres of Unique farmland, whereas the DEIS Alternative F/J1 impacted 190.5 acres of Prime farmland and 27 acres of Unique farmland. Changes in the road alignment have decreased the amount of farmland impacts.

5.4.4 Drainage and Hydrology

The resource agencies also requested additional information about runoff from major river crossings. Runoff from the major river crossings will be collected from these structures and piped to detention basins on the banks of the waterways before being released back to the waterways. No direct release of water from the bridges will be allowed. Similarly, it was noted that runoff from the roadway in other locations would be directed to and detained in detention basins adjacent to existing county drains wherever possible.

5.4.5 Wetland Impacts

Several resource agencies expressed concerns about the number of impacts to wetlands with the Recommended Alternative. For example, the United States Environmental Protection Agency (EPA) stated that every attempt should be made to develop an alternative that meets the Purpose of and Need for the project while avoiding and minimizing impacts to wetland resources. Through working with the local governments to address these and other concerns, the alignment was shifted and realigned considerably, and resulted in a reduction of wetland impacts to 2.55 acres.



The U.S. Army Corps of Engineers (USACE) advised that all wetland mitigation plans must contain clearly stated objectives, criteria for judging success, and provide for allowing for corrective actions during development of new wetland areas. All mitigation sites should be preserved permanently under conservation easements. The USACE agrees that “prior converted cropland” should be given priority in selecting mitigation sites. The USACE also recommended that additional mitigation sites be identified near the Grand River.

The MDEQ pointed out that many of the impairments identified in the Macatawa River and Pigeon River watersheds are linked to hydrologic modifications due to wetland losses, primarily in the headwater regions. To maximize the benefits of wetland mitigation, the DEQ recommended that the search area for mitigation sites be expanded to include headwater areas east of 120th Avenue.

5.4.6 Local Grand Haven Bypass

Alternatives P and P1r, also known as the “Local Grand Haven Bypass”, were eliminated from further study because they did not substantially meet the “Purpose and Need”, and had unacceptable social (residential and commercial displacements) impacts.

5.5 COORDINATION WITH LOCAL GOVERNMENTS AND AGENCIES

MDOT coordinated numerous meetings with public officials and agencies after the Public Hearings in order to address their concerns and build consensus for an alternative for the corridor. These following lists the meetings held with the officials and agencies.

Date	Participant and Major Topics of Meeting
January, 1999	Meeting with Ottawa County Board of Commissioners to discuss the DEIS.
February 5, 1999	Workshop meeting with FHWA and MDOT to establish an agenda for upcoming February 10 th meeting.
February 10, 1999	Meeting with resource agencies discussing various alternatives.
March 17, 1999	Workshop meeting with FHWA and MDOT establishing agenda for upcoming March 25 th meeting.
March 25, 1999	Meeting with resource agencies discussing various alternatives.
April 12, 1999	Resource agency meeting discussing the previous meetings and Recommended Alternative.
August 3, 1999	Meeting with City of Grand Haven.
August 24, 1999	Meeting with Macatawa Greenway Network and Ottawa County Parks Dept.
September 8, 1999	Meeting with Olive, Robinson & Crockery Townships discussing this FEIS.
September 13, 1999	MACC (Holland MPO) – Transit Technical Committee Briefing.
September 28, 1999	Workshop Meeting at URS.
September 28, 1999	Meeting with Holland Township.
October 20, 1999	Meeting with Ottawa County Road Commission discussing access, street closures, interchange locations, etc.
October 27, 1999	MACC (Holland MPO) – Transit Technical Committee Briefing, meeting initiated discussion between City of Holland, Holland Township and the Study Team on ITS/TSM topics.
November 12, 1999	Meeting with City of Grand Haven for a technical review of Alternative P1r through Grand Haven.
December 9, 1999	Meeting with City of Grand Haven to review alignment Alternative P1r.
February 25, 2000	Meeting with Olive Township discussing options for reducing US-31 Freeway Connection impacts with Olive Township.
February 28, 2000	Meeting with Ottawa County Commissioners at the Ottawa County Complex discussing status of FEIS.
April 10, 2000	Meeting with Blendon Township.
April 10, 2000	Meeting with John VanDenend of the Pigeon River Watershed Study and Charamy Butterworth of the MDEQ to review current proposed mitigation sites.

Date	Participant and Major Topics of Meeting
April 11, 2000	Meeting with John Scholtz and Mark Palega of Ottawa County Parks Department discussing joint use and development of their Huizenga property.
April 13, 2000	Meeting with the City of Grand Haven.
May 3, 2000	Meeting with Robinson Township to collect comments on Recommended Alternative.
May 23, 2000	Meeting with John VanDenend of the Pigeon River Watershed Study and Charamy Butterworth of the MDEQ and property owner to review the proposed mitigation plan.
May 24, 2000	Meeting with the Ottawa County Parks Department, the Macatawa River Watershed coordinator and landowner on the proposed park property wetland mitigation site plan.
June 21, 2000	Resource agency meeting to review the wetland mitigation site plans.
August 21, 2000	Meeting with three Olive Township farmers with large farms to update them on proposed alignment revisions.
October 16, 2000	Meeting with US-31 Study Team and Olive Township to review US-31 Freeway Connection alignment revisions.
October 18, 2000	Meeting with US-31 Study Team and Robinson Township to review US-31 Freeway Connection alignment revisions.
October 24, 2000	Meeting with Study Team and Crockery Township to review US-31 Freeway Connection alignment revisions.
November 9, 2000	Public Meeting @Zeeland Community Center.
December 12, 2000	Meeting with Blendon Township Supervisor, Henry Hoffman and a resident to discuss residents concerns with the US-31 Freeway Connection.
December 12, 2000	Meeting with Olive Township to discuss latest US-31 Freeway Connection alternatives.
January 4, 2001	Meeting with MDEQ to review revised Grand River and Pigeon River crossings.
January 5, 2001	Meeting with Olive Township to review latest modifications to the US-31 Freeway Connection.
January 5, 2001	Meeting with Grand Haven Township to review latest alignment revisions.
January 11, 2001	Meeting with City of Ferrysburg and Village of Spring Lake to discuss impacts of a 45' fixed span Grand River bridge.
January 17, 2001	Meeting with City of Grand Haven to discuss a host of issues including impacts of their desired 45' fixed span Grand River bridge.
January 22, 2001	Presentation to the MACC (Holland MPO) Policy Committee.
January 24, 2001	Meeting with MSU to discuss US-31 Land Use Study.
January 24, 2001	MSU US-31 Land Use Study Meeting @ Spring Lake Community Center.
March 26, 2001	MACC (Holland MPO) Policy Committee update on the US-31 Land Use Study.
March 29, 2001	Ottawa County Commissioner update on FEIS.
April 2, 2001	US-31 Study Team meeting with Ottawa County concerning Environmental Justice.
April 18, 2001	Meeting with US-31 Study Team and the City of Grand Haven.
April 30, 2001	Meeting with resource agencies for a progress update on the US-31 Land Use Study.
May 7, 2001	Meeting with MACC (Holland MPO) Ad Hoc Committee.
May 8, 2001	Public Meeting @ Ottawa County Building.
May 31, 2001	Meeting with Grand Haven Township.
May 31, 2001	Meeting with the City of Grand Haven.
June 27, 2001	Meeting with MSU to discuss the US-31 Land Use Study.
August 1, 2001	Meeting with Representative Barbara Vanderveen.
August 16, 2001	Meeting with Representative Barbara Vanderveen and CSTS.
October 1, 2001	Meeting with the City of Grand Haven.
October 5, 2001	Meeting with MSU to discuss US-31 Land Use Study.
October 15, 2001	Meeting with City of Grand Haven.

Date	Participant and Major Topics of Meeting
November 28, 2001	Meeting with the MACC (Holland MPO) Ad Hoc Committee.
December 6, 2001	Meeting with Federal Resource Agencies.
December 7, 2001	Meeting with resource agencies (MDEQ).
February 7, 2002	Public Meeting @ Zeeland Community Center to discuss the US-31 Land Use Study.
Late 2002	Meeting with Representative Wayne Kuipers
March 2, 2005	Meeting with Grand Haven Harbor Users Group
June 27, 2005	Meeting with Ottawa County Board and staff, with MDOT Director and staff
August 16, 2005	Meeting with the City of Grand Haven
August 23, 2005	Meeting with Robinson Township
August 29, 2005	Meeting with Macatawa Area Coordinating Council (Holland MPO) US-31 Committee
August 29, 2005	Meeting with the City of Grand Haven
September 1, 2005	Meeting with Olive Township
September 13, 2005	Meeting with Crockery Township
September 16, 2005	Meeting with the City of Ferrysburg
September 16, 2005	Meeting with Spring Lake Township
September 16, 2005	Meeting with Spring Lake Village
September 21, 2005	Meeting with WestPlan (Muskegon MPO) Technical and Policy Committees
September 28, 2005	Meeting with Ottawa County Road Commission
September 28, 2005	Meeting City of Wyoming Water Service District
September 29, 2005	Meeting with Grand Haven Township
October 1, 2005	Meeting with City of Grand Rapids Water Service District
March 2006	Meeting with Ottawa County Planning Department
August 23, 2006	Meeting with Ottawa County Board and staff, State Legislators, and MDOT Director and Staff
October 19, 2006	Meeting with resource agencies for a progress update and review of the Impacts Table
November 8, 2006	Public Meeting at the Ottawa County Fillmore Complex Building
November 29, 2006	Meeting with North-Bank (Grand River) Trail group
February 2007	Meeting with Ottawa County Planning Department
February 22, 2007	Holland MPO 2035 Long Range Transportation Plan Public Meeting
April 18, 2007	Meeting with Ottawa County Planning Department, Board Members and Property Owners
April 23, 2007	Holland MPO Policy Committee – Plan Approval
May 14, 2007	Muskegon MPO 2035 Long Range Transportation Plan Public Meeting
May 22, 2007	Meeting with Ottawa County (North-Bank) Non-Motorized Trail group
June 20, 2007	Muskegon MPO Policy Committee – Plan Approval
September 5, 2007	Meeting with Ottawa County Road Commission and Planning Department
January 31, 2008	The Muskegon and Holland MPO 2008-2011 Transportation Improvement Programs (TIP's) were approved by FHWA, including the US-31/M-231 project (Preliminary Engineering and Right-of-Way phases). Public Involvement for the TIP's took place during the summer of 2007.
February 25, 2008	Meeting with Ottawa County Planning Commission
April 22, 2008	Meeting with Crockery Township
June 24, 2008	Meeting with Ottawa County (North-Bank) Non-Motorized Trail group
September 17, 2008	Meeting with WestPlan (Muskegon MPO) Policy Committees
October 14, 2009	Robinson Township Board Meeting

(Several additional MPO, local community and property owner meetings we also held in 2006, 2007, 2008, and 2009.)

5.6 FEDERAL COOPERATING AGENCY CORRESPONDENCE AND COORDINATION

Letters were received by FHWA from the two federal cooperating agencies: the United States Coast Guard (USCG) on May 20, 2009; and the United States Department of the Army, Corps of Engineers (USACE) on July 8, 2009. Copies of the letters are in **Appendix C**. The following information summarizes the agency comments and MDOT response.

USCG

The USCG letter indicated a requirement to use proper Low Water Datum (LWD) for navigational clearances in the Grand River. The 35 feet vertical navigation clearance from the LWD is preliminary, pending comments from the issuance of a Coast Guard Public Notice. MDOT will use the LWD when developing subsequent design/engineering plans, as noted, for the new bridge over the Grand River.

All construction activities affecting the Grand River will follow the applicable permit processes. No temporary bridge is planned by MDOT for the Grand River during construction.

USACE

The USACE letter requested further information on the proposed Rogers wetland mitigation site in Ottawa County. This mitigation project has been classified and cleared as a Categorical Exclusion (CE), through the environmental classification process agreed to by MDOT and FHWA. Through this process, any archeological issues, threatened and endangered species, or other relevant environmental impacts have been identified and addressed as required. State Historic Preservation Office coordination has been addressed during this CE process as well. Additional information is provided in the Public Interest Finding Statement and related correspondence between MDOT and FHWA, in **Appendix G**.

Due to the presence of sandy soils and a relatively high water table, the site will be designed as a groundwater driven system. Hydrology will be achieved by excavating to the water table as indicated by monitoring wells on site. Secondary sources of hydrology will include direct precipitation and runoff from the property to the west via an existing culvert.

MDOT is not pursuing creation of, or connections to, a Great Lakes Marsh (GLM), due to the location of the site and design constraints with this proposed mitigation project. There will not be a direct connection from the MDOT created wetland on this site to the Grand River, for the water source needed to create a GLM. Although impractical with the US-31/M-231 project, the mitigation efforts proposed will not preclude future development of a GLM in coordination with the Michigan DNR. Any applicable subsequent findings will be documented in the Record of Decision for this FEIS.

The USACE concurs with the 35 foot bridge height requirement, per the USCG, as well as the Preferred Alternative and the revised Purpose and Need statements in the FEIS. The referenced wetland functions and values will be replaced as required. Specific the specific type and replacement ratio will be determined during the subsequent state and federal permit processes.

5.7 CONCURRENT NEPA/404 PROCESS FOR TRANSPORTATION PROJECTS

The National Environmental Policy Act (NEPA) and the Clean Water Act Section 404 process requirements are being completed concurrently for this project. This combined process serves as a consensus building tool for the agencies involved. It is intended that this process be at a sufficient level to develop full disclosure and documentation that appropriately addresses the NEPA and Section 404 regulations.

The three concurrence points within the NEPA process are as follows:

1. Purpose and Need, for the proposed action
2. Alternatives Carried Forward, for detailed study
3. The Preferred Alternative for the FEIS

The following state and federal agencies are participating in this process

- United States Army Corps of Engineers (USACOE)
- Federal Highway Administration (FHWA)
- Michigan Department of Transportation (MDOT)
- United States Environmental Protection Agency (USEPA)
- United States Department of the Interior/Fish and Wildlife Service (USFWS)
- Michigan Department of Natural Resources and Environment (MDNRE, formerly the MDEQ)

Concurrence on the first two points is generally obtained prior to the DEIS. However, some of the agencies deferred concurrence, pending further review of the impacts and mitigation for the alternatives. Subsequent correspondence has been received from all participating agencies and documented in the FEIS regarding point 1 and 2 concurrence. Concurrence on the third point will be requested as part of the agency review and comment process for the FEIS/ROD.

Correspondence was received indicating formal concurrence on the first two points as follows:

USACOE: Concurrence on point 1 and 2 (FEIS Page C-23)
MDEQ: Concurrence on point 1 and 2 (FEIS Page C-74)
USFWS: Concurrence on point 1 and 2 (FEIS Page C-331)
USEPA: Concurrence on point 1 and 2 (FEIS Page C-333)

Meetings were held with the above resource agencies to review projects impacts and issues affecting the concurrence points. MDOT addressed the agencies' concerns over wetland impacts by reducing wetland impacts for the alternatives carried forward and the Preferred Alternative. The wetland impacts were reduced from as much as 90 acres for alternative F/J-1, to just over 3 acres for the Preferred Alternative F1-a. In addition, MDOT addressed USEPA concerns over the Purpose and Need by providing further clarification of the issues in the DEIS Re-Evaluation, in this FEIS (Appendix F). Further USEPA concerns over indirect and cumulative impacts were addressed by completing the US-31 Land Use Study, in cooperation with Michigan State University. The study assessed the land use impacts expected in Ottawa County from the Practical Alternatives. The study findings are included in Chapter 4 (Section 4.1) of this FEIS.

Seven formal meetings were held with the participating resource agencies, between the DEIS and the FEIS, to address their concerns related to the concurrence points. Updates were also provided annually at the joint MDOT/FHWA Resource Agency meetings.

In addition, MDOT requested review of the stream crossings, as detailed in FEIS Tables 4.12-1 & 2, from the NEPA/404 process participating agencies. Comments were received from MDNRE and the USFWS. The key MDNRE issues included:

- Hydraulic analysis may be required for the proposed culvert extensions;
- The need to clarify or correct the stream crossing length and width contained in the FEIS;
- Factors to consider when selecting crossing options for construction;
- Environmental enhancement opportunities; and
- Coordination with MDNRE divisions during the design and permit process.

The US FWS also provided comments regarding the enhancement of wildlife habitat in the project area.

These issues were addressed and changes made to FEIS where appropriate. Issues that were not appropriate to address in the FEIS will be included in ongoing interagency coordination activities, subsequent project design phase activities, and/or permit process. All agency comments that are submitted during the FEIS waiting period will be addressed in the ROD.

MDOT and FHWA are requesting concurrence on point 3 (the Preferred Alternative), from the resource agencies participating in the Concurrent NEPA/404 Process, through the FEIS waiting period/review process. Concurrence will subsequently be documented in the ROD.

6.0 LIST OF PREPARERS

The following individuals prepared or aided in the compilation and completion of technical portions of the Final Environmental Impact Statement:

MICHIGAN DEPARTMENT OF TRANSPORTATION (MDOT)

Vicki Weerstra P.E., Associate Region Engineer/Development, MDOT Grand Region – Review and development of alternatives, traffic impacts and coordination with local municipalities and county governments. B.S. in Civil Engineering and 22 years of experience in Highway Engineering with MDOT.

Christopher VanNorwick P.E., Grand Region Project Manager, Cost and Scheduling Engineer, MDOT Grand Region - Review and development of alternatives, traffic impacts and coordination with local municipalities and county governments. B.S. in Geological Engineering with 10 years experience in geotechnical and civil engineering.

Susan Bourdon, Drafting Technician, MDOT Grand Region – Development and mapping of the Preferred Alternative. 5 years experience in the Grand Region Development area and previous experience in the Lansing Design Division.

Michael O'Malley, Environmental Project Manager, Lansing Project Planning - Review of the natural resource sections of this FEIS as well as coordination with the resource agencies, state legislative, municipal and other representatives and special interest groups. B.S. in Environmental Science, B.S. in Biological Education and 19 years experience with the Environmental Documentation for MDOT.

Dennis Kent, Region Transportation Planner, MDOT Grand Region - Review and development of Purpose and Need, alternatives, traffic data and coordination with local municipalities, MPO's, and county governments. B.S. in Regional Planning with 9 years experience with the Grand Rapids MPO and 20 years of experience in Transportation Planning with MDOT.

Tom Raymond, Transportation Planner, Lansing Project Planning – Review of project Purpose and Need, alternatives, traffic and reviews. B.S. in Community Development with 14 years experience in Planning and 22 additional years in land development activities.

Steve Redmond, Transportation Planner, MDOT Grand Region - Review of traffic data, and coordination with local municipalities, MPO's, and county governments. B.A. in Urban Policy with 14 years of experience in Transportation Planning with MDOT.

Peter Loftis, Real Estate Manager, MDOT Grand Region – Review of alternatives and property impacts. B.A. in Public Policy and 20 years of experience with MDOT.

Don Mayle, Transportation Planner, Lansing Statewide Planning – Travel demand model analysis of the project alternatives. B.S. in Geography with GIS specialization and 6 years experience in travel analysis with MDOT.

Doug Proper, Transportation Engineer, Lansing Project Planning – Review of project environmental resources, impacts, and mitigation. B.S. in Civil Engineering and 28 years experience in NEPA documents, environmental impact analysis, and mitigation with MDOT.

Richard A. Wolinski, Wildlife Ecologist, MDOT Lansing - Review of the natural science and floodplain sections of this FEIS. B.S. in Biology, M.S. in Biology. A total of 31 years of experience in natural resource assessment and impacts analysis, with four years of experience at MDOT.

Michael Pennington, Wetland Mitigation Specialist, Lansing Project Planning – Review of wetland impacts and associated mitigations. B.S. Earth Science and M.S. Forestry with a total of 15 years of experience in wetland mitigation with MDOT.

Bartlett E. Franklin P.E., Region Development Manager, MDOT Grand Region - Review of alternatives and preliminary cost estimates. B.S. in Civil Engineering and 12 years of civil engineering related experience, including 5 years with MDOT.

Art Green, Development Manager, Grand Rapids TSC - Review and development of design options and other related project development issues. 10 years experience within MDOT Development and 5 years experience with design and construction of MDOT local agency and municipal projects.

In accordance with Title 40 of the Code of Federal Regulations (Part 1506.5(c)), the consultant selected to assist in preparation of the environmental document was selected by MDOT and had no conflict of interest with the project. The preparers of this document have no financial or other interest (other than general enhancement of professional reputation) in the outcome of the project. This disclosure statement has been independently evaluated by the responsible official from the Federal Highway Administration in accordance with the regulations.

URS CORPORATION

Theresa Petko AICP, Project Manager – Management and review of Final EIS, contract administration and quality control/quality assurance. B.S. in Resource Development and 27 years experience in Transportation Planning and Environmental Studies.

Sean Kelsch, P.E., Senior Roadway Engineer – Preparation and review of roadway alignments, preliminary cost estimates and interchange alternatives. B.S. in Engineering and 13 years of experience in Highway Engineering and Transportation Planning.

Michael DeVries P.E., Traffic Engineer - Preparation of traffic projections and capacity analysis. B.S.E. and M.S.E. in Engineering and 13 years experience in Highway Traffic Engineering.

Tara Weise, PE, Roadway Engineer - Preparation of engineering alignments and Final EIS. B.S. in Civil Engineering and 10 years experience in Highway Engineering and Transportation Planning.

John Delp, Noise Analyst – Technician responsible for preparing computer noise model utilizing FHWA TNM software. Also responsible for conducting field noise measurements and identifying NSA boundaries. A.A.S. in Communications with 11 years of noise experience, including 6 years using TNM software.

Ray Schneider AICP, Transportation Planner – Traffic operations and crash analyst and coordinator of traffic data collection. B.A. in Economics and B.S. in Transportation Technology/Transportation Systems and 12 years experience in Transportation Planning and Traffic Engineering.

Jennifer Reidsma, Transportation Planner/GIS Specialist - Preparation of engineering alignments and Final EIS. B.S. in Sociology and City and Regional Planning and 6 years experience in Highway Engineering/Planning.

Stephanie Kozlownic, Graduate Transportation Planner/GIS Specialist – Preparation of engineering alignment and Final EIS. B.S. in Natural Resources Management and 2 years experience in Highway Engineering/Planning.

Meghan McDowell, Environmental Scientist – Prepared ecological sections of Final EIS and performed threatened and endangered species habitat assessments and wetland delineations. B.S. in Environmental Biology/Zoology and 3 years experience with biological assessments, wetland delineations and ecological studies.

Brendan Earl, Environmental Scientist – Prepared ecological sections of Final EIS and performed threatened and endangered species habitat assessments and wetland delineations. B.S. in Biology, M.S. in Biology and 5 years experience with biological assessments and ecological studies.

Sherry Slocum, Senior Environmental Scientist – Management and review of ecological sections of Final EIS. B.S. in Biology/Environmental Engineering, M.S. Environmental Management and GIS and 9 years experience in Water Resources and Ecological Planning.

Paul Burge, INCE.Bd.Cert, Noise Control Engineer – Responsible for overall noise analysis, including direction and review of noise measurements, modeling, analysis and reporting tasks. BS and MS in Mechanical Engineering, Board Certified Noise Control Engineer, 18 years experience in transportation noise issues.

Cole Martin, Noise Analyst – Contributed to all aspects of noise analysis effort, including noise site survey and noise measurements, noise analysis, abatement assessment and report preparation. B.A. in Audio Arts and Acoustics, and 2 years experience in highway noise analysis.

Deborah Dutcher Wilson, Air Quality Specialist – responsible for the preparation of the air quality analysis. B.S. and M.S. in meteorology with 15 years of experience in transportation air quality analyses.

James Kooser, Senior Ecologist – Field work and reporting for habitat surveys for the Indiana Bat. B.S. in Zoology, graduate work and research in plant community ecology and 21 years in ecological research, wetland delineation and mitigation, threatened and endangered species assessments and transportation environmental analyses.

ADVANCED GEOMATICS

Faye Feindt, Professional Technician - Preparation of socio-economic information, right-of-way estimates, and property impact assessments for alignments. Civil engineering studies and 27 years experience in Professional Surveying.

Mary Feindt, Ph.D., Professional Surveyor - Preparation of socio-economic information, right-of-way estimates, and property impact assessments for alignments. A.B. in General Studies, B.S. in Geodesy and Surveying, and M.S. in Civil Engineering and 29 years experience in Professional Surveying.

METCO SERVICES, Inc.

Martin Dunn, Professional Surveyor - Survey Ground Control and preparation hydraulic surveys. B.S. in Land Surveying and 25 years experience in Professional Surveying.

H.B. Singh, Civil Engineer - Preparation of storm water detention requirements. B.S. in Civil Engineering and 20 years in Highway Engineering, Hydraulics and Hydrology.

Stephen R. Jacobi, Professional Surveyor - Survey Ground Control and preparation hydraulic surveys.

STS CONSULTANTS, LTD.

Don Hopper P.E., Geotechnical Engineer - Analysis of soils for structures and their foundations. B.S. in Civil Engineering and 39 years experience in Geotechnical Engineering.

ENVIRONMENTAL and ENGINEERING SERVICES GROUP, Inc.

Lenora Jadun P.E. - Quality review of indirect and cumulative impact study. M.S.C.E. and M.P.A. with over 15 years of civil engineering, road planning and design experience.

Bill Taylor P.E. - Oversight of indirect and cumulative impact analysis. B.S., M.S. and Ph.D. in Civil Engineering, 7 years experience with State and local government agencies and 30 years experience as a faculty member at Universities.

GREAT LAKES RESEARCH ASSOCIATES, Inc.

Mark Branstner, Cultural Resource Analyst - Prehistoric and historic archaeology, archival research, cultural resource management and preservation planning. B.A. and M.A. in Anthropology and 21 years of cultural resource fieldwork, graduate study and consulting.

COMMONWEALTH CULTURAL RESOURCES GROUP, INC. (CCRG)

James A. Robertson, Ph.D., RPA, Project Manager – Prehistoric and historic archaeology, archival research, cultural resource management and preservation planning. M.A. and Ph.D. in Anthropology and over 18 years of cultural resource management experience. Dr. Robertson is a Registered Professional Archaeologist (RPA).

Daniel G. Landis, Project Archaeologist – Prehistoric and historic archaeology, archival research, cultural resource management and preservation planning. B.A. and M.A. in Anthropology and 25 years of cultural resource field management experience. Mr. Landis is a Registered Professional Archaeologist (RPA).

MATERIALS TESTING CONSULTANTS, INC.

Douglas W. Sabin, P.E., Geotechnical Manager – Preliminary soil borings and analysis for major river crossing of the Grand, Pigeon and Macatawa Rivers. B.S. in Civil Engineering, 15 years experience with soils and working with private developers, and State and local government agencies.

MICHIGAN STATE UNIVERSITY

Samuel A. Batzli, Ph.D., Land Use Study Project Manager – Project Manager responsible for the development of the Indirect and Cumulative impact assessments for the various alternatives considered in this FEIS. Ph.D. in Geography and 10 years experience with relational databases, cartography, and Geographic Information Systems.

David L. Skole, Ph.D., Land Use Study Co-Investigator – Responsible for the development of the Indirect and Cumulative impact assessments for the various alternatives considered in this FEIS. Ph.D. in Natural Resources and 20 years experience with systems modeling, relational databases, and Remote Sensing.

Yushuang Zhou, Graduate Research Assistant – Responsible for modeling land use change as results of transportation development and regional economic growth. B.S. and M.A. in Regional Economics, Ph.D. Candidate in Geography. Six years of experience in spatial econometric modeling and 4 years experience in Geographic Information System (GIS).

William A. Salas, Ph.D., Remote Sensing Specialist – Responsible for the development of the land cover and land cover change data using Landsat TM and ETM+ data, accuracy assessment of land cover and land cover change data, and development and implementation of prognostic model of land use change. B.A. in Mathematics, M.S. and Ph.D. in Natural Resources and 15 years experience with remote sensing, Geographic Information Systems, and land use and land cover change applications and modeling.

Oscar E. Castaneda, Specialist – Support for GIS, modeling, programming, network analysis. M.S. in Geological Sciences, 10 years experience with GIS, modeling, programming.

Walter H. Chomentowski, Geographic Information System – Support for land use modeling. M.S. in Forestry and Environmental Studies, 14 years experience with GIS and Remote Sensing technologies for monitoring land use change.

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7.0 DISTRIBUTION OF THE FINAL ENVIRONMENTAL IMPACT STATEMENT

The Final Environmental Impact Statement is being distributed to the following parties: Elected Officials, Federal Agencies, State Agencies, Affected Jurisdictions, Citizen Interest Groups, and MDOT staff for review and comment.

U.S. SENATORS and REPRESENTATIVES

U.S. Senator Debbie Stabenow
U.S. Senator Carl Levin
U.S. Representative Peter Hoekstra

FEDERAL AGENCIES

Federal Aviation Administration
Federal Emergency Management Agency (Washington Office)
U.S. Army Corps of Engineers (Detroit)
U.S. Coast Guard (Ninth District, Cleveland Office)
U.S. Department of Agriculture, State Conservationist (E. Lansing Office)
U.S. Department of Commerce (Washington Office)
U.S. Department of Energy (Washington Office)
U.S. Department of Housing and Urban Development
U.S. Department of Interior, Fish and Wildlife Service (East Lansing Field Office and Omaha, NE)
U.S. Environmental Protection Agency (Region 5)
U.S. Environmental Protection Agency (Washington Office)
U.S. Department of Health and Human Services (Center for Disease Control)

MICHIGAN SENATORS and REPRESENTATIVES

Michigan Senator Wayne Kuipers
Michigan Representative David Agema
Michigan Representative Arlan Meekhof
Michigan Representative Bill Huizenga
Michigan Representative Mary Valentine

STATE AGENCIES

Department of History, Arts and Libraries, State Historic Preservation Office (formerly Michigan Department of State)
Michigan Department of Agriculture
Michigan Department of Community Health
Michigan Department of Environmental Quality
Michigan Department of Natural Resources
Michigan Department of Transportation
Michigan Environmental Science Board

LOCAL JURISDICTIONS and AGENCIES

Ottawa County
Crockery Township
City of Grand Haven
Holland Township
Robinson Township
Macatawa Area Coordinating Council
West Michigan Shoreline Regional Development Commission
Ottawa County Drain Commission
Ottawa County Road Commission

OTHER AGENCIES and SPECIAL INTEREST GROUPS

Clean Water Action
Keweenaw Bay Indian Community
Little River Band of Ottawa Indians
Loutit Library
Michigan Environmental Council
Michigan United Conservation Clubs, Inc.
Ottawa County Farm Bureau
Potawatomi Indian Nation, Inc.
Region 8 Planning Commission
Region 14 Planning Commission
Sault Ste. Marie Chippewa Tribal Council
Sierra Club
West Michigan Environmental Action Council

MDOT STAFF

Project Manager MDOT Grand Region
Project Manager MDOT Lansing
Bureau of Highways-Technical Services
Grand Region Engineer
Associate Region Engineer
Grand Region Real Estate
Grand Region Survey
Grand Rapids Transportation Service Center (TSC) Manager
Muskegon TSC Manager
Grand Rapids TSC Development Manager
Muskegon TSC Development Engineer
Environmental Section

- Public Hearings Officer
- Environmental Project Manager
- Environmental Specialist
- Assistant Environmental Project Manager

8.0 LISTING OF TECHNICAL REPORTS

- Air Quality Report
- Wetland Assessment Report
- Noise Quality Analysis
- Indiana Bat Survey
- Navigation Boat Survey
- Traffic Analysis
- US-31 Preliminary Assessment of Bridge Hydraulics
- Archeological (CCRG's Report)
- US-31 Land Use Study (MSU Report)
- Natural Environment Biological Assessment
- Monthly Water Quality Assessment of Lake Macatawa and its Tributaries – 2004 (MDEQ Water Bureau)
- Hydraulic Study Report

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9.0 GLOSSARY OF TERMS

100-Year Flood Elevation: Defined by the Federal Emergency Management Agency (FEMA) as the flood elevation that has a one-percent chance of being equaled or exceeded (inundated) in any given year. Thus, despite its name, a 100-year flood could occur more than once in a relatively short period of time. See also floodplain.

Air Quality Index (AQI): The AQI is a guide for reporting daily air quality. It tells you how clean or polluted your air is and what associated health concerns you should be aware of. The AQI focuses on health effects that can happen within a few hours or days after breathing polluted air. USEPA uses the AQI for five major air pollutants regulated by the Clean Air Act: ground-level ozone, particulate matter, carbon monoxide, sulfur dioxide, and nitrogen dioxide. For each of these pollutants, USEPA has established national air quality standards to protect against harmful health effects.

Alternative: Different options under consideration for a project. By evaluating the impacts associated with different Alternatives, a decision can be made as to which one will be the “Preferred Alternative.” There have been a number of Alternatives considered as part of this project, and all the terms below are defined separately as well:

- Illustrative Alternatives
- Practical Alternative
- No-Action Alternative
- Preferred Alternative

American Association of State Highway and Transportation Officials (AASHTO): A nonprofit, nonpartisan association representing highway and transportation departments in the 50 states, the District of Columbia and Puerto Rico whose primary goal is to foster the development, operation, and maintenance of an integrated national transportation system.

Annual Average Daily Traffic (AADT): The average number of vehicles passing a fixed point in a 24-hour time frame. To reflect daily variation over time, AADT averages the daily traffic volumes over the course of a year. Used as a measure of traffic volume on a roadway. AADT is essentially the yearly traffic volume divided by 365.

Average Daily Traffic (ADT): The average number of vehicles passing a fixed point in a 24-hour time frame. Used as a measure of traffic volume on a roadway.

Archaeological Site: the location of past cultural activity which could be used to describe and explain the nature and evolution of cultural systems; a defined space with mainly continuous archaeological evidence.

Architectural Resource: A building or other structure with potential historic significance based on its age, type, or its association with a person(s) or event(s).

Area of Potential Effect (APE): In the context of cultural resources, the APE is the geographic area or areas within which a project may directly or indirectly cause alterations in the character or use of historic or archeological resources, if any such properties exist. The area of potential effect is influenced by the size and nature of a project and may be different for different kinds of effects caused by the project.

Clean Air Act Amendments (CAAA): Legislation designed to curb three major threats to the nation's environment and to the health of Americans: acid rain, urban air pollution, and toxic air emissions. It called for establishing a national permits program to make the law more workable and an improved

enforcement program to help ensure better compliance with the Act. The original Clean Air Act of 1970 was last amended in 1990.

Clean Water Act: Provides for comprehensive federal regulation of all sources of water pollution. It prohibits the discharge of pollutants from non-permitted sources.

Combined Sewer Overflows (CSOs): Sewers that are designed to collect rainwater runoff, domestic sewage, and industrial wastewater in the same pipe. Municipal utilities across the country have been grading their sewer systems in recent decades to separate storm water from sewage and wastewater, which are treated separately.

Congestion: The level at which transportation system performance is no longer acceptable due to traffic interference. The level of acceptable performance may vary by type of transportation facility, geographic area, and/or time of day.

Controlled Access: This is the regulated limitation of access and is achieved by regulation of public access rights into (ingress) and out of (egress) properties abutting a roadway. A controlled access roadway has few (or no) driveways, may be physically separated by a median, and intersections with crossroads are widely spaced. A freeway has limited access with access to and from the roadway limited to interchange ramps.

Cross Section: Depicts the characteristics of a roadway facility as seen from a driver's perspective, including lane, shoulder, and typical right-of-way widths.

Cultural Resources: A location, building, structure, or place with potential historic or archeological significance.

Cumulative Impacts: The impact on the environment which results from the incremental impact of action(s) when added to other past, present, and reasonable foreseeable future actions regardless of what agency or person undertakes such action(s).

Design Year: The year for which a project is designed (typically about 20 years in the future) to accommodate traffic needs.

Direct Impacts: An impact caused by a project that occurs at the same place as the project and at the same time as the project is implemented, i.e. is a direct result of the project.

Draft Environmental Impact Statement (DEIS): An environmental document that is prepared when it is initially determined that the action/project may cause significant impacts to the environment, when environmental studies and early coordination indicate significant impacts, or when review of a previously prepared environmental assessment indicates that the impacts anticipated to result from the project may be significant. The DEIS compares all reasonable alternatives to the proposed project and summarizes the studies, reviews, consultations, and coordination required by legislation and Executive Orders to the extent appropriate at the draft stage in the environmental process.

Endangered Species: Any species of animal or plant life that is in danger of extinction throughout all or a significant part of its range. Species can be designated "endangered" by either the U.S. Fish and Wildlife Service or a state's Natural Heritage program. With this designation comes legal protection at the federal level (Endangered Species Act) and/or the state level. Species can also be designated by state or federal government as Threatened Species or Special Concern Species for species with populations that are somewhat less in jeopardy than endangered species.

Environmental Consequences: The Environmental Consequences discussion in an Environmental Assessment (EA) or Environmental Impact Statement (EIS) assesses the anticipated effects of the proposed project alternatives on all possible resources (air quality, wildlife, wetlands, etc.) that may be

affected by the project. This discussion compares and contrasts the impacts associated with all alternatives, including the No-Build Alternative.

Facility: Any type of transportation infrastructure such as highways, local roads, transit centers, etc. that is used to move people and goods.

Farmland and Open Space Preservation Program: This program enables a farm owner to enter into a development rights agreement with the State, ensuring that the land remains in an agricultural use for a minimum of 10 years and that the land is not developed in a non-agricultural use.

Farmlands of Local Importance: The Natural Resources Conservation Service defines these farmlands as “those lands that are nearly prime and that economically produce high yields when treated and managed according to modern farming methods. Some may produce as high a yield as prime farmlands, if conditions are favorable” (USDA, 1983).

Federal Highway Administration (FHWA): Division of the U.S. Department of Transportation which funds highway planning and construction programs. The FHWA provides expertise, resources, and information to continually improve the quality of our nation’s highway system and its intermodal connections.

Final Environmental Impact Statement (FEIS): A document prepared in accordance with the National Environmental Policy Act (NEPA) identifying and addressing the social, economic, and environmental impacts of a Preferred Alternative and addressing public comments received during the formal public commenting period as well as the public comments received throughout the entire NEPA process.

Floodplain: Any land area susceptible to being inundated by floodwaters from any source.

Freeway: A divided arterial highway for through traffic with limited access, the intersections of which are usually separated from other roadways by differing grades (i.e. bridges).

Habitat: An area that provides an animal or plant with adequate food, water, shelter, and living space.

Hazardous Materials: Substances or materials capable of posing unreasonable risk to health, safety, and property when transported in commerce or when encountered in underground contamination.

Historic Resources: Properties that may possess potential historic significance based on its age, type, or its association with a person(s) or event(s). Such a property may have the distinctive characteristics of a type, period, or method of construction or may represent the works of a master or may possess high artistic values.

Hydric Soils: A soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic vegetation.

Hydrophytic Vegetation: Plants which grow in wetlands and exhibit certain physical characteristics such as shallow root systems, swollen trunks, or roots found growing from the plant stem, or trunk above the soil surface.

Illustrative Alternatives: Preliminary concepts developed at the onset of a transportation planning project. Illustrative Alternatives are typically very conceptual by nature and are intended to examine all potentially reasonable alternatives to address the transportation needs of the study area, prior to detailed study to identify their feasibility.

Impacts: Effects which occur as a result of implementing a transportation improvement; most commonly occurs when proposed right-of-way actually crosses a resource in question such as a residence, business, wetland, or other resources.

Indirect Impacts: Caused by the project and are later in time or further removed in distance than direct impacts, but are still “reasonably foreseeable.”

Infrastructure: Term used to describe the physical assets of a society or community including roads, bridges, transit facilities, bikeways, sidewalks, parks, sewer/water systems, communications networks, and other capital facilities.

Invasive Species: Non-native plants or animals that are introduced far from their original range, and become more successful at competing with native species for space and resources.

Land Evaluation Site Assessment (LESA): A point-based approach for rating the relative importance of agricultural land resources based upon specific measurable features.

Land Use: The way specific portions of land or the structures on them are used or planned for future use. Land use is typically based on local zoning guidelines and long term land use plans. Example land uses include commercial, residential, industrial, retail, agricultural, and vacant.

Level-of-Service (LOS): A term that reflects the ability of a roadway to accommodate traffic. LOS ranges from A (representing free-flowing traffic at high speeds), B (speed somewhat restricted and short delays), C (speed is determined by traffic and moderate delays), D (tolerable but fluctuating speeds), E (roadway near capacity with limited speed and long delays) to F which has high congestion and generally restricted operating speeds.

Limited Access Facility: A freeway facility that does not have driveway access or roadway intersections. Access is limited to freeway interchanges.

Median: A barrier, often found on multi-lane roadways or freeways, which provides separation distance between conflicting traffic movements. A median can consist of either a grass or natural setting, or a concrete wall or guardrail barrier.

Michigan Department of Environmental Quality (MDEQ): The State agency responsible for review of any wetland, floodplain, potentially contaminated sites, air quality, and/or water quality impacts.

Michigan Department of Natural Resources (MDNR): The State agency responsible for review of State threatened and endangered species, parkland, and fisheries impacts.

Michigan Department of Transportation (MDOT): The State agency responsible for planning, construction, and maintenance of all interstate, US, and State highways, bridges, and other modes of transportation within the state of Michigan.

Mitigation: Actions provided to avoid, minimize, or compensate the effect of impacts occurring as a result of an activity.

National Ambient Air Quality Standards (NAAQS): Air quality standards set by the U.S. Environmental Protection Agency (USEPA) for pollutants considered harmful to public health and the environment.

National Environmental Policy Act (NEPA): Federal act passed in 1969 which requires the assessment of the social, economic, and environmental impacts a federally funded or federally permitted project might cause, including identification of the purpose of and need for the project, and evaluation of alternatives to minimize resulting impacts.

National Pollution Discharge Elimination System (NPDES): As authorized by the Clean Water Act, the National Pollution Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Point Sources are discrete conveyances such as pipes or man made ditches. Industrial, municipal, commercial, and other facilities must obtain permits of their discharges go directly to surface waters. The permits section of the

Water Bureau within the Michigan Department of Environmental Quality is responsible for administering the permit program for the state.

National Register of Historic Places (NHRP): The Nation's official list of cultural resources worthy of preservation. This list was established under the National Historic Preservation Act of 1966 and is administered by the Department of the Interior.

Natural Resources Conservation Service (NRCS): The Federal agency responsible for providing leadership in a partnership effort to help people conserve, maintain, and improve our natural resources and environment. Formerly known as the Soil Conservation Service.

Network: A transportation system with its many roadways and routes.

No-Action Alternative: The No-Action Alternative involves maintaining the current configuration with no improvements. It is used as the basis of comparison with the other Practical Alternatives.

Non-Attainment Area: A designation by the U.S. Environmental Protection Agency of any place in the United States failing to meet national ambient air quality standards (NAAQS).

Non-Motorized Transportation: Bicycles, rollerblades, running, walking, wheelchairs, etc.

Peak Hour: The 60-minute period in the AM or PM in which the largest volume of travel is generally experienced (for example, rush hour).

Practical Alternative: Practical Alternatives are developed from refinements made to the initial Illustrative Alternatives. These alternatives are subject to increased levels of traffic, engineering, social, economic, and environmental analysis as well as public and agency comment to determine if they are capable of meeting the purpose and defined goals of the project.

Preferred Alternative: The Preferred Alternative is selected from the Practical Alternatives after extensive engineering, social, economic, and environmental analysis. It could include components of several Practical Alternatives in any combination found to be the most beneficial. It is recommended in the Final Environmental Impact Statement for Federal Highway Administration approval as required for design and construction utilizing federal funding.

Prime Farmland: The Natural Resources Conservation Service has designated prime farmland as "land that has the best combination of physical and chemical characteristics for producing food, forage, fiber, and oilseed crops. The land could be crop, pasture, range, forest, or other uses, but does not include urban built-up land or water bodies since these two are considered irreversible uses. It has the soil quality, growing season, and moisture supply needed to economically produce and sustain high yields when treated and managed according to modern farming methods, including water management" (USDA, 1983).

Public Hearing: A hearing formally advertised and convened to afford any person who deems their interest in property to be affected by a project an opportunity to be heard. A public hearing includes formal documentation of all comments received.

Record of Decision (ROD): A final environmental document published after a Final Environmental Impact Statement (FEIS) that identifies the selected alternative. A ROD discusses the alternatives considered and the basis of the decision as well as any mitigation measures for environmental impacts.

Right-of-Way (ROW): Public land reserved for locating infrastructure such as a roadway or a utility line. A road right-of-way includes area for any required shoulders, drainage ditches, curb, median, barriers, and fences in addition to the roadway.

Rural Cross-Section: A roadway facility characterized by the presence of open drainage into ditches.

Secondary Impact: Effects “caused by an action later in time or farther removed in distance (from the right-of-way), but which is still reasonably foreseeable” (40 CFR 1508.8).

Section 4(f): This is Section 4(f) of the Department of Transportation Act of 1966. Section 4(f) states that no highway project should be approved which requires the “use” of any publicly owned land from a public park, recreation area, wildlife and waterfowl refuge or historic site unless there is no feasible or prudent alternative to the use of such land. In addition, adverse impacts to these 4(f) sites must include all possible planning to minimize harm resulting from such use. In the context of Section 4(f), “use” can be either a direct impact (taking of property), or a “constructive use,” which may not actually require acquisition of land, but otherwise impairs the function of the resource through changes in access or surroundings.

Section 106: Section 106 of *The National Historic Preservation Act of 1966* is the main protection that archaeological, historical, and cultural resource sites have against the encroachment of federally-funded programs in the United States. Section 106 requires that the State Historic Preservation Office (SHPO) review all federal actions for any potentially adverse effect on cultural resources.

Special Concern Species: While not afforded legal protection under the Act, many of these species are of concern because of declining or relict populations on the state. Should these species continue to decline, they would be recommended for Threatened or Endangered status. Protection of Special Concern species now, before they reach dangerously low population levels, would prevent the need to list them in the future by maintaining adequate numbers of self-sustaining populations within Michigan. Some other potentially rare species are listed as of Special Concern pending more precise information on their status in the state; when such information becomes available, they could be moved to Threatened or Endangered statuses or deleted from the list.

State Historic Preservation Office (SHPO): The state agency having jurisdiction over protecting archaeological and above-ground historic architectural resources (e.g. cultural resources).

Temporary Impact: Refers to impacts occurring during construction that cease to exist after construction associated with the project is completed (e.g. dust associated with construction activities).

Threatened Species: Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Traffic Count: Mechanical, digital, or photographic means of quantifying the number and type of vehicles at a given location. Counts may be determined from raw base data (axle counts divided by two to give an estimation of passenger vehicles), or by more sophisticated means to quantify vehicle type (passenger, light truck, heavy truck, bus, etc...). Counts typically are performed for an identified peak period (Am – early/“rush hour” morning, PM – late/“rush hour” afternoon, other industry-determined period), or for a 24-hour period. 24-hour counts may be adjusted for weather, seasonal, and other factors to arrive at a representative annual average daily traffic count (AADT).

Transit: Transportation mode involving busses, trains, and other vehicles that individually move larger numbers of people than do individual automobiles. Also known as mass transit, public transit, public transportation, or urban transit.

Transportation System Management (TSM): Reasonable small-scale roadway improvements such as traffic signal improvements, turn restrictions, turn lanes, and short distance local road improvements.

Travel Demand: The counted or projected volume of traffic that is or will be utilizing a roadway in a specified time period (i.e., 24 hours, peak periods, etc.).

Trout Stream: A stream designated as potential trout habitat based on the average temperature of the water, approximately 55°F or colder.

Underground Storage Tank (UST): Depending on the type, age, and condition of the UST and associated underground piping, the UST may present a risk for soil and/or groundwater contamination. If the UST is documented as leaking or shows visible signs of leakage at ground level, it is referred to as a Leaking Underground Storage Tank (LUST).

Unique Farmlands: The Natural Resources Conservation Service has defined unique farmlands as “land other than prime farmland that is used for the production of specific high value food and fiber crops. These lands have a special combination of factors needed to economically produce sustained high quality yields of a specific crop when treated and managed according to modern farm methods. The special factors that make the land unique include soil quality, growing season, temperature, humidity, elevation, moisture supply, or other conditions such as nearness to market that favor growth of a specific crop. Moisture supply is in the form of stored moisture, precipitation, or a developed irrigation system.”

United States Army Corps of Engineers (USACE): The federal agency responsible for review of all water crossings of navigable streams. The USACE also serves in an advisory role on wetland impacts of Michigan highway projects.

United States Department of Agriculture (USDA): The federal agency responsible for review of any prime and unique farmland impacts.

United States Environmental Protection Agency (EPA): The federal agency charged with protecting the natural resources of the country.

United States Fish and Wildlife Service (USFWS): The federal agency responsible for review of the impacts on any federally listed threatened and endangered species. The USFWS also serves as an advisory agency for many other environmental issues including wetland and habitat impacts.

Urban Cross-Section: A roadway facility characterized by the presence of enclosed drainage (storm sewer) and curb and gutter or valley gutter. Urban freeway cross-sections have a median barrier wall separating opposing lanes of traffic.

Upland: An area that is not classified as a wetland.

Wetland (Wetland Complex): Areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support plants typically adapted for life in saturated soil conditions. The term “wetland” encompasses many different types of plant communities, and is dependent on the duration and depth of inundation. These different types can include fens, bogs, wet meadows, wooded wetlands, scrub/shrub wetlands, open water wetlands, etc. A “wetland complex” describes a contiguous area composed of more than one type of wetland. An area that is not classified as a wetland is called “upland.”

Wetland Delineation: The process used to determine the jurisdictional boundaries of a wetland. Wetland delineations are a function of the soils, hydrology, and vegetation observed.

Wetland Mitigation: Avoidance, minimization, and compensation for the loss of functional values associated with wetlands impacted by an activity. The most common types of compensation include wetland restoration reestablishing some or all of the values associated with wetland where wetland formerly occurred, and wetland creation (establishing new wetland in an upland or drained area).

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10.0 LIST OF ABBREVIATIONS

Agency names, technical analyses, or other phrases are frequently abbreviated into acronyms. We have provided a list of common abbreviations used in this document and which may be seen or heard from time to time during the course of this study.

ADA	Americans with Disabilities Act
AADT	Annual Average Daily Traffic
ADT	Average Daily Traffic
APE	Area of Potential Effect
AWRI	Annis Water Resource Institute
BIA	Bureau of Indian Affairs
BMP	Best Management Practice
BSRSI	Basic Science and Remote Sensing Institute
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CCTV	Closed Circuit Television
CEQ	Council on Environmental Quality
CSTS	Coalition for Sensible Transportation Solutions
dBA	A-weighted sound pressure level
DEIS	Draft Environmental Impact Statement
DMS	Dynamic Message Sign
EIS	Environmental Impact Statement
EMS	Emergency Medical Services
FAA	Federal Aviation Administration
FEIS	Final Environmental Impact Study
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIS	Flood Insurance Studies
FIRM	Flood Insurance Rate Maps
FTA	Federal Transit Administration
GIS	Geographic Information System
GVSU	Grand Valley State University
HCM	Highway Capacity Manual
HUD	Housing and Urban Development
ITS	Intelligent Transportation Systems
LOMR	Letter of Map Revision
LOS	Level of Service
LRTP	Long Range Transportation Plan
MACC	Macatawa Area Coordinating Council
MDEQ	Michigan Department of Environmental Quality
MDNR	Michigan Department of Natural Resources
MDOT	Michigan Department of Transportation
MPO	Metropolitan Planning Organizations
MRIS	Michigan Resource Information System
MSU	Michigan State University
MUCC	Michigan United Conservation Clubs
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NFIP	National Floodplain Insurance Program
NRCS	Natural Resource Conservation Service
NREPA	Natural Resources and Environmental Protection Act

NRHP	National Register of Historic Places
NPDES	National Pollutant Discharge Elimination System
NSA	Noise Sensitive Area
NWI	National Wetlands Inventory
OCRRC	Ottawa County Road Commission
PACS	Project Area Contamination Survey
PNA	Proposed Natural Area
PSI	Preliminary Site Investigation
ROD	Record of Decision
ROW	Right-of-Way
RPA	Registered Professional Archaeologist
RWIS	Road Weather Information Systems
SHPO	State Historic Preservation Office
SHWS	State Hazardous Waste Sites
SIP	State Implementation Plan
SWMP	Storm Water Management Plan
TIP	Transportation Improvement Program
TNM	Traffic Noise Model
TSC	Transportation Service Center
TSM	Transportation Systems Management
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
USDA	United States Department of Agriculture
USEPA	United State Environmental Protection Agency
USFWS	United State Fish and Wildlife Service
U.S.	United States of America
UST	Underground Storage Tank
WMSRDC	West Michigan Shoreline Regional Development Commission
WMTMC	West Michigan Traffic Management Center
WSEL	Water Surface Elevations
WQS	Water Quality Standards

11.0 INDEX

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